



# City of Sandy

## Agenda

**Planning Commission Meeting**

**Meeting Location: Zoom**

**Meeting Date: Monday, November 22, 2021**

**Meeting Time: 6:30 PM**

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### **1. MEETING FORMAT NOTICE**

The Planning Commission will conduct this meeting electronically using the Zoom video conference platform. Members of the public may listen, view, and/or participate in this meeting using Zoom. Using Zoom is free of charge. See the instructions below:

- To login to the electronic meeting online using your computer, click this link: <https://us02web.zoom.us/j/82805081944>
- If you would rather access the meeting via telephone, dial +1 346 248 7799. When prompted, enter the following meeting number: 828 0508 1944
- If you do not have access to a computer or telephone and would like to take part in the meeting, please contact City Hall by Thursday November 18, 2021 and arrangements will be made to facilitate your participation.

### **2. ROLL CALL**

### **3. REQUESTS FROM THE FLOOR - CITIZEN COMMUNICATION ON NON- AGENDA ITEMS**

The Commission welcomes your comments at this time. Please see the instructions below:

- If you are participating online, click the "raise hand" button and wait to be recognized.
- If you are participating via telephone, dial \*9 to "raise your hand" and wait to be recognized.

### **4. DIRECTOR'S REPORT**

4.1. Director's Report for November 22, 2021

[Director's Report for November 22, 2021 - Pdf](#)

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### **5. PLANNING COMMISSION DISCUSSION**

### **6. NEW BUSINESS**

- 6.1. 21-046 DR/VAR/ADJ/FSH The Pad Townhomes 4 - 387  
[21-046 DR/VAR/ADJ/FSH The Pad Townhomes - staff report](#)  
[Exhibit A - Land Use Application](#)  
[Exhibit B - Project Narrative](#)  
[Exhibit C - Plan Set](#)  
[Exhibit D - Updated Plan Set Pages \(Sept 13, 2021\)](#)  
[Exhibit E - Stormwater Report](#)  
[Exhibit F - Arborist Report](#)  
[Exhibit G - Traffic Impact Study](#)  
[Exhibit H - Supplemental Narrative](#)  
[Exhibit I - BPA Comment \(Sept 28, 2021\)](#)  
[Exhibit J - Sandy Fire District Comment \(Sept 28, 2021\)](#)  
[Exhibit K - Sandy Transit Comment \(Oct 18, 2021\)](#)  
[Exhibit M - Public Works Comment \(Oct 27, 2021\)](#)
- 6.2. 21-037 SUB/VAR/ADJ/TREE Sandy Woods II Subdivision 388 - 799  
[21-037 SUB/VAR/ADJ/TREE Sandy Woods II Subdivision - staff report](#)  
[Exhibit A - Land Use Application](#)  
[Exhibit B - Project Narrative](#)  
[Exhibit C - Plan Set](#)  
[Exhibit D - Storm Drainage Report](#)  
[Exhibit E - Traffic Impact Study](#)  
[Exhibit F - Arborist Report \(June 3, 2021\)](#)  
[Exhibit G - Arborist Report Addendum 1 \(July 13, 2021\)](#)  
[Exhibit H - Wetland Delineation - Remainder of Property \(May 2017\)](#)  
[Exhibit I - Wetland Delineation - NW corner \(May 2017, Aug 2020\)](#)  
[Exhibit J - DSL Wetland Concurrence - Entire Original Property \(Jan 29, 2019\)](#)  
[Exhibit K - DSL Wetland Concurrence - NW Corner \(Oct 29, 2021\)](#)  
[Exhibit L - Clackamas County Design Modification Request](#)  
[Exhibit M - Incomplete Letter Response \(Aug 3, 2021\)](#)  
[Exhibit N - City Transportation Engineer \(Oct 14, 2021\)](#)  
[Exhibit O - Fire Marshal Comment \(Oct 26, 2021\)](#)  
[Exhibit P - Parks Board Comments \(Oct 27, 2021\)](#)  
[Exhibit Q - Public Works Comment \(Oct 29, 2021\)](#)  
[Exhibit R - Joseph Plitt - Public Comment \(Nov 4, 2021\)](#)  
[Exhibit S - Third Party Arborist Report \(Oct 16, 2021\)](#)

## 7. ADJOURNMENT



## Staff Report

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**Meeting Date:** November 22, 2021  
**From** Kelly O'Neill, Development Services Director  
**SUBJECT:** Director's Report for November 22, 2021

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### **BACKGROUND / CONTEXT:**

#### Upcoming meetings (items are tentative):

- **December 13 at 6:00 PM:** City Council and Planning Commission joint work session on TSP
- **January 24 at 6:30 PM:** 1) Appoint Chair and Vice Chair; 2) The Bornstedt Views subdivision
- **February 28 at 6:30 PM:** items TBD

#### Recent decisions of note:

- **Annexation of 16370 Royal Lane (21-041 ANN):** This annexation was approved by the City Council and is effective on November 17, 2021.
- **Ace Hardware storage building (21-060 DR):** Staff approved a Type I design review for a new storage building at Ace Hardware that is 384 square feet and will be located to the west of the Sandy Actor's Theatre.

#### New applications of note:

- **Mt. Hood Cleaners Addition (21-057 DR):** Staff is reviewing a Type I design review for a 1,200 square foot addition to a building at 37645 Sunset Street. The building is in the industrial zone and owned by Mt. Hood Cleaners.

#### Other items of note:

- **Comprehensive Plan:** Staff continues to work with 3J Consulting on the scope of work and contract details.
- **TSP Update:** Staff launched a survey for the TSP. As of the morning of November 15 we have received over 400 survey responses. A work session with the City Council and Planning Commission will be held on December 13, 2021.
- **Senate Bill 458 (21-059 DCA):** Staff has started researching the requirements of Senate Bill 458 to determine what the City will need to adopt. The deadline for adoption is June 2022. This senate bill allows for lots with a duplex to be partitioned.



## Staff Report

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**Meeting Date:** November 22, 2021

**From** Shelley Denison, Associate Planner

**SUBJECT:** 21-046 DR/VAR/ADJ/FSH: "The Pad Townhomes"

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**DECISION TO BE MADE:**

Approve or deny a Type III design review with a Type III special variance, Type II adjustment, and FSH review.

**KEY CONSIDERATIONS / ANALYSIS:**

The applicant, Axis Design Group, is proposing 10 townhouse style multi-family units at 17650 Meinig Avenue, a 0.59-acre property immediately west of Meinig park and north of Fantasy Forest play area. If approved, this development will include improvements to the Highway 211 frontage, including elements to control the flow of traffic in and out of the property. Multiple site access points were analyzed, and the proposed site access on Highway 211 opposite Tupper Road was determined to be the safest. According to traffic engineering analysis, the proposed townhouses are anticipated to generate approximately 88 trips per day.

The applicant is also requesting two deviations from specific requirements in the development code. Such deviations have to follow specific procedures and must be reasonable given the site layout and design. These requests are as follows:

- The development code requires that the vertical face of a structure must provide an eight-foot offset every 20 feet. The applicant is proposing an eight-foot offset every 24 feet.
- The development code requires that any structure located along an arterial or collector street (such as Highway 211) be setback from the street by 20 feet. The requirement is intended to provide better light, air, and vision on more heavily traveled streets. The applicant is requesting to decrease this setback because there is a significant amount of additional right-of-way between the property and Highway 211.

**RECOMMENDATION:**

Staff recommends that the Planning Commission approve the Type III design review and associated Type II adjustment and Type III special variance with associated conditions.

**LIST OF ATTACHMENTS/EXHIBITS:**

Attachment 1: Staff Report

Attachment 2: Exhibits

**PLANNING COMMISSION STAFF REPORT  
TYPE III LAND USE PROPOSAL**

This proposal was reviewed concurrently as a Type III design review with a type III special variance, adjustment, and FSH review. The following exhibits and findings of fact explain the proposal and support the staff recommendation.

**DATE:** November 15, 2021

**FILE NO.:** 21-046 DR/VAR/ADJ/FSH

**PROJECT NAME:** The Pad Townhomes

**APPLICANT:** Axis Design Group Architecture and Engineering

**OWNER:** Miles Rusth

**PHYSICAL ADDRESS:** 17650 Meinig Avenue

**LEGAL DESCRIPTION:** 24E 13DB Tax Lot 1500

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**RECOMMENDATION .....26**

## EXHIBITS

### **Applicant's Submittals:**

- A. Land Use Application
- B. Project Narrative
- C. Plan Set (July 16, 2021)
  - Sheet G000 – Cover Sheet and Project Description
  - Sheet C1 – Existing Conditions
  - Sheet C2 – Civil Site Design
  - Sheet C3 – Utility Plan
  - Sheet C4 – Grading and Erosion Control Plan
  - Sheet C5 – Tree Preservation Plan
  - Sheet L1 – Planting Plan
  - Sheet L2 – Landscape Notes and Details
  - Sheet A101 – Site Plan (Existing)
  - Sheet A102 – Site Plan (Proposed)
  - Sheet A201 – First and Second Floor Plans
  - Sheet A221 – Exterior Elevations, Proposed North Building “A”
  - Sheet A222 – Exterior Elevations, Proposed South Building “B”
  - Sheet LT1 – Photometric Plan
- D. Updated Plan Set (September 13, 2021)
  - Sheet C4 – Grading and Erosion Control Plan
  - Sheet C5 – Tree Preservation Plan
  - Sheet L1 – Planting Plan
  - Sheet A101 – Site Plan (Existing)
  - Sheet A102 – Site Plan (Proposed)
- E. Stormwater Report
- F. Arborist Report
- G. Traffic Impact Study
- H. Supplemental Narrative (October 18, 2021)

### **Agency Comments:**

- I. BPA (September 28, 2021)
- J. Sandy Fire District No. 72 (September 28, 2021)
- K. Sandy Area Metro (October 18, 2021)
- L. Traffic Engineer (October 19, 2021)
- M. Sandy Public Works (October 27, 2021)

## **FINDINGS OF FACT**

### **GENERAL FINDINGS**

1. These findings are based on the applicant's submittals received on July 16, 2021. Staff found the application incomplete on August 13, 2021. Additional materials were received by the applicant on September 15, 2021. With these materials, staff deemed the application complete on September 20, 2021. The 120-day deadline is January 18, 2022.
2. This report is based upon the exhibits listed in this document, including the applicant's submittals and agency comments.
3. The subject site is approximately 0.59 acres. The site is located at 17650 Meinig Avenue. It is important to note that the subject property is just north of where Highway 211 becomes Meinig Avenue. The address for this site is from Meinig Avenue, but that appears to have been assigned in error. The recent jurisdictional transfer of Highway 211 from ODOT to the City of Sandy includes the land to the west of the subject property as part of Highway 211. The applicant shall apply for an address change and pay associated fees.
4. The parcel has a Comprehensive Plan Map designation of High Density Residential and a Zoning Map designation of High Density Residential (R-3).
5. The applicant, Axis Design Group Architecture and Engineering, submitted an application to construct 10 townhouse-style apartment units on the subject property. The proposed name of the development is "The Pad Townhomes", but the actual use is multi-family dwellings as defined in the Sandy Development Code. The proposal also includes frontage improvements, utility extensions, a Type II adjustment, a Type II variance, and a Type II FSH review.
6. The applicant submitted the application as a Type II design review. SDC Section 17.12.20 states: "If the Director contemplates persons other than the applicant can be expected to question the application's compliance with the Code, the Director may elevate an application to a Type III review." Based on generally high public interest in residential development in Sandy and the fact that the proposed development abuts a major park facility, the Development Services Director elevated this application to a Type III decision to be heard and considered by the Planning Commission. Additionally, upon further review of the application, staff discovered that what was applied for as a Type II variance in fact constitutes a Type III Special Variance. The notice labels provided by the applicant were for the properties within 300 feet of the subject property consistent with a Type II land use application. Staff obtained mailing labels for properties within 500 feet, as required for a Type III review, and sent the notice to property owners within 500 feet of the subject property.
7. The City of Sandy completed the following notices:
  - A. A transmittal was sent to agencies asking for comment on September 22, 2021.
  - B. Notification of the proposed application was mailed to affected property owners within 500 feet of the subject property on October 25, 2021.
  - C. A legal notice was published in the Sandy Post on November 10, 2021.

8. At publication of this staff report, no public comments were received.



**DENSITY CALCULATIONS – Chapter 17.30**

9. The total gross acreage for the entire property is 0.59 acres. There are no right-of-way or other public dedications, so the net acreage is also 0.59 acres.
  
10. The subject property is zoned High Density Residential (R-3); therefore, a minimum of 10 and a maximum of 20 units per net acre are allowed. The minimum density for the subject property is 6 units ( $0.59 \text{ net acres} \times 10 \text{ units/net acre} = 5.9$  rounded up to 6 units). The maximum density for the subject property is 12 units ( $0.59 \text{ net acres} \times 20 \text{ units/net acre} = 11.8$  rounded up to 12 units). The applicant is proposing 10 units, which is within the allowable density range.

## **HIGH DENSITY RESIDENTIAL – Chapter 17.40**

11. The subject property is zoned High Density Residential (R-3). The applicant proposes constructing 10 multi-family dwellings as permitted in this zoning district. Section 17.40.30 contains the design standards for this zone.
12. Section 17.40.30(C) requires all lots to have a minimum lot frontage of 20 feet. The applicant is proposing approximately 235 feet of frontage, meeting this standard.
13. Section 17.40.30(C) requires the following setbacks:
  - A. Front yard: 10 foot minimum; the applicant is proposing 10 foot 7 inch setback.
  - B. Rear yard: 15 foot minimum; the applicant is proposing a 15 foot setback.
  - C. Side yard (interior): 5 foot minimum; the applicant is proposing a 5 foot setback to the south and a 11 foot 5 inch setback to the north.

For the purposes of determining setbacks, the Highway 211 frontage of the property is considered the front lot line, the sides are the north and south property lines, and the east property line is the rear lot line.

14. Section 17.40.30(C) requires that 25 percent of R-3 land be landscaped. The applicant is proposing that 33 percent of the property be landscaped in compliance with the code requirement.
15. Section 17.40.30(C) requires that the maximum height of buildings be 35 feet. The applicant is proposing a maximum building height of 22 feet in compliance with the code requirement.
16. Section 17.40.40(A) requires that water service be connected to all dwellings in the proposed development. Per the submitted narrative (Exhibit B) and utility plan (Exhibit C, Sheet C3), the applicant proposes to extend water service to serve all dwellings on the subject site.
17. Section 17.40.40(B) requires that all proposed dwelling units be connected to sanitary service. Sheet C3 (Exhibit C) shows the proposed sewer plan. According to comments from the Public Works Director (Exhibit L), the utilities plan shows a sanitary sewer connection to an abandoned force main in the Hwy 211 right-of-way. This pipe cannot provide sanitary sewer service to the site. **The applicant shall connect the sanitary sewer lateral to a public sewer line in the adjacent right-of-way. Alternatively, the applicant may obtain a public utility easement for the sewer line through Meinig Park from the city. Under the alternative easement scenario, the applicant shall submit a preliminary design to the Public Works Department for review and request the easement from the Parks and Trails Advisory Board. A final decision to grant the easement must be approved by the City Council.**
18. Section 17.40.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. The applicant's narrative (Exhibit B) states that, because of the location of the subject property, no street connections are anticipated.

19. Section 17.40.40(D) requires that all dwelling units must have frontage or approved access to public streets. The subject property will be developed as a single parcel. This parcel has frontage on Highway 211 as required. A single access is proposed.

**ADDITIONAL SETBACKS AND SPECIAL SETBACKS – Chapters 17.80 and 17.82**

20. Chapter 17.80 requires all residential structures to be setback at least 20 feet to collector and arterial streets. Highway 211 is a major arterial. The applicant is requesting a Type III special variance to this requirement to reduce this setback to 10 feet 7 inches for Building A and 13 feet 11 inches for Building B. The requirements for processing and approving a Type III special variance can be found on page 10 of this document.
  
21. According to Section 17.80.00, the requirement of additional special setbacks for development on arterial or collector is intended to provide better light, air, and vision on more heavily traveled streets. Because there is a significant amount of unused right-of-way between the subject property and Highway 211, the actual setbacks as measured between the west edges of the buildings and the curb line of Highway 211 would be 30 feet for Building A and 50 feet for Building B. This would meet the intent of Chapter 17.80.
  
22. Section 17.82.20(A) requires that all residential dwellings shall have their primary entrances oriented toward a transit street rather than a parking area, or if not adjacent to a transit street, toward a public right-of-way or private walkway which leads to a transit street. Highway 211 is a transit street. As explained in the supplemental narrative (Exhibit H) and as shown in the updated plan set (Exhibit D, SheetA102), the proposed design features all units oriented to a private walkway connecting to the public sidewalk along Highway 211. This design is intended to provide pedestrians with a convenient, direct, and accessible route to and from the building entrances and the street.
  
23. Section 17.82.20(B) requires that dwellings shall have a primary entrance connecting directly between the transit street and building interior and outlines requirements for the pedestrian route. A concrete walkway is proposed to be constructed from the front door of each unit to a continuous concrete walkway in front of all units and to the sidewalk along Highway 211.
  
24. Section 17.82.20(C) requires that primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth. As shown on submitted architectural plans (Exhibit C, Sheets A221 and A222), all units feature a covered porch in compliance with this standard.

## **ADJUSTMENTS AND VARIANCES – Chapter 17.66**

25. The applicant is requesting a Type II adjustment to Section 17.90.160(D) requiring the vertical face of a structure facing a public street, pedestrian way, or an abutting residential use to provide an eight foot offset every 20 feet. As shown on submitted plans (Exhibit C, Sheets A221 and A222), the design features an eight foot recessed entry every 24 feet. As such, the applicant is requesting a Type II adjustment to exceed the 20 foot standard by four feet.
26. Section 17.66.40 outlines four criteria necessary to be met in order to approve a Type II adjustment. They are as follows:
- A. The proposed development will not be contrary to the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City.
  - B. The proposed development will not substantially reduce the amount of privacy enjoyed by users of nearby structures when compared to the same development located as specified by this Code.
  - C. The proposed development will not adversely affect existing physical systems and natural systems, such as traffic, drainage, dramatic land forms, or parks.
  - D. Architectural features of the proposed development will be compatible to the design character of existing structures on adjoining properties and on the proposed development site.
27. Staff has determined that the Type II adjustment request does not violate any of the criteria listed here.
- A. Approval of a four-foot increase for this standard will not affect the functionality or aesthetics of the proposed design or any other adopted policy or standard.
  - B. Approval of this request to widen the building facade by four feet without an offset will have no effect on the amount of privacy enjoyed by users of nearby structures.
  - C. Approval of this request to widen the building facade by four feet without an offset will not adversely affect traffic, drainage, land forms, or parks.
  - D. The subject property does not abut other property with existing structures within close proximity of the proposed multi-family buildings and the subject site is currently vacant. The nearest structures are Joe's Donuts, City Hall, and a building located across Highway 211 at 39150 Pioneer Blvd. (i.e., the Smith Building). All of these older structures are different from each other and are not designed according to current development code standards. The proposed multi-family buildings are designed in compliance with adopted design standards with this exception to offset distances. The requested adjustment will not affect the aesthetic quality of the proposed design and the proposal complies with this criteria.
28. As discussed in findings 20 and 21, the applicant also initially requested a Type II variance related to the required setback on Highway 211, a major arterial. Chapter 17.80 requires a 20 foot setback, but the applicant is requesting a variance to this requirement to reduce this setback to 10 feet 7 inches for Building A and 13 feet 11 inches for Building B.

29. One of the requirements in applying for a Type II variance is to show that the circumstances necessitating the variance are not of the applicant's making. After conferring with the City Attorney, staff determined that the circumstances are of the applicant's making as the need for the variance is driven by the applicant's specific site plan. Therefore, staff has elevated the request to a Type III special variance.
30. According to Section 17.66.80, the Planning Commission may grant a special variance waiving a specified provision under the Type III procedure if it finds that the provision is unreasonable and unwarranted due to the specific nature of the proposed development.
31. One of three criteria found in Section 17.66.80 must be met in order to approve a Type III special variance. The first criterion is most applicable here:
  - A. The unique nature of the proposed development is such that the intent and purpose of the regulations and of the provisions to be waived will not be violated, and authorization of the special variance will not be materially detrimental to the public welfare and will not be injurious to other property in the area when compared with the effects of development otherwise permitted.
32. Staff has determined that the Type III special variance request does not violate any of the conditions listed here. The intent and purpose of a 20 foot setback from collector and arterial streets is to provide better light, air and vision on more heavily traveled streets. The additional setback, on substandard streets, will protect collector and arterial streets and permit the eventual widening of streets. As noted in finding 21, because of the large piece of right-of-way existing between the property and the curb of Highway 211, approval of this variance would meet the intent of Chapter 17.80.
33. Staff has also found that approving a Type III special variance would not be detrimental to public welfare or surrounding property. No public comments from surrounding property owners were received and waiving a setback requirement has no connection to adjacent property values or potential land uses. Further, because of the additional right-of-way between the Highway 211 curb and the subject property, vision clearance for drivers will not be negatively impacted by approving this special variance.
34. For the reasons outlined above, staff recommends the Planning Commission approve a special variance to Section 17.80.20 to reduce the required 20 foot setback to 10 feet 7 inches for Building A and 13 feet 11 inches for Building B.

### **TRANSPORTATION – Chapter 17.84**

35. The applicant submitted a Traffic Impact Study with the application materials (Exhibit G). While a TIS is not required per conditions met in Section 17.85.50(B)(1), this Study was done for a previous townhouse-apartment style development proposal containing 12 dwelling units on the subject site prior to adoption of the aforementioned code section. One limitation of this TIS is that it assumes a connection between Dubarko Road and Highway 26, which was proposed as part of a previously denied subdivision application. However, based on agreement between the City’s traffic engineer and Public Works Director, the impacts of this assumption are likely to be minimal.
36. The Traffic Impact Study was performed by Ard Engineering and is dated August 25, 2020. It was reviewed by the City’s traffic engineer during the application review process.
37. There was considerable discussion and concern among staff, the applicant team, and the City’s traffic engineer regarding the location of the driveway approach on Highway 211 relative to surrounding roads and intersections. Multiple site access points were analyzed by the applicant’s traffic engineer at the request of ODOT staff, and the proposed site access on Highway 211 opposite Tupper Road was determined to be the safest.
38. The TIS study area included analysis of Pioneer Boulevard at Highway 211, Highway 211 at the City Hall/Joe’s Donuts driveway, and Highway 211 at the proposed site driveway.
39. The AM and PM peak hour traffic counts at the study area intersections were developed from counts conducted on Highway 26 and on Highway 211 during 2019. These counts were utilized because current counts were thought to be unrepresentative of actual conditions due to the COVID-19 pandemic which may have altered traffic volumes.
40. The TIS calculates that a 12-unit multi-family development would produce 6 AM peak hour trips, 7 PM peak hour trips, and 88 total daily trips. We can safely assume that the proposed 10-unit multi-family development would produce fewer peak hour and total daily trips than a similar development with 12-units.
41. In addition to the trip count analysis, a queuing analysis was conducted to determine whether northbound queues on Highway 211 may extend to the proposed driveway during the peak hours. According to the analysis results, the proposed driveway is within the existing 95<sup>th</sup> percentile queue length during the morning and evening peak hours, although it is outside the average projected queue lengths during the peak hours.
42. Accordingly, the applicant proposes some form of turning movement restriction in order to avoid having vehicles make potentially unsafe left-turn maneuvers through stopped vehicle queues and to avoid congestion within the through travel lanes which may occur when vehicles stop within an otherwise free-flowing travel lane to wait to make left turns across these queues. Such restrictions could include a raised center median in Highway 211 or a right-in right-out “pork chop” diverter within the new driveway approach.

43. However, according to the City's Public Works Director, a center median in Highway 211 could also block the intersection of Tupper Road and Highway 211, turning it into a right-in right-out intersection (Exhibit M). **The applicant shall be required to construct a center median that doesn't interfere with left turns to and from the Tupper Road/Hwy 211 intersection or construct a right-in-right-out site access as mitigation for the traffic, operational, and safety impacts of the development. Construction plans for either option should be submitted to the City for review and approval. Any required street widening on Hwy 211 necessary to accomplish either alternative shall be constructed by the applicant.**
44. Sections 17.84.50(F) and 17.84.50(G) require public streets to be improved to City standards along the entire frontage of the property. **The applicant shall be required to construct site frontage improvements including but not limited to half-street improvements, curbs, sidewalks, street trees, street lighting, and storm drainage improvements. In addition, the applicant shall construct a connection between the proposed site frontage sidewalk and the existing asphalt pedestrian path in Meinig Park that currently extends into the Hwy 211 right-of-way.**



## **DESIGN STANDARDS – Chapter 17.90**

45. Section 17.90.160 includes all design requirements for multi-family developments. Both buildings proposed in this development contain similar design elements. Building A is proposed to contain four units and Building B is proposed to contain six units.
46. Section 17.90.160(A) contains requirements for roofs. Roofs shall be gabled or hip type roofs (minimum pitch 3:1) with at least a 30-inch overhang and using shingles or similar roofing materials. Alternatives may be approved where the developer can demonstrate that abutting structures or the majority of structures within 300 feet have roofs similar to what is proposed. The proposed structures feature both 6:12 and 8:12 roof pitches exceeding the minimum 3:12 roof pitch standard. The proposed roof overhangs 30-inches measured to the outside edge of the gutter. The proposal complies with this section.
47. Section 17.90.160(B) contains requirements for entries. Entries shall be sheltered with an overhang, portico or recessed entry or otherwise articulated with an architecturally detailed entry. Primary dwelling entries shall face a public street or designated pedestrian way and be visible from the street whenever feasible. The entry door for all units will face the access drive and pedestrian walkway and are covered by an awning in compliance with this section.
48. Section 17.90.160(C) contains requirements for facades. Building facades shall be articulated with windows, entries, balconies and/or bays. Towers or other special vertical elements may be used in a limited fashion to focus views to the area from surrounding streets. The front facade of all proposed buildings are articulated by a recessed entry with covered awning, and projecting gable end with a considerable number of windows in compliance with this section.
49. Section 17.90.160(D) contains requirements for articulated building faces. Along the vertical face of a structure, when facing a public street, pedestrian way, or an abutting residential use, offsets shall occur at a minimum of every 20 feet by providing recesses of a minimum depth of eight feet or extensions with a minimum depth of eight feet. As shown on submitted plans the front door of each unit is recessed eight feet and there are 24-feet of vertical face between recesses. The proposed design exceeds this standard by 4-feet and a Type II Adjustment has been requested.
50. Section 17.90.160(E) contains requirements for private outdoor areas. A separate outdoor area of not less than 48 square feet shall be attached to each ground level dwelling unit. These areas shall be separated from common outdoor areas in a manner, which enables the resident to control access from separate to common areas with elements such as walls, fences or shrubs. Each unit features a 50 square foot outdoor patio area or deck in compliance with this section.
51. Section 17.90.160(F) contains parking lot requirements. Parking lots in multi-family developments shall not occupy more than 50 percent of the frontage of any public street abutting the lot or building. The proposed parking and maneuvering area occupies only 25 percent of the Highway 211 street frontage in compliance with this section.

52. Section 17.90.160(G) contains requirements for individual storage areas. Enclosed storage areas shall be required and may be attached to the exterior of each dwelling unit and are required to be at least 36 square feet for 2 bedroom units. Each unit includes a 38 square foot individual storage area in compliance with this section.
53. Section 17.90.160(I) contains requirements for shared outdoor recreation areas. Multi-family residential development shall provide usable recreation areas for developments containing more than 5 dwelling units at the rate of 200 square feet per dwelling unit. The proposed 10-unit multi-family project requires 2,000 square feet of shared outdoor recreation area (10 x 200 = 2,000). As shown on the Site Plan (Exhibit D, Sheet A102), approximately 2,430 square feet of shared outdoor area is proposed. This area includes two outdoor recreation areas; one located in the center of the multi-family complex with a play structure and benches and a second area to the west of Building B with tables. The proposal complies with this standard to provide outdoor recreation area.
54. Section 17.90.160(J) contains requirements for safety and security. The applicant shall provide an outdoor lighting system which facilitates police observation and resident observation through strategic location, orientation, and brightness without being obtrusive by shining into residential units or adjacent residential developments. A Lighting Plan is included with the plan set (Exhibit C, Sheet LT1) in compliance with this section. **The applicant shall establish a directory which clearly orients visitors and emergency service providers as to the location of residential units. If possible, this system should be evident from the primary vehicle entryway.**
55. Section 17.90.160(K) contains requirements for service, delivery, and screening. Requirements include postal delivery areas and garbage collection and recycling areas in convenient locations. According to the Site Plan (Exhibit D, Sheet A102), a garbage enclosure is included along the rear property line. A mail box is included on the north side of the entrance drive. This section also requires that garbage collection areas shall have a concrete floor surface and shall have a gate on the truck-loading side and a separate pedestrian access. Outdoor storage areas, garbage containers and recycling bins shall be screened from view using a six foot solid sight obscuring wall or fence or evergreen plant materials. Additionally, the applicant must provide pedestrian access from unit entries to postal delivery areas, garbage and recycling collection areas, shared activity areas, and parking areas. According to the Site Plan (Exhibit D, Sheet A102), the garbage area does have a concrete floor surface, as well as separate truck and pedestrian access points. However, it is unclear if there is a pedestrian access from unit entries to the garbage area other than what is otherwise the parking lot. **The applicant shall submit plans showing details related pedestrian access to the garbage area.**
56. Section 17.90.160(L) contains requirements for electrical and mechanical equipment. On- and above-grade electrical and mechanical equipment such as transformers, heat pumps, and central air conditioner units shall be screened with sight obscuring fences, walls or landscaping. The applicant proposes that all electrical and mechanical equipment are either within an enclosed structure or will be screened using landscape materials as required.

**PEDESTRIAN AND BICYCLE IMPROVEMENTS – Chapter 17.84**

57. Section 17.84.20(A)(1) requires that all improvements shall be installed concurrently with development or be financially guaranteed. **The site shall have required public and franchise utility improvements installed or financially guaranteed prior to temporary or final occupancy of structures.**
58. Section 17.84.30(A)(2) requires that all proposed sidewalks along arterial and collector streets shall be separated from curbs with a planting area. The planting area shall be landscaped with trees and plant materials approved by the City. The sidewalks shall be a minimum of 6 feet wide. The applicant is proposing a nine-foot sidewalk to be constructed along the Highway 211 frontage, which includes planting areas. However, given the residential nature of the development, **the applicant shall replace the tree wells with a 5-foot-wide planter strip and submit an updated site plan showing this change. This planter strip shall accompany a 6-foot-wide sidewalk.**
59. **Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.**
60. To ensure pedestrian connectivity to Meinig Park, **the applicant shall connect a pedestrian walkway from the subject site to the existing asphalt path in Meinig Park pursuant to Section 17.84.30(B).**
61. No other pedestrian or bicycle improvements are proposed as part of this development.
62. According to an email sent by the Sandy Area Metro Transit Director (Exhibit K), no transit amenities will be required with this development.

## **PARKING, LOADING, AND ACCESS REQUIREMENTS – Chapter 17.98**

63. Section 17.98.20(A)(8) requires that each multi-family dwelling unit with 2 bedrooms or more shall provide at least 2 off-street parking spaces per unit. This development proposal requires a total of 20 off-street parking spaces. As shown on the site plan (Exhibit D, Sheet A102), 21 parking spaces are proposed, including one van accessible ADA space in compliance with this section.
64. Section 17.98.20(A)(8) also requires one bicycle space per multi-family dwelling unit. Section 17.98.160 outlines detailed requirements for bicycle parking facilities. The applicant proposes that each unit's individual storage will be fitted with a hanging rack to accommodate a bicycle as required. In addition, a two-space bike rack is provided near the northwest corner of Building B, presumably for visitors.
65. Section 17.98.50 relates to required setbacks of parking areas. Parking areas are required to be setback from a lot line adjoining a street the same distance as the required building setbacks, and the setback area shall be landscaped as provided in the City's code. The applicant is proposing the same parking facility setback as the building setback. Additionally, according to the landscape plan (Exhibit D, Sheet L1), the area within the parking facility setback is proposed to be landscaped with a mix of groundcover, shrubs, and trees.
66. Section 17.98.60(B) provides measurements for standard, compact, and ADA compliant parking spaces. All proposed parking spaces comply with the standards as specified in the development code, and no compact parking spaces are proposed. One van accessible ADA compliant space is provided as required by ORS 447.233 and the Americans with Disabilities Act. The proposed access aisle is located on the passenger side of the ADA space as required.
67. Section 17.98.60(C) requires that the aisle width for a single-sided, two-way traffic, 90 degree angle parking lot (like the one proposed in this development) is a minimum of 22 feet wide. The submitted site plan (Exhibit D, Sheet A102) details a 22-foot wide aisle behind all parking spaces as required.
68. Section 17.98.100 requires that a driveway to an off-street parking area shall be improved from the public roadway to the parking area a minimum width of 20 feet for a two-way drive. The site plan (Exhibit D, Sheet A102) indicates that a 22-foot wide driveway is proposed to access the proposed parking lot in compliance with this section.
69. Section 17.98.130 requires that all parking and vehicular maneuvering areas shall be paved with asphalt or concrete. As required by Section 17.98.130, **all parking, driveway, and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.**

### **UTILITIES – Chapters 17.84 and 15.30**

70. The applicant submitted a Utility Plan (Exhibit C, Sheet C3) which shows the location of proposed private water, sanitary sewer, and stormwater drainage facilities.
71. Sheet C3 (Exhibit C) shows the proposed sewer plan. According to comments from the Public Works Director (Exhibit L), the utilities plan shows a sanitary sewer connection to an abandoned force main in the Hwy 211 right-of-way. This pipe cannot provide sanitary sewer service to the site. **The applicant shall connect the sanitary sewer lateral to a public sewer line in the adjacent right-of-way. Alternatively, the applicant may obtain a public utility easement for the sewer line through Meinig Park from the city. Under the alternative easement scenario, the applicant shall submit a preliminary design to the Public Works Department for review and request the easement from the Parks and Trails Advisory Board. A final decision to grant the easement must be approved by the City Council.**
72. Sheet C3 (Exhibit C) shows that water connection to the site will be from an existing water line along Highway 211.
73. **Broadband fiber service shall be detailed with building plans.**
74. **All utilities identified above shall be constructed concurrent with the proposed development. The applicant shall extend all utilities as necessary to serve the development as required by Section 17.84.60.**
75. Private utilities are allowed per Section 17.84.60 if the following conditions exist:
- A. Extension of a public facility through the site is not necessary for the future orderly development of adjacent properties.
  - B. The development site remains in one ownership and land division does not occur.
  - C. The facilities are designed and constructed in accordance with the Uniform Plumbing Code and other applicable codes, and permits and/or authorization to proceed with construction is issued prior to commencement of work.
76. Staff has determined that these conditions are satisfied. First, surrounding properties have already been developed, and therefore extension of a public facility through the site for adjacent development is not anticipated. Second, the applicant is not proposing land division of the subject property and is proposing that it remains under one ownership. Third, the design and construction of the private utility facilities will be reviewed by the City Building Official prior to construction during the building permitting process.
77. The proposed stormwater plan shows a gravity storm drain discharging to an existing roadside ditch in the Highway 211 right-of-way. **The applicant shall extend a storm line in the Highway 211 right-of-way to the existing ditch inlet to convey stormwater in a pipe to the public system.**

78. Section 17.84.80(E) requires that all franchise utility distribution facilities installed to serve new developments shall be placed underground with certain specific exceptions. The developer has proposed that all franchise utilities be installed underground.
79. **The developer shall be responsible for making necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.**
80. Chapter 15.30 contains the City of Sandy's Dark Sky Ordinance. A lighting plan will be coordinated with PGE and the City as part of the construction plan process and prior to installation of any fixtures as required by Section 17.100.210.
81. The applicant is proposing four lighting fixtures in the parking area. The submitted photometric plan (Exhibit C, Sheet LT-1) shows the luminaire schedule and foot candle calculations for these fixtures.
82. **The locations of these fixtures shall be reviewed in detail with construction plans. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.**
83. **The applicant shall submit lighting cut sheets to ensure full cut off in compliance with Sections 15.30.050 and 15.30.070.**
84. Section 17.84.100 outlines the requirements for mail delivery facilities. **The location and type of mail delivery facilities shall be coordinated with the City Engineer and the Post Office as part of the construction plan process.**
85. The Fire Marshal (Exhibit J) reviewed the proposal and provided general comments as well as comments related to fire apparatus access and firefighting water supplies. **Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval concurrently with building permit submittal. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs. The address shall be plainly legible and visible from the road fronting the property and the same shall be on the dwelling plainly legible and visible when approaching the site. These numbers shall contrast with their background. Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port. The applicant shall adhere to all other requirements of the Sandy Fire District.**

86. The Bonneville Power Administration (Exhibit I) reviewed the submitted materials and found no impact to their facilities.

87. As per the Sandy Public Works Director (Exhibit M), public utility and street plans for land use applications are submitted to comply with the requirements of the Sandy Municipal Code. **Land Use approval does not connote approval of utility or street construction plans which are subject to a separate submittal and review process.**

**PARKLAND DEDICATION – Chapter 17.86**

88. Section 17.86.10 contains a formula for determining the amount of land required to be dedicated. The formula is acres = proposed units x (persons/unit) x 0.0043. For 10 multi-family homes, acres = 10 x 2 x 0.0043 = 0.086 acres, rounded to 0.09 acres. The applicant is proposing to pay a fee-in-lieu of parkland dedication.
89. Per Section 17.86.40, at the City's discretion only, the City may accept payment of a fee in lieu of land dedication. A payment in lieu of land dedication is separate from Park Systems Development Charges and is not eligible for a credit of Park Systems Development Charges. The amount of the fee in lieu of land dedication (in dollars per acre) shall be set by City Council Resolution, and it shall be based on the typical market value of developed property (finished lots) in Sandy net of related development costs. The Parks and Trails Advisory Board (Board) met on October 6, 2021. During the meeting, the Board recommended a fee in lieu of parkland dedication given the size of the development and its proximity to Meinig Park.
90. **The applicant shall pay a fee-in-lieu of parkland dedication in the amount of \$21,690 (0.09 multiplied by \$241,000) to the City prior to issuance of building permits.**



## **LANDSCAPING AND SCREENING – Chapter 17.92**

91. Section 17.92.10 contains general provisions for landscaping. The applicant submitted Landscape Plans (Exhibit D, Sheet L1) as required by this section. **All required landscaping and related improvements shall be completed or financially guaranteed prior to the issuance of a Certificate of Occupancy.**
92. According to 17.92.10(B), **appropriate care and maintenance of landscaping on-site and landscaping in the adjacent public right-of-way is the right and responsibility of the property owner, unless City ordinances specify otherwise for general public and safety reasons. If street trees or other plant materials do not survive or are removed, materials shall be replaced in kind within 6 months.**
93. As required by Section 17.92.10(C), trees over 25-inches circumference (~ 8-inches DBH) measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. The applicant submitted a tree preservation plan (Exhibit D, Sheet C5) and an arborist report detailing tree protection requirements (Exhibit F). The applicant is proposing to remove 17 and retain 2 trees on the subject property: Trees 2823 & 2898. The arborist report states that the inventory was completed on December 24, 2020. While this inventory was completed prior to the ice storms in early 2021, and some trees in the inventory may have been lost, because the subject property is less than an acre, no tree retention is actually required. **All conditions found on the Tree Protection Plan Notes (Exhibit F) shall be conditions for development. Additionally, trees to be retained shall be protected from damage during construction by a construction fence located 5 ft. outside the dripline. The applicant shall submit updated tree protection plans detailing this fencing.**
94. The subject property is located adjacent to Meinig Park, which contains many existing trees, all of which need to be protected. Per Section 17.92.10(C), **the applicant shall install tree protection fencing located 5 feet beyond the dripline of all existing trees on the adjacent City properties. Tree removal on the subject site shall be completed under the supervision of the project arborist and the applicant shall fell the trees to be removed away from the trees to be retained on the subject property and on the adjacent City properties, so they do not contact or otherwise damage the trunks or branches of the trees to be retained.**
95. **The applicant shall install tree protection fencing located 5 feet beyond the dripline to protect the 2 retention trees on the subject property (Trees 2823 & 2898) as well as all trees on the adjacent City properties. The tree fencing shall be installed prior to any development activity on the site, including clearing, tree removal, and erosion control measures, in order to protect the trees and the soil around the trees from disturbance. Sediment fencing shall be located outside the tree protection zones. If erosion control is required inside the tree protection zones, use straw wattles to minimize root zone disturbance of the trees to be retained. The applicant shall not relocate or remove the fencing prior to certificates of occupancy. The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing supported with metal posts placed no farther than 10 feet apart installed flush with the initial undisturbed grade. The applicant shall affix**

a laminated sign (minimum 8.5 inches by 11 inches, placed every 75 feet or less) to the tree protection fencing with the following information: **TREE PROTECTION ZONE, DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING.** Please contact the project arborist if alterations to the approved location of the tree protection fencing are necessary. No construction activity shall occur within the tree protection zone, including, but not limited to, grading, clearing, excavation, access, stockpiling, dumping, or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures with City staff and the project arborist prior to any tree removal, grading, or other construction activity on the site. The applicant shall retain an arborist on site to monitor any construction activity within the tree protection area 5 feet beyond the dripline of the retention trees or trees on adjacent properties that have a dripline that would be impacted by development activity on the subject property.

96. The applicant shall submit a post-construction report prepared by a TRAQ certified arborist to assess whether any of the retention trees were damaged during construction, including all trees on the adjacent City properties. If retention trees were damaged and need to be replaced, the mitigation ratio shall be 4:1.
97. As required by Section 17.92.10(D), the planter strip and landscape boundary areas used for required plantings shall have a minimum diameter of 5-ft. (2-1/2 ft. radius, inside dimensions).
98. According to Section 17.92.10(E), in no case shall shrubs, conifer trees, or other screening be permitted within vision clearance areas of street, alley, or driveway intersections, or where the City Engineer otherwise deems such plantings would endanger pedestrians and vehicles. **The applicant shall modify the Landscape Plan as required to address vision clearance requirements as necessary.**
99. Section 17.92.10(F) requires that landscaped planters and other landscaping features shall be used to define, soften, or screen the appearance of off-street parking areas and other activity from the public street. The applicant is proposing landscape planters at the ends of parking bays.
100. Section 17.92.10(K) requires that **all areas not occupied by paved roadways, walkways, patios, or buildings shall be landscaped.**
101. Per Section 17.92.10(L), **all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
102. Section 17.92.20 outlines minimum landscaping and screening improvements according to the underlying zoning designation. High Density Residential (R-3) zoned areas must be 25 percent landscaped. As shown on the Landscape Plan (Exhibit D, Sheet L1), 33 percent of the site is proposed to be landscaped.

103. Section 17.92.30 states that planting of trees is required for all parking lots with four or more parking spaces and along public street frontages. The Landscape Plan (Exhibit D, Sheet L1) indicates that both sides of common parking areas will be bordered with a landscape planter to contain a mix of trees, shrubs, and ground covers.
104. Section 17.92.30 specifies that street trees shall be chosen from the City-approved list. Due to concerns with Asian Longhorn Beetle and Emerald Ash Borer as well as an interest in increasing species diversity, staff are not approving only maples or ashes as street trees at this time. **The applicant shall submit an updated planting plan with at least two-thirds of the proposed maples replaced with a different City-approved species.**
105. Section 17.92.40 requires that all landscaping shall be irrigated, either with a manual or automatic system. **The applicant shall submit details of the irrigation system with building plans.**
106. Section 17.92.50 specifies the types and sizes of plant materials that are required when planting new landscaping. The applicant's Landscape Plan (Exhibit D, Sheet L1) meets the standards of this section.
107. Section 17.92.60 requires revegetation in all areas that are not landscaped or remain as natural areas. The applicant did not submit any plans for re-vegetation of areas damaged through grading/construction, although most of the areas affected by grading will be improved. **Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two (2) years following the date of recording of the final plat associated with those improvements.**
108. Section 17.92.70 requires that landscaping within the street right-of-way shall not count as part of the lot area percentage to be landscaped. As shown on the Landscape Plan (Exhibit D, Sheet L1), the area between the property and the built section of Highway 211 will be landscaped as required.
109. Section 17.92.80 contains requirements for buffer planting around parking, loading, and maneuvering areas. Where required, a mix of plant materials shall be used to achieve the desired buffering effect. Buffering is required in conjunction with issuance of construction permits for parking areas containing 4 or more spaces, loading areas, and vehicle maneuvering areas. As shown on the Landscape Plan (Exhibit D, Sheet L1), these requirements have been met.
110. Section 17.92.130 contains performance bond requirements. If weather conditions or other circumstances beyond the control of the developer or property owner make completion of the landscaping impractical prior to desired occupancy, an extension of up to six months may be applied for by posting "security" equal to 120 percent of the cost of the landscaping, assuring installation within six months. "Security" may consist of a performance bond, letter of credit, or other such assurance. Upon acceptance of the security, the developer or owner may be allowed occupancy for a period of up to 180 days. If the installation of the landscaping improvement is not completed within 180 days, the

City shall have access to the security to complete the installation and/or revoke occupancy. Upon completion of the installation by the city, any portion of the remaining security minus administrative charges of 30 percent shall be returned to the owner. Costs in excess of the posted security shall be assessed against the property and the City shall thereupon have a valid lien against the property, which will come due, and payable.

111. Section 17.92.140 requires that **all landscape materials and workmanship shall be guaranteed by the installer and/or developer for a period of time not to exceed two years. This guarantee shall ensure that all plant materials survive in good condition and shall guarantee replacement of dead or dying plant materials.**

**FLOOD AND SLOPE HAZARD (FSH) OVERLAY – Chapter 17.60**

112. The City’s zoning map dated July 17, 2020 shows a very small portion of FSH Overlay associated with No Name Creek mapped at the southeast corner of the subject property. As shown on the submitted plans, a small portion of the southeast corner of Building B is proposed within the FSH Overlay.
113. The applicant provided the information required for mapping and interpreting the FSH Overlay in Section 17.60.10(C) in the Site Plan (Exhibit D, Sheet A101).
114. Section 17.60.20 outlines permitted uses and activities for development. Some sections of the FSH Overlay are restricted development areas, such as slopes of 25 percent or greater that encompass at least 1,000 square feet and have an elevation differential of at least 10 feet, protected water features, and required setbacks. Although development is proposed within the FSH Overlay, no development is proposed within a restricted development area.
115. Section 17.60.40 contains review procedures for development requests within the FSH Overlay District. “Development that is completely outside restricted development areas” is reviewed under a Type II review procedure per Section 17.60.40(B.7). As noted previously, a portion of the southeast corner of Building B is proposed within the FSH Overlay; however, there are no restricted development areas on the subject property, so the proposed development is completely outside restricted development areas.
116. No special reports have been requested by the City as outlined in Section 17.60.50.

## **RECOMMENDATION**

Staff recommends that the Planning Commission **approve** the Type III design review and associated Type II adjustment and Type III special variance with the conditions listed below.

### **CONDITIONS OF APPROVAL**

#### **A. Prior to grading and earthwork on the subject site the applicant shall complete the following and receive necessary approvals as described:**

1. Submit proof of receipt of a DEQ 1200-C Permit. (*Submit to Planning Department and Public Works Department for approval*)
2. Have a licensed pest control agent evaluate the site to determine if pest eradication is needed. Submit the evaluation to the City of Sandy for review and approval.
3. Install tree protection fencing per Section 17.92.10(C) located 5 feet outside of the dripline around all trees to be retained, including trees on the adjacent City properties. The tree fencing shall be installed prior to any development activity on the site, including clearing, tree removal, and erosion control measures, in order to protect the trees and the soil around the trees from disturbance. Sediment fencing shall be located outside the tree protection zones. If erosion control is required inside the tree protection zones, use straw wattles to minimize root zone disturbance of the trees to be retained. The applicant shall not relocate or remove the fencing prior to certificates of occupancy. The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing supported with metal posts placed no farther than 10 feet apart installed flush with the initial undisturbed grade. The applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches, placed every 75 feet or less) to the tree protection fencing with the following information: **TREE PROTECTION ZONE, DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING.** Please contact the project arborist if alterations to the approved location of the tree protection fencing are necessary. No construction activity shall occur within the tree protection zone, including, but not limited to, grading, clearing, excavation, access, stockpiling, dumping, or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures with City staff and the project arborist prior to any tree removal, grading, or other construction activity on the site. The applicant shall retain an arborist on site to monitor any construction activity within the tree protection area 5 feet beyond the dripline of the retention trees or trees on adjacent properties that have a dripline that would be impacted by development activity on the subject property.
4. Submit updated tree protection plans. Trees to be retained shall be protected from damage during construction by a construction fence located 5 ft. outside the dripline. The applicant shall request an inspection to verify tree protection fencing is appropriately installed.

5. Apply for a grading and erosion control permit.

**B. Submit the following with the building permit:**

1. Submit a revised Site Plan to include the following:
  - Details related to garbage area access and pedestrian access to the garbage area.
  - Tree wells within the sidewalk along Highway 211 replaced with a 5 foot planter strip accompanying a 6 foot sidewalk.
2. Submit a revised Landscape Plan to include the following:
  - Address vision clearance requirements as necessary.
  - Replace two-thirds of the proposed maples with a different City-approved species.
3. Submit an Irrigation Plan detailing how landscaping will be irrigated.
4. Submit construction plans that verify the domestic water meter size based on the meter flow and the building fixture counts found in the 2014 Oregon Plumbing Specialty Code, table 6-6.
5. Submit construction plans for either a center median that doesn't interfere with left turns to and from the Tupper/Hwy 211 intersection or a right-in-right-out site access as mitigation for the traffic, operational, and safety impacts of the development. Construction plans for either option shall be submitted to the City for review and approval.
6. Submit construction plans detailing broadband fiber service to the SandyNet Director for review and approval.
7. Submit construction documents detailing compliance with fire apparatus access and fire protection water supply requirements to the Sandy Fire District for review and approval.
8. Make necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.
9. Submit lighting cut sheets to ensure full cut off in compliance with Sections 15.30.050 and 15.30.070.
10. Provide construction documents detailing compliance with fire apparatus access and fire protection water supply requirements to Sandy Fire District for review and approval.

**C. Prior to building permit issuance, the applicant shall:**

1. Submit payment of system development charges in accordance with applicable City ordinances/resolutions.
2. Pay plan review, inspection, and permit fees as determined by the Public Works Director.
3. Pay the fee in lieu of park dedication in the amount of \$21,690 (0.09 x \$241,000).
4. Coordinate with the City Engineer and the Post Office as part of the construction plan process to determine the location and type of mail delivery facilities.

**D. Prior to occupancy (temporary or final) the applicant shall complete the following or provide assurance for their completion:**

1. Complete all site improvements including but not limited to landscaping, building improvements, stormwater facilities, parking, pedestrian walkways, and bicycle parking facilities.
2. Complete site frontage improvements including but not limited to half-street improvements, curbs, sidewalks, street trees, street lighting and storm drainage improvements. In addition, the applicant shall construct a connection between the proposed site frontage sidewalk and the existing paved pedestrian path in Meinig Park and the Highway 211 right-of-way.
3. All required landscaping and related improvements shall be completed or financially guaranteed.
4. Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.
5. Install or financially guarantee all required public and franchise utilities.
6. Connect a pedestrian walkway from the subject site to the existing asphalt path in Meinig Park.
7. Construct a center median that doesn't interfere with left turns to and from the Tupper Road/Highway 211 intersection or a right-in-right-out site access as mitigation for the traffic, operational, and safety impacts of the development.
8. Connect the sanitary sewer lateral to a public sewer line in the adjacent right-of-way. Alternatively, the applicant may obtain a public utility easement for the sewer line through Meinig Park from the City. Under the alternative easement scenario, the applicant shall submit a preliminary design to the Public Works Department for review and request the easement from the Parks and Trails Advisory Board. A final decision to grant the easement must be approved by the City Council.



9. Install an apartment directory which clearly orients visitors and emergency service providers as to the location of residential units. If possible, this system should be evident from the primary vehicle entryway.
10. Extend a storm line in the Hwy 211 right-of-way to the existing ditch inlet to convey stormwater in a pipe to the public system.
11. Complete re-vegetation of disturbed areas as specified on the City approved erosion control plan.
12. Install a fire suppression system in all buildings.
13. Submit a post-construction report prepared by a TRAQ certified arborist to assess whether any of the retention trees were damaged during construction, including all trees on the adjacent City properties. If retention trees were damaged and need to be replaced, the mitigation ratio shall be 4:1.
14. Plant and stake street trees and grade and backfill the planter strip as necessary.

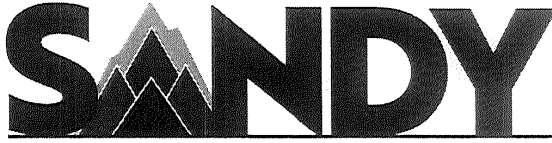
**E. General Conditions:**

1. Design review approval shall be void after two (2) years from the date of the Final Order, unless the applicant has submitted plans for building permit approval.
2. Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two (2) years following the date of recording of the final plat associated with those improvements.
3. All landscape materials and workmanship shall be guaranteed by the installer and/or developer for a period of time not to exceed two (2) years. This guarantee shall ensure that all plant materials survive in good condition and shall guarantee replacement of dead or dying plant materials.
4. Onsite walkways shall be constructed in accordance with the sidewalk standards adopted by the City. All pedestrian connections from the site to adjacent streets, access ways, or private drives shall be ungated.
5. All parking, driveway, and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.
6. Appropriate care and maintenance of landscaping on-site and landscaping in the adjacent public right-of-way is the right and responsibility of the property owner, unless City ordinances specify otherwise for general public and safety reasons. If street trees or other plant materials do not survive or are removed, materials shall be replaced in kind within 6 months.

7. All lighting shall comply with the requirements of Chapter 15.30, Dark Skies. LED bulbs shall not exceed 4,125 Kelvins or 591 nanometers.
8. All electrical and mechanical equipment shall be screened with sight obscuring fences, walls or landscaping.
9. Pavement markings shall be re-painted periodically as lines become faded.
10. All work within the public right-of-way and within the paved area shall comply with the American Public Works Association (APWA) and City requirements.
11. Any required street widening on Highway 211 necessary to accomplish either access alternative shall be constructed by the applicant.
12. The applicant shall follow ODOT's Analysis Procedure Manual for trip distribution, signal cycle plan, and saturation flow rate.
13. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33.
14. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs. The address shall be plainly legible and visible from the road fronting the property and the same shall be on the dwelling plainly legible and visible when approaching the site. These numbers shall contrast with their background.
15. Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port.
16. All franchise utilities shall be installed underground and in conformance with City standards. The existing overhead power line on the site shall be buried underground.
17. SandyNet requires the developer to work with the City to ensure that broadband infrastructure meets the design standards and adopted procedures as described in Section 17.84.70.
18. Site grading shall not in any way impede, impound, or inundate the surface drainage flow from the adjoining properties without a proper collection system.
19. All on-site grading shall be performed in accordance with the most current Oregon Structural Specialty Code and shall be observed and documented under the supervision of a geotechnical Engineer or his/her representative.

20. Tree removal on the subject site shall be completed under the supervision of the project arborist and the applicant shall fell the trees to be removed away from the trees to be retained on the subject property and on the adjacent City properties, so they do not contact or otherwise damage the trunks or branches of the trees to be retained.
21. As required by Section 17.92.140, the developer shall maintain all vegetation planted in the development for two years from the date of completion, and shall replace any dead or dying plants during that period. Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.
22. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.
23. Land use approval does not connote approval of utility or public improvement plans submitted with the land use application. Plan details will be reviewed during the construction plan submittal phase by the City Engineer and Public Works Director.
24. Comply with all standards required by Section 17.84 of the Sandy Development Code. Public and franchise improvements shall be installed or financially guaranteed in accordance with Chapter 17 of the Sandy Municipal Code prior to temporary or final occupancy of structures. Water lines and fire hydrants shall be installed in accordance with City standards. All sanitary sewer lines shall be installed in accordance with City standards. Postal delivery areas shall meet the requirements of 17.84.100.
25. Comply with all other conditions or regulations imposed by the Sandy Fire District or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.

**EXHIBIT A**



**General Land Use Application**

1 page

<b>Name of Project:</b>	The Pad Townhome Apartments
<b>Location or Address:</b>	17650 Meinig Avenue

<b>Map &amp; Tax Lot #</b>	<b>T:</b> 2S	<b>R:</b> 4E	<b>Section:</b> 13DB	<b>Tax Lot (s):</b> 1500
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**Request:** Design Review to develop a 10-unit townhome style multi-family project.

I am the (check one)  owner  lessee of the property listed above, and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

Applicant (if different than owner) Steven Maguire, AIA - AXIS Design Group	Owner Miles Rusth
Address 11104 SE Stark Street	Address P.O. Box 19914
City/State/Zip Portland, OR 97216	City/State/Zip Portland, OR 97280
Email stevenm@axisdesigngroup.com	Email MilesR@go-summit.com
Phone 971-266-6919	Phone 503-702-2151
Signature 	Signature 

Staff Use Only

File #:	Date:	Fee\$:	Planner:
Type of review: Type I <input type="checkbox"/> Type II <input type="checkbox"/> Type III <input type="checkbox"/> Type IV <input type="checkbox"/>			
Has applicant attended a pre-app? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, date of pre-app meeting:			

Development Services Department, 39250 Pioneer Blvd, Sandy, OR 97055, 503.489.2160

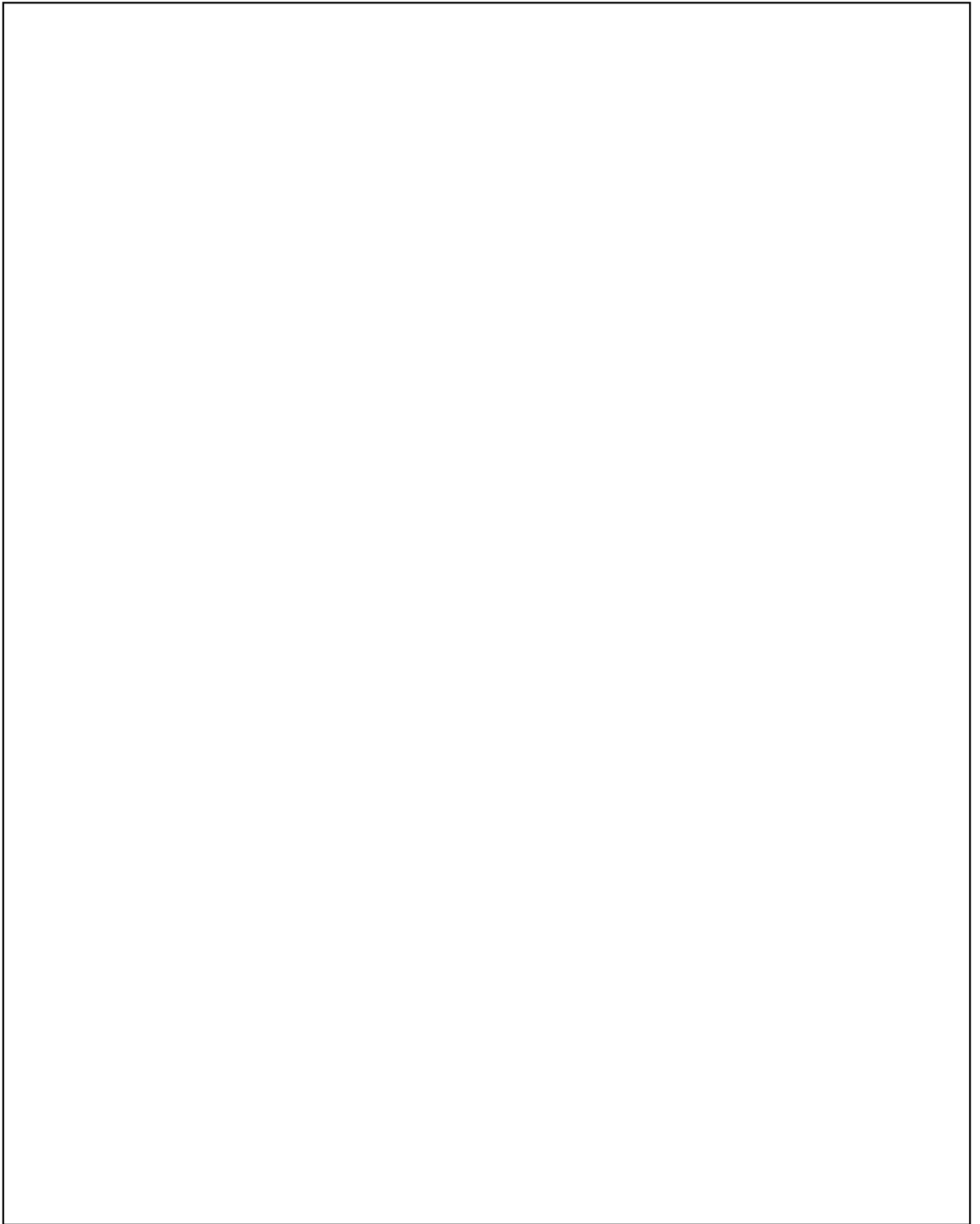
**Exhibit B**



THE PAD  
MULTI-FAMILY RESIDENTIAL DEVELOPMENT  
Design Review Application

JULY 16, 2021

PREPARED FOR:  
**MILES ROSTH**  
SITE ADDRESS:  
17650 Meinig Avenue  
Sandy, OR 97055



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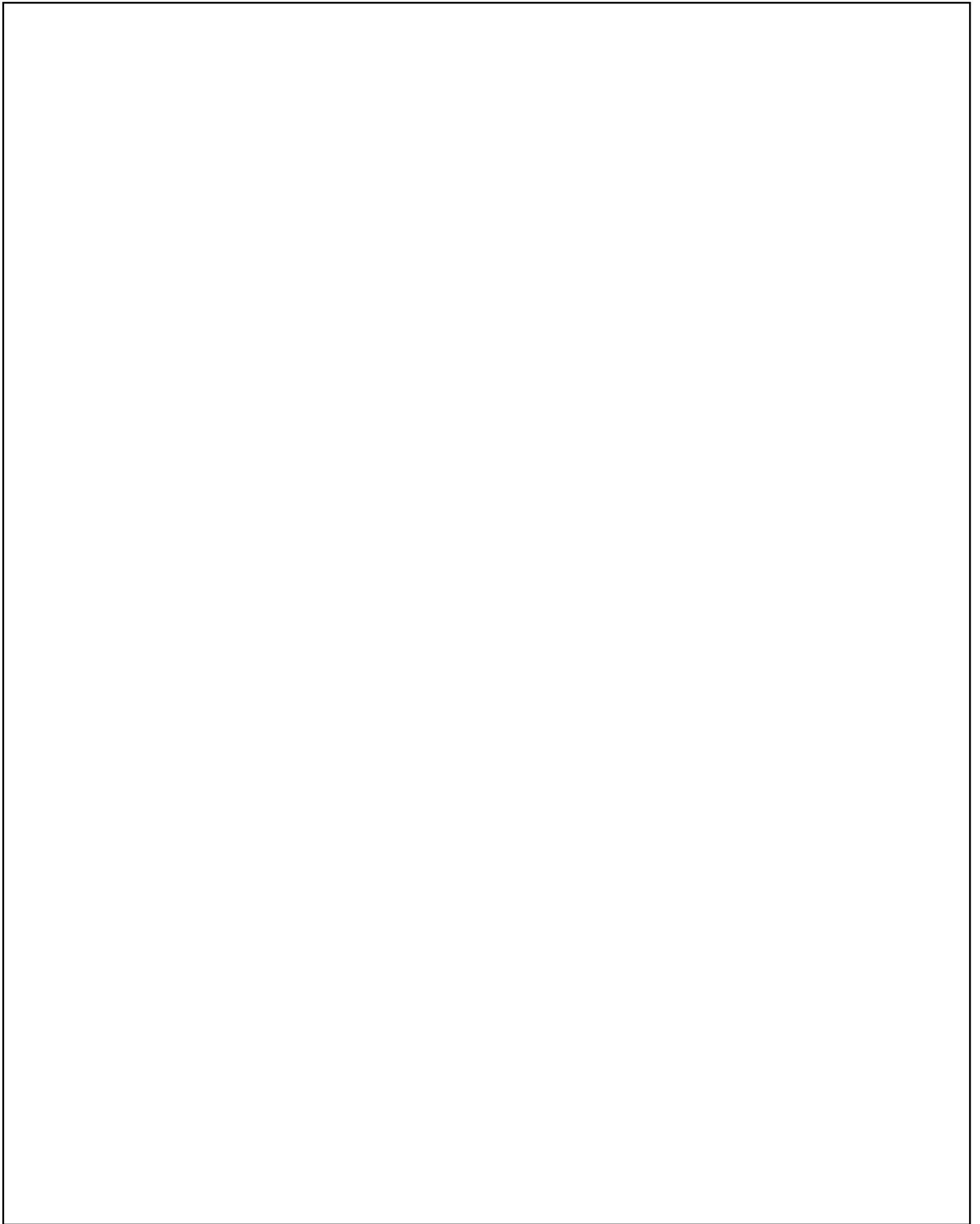
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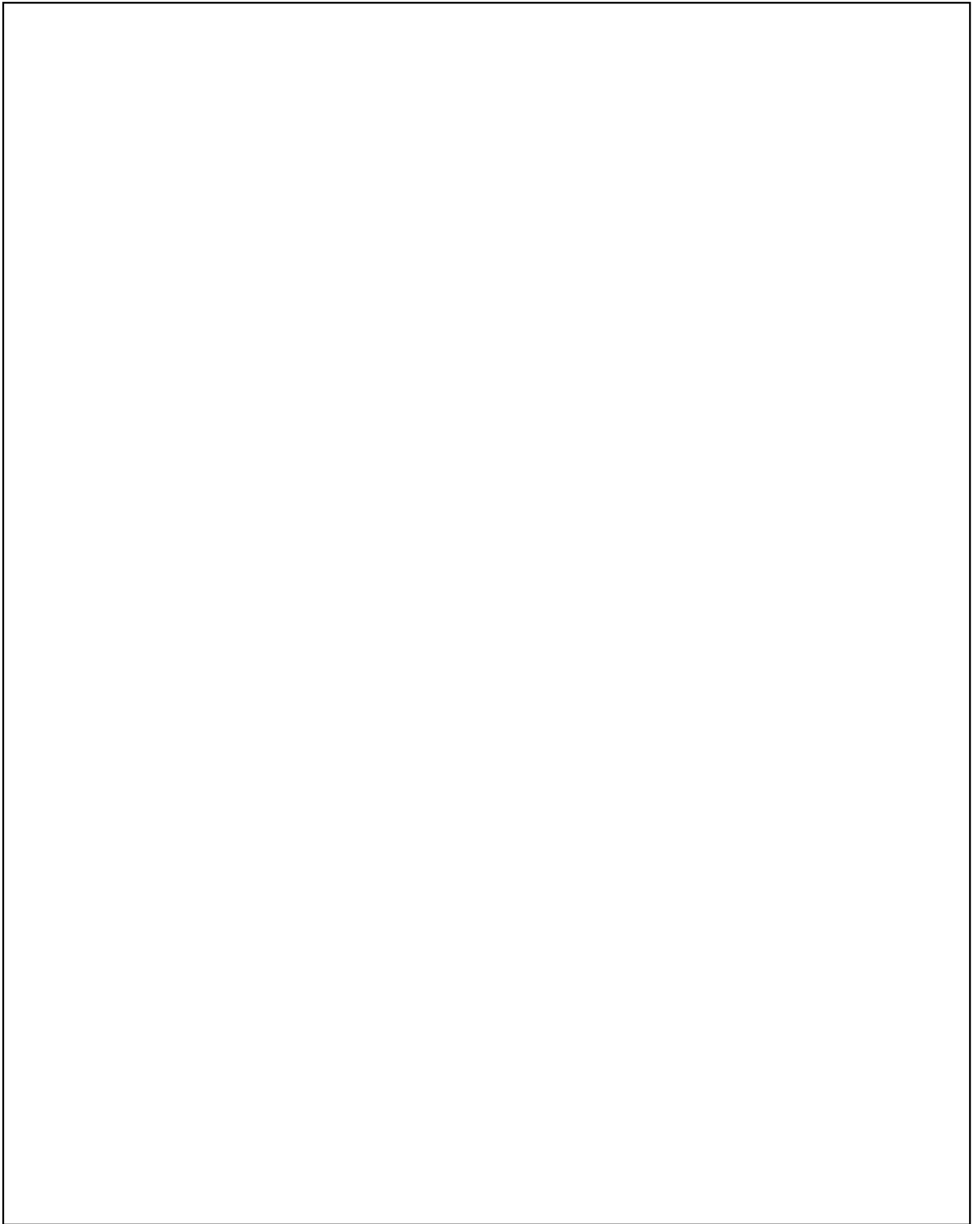


# SECTION I – INTRODUCTION TO DEVELOPMENT PROJECT

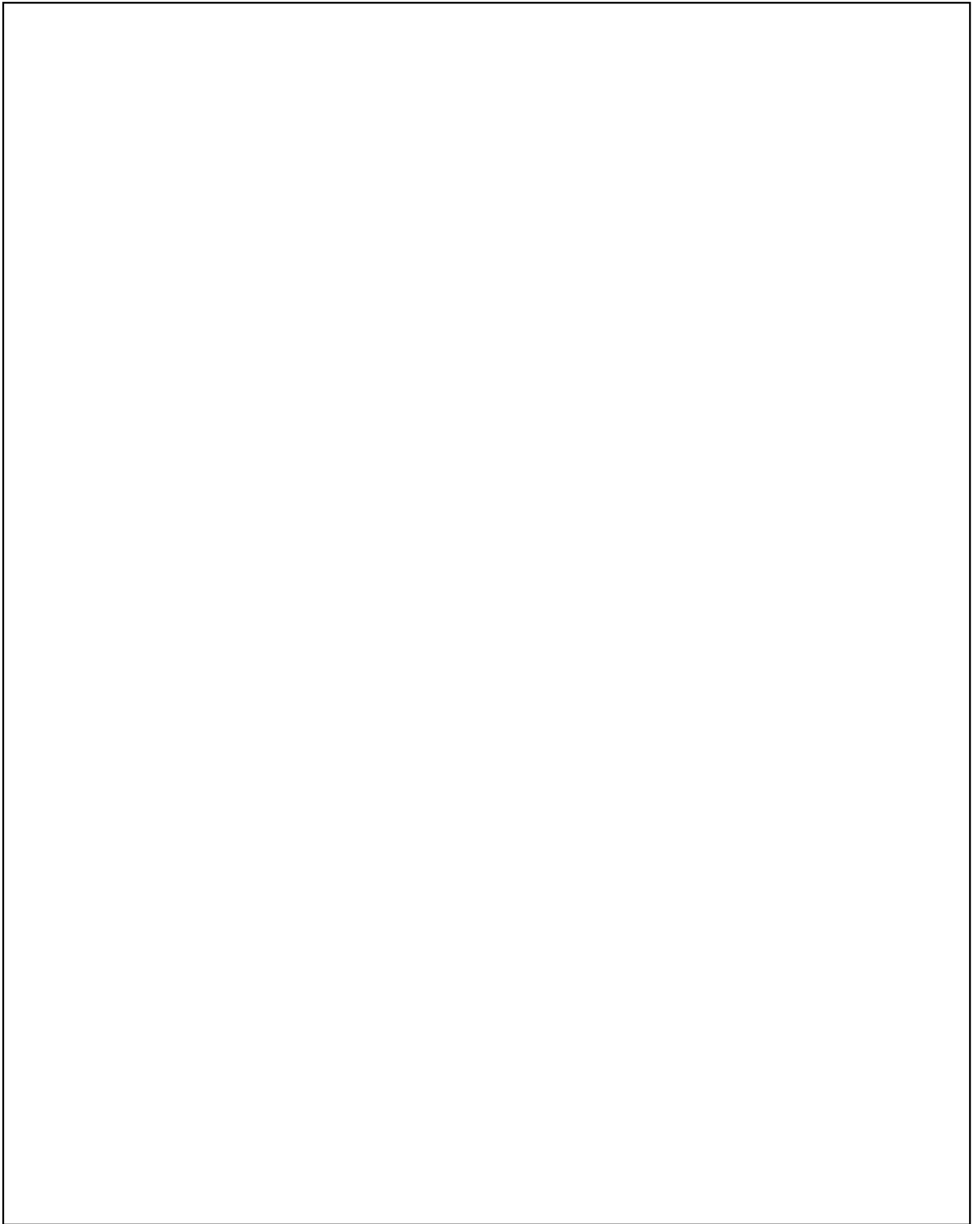
## **General Information**

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Applicant:	Steven Maguire, AIA AXIS Design Group Architecture & Engineering, Inc. 11104 S.E. Stark Street Portland, OR 97216
Phone:	503-284-0988
Email:	stevenm@axisdesigngroup.com
Owner:	<b>Miles Rusth</b> P.O. Box 19914 Portland, OR 97280
Phone:	503-702-2151
Project Name:	<b>The Pad</b> 17650 Meinig Avenue Sandy, OR 97055
Application Type:	Type II Design Review Type II Tree Removal Type II Adjustment Type II Variance
Parcel Number:	00663758
PropertyTax ID:	24E13DB01500
County:	Clackamas
Site Size:	25,869 S.F. (0.59 Acres)
Use:	Residential (Existing – No Change)
Zoning:	R3 – High Density Residential



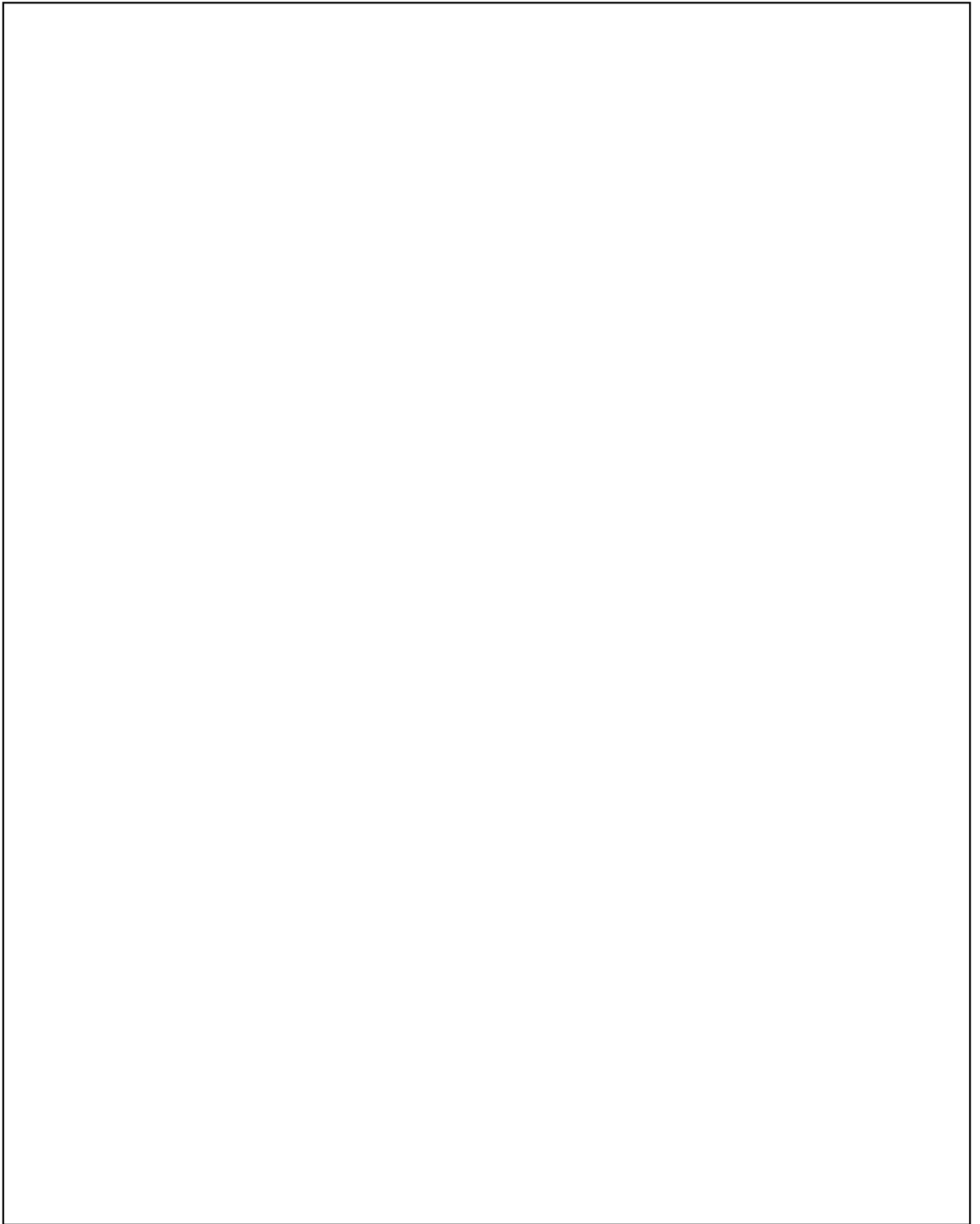
**SECTION II**  
**EXHIBIT A – PROJECT NARRATIVE**



**PROJECT NARRATIVE  
FOR  
THE PAD  
TOWNHOME APARTMENTS**



**July 2021**



## **I. General Project Description**

Miles Rusth is seeking design review approval to construct a 10-unit multi-family townhome project. The project site is located at 17650 Meinig Avenue in Sandy and is legally known as 24E 13DB tax lot 1500.

The entire property contains approximately 0.59 acres and is vacant. The property is zoned R-3, High Density Residential. The property borders Meinig Park along its southern boundary, Meinig Park and a city-owned parking lot along its eastern boundary, an access drive and the Veteran's Memorial along its northern boundary, and Highway 211 along its western boundary. The topography of the site slopes from north to south with about 32 feet of elevation difference between the northwest corner of the site and the southeast corner.

The applicant proposes constructing 10 townhouse style multi-family units in two buildings: Building A located in the northern portion of the site will contain four units and Building B located in the southern portion of the site includes six units. The development site will be accessed by a single driveway from Highway 211 and frontage improvements along this street will be completed as part of the project. The enclosed civil and architectural plans illustrate the details of the proposed project.

## **II. Application Approval Requests**

The applicant requests the following approvals with this application:

- Type II design review per the requirements of Section 17.90.160;
- Type II tree removal;
- Type II adjustment to Section 17.90.160(D);
- Type II variance to the front yard setback required by Section 17.80.20

## **III. Items Submitted With This Application**

- Land Use Application
- Notification List and Mailing Labels
- Exhibit A - Project Narrative (Tracy Brown Planning Consultants, LLC)
- Exhibit B - Civil Plans (Kurahashi and Associates)
  - Sheet C1 - Existing Conditions
  - Sheet C2 - Civil Site Design
  - Sheet C3 - Utility Plan
  - Sheet C4 - Grading and Erosion Control Plan
  - Sheet C5 - Tree Preservation Plan
- Exhibit C - Landscape Plans
  - Sheet L1.0 - Planting Plan
- Exhibit D - Architectural Plans (Axis Design Group)
  - Sheet A101 - Site Plan -Existing/Demo
  - Sheet A102 - Site Plan - Proposed
  - Sheet A201 - Floor Plans
  - Sheet A221 - Exterior Elevations Building A

- Sheet A222 - Exterior Elevations Building B
- Exhibit E - Lighting Plan/Photometric Analysis
- Exhibit F - Materials Selections
  - Paint colors, siding, and roofing
- Exhibit G - Preliminary Stormwater Report (Kurahashi and Associates)
- Exhibit H - Traffic Impact Study (Ard Engineering)
- Exhibit I - Initial Arborist Report (Portland Tree Consultancy)

#### IV. Review of Applicable Approval Criteria

Development applications are required to meet development standards set forth in the Sandy Development Code, codified as Title 17 of the Municipal Code. The following section addresses all applicable review criteria. Pertinent code provisions are cited below followed by a response in *italics* identifying how the proposal complies with this standard. The following code chapters have been reviewed in this narrative:

Chapter	Title
17.30	Zoning District
17.40	High Density Residential (R-3)
17.60	Flood and Slope Hazard Overlay
17.66	Adjustments & Variances
17.80	Additional Setbacks on Collector and Arterial Streets
17.84	Improvements Required with Development
17.86	Parkland and Open Space
17.90	Design Standards
17.92	Landscaping and Screening
17.98	Parking, Loading, and Access Requirements
17.102	Urban Forestry
15.30	Dark Sky Ordinance

#### 17.30.00 ZONING DISTRICT DESIGNATIONS

**Response:** The subject property is identified on the City of Sandy Zoning Map to be zoned R-3, High Density Residential.

#### 17.30.20 RESIDENTIAL DENSITY CALCULATION PROCEDURE

The number of dwelling units permitted on a parcel is calculated after the determination of the net site area and the acreage of any restricted development areas (as defined by Chapter 17.60). Limited density transfers are permitted from restricted development areas to unrestricted areas consistent with the provisions of the Flood and Slope Hazard Area Overlay District, Chapter 17.60.

**Response:** *The applicant proposes a single development site and the proposed development site contains a gross site area of 0.59 acres. The entire property is zoned R-3, High Density Residential. There are no roadway dedications or public tracts, so the net site area is the same as the gross area. The R-3 zone requires a minimum of 10 and allows a maximum of 20 units per net acre. The minimum density is calculated by multiplying the net site area x the required minimum density (0.59 acres x 10 = 5.9 units*



rounded up to 6 units). The maximum density is determined by multiplying the net site area x the maximum density (0.59 x 20 = 11.8 rounded up to 12 units).

As a result of these calculations the density range for the subject property is a minimum of 6 units and a maximum of 12 units. The applicant proposes 10 units which falls within the required density range.

**CHAPTER 17.40 - HIGH DENSITY RESIDENTIAL (R-3)**

**17.34.00 - INTENT**

This district is intended to implement the High Density Residential Comprehensive Plan designation by providing for housing in close proximity to retail, public amenities; major transportation routes and transit services where public sewer, water and other services are readily accessible. R-3 uses are designed to be a transition area between commercial and industrial uses and low density single family uses. Pedestrian connections are required to ensure a direct walking route to retail shops. All development shall also provide access to the surrounding neighborhood with excellent linkage between residential areas, schools, parks, and commercial. Density shall not be less than 10 or more than 20 units per net acre.

**Response:** As reviewed above the applicant is proposing 10 units in compliance with the density range required by the R-3 zone for this property.

**17.40.10 - PERMITTED USES**

A. Primary Uses Permitted Outright:

6. Multi-family dwellings.

**Response:** The applicant proposes constructing a multi-family dwelling which is a permitted outright use in this zoning district.

**17.40.30 - DEVELOPMENT STANDARDS**

Type	Standard	Proposed
Minimum Average Lot Width - Single detached dwelling - Detached zero lot line - Attached zero lot line - Other permitted uses	40 ft. 30 ft. 20 ft. No minimum	A multi-family project is proposed
Minimum Lot Frontage	20 ft. except as allowed by Section 17.100.160	The subject property contains about 235 feet of frontage in compliance with this standard.
Minimum Average Lot Depth	No minimum	No minimum is required
Setbacks (Main Building) Front yard  Rear yard Side yard (interior) Corner Lot Garage	10 ft. minimum  15 ft. minimum 5 ft. minimum 10 ft. minimum on side abutting the street 20 ft. for front vehicle access	The building closet to the front is 10ft 7in from this property line (complies) 15-feet (complies) 5-feet south, 11ft 5in north N/A N/A
Projections into Required Setbacks	See Chapter 17.74	The requirements of the section will be reviewed with submittal of building plans.

Accessory Structures in Required Setbacks	See Chapter 17.74	The requirements of the section will be reviewed with submittal of building plans.
Multi-family - Landscaping Setbacks	25% See Section 17.90.230	33% of the site will be landscaped. The reference in this section should be 17.90.160. This section is reviewed below.
Structure Height	35 ft. maximum	Approximately 22 feet
Building Site Coverage	No minimum	No minimum is required
Landscaping	See Chapter 17.92	Addressed below.
Off-Street Parking	See Chapter 17.98	Addressed below.

**Response:** For the purposes of determining setbacks, the Highway 211/Meinig Avenue frontage of the property is considered the front lot line, the sides are the northern and southern property lines and the eastern line is the rear lot line. As shown in the table above, the proposal complies with all Development Standards in this section.

#### 17.40.40 - MINIMUM REQUIREMENTS

- A. Must connect to municipal water.  
**Response:** The proposed project will be connected to City water.
- B. Must connect to municipal sewer.  
**Response:** The project will be connected to sanitary sewer service.
- C. The location of any real improvements to the property must provide for a future street network to be developed.  
**Response:** Because of the location of the subject property, no street connections are anticipated.
- D. Must have frontage or approved access to public streets.  
**Response:** The subject property will be developed as a single parcel. This parcel has frontage on Highway 211/Meinig Avenue as required. A single access is proposed.

#### 17.40.50 - ADDITIONAL REQUIREMENTS

- A. Design review as specified in Chapter 17.90 is required for all uses.  
**Response:** The multi-family design standards in Section 17.90.160, are applicable to residential developments. The requirements of this section are reviewed below.
- B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.  
**Response:** The subject property contains more than 40 feet of frontage. All units will be access by a single private driveway.

### CHAPTER 17.60 - FLOOD AND SLOPE HAZARD (FSH) OVERLAY

#### 17.60.10 - INTERPRETATION AND MAPPING

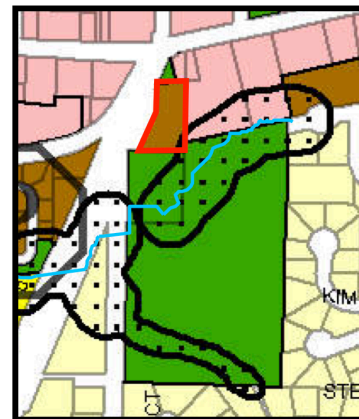
The Director has the ultimate responsibility for maintaining the FSH Overlay District on the City of Sandy Zoning Map, determining on-site measuring methods, and otherwise interpreting the provisions of this chapter. Technical terms used in this chapter are defined in Chapter 17.10, Definitions. This chapter does not regulate development on lots or parcels entirely outside the FSH Overlay District.

- A. FSH Overlay District. The only areas subject to the restrictions and prohibitions of the FSH overlay district are those indicated on the City of Sandy Zoning Map on file in the Planning Department. This chapter does not regulate lots or parcels entirely outside the FSH Overlay District.

**Response:** *The city's Zoning Map dated July 17, 2020 shows a very small portion of FSH Overlay associated with No Name Creek mapped at the southeast corner of the subject property.*

- B. Development Approval Required. No development shall occur within the FSH overlay district without first obtaining City approval under the provisions of this chapter. The Director shall notify the Oregon Division of State Lands whenever any inventoried wetland is proposed for development, in accordance with ORS 227.350. In riverine situations, the Director shall notify adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notification to the administrator.

**Response:** *As shown on submitted plans, a small portion of the south east corner of Building B is proposed within the FSH Overlay.*



- C. Applicant Responsibilities. The applicant for alteration or development within the FSH overlay district shall be responsible for preparing a survey of the entire site, based on site specific field surveys or Corps of Engineers data that precisely maps and delineates the following areas:

1. The name, location and dimensions of affected streams or rivers, and the tops of their respective banks.

**Response:** *All of this information is provided.*

2. 100-year floodplain and floodway boundaries and elevations as determined by the June 17, 2008 FIS for Clackamas County and Incorporated Areas.

**Response:** *The 100-year floodplain or floodway boundaries have not been identified for this portion of No Name Creek and does not affect the subject property.*

3. The City of Sandy FSH overlay district boundary as depicted on the City of Sandy FSH Map.
4. The water quality and slope setback area(s) as defined in Section 17.60.30.

5. The size and location of locally significant wetlands shall be determined based on the City of Sandy Locally Significant Wetland Inventory (2002) unless modified by a wetland delineation approved by the Oregon Division of State Lands and submitted to the City. Wetland delineations that have formal concurrence from the Division of State Lands shall be valid for the period specified in that agency's administrative rules.
6. Steep slope areas where the slope of the land is 25% or greater within the FSH overlay district boundary.
7. The area enclosed by a continuous line, measured 25 feet horizontally, parallel to and upland from the top of a steep slope area, where the top of the steep slope is within the FSH overlay district boundary.
8. Existing public rights-of-way, structures, roads and utilities.
9. Natural vegetation, including trees or tree clusters and understory within the FSH Overlay District boundary.
10. Existing and proposed contours at 2-foot intervals.

*Response: The applicant has shown the FSH Overlay on the plan set.*

#### **17.60.20 - PERMITTED USES AND ACTIVITIES**

- A. Restricted Development Areas. Restricted development areas within the FSH overlay district as shown on the City of Sandy Zoning Map include:

1. Slopes of 25% or greater that (a) encompass at least 1,000 square feet and (b) have an elevation differential of at least 10 feet.
2. Protected water features, including locally significant wetlands, wetland mitigation areas approved by the Division of State Lands, and perennial streams.
3. Required setback areas as defined in section 17.60.30.

*Response: Although development is proposed within the FSH Overlay, no development is proposed within a restricted development area.*

- B. Permitted Uses. Permitted uses within restricted development areas are limited to the following:

1. Open space and trails provided they are constructed consistent with standards on file in the Planning Department.
3. Planting of native vegetation species included on a list maintained by the Director.
4. Removal of non-native / invasive vegetation, dead or dying trees or vegetation that is hazardous to the public.
5. Removal of up to two trees of 6 inches or greater dbh in a calendar year, provided that each tree removed is replaced with two native trees, each of which must be 1.5 inches or greater caliper and placed within the restricted development area of the site.
6. Construction or expansion of public facilities or private roads necessary to support permitted development.

*Response: This section is not applicable because no development is proposed within a restricted development area.*

#### **17.60.30 - REQUIRED SETBACK AREAS**

- A. Required Setbacks. The required special setback(s) shall be:

1. 70 feet from the top of bank of Tickle Creek;
2. 50 feet from top of bank along other perennial streams, except for “No Name Creek” east of Towle Drive, as provided in Section 17.60.30.C.2 below.
3. 25 feet around the edge of any mapped locally significant wetland; and
4. 25 feet from the top of any 25% slope break where the slope break occurs within the FSH overlay district as mapped by the city.

*Response: This section is not applicable because no development is proposed within 50 feet of “No Name Creek” or within 25 feet of any 25% slope within the FSH.*

- B. **Minimize Impacts.** Natural vegetation shall be preserved and enhanced and excavation minimized within required water quality setback areas.

*Response: No development is proposed within a restricted development area.*

#### **17.60.40 - REVIEW PROCEDURES**

Review of development requests within the FSH Overlay District shall occur subject to the following procedures. Unless otherwise indicated below, the Director may approve Type I permits over the counter or following a field check. Type II and III development applications shall be reviewed to ensure consistency with Section 17.60.60-70. Section 17.60.50 special reports shall also be required, unless specifically exempted by the Director.

*Response: No special reports have been requested by the city with this application.*

#### **17.60.50 - SPECIAL REPORTS**

Where development is proposed on restricted development areas within the FSH overlay district as defined in Section 17.60.20.A, the Director shall require submission of the following special reports. These reports shall be in addition to other information required for specific types of development, and shall be prepared by professionals in their respective fields.

The Director may require one of more of these reports where necessary to address potential adverse impacts from development on buildable land within the FSH overlay district. The Director may exempt Type II permit applications from one or more of these reports where impacts are minimal and the exemption is consistent with the purpose of the FSH overlay zone as stated in Section 17.60.00.

- A. Hydrology and Soils Report.
- B. Grading Plan.
- C. Native Vegetation Report.

*Response: No special reports have been requested by the city with this application.*

#### **CHAPTER 17.66 - ADJUSTMENTS AND VARIANCES**

As reviewed in this narrative the proposal complies with all relevant code criteria with the exception of the following:

- Section 17.90.160(D); and,
- Section 17.80.20

For this reason the applicant is requesting a Type II Adjustment to Section 17.90.160(D) and a Type II Variance to Section 17.80.20.

**17.66.40. - TYPE I AND II ADJUSTMENT CRITERIA**

The applicant is requesting a Type II adjustment to Section 17.90.160(D) requiring the vertical face of a structure facing a public street, pedestrian way, or an abutting residential use to provide an eight foot offset every 20 feet. As shown on submitted plans, the design features an eight foot recessed entry every 24 feet. As such, the applicant is requesting a Type II adjustment (20%) to exceed the 20 foot standard by four feet.

- A. The proposed development will not be contrary to the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City;

*Response: Approval of a four foot increase in this standard will not affect the functioning or aesthetics of the proposed design or any other adopted policy or standard.*

- B. The proposed development will not substantially reduce the amount of privacy enjoyed by users of nearby structures when compared to the same development located as specified by this Code;

*Response: Approval of this request to widen the building facade by four feet without an offset will have not affect on the amount of privacy enjoyed by users of nearby structures.*

- C. The proposed development will not adversely affect existing physical systems and natural systems, such as traffic, drainage, dramatic land forms, or parks; and

*Response: Approval of this request to widen the building facade by four feet without an offset will have not adversely affect traffic, drainage, land forms, or parks.*

- D. Architectural features of the proposed development will be compatible to the design character of existing structures on adjoining properties and on the proposed development site.

*Response: The subject property is not adjoining any existing structures and the site is currently vacant. The nearest structures are Joe's Donuts, City Hall, and a building located across Meinig Avenue at 39150 Pioneer Blvd. All of these older structures are different from each other and are not designed according to current standards. The proposed building is designed in compliance with adopted design standards with this exception of the requested standard. The requested adjustment will not affect the aesthetic quality of the proposed design and the proposal complies with this criteria.*

**17.66.70 TYPE II VARIANCE CRITERIA**

The authority to grant a variance does not include authority to approve a development that is designed, arranged or intended for a use not otherwise approvable in the location. The criteria are as follows:

*Request: The applicant requests a Type II variance to Section 17.80.20 requiring any structure located on an arterial or collector street identified on the TSP to provide a 20*

foot minimum setback. The subject property abuts Highway 211, a major arterial requiring a 20 foot setback. The applicant requests a Variance to reduce the front setback along this frontage to 10 feet 7-inches for Building A and 13 feet 11-inches for Building B. This variance has been requested to allow the property to more efficiently be developed and to utilize the extra wide right-of-way abutting the site's frontage. With the increased right-of-way width adjacent to the site, Building A will be located about 30 feet and Building B about 50 feet from the curb line along this frontage.

- A. The circumstances necessitating the variance are not of the applicant's making.  
**Response:** The proposed variance to Section 17.80.20 has been requested to allow the subject property to more efficiently be developed and to use the unique attributes of the site. The subject property contains 0.59 acres and is bordered by Highway 211/Meinig Road on its western boundary and by city owned property on the other three sides. The site contains a considerable slope down from north to south requiring construction of a retaining wall and Building B to be constructed with a large crawl space. The applicant considered the option of requesting a variance to the rear yard setback instead of the front setback, however, due to the location of existing trees along the rear property line and the extra wide right-of-way in front of the property (western property line), the submitted variance request is the preferred option.
- B. The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.  
**Response:** The intent of Chapter 17.80, Additional Setbacks on Arterial and Collector Streets as stated in Section 17.80.10, is to "provide better light, air and vision on more heavily traveled streets". The requested variance to reduce the front yard setback is due to site specific conditions including the existing slope of the property, access limitations, the site's proximity to city owned properties, and the location of existing trees along the eastern line of the site. In addition, the proposed unit count falls within the middle of the allowed density range and the applicant determine this count cannot be reduced and still have an economically feasible project. As proposed, with the additional right-of-way existing in front of the property all structures will exceed the 20 foot setback required by Chapter 17.80.
- C. Granting of the variance will not adversely affect implementation of the Comprehensive Plan.  
**Response:** Approval of the requested variance will not adversely affect implementation of the Comprehensive Plan. On the contrary, approval of this variance ensures the subject property is developed in accordance with the goals and policies of the Plan.
- D. The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.  
**Response:** Approval of the variance will not be materially detrimental to the public welfare or injurious to other property in the vicinity of the subject property. In fact, because of the location and site specific conditions, approval of the requested variance will not affect any property in the vicinity of the subject property. As

*noted above, all units will be located greater than the required minimum 20 foot setback to the Highway 211/Meinig Avenue.*

- E. The development will be the same as development permitted under this Code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.

*Response: Approval of the variance will allow the subject property to be developed in an efficient manner as is anticipated by the City's Comprehensive Plan and Zoning Map. All units will be located greater than 20 feet from Highway 211/Meinig Avenue as desired by Chapter 17.80. Approval of the requested variance will allow the property to be developed in a similar manner as other properties permitted under the Code.*

- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.

*Response: The subject property contains special circumstances in that the property is located along Highway 211/Meinig Avenue and is surrounded by city owned property and Meinig Park on three sides. The extra wide right-of-way abutting the western boundary of the property is also a condition that is not typical of other properties. This feature provides the added setback and buffer distance desired by Section 17.80.20 to ensure livability of the developed units is protected. As shown on the Site Plan, Building A will be located about 10 feet further from this road than is required (30 feet) and Building B about 20 feet further (50 feet) than is required by this section.*

## **CHAPTER 17.80 - ADDITIONAL SETBACKS ON COLLECTOR AND ARTERIAL STREETS**

### **17.80.10 - APPLICABILITY**

These regulations apply to all collector and arterial streets as identified in the latest adopted Sandy Transportation System Plan (TSP). The Central Business District (C-1) is exempt from Chapter 17.80 regulations.

**Response:** The subject property is zoned High Density Residential (R-3) and abuts Highway 211, a major arterial street classified in the TSP.

### **17.80.20 SPECIFIC SETBACKS**

Any structure located on streets listed above or identified in the Transportation System Plan as arterials or collectors shall have a minimum setback of 20 feet measured from the property line. This applies to applicable front, rear and side yards.

**Response:** This section requires a 20-foot setback to any structure along the front yard of this property. *As shown on submitted plans, due to site specific constraints, the applicant is proposing to place a portion of Building A, 10 feet 7-inches and Building B, 13 feet 11-inches from the front property line. A Variance to this section has been requested as detailed in Chapter 17.66 above.*



## **CHAPTER 17.84 - IMPROVEMENTS REQUIRED WITH DEVELOPMENT**

### **17.84.20 - TIMING OF IMPROVEMENTS**

- A. All improvements required by the standards in this chapter shall be installed concurrently with development, as follows:
1. Where a land division is proposed, each proposed lot shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to approval of the final plat.  
*Response: A land division is not proposed.*
  2. Where a land division is not proposed, the site shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to temporary or final occupancy of structures.  
*Response: The applicant intends to install all required public and franchise utilities prior to occupancy.*
- B. Where specific approval for a phasing plan has been granted for a planned development and/or subdivision, improvements may similarly be phased in accordance with that plan.  
*Response: The section is not applicable.*

### **17.84.30 - PEDESTRIAN AND BICYCLIST REQUIREMENTS**

- A. Sidewalks shall be required along both sides of all arterial, collector, and local streets, as follows:
1. Sidewalks shall be a minimum of 5 ft. wide on local streets. The sidewalks shall be separated from curbs by a tree planting area that provides separation between sidewalk and curb, unless modified in accordance with Subsection 3 below.  
*Response: This section is not applicable.*
  2. Sidewalks along arterial and collector streets shall be separated from curbs with a planting area, except as necessary to continue an existing curb-tight sidewalk. The planting area shall be landscaped with trees and plant materials approved by the City. The sidewalks shall be a minimum of 6 ft. wide.  
*Response: A nine-foot wide sidewalk is proposed to be constructed along the Highway 211 Road frontage.*
  3. Sidewalk improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building. Any exceptions to the standards shall generally be in the following order.
    - a) Narrow landscape strips
    - b) Narrow sidewalk or portion of sidewalk to no less than 4 feet in width
    - c) Eliminate landscape strips
    - d) Narrow on-street improvements by eliminating on-street parking

e) Eliminate sidewalks

**Response:** *No exceptions or modifications to the sidewalk standards of this section are requested with this application.*

4. The timing of the installation of sidewalks shall be as follows:

- a) Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.
- b) Sidewalks along local streets shall be installed in conjunction with development of the site, generally with building permits, except as noted in (c) below.
- c) Where sidewalks on local streets abut common areas, drainageways, or other publicly owned or semi-publicly owned areas, the sidewalks and planted areas shall be installed with street improvements.

**Response:** *The applicant intends constructing all sidewalk improvements as required by this section.*

B. Safe and convenient pedestrian and bicyclist facilities that strive to minimize travel distance to the extent practicable shall be provided in conjunction with new development within and between new subdivisions, planned developments, commercial developments, industrial areas, residential areas, public transit stops, school transit stops, and neighborhood activity centers such as schools and parks, as follows:

1. For the purposes of this section, “safe and convenient” means pedestrian and bicyclist facilities that: are reasonably free from hazards which would interfere with or discourage travel for short trips; provide a direct route of travel between destinations; and meet the travel needs of pedestrians and bicyclists considering destination and length of trip.

**Response:** *No pedestrian or bicycle facilities other than sidewalks are proposed.*

2. To meet the intent of “B” above, right-of-ways connecting cul-de-sacs or passing through unusually long or oddly shaped blocks shall be a minimum of 15 ft. wide with 8 feet of pavement.

**Response:** *As noted above, none of these facilities are proposed.*

3. 12 feet wide pathways shall be provided in areas with high bicycle volumes or multiple use by bicyclists, pedestrians, and joggers.

**Response:** *This section is not applicable.*

4. Pathways and sidewalks shall be encouraged in new developments by clustering buildings or constructing convenient pedestrian ways. Pedestrian walkways shall be provided in accordance with the following standards:

- a) The pedestrian circulation system shall be at least five feet in width and shall connect the sidewalk on each abutting street to the main entrance of the primary structure on the site to minimize out of direction pedestrian travel.

- b) Walkways at least five feet in width shall be provided to connect the pedestrian circulation system with existing or planned pedestrian facilities which abut the site but are not adjacent to the streets abutting the site.
- c) Walkways shall be as direct as possible and avoid unnecessary meandering.  
**Response:** *Each building cluster is proposed to include a five foot sidewalk separating the structure from parking.*
- d) Walkway/driveway crossings shall be minimized. Internal parking lot design shall maintain ease of access for pedestrians from abutting streets, pedestrian facilities, and transit stops.
- e) With the exception of walkway/driveway crossings, walkways shall be separated from vehicle parking or vehicle maneuvering areas by grade, different paving material, painted crosshatching or landscaping. They shall be constructed in accordance with the sidewalk standards adopted by the City. (This provision does not require a separated walkway system to collect drivers and passengers from cars that have parked on site unless an unusual parking lot hazard exists).
- f) Pedestrian amenities such as covered walk-ways, awnings, visual corridors and benches will be encouraged. For every two benches provided, the minimum parking requirements will be reduced by one, up to a maximum of four benches per site. Benches shall have direct access to the circulation system.  
**Response:** *The requirements of these sections are not applicable to the proposal.*

C. Where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80.

**Response:** *No trails are identified in the City's Transportation System Plan or Parks Master Plan on the subject property. This section is not applicable.*

D. To provide for orderly development of an effective pedestrian network, pedestrian facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).

**Response:** *No pedestrian facilities except those noted above are proposed.*

E. To ensure improved access between a development site and an existing developed facility such as a commercial center, school, park, or trail system, the Planning Commission or Director may require off-site pedestrian facility improvements concurrent with development.

**Response:** *No off-site pedestrian improvements have been identified.*

#### **17.84.40 - TRANSIT AND SCHOOL BUS TRANSIT REQUIREMENTS**

A. Development sites located along existing or planned transit routes shall, where appropriate, incorporate bus pull-outs and/or shelters into the site design. These improvements shall be installed in accordance with the guidelines and standards of the transit agency. School bus pull-outs and/or shelters may also be required,

where appropriate, as a condition of approval for a residential development of greater than 50 dwelling units where a school bus pick-up point is anticipated to serve a large number of children.

**Response:** *The proposed project contains 10 units. No transit facilities are proposed or warranted.*

- B. New developments at or near existing or planned transit or school bus transit stops shall design development sites to provide safe, convenient access to the transit system, as follows:
1. Commercial and civic use developments shall provide a prominent entrance oriented towards arterial and collector streets, with front setbacks reduced as much as possible to provide access for pedestrians, bicycles, and transit.
  2. All developments shall provide safe, convenient pedestrian walkways between the buildings and the transit stop, in accordance with the provisions of 17.84.30 B.

**Response:** *The proposed project complies with the requirements of this section.*

#### **17.84.50 - STREET REQUIREMENTS**

- A. Traffic evaluations may be required of all development proposals in accordance with the following:

1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.
2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.

**Response:** *A Traffic Impact Study prepared by Ard Engineering is included with this application as requested by the City. This study recommends a center median in Highway 211 be constructed or in the alternative site access be restricted to right-in, right-out only through the installation of a pork-chop diverter.*

- B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

1. Arterial streets should generally be spaced in one-mile intervals.
2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.

**Response:** *No new arterial streets are required as part of this project.*

- C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, “through traffic” means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:
1. Straight segments of local streets should be kept to less than a quarter mile in length. As practical, local streets should include traffic calming features, and design features such as curves and “T” intersections while maintaining pedestrian connectivity.
  2. Local streets should typically intersect in “T” configurations rather than 4-way intersections to minimize conflicts and discourage through traffic. Adjacent “T” intersections shall maintain a minimum of 150 ft. between the nearest edges of the 2 rights-of-way.  
**Response:** *These sections are not applicable.*
  3. Cul-de-sacs should generally not exceed 400 ft. in length nor serve more than 20 dwelling units, except in cases where existing topography, wetlands, or drainage systems or other existing features necessitate a longer cul-de-sac in order to provide adequate access to an area. Cul-de-sacs longer than 400 feet or developments with only one access point may be required to provide an alternative access for emergency vehicle use only, install fire prevention sprinklers, or provide other mitigating measures, determined by the City.  
**Response:** *This section is not applicable.*
- D. Development sites shall be provided with access from a public street improved to City standards in accordance with the following:
1. Where a development site abuts an existing public street not improved to City standards, the abutting street shall be improved to City standards along the full frontage of the property concurrent with development.  
**Response:** *A single access drive from Highway 211 Road is proposed.*
  2. Half-street improvements are considered the minimum required improvement. Three quarter-street or full-street improvements shall be required where traffic volumes generated by the development are such that a half-street improvement would cause safety and/or capacity problems. Such a determination shall be made by the City Engineer.  
**Response:** *The applicant plans to construct sidewalk improvements along the Highway 211 frontage.*
  3. To ensure improved access to a development site consistent with policies on orderly urbanization and extension of public facilities the Planning Commission or Director may require off-site improvements concurrent with development. Off-site improvement requirements upon the site developer shall be reasonably related to the anticipated impacts of the development.  
**Response:** *No off-site improvements have been identified or are warranted with construction of this project.*

**17.84.60 - PUBLIC FACILITY EXTENSIONS**

- A. All development sites shall be provided with public water, sanitary sewer, broadband (fiber), and storm drainage.

*Response: The submitted Utility Plan shows the location of water, sanitary sewer, and stormwater drainage facilities. All facilities on the site are anticipated to be private. Broadband fiber service will be detailed on building plans.*

- B. Where necessary to serve property as specified in “A” above, required public facility installations shall be constructed concurrent with development.

*Response: All utilities identified above will be constructed concurrent with the proposed development.*

- C. Off-site public facility extensions necessary to fully serve a development site and adjacent properties shall be constructed concurrent with development.

*Response: The applicant will extend all utilities as necessary to serve the development as required by this section.*

- D. As necessary to provide for orderly development of adjacent properties, public facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).

*Response: No public facilities are required to be extended through the site to the edge of adjacent properties.*

- E. Private on-site sanitary sewer and storm drainage facilities may be considered provided all the following conditions exist:

*Response: All facilities onsite will be private.*

**17.84.70 - PUBLIC IMPROVEMENT PROCEDURES**

*Response: The applicant is aware of and intends to comply with the requirements of this section.*

**17.84.80 - FRANCHISE UTILITY INSTALLATIONS**

These standards are intended to supplement, not replace or supersede, requirements contained within individual franchise agreements the City has with providers of electrical power, telephone, cable television, and natural gas services (hereinafter referred to as “franchise utilities”).

- A. Where a land division is proposed, the developer shall provide franchise utilities to the development site. Each lot created within a subdivision shall have an individual service available or financially guaranteed prior to approval of the final plat.

*Response: This section is not applicable.*

- B. Where necessary, in the judgment of the Director, to provide for orderly development of adjacent properties, franchise utilities shall be extended through the site to the edge of adjacent property(ies), whether or not the development involves a land division.

*Response: The applicant does not anticipate extending franchise utilities beyond the site.*

C. The developer shall have the option of choosing whether or not to provide natural gas or cable television service to the development site, providing all of the following conditions exist:

1. Extension of franchise utilities through the site is not necessary for the future orderly development of adjacent property(ies);
2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above); and
3. The development is non-residential.

**Response:** *The applicant anticipates installing natural gas and cable television service as required.*

D. Where a land division is not proposed, the site shall have franchise utilities required by this section provided in accordance with the provisions of 17.84.70 prior to occupancy of structures.

**Response:** *This section is not applicable.*

E. All franchise utility distribution facilities installed to serve new development shall be placed underground except as provided below. The following facilities may be installed aboveground:

1. Poles for street lights and traffic signals, pedestals for police and fire system communications and alarms, pad mounted transformers, pedestals, pedestal mounted terminal boxes and meter cabinets, concealed ducts, substations, or facilities used to carry voltage higher than 35,000 volts;
2. Overhead utility distribution lines may be permitted upon approval of the City Engineer when unusual terrain, soil, or other conditions make underground installation impracticable. Location of such overhead utilities shall follow rear or side lot lines wherever feasible.

**Response:** *All franchise utilities will be installed underground in compliance with this section.*

F. The developer shall be responsible for making necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.

**Response:** *The developer will make all necessary arrangements with franchise utility providers as required by this section.*

G. The developer shall be responsible for installation of underground conduit for street lighting along all public streets improved in conjunction with the development in accordance with the following:

1. The developer shall coordinate with the City Engineer to determine the location of future street light poles. The street light plan shall be designed to provide illumination meeting standards set by the City Engineer.

2. The developer shall make arrangements with the serving electric utility for trenching prior to installation of underground conduit for street lighting.  
*Response: The developer will install underground conduit for street lighting in accordance with the requirements of this section as necessary.*

#### **17.84.90 - LAND FOR PUBLIC PURPOSES**

- A. Easements for public sanitary sewer, water, storm drain, pedestrian and bicycle facilities shall be provided whenever these facilities are located outside a public right-of-way in accordance with the following:
  1. When located between adjacent lots, easements shall be provided on one side of a lot line.
  2. The minimum easement width for a single utility is 15 ft. The minimum easement width for two adjacent utilities is 20 ft. The easement width shall be centered on the utility to the greatest extent practicable. Wider easements may be required for unusually deep facilities.  
*Response: No easements are required with this development.*
- B. Public utility easements with a minimum width of 5 feet shall be provided adjacent to all street rights-of-way for franchise utility installations.  
*Response: This section is not applicable.*
- C. Where a development site is traversed by a drainageway or water course, a drainage way dedication shall be provided to the City.  
*Response: This section is not applicable.*
- D. Where a development is traversed by, or adjacent to, a future trail linkage identified within the Transportation System Plan, dedications of suitable width to accommodate the trail linkage shall be provided. This width shall be determined by the City Engineer, considering the type of trail facility involved.  
*Response: This section is not applicable.*
- E. Where existing rights-of-way and/or easements within or adjacent to development sites are nonexistent or of insufficient width, dedications may be required. The need for and widths of those dedications shall be determined by the City Engineer.  
*Response: This section is not applicable. No dedications have been identified.*
- F. Where easement or dedications are required in conjunction with land divisions, they shall be recorded on the plat. Where a development does not include a land division, easements and/or dedications shall be recorded on standard document forms provided by the City Engineer.  
*Response: This section is not applicable.*

#### **17.84.100 - MAIL DELIVERY FACILITIES**

*Response: The location and type of mail delivery facilities will be coordinated with the City and the Post Office as part of the building permit process.*



## **CHAPTER 17.86 PARKLAND AND OPEN SPACE**

### **17.86.10 MINIMUM PARKLAND DEDICATION REQUIREMENTS**

Calculation of Required Dedication: The required parkland acreage to be dedicated is based on a calculation of the following formula rounded to the nearest 1/100 (0.00) of an acre: Required parkland dedication (acres) = (proposed units) x (persons/unit) x 0.0043 (per person park land dedication factor)

*Response: The proposed 10 unit multi-family project results in the following calculation: 10 units x 2 persons/unit x 0.0043 (per person parkland factor) = 0.086 rounded to the nearest 1/100 = 0.09 acres. Based on the current parkland fee in lieu amount in the City's fee resolution of \$241,000/acre, a payment of \$21,690 (0.09 x \$241,000 = \$21,690) is required to be paid prior with issuance of the building permit.*

## **CHAPTER 17.90 DESIGN STANDARDS**

### **17.90.160 ADDITIONAL REQUIREMENTS - MULTI-FAMILY DEVELOPMENTS**

Multi-family residential developments shall comply with the requirements of this chapter as listed above and the following additional requirements:

*Response: Both buildings proposed in the project contain similar design elements. Building A is proposed to contain four units and Building B will contain six units.*

#### **A. Roofs. Roofs shall meet the following additional requirement:**

1. Roofs shall be gabled or hip type roofs (minimum pitch 3:1) with at least a 30-inch overhang and using shingles or similar roofing materials. Alternatives may be approved where the developer can demonstrate that abutting structures or the majority of structures within 300 feet have roofs similar to what is proposed.

*Response: The proposed structures features a both 6:12 and 8:12 roof pitches exceeding the minimum 3:12 roof pitch standard. This section also requires roofs to contain at least a 30-inch overhang. The proposed roof overhangs 30-inches measured to the outside edge of the gutter. The proposal complies with this section.*

2. Offsets or breaks in roof elevation shall be at least 3 or more feet in height.

*Response: This section requires offset or break if they are provided to be at least three feet or more in height. As shown on the submitted Building Elevations, neither building includes a designed roof offset. Due to site elevation differences Building B is designed as two halves with the elevation of the western half approximately 18-inches higher than the eastern half.*

#### **B. Entries.**

1. Entries shall be sheltered with an overhang, portico or recessed entry or otherwise articulated with an architecturally detailed entry.
2. Primary dwelling entries shall face a public street or designated pedestrian way and be visible from the street whenever feasible.
3. Multiple units: Ground floor units shall face a public street or designated pedestrian way and be visible from the street whenever feasible and shall avoid out-of-direction travel. Upper story units may share entries.
4. Secondary entries may face parking lots or loading areas.

**Response:** The entry door for all units will face the access drive and pedestrian walkway and are covered by an awning.

- C. Building facades shall be articulated with windows, entries, balconies and/or bays. Towers or other special vertical elements may be used in a limited fashion to focus views to the area from surrounding streets.

**Response:** The front facade of all buildings are articulated by a recessed entry with covered awning, and projecting gable end with a considerable number of windows.

- D. Along the vertical face of a structure, when facing a public street, pedestrian way or an abutting residential use, offsets shall occur at a minimum of every 20 feet by providing any two of the following:

- 1. Recesses (decks, patios, entrances, floor area, etc.) of a minimum depth of 8 feet.
- 2. Extensions (decks, patios, entrances, floor area, etc.) at a minimum depth of 8 feet, with maximum length of an overhang not to exceed 25 feet.
- 3. If a partially enclosed covered porch is proposed, this can meet one of the offset requirements provided the porch is 8 feet deep and at least 125 sq. ft. in area.

**Response:** As shown on submitted plans the front door of each unit is recessed eight feet and there are 24-feet of vertical face between recesses. The proposed design exceeds this standard by 4-feet and a Type II Adjustment has been requested.

- E. Private Outdoor Areas.

- 1. A separate outdoor area of not less than 48 square feet shall be attached to each ground level dwelling unit. These areas shall be separated from common outdoor areas in a manner, which enables the resident to control access from separate to common areas with elements such as walls, fences or shrubs.
- 2. A separate outdoor area of not less than forty-eight (48) square feet in the form of balconies, terraces or porches shall be provided for each dwelling unit located above the ground level.

**Response:** Each unit features a 50 square foot outdoor patio area or deck in compliance with this section.

- F. Parking Lots. Parking lots in multi-family developments shall not occupy more than 50% of the frontage of any public street abutting the lot or building.

**Response:** The proposed parking and maneuvering area occupies only 25% of the Highway 211 street frontage in compliance with this section.

- G. Individual Storage Areas. Enclosed storage areas shall be required and may be attached to the exterior of each dwelling unit to accommodate garden equipment, patio furniture, barbecues, bicycles, etc. Storage areas may be provided within garages if the required storage area is in addition to the required parking area required.

Size of Dwelling	Minimum Square Feet	Minimum Height
Studio	24	6
1 Bedroom	24	6
2 Bedroom	36	6
3+ Bedroom	48	6

**Response:** Each unit includes a 38 square foot individual storage area in compliance with this section.

- H. Carports and Garages. If carport and garages are provided, the form, materials, color and construction shall be compatible with the complex they serve.

**Response:** No garages or carport are proposed.

- I. Shared Outdoor Recreation Areas. Multi-family residential development shall provide usable recreation areas for developments containing more than 5 dwelling units at the rate of 200 square feet per dwelling unit. Such areas shall be counted as part of the required landscaping. Examples include, but are not limited to, playgrounds, exercise trails, swimming pools, etc. Usable recreation area may also include slopes, wetlands, FSH setback areas, and other natural site features, however, at least 50% of the recreation area must be located outside the boundaries of such areas and slopes may not exceed 15% in the 50% usable recreation area. Gazebos and other outdoor covered spaces are encouraged and qualify as 1.25 square feet for every one square foot of required shared recreation area. The shared outdoor recreation area shall be located and designed in a manner which:

1. Provides approximately the same accessibility to the maximum number of dwelling units possible.
2. Windows shall be located to encourage watching over entry areas, shared recreational areas, laundry areas, walkways and parking areas from windows in at least two adjacent dwelling units. These windows must be located in kitchen, living room, dining room or other activity rooms (bedrooms or bathrooms are not included).
3. Provides a separation from parking and driveway areas with a landscaped transition area measuring a minimum of ten feet wide;
4. Controls access to shared outdoor areas from off-site as well as from on-site parking and entrance areas with features such as fencing, walls and landscaping;
5. Provides a usable surface material such as lawn, decks, wood chips, sand and hard surface materials (concrete/asphalt).

**Response:** The proposed 10 unit project requires 2,000 square feet of shared outdoor recreation area  $10 \times 200 = 2,000$ . As shown on the Site Plan, approximately 2,430 square feet of shared outdoor area is proposed. This area includes two spaces; one located in the center of the complex with a play structure and benches and a second area to the west of Building B with tables. The proposal complies with this standard.

- J. Safety and Security.

1. Provide an outdoor lighting system which facilitates police observation and resident observation through strategic location, orientation and brightness without being obtrusive by shining into residential units or adjacent residential developments.
2. Establish a directory for apartment complexes of four or more units, which clearly orients visitors and emergency service providers as to the location of residential units. Where possible, this system should be evident from the primary vehicle entryway.

**Response:** *A Lighting Plan is included with the plan set in compliance with this section.*

**K. Service, Delivery and Screening.**

1. Locate postal delivery areas in a convenient location efficiently designed for residents and mail delivery personnel and in accordance with U.S. Postal Service requirements.
2. Provide pedestrian access from unit entries to postal delivery areas, garbage and recycling collection areas, shared activity areas and parking areas. Elements such as, but not limited to, concrete paths, striped walkways or raised walkways through vehicular areas or gravel trails will meet this requirement.
3. Provide garbage collection and recycling areas in convenient locations for the service provider and residents.
4. Garbage collection areas shall have a concrete floor surface and shall have a gate on the truck-loading side and a separate pedestrian access.
5. Outdoor storage areas, garbage containers and recycling bins shall be screened from view in one of the following manners:
  - a. A solid sight obscuring wall or fence not less than six feet in height and constructed of durable materials compatible with the primary structure(s) shall surround these areas.
  - b. Evergreen plant materials which will retain their screening ability and will reach the height of six feet within three years from time of planting. An overlap of three inches is required of the evergreen plant screening. The material shall completely screen the area from the public view.

**Response:** *A garbage enclosure is included along the rear property line. A mail box is included on the north side of the entrance drive.*

**L. Electrical and Mechanical Equipment.** On- and above-grade electrical and mechanical equipment such as transformers, heat pumps and central air conditioner units shall be screened with sight obscuring fences, walls or landscaping.

**Response:** *All electrical and mechanical equipment are either within an enclosed structure or will be screened using landscape materials as required.*

**CHAPTER 17.92 - LANDSCAPING AND SCREENING GENERAL STANDARDS - ALL ZONES**

**Response:** The C-1 zoning district requires residential development not above commercial development to contain 20 percent landscaping. A Landscape Plan identifying that 36 percent of the site is proposed to be landscaped in compliance with this standard and the requirements of Chapter 17.92 is provided with this application.

**17.92.10 GENERAL PROVISIONS**

- A.** Where landscaping is required by this Code, detailed planting plans shall be submitted for review with development applications. No development may commence until the Director or Planning Commission has determined the plans comply with the purposes clause and specific standards in this chapter. All required landscaping and

related improvements shall be completed or financially guaranteed prior to the issuance of a Certificate of Occupancy.

**Response:** *A Landscape Plan containing the details of proposed landscape plantings is included. The applicant understands that all required landscaping shall be completed or financially guaranteed prior to the issuance of a Certificate of Occupancy.*

- B. Appropriate care and maintenance of landscaping on-site and landscaping in the adjacent public right-of-way is the right and responsibility of the property owner, unless City ordinances specify otherwise for general public and safety reasons. If street trees or other plant materials do not survive or are removed, materials shall be replaced in kind within 6 months.

**Response:** *All required landscape materials will be cared for the duration as required.*

- C. Significant plant and tree specimens should be preserved to the greatest extent practicable and integrated into the design of a development. Trees of 25-inches or greater circumference measured at a height of 4-1/2 ft. above grade are considered significant. Plants to be saved and methods of protection shall be indicated on the detailed planting plan submitted for approval. Existing trees may be considered preserved if no cutting, filling, or compaction of the soil takes place between the trunk of the tree and the area 5-ft. outside the tree's drip line. Trees to be retained shall be protected from damage during construction by a construction fence located 5 ft. outside the dripline.

**Response:** *The proposal preserves trees to the greatest extent practicable to allow development of the site for the proposed use. All preserved trees will be protected by tree protection fencing as required.*

- D. Planter and boundary areas used for required plantings shall have a minimum diameter of 5-ft. (2-1/2 ft. radius, inside dimensions). Where the curb or the edge of these areas are used as a tire stop for parking, the planter or boundary plantings shall be a minimum width of 7-1/2 ft.

**Response:** *All planter areas contain a minimum depth of five feet. All vehicle parking adjacent to landscape planters and sidewalks are provided with wheel stops.*

- E. In no case shall shrubs, conifer trees, or other screening be permitted within vision clearance areas of street, alley, or driveway intersections, or where the City Engineer otherwise deems such plantings would endanger pedestrians and vehicles.

**Response:** *The Landscape Plan will be modified as required to address vision clearance requirements necessary.*

- F. Landscaped planters and other landscaping features shall be used to define, soften or screen the appearance of off-street parking areas and other activity from the public street. Up to 35 percent of the total required landscaped area may be developed into pedestrian amenities, including, but not limited to sidewalk cafes, seating, water features, and plazas, as approved by the Director or Planning Commission.

**Response:** Landscape planters at the end of parking bays help to define and soften the appearance of these areas.

- G. Required landscaping/open space shall be designed and arranged to offer the maximum benefits to the occupants of the development as well as provide visual appeal and building separation.

**Response:** As noted above, 33 percent of the site is proposed to contain landscaping. All landscaped areas are designed to enhance the appearance of the site to provide visual appeal and interest.

- H. Balconies required for entrances and exits shall not be considered as open space except where such exits and entrances are for the sole use of the unit.  
I. Roofed structures shall not be included as open space except for open unenclosed public patios, balconies, gazebos, or other similar structures or spaces.

**Response:** These sections are not applicable.

- J. Driveways and parking areas shall not be included as open space.

**Response:** None of these areas are included in site landscaping calculations.

- K. All areas not occupied by paved roadways, walkways, patios, or buildings shall be landscaped.

**Response:** As shown on the Landscape Plan all areas not occupied by buildings and paved surfaces will be landscaped.

- L. All landscaping shall be continually maintained, including necessary watering, weeding, pruning and replacing.

**Response:** All landscaping is intended to be maintained as required.

#### **17.92.20 MINIMUM IMPROVEMENTS - LANDSCAPING AND SCREENING**

The minimum landscaping area of a site to be retained in landscaping shall be as follows:  
R-3 - 25%

**Response:** As shown on the Landscape Plan, 33 percent of the site is proposed to be landscaped exceeding the minimum 25 percent landscaping required.

#### **17.92.30 REQUIRED TREE PLANTINGS**

Planting of trees is required for all parking lots with 4 or more parking spaces, public street frontages, and along private drives more than 150 feet long. Trees shall be planted outside the street right-of-way except where there is a designated planting strip or City adopted street tree plan.

The City maintains a list of appropriate trees for street tree and parking lot planting situations. Selection of species should be made from the city-approved list. Alternate selections may be approved by the Director following written request. The type of tree used shall determine frequency of trees in planting areas. Trees in parking areas shall be dispersed throughout the lot to provide a canopy for shade and visual relief.

*Response: The Landscape Plan indicates that both sides of common parking areas will be bordered with a landscape planter to contain a mix of trees, shrubs and ground covers.*

#### **17.92.40 IRRIGATION**

Landscaping shall be irrigated, either with a manual or automatic system, to sustain viable plant life.

*Response: All landscape areas will be irrigated with either a manual or automatic system. The details of this system will be submitted with building plans.*

#### **17.92.50 TYPES AND SIZES OF PLANT MATERIALS**

A. At least 75% of the required landscaping area shall be planted with a suitable combination of trees, shrubs, or evergreen ground cover except as otherwise authorized by Chapter 17.92.10 F.

D. Deciduous trees shall be balled and burlapped, be a minimum of 7 feet in overall height or 1 1/2 inches in caliper measured 6 inches above the ground, immediately after planting. Bare root trees will be acceptable to plant during their dormant season.

F. Shrubs shall be a minimum of 1 gallon in size or 2 feet in height when measured immediately after planting.

G. Hedges, where required to screen and buffer off-street parking from adjoining properties shall be planted with an evergreen species maintained so as to form a continuous, solid visual screen within 2 years after planting.

H. Vines for screening purposes shall be a minimum of 1 gallon in size or 30 inches in height immediate after planting and may be used in conjunction with fences, screens, or walls to meet physical barrier requirements as specified.

I. Groundcovers shall be fully rooted and shall be well branched or leafed. If used in lieu of turf in whole or in part, ground covers shall be planted in such a manner as to provide complete coverage in one year.

J. Turf areas shall be planted in species normally grown as permanent lawns in western Oregon. Either sod or seed are acceptable. Acceptable varieties include improved perennial ryes and fescues used within the local landscape industry.

K. Landscaped areas may include architectural features or artificial ground covers such as sculptures, benches, masonry or stone walls, fences, rock groupings, bark dust, decorative hard paving and gravel areas, interspersed with planted areas. The exposed area developed with such features shall not exceed 25% of the required landscaped area. Artificial plants are prohibited in any required landscape area.

*Response: The submitted Landscape Plan has been designed in accordance with the standards of this section.*

#### **17.92.70 LANDSCAPING BETWEEN PUBLIC RIGHT-OF-WAY AND PROPERTY LINES**

Except for portions allowed for parking, loading, or traffic maneuvering, a required setback area abutting a public street and open area between the property line and the roadway in the public street shall be landscaped. That portion of the landscaping within the street right-of-way shall not count as part of the lot area percentage to be landscaped.

*Response: As shown on the Landscape Plan, the area between the buildings and Highway 211 will be landscaped as required.*

#### **17.92.80 BUFFER PLANTING - PARKING, LOADING AND MANEUVERING AREAS**

Buffer plantings are used to reduce building scale, provide transition between contrasting architectural styles, and generally mitigate incompatible or undesirable views. They are used to soften rather than block viewing. Where required, a mix of plant materials shall be used to achieve the desired buffering effect. Buffering is required in conjunction with issuance of construction permits for parking areas containing 4 or more spaces, loading areas, and vehicle maneuvering areas.

Boundary plantings shall be used to buffer these uses from adjacent properties and the public right-of-way. On-site plantings shall be used between parking bays, as well as between parking bays and vehicle maneuvering areas. A balance of low-lying ground cover and shrubs, and vertical shrubs and trees shall be used to buffer the view of these facilities. Decorative walls and fences may be used in conjunction with plantings, but may not be used by themselves to comply with buffering requirements. Exception: truck parking lots are exempt from parking bay buffer planting requirements.

*Response: The submitted Landscape Plan has been designed in accordance with these standards.*

### **CHAPTER 17.98 - PARKING, LOADING, AND ACCESS REQUIREMENTS**

#### **17.98.20 OFF-STREET PARKING REQUIREMENTS**

Vehicle parking for multi-family dwellings requires the following: 2.0 per 2 bedroom  
In addition, one bicycle space is required for each unit.

*Response: The 10 2-bedroom units require a total of 20 vehicle parking spaces (10 x 2 = 20). As shown on the Site Plan, 21 parking spaces including one van accessible ADA space are provided in compliance with this section. As noted on the submitted Site Plan, each unit's individual storage will be fitted with a hanging rack to accommodate a bicycle as required. In addition, a two bike rack is provided near the northwest corner of Building B. The proposal complies with this standard.*

#### **17.98.50 SETBACKS**

- A. Parking areas, which abut a residential zoning district, shall meet the setback of the most restrictive adjoining residential zoning district.
- B. Required parking shall not be located in a required front or side yard setback area abutting a public street except in industrial districts. For single family and two-family dwellings, required off-street parking may be located in a driveway.
- C. Parking areas shall be setback from a lot line adjoining a street the same distance as the required building setbacks. Regardless of other provisions, a minimum setback of 5 feet shall be provided along the property fronting on a public street. The setback area shall be landscaped as provided in this code.

*Response: The property abuts property zoned POS to the south and a portion of the northern boundary and C-1 to the east and a portion of the north. All parking will be shielded from view by buildings and screened by proposed landscaped.*

#### **17.98.60 DESIGN, SIZE AND ACCESS**

The Pad Townhome Apartments

Page 26 of 30



All off-street parking facilities, vehicular maneuvering areas, driveways, loading facilities, accessways, and private streets shall conform to the standards set forth in this section.

**A. Parking Lot Design.** All areas for required parking and maneuvering of vehicles shall have a durable hard surface such as concrete or asphalt.

*Response: All parking and maneuvering areas will be constructed using either asphalt or concrete as required.*

**B. Size of Space.**

1. A standard parking space shall be 9 feet by 18 feet.
2. A compact parking space shall be 8 feet by 16 feet.
3. Handicapped parking spaces shall be 13 feet by 18 feet. Accessible parking shall be provided for all uses in compliance with the requirements of the State of Oregon (ORS 447.233) and the Americans with Disabilities Act.
4. Parallel parking spaces shall be a length of 22 feet.
5. No more than 35 percent of the parking stalls shall be compact spaces.

*Response: All parking spaces comply with these standards. No compact parking spaces are proposed.*

**C. Aisle Width**

This section requires the aisle width for single-sided, two-way traffic, 90 degree angle parking lots to be a minimum of 22 feet.

*Response: The submitted site plan proposes a 22-foot wide aisle behind all parking spaces as required.*

**17.98.100 DRIVEWAYS**

- A. A driveway to an off-street parking area shall be improved from the public roadway to the parking area a minimum width of 20 feet for a two-way drive or 12 feet for a one-way drive but in either case not less than the full width of the standard approach for the first 20 feet of the driveway.
- B. A driveway for a single-family dwelling shall have a minimum width of 10 feet.
- C. A driveway for a two-family dwelling shall have a minimum width of 20 feet. A driveway approach must be constructed in accordance with applicable city standards and the entire driveway must be paved with asphalt or concrete.

*Response: The site plan indicates that a 22-foot wide driveway is proposed to access the project in compliance with this section.*

**17.98.120 LANDSCAPING AND SCREENING**

- A. Screening of all parking areas containing 4 or more spaces and all parking areas in conjunction with an off-street loading facility shall be required in accordance with zoning district requirements and Chapter 17.98. Where not otherwise specified by district requirement, screening along a public right-of-way shall include a minimum 5-ft. depth of buffer plantings adjacent to the right-of-way.
- B. When parking in a commercial or industrial district adjoins a residential zoning district, a sight-obscuring screen that is at least 80% opaque when viewed horizontally from between 2 and 8 feet above the average ground level shall be required. The

screening shall be composed of materials that are an adequate size so as to achieve the required degree of screening within 3 years after installation.

- C. Except for a residential development which has landscaped yards, parking facilities shall include landscaping to cover not less than 10% of the area devoted to parking facilities. The landscaping shall be uniformly distributed throughout the parking area and may consist of trees, shrubs, and ground covers.
- D. Parking areas shall be divided into bays of not more than 20 spaces in parking areas with 20 or more spaces. Between, and at the end of each parking bay, there shall be planters that have a minimum width of 5 feet and a minimum length of 17 feet for a single depth bay and 34 feet for a double bay. Each planter shall contain one major structural tree and ground cover. Truck parking and loading areas are exempt from this requirement.
- E. Parking area setbacks shall be landscaped with major trees, shrubs, and ground cover as specified in Chapter 17.92.
- F. Wheel stops, bumper guards, or other methods to protect landscaped areas shall be provided. No vehicle may project over a property line or a public right-of-way. Parking may project over an internal sidewalk, but a minimum clearance of 5 feet for safe pedestrian circulation is required.

*Response: All vehicle parking spaces will be screened from public view by buildings and landscaping. All of these spaces are divided into bays containing less than 20 spaces as required. Parking bays are broken up with a landscape planter at the end and along the largest parking bay. Wheel stops are proposed for all parking spaces to protect landscaping and sidewalks.*

#### **17.98.130 PAVING**

- A. Parking areas, driveways, aisles and turnarounds shall be paved with concrete, asphalt or comparable surfacing, constructed to city standards for off-street vehicle areas.
- B. Gravel surfacing shall be permitted only for areas designated for non-motorized trailer or equipment storage, propane or electrically powered vehicles, or storage of tracked vehicles.

*Response: Concrete is proposed for the entrance drive as shown. All other areas of the access drive and all parking spaces will be paved using either regular asphalt or concrete as required.*

#### **17.98.140 DRAINAGE**

Parking areas, aisles and turnarounds shall have adequate provisions made for the on-site collection of drainage waters to eliminate sheet flow of such waters onto sidewalks, public rights-of-way and abutting private property.

*Response: A preliminary stormwater management plan is provided as part of the application submittal. This plan has been designed in accordance with the City of Sandy Stormwater Management requirements.*

#### **17.98.150 LIGHTING**

Artificial lighting shall be provided in all required off-street parking areas. Lighting shall be directed into the site and shall be arranged to not produce direct glare on adjacent properties. Light elements shall be shielded and shall not be visible from abutting residential properties. Lighting shall be provided in all bicycle parking areas so that all

facilities are thoroughly illuminated and visible from adjacent sidewalks or vehicle parking lots during all hours of use.

**Response:** *As noted above, a Lighting Plan is included with the submittal package.*

#### **17.98.160 BICYCLE PARKING FACILITIES**

Multi-family developments, industrial, commercial and community service uses, transit transfer stations, and park and ride lots shall meet the following standards for bicycle parking facilities. The intent of this section is to provide secure bicycle parking that is visible from a building's primary entrance and convenient to bicyclists.

##### **A. Location.**

1. Bicycle parking shall be located on-site, convenient to primary building entrances, and have direct access to both the public right-of-way and to the main entrance of the principal structure.
2. Bicycle parking areas shall be visible from building interiors where possible.
3. For facilities with multiple buildings or parking lots, bicycle parking shall be located in areas of greatest use and convenience to bicyclists.
4. If the bicycle parking area is located within the vehicle parking area, the bicycle facilities shall be separated from vehicular maneuvering areas by curbing or other barrier to prevent damage to parked bicycles.
5. Curb cuts shall be installed to provide safe, convenient access to bicycle parking areas.

**Response:** *As noted above, the storage space of each dwelling unit will be fitted with a bike hanging rack. In addition, a two bicycle rack will be installed at the northwest of Building B.*

#### **CHAPTER 17.102 - URBAN FORESTRY**

##### **17.102.20 - APPLICABILITY**

This chapter applies only to properties within the Sandy Urban Growth Boundary that are greater than one acre including contiguous parcels under the same ownership.

**A. General:** No person shall cut, harvest, or remove trees 11 inches DBH or greater without first obtaining a permit and demonstrating compliance with this chapter.

1. As a condition of permit issuance, the applicant shall agree to implement required provisions of this chapter and to allow all inspections to be conducted.
2. Tree removal is subject to the provisions of Chapter 15.44, Erosion Control, Chapter 17.56, Hillside Development, and Chapter 17.60 Flood and Slope Hazard.

**Response:** *The subject property contains 0.58 acres and the standards of this chapter are not applicable to the proposed development.*

#### **CHAPTER 15.30 - DARK SKY ORDINANCE**

##### **15.30.000 Purpose.**

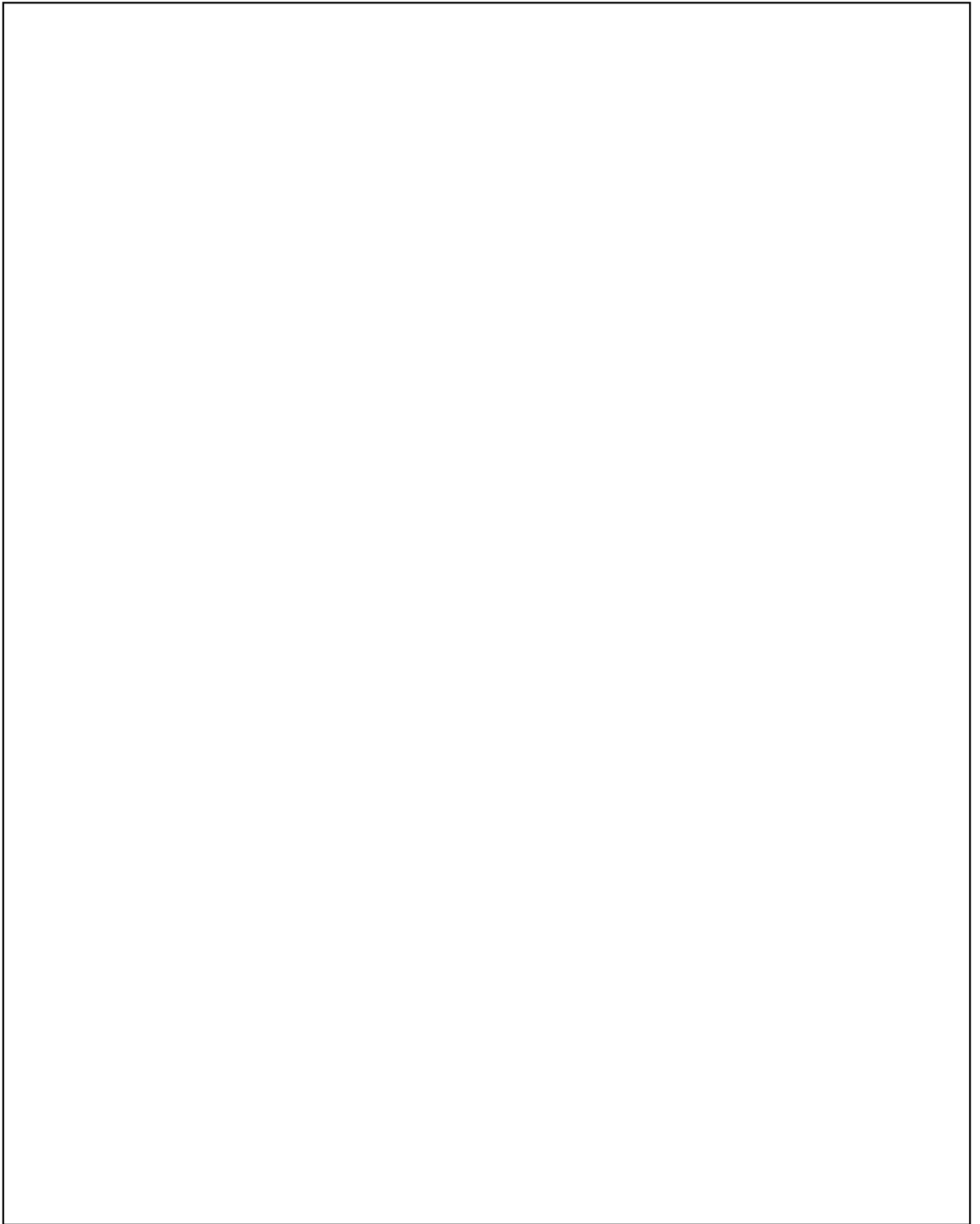
The purpose of the Sandy Dark Sky Ordinance is to regulate outdoor lighting in order to reduce or prevent light pollution. This means to the extent reasonably possible the reduction or prevention of glare and light trespass, the conservation of energy, and promotion of safety and security. (Ord. 2002-11)

**Response:** *A photometric analysis is included with the submittal package as required.*

## **V. Conclusion**

The applicant requests design review approval to construct a 10 unit townhome style multi-family project on property zoned R-3, High Density Residential. With this application, the applicant is also requesting a Type II Adjustment to Section 17.90.160(D) and a Type II Variance to Section 17.80.20. As demonstrated with this submittal, the proposal complies with or exceeds all relevant code standards and the applicant respectfully requests the application be approved.

**SECTION III – APPLICATION DRAWINGS**  
**EXHIBITS B,C,D,E**  
**(REDUCED – NOT TO SCALE)**











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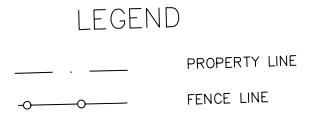


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**THE PAD**  
**TOWNHOME APARTMENTS**  
 17650 MEINIG AVENUE  
 SANDY, OR 97055

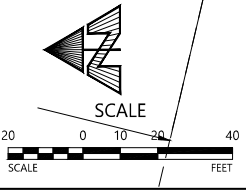


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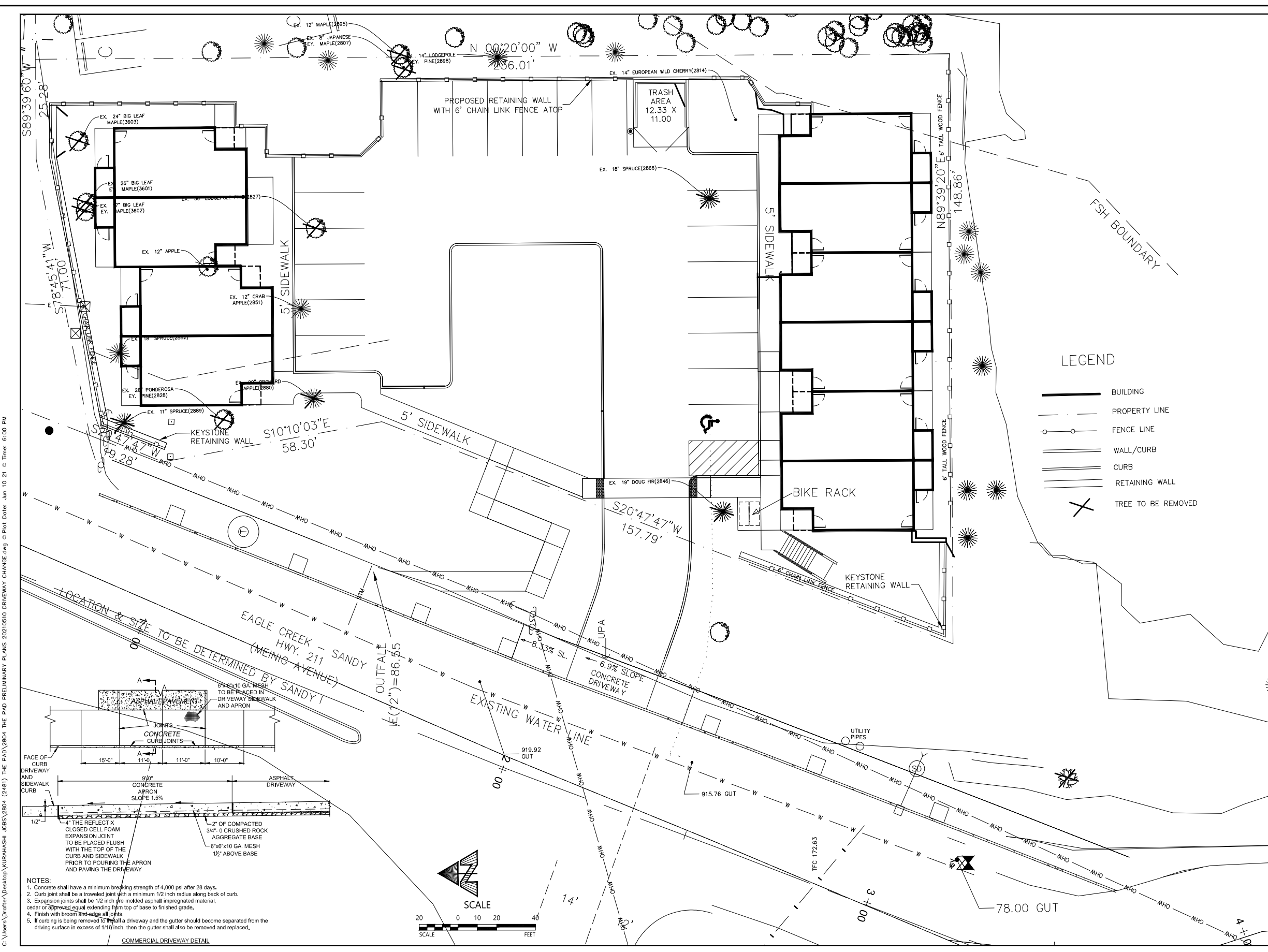
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 SHEET TITLE  
 EXISTING CONDITIONS  
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**C-1**







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- LEGEND**
- BUILDING
  - PROPERTY LINE
  - FENCE LINE
  - WALL/CURB
  - CURB
  - RETAINING WALL
  - TREE TO BE REMOVED

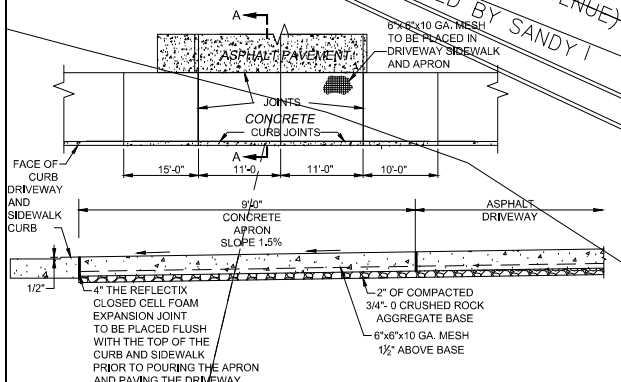
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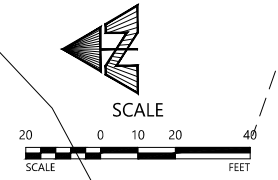
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 SHEET TITLE  
 CIVIL SITE DESIGN  
 SHEET NO.

**C-2**

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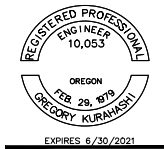
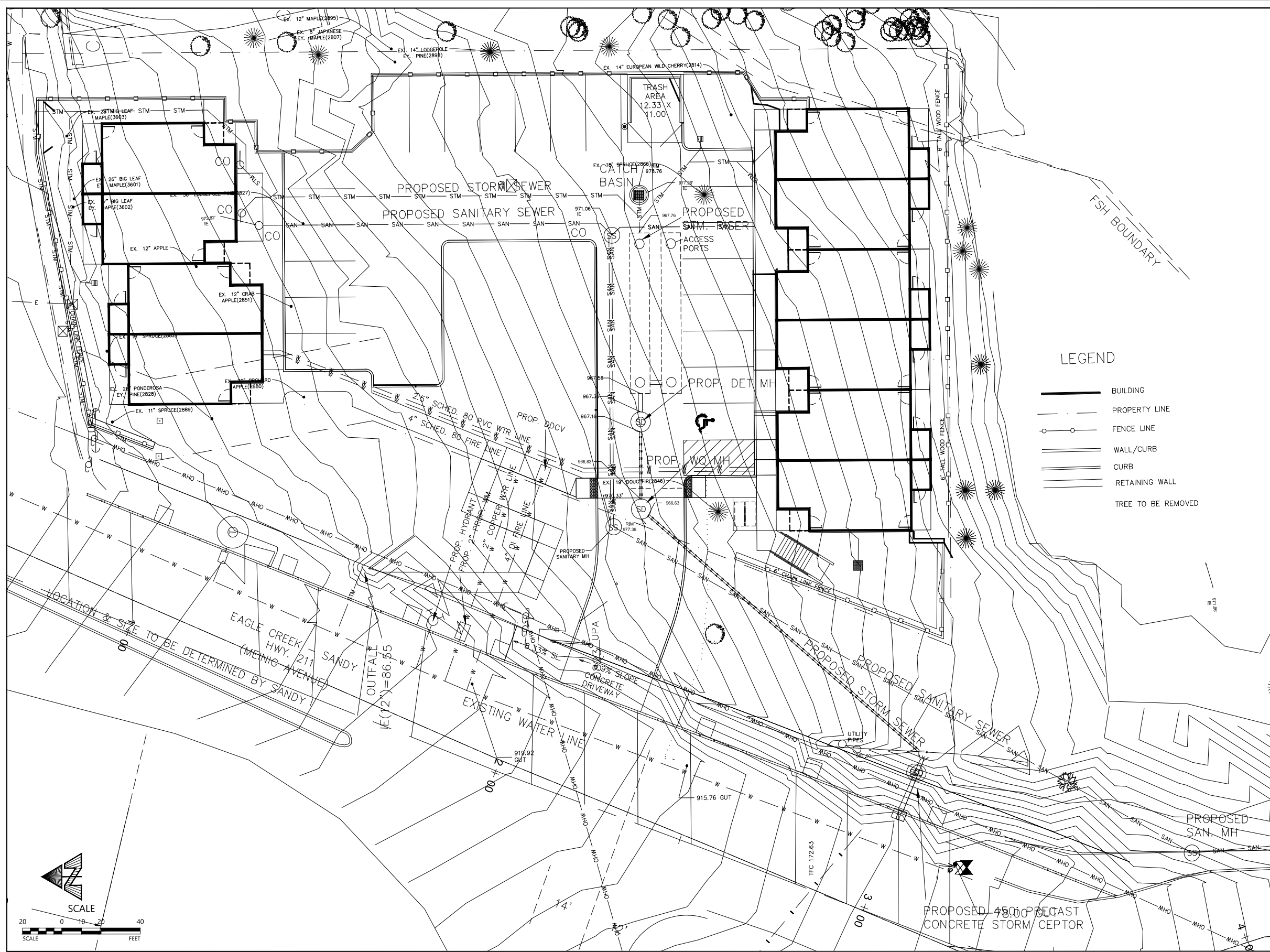


- NOTES:**
- Concrete shall have a minimum breaking strength of 4,000 psi after 28 days.
  - Curb joint shall be a troweled joint with a minimum 1/2 inch radius along back of curb.
  - Expansion joints shall be 1/2 inch pre-molded asphalt impregnated material, castor or 30-pound equal extending from top of base to finished grade.
  - Finish with broom and edge all joints.
  - If curbing is being removed to install a driveway and the gutter should become separated from the driving surface in excess of 1/16 inch, then the gutter shall also be removed and replaced.





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**THE PAD**  
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- LEGEND**
- BUILDING
  - PROPERTY LINE
  - FENCE LINE
  - WALL/CURB
  - CURB
  - RETAINING WALL
  - TREE TO BE REMOVED

REVISIONS

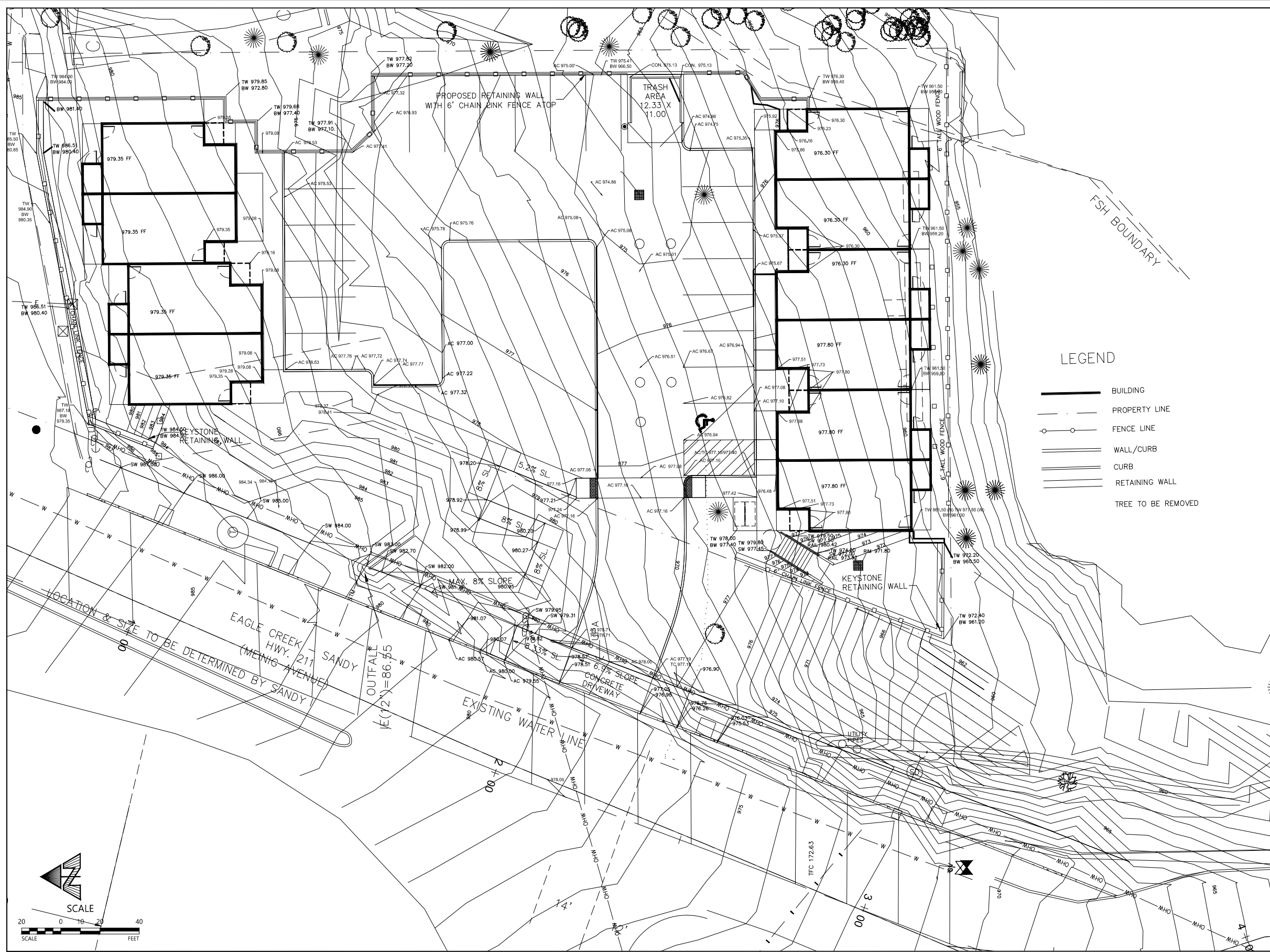
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**C-3**



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- LEGEND**
- BUILDING
  - PROPERTY LINE
  - FENCE LINE
  - WALL/CURB
  - CURB
  - RETAINING WALL
  - TREE TO BE REMOVED

REVISIONS

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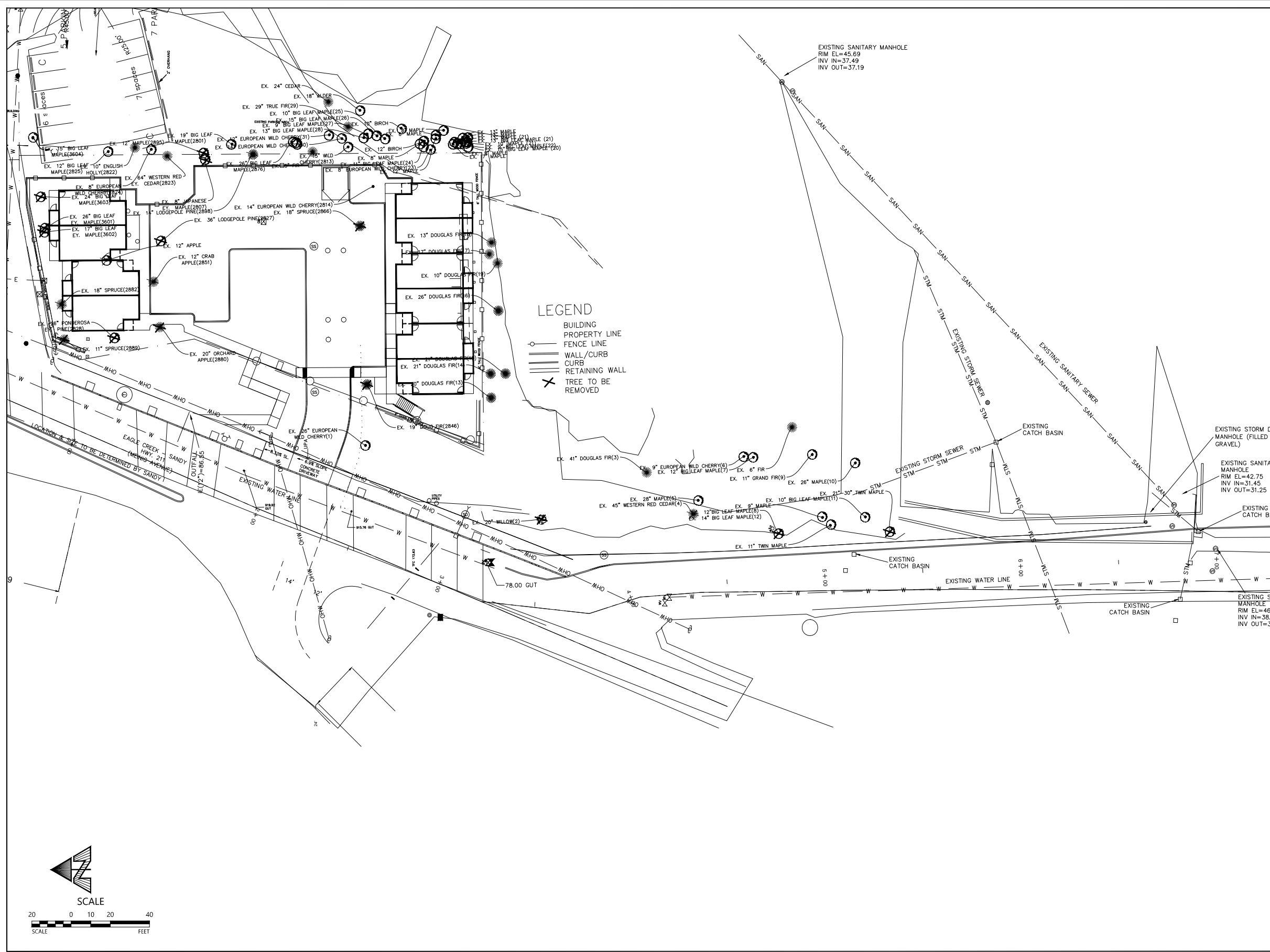
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 GRADING AND  
 EROSION CONTROL  
 PLAN  
 SHEET NO.

**C-4**





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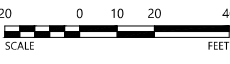


**LEGEND**

- BUILDING
- PROPERTY LINE
- FENCE LINE
- WALL/CURB
- CURB
- RETAINING WALL
- ⊗ TREE TO BE REMOVED



SCALE



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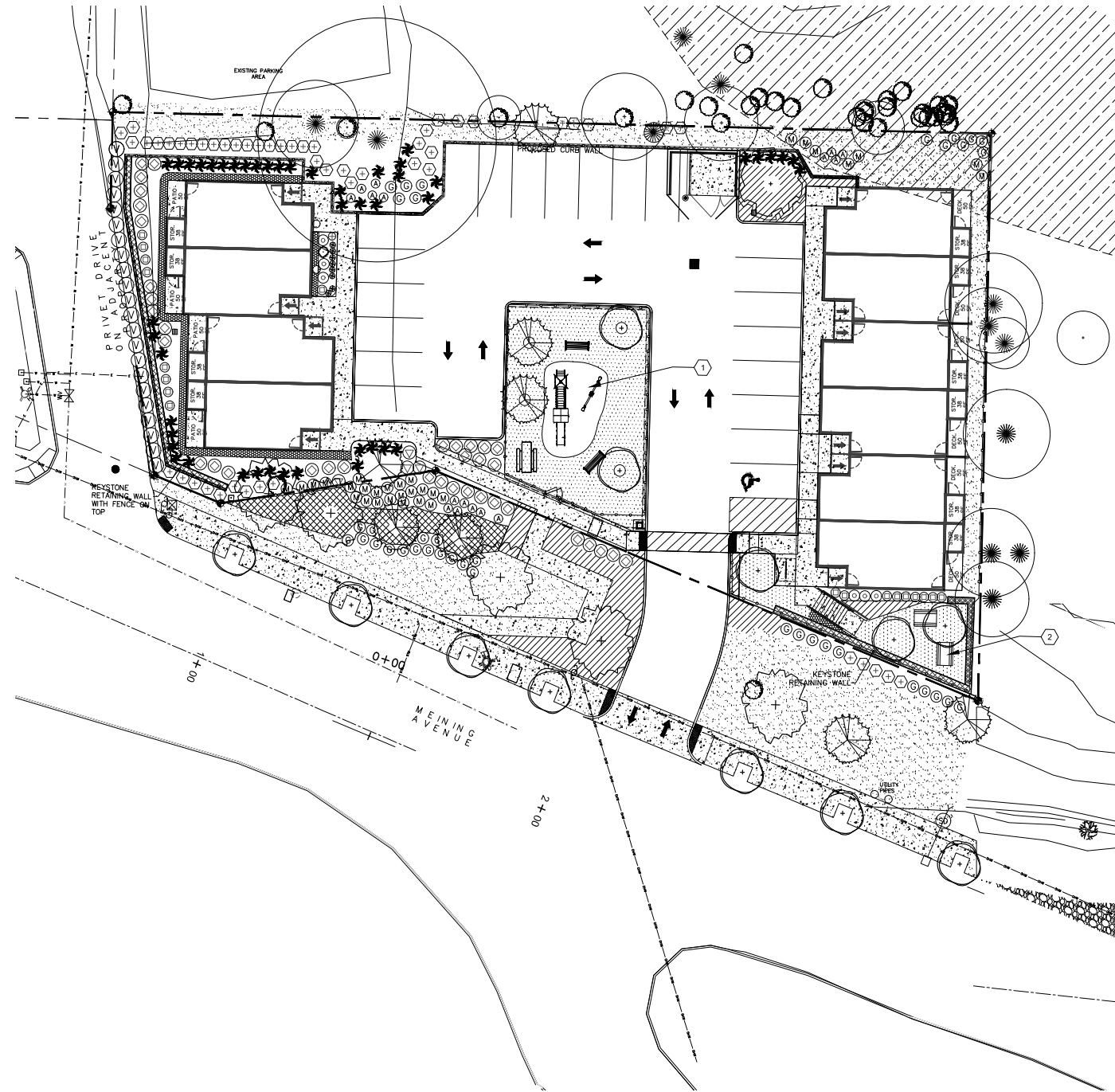
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 SHEET TITLE  
 TREE PRESERVATION PLAN  
 SHEET NO.

C-5



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**PLANT LIST**

**TREES**

SYM	QUAN	BOTANICAL NAME/COMMON NAME	SIZE	COMMENT
(Symbol)	12	ACER BUERGERIANUM - TRIDENT MAPLE	1-1/2" CAL B&B	AS SHOWN
(Symbol)	8	CALOCEDRUS DECURRENS - INCENSE CEDAR	6' HT MIN.	REMOVE LOWEST BRANCHES
(Symbol)	1	QUERCUS FRANETTO 'FOREST GREEN' FOREST GREEN OAK	2" CAL B&B	AS SHOWN
(Symbol)	5	RHAMNUS PURSHIANA	1-1/2" CAL B&B	AS SHOWN

**SHRUBS**

SYM	QUAN	BOTANICAL NAME	COMMON NAME	SIZE	COMMENT
(Symbol)	18	EUONYMUS FORTUNEI 'EMERALD GAIEY'	EMERALD GAIEY EUONYMUS	2 GAL	SPACE AS SHOWN
(Symbol)	4	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY	3 GAL	SPACE 42" O.C.
(Symbol)	1	JUNIPERUS VIRGINIANA 'BLUE ARROW'	BLUE ARROW JUNIPER	48" HT. B&B	AS SHOWN
(Symbol)	51	MAHONIA AQUIFOLIUM	OREGON GRAPE	2 GAL	FULLY BRANCHED
(Symbol)	1	NANDINA DOMESTICA 'WOODS DWARF'	WOODS DWARF HEAVENLY BAMBOO	2 GAL	SPACE AS SHOWN
(Symbol)	30	PHILADELPHUS LEWISII	MOCKORANGE	2 GAL	SPACE AS SHOWN
(Symbol)	38	ROSA GYMNOCARPA	BALDIP ROSE	2 GAL	AS SHOWN
(Symbol)	20	SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	2 GAL	AS SHOWN
(Symbol)	6	SPIRAEA X BUMALDA 'GOLDMOUND'	GOLDMOUND BUMALD SPIREA	2 GAL	AS SHOWN
(Symbol)	2	VBURNUM DAVIDII	DAVID VIBURNUM	3 GAL	AS SHOWN
(Symbol)	23	VBURNUM TINUS	LAURUSTINUS	5 GAL	SPACE 48" O.C.
(Symbol)	37	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	3 GAL	AS SHOWN

**GROUNDCOVER**

(Symbol)	8	HELIOTRICHON SEMPERVIRENS - BLUE OAT GRASS	1 GAL - SPACE AS SHOWN	
(Symbol)	47	POLYSTICHUM MUNITUM - WESTERN SWORD FERN	1 GAL - SPACE AS SHOWN	
(Symbol)	74	ARCTOSTAPHYLOS UVA-URSI - KINNICKINICK	1 GAL - SPACE 2' O.C.	
(Symbol)	23	MAHONIA REPENS - CREEPING MAHONIA	1 GAL - SPACE 30" O.C.	
(Symbol)	2340 SF	PT 301- WATER SMARTER TALL FESCUE BLEND TURFWAY TALL FESCUE - FESTUCA ARUNDINACEA 'TURFWAY' HOUNDDOG 8 TALL FESCUE - FESTUCA ARUNDINACEA 'HOUNDDOG 8' BLOODHOUND TALL FESCUE - FESTUCA ARUNDINACEA 'BLOODHOUND'	7 LBS / 1000 S.F.	
(Symbol)	4635 SF	PT 702 - NATIVE URBAN MEADOW	4 OZ / 1000 S.F.	

**LEGEND**

- (Symbol) EXISTING TREE TO REMAIN
- (Symbol) BENCH
- (Symbol) GRAVEL EDGING - SEE SHEET L2 FOR DETAILS
- (Symbol) 5' BLACK VINYL CLAD CHAIN LINK FENCING AROUND PLAY AREA

**KEY NOTES**

- 1 RECREATIONAL PLAY AREA - SPECIFIC PLAY EQUIPMENT TO BE DETERMINED LATER
- 2 PICNIC AREA - PICNIC TABLES

**GENERAL NOTES**

1. ALL LANDSCAPE AREAS TO BE IRRIGATED WITH AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM. SYSTEM SHALL USE DRIP IRRIGATION AND WATER CONSERVATION ROTOR IRRIGATION HEADS. NATIVE PLANTING AREAS SHALL HAVE TEMPORARY IRRIGATION THAT WILL BE REDUCED EACH YEAR UNTIL PLANTS ARE FULLY ESTABLISHED.
2. QUANTITIES ARE INTENDED TO ASSIST THE CONTRACTOR IN EVALUATING THEIR OWN TAKEOFFS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BID QUANTITIES AS SHOWN AND REQUIRED BY THE PLANS.
3. CONTRACTOR SHALL PROVIDE TOPSOIL, SOIL AMENDMENTS, AND COMPOST IN REQUIRED QUANTITIES TO CREATE THE PLANTING SOIL FOR PLANTED AND SEEDING AREAS IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
4. CONTRACTOR SHALL VERIFY THE LOCATIONS OF UTILITIES PRIOR TO BEGINNING EXCAVATION.
5. IF PLANT MATERIAL CONFLICTS WITH NEW OR EXISTING UTILITIES TO REMAIN, THE CONTRACTOR SHALL ADJUST THE PLANTING LOCATIONS IN COORDINATION WITH THE OWNER'S REPRESENTATIVE.
6. PROVIDE 3" OF BARK MULCH AROUND PLANTING.
7. RESTORE PUBLIC RIGHT IF AREA DISTURBED BY UTILITY INSTALLATION AND SEED AREA WITH NATIVE URBAN MEADOW MIX.
8. SEE SHEET L2 FOR PLANTING DETAILS AND NOTES.

**SITE DATA**

TOTAL SITE AREA =	25,869 S.F.
REQUIRED LANDSCAPE AREA =	25% OF SITE AREA = 6,467.25 S.F.
TOTAL LANDSCAPE AREA PROVIDED =	32.98 % = 8,522.83 S.F.
RECREATION REQUIRED =	2000 S.F.
RECREATIONAL AREA PROVIDED	
PICNIC AREA =	651.8 S.F.
CHILDREN PLAY AREA =	2,854.1 S.F.
TOTAL RECREATION AREA =	2,705.9 S.F.



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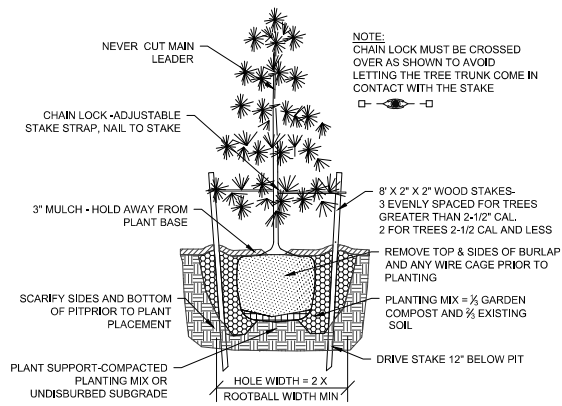
**REVISIONS**

No.	Description	Date

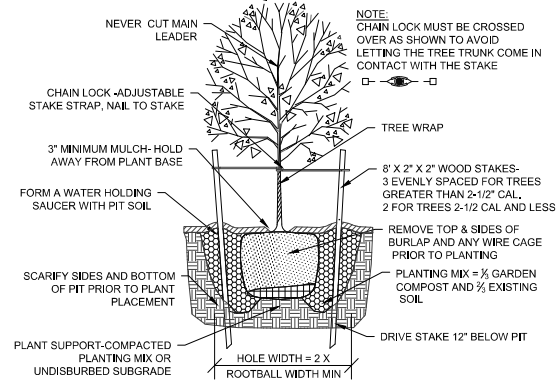
DRAWN BY: JJ  
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JOB NO: 20-004  
DATE: 07/7/2021  
ISSUED FOR: DESIGN REVIEW  
SHEET TITLE: PLANTING PLAN

SHEET NO. **L-1**

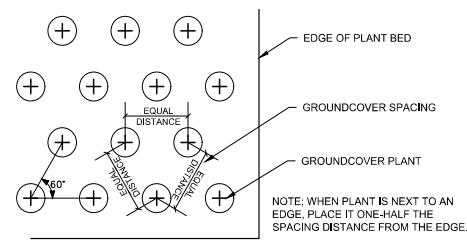




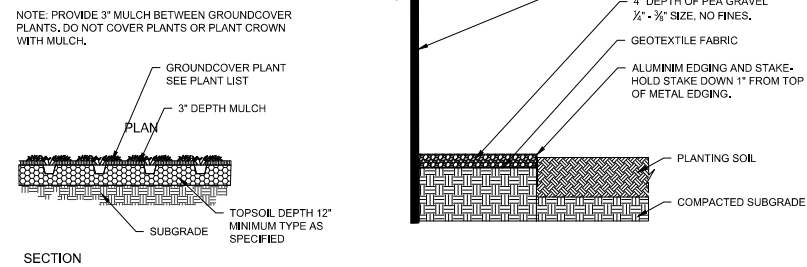
1 EVERGREEN TREE PLANTING DETAIL  
L2 NOT TO SCALE



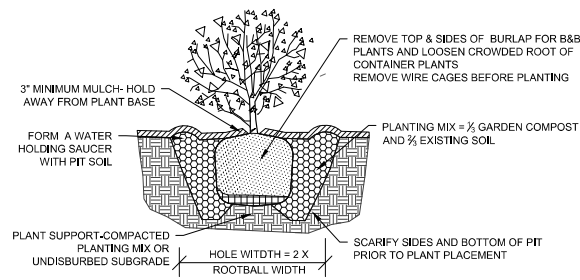
2 DECIDUOUS TREE PLANTING DETAIL  
L2 NOT TO SCALE



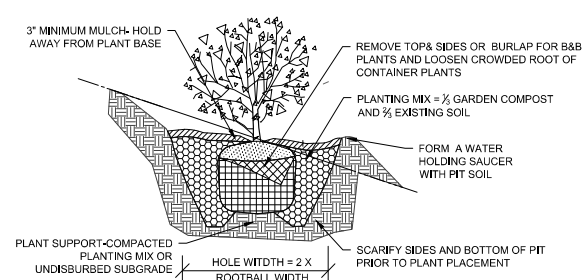
3 GROUND COVER PLANTING DETAIL  
L2 NOT TO SCALE



4 PEA GRAVEL EDGING DETAIL  
L2 NOT TO SCALE



5 SHRUB PLANTING DETAIL  
L2 NOT TO SCALE



6 SLOPE PLANTING DETAIL  
L2 NOT TO SCALE

NOTES

- PROVIDE ONE PERSON WHO WILL BE PRESENT AT ALL TIMES DURING THE WORK WHO IS FAMILIAR WITH PLANT MATERIALS AND IS KNOWLEDGEABLE OF GOOD HORTICULTURAL PRACTICE.
- CONTRACTOR SHALL REMOVE EXISTING VEGETATION THAT INTERFERES WITH ACCESS TO THE NEW PLANTING LOT. RECENTLY PLANTED MATERIAL SHALL BE STOCKPILED AND BE RE-PLANTED IN NEW LOCATIONS INDICATED ON THE PLANTING PLAN.
- NOTIFY THE OWNER'S REPRESENTATIVE, 48 HOURS IN ADVANCE OF WORK FOR SITE INSPECTION OF PLANT MATERIALS. THE LANDSCAPE ARCHITECT RETAINS THE RIGHT TO REJECT ANY MATERIALS WHICH DO NOT MEET MINIMUM SIZE REQUIREMENTS, OR WHICH DO NOT APPEAR HEALTHY AND WELL FORMED. REMOVE UNACCEPTABLE PLANT MATERIALS FROM WORK AREA IMMEDIATELY.
- VERIFY ALL QUANTITIES AND REPORT DISCREPANCIES TO OWNER'S REPRESENTATIVE FOR CLARIFICATION.
- CONTACT A UTILITY LOCATES COMPANY BEFORE STARTING EXCAVATIONS.
- FINAL GRADING SHALL PROVIDE DRAINAGE OF LANDSCAPE AREAS. PLANTING AREAS SHALL SLOPE AWAY FROM BUILDINGS WITH A 2% SLOPE MINIMUM. SHRUB BEDS AND LAWNS SHALL BE CROWNED WITH A 2% SLOPE UNLESS INDICATED OTHERWISE. FINAL GRADES SHALL BE 2 INCHES BELOW ADJACENT WALKS AND CURBS FOR MULCH APPLICATIONS AND 1 INCH BELOW FOR SOD INSTALLATION.
- ALL PLANTS SHALL BE HEALTHY, WELL BRANCHED, ROOTED, TRUE TO SPECIES AND VARIETY, FREE FROM DISEASE, INSECTS, PESTS AND WEEDS. THEY SHALL HAVE GOOD GROWTH HABIT FREE OF PHYSICAL DISFIGURATION, INJURY, ABRASIONS OR SUN SCALDS. PLANTS SHALL EQUAL OR EXCEED MEASUREMENTS IN THE PLANT LIST.
- PLANTS WILL CONFORM TO CURRENT REQUIREMENTS OF 'AMERICAN STANDARDS FOR NURSERY STOCK' BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
- PLANTS SHALL BE GROWN FOR THIS GENERAL LATITUDE AND ELEVATION OR SHALL BE ADEQUATELY CLIMATIZED.
- PROTECT PLANTS AT ALL TIMES DURING SHIPPING, HANDLING, STORAGE AND PLANTING FROM BREAKAGE, DESICCATION, WINDBURN, SUN DAMAGE AND WEATHER EXTREMES. STORE PLANTS IN AN UPRIGHT POSITION AND ALLOW SUFFICIENT VENTILATION. PROVIDE IRRIGATION. DO NOT PICK UP CONTAINERIZED OR BALLED PLANTS BY STEMS OR TRUCKS.
- ALL PLANTS WILL BE WELL FORMED AND POSSESS TOP AND ROOT GROWTH TYPICAL TO THE VARIETY AND IN HEALTHY PROPORTIONS TO EACH OTHER.
- CONTAINER GROWN MATERIAL SHALL HAVE ENOUGH FIBROUS ROOT MASS TO HOLD TOGETHER WHEN REMOVED FROM THE CONTAINER. ROOT BOUND MATERIAL IS UNACCEPTABLE.
- PLANTING PITS SHALL BE BACKFILLED WITH TWO-THIRDS EXISTING SOIL AND ONE-THIRD ORGANIC AMENDING MATERIAL APPROPRIATE FOR EACH SPECIES. CLEAN EXISTING SOIL OF ROOTS, PLANTS, SOD, STONES, CLODS, POCKETS OF COARSE SAND, CONCRETE SLURRY, CONCRETE LAYERS OR CHUNKS, CEMENT, ASPHALT, PLASTER, BUILDING DEBRIS, AND OTHER EXTRANEUS MATERIALS HARMFUL TO PLANT GROWTH. BACK FILL MATERIAL SHALL BE THOROUGHLY MIXED. NOTIFY LANDSCAPE ARCHITECT IMMEDIATELY IF AN UNUSUAL CONDITION WHICH APPEARS DETRIMENTAL TO THE NEW PLANTING IS ENCOUNTERED. PLANTING BEDS SHALL BE 4 INCHES OF AMENDING MATERIAL AND 8 INCHES EXISTING SOIL OR IF EXISTING SOIL IS INAPPROPRIATE, REMOVE IT AND REPLACE IT WITH 8 INCHES OF IMPORTED TOP SOIL AND 4 INCHES OF AMENDING MATERIAL.
- AMENDING MATERIAL SHALL BE COMPOST MATERIAL. COMPOST SHALL BE FROM A PROVIDER THAT COMPLIES WITH THE US COMPOSTING COUNCIL STANDARDS FOR COMPOST PRODUCTION. THE COMPOST SHALL BE FREE OF NOXIOUS WEED SEED OR OTHER DELETERIOUS MATERIAL. IT SHALL HAVE A P.H. BETWEEN 6 AND 7.2.
- TEST PLANTING SOIL TO DETERMINE FERTILIZER REQUIREMENTS PRIOR TO INSTALLING PLANTS. ADD FERTILIZER TO PLANTING SOIL AT THE RATES RECOMMENDED BY CERTIFIED SOIL LAB. DO NOT ADD FERTILIZER TO STORM WATER PLANTING AREAS.
- INSTALL OR REPAIR IRRIGATION SYSTEMS PRIOR TO PLANT MATERIAL INSTALLATION.
- INSTALL PLANT MATERIAL WHEN CONDITIONS ARE APPROPRIATE. DO NOT INSTALL PLANT MATERIAL DURING THE FOLLOWING CONDITIONS:
  - EXTENDED HOT WINDY WEATHER, GREATER THAN 90 DEGREES FAHRENHEIT.
  - WINDY WEATHER WITH VELOCITY GREATER THAN 20 MPH.
  - WHEN THE GROUND IS FROZEN AND COLDER THAN 32 DEGREES FAHRENHEIT.
- FIELD PLACE TREES AND SHRUBS IN LOCATIONS SHOWN ON DRAWINGS. PREPARE DEPTH OF PLANTING PIT EQUAL TO THE SIZE OF THE ROOT BALL WITH THE ROOTBALL FLUSH TO GRADE AND 1-2 INCHES HIGHER IN SLOWING DRAINING SOIL. WIDTH OF THE PLANTING PITS SHALL BE AT LEAST TWICE AS WIDE AS THE SIZE OF THE ROOT BALL.
- AFTER SETTING BALLED PLANTS COMPLETELY REMOVE TWINE OR WIRE BINDING AND FOLD BACK BURLAP FROM AT LEAST ONE THIRD OF THE ROOT BALL. NON BIODEGRADABLE WRAPPING SHALL BE REMOVED. DO NOT PLANT IF THE ROOTBALL IS BROKEN OR CRACKED.
- AFTER SETTING CONTAINERIZED PLANTS, LOOSEN ANY CIRCLED OR BOUND ROOTS TO INSURE STRAIGHT ROOT GROWTH INTO PLANT PIT OR BED SOIL. SEVERELY COILED AND ROOT BOUND PLANTS ARE UNACCEPTABLE.
- AFTER BACKFILLING 2/3 OF THE SOIL MIX THOROUGHLY WATER-IN EACH PLANT. IF RECOMMENDED PLACE FERTILIZER SLOW RELEASE TABLETS IN THE SOIL SO THEY DO NOT TOUCH THE PLANT ROOTS. TAMP IN REMAINING BACKFILL TO FINISHED GRADE AND CREATE LOW BERM WITH PLANTING SOIL AROUND PLANT TO RETAIN WATER. HOSE PLANT WITH A FINE MIST TO CLEANSE LEAVES OF DEBRIS AND REMOVE TAGS.
- APPLY A COMMERCIAL GRADE, MEDIUM GRIND, NATURALLY COLORED SOFTWOOD MULCH UNIFORMLY OVER THE PLANTING AREA A MINIMUM OF TWO INCHES (2") THICK. MULCH SHALL NOT COVER THE ROOT CROWN OR BE PLACED OVER GROUND COVER PLANTINGS.
- AMEND LAWN WITH A 4 INCH MINIMUM OF COMPOSTED GARDEN MULCH. ADD FERTILIZER AT RATES RECOMMENDED BY SOIL TESTING LABS. INCORPORATE AMENDING MATERIAL IN THE TOP 8 INCHES OF EXISTING SOIL AND THOROUGHLY BLEND. AFTER THE SOIL HAS BEEN PREPARED, APPLY PRILLED LIME AT A RATE DETERMINED BY TESTING, AND RAKE INTO SOIL SURFACE. FLOAT AND ROLL LAWN AREAS TO ENSURE A SMOOTH, FIRM, AND MOWABLE LAWN SURFACE.
- ONLY STAKE TREES IF ADDITIONAL SUPPORT IS NECESSARY AS IN THE FOLLOWING CONDITIONS: ROOT BALLS CONTAIN VERY SANDY SOIL OR VERY WET CLAY OR TREES ARE LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. IF STAKING IS DETERMINED NECESSARY, STAKE SHALL BE 2" X 2" W/PA NO.2 GRADE DOUGLAS FIR, EIGHT FEET LONG. TREE TIES SHALL BE POLY CHAIN LOCK MATERIAL AND LEAVE SLACK IN THE TIE. STAKES SHOULD NOT CONTACT THE TREE ROOTS OR ROOTBALL AND SHOULD BE EMBEDDED 12" BELOW THE PLANT PIT. REMOVE THE TREE TIES AND STAKES AFTER ONE YEAR.
- IRRIGATE WHEN NECESSARY TO AVOID DRYING OUT OF MATERIAL AND TO PROMOTE HEALTHY GROWTH UNTIL FINAL APPROVAL.
- AT JOB COMPLETION, ALL DEBRIS, EXTRA MATERIALS, SUPPLIES AND EQUIPMENT SHALL BE REMOVED FROM THE SITE. ALL SURFACES SHALL BE SWEEPED CLEAN AND MULCH AREAS CLEARED OF SOIL. ALL AREAS OF THE PROJECT SHALL BE CLEAN, ORDERLY AND COMPLETE.



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No.	Description	Date

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CHECKED BY: *aj*  
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DATE: 07/17/2021  
ISSUED FOR: DESIGN REVIEW  
SHEET TITLE: LANDSCAPE NOTES AND DETAILS

SHEET NO.

L-2





- SITE PLAN KEY NOTES**  
NOTE: COORDINATE DEMOLITION EXTENTS WITH NEW SITE PLAN AND CIVIL DRAWINGS
- 1 (E) UTILITY BOX/Vault
  - 2 (E) CONCRETE CURB - TYP
  - 3 (E) CONCRETE PAVED AREA - TYP
  - 4 (E) LANDSCAPE AREA - TYP
  - 5 (E) SHRUBS/BUSHES
  - 6 (E) TREE - TYP
  - 7 (E) FIRE HYDRANT
  - 8 (E) UTILITY POLE
  - 9 DEMO (E) ASPHALT PAVED AREA
  - 10 DEMO (E) CONCRETE CURB
  - 11 DEMO (E) CONCRETE PAVED AREA
  - 12 DEMO (E) LANDSCAPE AREA
  - 13 DEMO (E) GRAVEL AREA
  - 14 DEMO (E) TREE - TYP
  - 15 DEMO (E) FENCE
  - 16 DEMO (E) LANDSCAPE AND PREP FOR NEW RETAINING WALL
  - 17 VERIFY CONDITION OF (E) GAS METER AND SUPPLY LINE

**1 SITE PLAN - EXISTING / DEMO**  
SCALE: 1" = 10'-0"

**SITE STATISTICS - EXISTING (ON SITE)**

TOTAL SITE AREA (AS SURVEYED):	25,869 SF	100%
(0.59 ACRES)		
IMPERVIOUS AREA:	0 SF	
BUILDING FOOTPRINT (EXISTING):	0 SF	
HARDSCAPE (EXISTING):	0 SF	
EXISTING IMPERVIOUS AREA:	0 SF	0%
PERVIOUS AREA (GRAVEL):	1,620 SF	(6%)
PERVIOUS AREA (LANDSCAPE):	24,249 SF	(94%)
EXISTING PERVIOUS AREA:	25,869 SF	100%

EXISTING VEHICLE PARKING COUNTS:  
SITE IS UNDEVELOPED AND NO VEHICLE PARKING EXISTS

EXISTING BICYCLE PARKING:  
SITE IS UNDEVELOPED AND NO BICYCLE PARKING EXISTS

**SITE STATISTICS - EXISTING (OFF SITE)**

IMPERVIOUS AREA:	2,156 SF	
EXISTING TOTAL PERVIOUS AREA:	<2,022 SF>	
ASPHALT SIDEWALK (DEMO):	<134 SF>	
CONC. CURB RAMP (DEMO):	<134 SF>	
EXISTING IMPERVIOUS TO REMAIN:	0 SF	

PERVIOUS AREA:	8,243 SF	
EXISTING TOTAL PERVIOUS AREA:	<1,882 SF>	
GRAVEL (DEMO):	<2,690 SF>	
LANDSCAPE (DEMO):	<2,690 SF>	
EXISTING LANDSCAPE TO REMAIN:	3,671 SF	

NOTE: TOTAL ADJACENT OFF-SITE AREA IS ALSO REDUCED DUE TO RELOCATION OF THE STREET CURB AS A RESULT OF WIDENING THE ROAD.

**SITE PLAN LEGEND**

[Pattern]	(E) CONCRETE
[Pattern]	(E) ASPHALT
[Pattern]	(E) LANDSCAPE
[Pattern]	(E) GRAVEL
[Pattern]	(E) FLOOD SLOPE HAZARD ZONE
[Pattern]	(E) DRAINAGE DITCH
[Pattern]	DEMO AREA
[Line]	(E) PROPERTY LINE
[Line]	(E) FENCE LINE
[Line]	(E) BUILDING FOOTPRINT
[Line]	(E) CONTOUR LINE - SEE CIVIL
[Symbol]	(E) SIGN
[Symbol]	(E) TREE - EVERGREEN
[Symbol]	(E) TREE - DECIDUOUS
[Symbol]	(E) SHRUBBERY
[Symbol]	(E) STORMWATER INLET
[Symbol]	(E) FIRE HYDRANT - OR - FDC
[Symbol]	(E) GAS METER
[Arrow]	VEHICLE CIRCULATION
[Arrow]	BUILDING ENTRY/EXIT



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No.	Description	Date

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CHECKED BY: DH  
JOB NO: 20-004  
DATE: 07/16/2021  
ISSUED FOR: DESIGN REVIEW  
SHEET TITLE  
SITE PLAN - EXISTING / DEMO  
SHEET NO.

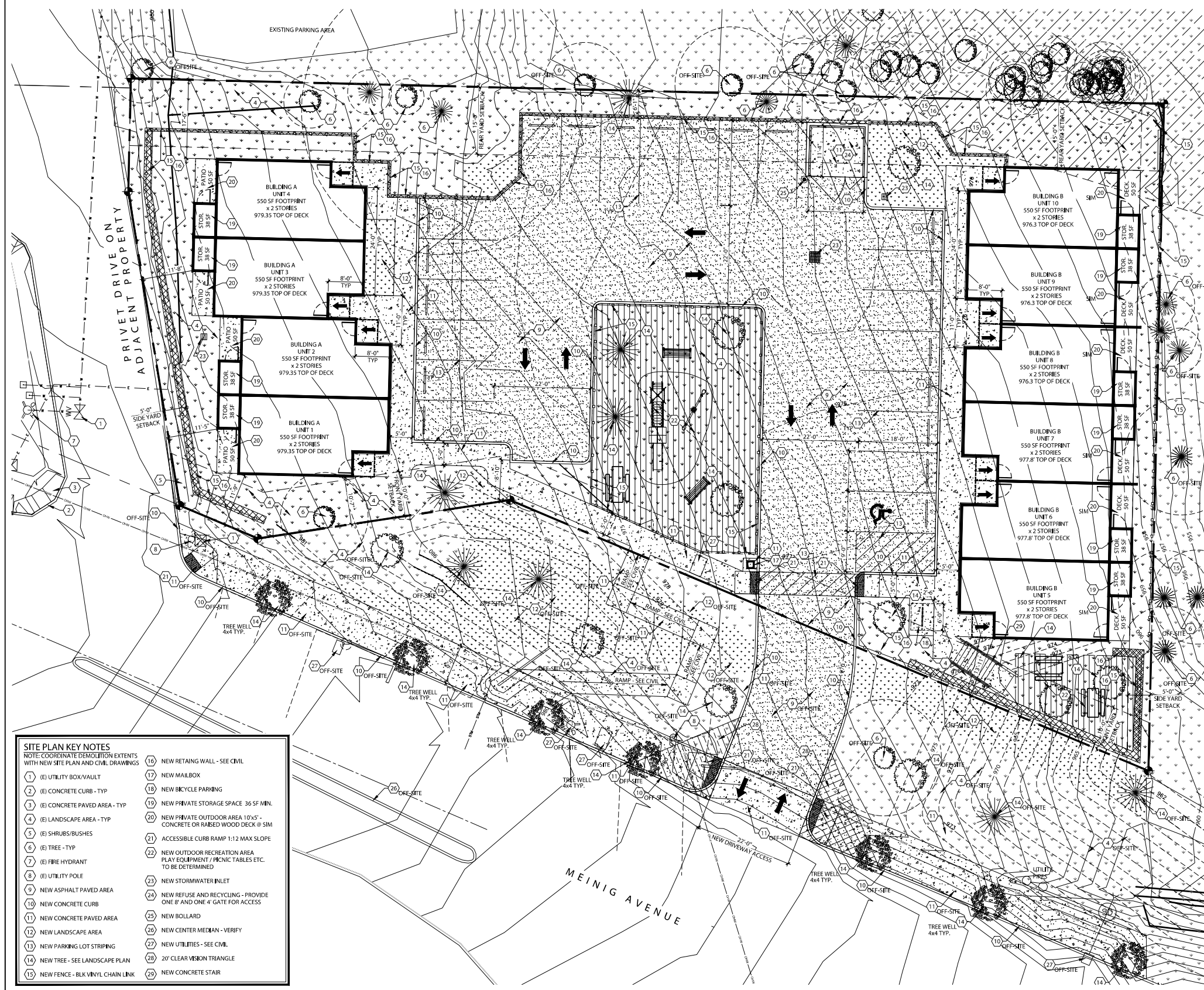
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**SITE PLAN KEY NOTES**  
NOTE: COORDINATE DEMOLITION EXTENTS WITH NEW SITE PLAN AND CIVIL DRAWINGS

1 (E) UTILITY BOX/Vault	16 NEW RETAINING WALL - SEE CIVIL
2 (E) CONCRETE CURB - TYP	17 NEW MAILBOX
3 (E) CONCRETE PAVED AREA - TYP	18 NEW BICYCLE PARKING
4 (E) LANDSCAPE AREA - TYP	19 NEW PRIVATE STORAGE SPACE 36 SF MIN.
5 (E) SHRUBS/BUSHES	20 NEW PRIVATE OUTDOOR AREA 10'x5' CONCRETE OR RAISED WOOD DECK @ 5" SIM
6 (E) TREE - TYP	21 ACCESSIBLE CURB RAMP 1:12 MAX SLOPE
7 (E) FIRE HYDRANT	22 NEW OUTDOOR RECREATION AREA PLAY EQUIPMENT / PICNIC TABLES ETC. TO BE DETERMINED
8 (E) UTILITY POLE	23 NEW STORMWATER INLET
9 NEW ASPHALT PAVED AREA	24 NEW REFUSE AND RECYCLING - PROVIDE ONE 8' AND ONE 4' GATE FOR ACCESS
10 NEW CONCRETE CURB	25 NEW BOLLARD
11 NEW CONCRETE PAVED AREA	26 NEW CENTER MEDIAN - VERIFY
12 NEW LANDSCAPE AREA	27 NEW UTILITIES - SEE CIVIL
13 NEW PARKING LOT STRIPING	28 20' CLEAR VISION TRIANGLE
14 NEW TREE - SEE LANDSCAPE PLAN	29 NEW CONCRETE STAIR
15 NEW FENCE - BLK VINYL CHAIN LINK	

**1 SITE PLAN - PROPOSED**  
SCALE: 1" = 10'-0"

**SITE STATISTICS - PROPOSED (ON SITE)**  
TOTAL SITE AREA (AS SURVEYED): 25,889 SF 100% (0.59 ACRES)  
IMPERVIOUS AREA:  
BUILDING FOOTPRINT (NEW): 5,500 SF  
10 @ 550 SF (LIVING AREA) + 38 SF (STORAGE)  
HARDSCAPE ASPHALT/CONC. (NEW): 11,760 SF  
PROPOSED IMPERVIOUS AREA: 17,260 SF 67%  
PERVIOUS LANDSCAPE AREA:  
EXISTING LANDSCAPE TO REMAIN: 8,003 SF  
NEW LANDSCAPE: 6,696 SF  
PROPOSED PERVIOUS AREA: 8,699 SF 33%  
NOTE: PROPOSED REQUIRED OUTDOOR RECREATION AREA IS APPROXIMATELY 2,430 SF OF THE PROPOSED LANDSCAPE AREA

**PROPOSED VEHICLE PARKING COUNTS:**  
BASED ON 2 STALLS PER 2 BED UNIT  
10 UNITS = 20 STALLS  
21 STALLS PROVIDED INCLUDING ONE ACCESSIBLE

**PERCENTAGE OF STREET FRONTAGE OCCUPIED BY PARKING**  
TOTAL FRONTAGE DIMENSION: 235'-0"  
TOTAL FRONTAGE OCCUPIED BY PARKING AND MANEUVERING MINUS DRIVE ACCESS: 58'-0" (25%)

**NEW BICYCLE PARKING:**  
1 STALL PER DWELLING UNIT REQUIRED. TENANT BICYCLE PARKING SPACE PROVIDED VIA HANGING RACK WITHIN INDIVIDUAL ATTACHED STORAGE SPACE.  
2 PUBLIC STALLS MEASURING 2.5 FEET BY 6 FEET ARE PROVIDED ADJACENT TO THE SITE DRIVEWAY ACCESS.

**SITE STATISTICS - PROPOSED (OFF SITE)**  
IMPERVIOUS AREA:  
ASPHALT ACCESS DRIVE (NEW): 1,004 SF  
CONC SIDEWALK (NEW): 11,760 SF  
PROPOSED NEW IMPERVIOUS AREA: 12,764 SF  
PERVIOUS LANDSCAPE AREA:  
EXISTING LANDSCAPE TO REMAIN: 3,671 SF  
NEW LANDSCAPE: 2,238 SF  
NEW STREET TREE WELLS @ 16 SF: 80 SF  
PROPOSED PERVIOUS AREA: 5,989 SF

**SITE PLAN LEGEND**

(E) CONCRETE	(E) CONCRETE
(N) CONCRETE	(N) CONCRETE
(E) ASPHALT	(E) ASPHALT
(N) ASPHALT	(N) ASPHALT
(E) LANDSCAPE	(E) LANDSCAPE
(N) LANDSCAPE	(N) LANDSCAPE
(N) LANDSCAPE RECREATION AREA	(N) LANDSCAPE RECREATION AREA
(E) FLOOD SLOPE HAZARD ZONE	(E) FLOOD SLOPE HAZARD ZONE
(E) PROPERTY LINE	(E) PROPERTY LINE
(E) FENCE LINE	(E) FENCE LINE
(N) FENCE LINE	(N) FENCE LINE
(E) BUILDING FOOTPRINT	(E) BUILDING FOOTPRINT
(N) BUILDING FOOTPRINT	(N) BUILDING FOOTPRINT
(E) CONTOUR LINE - SEE CIVIL	(E) CONTOUR LINE - SEE CIVIL
(N) CONTOUR LINE - SEE CIVIL	(N) CONTOUR LINE - SEE CIVIL
NEW RETAINING WALL	NEW RETAINING WALL
(E) OR NEW SITE LIGHTING	(E) OR NEW SITE LIGHTING
(E) OR NEW SIGN	(E) OR NEW SIGN
(E) OR NEW TREE - EVERGREEN	(E) OR NEW TREE - EVERGREEN
(E) OR NEW TREE - DECIDUOUS	(E) OR NEW TREE - DECIDUOUS
(E) OR NEW SHRUBBERY	(E) OR NEW SHRUBBERY
(E) OR NEW STORMWATER INLET	(E) OR NEW STORMWATER INLET
(E) OR NEW FIRE HYDRANT / FDC	(E) OR NEW FIRE HYDRANT / FDC
(E) OR NEW GAS METER	(E) OR NEW GAS METER
VEHICLE CIRCULATION	VEHICLE CIRCULATION
BUILDING ENTRY/EXIT	BUILDING ENTRY/EXIT



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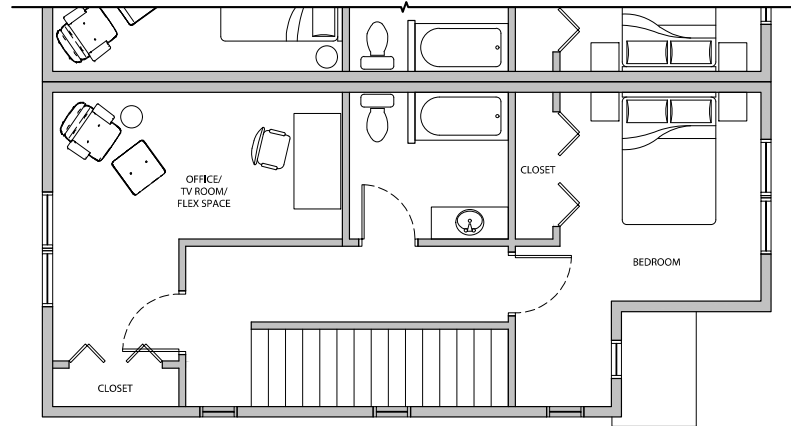
No.	Description	Date

DRAWN BY: SIM  
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ISSUED FOR: DESIGN REVIEW  
SHEET TITLE  
SITE PLAN - PROPOSED  
SHEET NO.

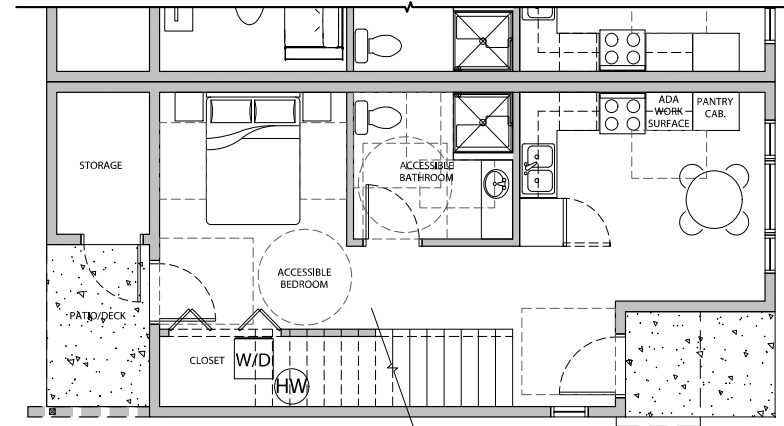
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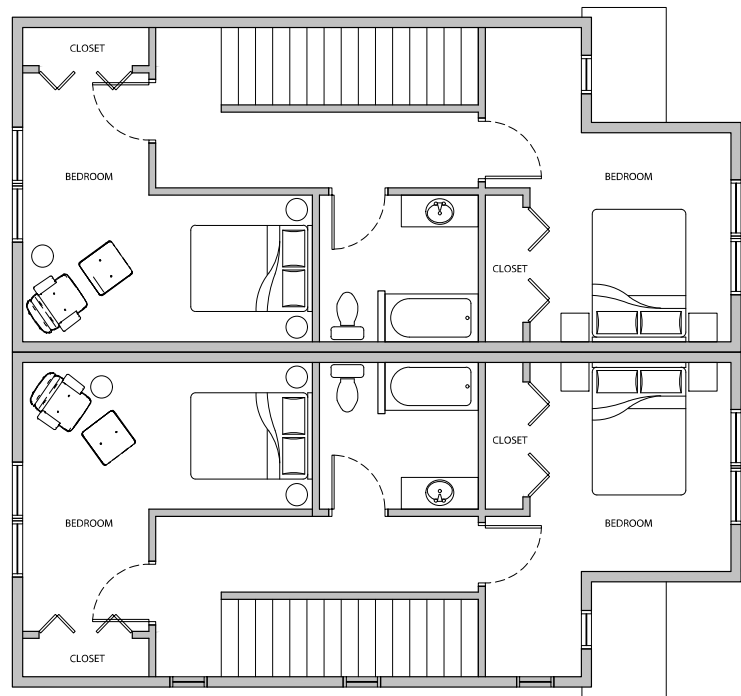
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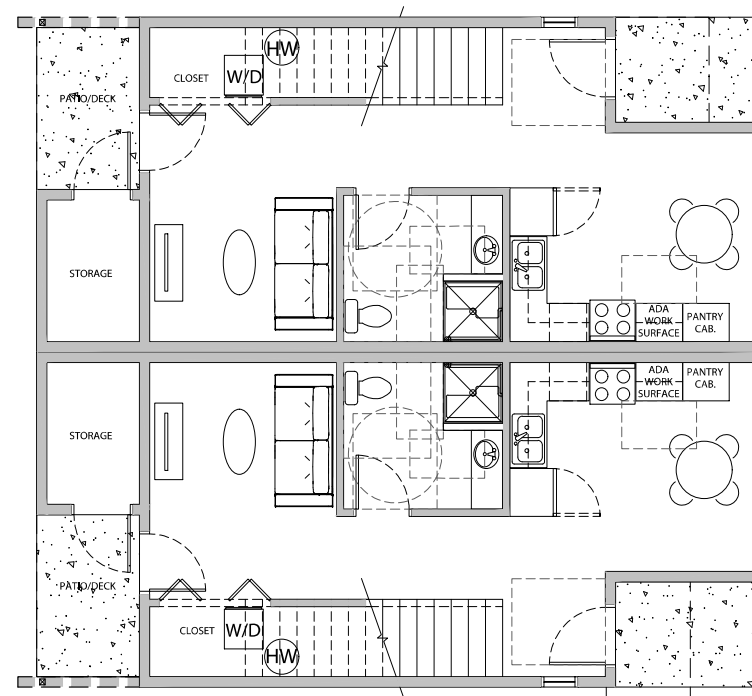
**4** SECOND FLOOR PLAN - ACCESSIBLE UNIT  
SCALE: 1/4" = 1'-0"



**3** FIRST FLOOR PLAN - ACCESSIBLE UNIT  
SCALE: 1/4" = 1'-0"



**2** SECOND FLOOR PLAN - STANDARD UNIT  
SCALE: 1/4" = 1'-0"



**1** FIRST FLOOR PLAN - STANDARD UNIT  
SCALE: 1/4" = 1'-0"



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DRAWN BY: SIM

CHECKED BY: DH

JOB NO: 20-004

DATE: 07/16/2021

ISSUED FOR: DESIGN REVIEW

SHEET TITLE

FIRST AND SECOND FLOOR PLANS  
PROPOSED

SHEET NO.

**A-201**

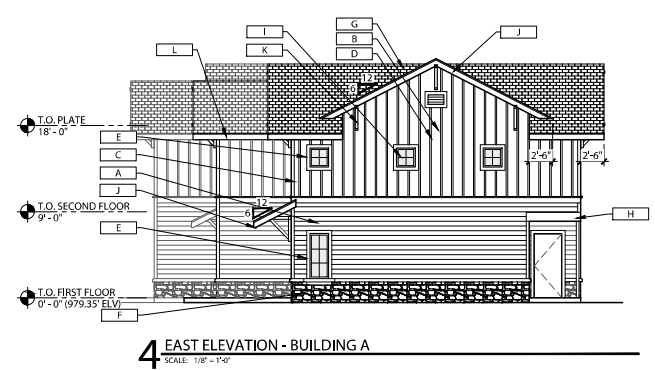




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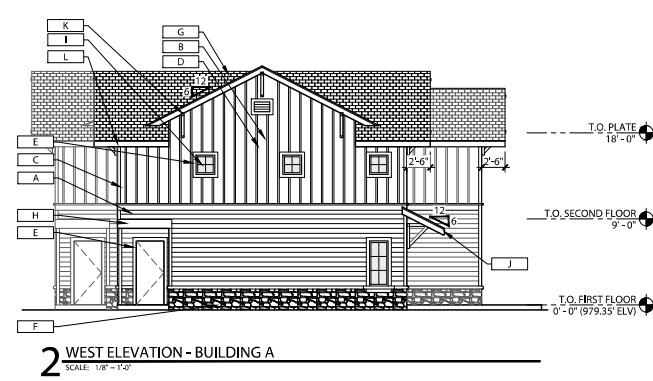
THE PAD  
 TOWNHOME APARTMENTS  
 17650 MENING AVENUE  
 SANDY, OR 97055



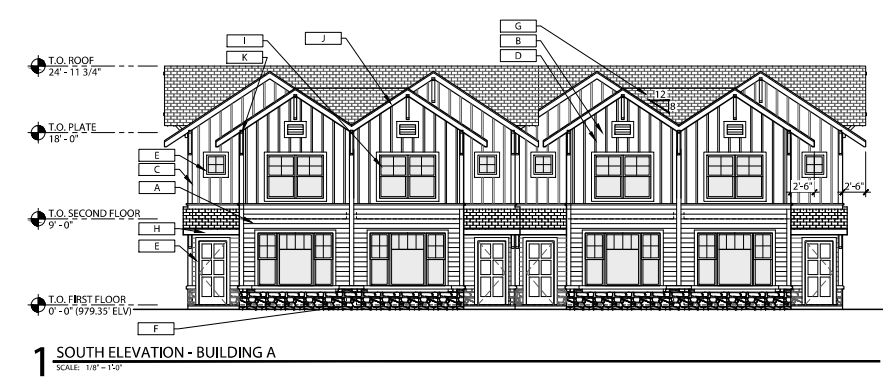
4 EAST ELEVATION - BUILDING A  
 SCALE: 1/8" = 1'-0"



3 NORTH ELEVATION - BUILDING A  
 SCALE: 1/8" = 1'-0"



2 WEST ELEVATION - BUILDING A  
 SCALE: 1/8" = 1'-0"



1 SOUTH ELEVATION - BUILDING A  
 SCALE: 1/8" = 1'-0"

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
A	LAP SIDING	JAMES HARDIE	SELECT CEDAR MILL	WARM WHISKY	8 1/2" (7" EXPOSURE)	
B	HARDIE PANEL	JAMES HARDIE	SELECT CEDAR MILL	COBBLE STONE	PANEL	
C	HARDIE TRIM	JAMES HARDIE	1/2" ROUGH SAWN	ARCTIC WHITE	5.5"	
D	HARDIE TRIM	JAMES HARDIE	1/2" RUSTIC GRAIN BATTEN BOARDS	COBBLE STONE	2.5"	
E	HARDIE TRIM	JAMES HARDIE	1/2" ROUGH SAWN	ARCTIC WHITE	3.5"	
F	CULTURED STONE	MUTUAL MATERIALS	COUNTRY LEDGE STONE	SKYLINE	VARIES	
G	ASPHALT SHINGLES	OWENS CORNING	OAKRIDGE	BROWNWOOD		
H	HARDIE TRIM	JAMES HARDIE	1/2" ROUGH SAWN	ARCTIC WHITE	11.25"	
I	VINYL WINDOWS	TBD	TBD	WHITE	VARIES	LOW-E, INSULATED GLASS

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
J	WOOD RAKE	N/A	RAKE BOARD	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER
K	WOOD BRACKET	EKENA MILLWORK	WOOD BRACKET	ARCTIC WHITE	32" X 32"	4"x4" ROUGH SAWN LUMBER - WRC OR DF
L	WOOD FASCIA	N/A	WOOD FASCIA	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER

**ELEVATIONS GENERAL NOTES**

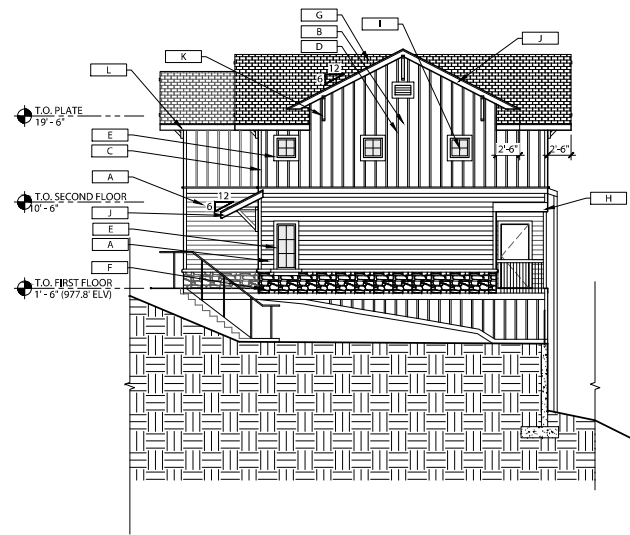
- MATERIAL MANUFACTURERS AND FINISH TO BE DETERMINED.
- COLORS SHALL BE IN MUTED EARTH TONE PALETTE AS SUGGESTED BY SANDY STYLE DEVELOPMENT CODE - SEE COLOR RENDERS INCLUDED WITH THIS SUBMISSION

REVISIONS		
No.	Description	Date

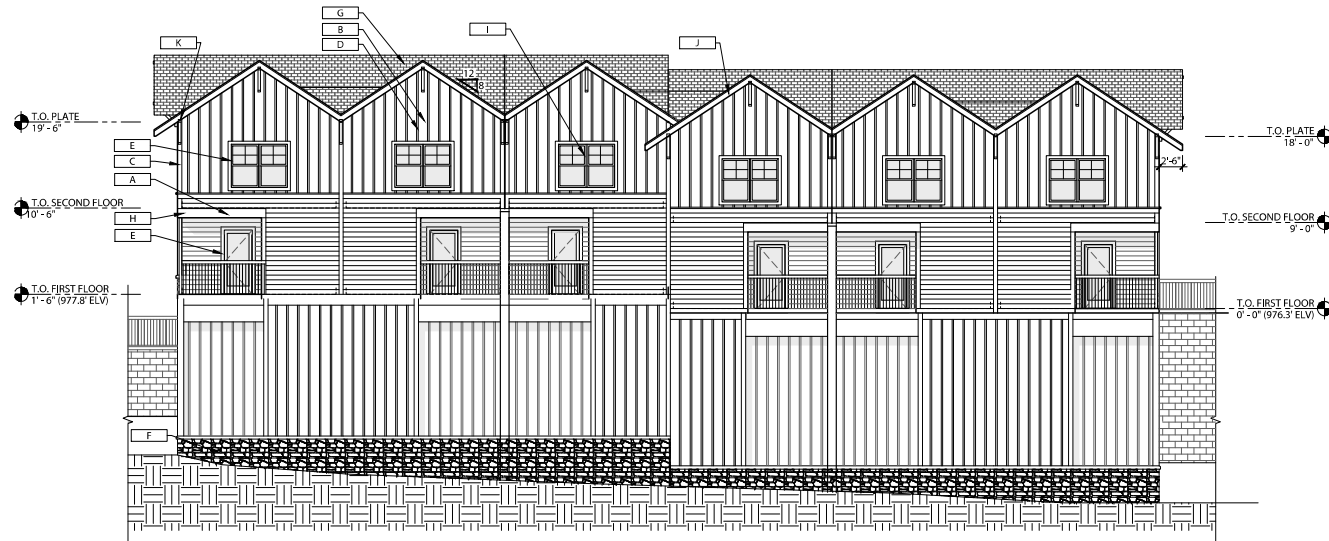
DRAWN BY: SIM  
 CHECKED BY: DH  
 JOB NO: 20-004  
 DATE: 07/16/2021  
 ISSUED FOR: DESIGN REVIEW  
 SHEET TITLE  
 EXTERIOR ELEVATIONS  
 PROPOSED NORTH BUILDING "A"  
 SHEET NO.

A-221

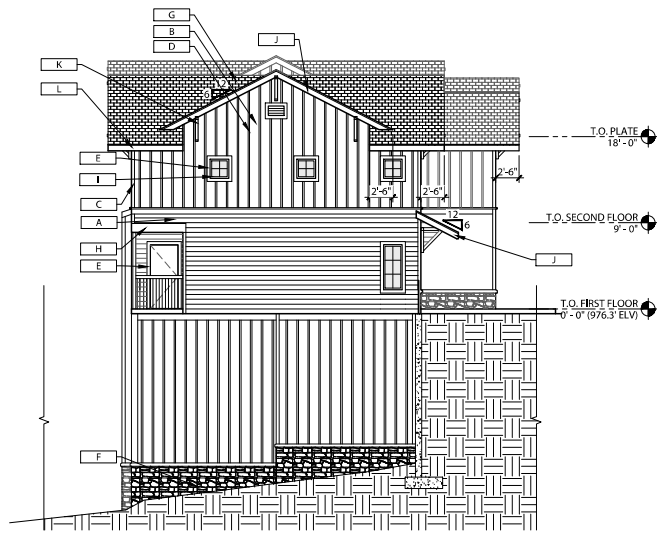




4 WEST ELEVATION - BUILDING B  
SCALE: 1/8" = 1'-0"



3 SOUTH ELEVATION - BUILDING B  
SCALE: 1/8" = 1'-0"



2 EAST ELEVATION - BUILDING B  
SCALE: 1/8" = 1'-0"



1 NORTH ELEVATION - BUILDING B  
SCALE: 1/8" = 1'-0"

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
A	LAP SIDING	JAMES HARDIE	SELECT CEDAR MILL	WARM WHISKY	8 1/2" (7" EXPOSURE)	
B	HARDIE PANEL	JAMES HARDIE	SELECT CEDAR MILL	COBBLE STONE	PANEL	
C	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	5.5"	
D	HARDIE TRIM	JAMES HARDIE	1/2" RUSTIC GRAIN BATTEN BOARDS	COBBLE STONE	2.5"	
E	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	3.5"	
F	CULTURED STONE	MUTUAL MATERIALS	COUNTRY LEDGE STONE	SKYLINE	VARIES	
G	ASPHALT SHINGLES	OWENS CORNING	OAKRIDGE	BROWNWOOD		
H	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	11.25"	
I	VINYL WINDOWS	TBD	TBD	WHITE	VARIES	LOW-E, INSULATED GLASS

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
J	WOOD RAKE	N/A	RAKE BOARD	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER
K	WOOD BRACKET	EKENA MILLWORK	WOOD BRACKET	ARCTIC WHITE	32" X 32"	4"x4" ROUGH SAWN LUMBER - WRC OR DF
L	WOOD FASCIA	N/A	WOOD FASCIA	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER

**ELEVATIONS GENERAL NOTES**

- MATERIAL MANUFACTURERS AND FINISH TO BE DETERMINED.
- COLORS SHALL BE IN MUTED EARTH TONE PALETTE AS SUGGESTED BY SANDY STYLE DEVELOPMENT CODE - SEE COLOR RENDERS INCLUDED WITH THIS SUBMISSION



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THE PAD  
TOWNHOME APARTMENTS  
17850 MENING AVENUE  
SANDY, OR 97055

REVISIONS

No.	Description	Date

DRAWN BY: SIM

CHECKED BY: DH

JOB NO: 20-004

DATE: 07/16/2021

ISSUED FOR: DESIGN REVIEW

SHEET TITLE

EXTERIOR ELEVATIONS

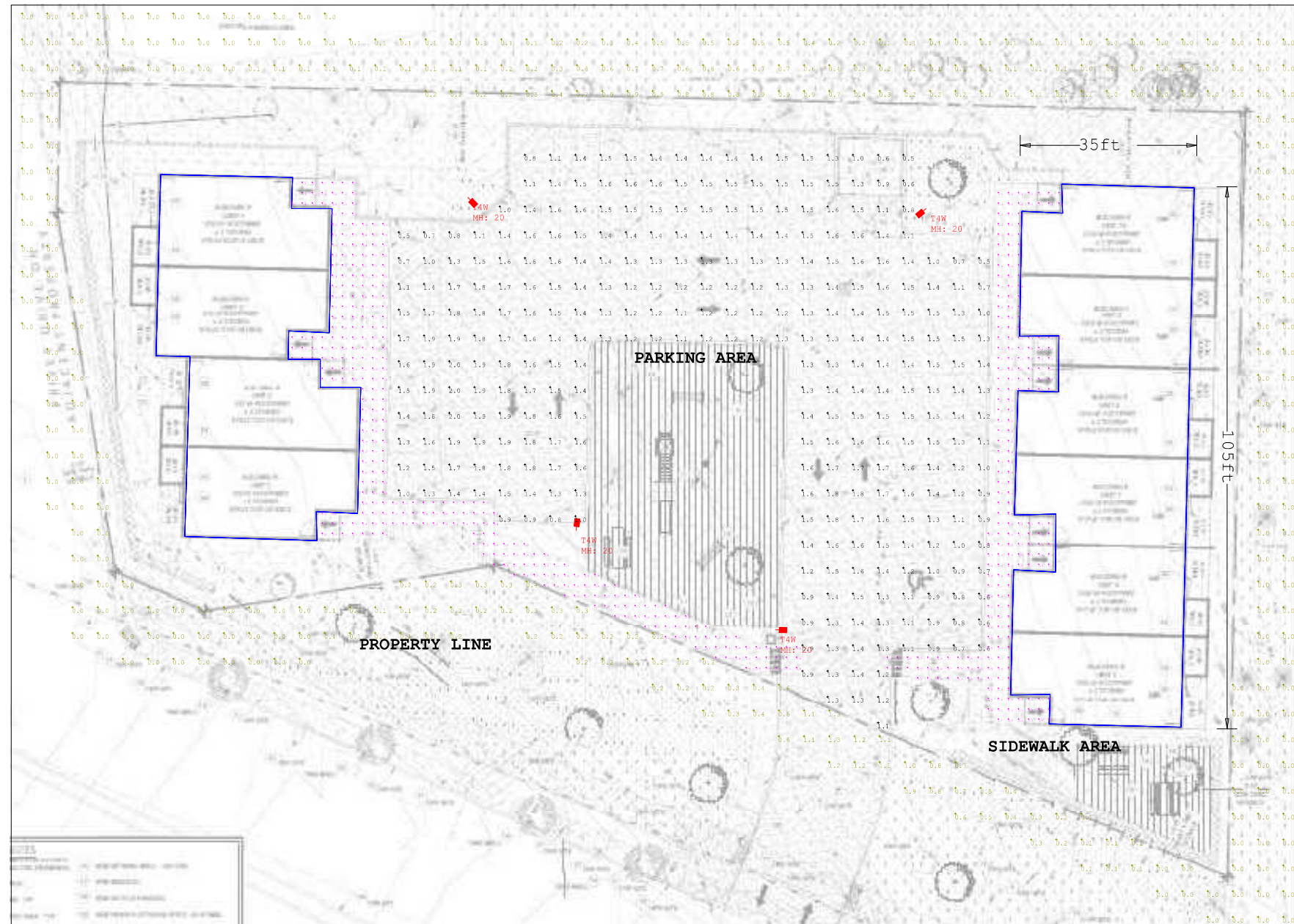
PROPOSED SOUTH BUILDING "B"

SHEET NO.

A-222



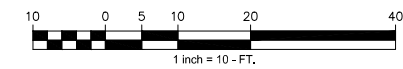




Luminaire Schedule							
Symbol	Label	Qty	Lum. Watts	Lum. Lumens	LLF	Arrangement	Description
	T4W	4	49.8	6245	0.850	SINGLE	RAR1-80L-50-4K7-4W

Note:  
 Calculation Grid (5ft x 5ft) @ Ground Level.  
 SidewalkGrid (2ft x 2ft) @ Ground Level.  
 Luminaire mounting heights are noted on each Luminaire Label.

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Parking area	Illuminance	Fc	1.37	2.0	0.5	2.74	4.00
Property line	Illuminance	Fc	0.16	1.3	0.0	N.A.	N.A.
Sidewalk area	Illuminance	Fc	0.58	1.5	0.0	N.A.	N.A.



# LT-1

THE LIGHTING DESIGN IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO HUBBELL LIGHTING. SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AND FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, SPECIAL SITE INFORMATION (PILE LOCATIONS, UNDERGROUND UTILITIES, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.  
 1. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS, OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.  
 2. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

REV: PHOTOMETRIC PLAN  
 The Pad Townhouses Sandy OR

REVISED FROM DRAWING NUMBER(S)
20-26577
20-26577R1

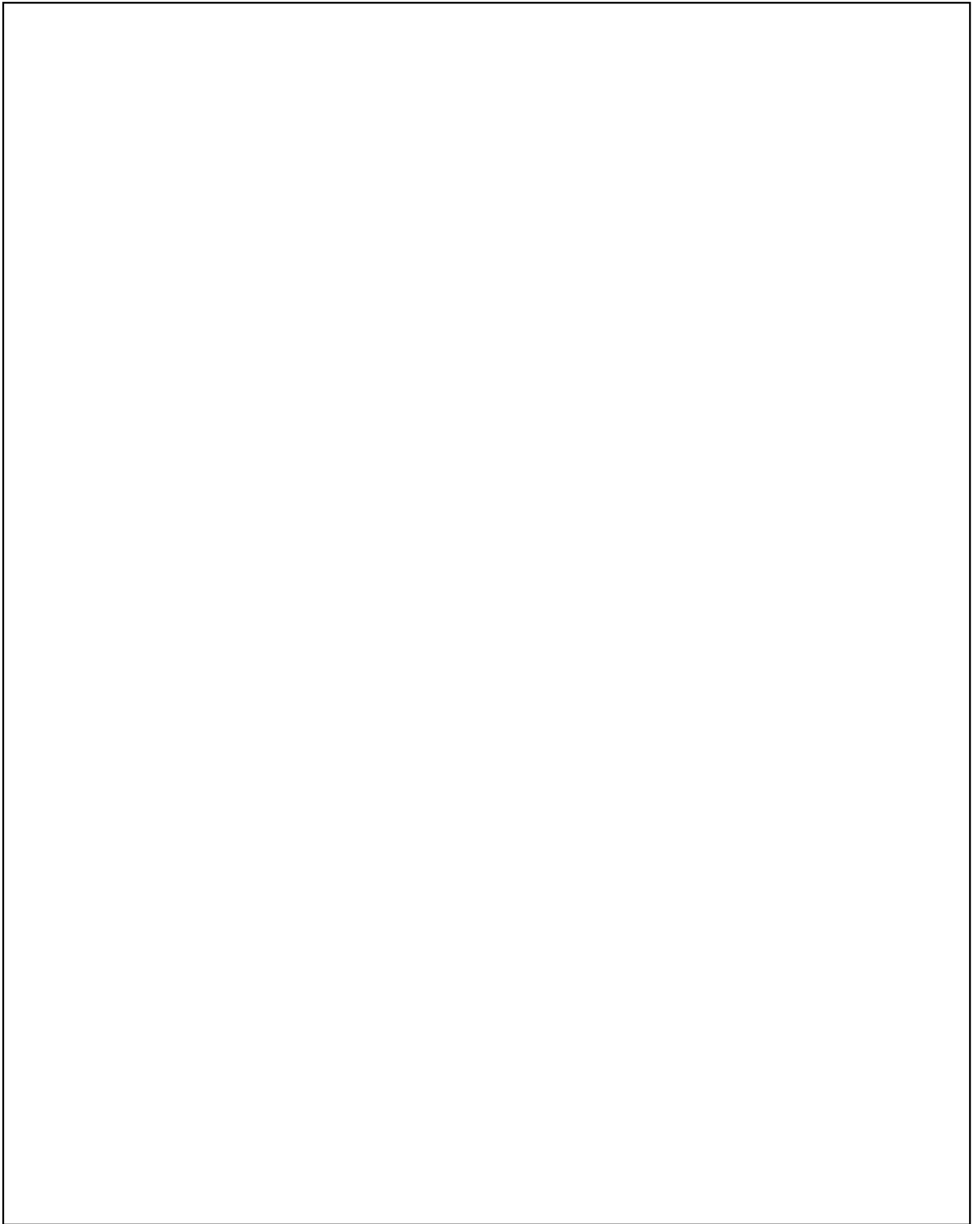


DATE	BY	SCALE
05-27-2021	Harish	AS NOTED

QUOTE: N/A  
 DRAWING DESIGN NO: 20-26577R2



**SECTION IV – APPENDIX ITEMS**  
**EXHIBIT F – MATERIALS SELECTION/**  
**LIGHTING FIXTURE CUT SHEETS**



# THE PAD - RESIDENTIAL DEVELOPMENT

## EXTERIOR FINISHES - MATERIAL SAMPLE BOARD

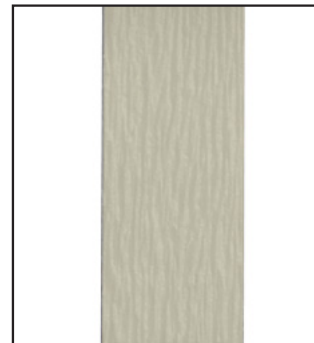
MATERIAL "A" - LAP SIDING  
MANUFACTURER: JAMES HARDIE  
STYLE: HARDIEPLANK SELECT CEDARMILL  
THICKNESS: 5/16"  
WIDTH: 8.25" (7" EXPOSURE)  
COLOR: WARM WHISKY (PRE-FINISHED)



MATERIAL "B" - BOARD AND BATTEN SIDING  
MANUFACTURER: JAMES HARDIE  
STYLE: HARDIE PANEL SELECT CEDARMILL  
THICKNESS: 5/16"  
COLOR: COBBLE STONE (PRE-FINISHED)



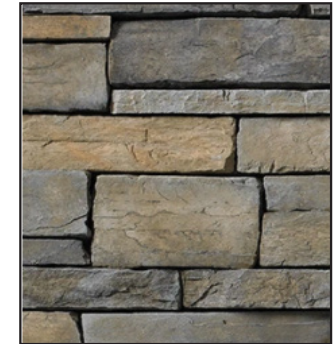
MATERIAL "D" - BOARD AND BATTEN SIDING  
MANUFACTURER: JAMES HARDIE  
STYLE: HARDIE TRIM BATTENS SELECT CEDARMILL  
THICKNESS: 5/16"  
WIDTH: 2.5"  
COLOR: COBBLE STONE (PRE-FINISHED)



MATERIAL "C" / "E" / "H" - TRIM BAORDS  
MANUFACTURER: JAMES HARDIE  
STYLE: HARDIE TRIM ROUGH SAWN  
THICKNESS: 5/4"  
WIDTH: VARIES - SEE ELEVATION DRAWINGS  
COLOR: ARCTIC WHITE (PRE-FINISHED)  
NOTE: ROOF RAKE AND FASCIA TO BE 2 x 8 DIMENSIONAL  
LUMBER PAINTED TO MATCH ARCTIC WHITE



MATERIAL "F" - CULTURED STONE  
MANUFACTURER: MUTUAL MATERIALS OR EQ.  
STYLE: COUNTRY LEDGESTONE  
THICKNESS: VARIES  
WIDTH: VARIES  
COLOR: SKYLINE



MATERIAL "G" - ASPHALT SHINGLES  
MANUFACTURER: OWENS CORNING OR EQ.  
STYLE: OAKRIDGE  
COLOR: BROWNWOOD



MATERIAL "K" - WOOD BRACKET  
MANUFACTURER: EKENA MILLWORKK OR EQ.  
STYLE: 4 x 4 ROUGH SAWN CEDAR OR DOUG FIR  
DIMENSIONS: 32' x 32"  
COLOR: PAINT TO MATCH ARCTIC WHITE





# RATIO Series

AREA/SITE LIGHTER

## T4W - SITE LIGHTING FIXTURE

### FEATURES

- Low profile LED area/site luminaire with a variety of IES distributions for lighting applications such as retail, commercial and campus parking lots
- Featuring Micro Strike Optics which maximizes target zone illumination with minimal losses at the house-side, reducing light trespass issues
- Visual comfort standard
- Compact and lightweight design with low EPA
- 3G rated for high vibration applications including bridges and overpasses
- Control options including photo control, occupancy sensing, NX Distributed Intelligence™ and 7-Pin with networked controls
- Best in class surge protection available



### RELATED PRODUCTS

- [Airo](#)  
 [Cimarron LED](#)  
 [Ratio Family](#)



### CONTROL TECHNOLOGY



### SPECIFICATIONS

#### CONSTRUCTION

- Rectilinear form mimics the traditional shoebox form factor keeping a similar but updated style and appearance, ideal for retrofit applications
- Die-cast housing with hidden vertical heat fins that are optimal for heat dissipation while keeping a clean smooth outer surface
- Corrosion resistant, die-cast aluminum housing with powder coat paint finish

#### OPTICS

- Entire optical aperture illuminates to create a larger luminous surface area resulting in a low glare appearance without sacrificing optical performance
- 80, 160, 320 or 480 midpower LEDs
- 3000K, 4000K or 5000K (70 CRI) CCT
- Zero uplight at 0 degrees of tilt
- Field rotatable optics

#### INSTALLATION

- Standard square arm mount, compatible with B3 drill pattern
- Optional universal mounting block for ease of installation during retrofit applications. Available as an option or accessory for square and round poles.
- Knuckle arm fitter option available for 2-3/8" OD tenon. Max tilt of 60 degrees with 4 degree adjustable increments. (Restrictions apply for 7-pin options)

#### ELECTRICAL

- Universal 120-277 VAC or 347-480 VAC input voltage, 50/60 Hz
- Ambient operating temperature -40°C to 40°C
- Drivers have greater than 90% power factor and less than 20% THD
- LED drivers have output power over-voltage, over-current protection and short circuit protection with auto recovery
- Field replaceable surge protection device provides 20kA protection meeting ANSI/IEEE C62.41.2 Category C High and Surge Location Category C3; Automatically takes fixture off-line for protection when device is compromised

#### CONTROLS

- Photo control, occupancy sensor and wireless available for complete on/off and dimming control
- 7-pin ANSI C136.41-2013 photocontrol receptacle option available for twist lock photocontrols or wireless control modules (control accessories sold separately)
- 0-10V dimming leads available for use with control devices (provided by others, must specify lead length)
- SiteSync™ wireless control system is available via 7-pin. See ordering information and details at: [www.hubbelloighting.com/sitesync](http://www.hubbelloighting.com/sitesync)
- NX Distributed Intelligence™ available with in fixture wireless control module, features dimming and occupancy sensor

#### CONTROLS (CONT'D)

- wiSCAPE® available with in fixture wireless control module, features dimming and occupancy sensor via 7-pin

#### CERTIFICATIONS

- DLC® (DesignLights Consortium Qualified), with some Premium Qualified configurations. Please refer to the DLC website for specific product qualifications at [www.designlights.org](http://www.designlights.org)
- Listed to UL1598 and CSA C22.2#250.0-24 for wet locations and 40°C ambient temperatures
- 3G rated for ANSI C136.31 high vibration applications
- Fixture is IP66 rated
- Meets IDA recommendations using 3K CCT configuration at 0 degrees of tilt

#### WARRANTY

- 5 year limited warranty
- See [HLI Standard Warranty](#) for additional information

KEY DATA	
Lumen Range	3,000–48,000
Wattage Range	25–340
Efficacy Range (LPW)	118–155
Fixture Projected Life (Hours)	L70>60K
Weights lbs. (kg)	13.5–24 (6.1–10.9)

# RATIO SERIES

AREA/SITE LIGHTER

## ORDERING GUIDE

**Example:** RAR1-80L-25-3K7-2-UNV-ASQ-BL-NXWE-BC

 CATALOG # 

## ORDERING INFORMATION

Series	# LEDs - Wattage	CCT/CRI	Distribution	Optics Rotation	Voltage
<b>RAR1</b> Ratio Area Size 1	<b>80L-25</b> 25W - 3,000 Lumens	<b>3K7</b> 3000K, 70 CRI	<b>2</b> IES TYPE II	<b>Blank for no rotation</b>	<b>UNV</b> Universal 120-277V
	<b>80L-39</b> 39W - 5,200 Lumens	<b>4K7</b> 4000K, 70 CRI	<b>3</b> IES TYPE III	<b>L</b> Optic rotation left	<b>120</b> 120V
	<b>80L-50</b> 50W - 6,000 Lumens	<b>5K7</b> 5000K, 70 CRI	<b>4W</b> IES TYPE IV	<b>R</b> Optic rotation right	<b>208</b> 208V
	<b>160L-70</b> 70W - 9,000 Lumens		<b>5QW</b> IES TYPE V		<b>240</b> 240V
	<b>160L-100</b> 100W - 12,000 Lumens				<b>277</b> 277V
	<b>160L-115</b> 115W - 15,000 Lumens				<b>347</b> 347V
	<b>160L-135</b> 135W - 18,000 Lumens				<b>480</b> 480V
<b>RAR2</b> Ratio Area Size 2	<b>320L-110</b> 110W - 15,000 Lumens				
	<b>320L-140</b> 140W - 18,000 Lumens				
	<b>320L-165</b> 165W - 21,000 Lumens				
	<b>480L-185</b> 185W - 24,000 Lumens				
	<b>480L-210</b> 210W - 27,000 Lumens				
	<b>480L-240</b> 240W - 30,000 Lumens				
	<b>480L-255</b> 255W - 36,000 Lumens				
	<b>480L-295</b> 295W - 42,000 Lumens				
	<b>480L-340</b> 340W - 48,000 Lumens				

Mounting	
<b>ASQ</b>	Arm mount for square pole/flat surface
<b>ASQU</b>	Universal arm mount for square pole/flat surface
Mounting Round Poles	
<b>A_</b>	Arm mount for round pole <sup>1</sup>
<b>A_U</b>	Universal arm mount for round pole <sup>1</sup>
Mounting Other	
<b>WB</b>	Wall bracket
<b>MAF</b>	Mast arm fitter for 2-3/8" OD horizontal arm
<b>K</b>	Knuckle

Color	
<b>BLT</b>	Black Matte Textured
<b>BLS</b>	Black Gloss Smooth
<b>DBT</b>	Dark Bronze Matte Textured
<b>DBS</b>	Dark Bronze Gloss Smooth
<b>GTT</b>	Graphite Matte Textured
<b>LGS</b>	Light Grey Gloss Smooth
<b>PSS</b>	Platinum Silver Smooth
<b>WHT</b>	White Matte Textured
<b>WHS</b>	White Gloss Smooth
<b>VGT</b>	Verde Green Textured
Color Option	
<b>CC</b>	Custom Color

Control Options Network	
<b>NXWE</b>	NX Wireless Enabled (module + radio)
<b>NXSPW_F</b>	NX Wireless, PIR Occ. Sensor, Daylight Harvesting <sup>2</sup>
<b>NXSP_F</b>	NX, PIR Occ. Sensor, Daylight Harvesting <sup>2</sup>
Control Options Other	
<b>SCP-40F</b>	Programmable occupancy sensor <sup>4</sup>
<b>7PR</b>	7-Pin twist lock receptacle
<b>7PR-SC</b>	7-Pin receptacle with shorting cap
<b>7PR-MD40F</b>	Low voltage sensor for 7PR
<b>7PR-TL</b>	7-Pin PCR with photocontrol

Options	
<b>BC</b>	Backlight control
<b>CD</b>	Continuous dimming
<b>F</b>	Fusing (must specify voltage)
<b>TB</b>	Terminal block
<b>2PF</b>	2 power feed with 2 drivers <sup>3</sup>

**Notes:**

- 1 Replace "\_" with "3" for 3.5"-4.13" OD pole, "4" for 4.18"-5.25" OD pole, "5" for 5.5"-6.5" OD pole
- 2 Replace "\_" with "14" for up to 14' mounting height, "30F" for 15'-30' mounting height
- 3 Not available with 25, 50, 255, 295 & 340W configurations
- 4 At least one SCPREMOTE required to program SCP motion sensor

## STOCK ORDERING INFORMATION

Catalog Number	Lumens	Wattage	LED Count	CCT/CRI	Voltage	Distribution	Mounting	Finish
<b>RAR1-100-4K-3</b>	12,000	100W	160L	4000K/70CRI	120-277V	Type 3	Square Arm	Bronze
<b>RAR1-100-4K-4W</b>	12,000	100W	160L	4000K/70CRI	120-277V	Type 4W	Square Arm	Bronze
<b>RAR1-135-4K-3</b>	18,000	135W	160L	4000K/70CRI	120-277V	Type 3	Square Arm	Bronze
<b>RAR1-135-4K-4W</b>	18,000	135W	160L	4000K/70CRI	120-277V	Type 4W	Square Arm	Bronze
<b>RAR2-165-4K-3</b>	21,000	165W	320L	4000K/70CRI	120-277V	Type 3	Square Arm	Bronze
<b>RAR2-165-4K-4W</b>	21,000	165W	320L	4000K/70CRI	120-277V	Type 4W	Square Arm	Bronze



# RATIO SERIES

AREA/SITE LIGHTER

## OPTIONS AND ACCESSORIES - STOCK (ORDERED SEPARATELY)

Catalog Number	Description
<input type="checkbox"/> RARRPA3DB	Round pole adapter 3.5" to 4.13" for ASQ arm, 3.5" to 4.13" OD pole, dark bronze finish
<input type="checkbox"/> RARA3UDB	Universal mount for square pole or round pole 3.5" to 4.13", dark bronze finish
<input type="checkbox"/> RARBC80L	Ratio blacklight control 80L
<input type="checkbox"/> RARBC160L	Ratio blacklight control 160L
<input type="checkbox"/> RARBC320L	Ratio blacklight control 320L
<input type="checkbox"/> RARBC480L	Ratio blacklight control 480L

## ACCESSORIES AND REPLACEMENT PARTS - MADE TO ORDER

Catalog Number	Description
<input type="checkbox"/> RAR-ASQU-XX	Universal arm mount for square pole/flat surface <sup>2</sup>
<input type="checkbox"/> RAR-A_U-XX	Universal arm mount for round poles <sup>1,2</sup>
<input type="checkbox"/> RAR-RPA_-XX	Round pole adapter <sup>1,2</sup>
<input type="checkbox"/> SETAVP-XX	4" square pole top tenon adapter, 2 3/8" OD slipfitter <sup>2</sup>
<input type="checkbox"/> RETAVP-XX	4" round pole top tenon adapter; 2 3/8" OD slipfitter for max. Four fixtures (90o); order 4" round pole adapters separately <sup>2</sup>
<input type="checkbox"/> BIRD-SPIKE-3	Ratio size 1 bird deterrent/spikes
<input type="checkbox"/> BIRD-SPIKE-4	Ratio size 2 bird deterrent/spikes
<input type="checkbox"/> RARWB-XX	Wall bracket - use with Mast Arm Fitter or Knuckle <sup>2</sup>

- 1 Replace "\_" with "3" for 3.5"-4.13" OD pole, "4" for 4.18"-5.25" OD pole, "5" for 5.5"-6.5" OD pole  
 2 Replace "XX" with desired color/paint finish

## CONTROLS

### Control Options

#### Standalone

- SW7PR** SiteSync™ on fixture module via 7PR
- SWUSB** SiteSync™ Software on USB
- SWTAB** SiteSync™ Windows Tablet
- SWBRG** SiteSync™ Wireless Bridge Node
- SWFC** SiteSync™ Field Commission Serve
- SCPREMOTE** Order at least one per project location to program and control

#### Networked – Wireless

- WIR-RME-L** wiSCAPE External Fixture Module<sup>1,2</sup>

#### NX Networked – Wireless

- NXOFM-1R1D-UNV** NX Wireless, Daylight Harvesting, BLE, 7 pin twisted lock

Notes:

- 1 Works with external networked photosensor
- 2 wiSCAPE Gateway required for system programming

# RATIO SERIES

AREA/SITE LIGHTER

## PERFORMANCE DATA

Description	Nominal Wattage	System Watts	Dist. Type	5K (5000K NOMINAL 70 CRI)					4K (4000K NOMINAL 70 CRI)					3K (3000K NOMINAL 80 CRI)				
				Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
RAR1	25	25.4	2	3438	135	1	0	1	3445	136	1	0	1	3240	128	1	0	1
			3	3460	136	1	0	1	3467	136	1	0	1	3260	128	1	0	1
			4W	3406	134	1	0	1	3412	134	1	0	1	3209	126	1	0	1
			5QW	3483	137	2	0	1	3490	137	2	0	1	3282	129	2	0	1
	39	39	2	5263	139	1	0	2	5273	139	1	0	2	4960	131	1	0	2
			3	5297	139	1	0	2	5308	140	1	0	2	4991	131	1	0	2
			4W	5200	137	1	0	2	5210	137	1	0	2	4900	129	1	0	2
			5QW	5333	140	3	0	1	5344	141	3	0	1	5025	132	3	0	1
	50	49.8	2	6310	127	1	0	2	6323	127	1	0	2	5946	120	1	0	2
			3	6349	128	1	0	2	6362	128	1	0	2	5983	120	1	0	2
			4W	6233	125	1	0	2	6245	126	1	0	2	5873	118	1	0	2
			5QW	6392	129	3	0	1	6405	129	3	0	1	6023	121	3	0	1
	70	68.4	2	9486	139	1	0	2	9505	139	1	0	2	8938	131	1	0	2
			3	9544	140	1	0	2	9563	140	1	0	2	8993	131	1	0	2
			4W	9395	137	1	0	2	9414	138	1	0	2	8853	129	1	0	2
			5QW	9608	140	4	0	2	9628	141	4	0	2	9054	132	4	0	2
	100	90.0	2	11976	133	2	0	2	12000	133	2	0	2	11285	125	2	0	2
			3	12050	134	2	0	2	12074	134	2	0	2	11354	126	2	0	2
			4W	11861	132	2	0	2	11885	132	2	0	2	11177	124	2	0	2
			5QW	12131	135	4	0	2	12155	135	4	0	2	11431	127	4	0	2
	115	109.7	2	15572	142	2	0	2	15494	141	2	0	2	14871	136	2	0	2
			3	15833	144	2	0	2	15754	144	2	0	2	15121	138	2	0	2
			4W	15281	139	2	0	3	15205	139	2	0	3	14623	133	2	0	3
			5QW	15732	143	4	0	2	15653	143	4	0	2	15024	137	4	0	2
	135	133.3	2	17971	135	3	0	3	17881	134	3	0	3	17163	129	3	0	3
			3	18272	137	2	0	2	18181	136	2	0	2	17450	131	2	0	2
			4W	17635	132	2	0	3	17547	132	2	0	3	16876	127	2	0	3
			5QW	18156	136	4	0	2	18065	136	4	0	2	17339	130	4	0	2

RAR2 Performance Data on next page

\* Lumen values are from photometric test performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

# RATIO SERIES

AREA/SITE LIGHTER

## PERFORMANCE DATA

Description	Nominal Wattage	System Watts	Dist. Type	5K (5000K NOMINAL 70 CRI)					4K (4000K NOMINAL 70 CRI)					3K (3000K NOMINAL 80 CRI)				
				Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
RAR2	110	100.3	2	15326	153	2	0	3	15357	153	2	0	3	14442	144	2	0	3
			3	15421	154	2	0	3	15452	154	2	0	3	14531	145	2	0	3
			4W	15180	151	2	0	2	15210	152	2	0	2	14304	143	2	0	2
			5QW	15525	155	4	0	2	15556	155	4	0	2	14629	146	4	0	2
	140	133.2	2	19395	146	2	0	3	19434	146	2	0	3	18276	137	2	0	3
			3	19515	147	2	0	3	19554	147	2	0	3	18389	138	2	0	3
			4W	19210	144	2	0	3	19248	145	2	0	3	18101	136	2	0	3
			5QW	19647	148	5	0	3	19686	148	5	0	3	18513	139	5	0	3
	165	153.6	2	21651	141	3	0	3	21695	141	3	0	3	20402	133	3	0	3
			3	21785	142	3	0	3	21828	142	3	0	3	20527	134	3	0	3
			4W	21444	140	3	0	3	21487	140	3	0	3	20206	132	3	0	3
			5QW	21932	143	5	0	3	21976	143	5	0	3	20666	135	5	0	3
	185	174.5	2	26046	149	3	0	3	26098	150	3	0	3	24543	141	3	0	3
			3	26207	150	3	0	3	26259	150	3	0	3	24694	142	3	0	3
			4W	25797	148	3	0	4	25849	148	3	0	4	24308	139	3	0	4
			5QW	26384	151	5	0	3	26437	152	5	0	3	24861	143	5	0	3
	210	198.2	2	28848	145	3	0	4	28906	146	3	0	4	27184	137	3	0	4
			3	29027	146	3	0	4	29085	147	3	0	4	27351	138	3	0	4
			4W	28572	144	3	0	4	28630	144	3	0	4	26924	136	3	0	4
			5QW	29222	147	5	0	4	29281	148	5	0	4	27536	139	5	0	4
	240	226.9	2	32087	141	3	0	4	32151	142	3	0	4	30235	133	3	0	4
			3	32285	142	3	0	4	32350	143	3	0	4	30422	134	3	0	4
			4W	31780	140	3	0	4	31844	140	3	0	4	29946	132	3	0	4
			5QW	32503	143	5	0	4	32568	144	5	0	4	30627	135	5	0	4
	255	257.0	2	37040	144	3	0	4	36854	143	3	0	4	35373	138	3	0	4
			3	37660	147	3	0	4	37472	146	3	0	4	35966	140	3	0	4
			4W	36347	141	3	0	5	36166	140	3	0	5	34782	135	3	0	5
			5QW	37420	146	5	0	4	37233	145	5	0	4	35736	139	5	0	4
	295	294.0	2	41733	142	3	0	4	41524	141	3	0	4	39855	136	3	0	4
			3	42432	144	3	0	4	42220	144	3	0	4	40523	138	3	0	4
			4W	40953	139	3	0	5	40748	139	3	0	5	39190	133	3	0	5
			5QW	42162	143	5	0	4	41951	143	5	0	4	40264	137	5	0	4
	340	347.1	2	48392	139	4	0	5	48150	139	4	0	5	46215	133	4	0	5
			3	49203	142	3	0	4	48957	141	3	0	4	46989	135	3	0	4
			4W	47488	137	4	0	5	47261	136	4	0	5	45443	131	4	0	5
			5QW	48889	141	5	0	5	48645	140	5	0	5	46689	135	5	0	5

\* Lumen values are from photometric test performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

# RATIO SERIES

AREA/SITE LIGHTER

## ELECTRICAL DATA

# OF LEDES	Nominal Wattage	Input Voltage	Oper. Current (Amps)	System Power (Watts)	
RAR1	25	120	0.21	25.4	
		208	0.12		
		240	0.11		
		277	0.09		
	39	120	0.32	38.0	
		208	0.18		
		240	0.16		
		277	0.14		
		347	0.11		
		480	0.08		
	50	120	0.42	49.8	
		208	0.24		
		240	0.21		
		277	0.18		
	70	120	0.57	68.4	
		208	0.33		
		240	0.29		
		277	0.25		
	100	120	0.75	90.0	
		208	0.43		
		240	0.38		
		277	0.32		
	115	120	0.91	109.7	
		208	0.53		
240		0.46			
277		0.40			
347		0.32			
480		0.23			
135	120	1.11	133.3		
	208	0.64			
	240	0.56			
	277	0.48			
			347	0.38	
			480	0.28	

# OF LEDES	Nominal Wattage	Input Voltage	Oper. Current (Amps)	System Power (Watts)
RAR2	110	120	0.84	100.3
		208	0.48	
		240	0.42	
		277	0.36	
	140	120	1.11	133.2
		208	0.64	
		240	0.56	
		277	0.48	
	165	120	1.28	153.6
		208	0.74	
		240	0.64	
		277	0.55	
	185	120	1.45	174.5
		208	0.84	
		240	0.73	
		277	0.63	
	210	120	1.65	198.3
		208	0.95	
		240	0.83	
		277	0.72	
	240	120	1.89	226.9
		208	1.09	
		240	0.95	
		277	0.82	
255	120	2.14	257.0	
	208	1.24		
	240	1.07		
	277	0.93		
	347	0.74		
	480	0.54		
295	120	2.45	294.0	
	208	1.41		
	240	1.23		
	277	1.06		
	347	0.85		
	480	0.61		
340	120	2.89	347.1	
	208	1.67		
	240	1.45		
	277	1.25		
	347	1.00		
	480	0.72		

## LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

Ambient Temperature		Lumen Multiplier
0° C	32° F	1.03
10° C	50° F	1.01
20° C	68° F	1.00
25° C	77° F	1.00
30° C	86° F	0.99
40° C	104° F	0.98
50° C	122° F	0.97

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

## PROJECTED LUMEN MAINTENANCE

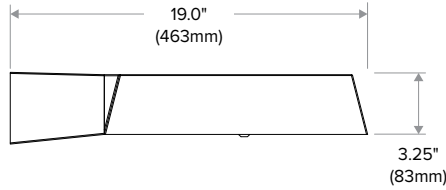
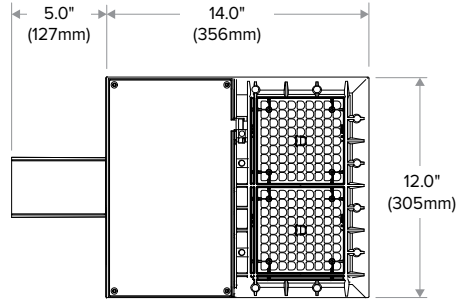
Ambient Temperature	OPERATING HOURS					
	0	25,000	TM-21-11 L90 36,000	50,000	100,000	L70 (Hours)
25°C / 77°F	1.00	0.97	0.95	0.93	0.86	238,000
40°C / 104°F	0.99	0.96	0.95	0.93	0.85	225,000

# RATIO SERIES

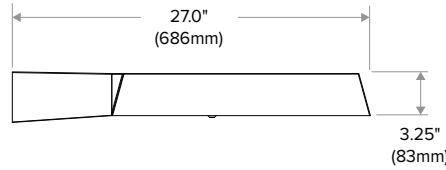
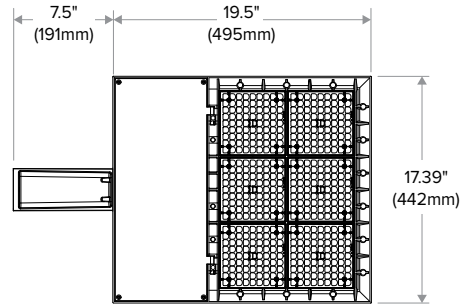
AREA/SITE LIGHTER

## DIMENSIONS

RAR1

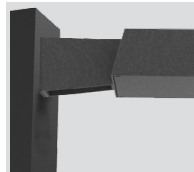


RAR2



## ADDITIONAL INFORMATION

### MOUNTING



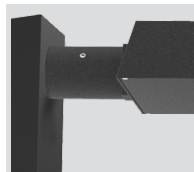
**Arm Mount** – Fixture ships with integral arm for ease of installation. Compatible with Hubbell Outdoor B3 drill pattern.



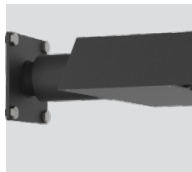
**Knuckle** – Knuckle mount 15° aiming angle increments for precise aiming and control, fits 2-3/8" tenons or pipes.



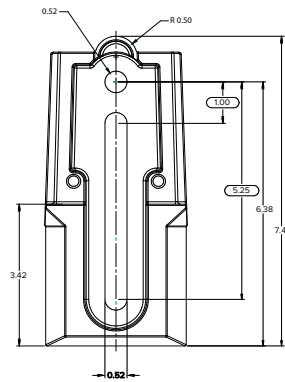
**Universal Mounting** – Universal mounting block for ease of installation. Compatible with drill patterns from 2.5" to 4.5"



**MAF** – Fits 2-3/8" OD arms Roadway applications.



**Wall Mount** – Wall mount bracket designed for building mount applications.



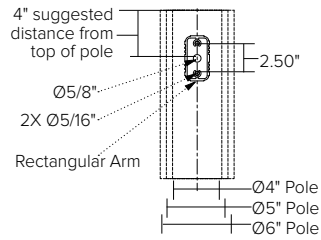
# RATIO SERIES

AREA/SITE LIGHTER

## ADDITIONAL INFORMATION (CONT'D)

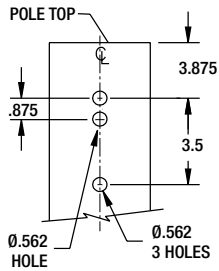
### ARM MOUNT (ASQ)

Compatible with Pole drill pattern B3



### UNIVERSAL MOUNTING (ASQU)

Compatible with pole drill pattern S2



### SITESYNC 7-PIN MODULE



SW7PR



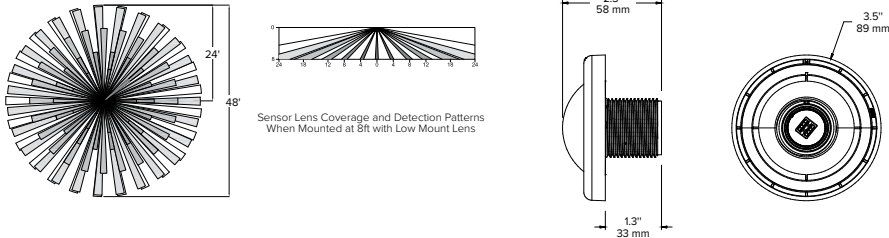
- SiteSync features in a new form
- Available as an accessory for new construction or retrofit applications (with existing 7-Pin receptacle)

# RATIO SERIES

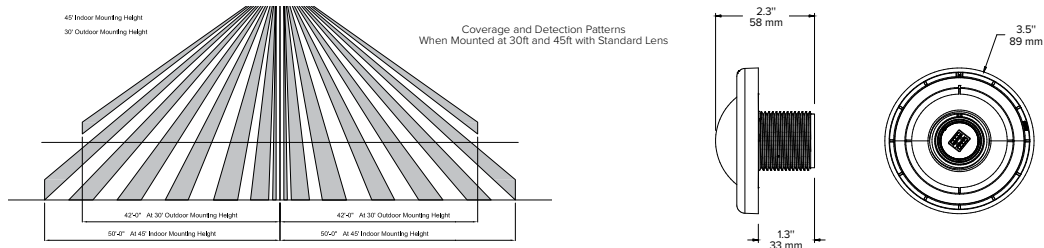
AREA/SITE LIGHTER

## ADDITIONAL INFORMATION (CONT'D)

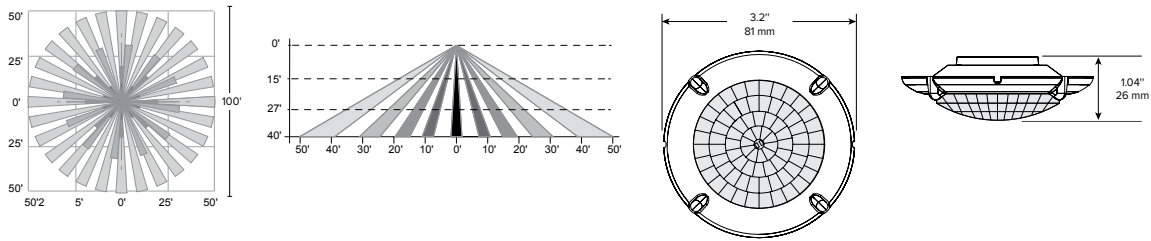
### NXSP-14F



### NXSP-30F



### SCP-40F



### RAR1 EPA

RAR-1	
EPA at 0°	EPA at 30°
.45ft. <sup>2</sup>	.56ft. <sup>2</sup>
.13m <sup>2</sup>	.17m <sup>2</sup>

### RAR2 EPA

RAR-2	
EPA at 0°	EPA at 30°
.55ft. <sup>2</sup>	1.48ft. <sup>2</sup>
.17m <sup>2</sup>	.45m <sup>2</sup>

### SHIPPING

Catalog Number	G.W(kg)/CTN	Carton Dimensions		
		Length Inch (cm)	Width Inch (cm)	Height Inch (cm)
RAR1	15 (6.8)	20.75 (52.7)	15.125 (38.4)	6.9375 (17.6)
RAR2	19 (8.6)	25 (63.5)	15.125 (38.4)	6.9375 (17.6)

### USE OF TRADEMARKS AND TRADE NAMES

All product and company names, logos and product identifies are trademarks™ or registered trademarks® of Hubbell Lighting, Inc. or their respective owners. Use of them does not necessarily imply any affiliation with or endorsement by such respective owners.



LOCATION	FRONT AND REAR PORCHES	DATE
PREPARED BY		QUANTITY
COMMENTS		FIXTURE TYPE
CATALOG NUMBER		

## Edmund LED Outdoor Sconce EDDW Series

### Features

This outdoor LED light is ideal for security and general lighting. Up illumination (1-Light) or Up/down-light illumination (2-Light) for outdoor or indoor residential, commercial, and hospitality applications. Fixture mounts to a standard junction box (not included).



### Construction

Die-cast aluminum construction. Standard mounting holes and hardware are included. Power supply connections must be made inside a junction box (not included).

### Finish

Black powder coated finish.

### Diffuser

Solid acrylic diffuser.

### Electrical

Input 120-277 VAC / 60 Hz.  
Minimum starting temp -4° F / -20°C.

### LED

Integrated LED modules capable of producing:  
1-LIGHT - 14W = 800 source lumens, 480 delivered lumens  
2-LIGHT - 26W = 1600 source lumens, 960 delivered lumens  
Adjustable Choice 3000K, 3500K, 4000K (CCT).  
Rated for 50,000 Hrs. 90 CRI.

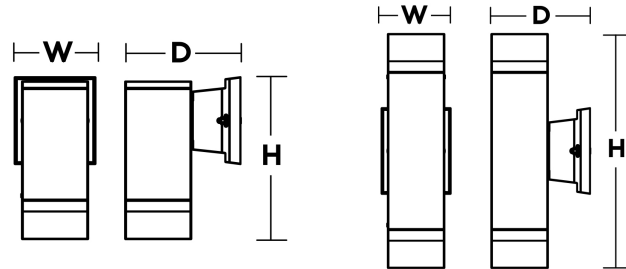
### Certification

All fixtures are cETLus listed for wet locations.  
Title 24/JA8 Compliant (outdoor only).

### Warranty

Limited warranty: This fixture is free from defects in materials and workmanship for a period of 5 years from date of purchase.

**Specifications and dimensions  
subject to change without notice.**

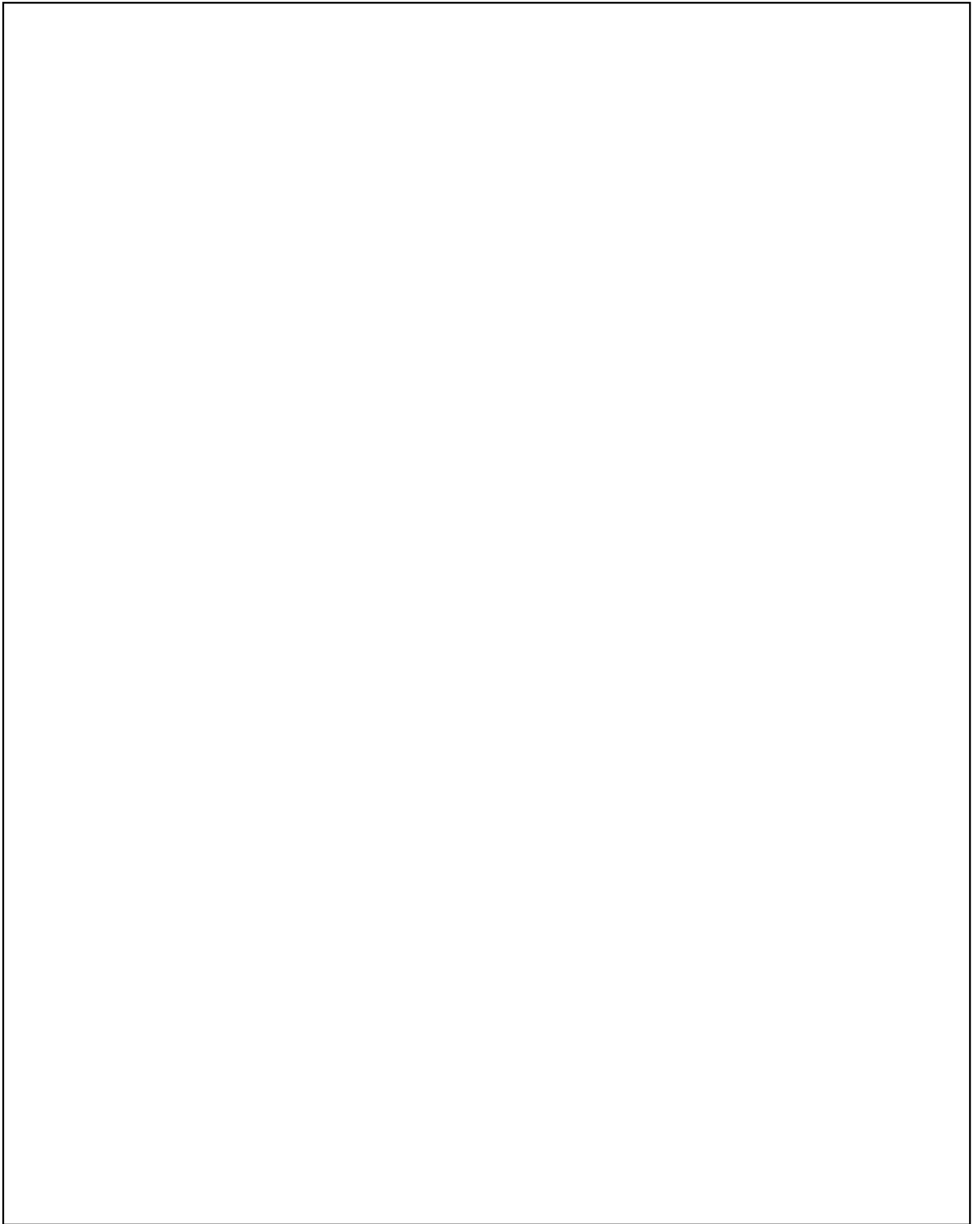


### Ordering Information:

Black	LED	Source Lumens	Delivered Lumens	Adjustable CCT	H	W	D
EDDW0608LAJMVKB (1-LIGHT)	14W	800	480	3000K/3500K/4000K	8"	3-1/2"	6-1/4"
EDDW0612LAJMVKB (2-LIGHT)	26W	1600	960	3000K/3500K/4000K	11-7/8"	3-1/2"	6-1/4"



**EXHIBIT G – PRELIMINARY**  
**STORMWATER REPORT**



# SITE HYDRAULICS REPORT

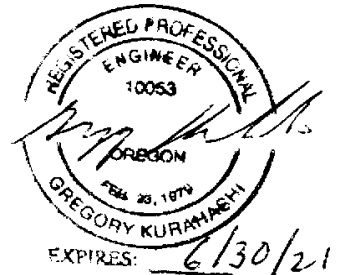
“THE PAD” DRAINAGE REPORT

FOR “THE PAD” DEVELOPMENT

SANDY, OREGON

JULY 6, 2020

Prepared By  
Kurahashi and Associates Company  
4470 SW Hall Blvd. Suite C  
Beaverton, Oregon 97005  
503 267 8434



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**1 Introduction**

**2 Existing Stormwater System**

**3 Proposed Stormwater System**

**4 Storm Water Analysis**

**5 Appendix**

# INTRODUCTION

## 1.1 Project Overview

This report contains the hydrologic and hydraulic design parameters for the “THE PAD” Sandy Development Project at tax lot 1500; Assessor Map 2S-24E-13DB-01500, with the total area is approximately 0.478 acres. The property is situated at 17650 Meinig Avenue in Sandy, Oregon. This report reviews and confirms the information necessary to design on-site conveyance systems as well as water quality treatment facilities for “THE PAD” Sandy Development Project and the retention system on the site which will be located in the south driveway of the development.

Please note that the methodology used to analyze the storm water conveyance system uses a computer program (Hydraflow 2002 by inteliSOLV) that uses SCS unit hydrograph as the method for calculating the Storm Flow. The land for the development required the use of a Contech storm filter system for treatment. The plan includes 1 Contech manhole storm filter that is shown on the C3 Utility Plan attached in the appendix.

## 1.2 Existing Conditions

The site originally had a home, shed and yard that encompassed the central portion of the property. The structures are no longer present.

## 1.3 Proposed Improvements

The proposed development will include a 10 unit 2 story townhouse apartments. 6 units will be on the south end while 4 will be on the north end of the development. 1 handicap parking space and 20 regular parking spaces will be provided. Six 9’x18’ parking spaces will be on the north end while seven 9’x19’ parking spaces will be on the east side and seven 9’x18’ parking spaces the south side along with the 9’x18’ handicap space and 9’x18’ handicap loading zone. The southwest corner of the development will have mail boxes, picnic tables and a grassy recreation area. The East side of the lot will have a trash/recycling enclosure at the southern end. The site will have a grassy recreation area with trees and a gazebo bordered by the south, east and north portions of the development as well as the west property line. The building and parking rain water collection system will be directed to the SE area of the parking lot in front of the trash/recycling enclosure. The storm water after detention and treatment will accommodate the 1yr, 2yr, 5yr, 10yr and 25yr storms using City of Sandy 24 hour rainfall. It will be metered out to retain the flow to reduce the storms to be stored and discharged at the same rate that the project discharged at existing conditions. The discharges will no longer be overland to City and Park District property but directed to the ditch along Meinig Ave. Storm drainage will be

detained in a system of two 40' pipes 5' in diameter pipes. The project is in a location that does not allow for significant infiltration and this could be dangerous to downstream areas.

## **Existing Stormwater System**

The existing system discharged storm drainage was discharge from the original house roof to daylight on to the ground and then be discharged overland to the city property and to the Park southeasterly from the property this water has no direct discharge to a channel. Continuing the discharge in pipes or overland would require approval of the Park district and require DSL and Corps approval to discharge with pipes to the street. By directing the flow to the existing storm drainage system of pipes we would not require approval because it enters a City pipes system after discharging to a ditch along Meinig Ave.

## Storm Water Analysis

### 4.1 Design Solution:

The proposed storm water design on property includes: One catch basin, 2 5' diameter 40' long detention pipes, one detention manhole, and a water quality manhole.

### 4.2 Design Assumptions and Parameters of Detention

City of Sandy Rainfall in Inches per 24 hour period: 3.5 (2 year), 4.5 (5 year), 4.8 (10 year), 5.5 (25 year), 6.5 (100 year)

Impervious Area of Roof, Driveway Sidewalks and Patio

Prior to Development.: 0.0 Acres

CN# used for Impervious areas: 98

Length N/A

Time interval of analysis: N/A

Unit Hydrograph: N/A

Storm Distribution: Type 1A

Area of Site Prior to Development.: 0.65 Acres (Including Large Right of Way)

CN# used for Pervious areas: 77

Slope: 15%

Length: 125 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A

Impervious Area of Roof, Driveway, Sidewalks and Deck

after Development: 0.478 Acres

CN# used for Impervious areas: 98

Slope: 2%

Length: 100 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A

Area of Landscaping after Development: 0.21 Acres

CN# used for Pervious areas: 77

Slope: 15%

Length: 125 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A



### **4.3 Reservoir Analysis:**

Please note the proposed Detention utilizes no percolation.

The storage was developed using detention pipes to modify the discharge to pre-development levels.

The pipe system uses 80 lineal feet of 5 foot diameter N12 PVC conduits.

Most of the storm water collection system backwaters into the detention pipes.

Attached in the Appendix is the Reservoir Stage Storage Discharge Table (Reservoir Report)

The report analyzes a 2.4 inch orifice at the bottom of the pipe storage a 2.8 inch orifice at 2.5 feet and a 2 inch orifice at 4.15 feet which was never reached. The Final Analysis will refine the preliminary design and may change to Storm Tech Chambers.

This utilizes 1,288 cubic feet of storage of the 1571 cubic feet of pipe storage available.

### **4.4 Design Flow Analysis:**

The values of discharge for each storm are tabulated. On the tables provided for each return interval in the Appendix. Below are the comparisons of peak discharge or each return interval.

Return Interval	Existing (CFS)	Proposed (CFS)
2 Year	0.19	0.19
5 Year	0.32	0.32
10 Year	0.36	0.36
25 Year	0.43	0.43

#### 24 hour Statistical Storm Data:

Storm Inches Peak Flow (cfs)

Year in 24

Year	Hours	Impervious	Pervious	Combined	Existing	Detention
2	3.5"	0.37	0.06	0.43	0.19	0.19
5	4.5"	0.48	0.10	0.58	0.32	0.32
10	4.8"	0.52	0.12	0.63	0.36	0.36
25	5.5"	0.59	0.15	0.74	0.46	0.43
100	6.5"					

The allowable discharge that was the limit for Developed Discharge.

**4.5 CONCLUSION:**

Based on the analysis and findings above, the proposed stormwater drainage system complies with the requirements of the City of Sandy.

## Appendix

	PAGE
THE PAD Development UTILITY PLAN	1
THE PAD Development Original Site Conditions	2
Runoff Curve Numbers	3
RESERVOIR REPORT	4
FLOW SUMMARY REPORTS (.5 YEAR HYDO MOD. WQ), 2,5,10,25 YR. RET. PER.	5-8



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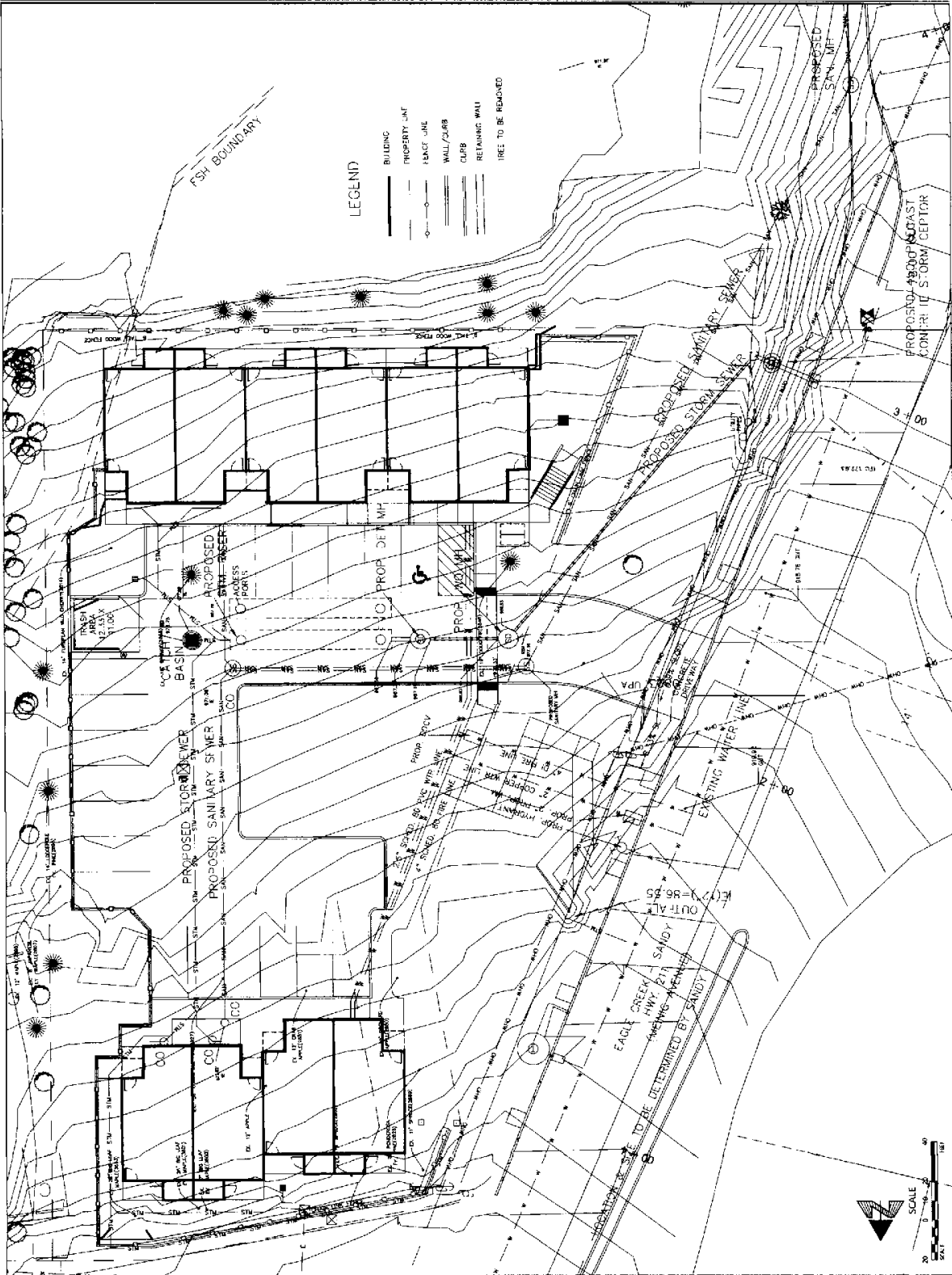
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**THE PAD**  
**TOWNHOME APARTMENTS**  
SANDY, OR 97055

NO.	DESCRIPTION	DATE
1	ISSUED FOR EXISTING REVIEW	06/17/2021
2	ISSUED FOR EXISTING REVIEW	06/17/2021
3	ISSUED FOR EXISTING REVIEW	06/17/2021
4	ISSUED FOR EXISTING REVIEW	06/17/2021
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49	ISSUED FOR EXISTING REVIEW	06/17/2021
50	ISSUED FOR EXISTING REVIEW	06/17/2021

DATE: 06/17/2021  
SHEET NO: C 3.0



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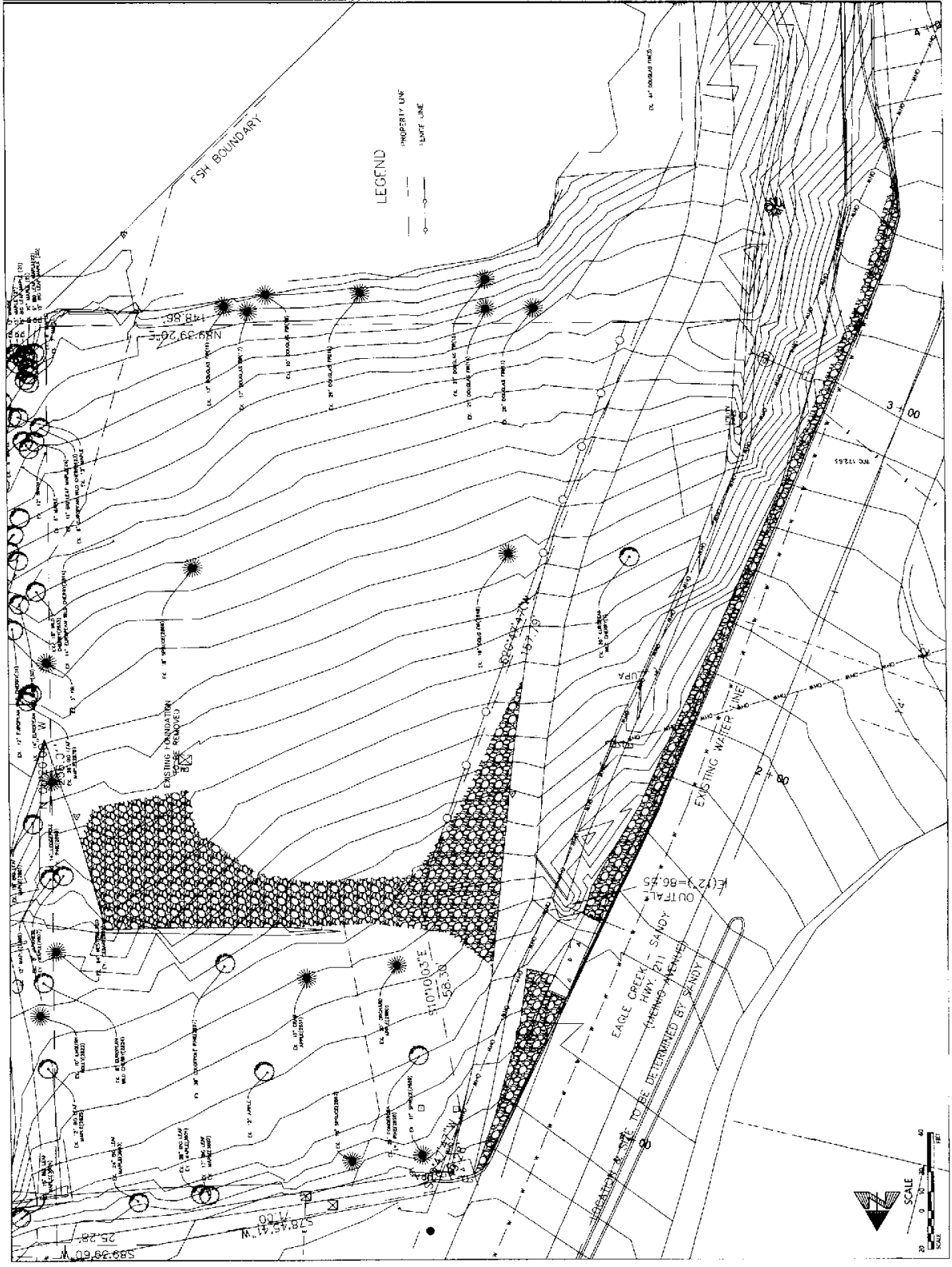
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**& ASSOCIATES, INC.**  
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 MIAMI, FL 33139  
 TEL: 305.546.0273

**THE PAD**  
**TOWNHOME APARTMENTS**  
 1780 BAYVIEW AVE  
 MIAMI, FL 33139

NO.	DESCRIPTION	DATE

DESIGNED BY: J.L.K.  
 CHECKED BY: J.L.K.  
 DATE: 5/10/2018  
 PROJECT FOR: DESIGN REVIEW  
 SHEET TITLE: EXISTING CONDITIONS  
 SHEET NO.: C 1.0



<b>Table 2.2</b>				
<b>Runoff Curve Numbers for Selected Agricultural, Suburban, and Urban Areas</b>				
(Sources: TR 55, 1986, and Stormwater Management Manual, 1992. See Section 2.1.1 for explanation)				
Cover type and hydrologic condition.	CNs for hydrologic soil group			
	A	B	C	D
<b>Curve Numbers for Pre-Development Conditions</b>				
<b>Pasture, grassland, or range-continuous forage for grazing:</b>				
Fair condition (ground cover 50% to 75% and not heavily grazed).	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
<b>Woods:</b>				
Fair (Woods are grazed but not burned, and some forest litter covers the soil).	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil).	30	55	70	77
<b>Curve Numbers for Post-Development Conditions</b>				
<b>Open space (lawns, parks, golf courses, cemeteries, landscaping, etc.)<sup>1</sup></b>				
Fair condition (grass cover on 50% - 75% of the area).	77	85	90	92
Good condition (grass cover on >75% of the area)	68	80	86	90
<b>Impervious areas:</b>				
Open water bodies: lakes, wetlands, ponds etc.	100	100	100	100
Paved parking lots, roofs <sup>2</sup> , driveways, etc. (excluding right-of-way)	98	98	98	98
<b>Permeable Pavement (See Appendix C to decide which condition below to use)</b>				
Landscaped area	77	85	90	92
50% landscaped area/50% impervious	87	91	94	96
100% impervious area	98	98	98	98
Paved	98	98	98	98
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
<b>Pasture, grassland, or range-continuous forage for grazing:</b>				
Poor condition (ground cover <50% or heavily grazed with no mulch).	68	79	86	89
Fair condition (ground cover 50% to 75% and not heavily grazed).	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
<b>Woods:</b>				
Poor (Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning).	45	66	77	83
Fair (Woods are grazed but not burned, and some forest litter covers the soil).	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil).	30	55	70	77
<b>Single family residential<sup>3</sup>:</b>				
Dwelling Unit/Gross Acre	Should only be used for subdivisions > 50 acres	Average Percent impervious area <sup>3,4</sup>		
1.0 DU/GA		15	Separate curve number shall be selected for pervious & impervious portions of the site or basin	
1.5 DU/GA		20		
2.0 DU/GA		25		
2.5 DU/GA		30		
3.0 DU/GA		34		
3.5 DU/GA		38		
4.0 DU/GA		42		
4.5 DU/GA		46		
5.0 DU/GA		48		
5.5 DU/GA		50		
6.0 DU/GA		52		
6.5 DU/GA		54		
7.0 DU/GA		56		
7.5 DU/GA		58		
PUD's, condos, apartments, commercial businesses, industrial areas & subdivisions < 50 acres	%impervious must be computed	Separate curve numbers shall be selected for pervious and impervious portions of the site		

For a more detailed and complete description of land use curve numbers refer to chapter two (2) of the Soil Conservation Service's Technical Release No. 55, (210-VI-TR-55, Second Ed., June 1986).

<sup>1</sup> Composite CN's may be computed for other combinations of open space cover type.

<sup>2</sup> Where roof runoff and driveway runoff are infiltrated or dispersed according to the requirements in Chapter 3, the average percent impervious area may be adjusted in accordance with the procedure described under "Flow Credit for Roof Downspout Infiltration" (Section 3.1.1), and "Flow Credit for Roof Downspout Dispersion" (Section 3.1.2).

<sup>3</sup> Assumes roof and driveway runoff is directed into street/storm system.

<sup>4</sup> All the remaining pervious area (lawn) are considered to be in good condition for these curve numbers.

# Reservoir Report

## Reservoir No. 1 - Detention Pipe

Hydraflow Hydrographs by Intelisolve

### Pond Data

Pipe diameter = 5.00 ft    Pipe length = 160.0 ft    Pipe slope = 0.00 %    Invert elev. = 100.00 ft

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	00	0	0
0.25	100.25	00	29	29
0.50	100.50	00	52	82
0.75	100.75	00	66	148
1.00	101.00	00	76	224
1.25	101.25	00	84	307
1.50	101.50	00	89	397
1.75	101.75	00	94	490
2.00	102.00	00	96	587
2.25	102.25	00	99	686
2.50	102.50	00	100	786
2.75	102.75	00	100	885
3.00	103.00	00	99	985
3.25	103.25	00	97	1,081
3.50	103.50	00	93	1,175
3.75	103.75	00	89	1,264
4.00	104.00	00	84	1,348
4.25	104.25	00	76	1,423
4.50	104.50	00	66	1,489
4.75	104.75	00	52	1,542
5.00	105.00	00	29	1,571

### Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 2.4	2.8	2.0	0.0
Span in	= 2.4	2.8	2.0	0.0
No. Barrels	= 1	1	1	0
Invert El. ft	= 100.00	102.50	104.15	0.00
Length ft	= 10.0	10.0	10.0	0.0
Slope %	= 1.00	1.00	1.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	0.00	0.00	0.00
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= --	--	--	--
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft    Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

### Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	100.00	0.00	0.00	0.00	--	--	--	--	--	--	0.00
0.25	29	100.25	0.05	0.00	0.00	--	--	--	--	--	--	0.05
0.50	82	100.50	0.08	0.00	0.00	--	--	--	--	--	--	0.08
0.75	148	100.75	0.10	0.00	0.00	--	--	--	--	--	--	0.10
1.00	224	101.00	0.12	0.00	0.00	--	--	--	--	--	--	0.12
1.25	307	101.25	0.13	0.00	0.00	--	--	--	--	--	--	0.13
1.50	397	101.50	0.15	0.00	0.00	--	--	--	--	--	--	0.15
1.75	490	101.75	0.16	0.00	0.00	--	--	--	--	--	--	0.16
2.00	587	102.00	0.17	0.00	0.00	--	--	--	--	--	--	0.17
2.25	686	102.25	0.18	0.00	0.00	--	--	--	--	--	--	0.18
2.50	786	102.50	0.19	0.00	0.00	--	--	--	--	--	--	0.19
2.75	885	102.75	0.20	0.06	0.00	--	--	--	--	--	--	0.26
3.00	985	103.00	0.21	0.10	0.00	--	--	--	--	--	--	0.32
3.25	1,081	103.25	0.22	0.14	0.00	--	--	--	--	--	--	0.36
3.50	1,175	103.50	0.23	0.16	0.00	--	--	--	--	--	--	0.39
3.75	1,264	103.75	0.24	0.18	0.00	--	--	--	--	--	--	0.42
4.00	1,348	104.00	0.24	0.20	0.00	--	--	--	--	--	--	0.45
4.25	1,423	104.25	0.25	0.22	0.02	--	--	--	--	--	--	0.49
4.50	1,489	104.50	0.26	0.24	0.04	--	--	--	--	--	--	0.54
4.75	1,542	104.75	0.27	0.25	0.06	--	--	--	--	--	--	0.58
5.00	1,571	105.00	0.27	0.26	0.07	--	--	--	--	--	--	0.61

Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.37	1	469.00	5,309				Pad Impervious
2	SCS Runoff	0.06	1	477.00	1,021				The Pad Pervious
3	Combine	0.43	1	470.00	6,330	1, 2			Combined Site
4	SCS Runoff	0.19	1	477.00	3,160				Existing Conditions
5	Reservoir	0.19	1	500.00	6,309	3	102.33	718	Detention Pipe
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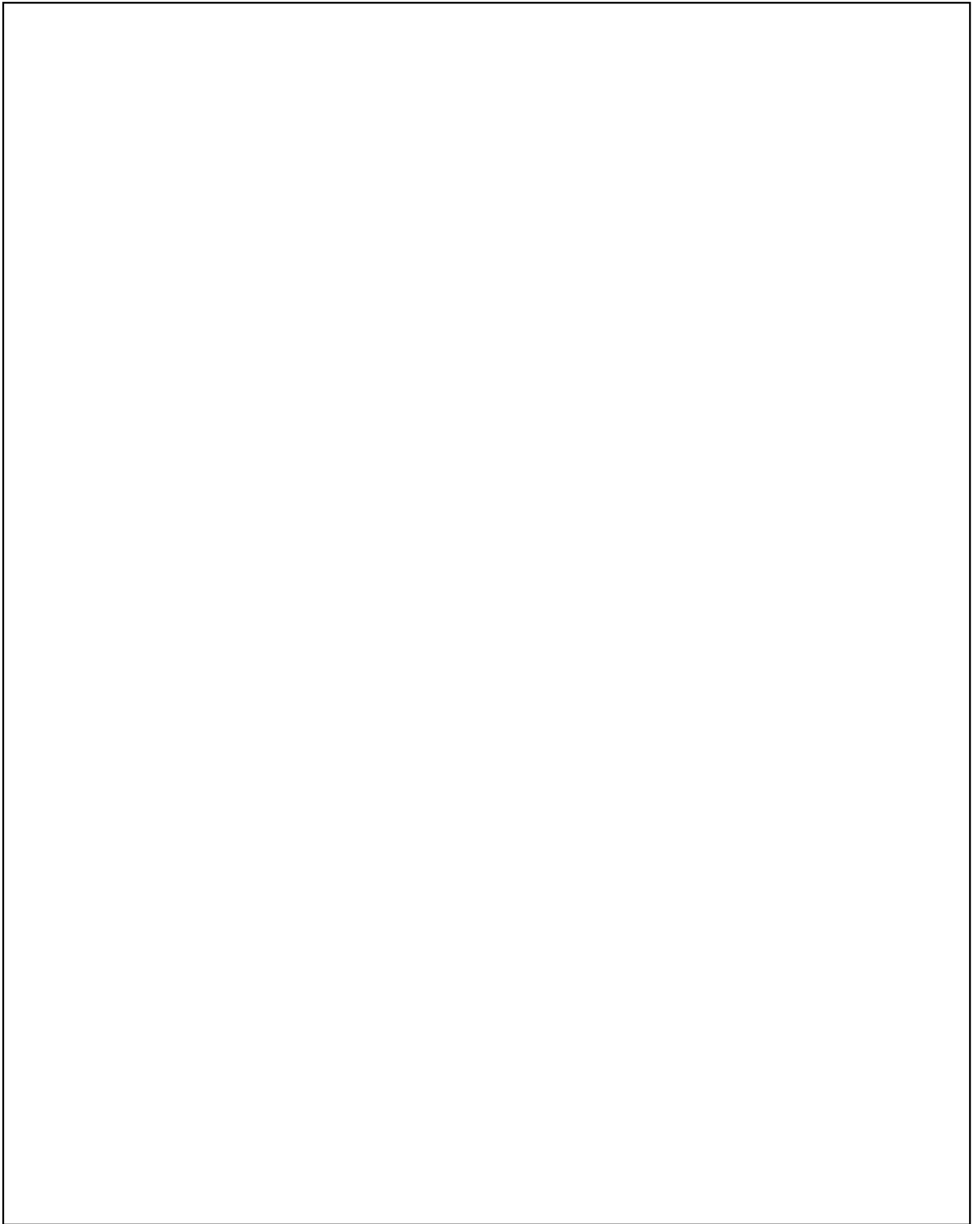
Hydraflow Hydrographs 2002 - 2-yr return period



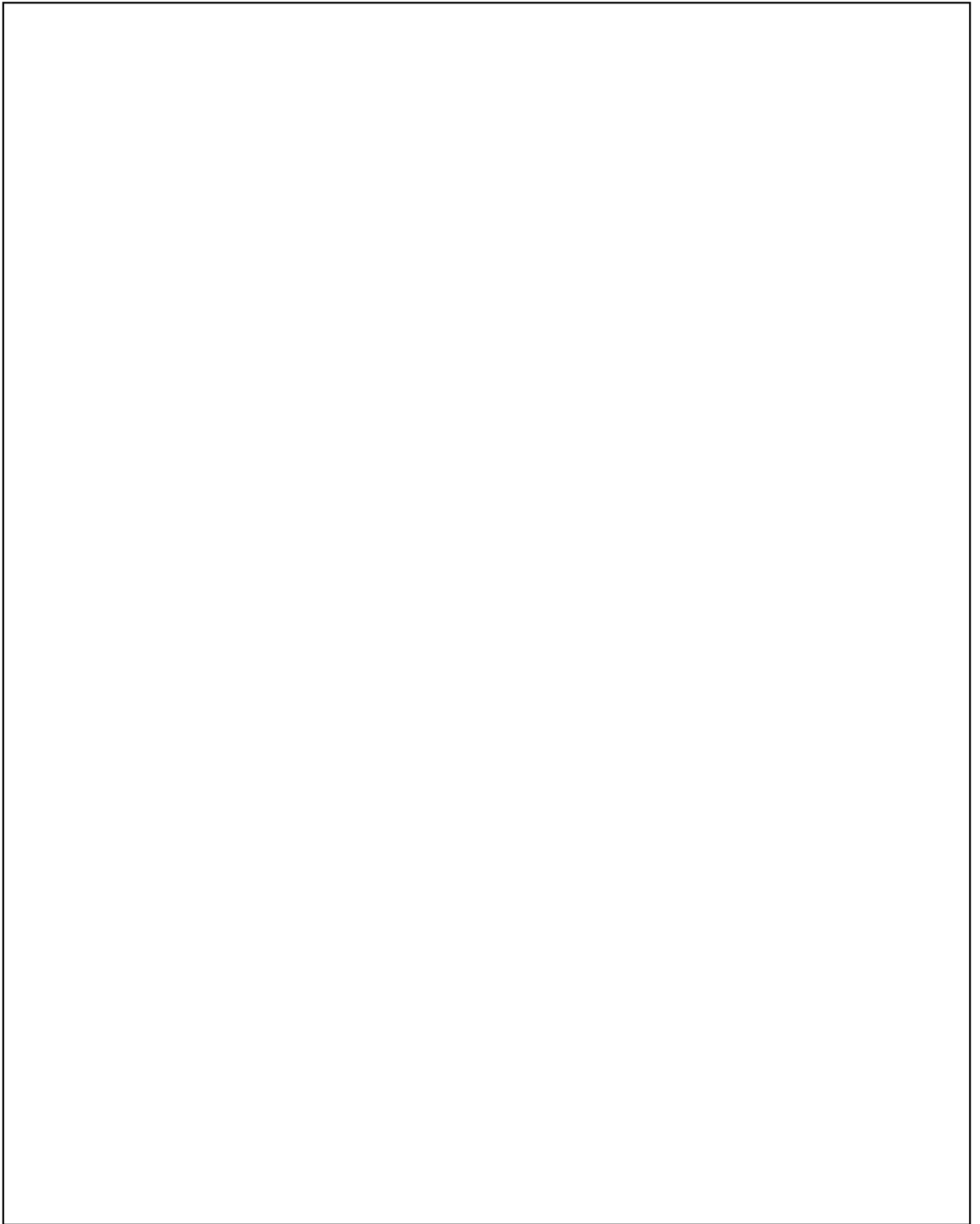
Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.48	1	469.00	6,931				Pad Impervious
2	SCS Runoff	0.10	1	475.00	1,578				The Pad Pervious
3	Combine	0.58	1	470.00	8,509	1, 2			Combined Site
4	SCS Runoff	0.32	1	475.00	4,884				Existing Conditions
5	Reservoir	0.32	1	489.00	8,475	3	103.03	998	Detention Pipe
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Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.52	1	469.00	7,418				Pad Impervious
2	SCS Runoff	0.12	1	475.00	1,754				The Pad Pervious
3	Combine	0.63	1	470.00	9,171	1, 2			Combined Site
4	SCS Runoff	0.36	1	475.00	5,428				Existing Conditions
5	Reservoir	0.36	1	488.00	9,131	3	103.25	1,081	Detention Pipe
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Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.59	1	469.00	8,554				Pad Impervious
2	SCS Runoff	0.15	1	474.00	2,175				The Pad Pervious
3	Combine	0.74	1	470.00	10,729	1, 2			Combined Site
4	SCS Runoff	0.46	1	474.00	6,731				Existing Conditions
5	Reservoir	0.43	1	487.00	10,673	3	103.82	1,288	Detention Pipe
6									
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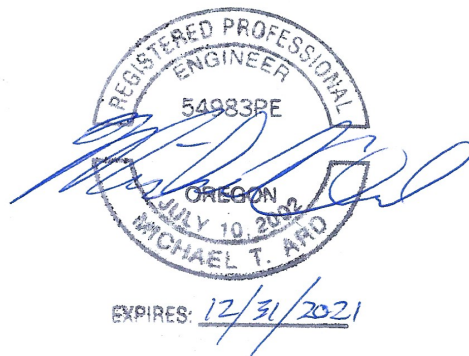
**EXHIBIT H – TRAFFIC IMPACT STUDY**





# THE PAD TRAFFIC IMPACT STUDY

SANDY, OREGON



**PREPARED FOR:**  
Ryan Bigbee

**PREPARED BY:**  
Michael Ard, PE  
Ard Engineering

**DATE:**  
August 25, 2020

21370 SW Langer Farms Parkway, Suite 142, Sherwood, OR 97140 - (503)862-6960



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## EXECUTIVE SUMMARY

1. A residential development is proposed on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon. The proposed development will consist of 12 townhome dwelling units. As currently proposed, the site will take access via a new driveway on Highway 211 opposite Tupper Road.
2. Upon completion of proposed development, the subject property is projected to generate 6 new site trips during the morning peak hour, 7 trips during the evening peak hour, and 88 new daily site trips.
3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.
4. Based on the queuing analysis, the northbound 95<sup>th</sup> percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a “pork-chop” diverter within the new driveway approach.
5. Based on the crash data, the study intersections are currently operating acceptably with respect to safety.
6. Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.
7. At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.



## **PROJECT DESCRIPTION & LOCATION**

### ***INTRODUCTION***

A 12-unit residential townhome development is proposed for a property located on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon.

As currently proposed, the site would take access via a new driveway intersecting Highway 211 directly opposite Tupper Road. At the request of the Oregon Department of Transportation, two alternative access scenarios are also considered within this study. Under the first alternative, access would be shared with the existing City Hall/Joe's Donuts access driveway on Highway 211 approximately 75 feet south of the near-side crosswalk at the signalized intersection of Highway 26 at Highway 211. Under the second alternative, a new driveway would be constructed at the north end of the subject property immediately adjacent to the exiting City Hall/Joe's Donuts access. All three potential access scenarios are discussed, with information regarding safety and operation at the time of project opening and farther into the future.

This report addresses the impacts of the proposed development on the surrounding street system. The purpose of this analysis is to determine whether the surrounding transportation system is capable of safely and efficiently supporting the proposed use and to identify any necessary improvements and mitigations.

### ***SITE LOCATION AND STUDY AREA DESCRIPTION***

The subject property has a total area of 0.59 acres and is zoned R-3 (High-Density Residential). The site is currently undeveloped, and the proposed development is permitted within the R-3 zone. The subject property is surrounded by existing commercial and institutional uses within the Central Business District zone to the west, north and east, and by parks property to the south.

Oregon Highway 211 (Eagle Creek Sandy Highway) is classified by the Oregon Department of Transportation as a District Highway. It has a two-lane cross-section with one through lane in each direction and added turn lanes at major intersections. It has a posted speed limit of 40 mph in the site vicinity.

Pioneer Boulevard forms the eastbound travel lanes of US Highway 26 (Mt. Hood Highway) in the site vicinity. The highway is classified by the Oregon Department of Transportation as a Statewide Highway and a Freight Route within a Special Transportation Area. It generally has two eastbound travel lanes plus a bike lane, with on-street parking and sidewalks in place on both sides of the roadway. It has a posted speed limit of 25 mph.

Tupper Road is classified by the City of Sandy as a collector street and is striped to prohibit passing. On the south side of the roadway existing curbs and sidewalks are in place in the site vicinity, while the north side has a narrow gravel shoulder.



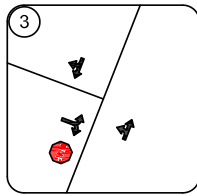
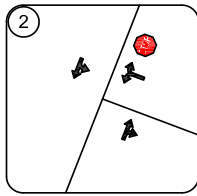
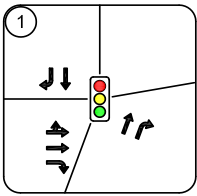
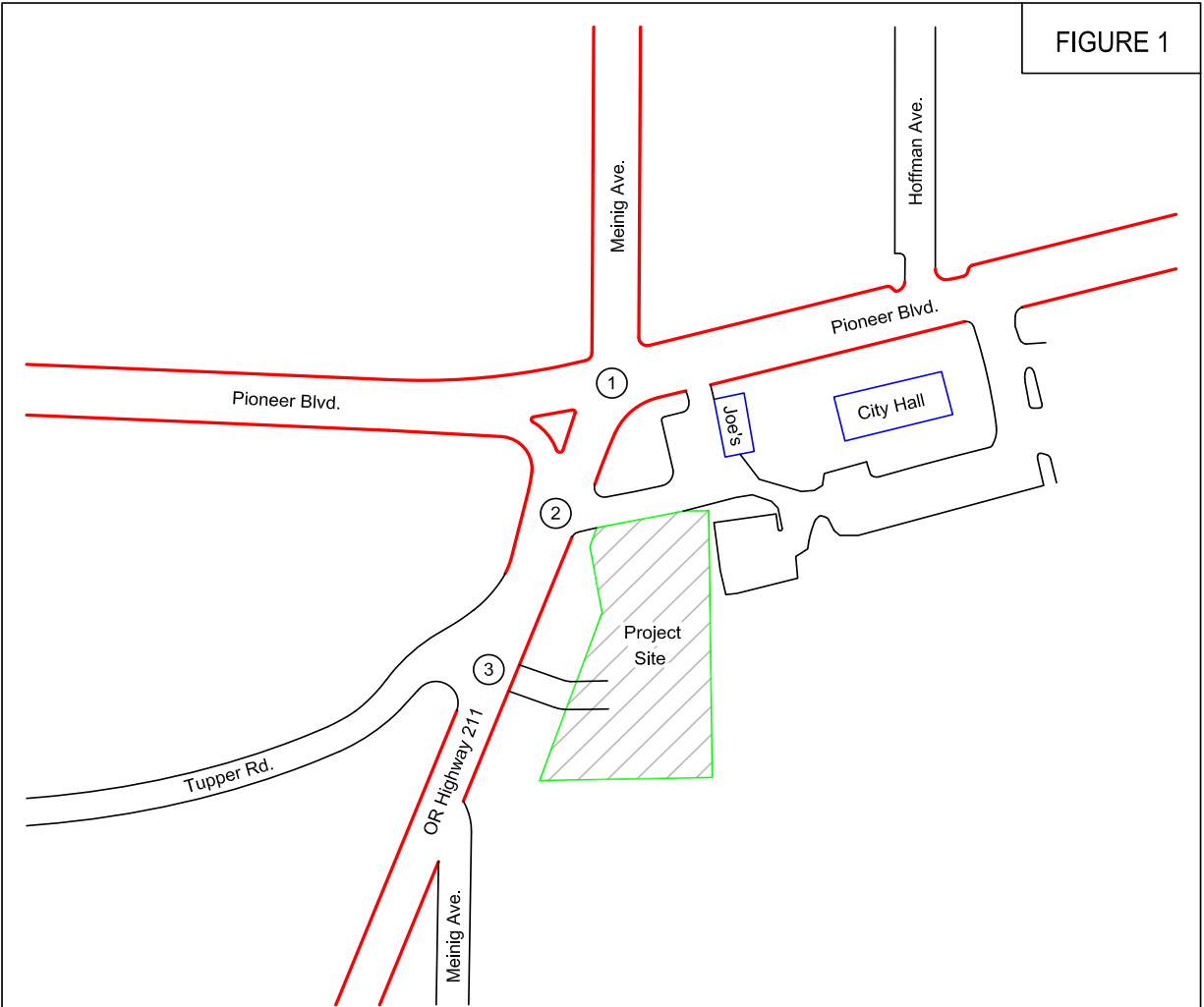
## **EXISTING CONDITIONS**

The intersection of Pioneer Boulevard/US Highway 26 at Highway 211 is currently a four-way intersection controlled by a traffic signal. The eastbound approach has a shared through/left lane, an exclusive through lane and a right-turn lane which operates under yield control. The northbound approach has a through lane and a right-turn lane. The southbound approach has a left-turn lane and a through lane. All four legs of the intersection have marked crosswalks in place with pedestrian signals.

The intersection of Highway 211 at Tupper Road is currently a T-intersection controlled by a stop sign on the eastbound Tupper Road approach. Through traffic traveling along Highway 211 does not stop. Each approach has a single, shared lane for all turning movements.

A vicinity map displaying the project site, vicinity streets, and the study intersections including lane configurations is provided in Figure 1 on page 6.

FIGURE 1



LEGEND	
#	Study Intersection
	Traffic Signal
	Stop Control



VICINITY MAP  
Study Intersections  
Lane Configurations and Traffic Control



### ***TRAFFIC COUNT DATA***

Due to the current COVID-19 crisis, traffic volumes in the site vicinity are not representative of typical conditions. In order to provide count data that more conservatively reflects expectations regarding future traffic volumes, historical count data was used in conjunction with modeling data and intersection observations to develop estimates of the traffic volumes that would be expected absent the impacts of the current pandemic.

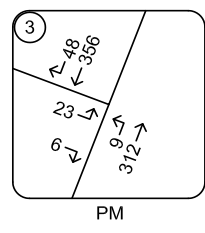
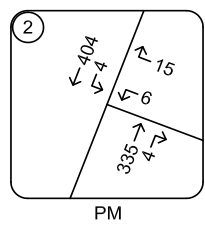
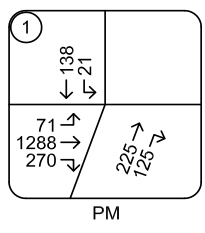
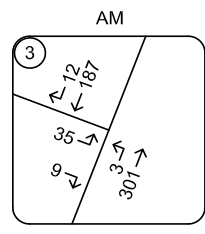
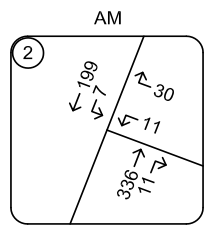
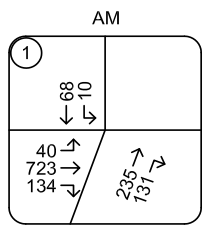
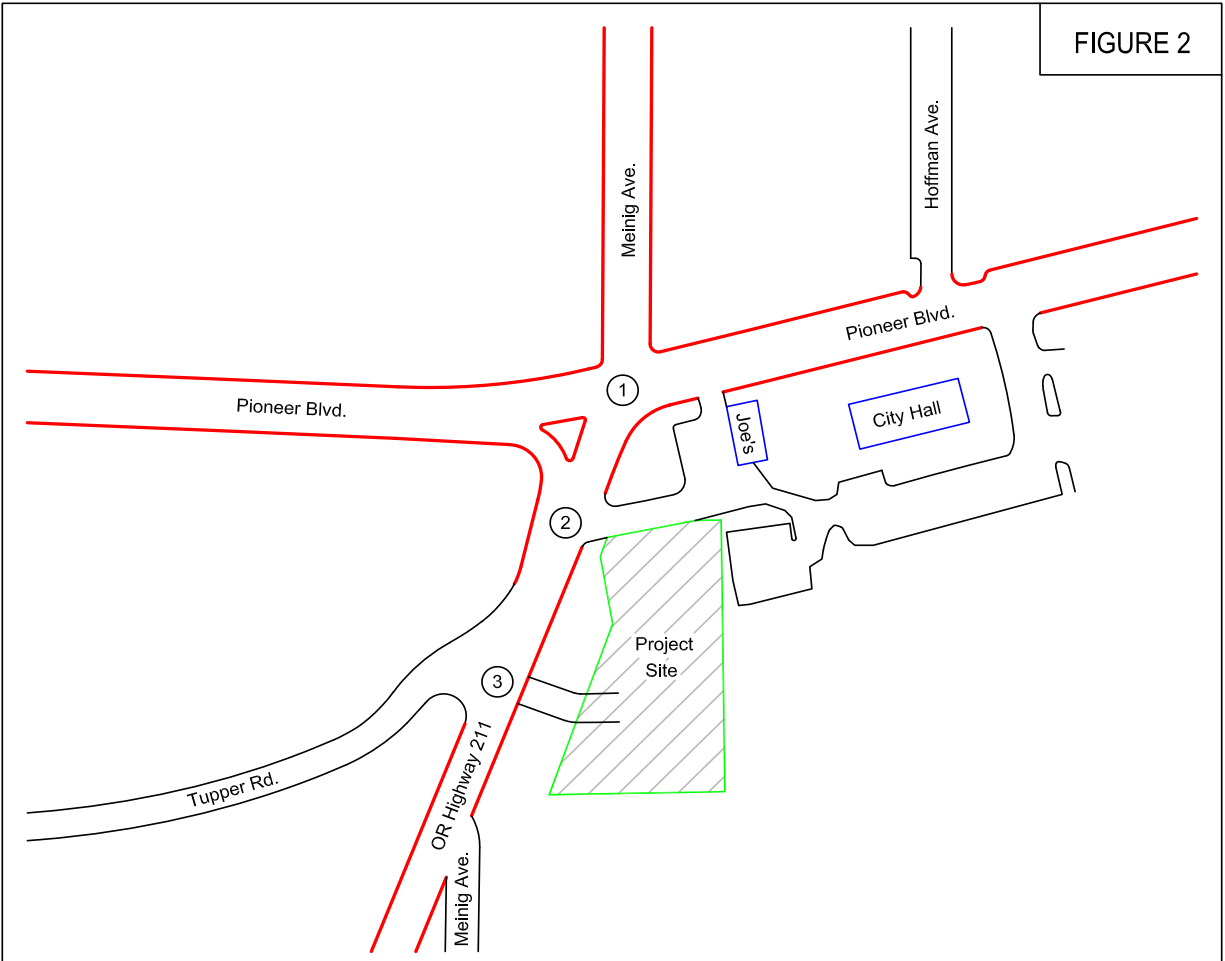
The data sources used include recent count data collected at the nearby intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive to determine through traffic volumes along the respective highways, along with seasonal data, growth data and planning model data from ODOT to determine how those volumes change over distance and time, as well as direct observation of the relative volumes for different turning movements at the intersections of Highway 26 at Highway 211 and Highway 211 at Tupper Road.

The historical count data for the intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive were conducted at the study intersections on Tuesday March 19<sup>th</sup>, 2019 from 4:00 to 6:00 PM and on Wednesday March 20<sup>th</sup>, 2019 from 7:00 to 9:00 AM. The resulting data was adjusted to reflect the projected 30<sup>th</sup>-highest hour volumes for year 2020 traffic conditions as part of the traffic impact study prepared for the Bull Run Terrace Subdivision project. These adjusted future volumes were used to determine the expected through traffic volumes along Highway 26 and Highway 211 in the site vicinity. A diagram excerpted from the Bull Run Terrace TIS showing the year 2020 traffic volumes is included in the attached technical appendix.

In addition to determination of the expected through traffic volumes, it was necessary to determine the turning movement volumes at the study intersections for year 2020 traffic conditions absent the pandemic. Turning movements were estimated based on direct observation of the relative volumes of traffic making each turning movement at the intersections. After calculating the through movement volumes, the percentage of traffic observed making turning movements was applied to determine the remaining hourly volumes.

Figure 2 on page 8 shows the existing 2020 30<sup>th</sup>-highest hour traffic volumes for the morning and evening peak hours at the study intersections.

FIGURE 2



**TRAFFIC VOLUMES**  
 2020 Existing 30th-Highest Hour (August) Conditions  
 Morning and Evening Peak Hours



**OPERATIONAL ANALYSIS**

An operational analysis was conducted for the study intersections using Synchro 10 software, with outputs calculated based on the *HIGHWAY CAPACITY MANUAL, 6<sup>th</sup> Edition*. The analysis was conducted for the weekday morning and evening peak hours.

The purpose of the existing conditions analysis is to establish how the study area intersections operate currently and allow for calibration of the operational analysis if required.

The results of the operational analysis are reported based on delay, Level of Service (LOS), and volume-to-capacity ratio (v/c). Delays are reported in seconds. Level of service is reported as a letter grade and can range from A to F, with level of service A representing nearly free-flow conditions and level of service F representing high delays and severe congestion. A report of level of service D generally indicates moderately high but tolerable delays, and typically occurs prior to reaching intersection capacity. For unsignalized intersections, the v/c represents the portion of the available intersection capacity that is being utilized on the worst intersection approach. A v/c ratio of 1.0 would indicate that the approach is operating at capacity.

A summary of the existing conditions operational analysis is provided in Table 1 below. For the signalized intersection of Highway 26 at Highway 211, the reported delays, levels of service and volume-to capacity ratios represent the overall operation of the intersection. For the two unsignalized study intersections, the reported delays and levels-of-service represent the approach lane which experiences the highest delays, while the reported v/c ratios represent the highest ratio for the major-street and minor-street movements.

The Oregon Department of Transportation requires that the study intersections operate with a volume-to-capacity ratio (v/c) of 0.90 or less.

Based on the analysis, the study intersections are currently operating acceptably. Detailed capacity analysis worksheets are provided in the technical appendix.

**Table 1 - Operational Analysis Summary: 2020 Existing 30th-Highest Hour Conditions**

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Highway 26 at Highway 211	18.2	B	0.53	20.7	C	0.71
Highway 211 at City Hall Access	11.6	B	0.22	12	B	0.25
Highway 211 at Tupper Road	12.3	B	0.19	14.7	B	0.25



## SITE TRIPS

### Proposed Development

The proposed new development will consist of 12 townhome dwelling units. To estimate the number of trips that will be generated by the proposed development, trip rates from the *TRIP GENERATION MANUAL, 10<sup>th</sup> EDITION* were used. Data from land-use code 220, *Multi-Family Housing*, were used. The trip estimates are based on the number of dwelling units.

A summary of the trip generation calculations is provided in Table 2 below. Detailed trip generation worksheets are also included in the technical appendix.

**Table 2 - Proposed Development Trip Generation Summary**

	AM Peak Hour			PM Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	
12 Multi-Family Dwelling Units	1	5	6	4	3	7	88

### TRIP DISTRIBUTION

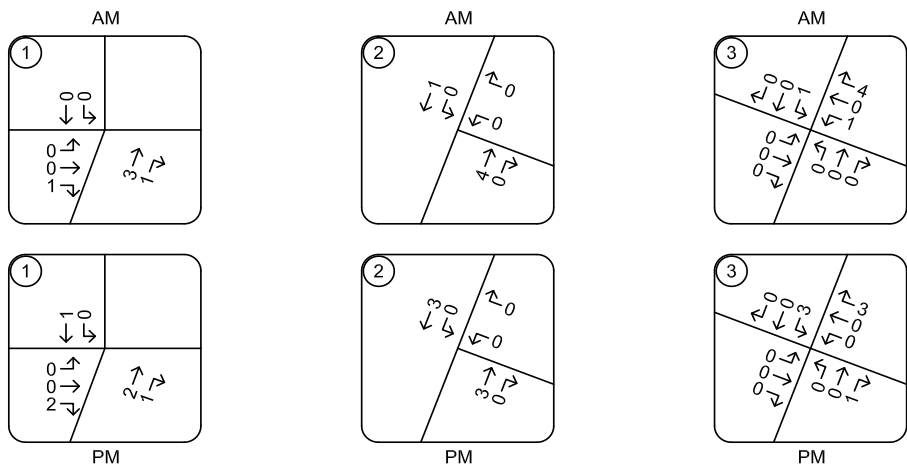
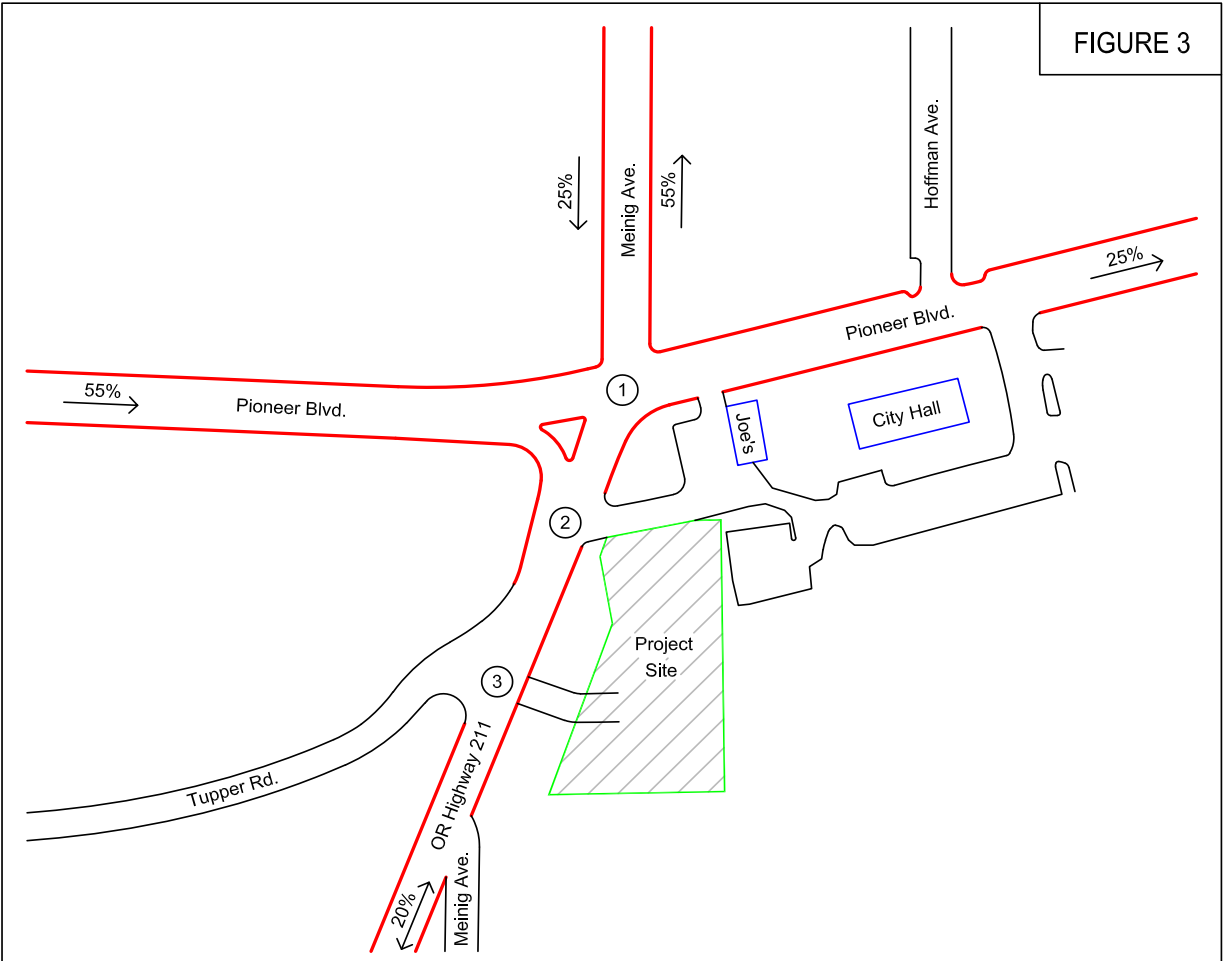
The directional distribution of site trips to and from the project site was estimated based the existing travel patterns in the site vicinity, as well as the locations of likely trip destinations and major transportation routes. Overall, 55 percent of the anticipated site trips are projected to travel to and from the west on Highway 26, 25 percent are projected to travel to and from the east on Highway 26, and 20 percent are projected to travel to and from the south on Highway 211.

Since it is anticipated that any future site access to Highway 211 will be restricted to right-in, right-out movements only, drivers entering from the north will need to pass the site access and turn around prior to lawfully entering the project site. Similarly, drivers exiting the site intending to travel to the south will need to turn right then turn around to reach their intended destination. Accordingly, these trips may pass through the study intersections more than once. The additional trips resulting from vehicles turning around are included in the trip assignment diagram.

The trip distribution percentages and trip assignment for the proposed development are shown in Figure 3 on page 11.



FIGURE 3



**TRAFFIC VOLUMES**  
 Proposed Development - Primary Site Trips  
 Morning and Evening Peak Hours



## **FUTURE CONDITIONS ANALYSIS**

### ***BACKGROUND VOLUMES***

In order to determine the expected impact of site trips on the study area intersections, it is necessary to compare traffic conditions both with and without the addition of the projected traffic from the proposed development. Since the proposed use cannot be constructed and occupied immediately, the comparison is made for future traffic conditions at the time of project completion. It is anticipated that the proposed use will be completed and occupied by 2022. Accordingly, the analysis was conducted for year 2022 traffic conditions.

Similar to the existing year 2020 conditions analysis, the year 2022 traffic volumes were determined using data from the Bull Run Terrace Subdivision TIS as well as ODOT data resources and the direct observations of turning movement volumes at the study area intersections to determine the likely traffic volumes during the peak hours absent the current COVID-19 pandemic.

Since the data used was drawn from the year 2022 background traffic volume for the Bull Run Terrace Subdivision, the projected volumes already account for future site trips from development within the in-process developments considered in that report as well as the anticipated background growth rates for highway volumes in the site vicinity. Site trips from the Bull Run Terrace Subdivision were not directly included in the analysis since completion of the Bull Run Terrace project will result in diversion of trips to the new Dubarko Road connection between Highway 211 and Highway 26 at the east side of the City of Sandy. Accordingly, the 2022 background conditions analysis represents the highest traffic volumes which may reasonably occur in association with the proposed development.

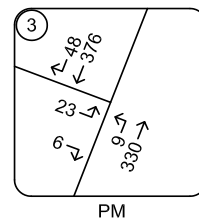
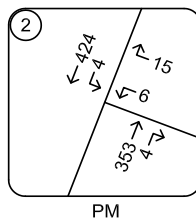
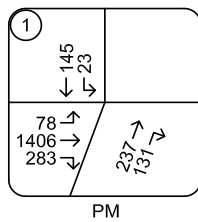
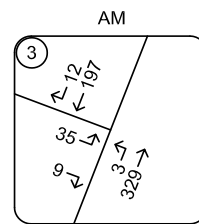
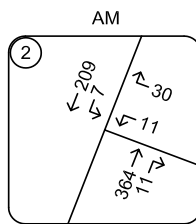
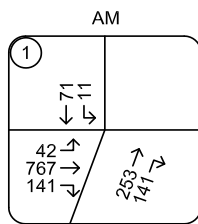
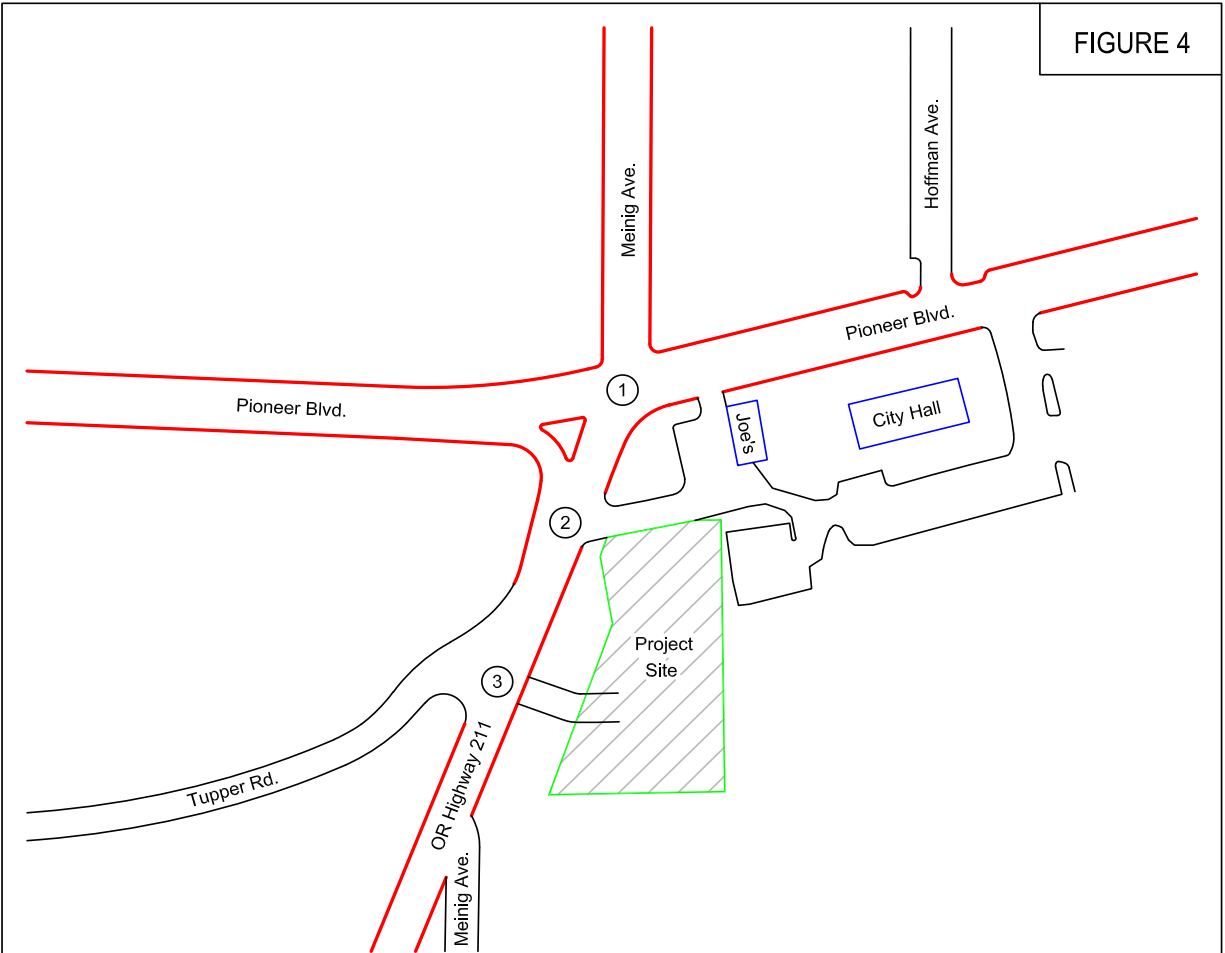
Figure 4 on page 13 shows the projected year 2022 background traffic volumes at the study intersections during the morning and evening peak hours, including anticipated future traffic from in-process developments.

### ***BACKGROUND VOLUMES PLUS SITE TRIPS***

Peak hour trips calculated to be generated by the proposed development were added to the projected year 2022 background traffic volumes to obtain the year 2022 total traffic volumes following completion of the proposed residential development. The resulting total traffic volumes are shown in figure 5 on page 14.

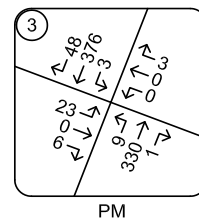
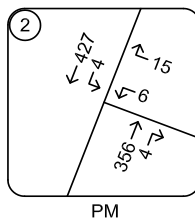
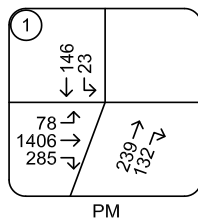
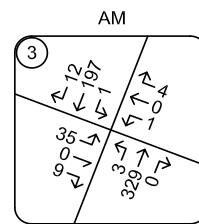
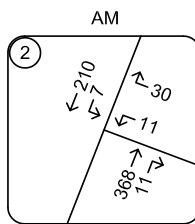
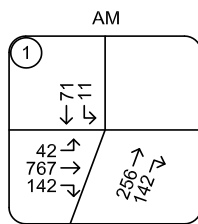
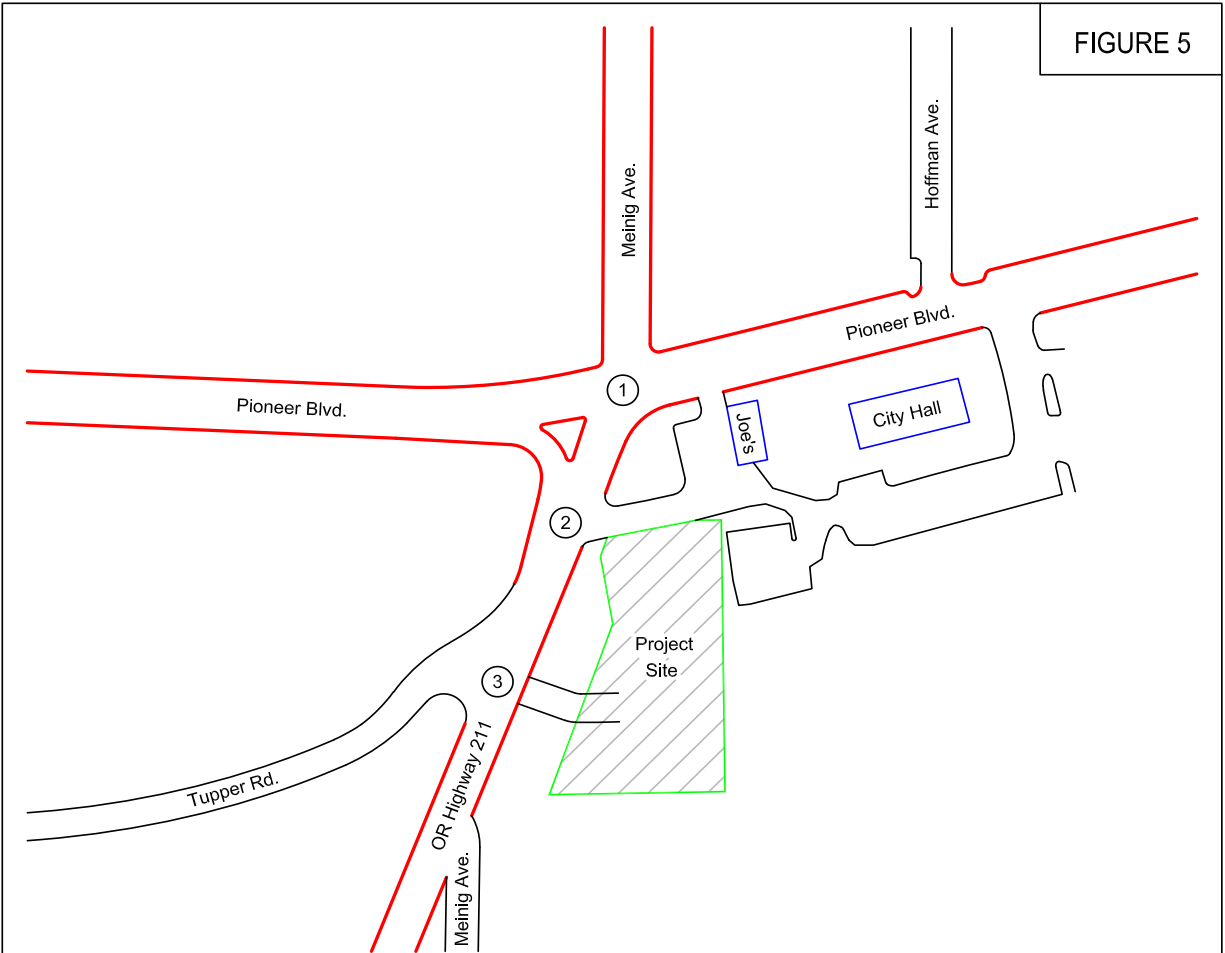
Based on discussions with ODOT staff, it is anticipated that the study intersections along Highway 211 south of Pioneer Boulevard may be restricted to right-in, right-out operation only in conjunction with the proposed development in order to reduce concerns associated with limited access spacing and queues. An additional diagram showing the year 2022 background plus site trips volumes with traffic diversions resulting from right-in, right-out restriction of these intersections is provided in Figure 6 on page 15.

FIGURE 4



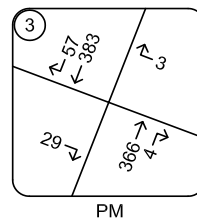
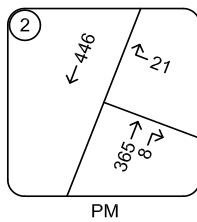
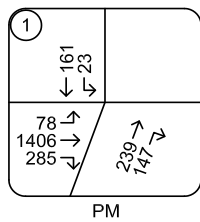
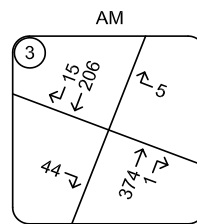
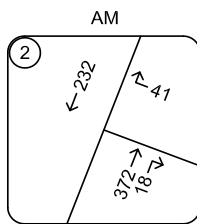
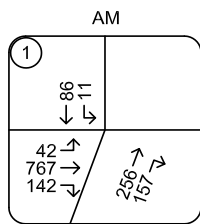
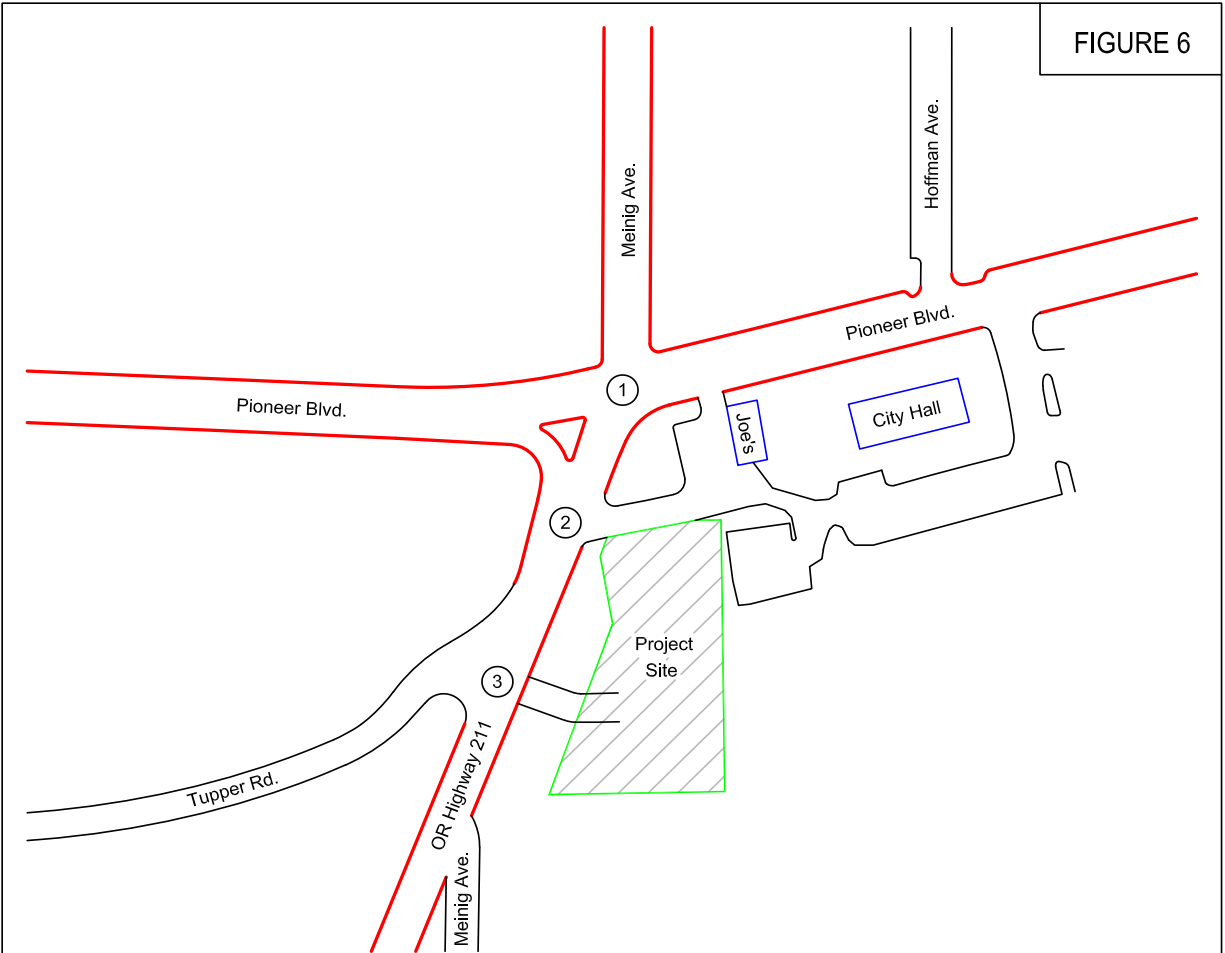
**TRAFFIC VOLUMES**  
 2022 Background Conditions  
 Morning and Evening Peak Hours

FIGURE 5



**TRAFFIC VOLUMES**  
 2022 Background Plus Site Trips  
 Morning and Evening Peak Hours

FIGURE 6



**TRAFFIC VOLUMES**  
 2022 Background Plus Site Trips Conditions (RIRO)  
 Morning and Evening Peak Hours



**OPERATIONAL ANALYSIS**

The operational analysis for future traffic conditions was again conducted using Synchro analysis software, with outputs based on the analysis methodologies contained in the *HIGHWAY CAPACITY MANUAL, 6<sup>th</sup> Edition*. The analysis was prepared for the intersections’ morning and evening peak hours.

The results of the operational analysis are summarized in Table 3 below. Detailed analysis worksheets are also included in the technical appendix.

**Table 3 - Operational Analysis Summary: Year 2022 Future Conditions**

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Pioneer Blvd. at Highway 211						
2022 Background Conditions	18.6	B	0.56	22.6	C	0.77
2022 Background plus Site	18.7	B	0.57	22.7	C	0.77
2022 Bkgd plus Site (w/ Median Barrier)	19.1	B	0.57	23.1	C	0.77
Highway 211 at City Hall Driveway						
2022 Background Conditions	11.9	B	0.23	12.3	B	0.26
2022 Background Plus Site	12.0	B	0.24	12.4	B	0.26
2022 Bkgd Plus Site (w/ Median Barrier)	11.2	B	0.24	10.8	B	0.27
Highway 211 at Tupper Road						
2022 Background Conditions	15.2	C	0.21	15.2	C	0.26
2022 Background plus Site	13.8	B	0.21	17.1	C	0.26
2022 Bkgd plus Site (w/ Median Barrier)	10.6	B	0.23	11.2	B	0.27

Based on the results of the operational analysis, the study intersections are projected to operate acceptably per ODOT standards either with or without the addition of site trips from the proposed development, and with or without conversion of the stop-controlled minor-street approaches to right-in, right-out only. No operational mitigations are necessary or recommended in conjunction with the proposed development.



### ***QUEUING ANALYSIS***

In addition to the operational analysis, a queuing analysis was conducted to determine whether northbound queues on Highway 211 may extend to the proposed site access driveway during the peak hours. The queuing analysis was prepared using SimTraffic simulation software with model calibrations as required per ODOT's Analysis Procedures Manual. The results of the analysis are reported as 95<sup>th</sup> percentile queues, which represent the queue length that is exceeded during less than 5 percent of the peak hour. Queue lengths in excess of the 95<sup>th</sup> percentile do not occur with sufficient frequency to allow for cost-effective design.

Based on the analysis, the projected 95<sup>th</sup> percentile queue lengths for the northbound Highway 211 approach to Pioneer Boulevard were determined to be 263 feet during the morning peak hour and 308 feet during the evening peak hour. (The average queue lengths during these analysis periods were projected to be 145 feet and 177 feet, respectively.)

The intersection of Highway 211 at the existing City Hall/Joe's Donuts driveway is centered approximately 70 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, the average peak-hour queues projected during the peak hours will extend beyond this driveway.

The intersection of Highway 211 at Tupper Road is centered approximately 225 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, this intersection is within the 95<sup>th</sup> percentile queue length during the morning and evening peak hours, although it is outside the average projected queue lengths during the peak hours.

Based on the queuing analysis, both unsignalized study intersections are within the 95<sup>th</sup> percentile queue lengths for northbound traffic approaching Pioneer Boulevard along Highway 211. Accordingly, it is appropriate to consider some form of turning movement restriction in order to avoid having vehicles make potentially unsafe left-turn maneuvers through stopped vehicle queues and to avoid congestion within the through travel lanes which may occur when vehicles stop within an otherwise free-flowing travel lane to wait to make left turns across these queues.

Typically, the most effective mechanism for restricting turning movements is the installation of a raised median within the major street. A raised median provides a physical barrier resulting in high compliance with the intended turning movement restriction. Where it is not possible to install a raised median within the major street, the side-street approaches may have "pork-chop" diverters installed which also physically direct vehicles toward the permitted turning movements only.

If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a "pork-chop" diverter within the new driveway approach.



## **SAFETY ANALYSIS**

### ***CRASH DATA ANALYSIS***

Using data obtained from the Oregon Department of Transportation, a review of the five most recent years of available crash history (from January 2013 through December 2017) was performed for the study intersections. In addition to examination of the crash data, crash rates are calculated for the intersections. Crash rates allow for comparison of relative risk by accounting for both the number of crashes and the number of vehicles travelling through the intersection. Crash rates are reported as the number of crashes per million entering vehicles.

The intersection of Pioneer Boulevard at OR Highway 211/Meinig Road had a total of 10 reported crashes during the 5-year analysis period. These included 6 rear-end collisions, 2 angle collisions, 1 sideswipe-overtaking collision and one fixed-object collision. The crashes resulted in one non-incapacitating injury and 4 reports of a “possible injury/complaint of pain.” The crash rate for the intersection was calculated to be 0.256 crashes per million entering vehicles. This is roughly the median crash rate for urban 3-way signalized intersections in Oregon (0.252 crashes per million entering vehicles), indicating that the intersection is operating similar to average intersections in Oregon with respect to safety.

The other study intersections had no reported crashes during the five-year analysis period.

Based on the detailed examination of crash data, no significant safety concerns were identified and no specific safety mitigations are recommended.

### ***WARRANT ANALYSIS***

Traffic signal and turn-lane warrants were examined for the study intersections.

Based on the projected side-street traffic volumes, traffic signal warrants are not projected to be met at either of the unsignalized study intersections under any of the analysis scenarios. Accordingly, no new traffic signals are recommended in conjunction with the proposed development.

Left-turn lane warrants were examined for the major-street approaches to the unsignalized study intersections. Left-turn lane warrants are intended to evaluate whether a meaningful safety benefit may be expected if the turning vehicles are provided with turn lane within the street, allowing left-turning drivers to move out of the through travel lane so that following vehicles may pass without conflicts. The left-turn lane warrant analysis methodology utilizes the number of travel lanes in conjunction with the volume of advancing and opposing traffic to determine the minimum number of left-turning vehicles which would result in a meaningful safety benefit. This threshold left-turn volume may be as low as 10 vehicles per hour. Notably, fewer than 10 left-turn movements are projected for all unsignalized major-street approaches during each of the peak hours. Accordingly, by inspection left-turn lane warrants will not be met. No new left-turn lanes are recommended in conjunction with the proposed development.

Right-turn lane warrants were also examined for the major-street approaches to the unsignalized study intersections. Right-turn lanes reduce the likelihood of rear-end collisions as vehicles slow or





stop to turn right from a free-flowing through travel lane. Generally, right-turn lane warrants are not met where the hourly right-turn volume is 20 vehicles or fewer. However, if the total approach volume in the outside lane is in excess of 700 vehicles per hour, a shoulder or right-turn lane treatment may be appropriate even if the right-turn volume is fewer than 20 vehicles. Examining the study intersections shows that none of the highway through lanes carries more than 700 vehicles per hour under any of the analysis scenarios. Accordingly, right-turn lane warrants will not be met for any intersections with fewer than 20 right-turning vehicles per hour.

Only one unsignalized major-street right-turn movement carries more than 20 vehicles per hour. This movement is the southbound right-turn movement from Highway 211 onto Tupper Road. Accordingly, a detailed right-turn lane warrant analysis was prepared for this intersection approach. Based on the analysis, right turn lane warrants would not be met under year 2022 background conditions or year 2022 background plus site trips conditions. With conversion of the intersection to right-in, right-out only and assuming that all northbound left-turning traffic diverts by passing Tupper Road northbound, turning around, then returning southbound, right-turn lane warrants would be marginally met. However, since some left-turning drivers would be expected to divert by turning left onto Dubarko Road prior to reaching Tupper Road, the actual volume of southbound right-turning traffic is expected to be below the threshold that would trigger the need for a right-turn lane. Additionally, no site trips from the proposed development would make this turning movement. Accordingly, installation of a new southbound right-turn lane serving Tupper Road is not recommended in conjunction with the proposed development.

Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.

#### ***INTERSECTION SIGHT DISTANCE***

Based on the posted speed limit of 40 mph, a minimum of 445 feet of intersection sight distance is required to the south of the proposed site access on Highway 211. Vehicles approaching from the north are within a 25-mph speed zone on SE Meinig Avenue, requiring a minimum of 280 feet of intersection sight distance to the north.

In accordance with the procedures described in *A Policy On Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials, intersection sight distance was measured from a driver's eye position within the proposed driveway 15 feet behind the edge of the traveled way and 3.5 feet above the driveway surface. The available intersection sight distances in each direction were measured to the oncoming driver's eye position within the oncoming travel lane 3.5 feet above the roadway surface.

Intersection sight distance was measured to be in excess of 600 feet to the south from the proposed site access location. Sight distance to the north is restricted by a crest vertical curve where Highway 211 meets Pioneer Boulevard. The available intersection sight distance in this direction was measured to be 330 feet.

In addition to evaluation of intersection sight distance for the northbound and southbound approaches along Highway 211/SE Meinig Avenue, it is appropriate to evaluate whether adequate



stopping sight distance is available for vehicles turning from Highway 26 onto Highway 211 to stop if necessary to avoid a collision.

Vehicles turning from Highway 26 would be expected to turn at speeds of up to approximately 20 mph. Based on this design speed and the 6 percent downhill grade on the approach, the minimum required stopping sight distance for this approach speed was calculated to be 120 feet. The available intersection sight distance for vehicles approaching from this direction was measured to be 203 feet. Accordingly, the access can operate safely with respect to vehicles approaching from Highway 26.

Based on the sight distance analysis, adequate sight lines can be attained for safe and efficient operation at the proposed site access location on Highway 211.

#### ***SITE ACCESS ALTERNATIVES ANALYSIS***

At the direction of ODOT staff, three total site access scenarios were examined. The potential site access options include:

- 1) Shared site access to Highway 211 at the existing City Hall/Joe's Donuts Driveway;
- 2) A new site access driveway on Highway 211 immediately south of the existing City Hall/Joes' Donuts driveway; and
- 3) A new site access driveway on Highway 211 directly opposite Tupper Road.

These potential site access scenarios were evaluated in order to determine the relative merits of each. It should be noted that given the low delays, high levels of service and low v/c ratios projected in the operational analysis portion of this report, it is anticipated that any of the three site access scenarios would result in acceptable operation per ODOT standards. However, the access scenarios differ significantly in near-term and long-term access spacing and safety, as well as viability.

#### **Access Scenario 1**

A shared access to Highway 211 at the existing City Hall/Joe's Donuts Driveway would result in increasing traffic volumes at an intersection in very close proximity to the traffic signal at Pioneer Boulevard. Based on the queuing analysis, this existing driveway is well within the average queue length for northbound vehicles approaching the signal during both the morning and evening peak hours. Conflicts between turning vehicles and through traffic would remain frequent, and the increased traffic volumes using the driveway would exacerbate existing problems at this driveway.

In addition to the operational concerns associated with shared access at the existing City Hall/Joe's Donuts driveway, sharing this access would require approval from the City of Sandy for sharing the access. This approval was previously formally requested of the Sandy City Council and was denied. City staff are also unsupportive of a shared access. As such, this option was determined to be infeasible.

#### **Access Scenario 2**

Although the subject property cannot share access with the existing city driveway, it would be possible to construct a new driveway immediately south of and adjacent to the City Hall/Joe's



Donuts driveway within the subject property. The idea would be to align the driveway at the north end of the property and provide an easement for future use by the city. Given such an easement, at any time that the city and/or Joe's makes substantive changes to their sites the existing driveway could be closed and consolidated with the driveway serving the subject property. In the long term, this would result in (marginally) increased access spacing between the driveway and Pioneer Boulevard as well as a reduction in the number of points of access to Highway 211.

This access alternative also has some substantial weaknesses.

First, since near-term operation would require that both the existing city driveway and the proposed site access operate simultaneously. Since drivers turning right onto Highway 211 primarily focus on conflicts approaching along the highway, they may begin turns only to find they are obstructed by a vehicle that has entered Highway 211 from the adjacent driveway. This may lead to both operational and safety concerns.

Second, since the new driveway would need to be located at the extreme north end of the subject property, it would be placed at the location providing the least possible access spacing between the new driveway and the traffic signal at Pioneer Boulevard. Again, this driveway would be located well within the average northbound queue length during the morning and evening peak hours.

Third, this scenario would result in an immediate degradation to access spacing and safety in the site vicinity which would continue indefinitely until such time as the City of Sandy could be forced to move their access to a shared alignment with the proposed development. Since no improvements are currently planned within the City Hall or Joe's Donuts sites, it is expected that this degradation would continue well into the future.

Fourth, providing exclusive site access to The Pad at the north end of the subject property would result in a permanent driveway which cannot be either closed or relocated at any point in the future. Since Joe's Donuts and the Sandy City Hall currently also have access to Highway 26 (two driveways), it may be possible to close their existing driveway at some point in the future. However, if site access for the Pad is placed at the north end of the subject property, it will not be possible to remove that access in the future.

Fifth, the subject property is located on a slope, with the north end of the site forming the highest point of the subject property. If access is taken at the north end of the site, it will be necessary to provide a long driveway carrying site traffic to the lower elevation from which vehicles will access parking spaces within the site. This will result in a meaningful reduction in the development potential of the subject property.

Based on the analysis, selection of site access at the north end of the site is not recommended.

### Access Scenario 3

Under the third access scenario, a new driveway would be constructed intersecting Highway 211 directly opposite Tupper Road.



Since there is an existing intersection at this location, construction of the driveway would result in no change to the existing access spacing on Highway 211. Although access spacing between the site access and the City Hall/Joe's Donuts access would only be approximately 150 feet, this would be considerably in excess of the access spacing that results from implementation of Access Scenario 2, with ample room for drivers simultaneously exiting the two driveways to anticipate and avoid collisions with each other.

Although the site access would be located within the 95<sup>th</sup> percentile queue length for northbound traffic on Highway 211, it would be well outside the average queue length during the peak hours. This indicates that although there may be some obstruction of the site access by through traffic, the standing queues would be expected to clear during each signal cycle, allowing for safe and efficient access to and from the site in conjunction with the proposed right-in, right-out restriction.

Although this site access would also be permanent (similar to Access Scenario 2), it may be possible to remove the City Hall/Joe's Donuts access in the future since alternative access is available for these uses. Accordingly, selection of this access alternative results not only in maximizing access spacing in the near term, but in the potential for maximizing access spacing in the long term as well.

Since Tupper Road intersects Highway 211 near the middle of the subject property, this access scenario also results in the most efficient site plan, since vehicles entering the site from the middle of the property can easily access dwelling units on the north and south sides of the site without the need for significant changes in elevation.

Based on the detailed analysis of the three site access scenarios, it is recommended that site access be taken to Highway 211 directly opposite Tupper Road.



## CONCLUSIONS

Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.

Based on the queuing analysis, the northbound 95<sup>th</sup> percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a “pork-chop” diverter within the new driveway approach.

Based on the crash data, the study intersections are currently operating acceptably with respect to safety.

Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.

At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.

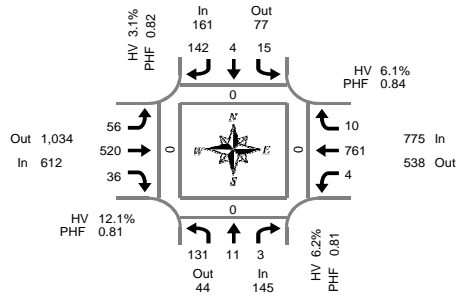


## APPENDIX

# Total Vehicle Summary



Clay Carney  
(603) 833-2740



## SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019  
7:00 AM to 9:00 AM

### 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	16	0	0	0	0	0	17	0	5	26	2	0	0	74	0	0	140	0	0	0	0
7:05 AM	10	0	1	0	1	0	10	0	2	18	3	0	1	65	2	0	113	0	0	0	0
7:10 AM	17	1	0	0	2	0	11	0	7	36	2	0	2	74	1	0	153	0	0	0	0
7:15 AM	12	0	0	0	1	2	9	0	9	40	2	0	1	84	1	0	161	0	0	0	0
7:20 AM	15	0	0	0	3	0	11	0	3	40	1	0	0	68	0	0	141	0	0	0	0
7:25 AM	14	1	0	0	1	1	16	0	2	40	4	0	0	70	1	0	150	0	0	0	0
7:30 AM	7	1	1	0	0	0	16	0	8	43	2	0	0	67	0	0	145	0	0	0	0
7:35 AM	12	2	0	0	3	0	12	0	0	56	5	0	0	57	1	0	148	0	0	0	0
7:40 AM	8	2	0	0	0	0	11	0	4	59	3	0	0	53	0	0	140	0	0	0	0
7:45 AM	12	1	1	0	2	0	11	0	4	53	3	0	0	45	2	0	134	0	0	0	0
7:50 AM	4	2	0	0	1	0	10	0	9	47	4	0	0	62	0	0	139	0	0	0	0
7:55 AM	4	1	0	0	1	1	8	0	3	62	5	0	0	42	2	0	129	0	0	0	0
8:00 AM	5	0	1	0	2	1	13	0	2	46	2	0	0	41	0	0	113	0	0	0	0
8:05 AM	6	0	0	0	1	1	5	0	8	50	2	0	0	42	2	0	117	0	0	0	0
8:10 AM	3	0	0	0	2	1	10	0	5	45	4	0	0	53	1	0	124	0	0	0	1
8:15 AM	12	0	0	0	2	0	7	0	3	38	1	0	0	34	1	0	98	0	0	0	0
8:20 AM	6	2	0	0	2	0	9	0	5	38	1	0	1	49	0	0	113	0	0	0	0
8:25 AM	8	0	0	0	1	0	11	0	4	44	3	0	0	39	2	0	112	0	0	0	1
8:30 AM	5	0	0	0	2	1	10	0	4	66	2	0	0	47	0	0	137	1	0	0	0
8:35 AM	10	0	0	0	3	0	13	0	6	59	5	0	0	45	1	0	142	0	0	0	0
8:40 AM	7	0	0	0	5	1	15	0	10	62	3	0	1	43	1	0	148	0	0	0	0
8:45 AM	5	0	0	0	1	0	12	0	5	69	5	0	0	63	0	0	160	0	0	0	0
8:50 AM	9	2	0	0	3	0	12	0	7	56	8	0	1	46	1	0	145	0	0	0	0
8:55 AM	8	1	0	0	2	0	13	0	6	51	8	0	2	44	1	0	136	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

### 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	43	1	1	0	3	0	38	0	14	80	7	0	3	213	3	0	406	0	0	0	0
7:15 AM	41	1	0	0	5	3	36	0	14	120	7	0	1	222	2	0	452	0	0	0	0
7:30 AM	27	5	1	0	3	0	39	0	12	158	10	0	0	177	1	0	433	0	0	0	0
7:45 AM	20	4	1	0	4	1	29	0	16	162	12	0	0	149	4	0	402	0	0	0	0
8:00 AM	14	0	1	0	5	3	28	0	15	141	8	0	0	136	3	0	354	0	0	0	1
8:15 AM	26	2	0	0	5	0	27	0	12	120	5	0	1	122	3	0	323	0	0	0	1
8:30 AM	22	0	0	0	10	2	38	0	20	187	10	0	1	135	2	0	427	1	0	0	0
8:45 AM	22	3	0	0	6	0	37	0	18	176	21	0	3	153	2	0	441	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

### Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	145	44	189	0	161	77	238	0	612	1,034	1,646	0	775	538	1,313	0	1,693	0	0	0	0
%HV	6.2%				3.1%				12.1%				6.1%				8.0%				
PHF	0.81				0.82				0.81				0.84				0.93				

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	11	3	145	15	4	142	161	56	520	36	612	4	761	10	775	1,693
%HV	6.9%	0.0%	0.0%	6.2%	13.3%	25.0%	1.4%	3.1%	8.9%	12.7%	8.3%	12.1%	75.0%	5.5%	20.0%	6.1%	8.0%
PHF	0.74	0.55	0.75	0.81	0.63	0.33	0.81	0.82	0.74	0.77	0.75	0.81	0.25	0.84	0.63	0.84	0.93

### Rolling Hour Summary

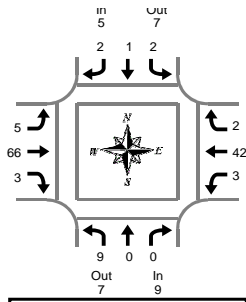
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	131	11	3	0	15	4	142	161	56	520	36	0	4	761	10	0	1,693	0	0	0	0
7:15 AM	102	10	3	0	17	7	132	0	57	581	37	0	1	684	10	0	1,641	0	0	0	1
7:30 AM	87	11	3	0	17	4	123	0	55	581	35	0	1	584	11	0	1,512	0	0	0	2
7:45 AM	82	6	2	0	24	6	122	0	63	610	35	0	2	542	12	0	1,506	1	0	0	2
8:00 AM	84	5	1	0	26	5	130	0	65	624	44	0	5	546	10	0	1,545	1	0	0	2

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



**Peak Hour Summary**  
7:00 AM to 8:00 AM

## SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019  
7:00 AM to 9:00 AM

### Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	0	1	0	0	0	0	1	6	1	8	0	6	0	6	15
7:05 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0	5	10
7:10 AM	3	0	0	3	0	0	0	0	0	3	0	3	2	2	1	5	11
7:15 AM	1	0	0	1	0	1	0	1	2	6	0	8	1	1	0	2	12
7:20 AM	2	0	0	2	1	0	0	1	0	5	0	5	0	1	0	1	9
7:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	1	0	1	8
7:30 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	7	0	7	14
7:35 AM	0	0	0	0	1	0	0	1	0	7	0	7	0	6	0	6	14
7:40 AM	0	0	0	0	0	0	0	0	1	8	0	9	0	1	0	1	10
7:45 AM	0	0	0	0	0	0	1	1	0	6	0	6	0	4	0	4	11
7:50 AM	0	0	0	0	0	0	1	1	0	3	0	3	0	7	0	7	11
7:55 AM	2	0	0	2	0	0	0	0	1	4	1	6	0	1	1	2	10
8:00 AM	1	0	0	1	0	0	1	1	0	10	1	11	0	2	0	2	15
8:05 AM	0	0	0	0	1	0	1	2	0	9	0	9	0	7	1	8	19
8:10 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	6	0	6	8
8:15 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	3	0	3	7
8:20 AM	0	0	0	0	0	0	1	1	0	5	0	5	1	2	0	3	9
8:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	3	0	3	10
8:30 AM	0	0	0	0	1	0	0	1	2	6	0	8	0	3	0	3	12
8:35 AM	0	0	0	0	0	0	0	0	1	5	0	6	0	8	0	8	14
8:40 AM	0	0	0	0	0	0	1	1	0	5	0	5	0	1	0	1	7
8:45 AM	0	0	0	0	0	0	0	0	0	9	0	9	0	3	0	3	12
8:50 AM	0	0	0	0	0	0	0	0	1	4	0	5	1	8	0	9	14
8:55 AM	0	0	0	0	0	0	3	3	0	0	2	2	0	3	0	3	8
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

### Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	0	0	4	0	0	0	0	1	14	1	16	2	13	1	16	36
7:15 AM	3	0	0	3	1	1	0	2	2	17	1	20	1	3	0	4	29
7:30 AM	0	0	0	0	1	0	0	1	1	22	0	23	0	14	0	14	38
7:45 AM	2	0	0	2	0	0	2	2	1	13	1	15	0	12	1	13	32
8:00 AM	1	0	0	1	1	0	2	3	0	21	1	22	0	15	1	16	42
8:15 AM	0	0	0	0	0	0	1	1	0	15	1	16	1	8	0	9	26
8:30 AM	0	0	0	0	1	0	1	2	3	16	0	19	0	12	0	12	33
8:45 AM	0	0	0	0	0	0	3	3	1	13	2	16	1	14	0	15	34
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

### Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	9	7	16	5	7	12	74	53	127	47	68	115	135
PHF	0.38			0.63			0.80			0.73			0.89

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
PHF	0.38	0.00	0.00	0.38	0.50	0.25	0.25	0.63	0.63	0.75	0.75	0.80	0.25	0.75	0.50	0.73	0.89

### Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
7:15 AM	6	0	0	6	3	1	4	8	4	73	3	80	1	44	2	47	141
7:30 AM	3	0	0	3	2	0	5	7	2	71	3	76	1	49	2	52	138
7:45 AM	3	0	0	3	2	0	6	8	4	65	3	72	1	47	2	50	133
8:00 AM	1	0	0	1	2	0	7	9	4	65	4	73	2	49	1	52	135



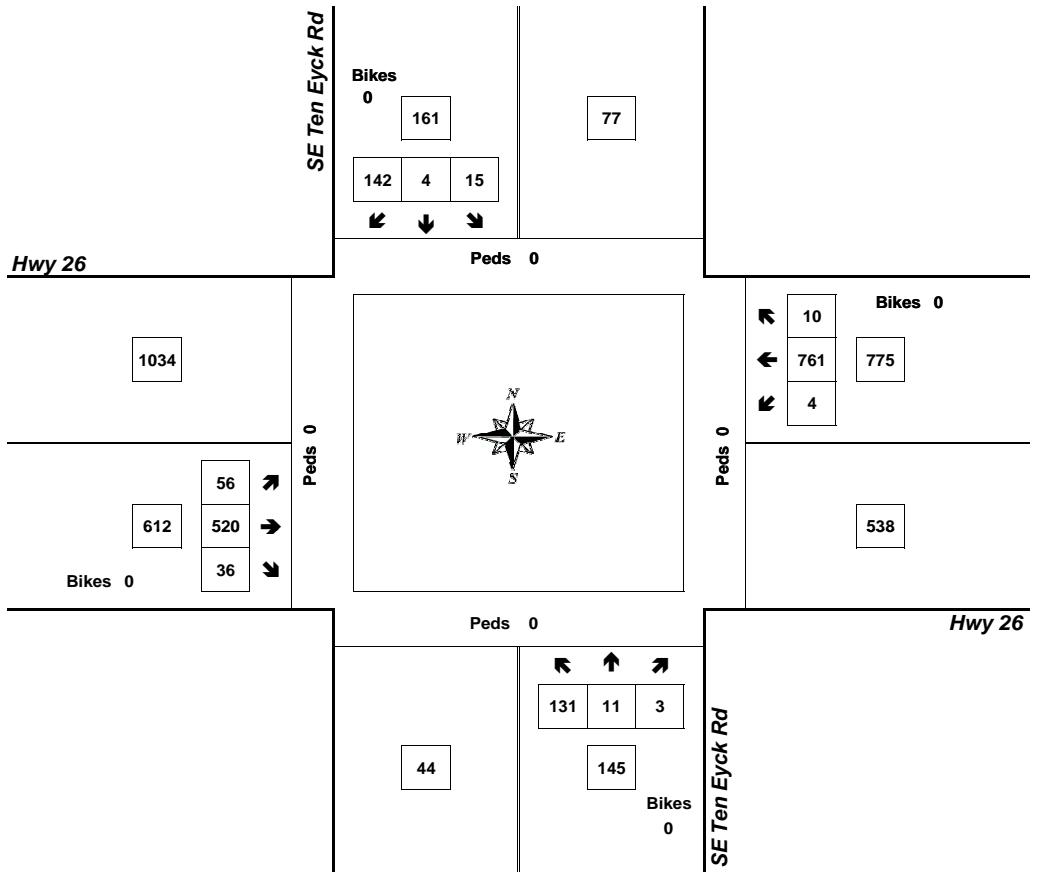
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**SE Ten Eyck Rd & Hwy 26**

7:00 AM to 8:00 AM  
Wednesday, March 20, 2019



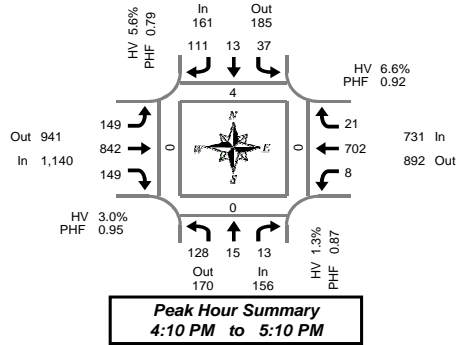
Approach	PHF	HV%	Volume
EB	0.81	12.1%	612
WB	0.84	6.1%	775
NB	0.81	6.2%	145
SB	0.82	3.1%	161
<b>Intersection</b>	<b>0.93</b>	<b>8.0%</b>	<b>1,693</b>

Count Period: 7:00 AM to 9:00 AM

# Total Vehicle Summary



Clay Carney  
(603) 833-2740



## SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019  
4:00 PM to 6:00 PM

### 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	0	2	0	4	3	11	0	8	58	12	0	1	49	2	0	154	0	1	0	0
4:05 PM	10	1	0	0	7	1	5	0	12	63	8	0	1	53	3	0	164	0	0	0	0
4:10 PM	7	2	3	0	1	0	17	0	12	76	11	0	0	65	1	0	195	0	0	0	0
4:15 PM	14	0	1	0	7	1	9	0	18	71	15	0	0	62	1	0	199	0	0	0	0
4:20 PM	9	0	1	0	4	1	11	0	9	75	10	0	0	62	7	0	189	0	0	0	0
4:25 PM	12	2	0	0	5	0	10	0	12	61	14	0	0	52	0	0	168	0	0	0	0
4:30 PM	11	1	4	0	3	2	12	0	17	87	16	1	1	58	1	0	213	0	0	0	0
4:35 PM	15	0	0	0	2	2	6	0	6	59	14	0	0	65	3	0	172	0	0	0	0
4:40 PM	7	1	1	0	3	0	7	0	7	54	9	0	1	57	0	0	147	1	0	0	0
4:45 PM	8	1	0	0	4	1	3	0	13	71	15	1	3	51	3	0	173	0	0	0	0
4:50 PM	13	2	1	0	1	1	6	0	19	74	8	0	0	56	0	0	181	0	0	0	0
4:55 PM	7	1	0	0	1	0	12	0	10	67	14	0	3	57	1	0	173	1	0	0	0
5:00 PM	13	3	1	0	2	2	14	0	12	81	12	0	0	49	1	0	190	2	0	0	0
5:05 PM	12	2	1	0	4	3	4	0	14	86	11	0	0	68	3	1	188	0	0	0	0
5:10 PM	8	0	0	0	6	2	10	0	13	60	12	0	0	68	2	0	181	2	0	0	0
5:15 PM	8	2	1	0	6	2	8	0	9	70	11	0	0	57	1	0	175	0	0	0	0
5:20 PM	8	1	1	1	1	4	10	0	15	73	10	0	0	43	1	0	167	0	1	0	0
5:25 PM	9	1	0	0	4	2	8	0	14	74	11	0	0	43	0	0	166	0	0	0	0
5:30 PM	5	0	1	0	4	0	5	0	15	64	10	0	0	44	0	0	148	1	0	0	0
5:35 PM	5	1	0	0	7	0	9	0	17	50	4	1	0	39	0	0	132	0	0	0	0
5:40 PM	4	0	0	0	2	1	5	0	11	56	7	0	0	30	1	0	117	2	0	0	2
5:45 PM	4	1	0	0	3	2	8	0	14	76	6	0	3	41	1	0	159	0	0	0	0
5:50 PM	7	1	0	0	0	1	6	0	14	69	8	0	0	42	0	0	148	0	0	0	0
5:55 PM	10	1	0	0	2	3	0	16	65	10	0	0	0	51	1	0	159	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

### 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	21	3	5	0	12	4	33	0	32	197	31	0	2	167	6	0	513	0	1	0	0
4:15 PM	35	2	2	0	16	2	30	0	39	207	39	0	0	176	8	0	556	0	0	0	0
4:30 PM	33	2	5	0	8	4	25	0	30	200	39	1	2	180	4	0	532	1	0	0	0
4:45 PM	28	4	1	0	6	2	21	0	42	212	37	1	6	164	4	0	527	1	0	0	0
5:00 PM	33	5	2	0	12	7	28	0	39	207	35	0	0	185	6	1	559	4	0	0	0
5:15 PM	25	4	2	1	11	8	26	0	38	217	32	0	0	143	2	0	508	0	1	0	0
5:30 PM	14	1	1	0	13	1	19	0	43	170	21	1	0	113	1	0	397	3	0	0	2
5:45 PM	21	3	0	0	3	5	17	0	44	210	24	0	3	134	2	0	466	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

### Peak Hour Summary 4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	156	170	326	0	161	185	346	0	1,140	941	2,081	2	731	892	1,623	1	2,188	4	0	0	0
%HV	1.3%				5.6%				3.0%				6.6%				4.3%				
PHF	0.87				0.79				0.95				0.92				0.94				

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	128	15	13	156	37	13	111	161	149	842	149	1,140	8	702	21	731	2,188
%HV	1.6%	0.0%	0.0%	1.3%	0.0%	0.0%	8.1%	5.6%	4.0%	3.0%	2.0%	3.0%	0.0%	6.7%	4.8%	6.6%	4.3%
PHF	0.84	0.63	0.65	0.87	0.58	0.65	0.75	0.79	0.89	0.94	0.85	0.95	0.33	0.93	0.58	0.92	0.94

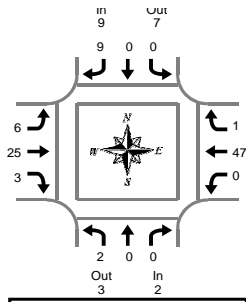
### Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	117	11	13	0	42	12	109	0	143	816	146	2	10	687	22	0	2,128	2	1	0	0
4:15 PM	129	13	10	0	42	15	104	0	150	826	150	2	8	705	22	1	2,174	6	0	0	0
4:30 PM	119	15	10	1	37	21	100	0	149	836	143	2	8	672	16	1	2,126	6	1	0	0
4:45 PM	100	14	6	1	42	18	94	0	162	806	125	2	6	605	13	1	1,991	8	1	0	2
5:00 PM	93	13	5	1	39	21	90	0	164	804	112	1	3	575	11	1	1,930	7	1	0	2

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



Out 58  
In 34

**Peak Hour Summary**  
4:10 PM to 5:10 PM

## SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019  
4:00 PM to 6:00 PM

### Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	4	0	10	1	11
4:05 PM	0	0	0	0	1	0	0	1	0	6	0	0	6	0	3	1	4
4:10 PM	0	0	0	0	0	0	0	0	0	2	0	0	2	0	8	0	8
4:15 PM	2	0	0	2	0	0	2	2	2	3	0	5	0	3	0	3	12
4:20 PM	0	0	0	0	0	0	2	2	1	3	0	4	0	5	1	6	12
4:25 PM	0	0	0	0	0	0	1	1	0	5	1	6	0	4	0	4	11
4:30 PM	0	0	0	0	0	0	2	2	1	0	0	1	0	3	0	3	6
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5
4:40 PM	0	0	0	0	0	0	1	1	0	3	0	3	0	2	0	2	6
4:45 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	7
4:55 PM	0	0	0	0	0	0	1	1	1	2	1	4	0	0	0	0	5
5:00 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	1	0	1	6
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7
5:10 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	4	0	4	8
5:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	0	2	4
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	5	0	5	6
5:25 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3
5:30 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	3	0	3	7
5:35 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:45 PM	1	0	0	1	0	0	0	0	0	2	0	2	0	3	0	3	6
5:50 PM	1	0	0	1	0	0	0	0	0	1	1	2	0	4	0	4	7
5:55 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	5	0	5	8
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176

### Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	1	0	0	1	0	12	0	12	0	21	2	23	36
4:15 PM	2	0	0	2	0	0	5	5	3	11	1	15	0	12	1	13	35
4:30 PM	0	0	0	0	0	0	3	3	1	3	0	4	0	10	0	10	17
4:45 PM	0	0	0	0	0	0	1	1	2	3	1	6	0	11	0	11	18
5:00 PM	0	0	0	0	0	0	0	0	1	9	1	11	0	10	0	10	21
5:15 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	8	0	8	13
5:30 PM	0	0	0	0	0	0	0	0	1	6	1	8	0	7	0	7	15
5:45 PM	2	0	0	2	0	0	0	0	1	5	1	7	0	12	0	12	21
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176

### Heavy Vehicle Peak Hour Summary 4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	3	5	9	7	16	34	58	92	48	25	73	93
PHF	0.25			0.45			0.57			0.71			0.66

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	0	2	0	0	9	9	6	25	3	34	0	47	1	48	93
PHF	0.25	0.00	0.00	0.25	0.00	0.00	0.45	0.45	0.50	0.57	0.38	0.57	0.00	0.73	0.25	0.71	0.66

### Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	0	0	2	1	0	9	10	6	29	2	37	0	54	3	57	106
4:15 PM	2	0	0	2	0	0	9	9	7	26	3	36	0	43	1	44	91
4:30 PM	0	0	0	0	0	0	4	4	5	19	2	26	0	39	0	39	69
4:45 PM	0	0	0	0	0	0	1	1	5	22	3	30	0	36	0	36	67
5:00 PM	2	0	0	2	0	0	0	0	4	24	3	31	0	37	0	37	70

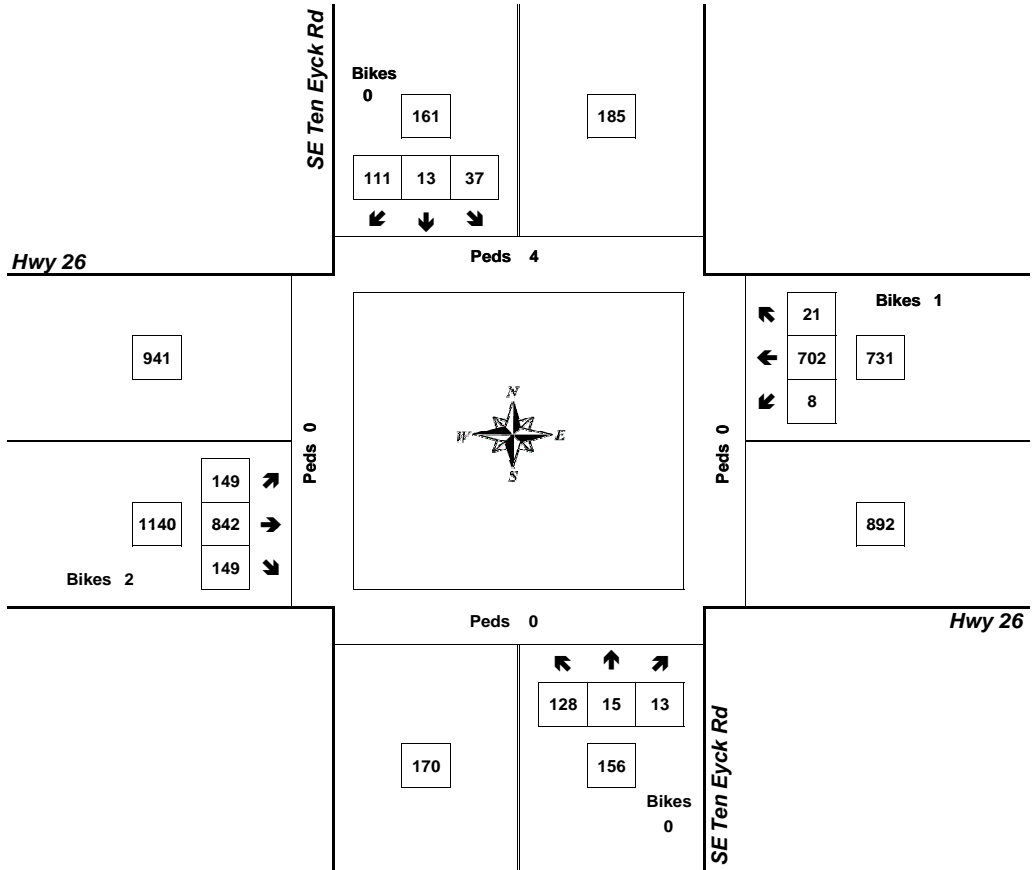
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**SE Ten Eyck Rd & Hwy 26**

4:10 PM to 5:10 PM  
Tuesday, March 19, 2019



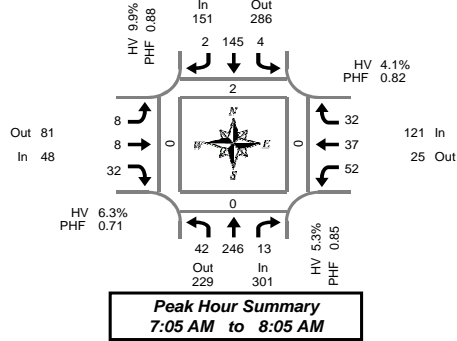
Approach	PHF	HV%	Volume
EB	0.95	3.0%	1,140
WB	0.92	6.6%	731
NB	0.87	1.3%	156
SB	0.79	5.6%	161
<b>Intersection</b>	<b>0.94</b>	<b>4.3%</b>	<b>2,188</b>

Count Period: 4:00 PM to 6:00 PM

# Total Vehicle Summary



Clay Carney  
(603) 833-2740



## Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019  
7:00 AM to 9:00 AM

**Peak Hour Summary**  
7:05 AM to 8:05 AM

### 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	2	18	1	0	0	8	0	0	0	0	0	0	4	5	0	0	38	0	1	0	0
7:05 AM	3	20	1	0	0	12	0	0	0	0	0	0	3	1	5	0	45	0	0	0	0
7:10 AM	5	23	0	0	0	12	0	0	2	2	4	0	4	3	9	0	64	0	0	0	0
7:15 AM	5	32	0	0	0	9	0	0	1	0	2	0	4	2	2	0	57	1	0	0	0
7:20 AM	8	13	0	0	2	13	1	0	0	0	2	0	5	3	5	0	52	0	0	0	0
7:25 AM	1	23	2	0	0	13	0	0	1	1	5	0	4	3	3	0	56	0	0	0	0
7:30 AM	3	17	0	0	1	12	0	0	0	0	3	0	4	9	1	0	50	1	0	0	0
7:35 AM	2	23	0	0	0	17	0	0	0	0	7	0	6	5	1	0	61	0	0	0	0
7:40 AM	2	23	1	0	0	6	1	0	1	2	4	0	6	4	1	0	51	0	0	0	0
7:45 AM	4	20	3	0	0	14	0	0	0	1	0	0	3	1	0	0	46	0	0	0	0
7:50 AM	5	15	3	0	0	10	0	0	1	1	1	0	5	4	2	0	47	0	0	0	0
7:55 AM	1	21	2	0	1	15	0	0	1	0	3	0	3	1	1	0	49	0	0	0	0
8:00 AM	3	16	1	0	0	12	0	0	1	1	1	0	5	1	2	0	43	0	0	0	0
8:05 AM	2	15	0	0	0	7	0	0	1	1	2	0	4	0	3	0	35	1	0	0	0
8:10 AM	2	19	1	0	1	8	0	0	3	1	2	0	3	4	1	0	45	1	0	0	0
8:15 AM	3	27	1	0	0	8	0	0	0	0	1	0	1	3	2	0	46	0	0	0	0
8:20 AM	0	19	0	0	0	10	0	0	0	1	0	0	1	3	0	0	34	0	0	0	0
8:25 AM	6	8	1	0	0	8	0	0	0	1	1	0	1	1	2	0	29	0	0	0	0
8:30 AM	3	27	2	0	0	10	0	0	0	1	1	0	2	2	5	0	53	0	0	0	0
8:35 AM	1	14	0	0	0	16	0	0	0	1	0	0	2	2	0	0	36	0	0	0	0
8:40 AM	0	19	1	0	0	15	0	0	0	1	1	0	1	3	1	0	42	0	0	0	0
8:45 AM	1	21	1	0	0	15	1	0	0	2	3	0	1	2	4	0	51	0	0	0	0
8:50 AM	0	21	0	0	0	9	0	0	0	2	0	0	3	3	2	0	40	0	0	0	0
8:55 AM	4	20	1	0	1	10	0	0	1	3	2	0	3	3	3	0	51	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

### 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	10	61	2	0	0	32	0	0	2	2	4	0	11	9	14	0	147	0	1	0	0
7:15 AM	14	68	2	0	2	35	1	0	2	1	9	0	13	8	10	0	165	1	0	0	0
7:30 AM	7	63	1	0	1	35	1	0	1	2	14	0	16	18	3	0	162	1	0	0	0
7:45 AM	10	56	8	0	1	39	0	0	2	2	4	0	11	6	3	0	142	0	0	0	0
8:00 AM	7	50	2	0	1	27	0	0	5	3	5	0	12	5	6	0	123	1	0	0	0
8:15 AM	9	54	2	0	0	26	0	0	0	2	2	0	3	7	4	0	109	0	0	0	0
8:30 AM	4	60	3	0	0	41	0	0	0	3	2	0	5	7	6	0	131	0	0	0	0
8:45 AM	5	62	2	0	1	34	1	0	1	7	5	0	7	8	9	0	142	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

### Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	301	229	530	0	151	286	437	0	48	81	129	0	121	25	146	0	621	2	0	0	0
%HV	5.3%				9.9%				6.3%				4.1%				6.3%				
PHF	0.85				0.88				0.71				0.82				0.90				

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	42	246	13	301	4	145	2	151	8	8	32	48	52	37	32	121	621
%HV	2.4%	5.7%	7.7%	5.3%	25.0%	9.7%	0.0%	9.9%	12.5%	0.0%	6.3%	6.3%	1.9%	0.0%	12.5%	4.1%	6.3%
PHF	0.58	0.82	0.41	0.85	0.33	0.86	0.50	0.88	0.67	0.50	0.53	0.71	0.81	0.51	0.50	0.82	0.90

### Rolling Hour Summary

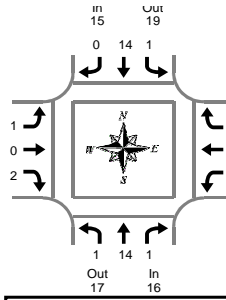
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	41	248	13	0	4	141	2	0	7	7	31	0	51	41	30	0	616	2	1	0	0
7:15 AM	38	237	13	0	5	136	2	0	10	8	32	0	52	37	22	0	592	3	0	0	0
7:30 AM	33	223	13	0	3	127	1	0	8	9	25	0	42	36	16	0	536	2	0	0	0
7:45 AM	30	220	15	0	2	133	0	0	7	10	13	0	31	25	19	0	505	1	0	0	0
8:00 AM	25	226	9	0	2	128	1	0	6	15	14	0	27	27	25	0	505	1	0	0	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



Out 1  
In 3

## Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019  
7:00 AM to 9:00 AM

**Peak Hour Summary**  
7:05 AM to 8:05 AM

### Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total					
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
7:05 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
7:10 AM	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	1	3
7:15 AM	0	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	2
7:20 AM	0	0	0	0	1	1	0	2	0	0	0	0	1	0	0	1	1	0	0	1	3
7:25 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	0	0	0	0	3
7:30 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3
7:35 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3
7:40 AM	0	3	1	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	5
7:45 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:55 AM	1	0	0	1	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	4
8:00 AM	0	6	0	6	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	8
8:05 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	1	0	0	1	0	0	1	4
8:10 AM	0	2	0	2	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	4
8:15 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
8:20 AM	0	2	0	2	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	5
8:25 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
8:30 AM	0	3	0	3	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	5
8:35 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	7
8:40 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:50 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:55 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0	3
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10					80

### Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total					
7:00 AM	0	2	0	2	0	1	0	1	0	0	1	1	0	1	1	0	2	0	0	0	6
7:15 AM	0	1	0	1	1	1	0	2	1	0	1	2	1	0	2	3	0	0	0	0	8
7:30 AM	0	5	1	6	0	4	0	4	0	0	0	0	0	0	1	1	0	0	0	11	
7:45 AM	1	0	0	1	0	6	0	6	0	0	0	0	0	0	0	0	0	0	0	7	
8:00 AM	0	8	0	8	0	5	0	5	0	0	0	0	2	1	0	3	1	0	0	16	
8:15 AM	1	6	0	7	0	4	0	4	0	1	0	1	0	0	0	0	0	0	0	12	
8:30 AM	0	7	0	7	0	7	0	7	0	0	0	0	0	0	0	0	0	0	0	14	
8:45 AM	0	2	0	2	0	3	0	3	0	0	0	0	0	1	0	1	0	0	0	6	
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10					80

### Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	16	17	33	15	19	34	3	1	4	5	2	7	39
PHF	0.57			0.63			0.38			0.42			0.81

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	14	1	16	1	14	0	15	1	0	2	3	1	0	4	5	39
PHF	0.25	0.58	0.25	0.57	0.25	0.58	0.00	0.63	0.25	0.00	0.25	0.38	0.25	0.00	0.50	0.42	0.81

### Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total					
7:00 AM	1	8	1	10	1	12	0	13	1	0	2	3	1	1	4	6					32
7:15 AM	1	14	1	16	1	16	0	17	1	0	1	2	3	1	3	7					42
7:30 AM	2	19	1	22	0	19	0	19	0	1	0	1	2	1	1	4					46
7:45 AM	2	21	0	23	0	22	0	22	0	1	0	1	2	1	0	3					49
8:00 AM	1	23	0	24	0	19	0	19	0	1	0	1	2	2	0	4					48

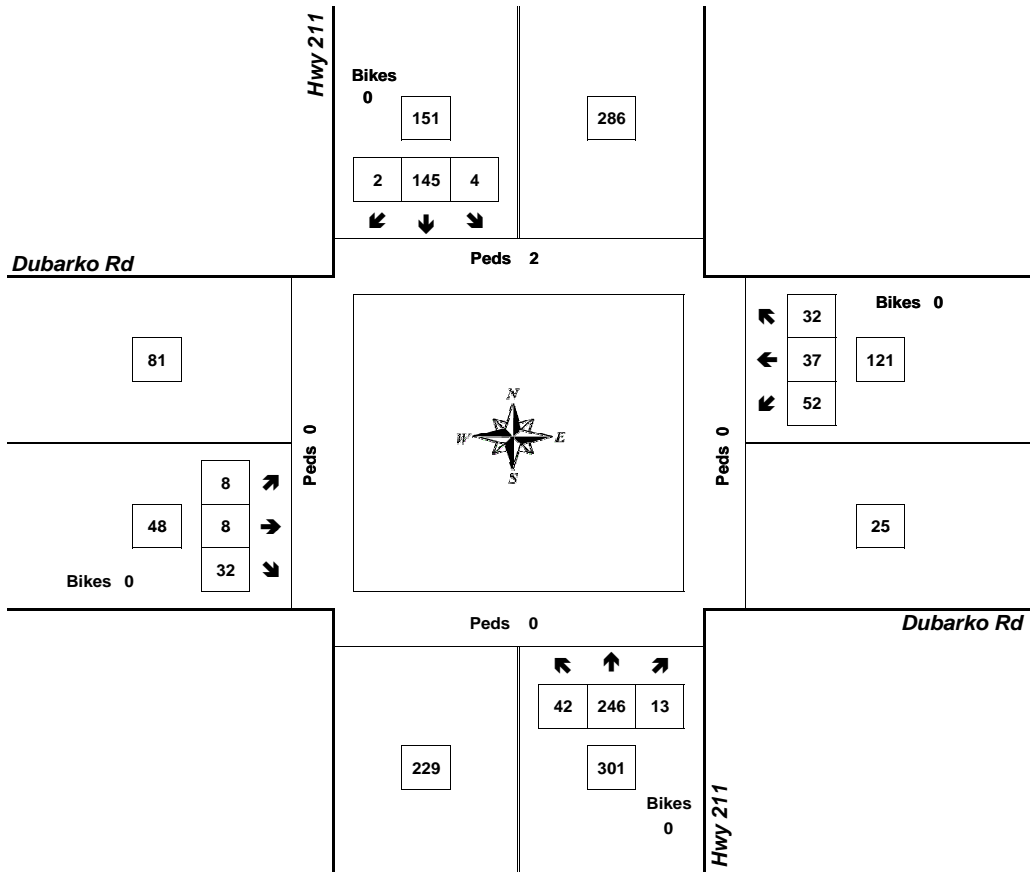
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**Hwy 211 & Dubarko Rd**

7:05 AM to 8:05 AM  
Wednesday, March 20, 2019



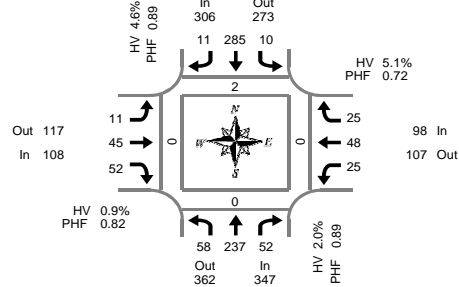
Approach	PHF	HV%	Volume
EB	0.71	6.3%	48
WB	0.82	4.1%	121
NB	0.85	5.3%	301
SB	0.88	9.9%	151
<b>Intersection</b>	<b>0.90</b>	<b>6.3%</b>	<b>621</b>

Count Period: 7:00 AM to 9:00 AM

**Total Vehicle Summary**



Clay Carney  
(603) 833-2740



**Hwy 211 & Dubarko Rd**

**Tuesday, March 19, 2019**  
**4:00 PM to 6:00 PM**

**Peak Hour Summary**  
**4:05 PM to 5:05 PM**

**5-Minute Interval Summary**  
**4:00 PM to 6:00 PM**

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk								
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West					
4:00 PM	4	14	0	0	2	25	1	0	0	3	3	0	2	3	3	0	2	3	3	0	60	0	0	1	0	
4:05 PM	4	28	3	0	1	31	0	0	1	7	6	0	2	6	2	0	91	0	0	0	0	91	0	0	0	0
4:10 PM	10	17	2	0	1	19	0	0	0	4	3	0	3	4	3	0	66	0	0	0	0	66	0	0	0	0
4:15 PM	4	20	6	0	2	20	1	0	2	7	3	1	1	5	1	0	72	0	0	0	0	72	0	0	0	0
4:20 PM	6	12	1	0	1	14	1	0	2	3	4	0	5	7	4	0	60	1	0	0	0	60	1	0	0	0
4:25 PM	5	16	4	0	1	21	1	0	3	3	4	0	2	4	1	0	65	0	0	0	0	65	0	0	0	0
4:30 PM	4	22	3	0	0	19	3	0	1	2	2	0	5	5	1	0	67	1	0	0	0	67	1	0	0	0
4:35 PM	2	23	7	0	0	29	1	0	1	2	1	0	0	1	3	0	70	0	0	0	0	70	0	0	0	0
4:40 PM	2	17	4	0	0	22	0	0	0	2	1	0	1	3	3	0	55	0	0	0	0	55	0	0	0	0
4:45 PM	10	23	7	0	2	29	1	0	0	6	8	0	3	2	0	0	91	0	0	0	0	91	0	0	0	0
4:50 PM	3	22	6	0	1	19	1	0	1	0	4	0	1	2	0	0	61	0	0	0	0	61	0	0	0	0
4:55 PM	4	20	3	0	0	20	2	0	0	6	2	0	1	6	1	0	65	0	0	0	0	65	0	0	0	0
5:00 PM	4	17	6	0	1	42	0	0	0	3	14	0	1	4	4	0	96	0	0	0	0	96	0	0	0	0
5:05 PM	2	24	5	0	0	20	0	0	0	4	5	0	1	2	3	0	66	0	0	0	0	66	0	0	0	0
5:10 PM	8	24	4	0	1	13	1	0	1	8	2	0	2	1	3	0	68	0	0	0	0	68	0	0	0	0
5:15 PM	4	13	4	0	1	19	1	0	0	4	3	0	5	3	0	0	57	0	0	0	0	57	0	0	0	0
5:20 PM	1	19	6	0	1	29	1	0	1	2	2	0	1	4	0	0	67	0	0	0	0	67	0	0	0	0
5:25 PM	5	14	6	0	0	17	1	0	1	3	9	0	2	4	3	0	65	0	0	0	0	65	0	0	0	0
5:30 PM	5	19	6	0	0	19	1	0	1	5	5	0	0	2	3	0	66	0	0	0	0	66	0	0	0	0
5:35 PM	5	15	1	0	2	24	0	0	1	5	6	0	1	2	1	0	63	0	0	0	0	63	0	0	0	0
5:40 PM	5	19	7	0	0	29	1	0	0	8	3	0	1	2	0	1	75	0	0	0	0	75	0	0	0	0
5:45 PM	4	15	8	0	0	16	1	0	0	7	3	0	3	0	0	0	57	0	0	0	0	57	0	0	0	0
5:50 PM	4	13	2	0	0	20	3	0	2	5	3	0	0	5	3	0	60	0	0	0	0	60	0	0	0	0
5:55 PM	5	13	2	0	1	18	0	0	0	2	3	0	2	1	1	0	48	0	0	0	0	48	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0	1,611	2	0	1	0

**15-Minute Interval Summary**  
**4:00 PM to 6:00 PM**

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk								
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West					
4:00 PM	18	59	5	0	4	75	1	0	1	14	12	0	7	13	8	0	217	0	0	1	0	217	0	0	1	0
4:15 PM	15	48	11	0	4	55	3	0	7	13	11	1	8	16	6	0	197	1	0	0	0	197	1	0	0	0
4:30 PM	8	62	14	0	0	70	4	0	2	6	4	0	6	9	7	0	192	1	0	0	0	192	1	0	0	0
4:45 PM	17	65	16	0	3	68	4	0	1	12	14	0	5	9	3	0	217	0	0	0	0	217	0	0	0	0
5:00 PM	14	65	15	0	2	75	1	0	1	15	21	0	4	7	10	0	230	0	0	0	0	230	0	0	0	0
5:15 PM	10	46	16	0	2	65	3	0	2	9	14	0	8	11	3	0	189	0	0	0	0	189	0	0	0	0
5:30 PM	15	53	14	0	2	72	2	0	2	18	14	0	2	6	4	1	204	0	0	0	0	204	0	0	0	0
5:45 PM	13	41	12	0	1	54	4	0	2	14	9	0	5	6	4	0	165	0	0	0	0	165	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0	1,611	2	0	1	0

**Peak Hour Summary**  
**4:05 PM to 5:05 PM**

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk								
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West					
Volume	347	362	709	0	306	273	579	0	108	117	225	1	98	107	205	0	859	2	0	0	0	859	2	0	0	0
%HV	2.0%				4.6%				0.9%				5.1%					3.1%								
PHF	0.89				0.89				0.82				0.72				0.94									

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	58	237	52	347	10	285	11	306	11	45	52	108	25	48	25	98	859
%HV	3.4%	1.7%	1.9%	2.0%	0.0%	4.9%	0.0%	4.6%	0.0%	0.0%	1.9%	0.9%	4.0%	2.1%	12.0%	5.1%	3.1%
PHF	0.73	0.91	0.72	0.89	0.63	0.88	0.55	0.89	0.39	0.63	0.65	0.82	0.52	0.75	0.78	0.72	0.94

**Rolling Hour Summary**  
**4:00 PM to 6:00 PM**

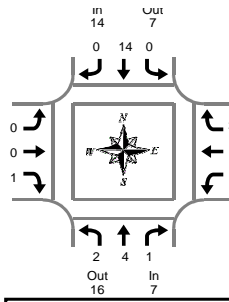
Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk								
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West					
4:00 PM	58	234	46	0	11	288	12	0	11	45	41	1	26	47	24	0	823	2	0	1	0	823	2	0	1	0
4:15 PM	54	240	56	0	9	288	12	0	11	46	50	1	23	41	26	0	836	2	0	0	0	836	2	0	0	0
4:30 PM	49	238	61	0	7	278	12	0	6	42	53	0	23	36	23	0	828	1	0	0	0	828	1	0	0	0
4:45 PM	56	229	61	0	9	280	10	0	6	54	63	0	19	33	20	1	840	0	0	0	0	840	0	0	0	0
5:00 PM	52	205	57	0	7	266	10	0	7	56	58	0	19	30	21	1	788	0	0	0	0	788	0	0	0	0



# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Hwy 211 & Dubarko Rd

Tuesday, March 19, 2019  
4:00 PM to 6:00 PM

**Peak Hour Summary**  
4:05 PM to 5:05 PM

### Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	4	0	4	0	0	1	1	0	0	0	1	7
4:05 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:10 PM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	3
4:15 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	0	0	5
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2
4:25 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	1	3
4:35 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	1	1	3
4:40 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
4:50 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:55 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:00 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
5:05 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:10 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:20 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:40 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	2	0	2	0	0	1	1	1	0	0	1	4
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

### Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	1	0	3	0	5	0	5	0	0	1	1	1	0	1	2	11
4:15 PM	0	1	0	1	0	6	0	6	0	0	0	0	1	1	0	2	9
4:30 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	2	2	7
4:45 PM	0	1	1	2	0	1	0	1	0	0	1	1	0	0	0	0	4
5:00 PM	0	2	0	2	0	3	0	3	0	0	0	0	0	0	0	0	5
5:15 PM	1	2	1	4	0	0	0	0	0	0	0	0	0	0	0	0	4
5:30 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	3	0	3	0	0	1	1	1	0	0	1	5
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

### Heavy Vehicle Peak Hour Summary 4:05 PM to 5:05 PM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	16	23	14	7	21	1	3	4	5	1	6	27
PHF	0.58			0.58			0.25			0.42			0.68

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	4	1	7	0	14	0	14	0	0	1	1	1	1	3	5	27
PHF	0.25	0.50	0.25	0.58	0.00	0.58	0.00	0.58	0.00	0.00	0.25	0.25	0.25	0.25	0.38	0.42	0.68

### Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	4	1	7	0	16	0	16	0	0	2	2	2	1	3	6	31
4:15 PM	0	5	1	6	0	14	0	14	0	0	1	1	1	1	2	4	25
4:30 PM	1	6	2	9	0	8	0	8	0	0	1	1	0	0	2	2	20
4:45 PM	1	6	2	9	0	5	0	5	0	0	1	1	0	0	0	0	15
5:00 PM	1	5	1	7	0	7	0	7	0	0	1	1	1	0	0	1	16

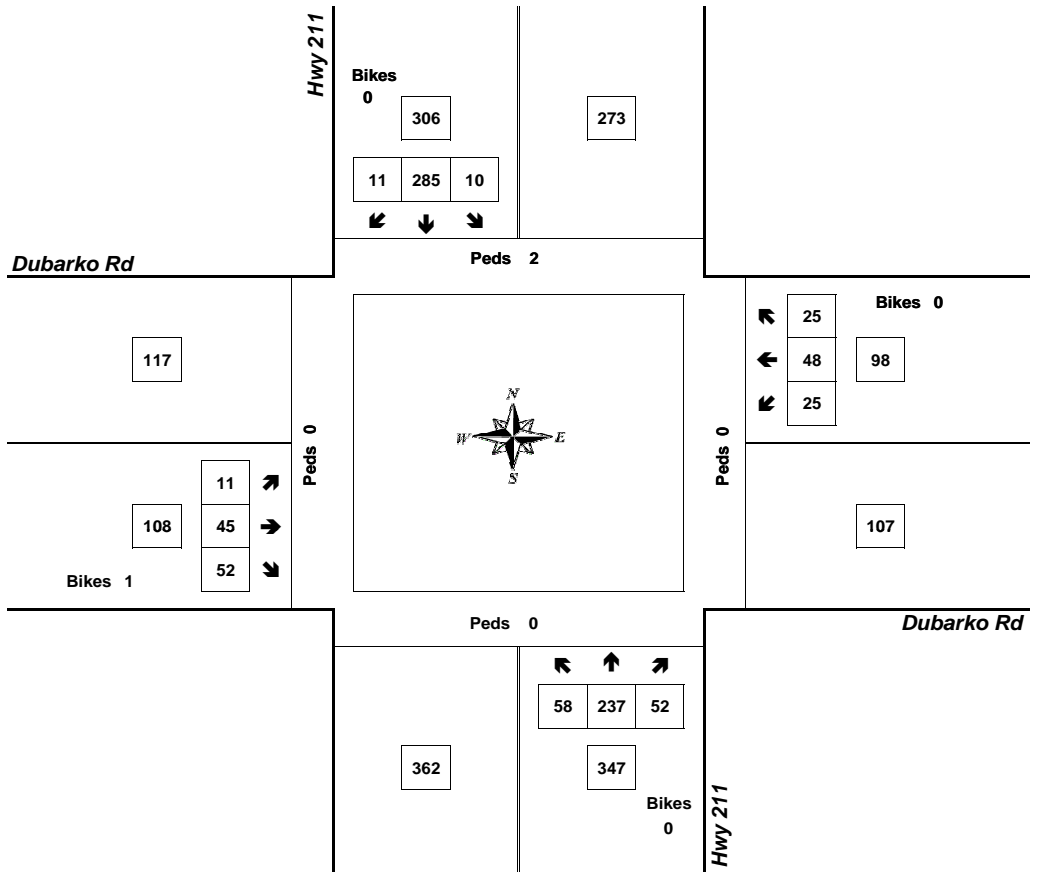
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**Hwy 211 & Dubarko Rd**

4:05 PM to 5:05 PM  
Tuesday, March 19, 2019



Approach	PHF	HV%	Volume
EB	0.82	0.9%	108
WB	0.72	5.1%	98
NB	0.89	2.0%	347
SB	0.89	4.6%	306
<b>Intersection</b>	<b>0.94</b>	<b>3.1%</b>	<b>859</b>

Count Period: 4:00 PM to 6:00 PM

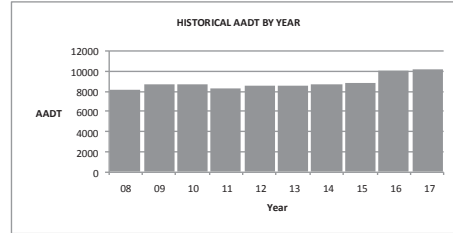
HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
026	22.72	1		0.02 mile northwest of S.E. 362nd Drive, west city limits of Sandy		29500		41400	MODEL
026	23.85	1		0.02 mile west of Bluff Road		30100		42600	MODEL
026	23.89	1		0.02 mile east of Bluff Road		15100		21600	MODEL
026	24.02	1		0.02 mile west of Beers Avenue		15100		21600	MODEL
026	24.35	1		0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14800		21600	MODEL
026	24.42	1		0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12000		17100	MODEL
026	24.59	1		0.02 mile west of Ten Eyck Road		11200		16000	MODEL
026	23.89	2	W	0.02 mile east of Bluff Road		15200		21300	MODEL
026	24.04	2	W	0.02 mile west of Beers Avenue		15200		21300	MODEL
026	24.36	2	W	0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14500		20700	MODEL
026	24.40	2	W	0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12100		16900	MODEL
026	24.61	2	W	0.02 mile west of Ten Eyck Road		11700		16400	MODEL
026	25.10	1		0.02 mile west of Langensand Road		18000		25400	MODEL
026	25.66	1		0.10 mile east of Vista Loop Drive		19700		27600	MODEL

HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
172	-0.13	1		0.10 mile east of Clackamas Highway (OR224)			5600	8800	MODEL
172	1.45	1		0.10 mile southwest of Judd Road			5800	9100	MODEL
172	1.65	1		0.10 mile northeast of Judd Road			6200	9600	MODEL
172	3.65	1		0.05 mile west of 362nd Drive			7600	11600	MODEL
172	3.75	1		0.05 mile east of 362nd Drive			5300	7900	MODEL
172	5.07	1		0.10 mile west of Bornstedt Road			4200	6900	MODEL
172	5.29	1		0.10 mile south of Dubarko Road			6500	10700	MODEL
172	5.50	1		0.11 mile north of Dubarko Road			5700	9200	MODEL
172	5.83	1		0.05 mile south of Mt. Hood Highway (US26-Eastbound)			5700	9200	MODEL
172	5.92	1		0.02 mile south of Mt. Hood Highway (US26-Westbound)			5000	8100	MODEL

<b>Location:</b>	US26; MP 46.38; MT. HOOD HIGHWAY NO. 26; 0.30 mile east of Camp Creek Rd	<b>Site Name:</b>	Rhododendron (03-006)
	(USFS 28)		<b>Installed:</b>

**HISTORICAL TRAFFIC DATA**

Year	AADT	Percent of AADT				
		Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	8162	233	22.9	20.1	19.1	18.2
2009	8737	197	22.3	19.6	18.4	17.8
2010	8714	207	21.6	19.8	18.9	18.5
2011	8330	214	24.7	20.0	18.6	18.1
2012	8480	227	24.0	21.0	20.2	19.4
2013	8527	213	23.4	21.1	20.3	19.1
2014	8652	216	23.2	21.1	20.3	19.2
2015	8861	242	21.4	20.3	19.4	18.7
2016	10071	208	22.9	19.6	18.8	17.9
2017	10223	200	19.9	19.1	18.1	17.5



**2017 TRAFFIC DATA**

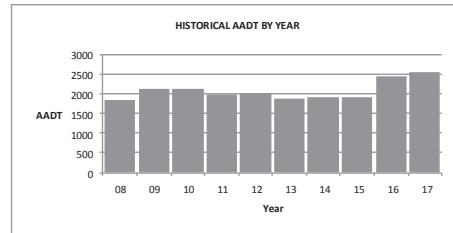
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October	6589	64	8087	79
November	5493	54	7313	72
December	8753	86	10161	99

For Vehicle Classification data near your project, please go to the following web page:  
[https://www.oregon.gov/ODOT/Data/Documents/TVT\\_2017.xlsx](https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx)

<b>Location:</b>	OR35; MP 57.79; MT. HOOD HIGHWAY NO. 26; 0.02 mile east of Warm Springs Highway No. 53 (US26)	<b>Site Name:</b>	Mt. Hood Meadows (03-007)
			<b>Installed:</b>

**HISTORICAL TRAFFIC DATA**

Year	AADT	Percent of AADT				
		Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	1854	398	56.8	44.2	39.9	36.1
2009	2130	***	***	***	***	***
2010	2145	374	49.2	39.5	34.8	33.2
2011	1976	476	79.2	49.1	45.0	39.1
2012	2023	452	65.4	43.4	40.3	37.7
2013	1868	427	68.1	48.7	42.0	37.1
2014	1908	400	60.0	41.9	37.4	33.6
2015	1931	393	50.4	38.6	34.4	32.6
2016	2455	366	55.9	38.3	33.1	31.2
2017	2565	340	52.1	37.7	32.5	31.3

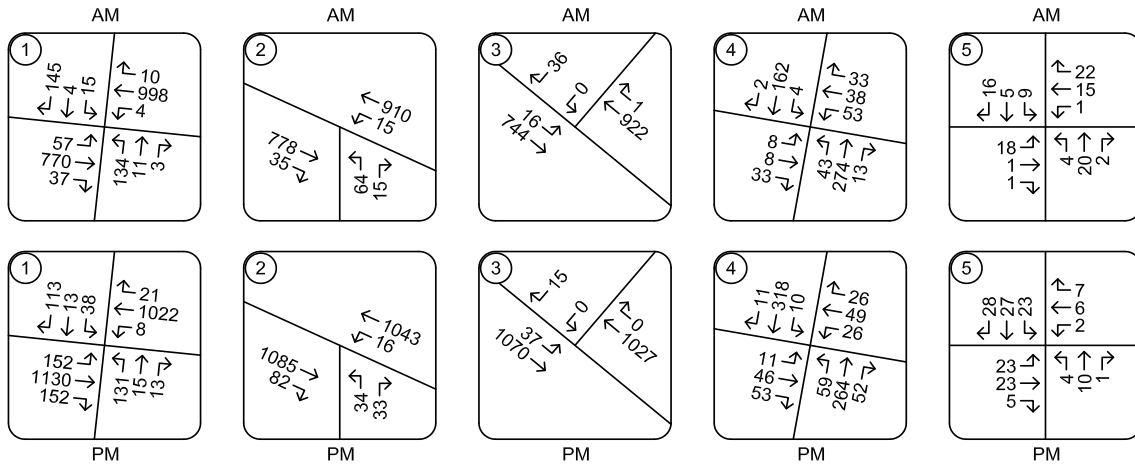
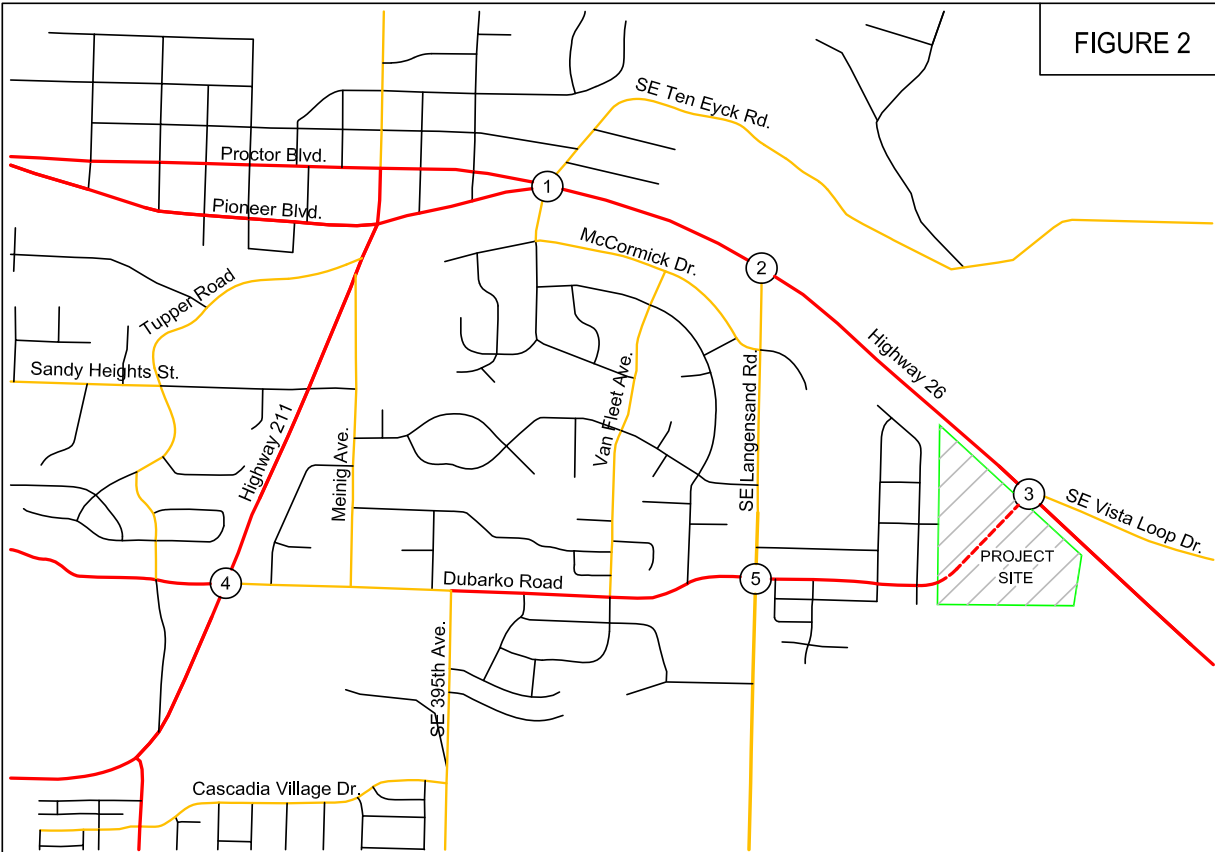


**2017 TRAFFIC DATA**

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2449	95	3616	141
February	1978	77	3362	131
March	1781	69	2833	110
April	1116	44	2050	80
May	1202	47	1609	63
June	1794	70	2070	81
July	2405	94	2837	111
August	2302	90	2614	102
September	3956	154	3993	156
October	1387	54	1614	63
November	768	30	1156	45
December	2499	97	2966	116

For Vehicle Classification data near your project, please go to the following web page:  
[https://www.oregon.gov/ODOT/Data/Documents/TVT\\_2017.xlsx](https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx)

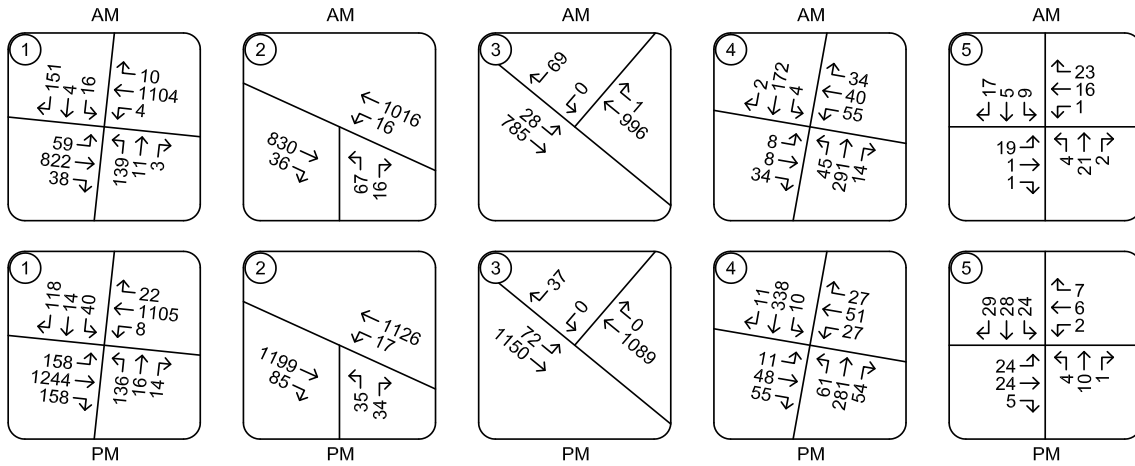
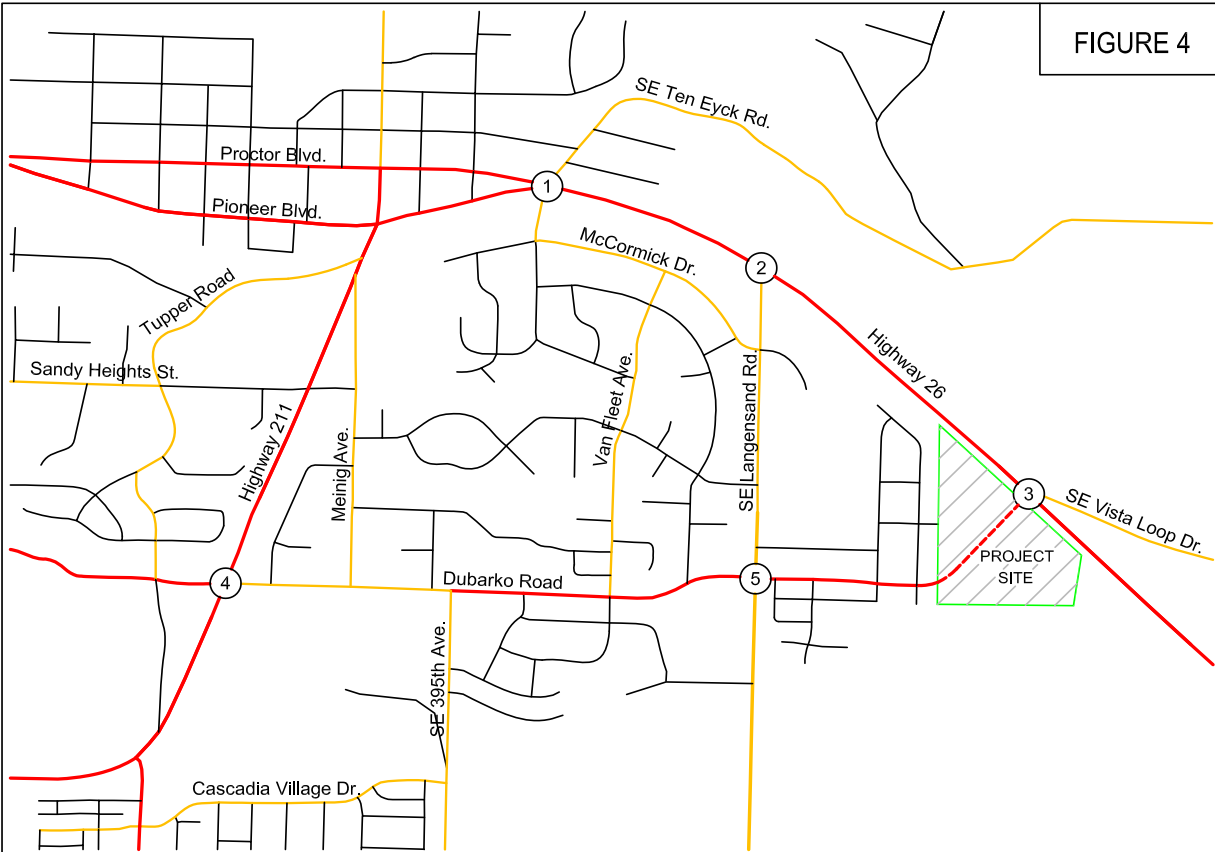
FIGURE 2



**TRAFFIC VOLUMES**  
 2020 Existing 30th-Highest Hour (August) Conditions  
 Morning and Evening Peak Hours

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FIGURE 4



**TRAFFIC VOLUMES**  
 2022 Background Conditions  
 Morning and Evening Peak Hours

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑			
Traffic Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0		
Future Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0		
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750		
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5			
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00			
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00			
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00			
Frt		1.00	0.85					1.00	0.85	1.00	1.00			
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00			
Satd. Flow (prot)		2664	1154					1500	1245	1354	1432			
Flt Permitted		1.00	1.00					1.00	1.00	0.40	1.00			
Satd. Flow (perm)		2664	1154					1500	1245	573	1432			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		
Adj. Flow (vph)	43	777	144	0	0	0	0	253	141	11	73	0		
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	109	0	0	0		
Lane Group Flow (vph)	0	820	105	0	0	0	0	253	32	11	73	0		
Confl. Peds. (#/hr)	3		6						8	5				
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%		
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA			
Protected Phases		2						4			8			
Permitted Phases	2		2						4	8				
Actuated Green, G (s)		60.4	60.4					20.6	20.6	20.6	20.6			
Effective Green, g (s)		60.4	60.4					20.6	20.6	20.6	20.6			
Actuated g/C Ratio		0.67	0.67					0.23	0.23	0.23	0.23			
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5			
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)		1787	774					343	284	131	327			
v/s Ratio Prot								c0.17			0.05			
v/s Ratio Perm		0.31	0.09						0.03	0.02				
v/c Ratio		0.46	0.14					0.74	0.11	0.08	0.22			
Uniform Delay, d1		7.0	5.4					32.2	27.5	27.3	28.2			
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.9	0.4					8.0	0.2	0.3	0.3			
Delay (s)		7.9	5.7					40.2	27.7	27.6	28.5			
Level of Service		A	A					D	C	C	C			
Approach Delay (s)		7.6			0.0			35.7			28.4			
Approach LOS		A			A			D			C			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			16.5									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.53											
Actuated Cycle Length (s)			90.0								9.0		Sum of lost time (s)	
Intersection Capacity Utilization			52.6%										ICU Level of Service	A
Analysis Period (min)			15											

c Critical Lane Group



HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Future Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	43	777	0				0	253	141	11	73	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	97	1845					0	303	252	110	291	0
Arrive On Green	0.70	0.70	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	139	2638	1210				0	1514	1257	763	1452	0
Grp Volume(v), veh/h	439	381	0				0	253	141	11	73	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1257	763	1452	0
Q Serve(g_s), s	12.1	10.6	0.0				0.0	14.4	9.1	1.3	3.8	0.0
Cycle Q Clear(g_c), s	12.1	10.6	0.0				0.0	14.4	9.1	15.7	3.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	994	949					0	303	252	110	291	0
V/C Ratio(X)	0.44	0.40					0.00	0.83	0.56	0.10	0.25	0.00
Avail Cap(c_a), veh/h	994	949					0	530	440	225	508	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.9	5.6	0.0				0.0	34.6	32.4	42.1	30.3	0.0
Incr Delay (d2), s/veh	1.4	1.3	0.0				0.0	6.0	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	2.9	0.0				0.0	5.6	2.8	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	6.9	0.0				0.0	40.5	34.4	42.5	30.7	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		820	A					394			84	
Approach Delay, s/veh		7.1						38.3			32.3	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		67.5		22.5				22.5				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		49.5		31.5				31.5				
Max Q Clear Time (g_c+I1), s		14.1		16.4				17.7				
Green Ext Time (p_c), s		6.5		1.6				0.3				

Intersection Summary		
HCM 6th Ctrl Delay		18.2
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Vol, veh/h	11	30	336	11	7	199
Future Vol, veh/h	11	30	336	11	7	199
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	365	12	8	216
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	609	377	0	0	380	
Stage 1	374	-	-	-	-	
Stage 2	235	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	458	670	-	-	1178	
Stage 1	696	-	-	-	-	
Stage 2	804	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	452	666	-	-	1175	
Mov Cap-2 Maneuver	452	-	-	-	-	
Stage 1	694	-	-	-	-	
Stage 2	795	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	11.6	0		0.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	591	1175	-	
HCM Lane V/C Ratio	-	-	0.075	0.006	-	
HCM Control Delay (s)	-	-	11.6	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	35	9	3	301	187	12
Future Vol, veh/h	35	9	3	301	187	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	327	203	13
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	547	214	218	0	-	0
Stage 1	212	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	498	826	1352	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	823	1349	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	724	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.3	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1349	-	539	-	-	
HCM Lane V/C Ratio	0.002	-	0.089	-	-	
HCM Control Delay (s)	7.7	0	12.3	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Scenario 1 The Pad 12:41 pm 08/11/2020 2020 Existing AM Peak Hour  
MTA

Synchro 11 Light Report  
Page 4

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑		
Traffic Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0	
Future Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.36	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	537	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	76	1370	287	0	0	0	0	239	133	22	147	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	53	0	0	0	
Lane Group Flow (vph)	0	1446	246	0	0	0	0	239	80	22	147	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		79.1	79.1					21.9	21.9	21.9	21.9		
Effective Green, g (s)		79.1	79.1					21.9	21.9	21.9	21.9		
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2082	898					307	254	106	298		
v/s Ratio Prot								0.15			0.10		
v/s Ratio Perm		0.50	0.20						0.06	0.04			
v/c Ratio		0.69	0.27					0.78	0.32	0.21	0.49		
Uniform Delay, d1		8.7	5.4					41.8	37.6	36.8	39.1		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.9	0.8					11.8	0.7	1.0	1.3		
Delay (s)		10.6	6.2					53.5	38.4	37.8	40.4		
Level of Service		B	A					D	D	D	D		
Approach Delay (s)		9.9			0.0			48.1			40.1		
Approach LOS		A			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			18.4									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			74.0%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Future Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	76	1370	0				0	239	133	22	147	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	109	2053					0	303	252	105	296	0
Arrive On Green	0.72	0.72	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1287	815	1514	0
Grp Volume(v), veh/h	774	672	0				0	239	133	22	147	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1287	815	1514	0
Q Serve(g_s), s	31.2	26.0	0.0				0.0	16.1	10.2	2.9	9.5	0.0
Cycle Q Clear(g_c), s	31.2	26.0	0.0				0.0	16.1	10.2	19.0	9.5	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1106	1056					0	303	252	105	296	0
V/C Ratio(X)	0.70	0.64					0.00	0.79	0.53	0.21	0.50	0.00
Avail Cap(c_a), veh/h	1106	1056					0	402	333	157	392	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	7.8	0.0				0.0	42.1	39.7	51.1	39.4	0.0
Incr Delay (d2), s/veh	3.7	2.9	0.0				0.0	7.5	1.7	1.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	8.1	0.0				0.0	6.6	3.3	0.6	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	10.8	0.0				0.0	49.6	41.4	52.1	40.7	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1446	A					372			169	
Approach Delay, s/veh		11.6						46.6			42.2	
Approach LOS		B						D			D	
Timer - Assigned Phs		2	4					8				
Phs Duration (G+Y+Rc), s		84.0	26.0					26.0				
Change Period (Y+Rc), s		4.5	4.5					4.5				
Max Green Setting (Gmax), s		72.5	28.5					28.5				
Max Q Clear Time (g_c+I1), s		33.2	18.1					21.0				
Green Ext Time (p_c), s		15.4	1.2					0.5				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			20.7									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	6	15	335	4	4	404
Future Vol, veh/h	6	15	335	4	4	404
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	356	4	4	430
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	802	364	0	0	363	0
Stage 1	361	-	-	-	-	-
Stage 2	441	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	353	681	-	-	1196	-
Stage 1	705	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	349	677	-	-	1193	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	703	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	534	1193	-	
HCM Lane V/C Ratio	-	-	0.042	0.004	-	
HCM Control Delay (s)	-	-	12	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Scenario 2 The Pad 1:20 pm 08/11/2020 2020 Existing PM Peak Hour  
MTA

Synchro 11 Light Report  
Page 3

HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	23	6	9	312	356	48
Future Vol, veh/h	23	6	9	312	356	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	332	379	51
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	761	409	432	0	-	0
Stage 1	407	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	373	642	1128	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	640	1126	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	14.7	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1126	-	403	-	-	
HCM Lane V/C Ratio	0.009	-	0.077	-	-	
HCM Control Delay (s)	8.2	0	14.7	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Scenario 2 The Pad 1:20 pm 08/11/2020 2020 Existing PM Peak Hour  
MTA

Synchro 11 Light Report  
Page 4

# Trip Generation Calculation Worksheet



Land Use Description: Multi-Family Housing (Low-Rise)  
 ITE Land Use Code: 220  
 Independent Variable: Dwelling Units  
 Quantity: 12 Dwelling Units

## Summary of ITE Trip Generation Data

### **AM Peak Hour of Adjacent Street Traffic**

Trip Rate: 0.46 trips per dwelling unit  
 Directional Distribution: 23% Entering 77% Exiting

### **PM Peak Hour of Adjacent Street Traffic**

Trip Rate: 0.56 trips per dwelling unit  
 Directional Distribution: 63% Entering 37% Exiting

### **Total Weekday Traffic**

Trip Rate: 7.32 trips per dwelling unit  
 Directional Distribution: 50% Entering 50% Exiting

## Site Trip Generation Calculations

12 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	5	6
PM Peak Hour	4	3	7
Weekday	44	44	88

Data Source: *Trip Generation Manual, 10th Edition*, Institute of Transportation Engineers, 2017



HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↔↑	0	0	0	0	↑	↔↑	↔↑	↑	0
Traffic Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0
Future Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432	
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00	
Satd. Flow (perm)		2664	1154					1500	1245	548	1432	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	45	825	152	0	0	0	0	272	152	12	76	0
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	107	0	0	0
Lane Group Flow (vph)	0	870	113	0	0	0	0	272	45	12	76	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		59.2	59.2					21.8	21.8	21.8	21.8	
Effective Green, g (s)		59.2	59.2					21.8	21.8	21.8	21.8	
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1752	759					363	301	132	346	
v/s Ratio Prot								c0.18			0.05	
v/s Ratio Perm		0.33	0.10						0.04	0.02		
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22	
Uniform Delay, d1		7.8	5.8					31.6	26.8	26.4	27.3	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	0.4					8.2	0.2	0.3	0.3	
Delay (s)		8.8	6.3					39.8	27.0	26.7	27.6	
Level of Service		A	A					D	C	C	C	
Approach Delay (s)		8.5			0.0			35.2			27.5	
Approach LOS		A			A			D			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			16.9									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			90.0							9.0		Sum of lost time (s)
Intersection Capacity Utilization			54.7%									ICU Level of Service A
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Future Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	272	152	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1812					0	323	269	111	310	0
Arrive On Green	0.69	0.69	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	745	1452	0
Grp Volume(v), veh/h	466	404	0				0	272	152	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	745	1452	0
Q Serve(g_s), s	13.8	12.0	0.0				0.0	15.5	9.7	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.0	0.0				0.0	15.5	9.7	16.9	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	975	931					0	323	269	111	310	0
V/C Ratio(X)	0.48	0.43					0.00	0.84	0.57	0.11	0.24	0.00
Avail Cap(c_a), veh/h	975	931					0	547	455	221	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.6	6.3	0.0				0.0	33.9	31.6	42.0	29.4	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.4	0.0				0.0	5.9	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	7.8	0.0				0.0	39.8	33.5	42.5	29.8	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					424			88	
Approach Delay, s/veh		8.0						37.5			31.5	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.3		23.7				23.7				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.5				18.9				
Green Ext Time (p_c), s		6.9		1.7				0.3				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			B									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Vol, veh/h	11	30	364	11	7	209
Future Vol, veh/h	11	30	364	11	7	209
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	396	12	8	227

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	651	408	0	0	411
Stage 1	405	-	-	-	-
Stage 2	246	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	433	643	-	-	1148
Stage 1	673	-	-	-	-
Stage 2	795	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	427	639	-	-	1145
Mov Cap-2 Maneuver	427	-	-	-	-
Stage 1	671	-	-	-	-
Stage 2	786	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	564	1145
HCM Lane V/C Ratio	-	-	0.079	0.007
HCM Control Delay (s)	-	-	11.9	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	35	9	3	329	197	12
Future Vol, veh/h	35	9	3	329	197	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	358	214	13
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	589	225	229	0	-	0
Stage 1	223	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	471	814	1339	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	468	811	1336	-	-	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	701	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.8	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1336	-	512	-	-	
HCM Lane V/C Ratio	0.002	-	0.093	-	-	
HCM Control Delay (s)	7.7	0	12.8	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑		
Traffic Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0	
Future Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	505	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	83	1496	301	0	0	0	0	252	139	24	154	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	260	0	0	0	0	252	97	24	154	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.7	78.7					22.3	22.3	22.3	22.3		
Effective Green, g (s)		78.7	78.7					22.3	22.3	22.3	22.3		
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2071	894					313	259	102	304		
v/s Ratio Prot								c0.16			0.10		
v/s Ratio Perm		0.55	0.21						0.08	0.05			
v/c Ratio		0.76	0.29					0.81	0.37	0.24	0.51		
Uniform Delay, d1		9.8	5.6					41.8	37.8	36.7	39.0		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					13.9	0.9	1.2	1.3		
Delay (s)		12.5	6.4					55.7	38.7	37.9	40.3		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.5			0.0			49.7			40.0		
Approach LOS		B			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			19.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			80.1%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Future Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	252	139	24	154	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2026					0	318	265	106	311	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	802	1514	0
Grp Volume(v), veh/h	846	733	0				0	252	139	24	154	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	802	1514	0
Q Serve(g_s), s	39.0	31.8	0.0				0.0	17.0	10.6	3.2	9.9	0.0
Cycle Q Clear(g_c), s	39.0	31.8	0.0				0.0	17.0	10.6	20.2	9.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1091	1042					0	318	265	106	311	0
V/C Ratio(X)	0.78	0.70					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1091	1042					0	388	322	142	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.1	9.1	0.0				0.0	41.5	38.9	51.1	38.7	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	8.9	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	10.1	0.0				0.0	7.1	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	13.1	0.0				0.0	50.3	40.5	52.1	39.9	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					391			178	
Approach Delay, s/veh		14.4						46.9			41.5	
Approach LOS		B						D			D	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.9		27.1				27.1				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.0		19.0				22.2				
Green Ext Time (p_c), s		16.4		1.2				0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			22.6									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	6	15	353	4	4	424
Future Vol, veh/h	6	15	353	4	4	424
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	376	4	4	451
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	843	384	0	0	383	
Stage 1	381	-	-	-	-	
Stage 2	462	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	334	664	-	-	1175	
Stage 1	691	-	-	-	-	
Stage 2	634	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	330	660	-	-	1172	
Mov Cap-2 Maneuver	330	-	-	-	-	
Stage 1	689	-	-	-	-	
Stage 2	629	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	12.3	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	513	1172	-	
HCM Lane V/C Ratio	-	-	0.044	0.004	-	
HCM Control Delay (s)	-	-	12.3	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	23	6	9	330	376	48
Future Vol, veh/h	23	6	9	330	376	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	351	400	51
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	801	430	453	0	0	
Stage 1	428	-	-	-	-	
Stage 2	373	-	-	-	-	
Critical Hdwy	6.42	6.22	4.12	-	-	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	2.218	-	-	
Pot Cap-1 Maneuver	354	625	1108	-	-	
Stage 1	657	-	-	-	-	
Stage 2	696	-	-	-	-	
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	349	623	1106	-	-	
Mov Cap-2 Maneuver	349	-	-	-	-	
Stage 1	648	-	-	-	-	
Stage 2	695	-	-	-	-	
Approach	EB	NB		SB		
HCM Control Delay, s	15.2	0.2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1106	-	384	-	-	
HCM Lane V/C Ratio	0.009	-	0.08	-	-	
HCM Control Delay (s)	8.3	0	15.2	-	-	
HCM Lane LOS	A	A	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	



HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↑					↑	↔↑	↔↑	↑		
Traffic Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0	
Future Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	545	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	45	825	153	0	0	0	0	275	153	12	76	0	
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	107	0	0	0	
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	46	12	76	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		59.0	59.0					22.0	22.0	22.0	22.0		
Effective Green, g (s)		59.0	59.0					22.0	22.0	22.0	22.0		
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1746	756					366	304	133	350		
v/s Ratio Prot								c0.18			0.05		
v/s Ratio Perm		0.33	0.10						0.04	0.02			
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22		
Uniform Delay, d1		7.9	5.9					31.5	26.7	26.3	27.1		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.0	0.4					8.4	0.2	0.3	0.3		
Delay (s)		8.9	6.3					39.9	26.9	26.6	27.4		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		8.6			0.0			35.3			27.3		
Approach LOS		A			A			D			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			17.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			54.7%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↔↑					↑	↔↑	↔↑	↑	
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	153	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1806					0	326	271	111	313	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	742	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	153	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	742	1452	0
Q Serve(g_s), s	13.8	12.1	0.0				0.0	15.7	9.8	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.1	0.0				0.0	15.7	9.8	17.1	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	972	928					0	326	271	111	313	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.56	0.11	0.24	0.00
Avail Cap(c_a), veh/h	972	928					0	547	455	219	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.5	42.0	29.2	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	6.0	1.8	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.8	33.3	42.4	29.6	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					428			88	
Approach Delay, s/veh		8.1						37.5			31.4	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.1		23.9				23.9				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.7				0.3				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			18.7									
HCM 6th LOS			B									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Vol, veh/h	11	30	368	11	7	210
Future Vol, veh/h	11	30	368	11	7	210
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	400	12	8	228
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	656	412	0	0	415	
Stage 1	409	-	-	-	-	
Stage 2	247	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	430	640	-	-	1144	
Stage 1	671	-	-	-	-	
Stage 2	794	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	424	636	-	-	1141	
Mov Cap-2 Maneuver	424	-	-	-	-	
Stage 1	669	-	-	-	-	
Stage 2	785	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	12	0		0.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	561	1141	-	
HCM Lane V/C Ratio	-	-	0.079	0.007	-	
HCM Control Delay (s)	-	-	12	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Future Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	38	0	10	1	0	4	3	358	0	1	214	13
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	593	589	225	594	595	360	229	0	0	358	0	0
Stage 1	225	225	-	364	364	-	-	-	-	-	-	-
Stage 2	368	364	-	230	231	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	417	421	814	417	417	684	1339	-	-	1201	-	-
Stage 1	778	718	-	655	624	-	-	-	-	-	-	-
Stage 2	652	624	-	773	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	412	418	811	410	414	683	1336	-	-	1201	-	-
Mov Cap-2 Maneuver	412	418	-	410	414	-	-	-	-	-	-	-
Stage 1	774	716	-	653	622	-	-	-	-	-	-	-
Stage 2	645	622	-	761	711	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	13.8	11			0.1			0				
HCM LOS	B	B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1336	-	-	458	603	1201	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.104	0.009	0.001	-	-				
HCM Control Delay (s)	7.7	0	-	13.8	11	8	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-				

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑		
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0	
Future Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	502	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	83	1496	303	0	0	0	0	254	140	24	155	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	98	24	155	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2069	893					314	260	102	305		
v/s Ratio Prot								c0.16			0.10		
v/s Ratio Perm		0.55	0.21						0.08	0.05			
v/c Ratio		0.76	0.29					0.81	0.38	0.24	0.51		
Uniform Delay, d1		9.9	5.7					41.8	37.8	36.6	38.9		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					14.2	0.9	1.2	1.3		
Delay (s)		12.6	6.5					55.9	38.7	37.8	40.2		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.6			0.0			49.8			39.9		
Approach LOS		B			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			19.8									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			80.2%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	140	24	155	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2022					0	320	266	106	313	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	800	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	140	24	155	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	800	1514	0
Q Serve(g_s), s	39.2	32.0	0.0				0.0	17.1	10.6	3.2	10.0	0.0
Cycle Q Clear(g_c), s	39.2	32.0	0.0				0.0	17.1	10.6	20.3	10.0	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1089	1040					0	320	266	106	313	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1089	1040					0	388	322	141	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.2	9.2	0.0				0.0	41.4	38.8	51.1	38.6	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	9.0	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.3	10.2	0.0				0.0	7.2	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.2	0.0				0.0	50.4	40.5	52.1	39.8	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					394			179	
Approach Delay, s/veh		14.5						46.9			41.4	
Approach LOS		B						D			D	
Timer - Assigned Phs		2	4					8				
Phs Duration (G+Y+Rc), s		82.8	27.2					27.2				
Change Period (Y+Rc), s		4.5	4.5					4.5				
Max Green Setting (Gmax), s		73.5	27.5					27.5				
Max Q Clear Time (g_c+I1), s		41.2	19.1					22.3				
Green Ext Time (p_c), s		16.3	1.2					0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			22.7									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T		T	
Traffic Vol, veh/h	6	15	356	4	4	427
Future Vol, veh/h	6	15	356	4	4	427
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	379	4	4	454
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	849	387	0	0	386	
Stage 1	384	-	-	-	-	
Stage 2	465	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	331	661	-	-	1172	
Stage 1	688	-	-	-	-	
Stage 2	632	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	327	657	-	-	1169	
Mov Cap-2 Maneuver	327	-	-	-	-	
Stage 1	686	-	-	-	-	
Stage 2	627	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	12.4	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	510	1169	-	
HCM Lane V/C Ratio	-	-	0.044	0.004	-	
HCM Control Delay (s)	-	-	12.4	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Future Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	24	0	6	0	0	3	10	351	1	3	400	51
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	809	806	430	809	831	354	453	0	0	352	0	0
Stage 1	434	434	-	372	372	-	-	-	-	-	-	-
Stage 2	375	372	-	437	459	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	299	316	625	299	305	690	1108	-	-	1207	-	-
Stage 1	600	581	-	648	619	-	-	-	-	-	-	-
Stage 2	646	619	-	598	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	293	311	623	292	300	689	1106	-	-	1207	-	-
Mov Cap-2 Maneuver	293	311	-	292	300	-	-	-	-	-	-	-
Stage 1	592	578	-	641	612	-	-	-	-	-	-	-
Stage 2	635	612	-	589	563	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	17.1	10.3			0.2			0.1				
HCM LOS	C	B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1106	-	-	329	689	1207	-	-				
HCM Lane V/C Ratio	0.009	-	-	0.094	0.005	0.003	-	-				
HCM Control Delay (s)	8.3	0	-	17.1	10.3	8	0	-				
HCM Lane LOS	A	A	-	C	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-				



HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↔↑	↔↑					↑	↔↑	↔↑	↑			
Traffic Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0		
Future Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0		
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750		
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5			
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00			
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00			
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00			
Frt		1.00	0.85					1.00	0.85	1.00	1.00			
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00			
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432			
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00			
Satd. Flow (perm)		2664	1154					1500	1245	547	1432			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		
Adj. Flow (vph)	45	825	153	0	0	0	0	275	169	12	92	0		
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	106	0	0	0		
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	63	12	92	0		
Confl. Peds. (#/hr)	3		6						8	5				
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%		
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA			
Protected Phases		2						4			8			
Permitted Phases	2		2						4	8				
Actuated Green, G (s)		58.9	58.9					22.1	22.1	22.1	22.1			
Effective Green, g (s)		58.9	58.9					22.1	22.1	22.1	22.1			
Actuated g/C Ratio		0.65	0.65					0.25	0.25	0.25	0.25			
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5			
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)		1743	755					368	305	134	351			
v/s Ratio Prot								c0.18			0.06			
v/s Ratio Perm		0.33	0.10						0.05	0.02				
v/c Ratio		0.50	0.15					0.75	0.21	0.09	0.26			
Uniform Delay, d1		8.0	6.0					31.4	27.0	26.2	27.4			
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00			
Incremental Delay, d2		1.0	0.4					8.1	0.3	0.3	0.4			
Delay (s)		9.0	6.4					39.4	27.3	26.5	27.8			
Level of Service		A	A					D	C	C	C			
Approach Delay (s)		8.6			0.0			34.8			27.6			
Approach LOS		A			A			C			C			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			17.3									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.57											
Actuated Cycle Length (s)			90.0							9.0			Sum of lost time (s)	
Intersection Capacity Utilization			55.6%										ICU Level of Service	B
Analysis Period (min)			15											

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	169	12	92	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1804					0	328	273	111	314	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	731	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	169	12	92	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	731	1452	0
Q Serve(g_s), s	13.9	12.1	0.0				0.0	15.7	10.9	1.4	4.8	0.0
Cycle Q Clear(g_c), s	13.9	12.1	0.0				0.0	15.7	10.9	17.1	4.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	971	927					0	328	273	111	314	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.62	0.11	0.29	0.00
Avail Cap(c_a), veh/h	971	927					0	547	455	217	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.9	41.9	29.5	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	2.3	0.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.3	0.3	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.6	34.2	42.4	30.0	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					444			104	
Approach Delay, s/veh		8.2						37.6			31.4	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.0		24.0				24.0				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.9		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.8				0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			19.1									
HCM 6th LOS			B									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	41	372	18	0	232
Future Vol, veh/h	0	41	372	18	0	232
Conflicting Peds, #/hr	0	3	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	0	45	404	20	0	252
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	420	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.22	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.318	-	-	-	
Pot Cap-1 Maneuver	0	633	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	-	629	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	11.2	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT			
Capacity (veh/h)	-	-	629			
HCM Lane V/C Ratio	-	-	0.071			
HCM Control Delay (s)	-	-	11.2			
HCM Lane LOS	-	-	B			
HCM 95th %tile Q(veh)	-	-	0.2			

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↘			↘	
Traffic Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Future Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	48	0	0	5	0	407	1	0	224	16

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	-	-	236	-	-	408	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	803	0	0	643	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	-	-	800	-	-	643	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	10.6	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	800	643	-	-
HCM Lane V/C Ratio	-	-	0.06	0.008	-	-
HCM Control Delay (s)	-	-	9.8	10.6	-	-
HCM Lane LOS	-	-	A	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑		
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0	
Future Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	502	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	83	1496	303	0	0	0	0	254	156	24	171	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	114	24	171	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2069	893					314	260	102	305		
v/s Ratio Prot								c0.16			0.11		
v/s Ratio Perm		0.55	0.21						0.09	0.05			
v/c Ratio		0.76	0.29					0.81	0.44	0.24	0.56		
Uniform Delay, d1		9.9	5.7					41.8	38.3	36.6	39.4		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					14.2	1.2	1.2	2.4		
Delay (s)		12.6	6.5					55.9	39.5	37.8	41.7		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.6			0.0			49.7			41.2		
Approach LOS		B			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			20.2									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			80.2%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	156	24	171	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2020					0	321	267	106	314	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1289	789	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	156	24	171	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1289	789	1514	0
Q Serve(g_s), s	39.3	32.0	0.0				0.0	17.1	12.0	3.3	11.1	0.0
Cycle Q Clear(g_c), s	39.3	32.0	0.0				0.0	17.1	12.0	20.4	11.1	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1088	1039					0	321	267	106	314	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.58	0.23	0.55	0.00
Avail Cap(c_a), veh/h	1088	1039					0	388	322	140	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.3	9.2	0.0				0.0	41.3	39.3	51.0	39.0	0.0
Incr Delay (d2), s/veh	5.5	4.0	0.0				0.0	8.9	2.0	1.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	10.3	0.0				0.0	7.1	3.9	0.7	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.3	0.0				0.0	50.2	41.3	52.0	40.4	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					410			195	
Approach Delay, s/veh		14.6						46.8			41.9	
Approach LOS		B						D			D	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.7		27.3				27.3				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.3		19.1				22.4				
Green Ext Time (p_c), s		16.3		1.2				0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			23.1									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	21	365	8	0	446
Future Vol, veh/h	0	21	365	8	0	446
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	0	22	388	9	0	474

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	399	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	651	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	647	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	647
HCM Lane V/C Ratio	-	-	0.035
HCM Control Delay (s)	-	-	10.8
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.1

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔			↔		↔			↔	
Traffic Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Future Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	31	0	0	3	0	389	4	0	407	61

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	-	-	442	-	-	391	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	615	0	0	658	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	613	-	-	658	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	10.5	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	613	658	-	-
HCM Lane V/C Ratio	-	-	0.05	0.005	-	-
HCM Control Delay (s)	-	-	11.2	10.5	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-



Queuing and Blocking Report  
 2022 Background Plus Site AM Peak Hour

08/12/2020

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	322	286	100	310	125	59	155
Average Queue (ft)	153	104	32	145	62	11	48
95th Queue (ft)	273	225	102	263	138	39	112
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				1			
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		7	0	17	0	0	2
Queuing Penalty (veh)		9	1	24	1	0	0

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	48	44	44
Average Queue (ft)	26	3	3
95th Queue (ft)	52	24	21
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	35	12	13
Average Queue (ft)	29	4	1	0
95th Queue (ft)	57	23	9	6
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 37

Queuing and Blocking Report  
 2022 Background Plus Site PM Peak Hour

08/12/2020

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	616	600	100	307	125	108	254
Average Queue (ft)	304	272	59	177	90	28	108
95th Queue (ft)	505	497	134	308	162	82	200
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)	1	1		1			0
Queuing Penalty (veh)	0	0		3			0
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		17	1	28	2	1	15
Queuing Penalty (veh)		49	6	37	4	1	3

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	44	69	48
Average Queue (ft)	15	5	3
95th Queue (ft)	42	36	25
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	34	83	36
Average Queue (ft)	23	3	7	1
95th Queue (ft)	52	20	41	13
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 103

CDS380  
 08/11/2020  
 OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
**PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**  
 1 - 5 of 10 Crash records shown.

SR#	P	R	J	S	M	D	E	D	CLAS	CITY	STRE	INT-T	INT-REL	OFFD	WTHR	CRASH	SPCL	MOVE	A	S	PH	INJ	G	E	LICNS	PED	CAUSE		
02013	N	N	N	N	05/02/2015	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	0	STRGHT	01	NONE	0	STRGHT	01	DRVR	NONE	00	Unk	Unk	Unk	026	000	000	00	
NONE					SA		PIONEER BLVD		0						DAY	PDO	UNKNOWN	N - S							026	000	000	00	
N					3P		017200100800		0						DAY	PDO									026	000	000	00	
N					45:23				0						DAY	PDO	02 NONE 0	STOP								000	011	000	00
N					46:7267279				0						DAY	PDO	PRVTE PSNGR CAR	N - S							000	000	000	00	
00025	N	N	N	N	01/03/2014	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	0	STRGHT	01	NONE	0	STRGHT	01	DRVR	NONE	00	Unk	Unk	Unk	045	000	000	00	
NONE					FR		PIONEER BLVD		0						DAY	PDO	PRVTE PSNGR CAR	S - N							000	000	000	00	
N					10A				0						DAY	PDO										000	000	000	00
N					45:23		017200100800		0						DAY	PDO	02 NONE 0	STOP								000	000	000	00
N					46:7267279				0						DAY	PDO	PRVTE PSNGR CAR	S - N							000	000	000	00	
03127	N	N	N	N	08/03/2015	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	0	STRGHT	01	NONE	0	STRGHT	01	DRVR	NONE	00	Unk	Unk	Unk	045	000	000	00	
NONE					NO		PIONEER BLVD		0						DAY	REAR	PRVTE PSNGR CAR	S - N							000	000	000	00	
N					12P				0						DAY	INJ										000	000	000	00
N					45:23		017200100800		0						DAY	INJ	02 NONE 0	STOP								000	011	000	00
N					45:23				0						DAY	INJ	PRVTE PSNGR CAR	S - N							000	000	000	00	
04757	N	N	N	N	10/14/2016	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	0	TURN-R	01	NONE	9	TURN-R	01	DRVR	NONE	00	Unk	Unk	Unk	100	000	000	00	
CITY					FR		PIONEER BLVD		1						DAY	PDO	N/A	N - S							000	000	000	00	
N					11P				1						DAY	PDO	PRVTE PSNGR CAR								000	000	000	00	
N					45:23		017200100800		1						DAY	PDO									000	000	000	00	
02544	N	N	N	N	06/27/2017	14	MEINIG AVE	CROSS	N	TRF SIGNAL	N	0	STRGHT	01	NONE	9	STRGHT	01	DRVR	NONE	00	Unk	Unk	Unk	000	000	000	00	
NONE					TU		PIONEER BLVD		1						DAY	PDO	N/A	NW-SE							000	000	000	00	
N					2P				1						DAY	PDO	PRVTE PSNGR CAR								000	000	000	00	
N					45:23		002600100800		1						DAY	PDO	02 NONE 9	STOP								000	011	000	00
N					45:23				1						DAY	PDO	N/A	NW-SE							000	000	000	00	
N					45:23				1						DAY	PDO	PRVTE PSNGR CAR								000	000	000	00	
N					45:23				1						DAY	PDO	01 DRVR	NONE	00	Unk	Unk	Unk	Unk	000	000	000	000	00	
N					45:23				1						DAY	PDO	01 DRVR	NONE	00	Unk	Unk	Unk	Unk	000	000	000	000	00	
N					45:23				1						DAY	PDO	01 DRVR	NONE	00	Unk	Unk	Unk	Unk	000	000	000	000	00	
N					45:23				1						DAY	PDO	01 DRVR	NONE	00	Unk	Unk	Unk	Unk	000	000	000	000	00	
N					45:23				1						DAY	PDO	01 DRVR	NONE	00	Unk	Unk	Unk	Unk	000	000	000	000	00	
N					45:23				1						DAY	PDO	01 DRVR	NONE	00	Unk	Unk	Unk	Unk	000	000	000	000	00	

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
**PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**  
 6 - 9 of 10 Crash records shown.

SR#	P	R	J	S	M	D	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE					
INVEST	E A I C O DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	TRLR QTY	RD DPT	E L G N H R TIME	FROM	SECOND STREET	DIRRECT	LOCIN	DRVY	LIGHT	SVRTY	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE	
UNLOC?	D C S V L K LAT	LONG	LES	INTER	CROSS	N	YIELD	N	WET	REAR	N/A	MM-SE	01	DRVR	NONE	00	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK
04274	N	N	N	10/10/2017	14	MEINIG AVE	INTER	SW	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
N	N	N	N	45 23 46.73	-122.15	PIONEER BLVD	SW	09	N	DAY	PSNGR CAR	01	DRVR	NONE	00	UNK <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td>	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	
N	N	N	N	45 23 46.73	-122.15	002600100800	SW	(02)	N	DAY	PSNGR CAR	02	NONE	0	STOP	011	000	000	000	000	000	000	000	000	000	000	
N	N	N	N	45 23 46.73	-122.15	35.13	PSNGR CAR																				
02787	N	N	N	07/11/2015	14	MEINIG AVE	INTER	W	N	CLR	S-1STOP	01	DRVR	NONE	0	STRGHT	01	DRVR	NONE	00	UNK <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td>	UNK	UNK	UNK	UNK	UNK	
N	N	N	N	45 23 46.73	-122.15	PIONEER BLVD	W	06	N	DAY	PSNGR CAR	01	DRVR	NONE	68	M	UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK</td> </td></td></td></td></td></td></td></td>	UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK</td> </td></td></td></td></td></td></td>	UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK</td> </td></td></td></td></td></td>	UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK</td> </td></td></td></td></td>	UNK <td>UNK <td>UNK <td>UNK <td>UNK <td>UNK</td> </td></td></td></td>	UNK <td>UNK <td>UNK <td>UNK <td>UNK</td> </td></td></td>	UNK <td>UNK <td>UNK <td>UNK</td> </td></td>	UNK <td>UNK <td>UNK</td> </td>	UNK <td>UNK</td>	UNK	
N	N	N	N	45 23 46.73	-122.15	002600100800	W	06	N	DAY	PSNGR CAR	02	NONE	0	STOP	011	000	000	000	000	000	000	000	000	000	000	
N	N	N	N	45 23 46.73	-122.15	35.13	PSNGR CAR																				
01847	N	N	N	04/22/2016	14	MEINIG AVE	INTER	W	N	CLR	S-1STOP	01	DRVR	NONE	0	STRGHT	01	DRVR	NONE	00	UNK <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td> <td>UNK</td>	UNK	UNK	UNK	UNK	UNK	
N	N	N	N	45 23 46.73	-122.15	PIONEER BLVD	W	05	N	DAY	PSNGR CAR	01	DRVR	NONE	45	M	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td></td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td>	OR-Y <td>OR-Y <td>OR-Y</td> </td>	OR-Y <td>OR-Y</td>	OR-Y	
N	N	N	N	45 23 46.73	-122.15	002600100800	W	05	N	DAY	PSNGR CAR	02	NONE	0	STOP	011	000	000	000	000	000	000	000	000	000	000	
N	N	N	N	45 23 46.73	-122.15	35.13	PSNGR CAR																				
04316	N	N	N	10/20/2015	14	MEINIG AVE	INTER	CN	N	CLD	ANGL-OTH	01	DRVR	NONE	0	STRGHT	01	DRVR	NONE	22	M	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td>	OR-Y <td>OR-Y <td>OR-Y</td> </td>	OR-Y <td>OR-Y</td>	OR-Y	
N	N	N	N	45 23 46.73	-122.15	PIONEER BLVD	CN	03	N	DRY	ANGL	PRVTE	01	DRVR	NONE	44	M	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td>	OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td>	OR-Y <td>OR-Y</td> <td>OR-Y</td>	OR-Y	OR-Y	
N	N	N	N	45 23 46.73	-122.15	002600100800	CN	03	N	DRY	ANGL	PSNGR CAR	02	PSNG	INJC	13	F	000	000	000	000	000	000	000	000	000	
N	N	N	N	45 23 46.73	-122.15	35.13	PSNGR CAR																				
03085	N	N	N	07/08/2016	14	MEINIG AVE	INTER	CN	N	CLR	ANGL-OTH	01	DRVR	NONE	0	STRGHT	01	DRVR	NONE	44	F	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> </td></td>	OR-Y <td>OR-Y <td>OR-Y</td> </td>	OR-Y <td>OR-Y</td>	OR-Y	
N	N	N	N	45 23 46.73	-122.15	PIONEER BLVD	CN	01	N	DAY	ANGL	PRVTE	01	DRVR	NONE	51	F	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td></td>	OR-Y <td>OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td></td>	OR-Y <td>OR-Y <td>OR-Y</td> <td>OR-Y</td> </td>	OR-Y <td>OR-Y</td> <td>OR-Y</td>	OR-Y	OR-Y	
N	N	N	N	45 23 46.73	-122.15	002600100800	CN	01	N	DAY	ANGL	PSNGR CAR	02	PSNG	INJC	13	F	000	000	000	000	000	000	000	000	000	
N	N	N	N	45 23 46.73	-122.15	35.13	PSNGR CAR																				

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
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 URBAN NON-SYSTEM CRASH LISTING

PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018  
 10 - 10 of 10 Crash records shown.

CDS380  
 08/11/2020

CITY OF SANDY, CLACKAMAS COUNTY

SR#	INVEST	RD DPT	UNLOC?	D C S V L K LAT	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE		
	E A U I C O DAY	FIRST STREET	DIRECT		DIST	FIRST STREET	DIRCT	(MEDIAN)	INT-REL	RNDFT	SURF	COLL	TRLR QTY	FROM								
		SECOND STREET	LOCIN		FROM	LEG	LOCIN	LEGS	TRAF-	DRVWY	LIGHT	SVRTY	OWNER	TO								
		LONG			LONG			(LANES)	CONTL				V# TYPE	STRGHT								
													02 NONE	0	01	DRVR	INJB	51 F	OR-Y	000	00	
													PRVTE	N -S							04	
													PSNGR CAR								000	04
																					000	04
																					020	04

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 URBAN NON-SYSTEM CRASH LISTING  
**PIONEER BLVD at EAGLE CRK-SANDY HY, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**

CDS380  
 08/11/2020  
 CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DPT	UNLOC?	D M	P R J S M DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
	E A I C O DAY	DIST	FROM	LONG	FIRST STREET	DIRRECT	RD CHAR	(MEDIAN)	LEGS	TRAF-	RNDFT	SURF	COLL	TRLR QTY	FROM		INJ				
					SECOND STREET	LOCIN		(LANES)	CONTL		DRVWY	LIGHT	SVRTY	V# TYPE	TO						

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 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
**EAGLE CREEK-SANDY HY at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**

CDS380  
 08/11/2020  
 CITY OF SANDY, CLACKAMAS COUNTY

SR#	INVEST	RD DPT	UNLOC?	DM	P R J S M DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
	E A U I C O DAY	RD DPT				DIST	FIRST STREET	DIRECT	(MEDIAN)		RNDST	SURF	COLL	TRLR QTY	FROM						
		LONG	LES			FROM	SECOND STREET	LOCIN	LEGS	TRAF-	DRVWY	LIGHT	SVRTY	V# TYPE	TO						
									(LANES)	CONTL											

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
**MEINIG AVE at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**

CDS380  
 08/11/2020  
 CITY OF SANDY, CLACKAMAS COUNTY

SR#	INVEST	RD DPT	UNLOC?	CLASS	DIST	FROM	LONG	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	TRLR	QTY	MOVE	PH	TYPE	SVRTY	E	X	RES	LOC	ACT	EVENT	CAUSE

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submission of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.



## Right-Turn Lane Warrant Analysis (ODOT Methodology)



Project Name: The Pad Residential Development  
 Approach: Southbound Highway 211 at Tupper Road  
 Scenario: 2022 Background Plus Site Trips (RIRO)

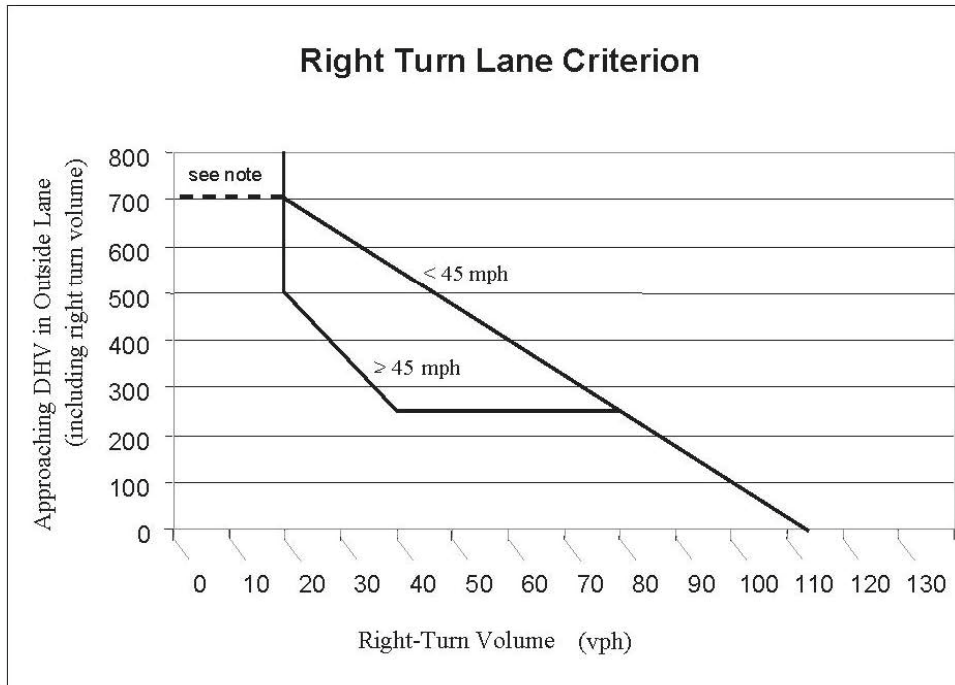
Major-Street Design Speed: 40 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	15	54
Approaching DVH in Outside Lane:	221	437
Calculated Turn Volume Threshold:	84	55
Right Turn Volume Exceeds Threshold?	<b>NO</b>	<b>NO</b>

### Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria are determined using the curve in Exhibit 7-2.

### **Exhibit 7-2 Right Turn Lane Criterion**



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

**Stopping Sight Distance**

Design Speed 20 mph  
 Reaction Time 2.5 seconds  
 Acceleration 11.2 ft/sec<sup>2</sup>  
 Grade (percent) -6.00%

**Distance 119.8 feet****Reaction Distance**

Travel Speed  
 Travel Speed  
 Reaction Time

**Reaction Distance**

20 mph  
 29.4 fps  
 2.5 seconds

**73.5 feet****Braking Distance**

Travel Speed  
 Acceleration  
 Grade (percent)

**Braking Distance**

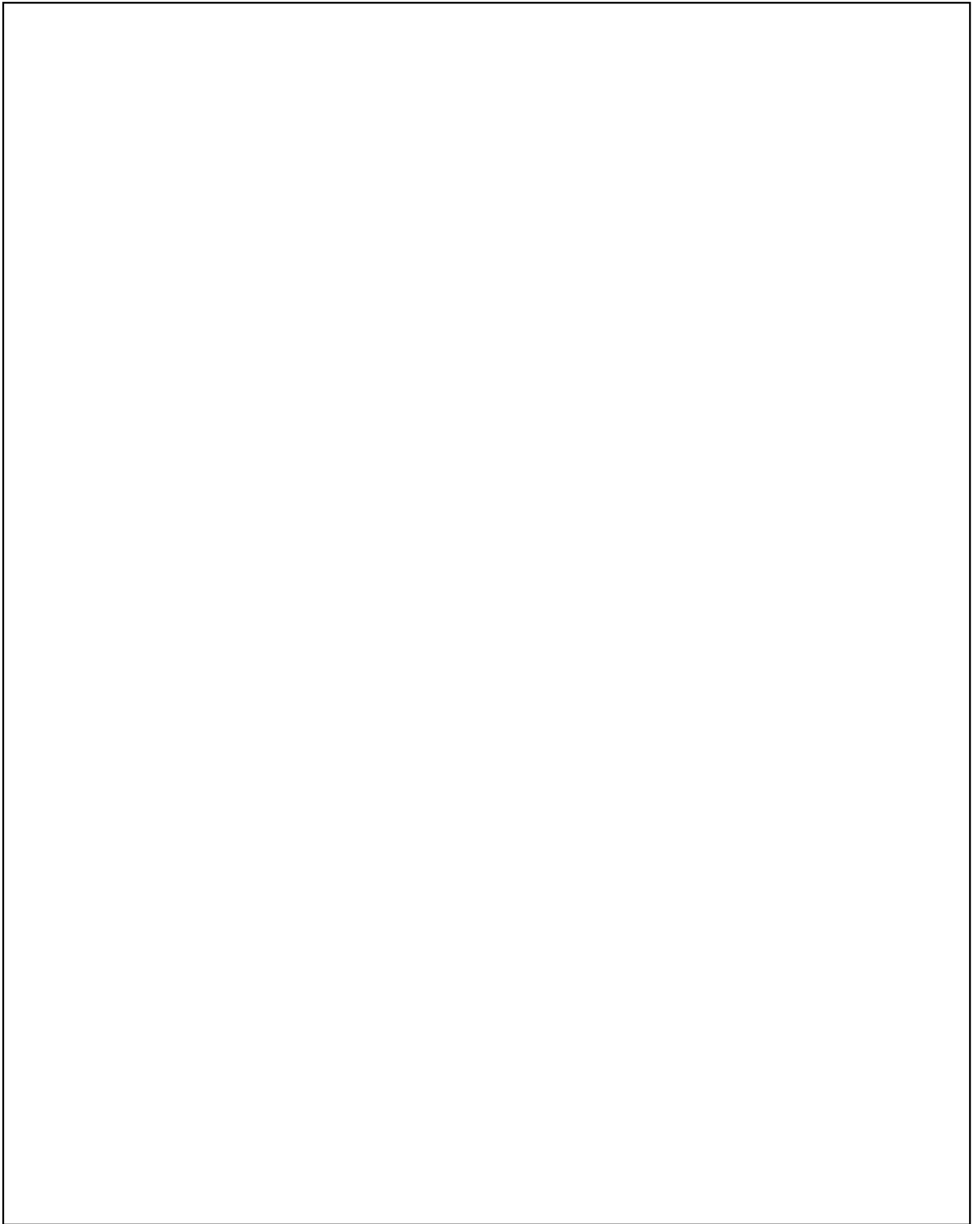
20 mph  
 11.2 ft/sec<sup>2</sup>  
 -6.00%

**46.3 feet**

For standard roadways >400 ADT, use 2.5 seconds perception/reaction time and 11.2 ft/sec<sup>2</sup> deceleration.  
 (95th percentile reaction time and 10th percentile deceleration)

For VLV roadways < 400 ADT, use 2.0 seconds perception/reaction time and 13.4 ft/sec<sup>2</sup> deceleration.  
 (90th percentile reaction time and 50th percentile deceleration)

**EXHIBIT I – INITIAL ARBORIST REPORT**





# Portland Tree Consultancy

Lou Phemister  
ASCA Registered Consulting Arborist #590  
(573) 999-3886 / louphemister@outlook.com

## INITIAL ARBORIST REPORT

### Tree Inventory & Condition Assessment

DATE: 12.27.2020  
PROPERTY ADDRESS: 17650 Meining Ave, Sandy, OR 97055  
CLIENT REFERENCE: Axis Design Group  
PROJECT DESCRIPTION: Tree Inventory and Condition Assessment  
for The Pad, a proposed residential development

#### Introduction

An inventory of all trees 11-inches DBH and larger over was completed on the project site detailed in Figures 1a and 1b and on adjacent trees that could be influenced by development on the project site. Trees affected by excavation for utility lines are also inventoried and their location detailed in Figure 1c. The trees within the project site were tagged with numbered aluminum discs whose numbers correspond to the ID column in the inventory table. The inventory was completed on December 24th, 2020.

#### Regulated Trees. Chapter 17.102 City Code

Only trees 11-inches DBH and over are regulated by the ordinance. There are 19 trees meeting that threshold on the property: Trees (2801, 2813, 2814, 2823, 2825, 2827, 2828, 2846, 2851, 2866, 2876, 2880, 2882, 2895, 2898, 3601, 3602, 3603, 3604). Of these, one tree is dying, and two are Invasive non-native species.

#### Tree Retention & Protection Requirements. Chapter 17.102.50

Three trees 11-inches DBH and larger are required to be retained on site. If possible, two of the three must be conifers.

### **Notes on Value of Trees & Tree Protection**

There are four high value conifers along the edges of the property that can be expected to survive construction impacts if protected appropriately:

*Tree 2823* is a very large multi-stem Western red cedar. The tree has a crown radius of around 20-ft and, if preserved, it is recommended that a tree protection area of at least 20-ft is established around the tree.

*Tree 2898* is a good quality Shore pine with no low branches and this tree could be preserved with a recommended tree protection area of 10-ft radius.

*Tree 2828* is a mature Ponderosa pine that has been badly pruned but is in otherwise good condition. The recommended minimum distance to excavation and fill should be 15-ft.

*Tree 2846* is a Douglas fir in early maturity. It has a low spreading crown and is in very good condition. Again, a tree protection area radius of 15-ft would be the minimum recommended for protecting this tree.

- a. The tree protection areas noted above should protect the tree from any disturbance including any excavation or fill. In certain situations small areas of excavation and fill may be allowed nearer the tree if the total undisturbed area around the tree is made large enough.
- b. It should be noted that the City Code only requires a tree protection area of 10-ft from any preserved tree, but this will not be sufficient to protect most larger conifers.

### **Notes on Tree Protection for trees on adjacent land.**

One very large True fir exists adjacent to the east property line (T 29). This tree is set back from the property line slightly and will need a minimum tree protection area of 20-ft. The other trees adjacent to the east property line can be protected with a tree protection area of 10-ft.

There is a line of semi-mature Douglas fir trees adjacent to the south property line (Trees 13 to 18). Most of these trees are in good condition and all are semi-mature. The tree protection area for these trees should be 15-ft minimum distance. The branches of these trees are low over the property and extend at least 25-ft into the property, so careful pruning will be required.

**TREE INVENTORY TABLE (for Locations see Fig 1a, b and c)**

ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
2801	Big leaf maple <i>Acer macrophyllum</i>	19	Good	H	Early maturity. Narrow CR form, but good vitality and vigor	At E edge of small raised bank
2807	Japanese maple <i>Acer palmatum</i>	9	Good	M	Asymmetric CR heavily shaded. Codominant stem with wide angle at 4.5-ft	At edge of small raised bank
2813	European wild cherry <i>Prunus avium</i>	15	Fair	L	Heavily leaning stem, growing away from big leaf maple. INVASIVE NON NATIVE	Within E tree line
2814	European wild cherry <i>Prunus avium</i>	14	Fair	L	Straight stem lean, away from big leaf maples INVASIVE NON NATIVE	Within group of smaller trees. E property line
2822	English holly <i>Ilex aquifolium</i>	10	Good/Fair	L	Strong upright crown form, but heavily shaded by western red cedar INVASIVE NON NATIVE	Under red cedar canopy
2823	Western red cedar <i>Thuja plicata</i>	64	Good	H	Large specimen tree with no significant defects. CR low over property	On small raised bank on E property line
2824	European wild cherry <i>Prunus avium</i>	8	Poor	L	Stem has 45-degree lean. Damaged surface roots evident INVASIVE NON NATIVE	Under red cedar canopy. E side property line
2825	Big leaf maple <i>Acer macrophyllum</i>	12	Good	M	CR has vigorous upright growth and good form	Growing N and clear of red cedar canopy
2827	Lodgepole pine <i>Pinus contorta</i>	36	Good	H	Full strong CR. Twin leaders from 8-ft	Grassed center of site
2828	Ponderosa pine <i>Pinus Ponderosa</i>	26	Good/Fair	H	Healthy tree with good CR form. Very poor pruning practice	Grassed center of site
2846	Douglas fir <i>Pseudotsuga menziesii</i>	19	Good	H	Good crown form and good vitality. CR is low to ground and extends 15-ft radius	5-ft from existing fence on west side
2851	Crabapple species <i>Malus spp</i>	12	Fair	L	Thin narrow and damaged CR	Grassed center of site
2866	Spruce species <i>Picea spp</i>	18	Fair/Good	M	Fair vigor. Complete CR but thin growth form	Grassed center of site
2876	Big leaf maple <i>Acer macrophyllum</i>	26	Good/Fair	M	Twin stems from ground level. Some minor basal damage	E side within tree line
2880	Orchard apple <i>Malus domestica</i>	24	Fair	M	Large domestic apple, formerly managed tree. Has heavy sapsucker damage	Grassed center of site
2882	Spruce species <i>Picea spp</i>	18	Dying	-	Recent strong decline. May have no live foliage	Adjacent to N property line
2889	Spruce species <i>Picea spp</i>	11	Fair/Poor	L	Small reduced crown under O/E lines. Large stem lesion Low vigor	OFF SITE: ROW tree at NW property corner

ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
2895	Maple species <i>Acer spp</i>	12	Fair/Good	M	Strong vertical growth within closely spaced tree grouping	Small raised bank on E property line
2898	Lodgepole pine <i>Pinus contorta</i>	14	Good	H	Strong vertical CR development. Lower stem among cherry laurel stems	Small raised bank on E property line
3601	Big leaf maple <i>Acer macrophyllum</i>	26	Good/Fair	M	Canopy dominant tree. Full large CR. CR low over property and 35-ft radial spread	Raised bank area at N end of property
3602	Big leaf maple <i>Acer macrophyllum</i>	17	Fair/Good	M	Twisting strong stem intertwined with dominant tree T 3601	Raised bank area at N end of property
3603	Big leaf maple <i>Acer macrophyllum</i>	24	Good/Fair	M	Strong dominant CR. Spreading CR form. CR low over property and 35-ft radial spread	Raised bank area at N end of property
3604	Big leaf maple <i>Acer macrophyllum</i>	15	Poor	L	Heavy lean over PL, likely partial uproot. Basal decay and damage on off-lean basal area	Raised bank area at N end of property. NE co
1	European wild cherry <i>Prunus avium</i>	26	Fair	M	Fully mature, low vigor. Branch failures. Pruned under O/E INVASIVE NON NATIVE	OFF SITE: On slope of hwy bank. 8-ft from AP
2	Willow species <i>Salix spp</i>	20	Fair/poor	L	Multi-stem – no dominant stem Tree but in shrub form.	OFF SITE: 11-ft from AP. W side drain channel
3	Douglas fir <i>Pseudotsuga menziesii</i>	41	Good	H	Strong complete crown. On raised root mound. No defects noted	OFF SITE: 2-ft from AP
4	Western red cedar <i>Thuja plicata</i>	45	Good	H	Complete CR and branch structure. Crown slightly thin	OFF SITE: 10-ft from AP. At drain channel
5	Big leaf maple <i>Acer macrophyllum</i>	28	Fair	M	Heavily shaded by T4. Multiple branch breakouts. Shared CR space with T4	OFF SITE: 4-ft from AP. At drain channel
6	European wild cherry <i>Prunus avium</i>	9	Poor	L	Significant stem damage. Multiple stem lesions INVASIVE NON NATIVE	OFF SITE: Park landscape area
7	Big leaf maple <i>Acer macrophyllum</i>	12	Good/Fair	M	Semi-mature. Upright CR	OFF SITE: Park landscape area
8	Big leaf maple <i>Acer macrophyllum</i>	12	Fair/Poor	L	Tree shaded under adjacent tree. No upper CR	OFF SITE: On steep hwy bank
9	Grand fir <i>Abies grandis</i>	11	Good	H	Semi-mature. Strong upright growth and good upper CR growth	OFF SITE: 20-ft from AP
10	Big leaf maple <i>Acer macrophyllum</i>	26	Fair/Good	M	Group of stems from ground level	OFF SITE: 12-ft from AP
11	Big leaf maple <i>Acer macrophyllum</i>	10	Poor/Fair	M	Severely damaged CR. Scarring of stem	OFF SITE: 6-ft from AP
12	Big leaf maple <i>Acer macrophyllum</i>	14	Good/Fair	M	Early maturity. Stem scar	OFF SITE: On steep hwy bank



ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
13	Douglas fir <i>Pseudotsuga menziesii</i>	20	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
14	Douglas fir <i>Pseudotsuga menziesii</i>	21	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
15	Douglas fir <i>Pseudotsuga menziesii</i>	21	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
16	Douglas fir <i>Pseudotsuga menziesii</i>	26	Good	H	No shared space. No defects noted. CR low over site to 8-ft ht. Mid-bank location	OFF SITE: Adjacent children play area
17	Douglas fir <i>Pseudotsuga menziesii</i>	17	Good/Fair	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
18	Douglas fir <i>Pseudotsuga menziesii</i>	13	Good	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
19	Douglas fir <i>Pseudotsuga menziesii</i>	10	Good	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
20	Big leaf maple <i>Acer macrophyllum</i>	15	Fair	M	Two stems sound, one damaged. Among large adjacent group of similar species	OFF SITE: Within tree line, E side of property
21	Big leaf maple <i>Acer macrophyllum</i>	13	Fair/Good	M	Group of 3 large stems, average 13" diam	OFF SITE: Within tree line, E side of property
22	Big leaf maple <i>Acer macrophyllum</i>	9	Fair/Poor	L	A group of smaller stems. Some basal damage	OFF SITE: Within tree line, E side of property
23	European wild cherry <i>Prunus avium</i>	8	Fair	L	Leaning stem INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property
24	Big leaf maple <i>Acer macrophyllum</i>	11	Good/Fair	M	Vertical growing. One large live stem, two dead stems	OFF SITE: Within tree line, E side of property
25	Big leaf maple <i>Acer macrophyllum</i>	10	Good/Fair	M	Canopy sub-dominant. Twisting but strong stem	OFF SITE: Within tree line, E side of property
26	Big leaf maple <i>Acer macrophyllum</i>	15	Good	M	Early maturity. Strong vertical growing stem	OFF SITE: Within tree line, E side of property
27	Big leaf maple <i>Acer macrophyllum</i>	9	Dying	-	Functionally dead. Upper CR is missing	OFF SITE: Within tree line, E side of property
28	Big leaf maple <i>Acer macrophyllum</i>	13	Good/Fair	M	Narrow strong vertical CR	OFF SITE: Within tree line, E side of property
29	True fir <i>Abies spp</i>	29	Good	H	Very straight upright stem. Vitality appears good. Full upper CR	OFF SITE: Within tree line, E side of property
30	European wild cherry <i>Prunus avium</i>	14	Fair/Good	L	Vertical stem. Small high CR INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property
31	European wild cherry <i>Prunus avium</i>	12	Fair/Good	L	Vertical stem. Small high CR INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property

**Table Notes:**

DBH: Stem diameter at 4.5-ft from grade or measured as required by regulation.

V: Amenity value of tree in the opinion of the consultant. Taking into account the species type, size, and safe and healthy life expectancy of the tree (L: Low; M: Medium; H: High).

Abbreviations: AP - asphalt path; CR - Tree crown; O/E - Hi voltage overhead electricity; PL - Parking lot; SS - Self-sown;

Figure 1a Tree survey 12.24.20 (North half of site)

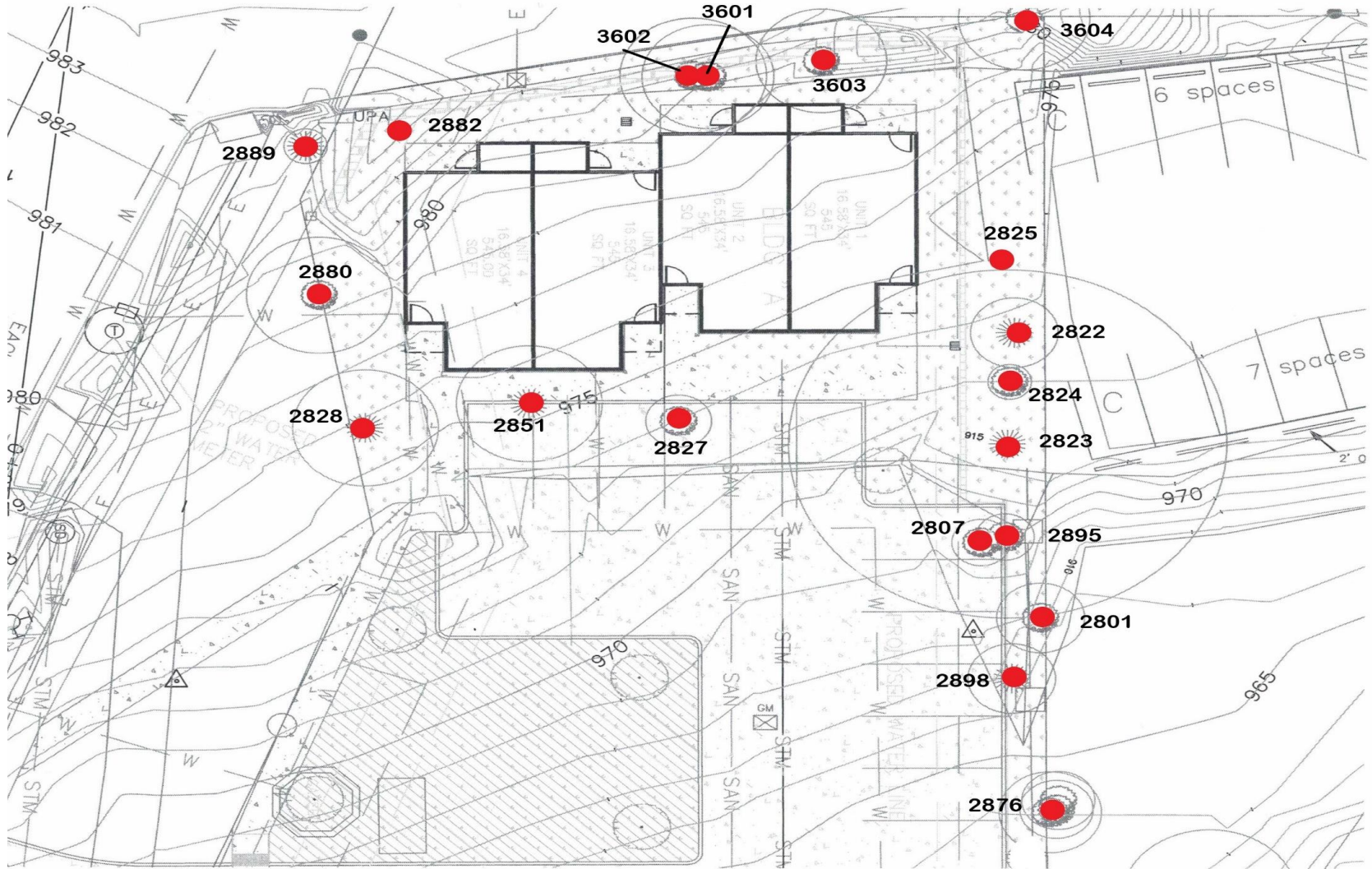
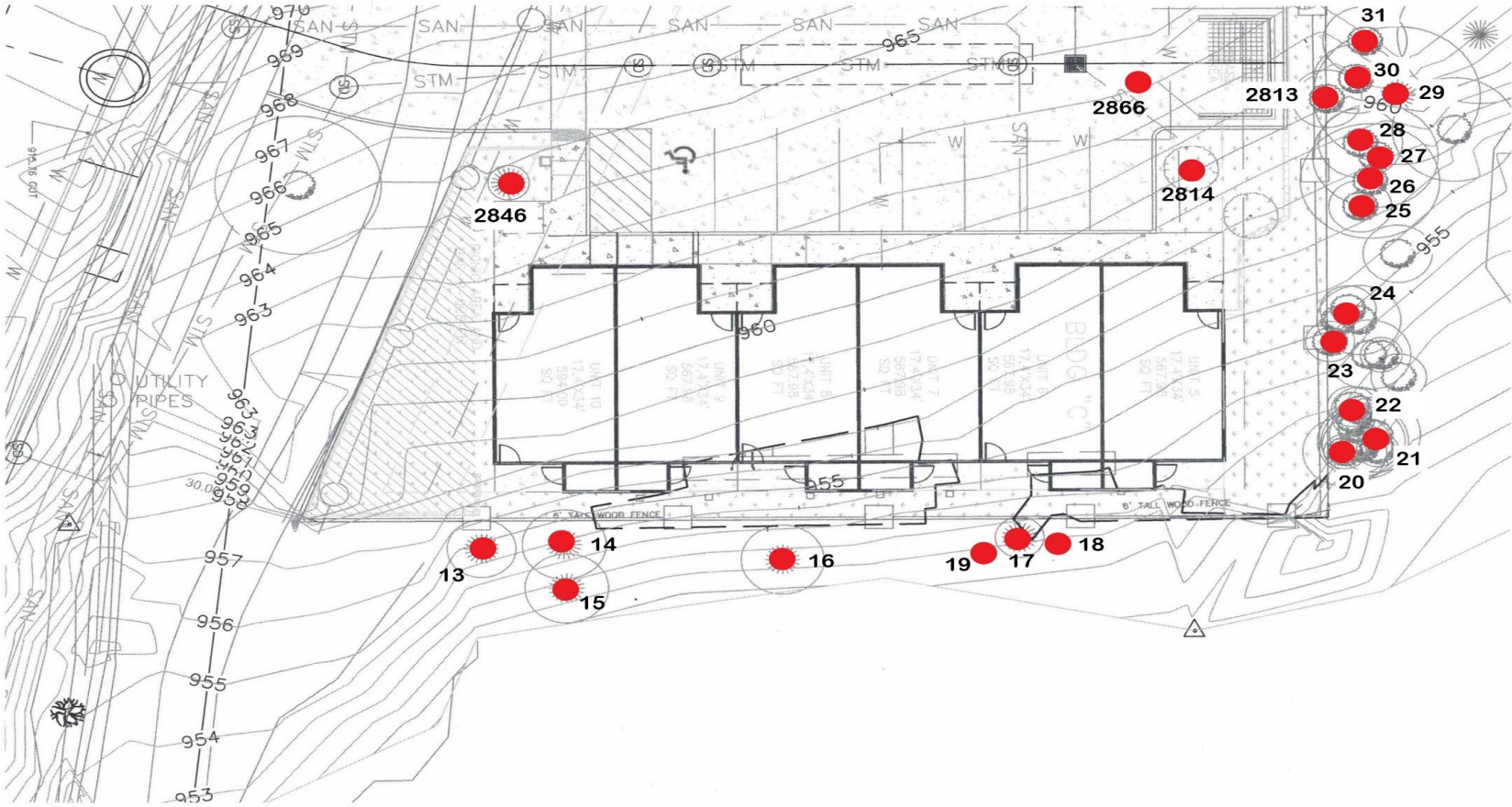
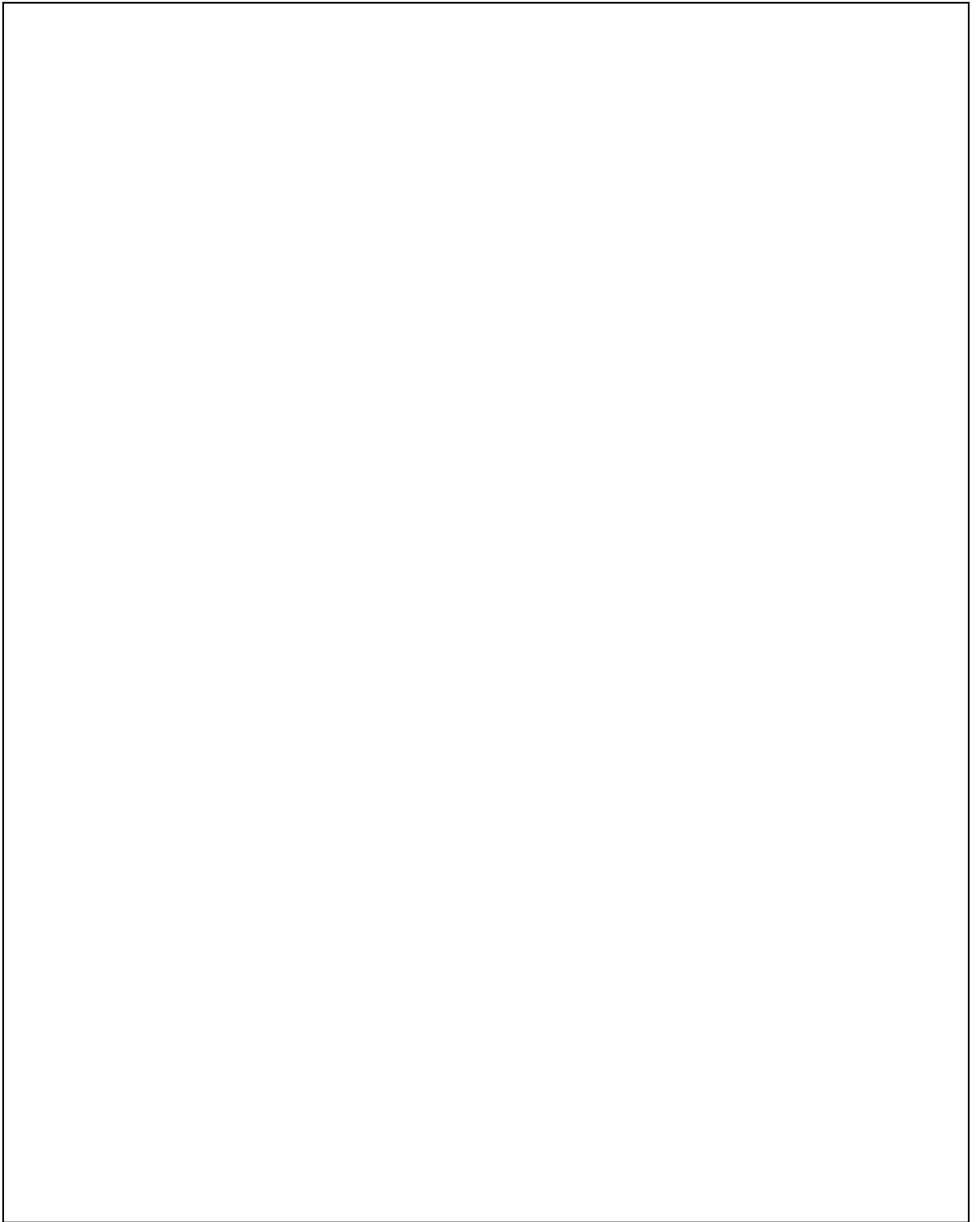


Figure 1b Tree survey 12.24.20 (South half of site)

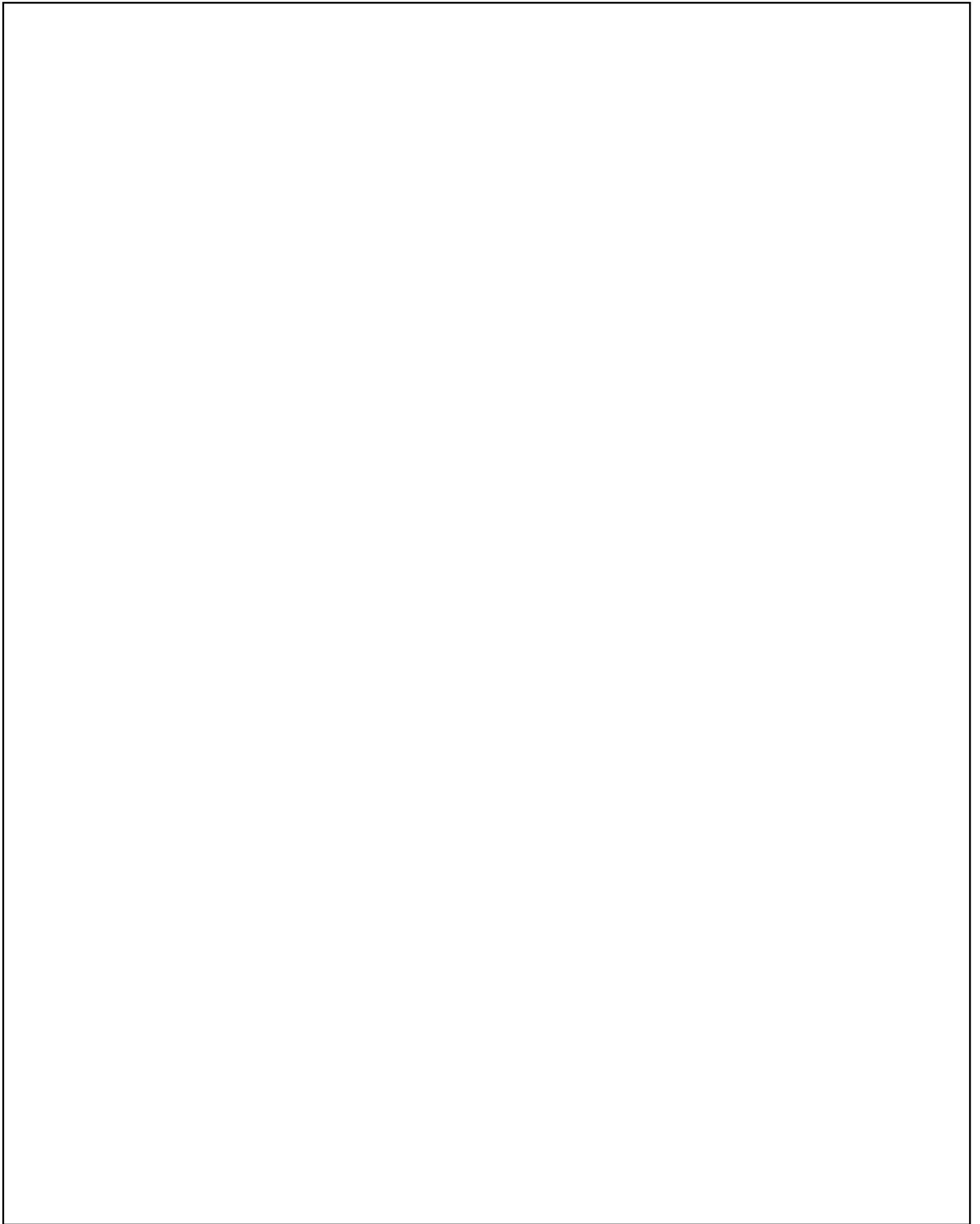


**Figure 1c Tree survey 12.24.20 (Utility alignment area)**

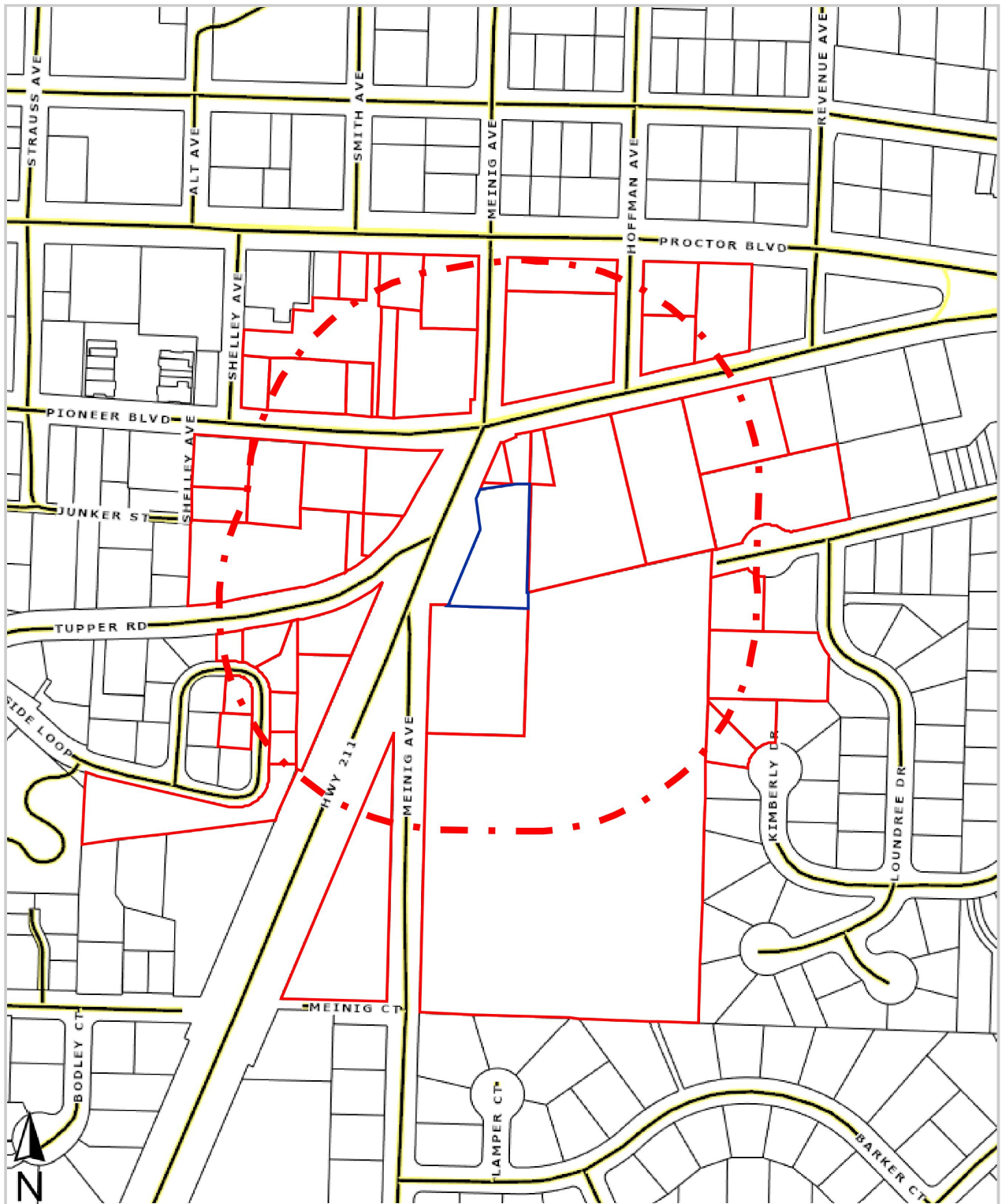




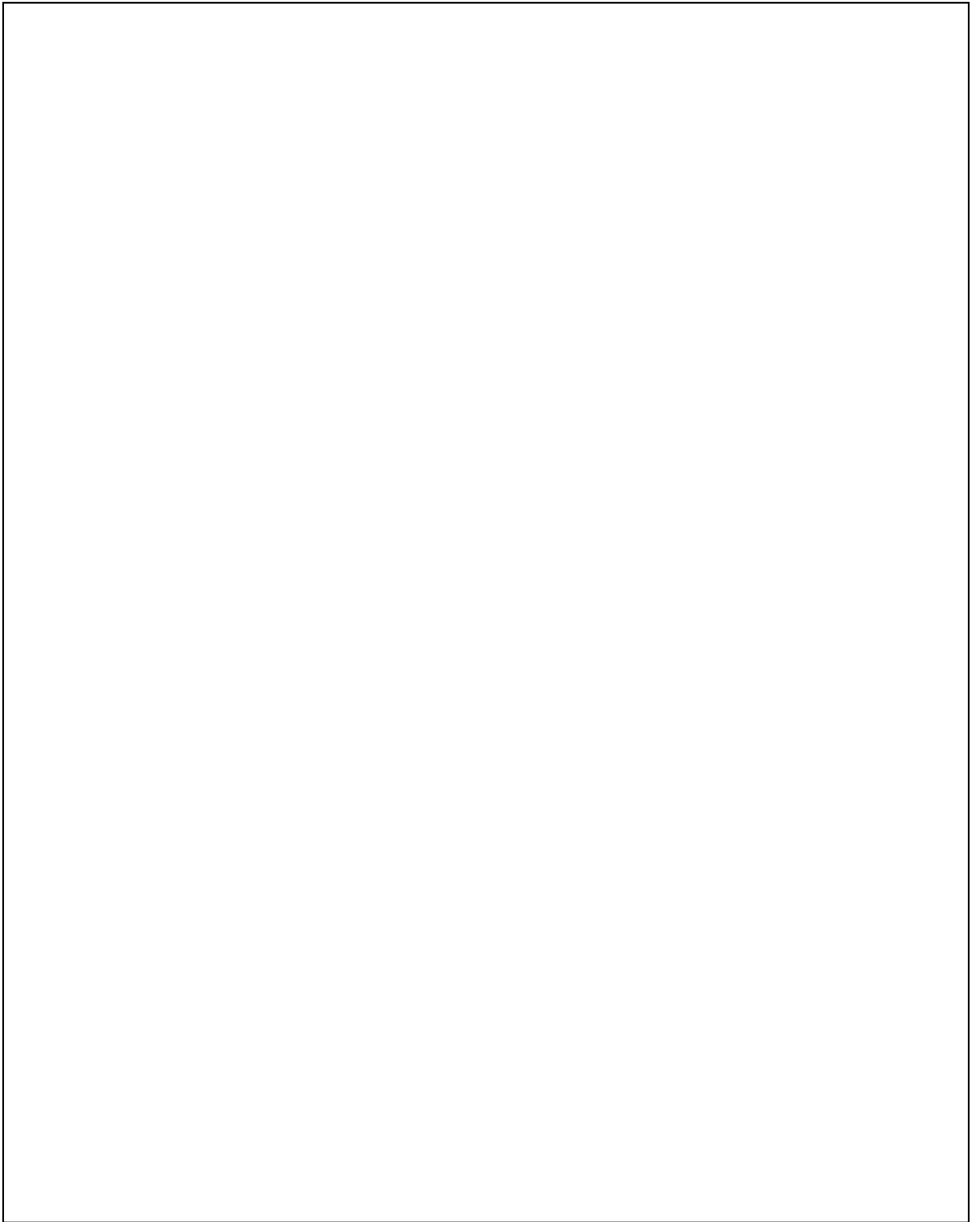
**SECTION V – ADDITIONAL ITEMS**  
**NEIGHBORHOOD NOTIFICATION**  
**RADIUS SEARCH AND MAILING LABELS**







This map/plat is being furnished as an aid in locating the herein described land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.



TaxAcctNum	OwnerNmFirst	OwnerNmLast	OwnerAddr	OwnerCityNm	OwnerState	OwnerZIP	SiteAddr	SiteCity	SiteState	SiteZIP
24E13CA00100		Oregon City Building Lp	3662 SW Tunnelwood St	Portland	OR	97221	39180 Proctor Blvd	Sandy	OR	97055
24E13CA00200		Milward LLC	PO Box 417	Sandy	OR	97055	39181 Pioneer Blvd	Sandy	OR	97055
24E13CA00300	Glenn	Butler	11835 SW Ebberts Ct	Beaverton	OR	97008		Sandy	OR	97055
24E13CA00400	Glenn	Butler	11835 SW Ebberts Ct	Beaverton	OR	97008	39140 Proctor Blvd	Sandy	OR	97055
24E13CA00500		46 & 2 Properties LLC	PO Box 1863	Sandy	OR	97055	39110 Proctor Blvd	Sandy	OR	97055
24E13CA00700	Wo	Kuang	11832 SE Grand Vista Dr	Clackamas	OR	97015	39131 Pioneer Blvd	Sandy	OR	97055
24E13CA00800		Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39085 Pioneer Blvd	Sandy	OR	97055
24E13CA01200	Kenneth	Claggett	39055 Pioneer Blvd	Sandy	OR	97055	17470 Shelley Ave	Sandy	OR	97055
24E13CA01300		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13CA06000	Karen	Huston	PO Box 476	Sandy	OR	97055	39010 Pioneer Blvd	Sandy	OR	97055
24E13CA06100	Marshall	Hilton	39000 Junker St	Sandy	OR	97055	39000 Junker St	Sandy	OR	97055
24E13CA06200		Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39050 Pioneer Blvd	Sandy	OR	97055
24E13CA06300	Paola	D	15475 SE 262nd Ave	Boring	OR	97009	39070 Pioneer Blvd	Sandy	OR	97055
24E13CA06400	David	Goldenberg	18127 Upper Midhill Dr	West Linn	OR	97068	39150 Pioneer Blvd	Sandy	OR	97055
24E13CA06500	David	Goldenberg	18127 Uppper Midhill Dr	West Linn	OR	97068		Sandy	OR	97055
24E13CA06600	Paola	D	15475 SE 262nd Ave	Boring	OR	97009		Sandy	OR	97055
24E13CA06700	Ernesto	Brache	39085 Pioneer Blvd Ste 100	Sandy	OR	97055		Sandy	OR	97055
24E13CA08700	Christine	Cassel	17700 Tupper Rd	Sandy	OR	97055	17700 Tupper Rd	Sandy	OR	97055
24E13CA08800	Richie	Irvin	17702 Tupper Rd	Sandy	OR	97055	17702 Tupper Rd	Sandy	OR	97055
24E13CA10400	John	Rawlinson Jr	17995 Meinig Ave	Sandy	OR	97055	17995 Meinig Ave	Sandy	OR	97055
24E13DB00600		Sandy Historical Soc Inc	PO Box 652	Sandy	OR	97055	39345 Pioneer Blvd	Sandy	OR	97055
24E13DB00800		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055	39295 Pioneer Blvd	Sandy	OR	97055
24E13DB00900		McCool Enterprises Inc	PO Box 1105	Boring	OR	97009	39332 Proctor Blvd	Sandy	OR	97055
24E13DB01000	Bradford	Picking	PO Box 632	Sandy	OR	97055	17430 Meinig Ave	Sandy	OR	97055
24E13DB01100	Bradford	Picking	PO Box 632	Sandy	OR	97055	17450 Meinig Ave	Sandy	OR	97055
24E13DB01200		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01300		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01400	Sherry	Vargo	23975 SE Firwood Rd	Sandy	OR	97055	39230 Pioneer Blvd	Sandy	OR	97055
24E13DB01500	Miles	Rusth	PO Box 236	Lake Oswego	OR	97035	17650 Meinig Ave	Sandy	OR	97055
24E13DB01600		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
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24E13DB01801		Edison Plaza LLC	PO Box 99	Sandy	OR	97055	39400 Pioneer Blvd	Sandy	OR	97055
24E13DB01802		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01804		Caritas Community Housing Corp	9600 SW Oak St Ste 200	Portland	OR	97223	39451 McCormick Dr	Sandy	OR	97055
24E13DB02301	Laura	Grimsley	17725 Loundree Dr	Sandy	OR	97055	17725 Loundree Dr	Sandy	OR	97055
24E13DB02303	Helen	Loundree	PO Box 104	Sandy	OR	97055	39405 McCormick Dr	Sandy	OR	97055
24E13DB02323	Robert	Tilton	39400 Kimberly Dr	Sandy	OR	97055	39400 Kimberly Dr	Sandy	OR	97055
24E13DB02324	Robert	Shea	39410 Kimberly Dr	Sandy	OR	97055	39410 Kimberly Dr	Sandy	OR	97055
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24E13CA08809		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38961 Creekside Loop	Sandy	OR	97055
24E13CA08810		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38971 Creekside Loop	Sandy	OR	97055
24E13CA08814		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38956 Creekside Loop	Sandy	OR	97055

24E13CA08815	Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38966 Creekside Loop	Sandy	OR	97055
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24E13CA08819	City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13CA00100E1	Oregon City Building Lp	3662 SW Tunnelwood St	Portland	OR	97221		Sandy	OR	97055
24E13CA00800E2	Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39085 Pioneer Blvd	Sandy	OR	97055
24E13CA00800E3	Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39085 Pioneer Blvd	Sandy	OR	97055

24E13CA00100  
Oregon City Building Lp  
3662 SW Tunnelwood St  
Portland, OR 97221

24E13CA00200  
Milward LLC  
PO Box 417  
Sandy, OR 97055

24E13CA00300  
Glenn Butler  
11835 SW Ebberts Ct  
Beaverton, OR 97008

24E13CA00400  
Glenn Butler  
11835 SW Ebberts Ct  
Beaverton, OR 97008

24E13CA00500  
46 & 2 Properties LLC  
PO Box 1863  
Sandy, OR 97055

24E13CA00700  
Wo Kuang  
11832 SE Grand Vista Dr  
Clackamas, OR 97015

24E13CA00800  
Jabez Properties LLC  
39085 Pioneer Blvd Ste 100  
Sandy, OR 97055

24E13CA01200  
Kenneth Claggett  
39055 Pioneer Blvd  
Sandy, OR 97055

24E13CA01300  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13CA06000  
Karen Huston  
PO Box 476  
Sandy, OR 97055

24E13CA06100  
Marshall Hilton  
39000 Junker St  
Sandy, OR 97055

24E13CA06200  
Jabez Properties LLC  
39085 Pioneer Blvd Ste 100  
Sandy, OR 97055

24E13CA06300  
Paola D  
15475 SE 262nd Ave  
Boring, OR 97009

24E13CA06400  
David Goldenberg  
18127 Upper Midhill Dr  
West Linn, OR 97068

24E13CA06500  
David Goldenberg  
18127 Uppper Midhill Dr  
West Linn, OR 97068

24E13CA06600  
Paola D  
15475 SE 262nd Ave  
Boring, OR 97009

24E13CA06700  
Ernesto Brache  
39085 Pioneer Blvd Ste 100  
Sandy, OR 97055

24E13CA08700  
Christine Cassel  
17700 Tupper Rd  
Sandy, OR 97055

24E13CA08800  
Richie Irvin  
17702 Tupper Rd  
Sandy, OR 97055

24E13CA10400  
John Rawlinson Jr  
17995 Meinig Ave  
Sandy, OR 97055

24E13DB00600  
Sandy Historical Soc Inc  
PO Box 652  
Sandy, OR 97055

24E13DB00800  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB00900  
McCool Enterprises Inc  
PO Box 1105  
Boring, OR 97009

24E13DB01000  
Bradford Picking  
PO Box 632  
Sandy, OR 97055

24E13DB01100  
Bradford Picking  
PO Box 632  
Sandy, OR 97055

24E13DB01200  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB01300  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB01400  
Sherry Vargo  
23975 SE Firwood Rd  
Sandy, OR 97055

24E13DB01500  
Miles Rusth  
PO Box 236  
Lake Oswego, OR 97035

24E13DB01600  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB01700  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB01801  
Edison Plaza LLC  
PO Box 99  
Sandy, OR 97055

24E13DB01802  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB01804  
Caritas Community Housing Corp  
9600 SW Oak St Ste 200  
Portland, OR 97223

24E13DB02301  
Laura Grimsley  
17725 Loundree Dr  
Sandy, OR 97055

24E13DB02303  
Helen Loundree  
PO Box 104  
Sandy, OR 97055

24E13DB02323  
Robert Tilton  
39400 Kimberly Dr  
Sandy, OR 97055

24E13DB02324  
Robert Shea  
39410 Kimberly Dr  
Sandy, OR 97055

24E13DB01790  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB01290  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13DB01590  
Miles Rusth  
PO Box 236  
Lake Oswego, OR 97035

24E13CA08807  
Trimble Rentals LLC  
PO Box 10  
Sandy, OR 97055

24E13CA08808  
Trimble Rentals LLC  
PO Box 10  
Sandy, OR 97055

24E13CA08809  
Trimble Rentals LLC  
PO Box 10  
Sandy, OR 97055

24E13CA08810  
Trimble Rentals LLC  
PO Box 10  
Sandy, OR 97055

24E13CA08814  
Trimble Rentals LLC  
PO Box 10  
Sandy, OR 97055

24E13CA08815  
Trimble Rentals LLC  
PO Box 10  
Sandy, OR 97055

24E13CA08818  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13CA08819  
City Of Sandy  
39250 Pioneer Blvd  
Sandy, OR 97055

24E13CA00100E1  
Oregon City Building Lp  
3662 SW Tunnelwood St  
Portland, OR 97221

24E13CA00800E2  
Jabez Properties LLC  
39085 Pioneer Blvd Ste 100  
Sandy, OR 97055

24E13CA00800E3  
Jabez Properties LLC  
39085 Pioneer Blvd Ste 100  
Sandy, OR 97055

# THE PAD - MULTI-FAMILY RESIDENTIAL

MULTI-FAMILY RESIDENTIAL | SANDY, OREGON

## Exhibit C



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REPRESENTATIONAL IMAGE. IMAGE SHOWN MAY NOT BE AN EXACT REPRESENTATION OF ACTUAL DESIGN AND CONSTRUCTION.



REPRESENTATIONAL IMAGE. IMAGE SHOWN MAY NOT BE AN EXACT REPRESENTATION OF ACTUAL DESIGN AND CONSTRUCTION.

THE PAD  
 TOWNHOME APARTMENTS  
 17650 MEING AVENUE  
 SANDY, OR 97055

### PROJECT DESCRIPTION

REDEVELOPMENT OF AN EXISTING LOT INTO A MULTI-FAMILY COMPLEX CONSISTING OF TEN 2-STORY UNITS OCCUPYING 2 BUILDINGS. OUTDOOR RECREATIONAL AREAS AS WELL AS PARKING, AND VEHICLE AND PEDESTRIAN CIRCULATION SYSTEMS WILL ALSO BE INSTALLED.

### SITE INFORMATION

ADDRESS: 17650 MEING AVENUE  
 SANDY, OR 97055  
 PARCEL NUMBER: 00663758  
 TAX LOT NUMBER: 24E13D801500  
 COUNTY: CLACKAMAS COUNTY  
 JURISDICTION: CITY OF SANDY  
 FIRE DISTRICT: SANDY FIRE DISTRICT NO. 72  
 ZONING: R3 - HIGH DENSITY RESIDENTIAL  
 DESCRIPTION OF USE: MULTI-FAMILY RESIDENTIAL  
 AREA (APPROX.): PROPERTY: 25,869 S.F. (0.59 ACRES)

### PROJECT TEAM

OWNER: OWNER NAME  
 STREET ADDRESS  
 CITY, STATE, ZIP CODE  
 PHONE: (###) ###-####  
 CONTACT: FIRST LAST NAME  
 ARCHITECT: AXIS DESIGN GROUP  
 ARCHITECTURE & ENGINEERING, INC.  
 11104 S.E. STARK STREET  
 PORTLAND, OR 97216  
 PHONE: (503) 284-0988  
 CONTACT: FIRST LAST NAME  
 CIVIL: KURAHASHI & ASSOCIATES  
 4470 SW HALL BLVD.  
 SUITE C  
 BEAVERTON, OR 97005  
 PHONE: (503) 267-9434  
 CONTACT: GREG KURAHASHI  
 LANDSCAPE: JOYCE JACKSON - LANDSCAPE ARCHITECT  
 1940 SYLVAN WAY  
 WEST LINN, OR 97068  
 PHONE: (503) 703-8607  
 CONTACT: JOYCE JACKSON

### SHEET INDEX

SHEET NUMBER	SHEET TITLE	DESIGN REVIEW	MILESTONE 2
<b>GENERAL</b>			
G-000	COVER SHEET, SITE INFO, SHEET INDEX	X	
<b>CIVIL</b>			
C-1	EXISTING CONDITIONS	X	
C-2	CIVIL SITE PLAN	X	
C-3	UTILITY PLAN	X	
C-4	GRADING PLAN	X	
C-5	TREE PRESERVATION PLAN	X	
<b>LANDSCAPE</b>			
L-1	PLANTING PLAN	X	
L-2	LANDSCAPE NOTES AND DETAILS	X	
<b>ARCHITECTURAL</b>			
A-101	SITE PLAN - EXISTING/DEMO	X	
A-102	SITE PLAN - PROPOSED	X	
A-201	FIRST AND SECOND FLOOR PLANS - PROPOSED	X	
A-221	EXTERIOR ELEVATIONS - BUILDING "A" - PROPOSED	X	
A-222	EXTERIOR ELEVATIONS - BUILDING "B" - PROPOSED	X	
<b>SITE LIGHTING</b>			
LT-1	SITE PHOTOMETRIC PLAN	X	

LEGEND:  
 x = ISSUED AS PART OF SET  
 o = NOT PART OF ISSUED SET  
 \* = ISSUED FOR INFORMATION ONLY

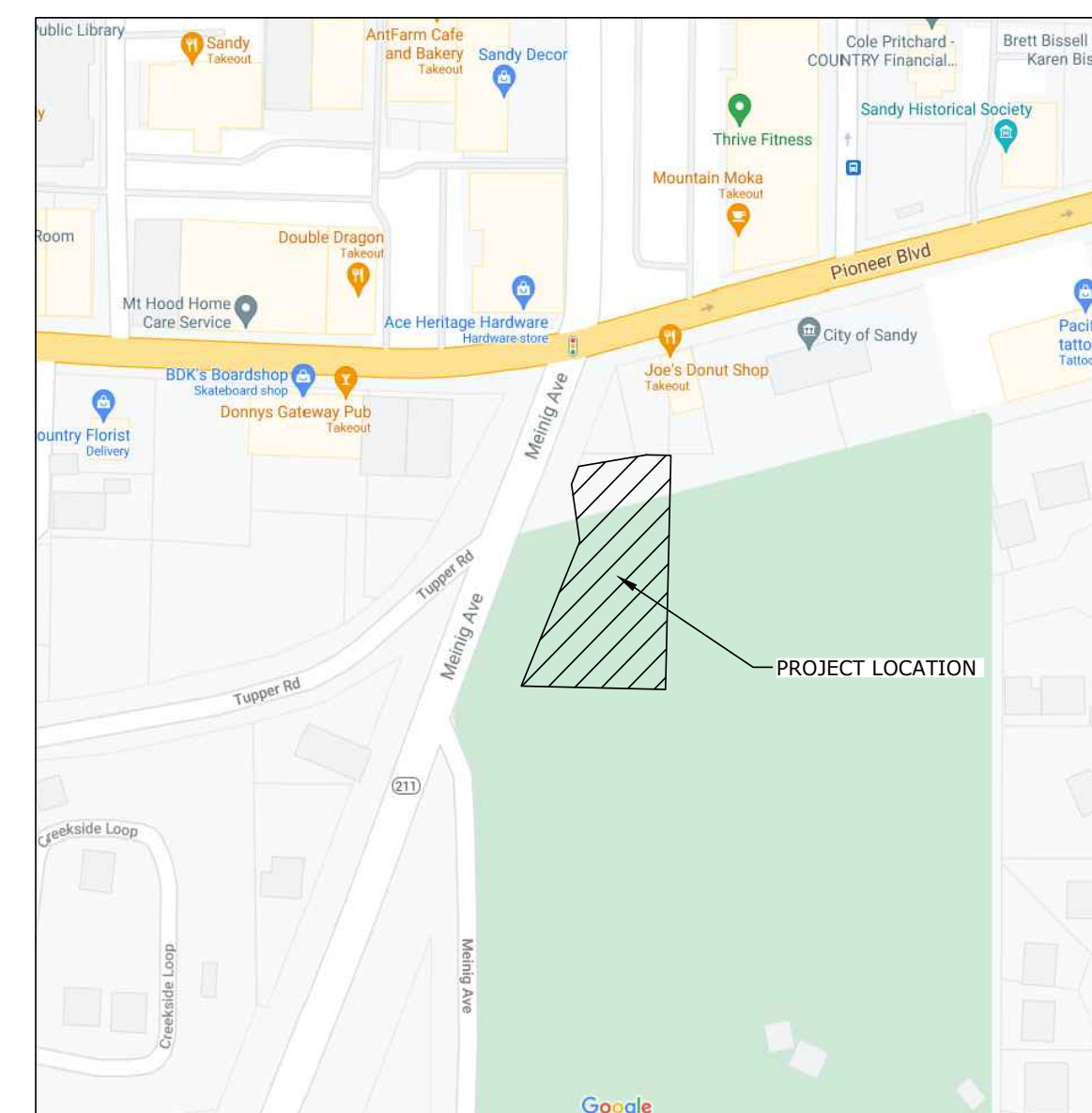
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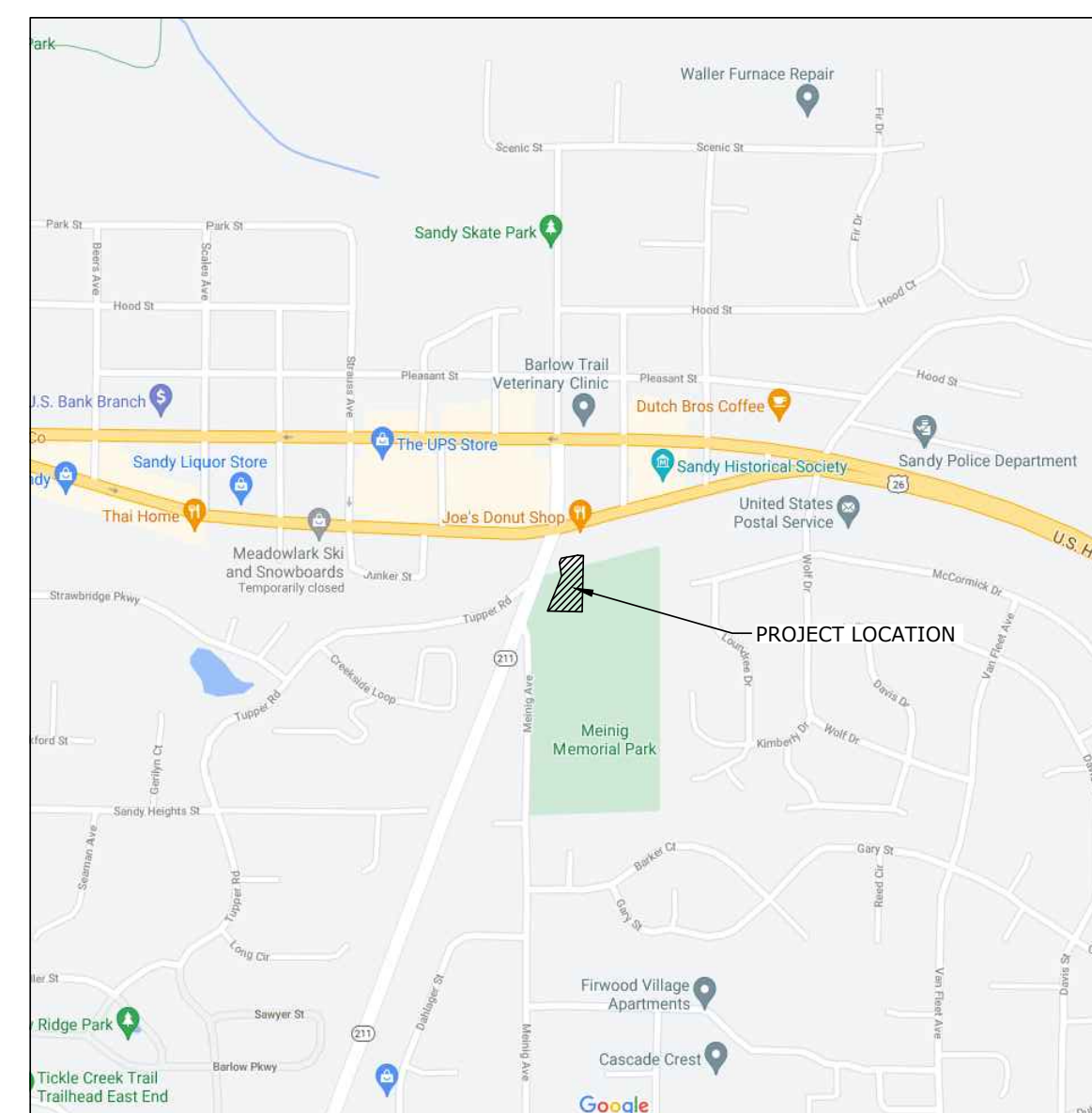
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 CHECKED BY: DH  
 JOB NO: 20-004  
 DATE: 07/16/2021  
 ISSUED FOR: DESIGN REVIEW  
 SHEET TITLE  
 SHEET INDEX  
 PROJECT DESCRIPTION,  
 SITE INFORMATION, AND  
 PROJECT TEAM

SHEET NO.

G-000



VICINITY MAP  
 SCALE: NTS



PROJECT LOCATION MAP  
 SCALE: NTS

**REGISTERED PROFESSIONAL ENGINEER**  
10,053

OREGON  
FEB 29, 87  
CREGORY KURAHASHI

EXPIRES 6/30/2021

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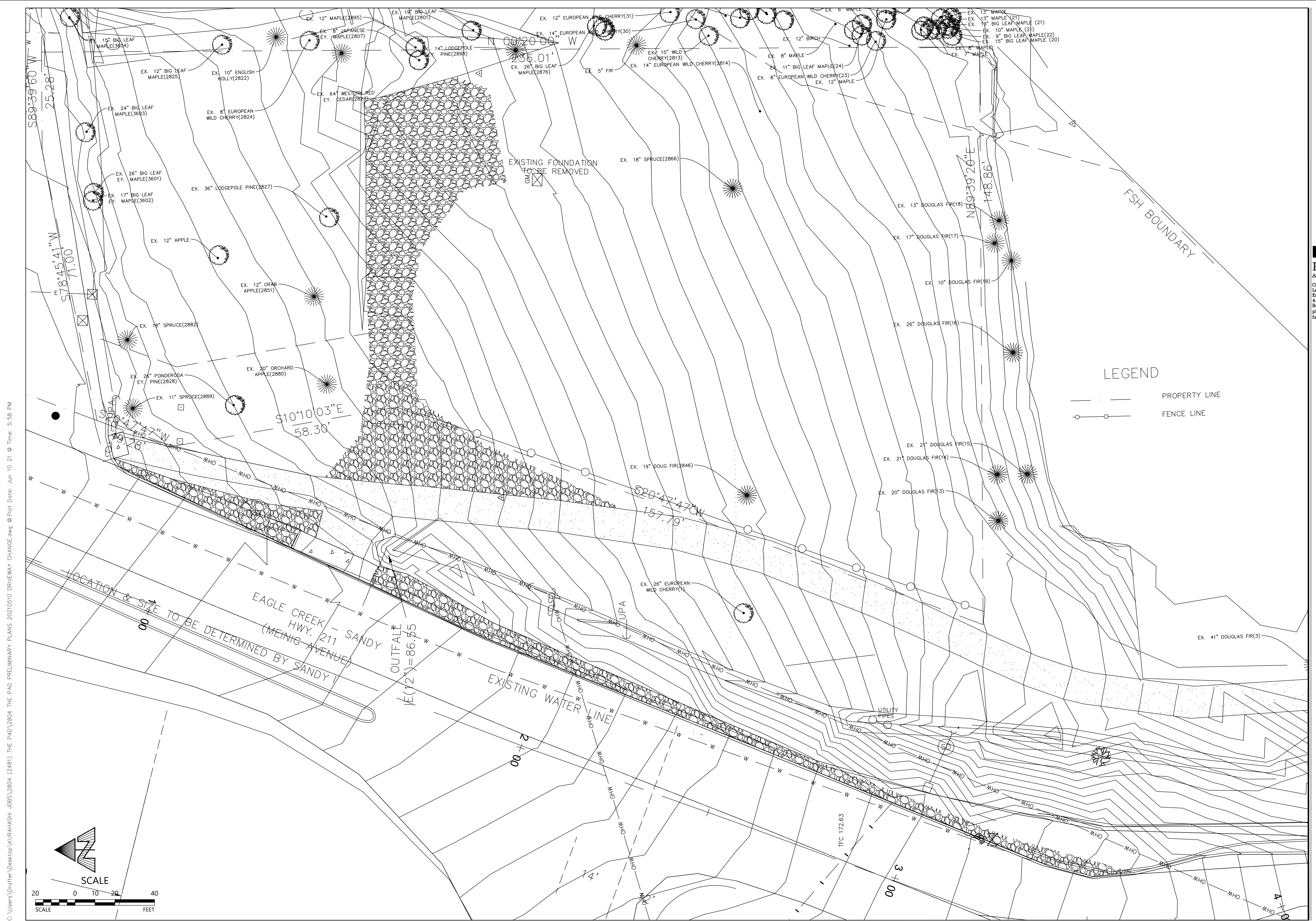
**THE PAD**  
**TOWNHOME APARTMENTS**  
17660 MENING AVENUE  
SANDY, OR 97055

REVISIONS

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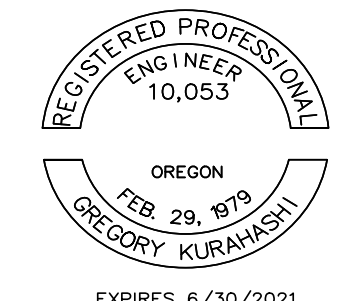
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EXISTING CONDITIONS  
SHEET NO.

**C-1**



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fax: (503)644-9731

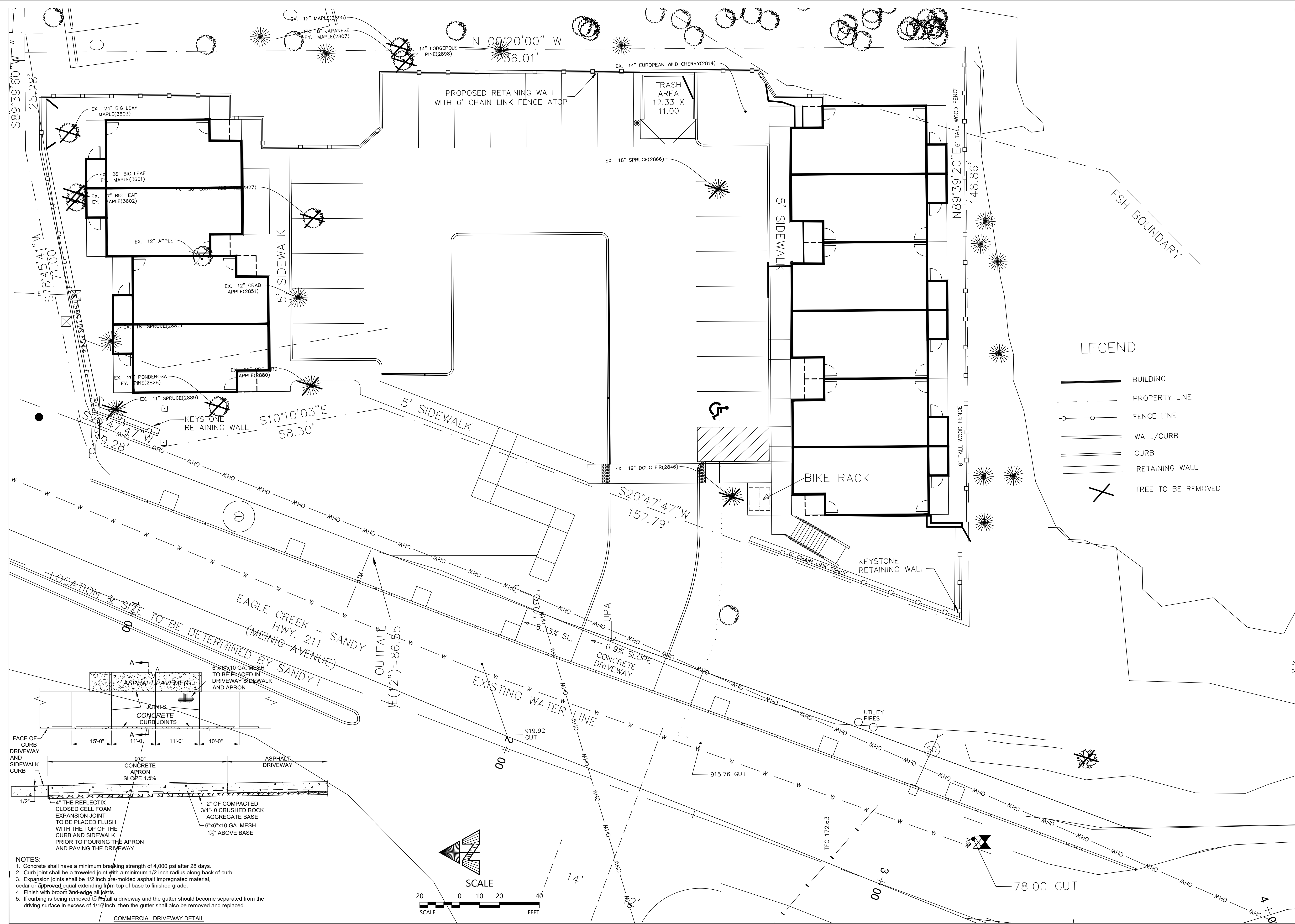
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17860 MENING AVENUE  
SANDY, OR 97055

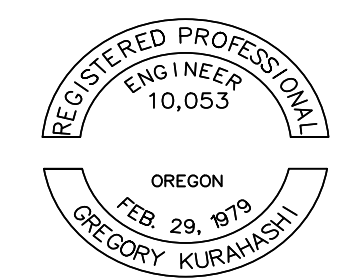
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ISSUED FOR: DESIGN REVIEW  
SHEET TITLE  
CIVIL SITE DESIGN  
SHEET NO.

# C-2



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**THE PAD  
 TOWNHOME APARTMENTS**  
 17660 MENING AVENUE  
 SANDY, OR 97055

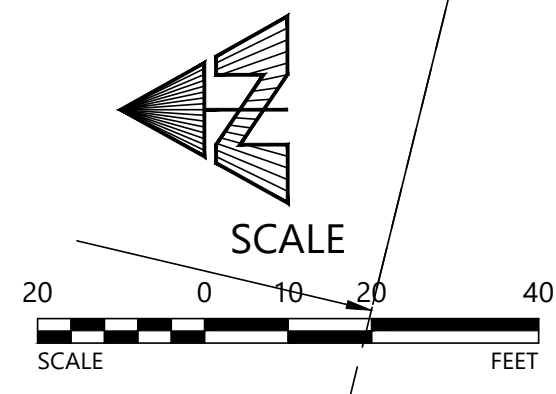
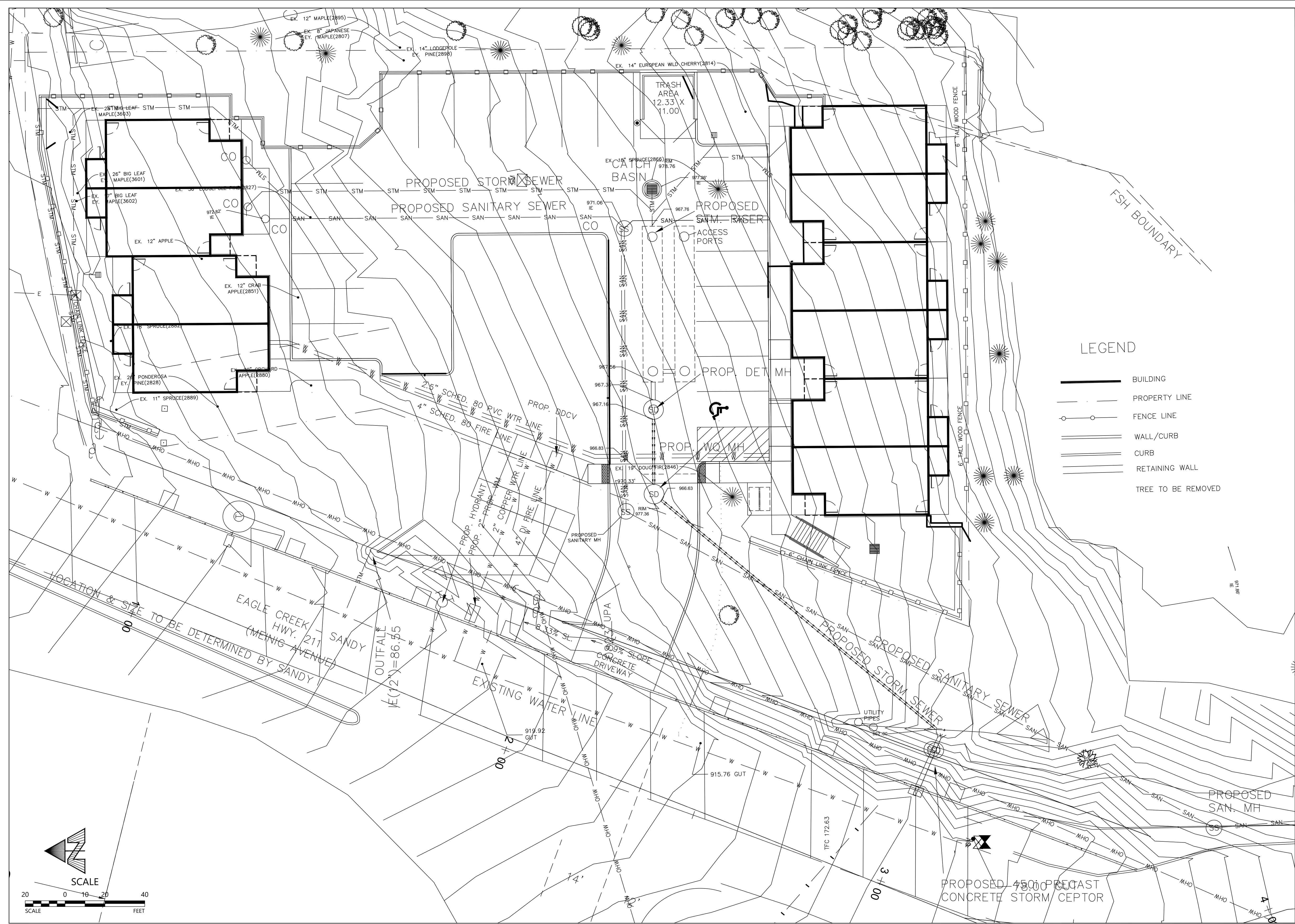
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- BUILDING
  - PROPERTY LINE
  - FENCE LINE
  - WALL/CURB
  - CURB
  - RETAINING WALL
  - TREE TO BE REMOVED

REVISIONS

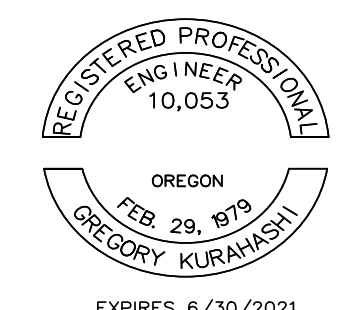
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 CHECKED BY: GTK  
 JOB NO: 20-004  
 DATE: 6/10/2021  
 ISSUED FOR: DESIGN REVIEW  
 SHEET TITLE  
 UTILITY PLAN  
 SHEET NO.

**C-3**



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**THE PAD TOWNHOME APARTMENTS**  
 17650 MENING AVENUE  
 SANDY, OR 97055

- LEGEND**
- BUILDING
  - PROPERTY LINE
  - FENCE LINE
  - WALL/CURB
  - CURB
  - RETAINING WALL
  - TREE TO BE REMOVED

REVISIONS

No.	Description	Date

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 CHECKED BY: GTK  
 JOB NO: 20-004  
 DATE: 6/10/2021  
 ISSUED FOR: DESIGN REVIEW

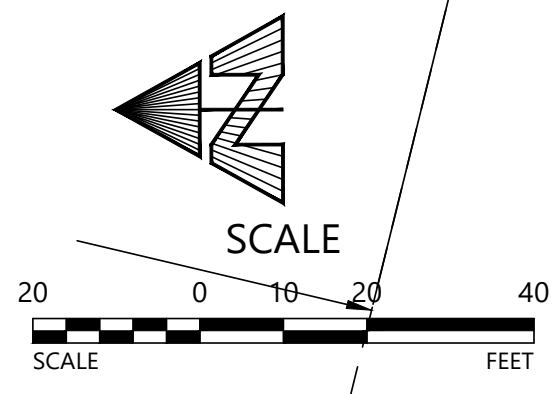
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 GRADING AND  
 EROSION CONTROL  
 PLAN

SHEET NO.

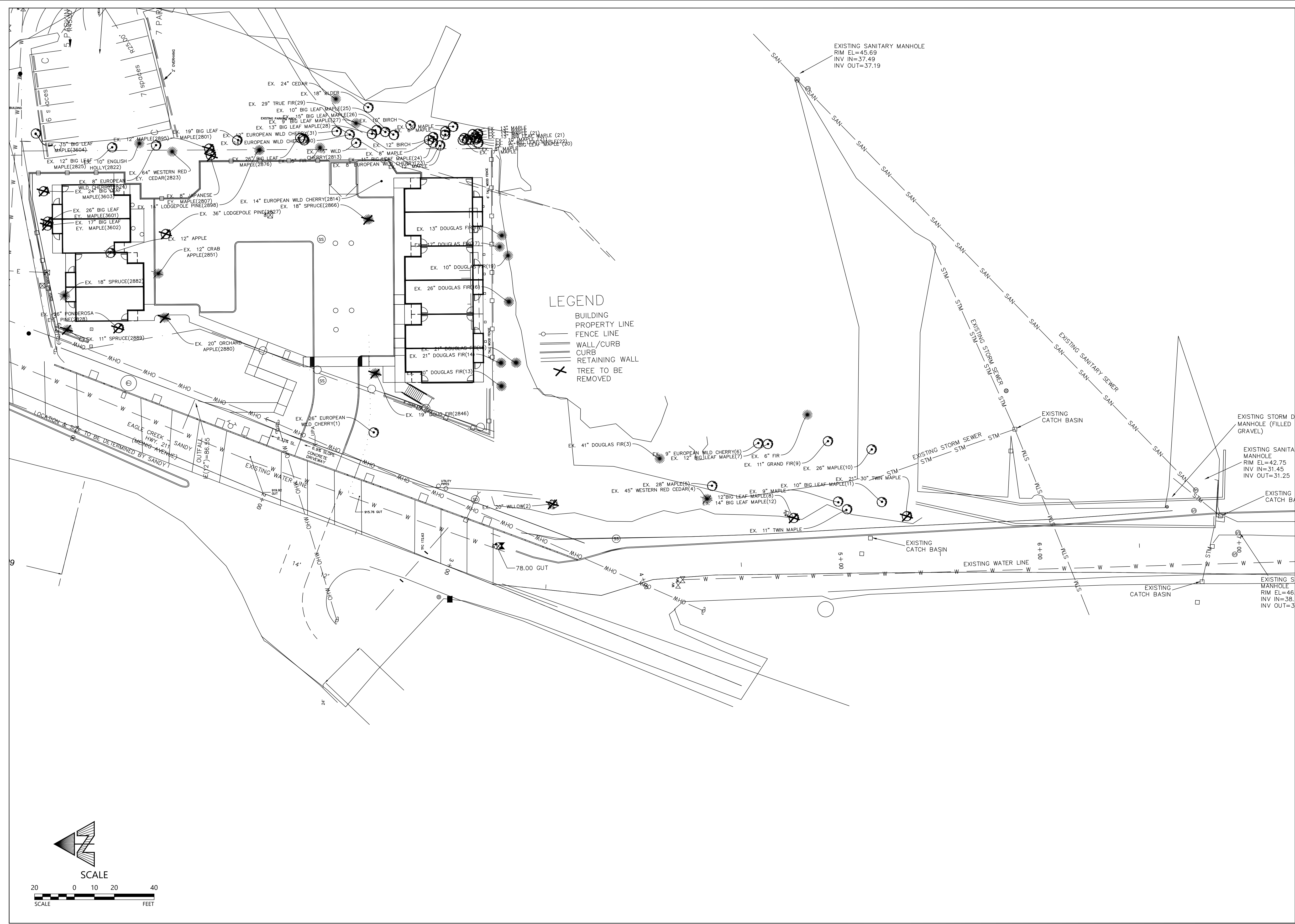
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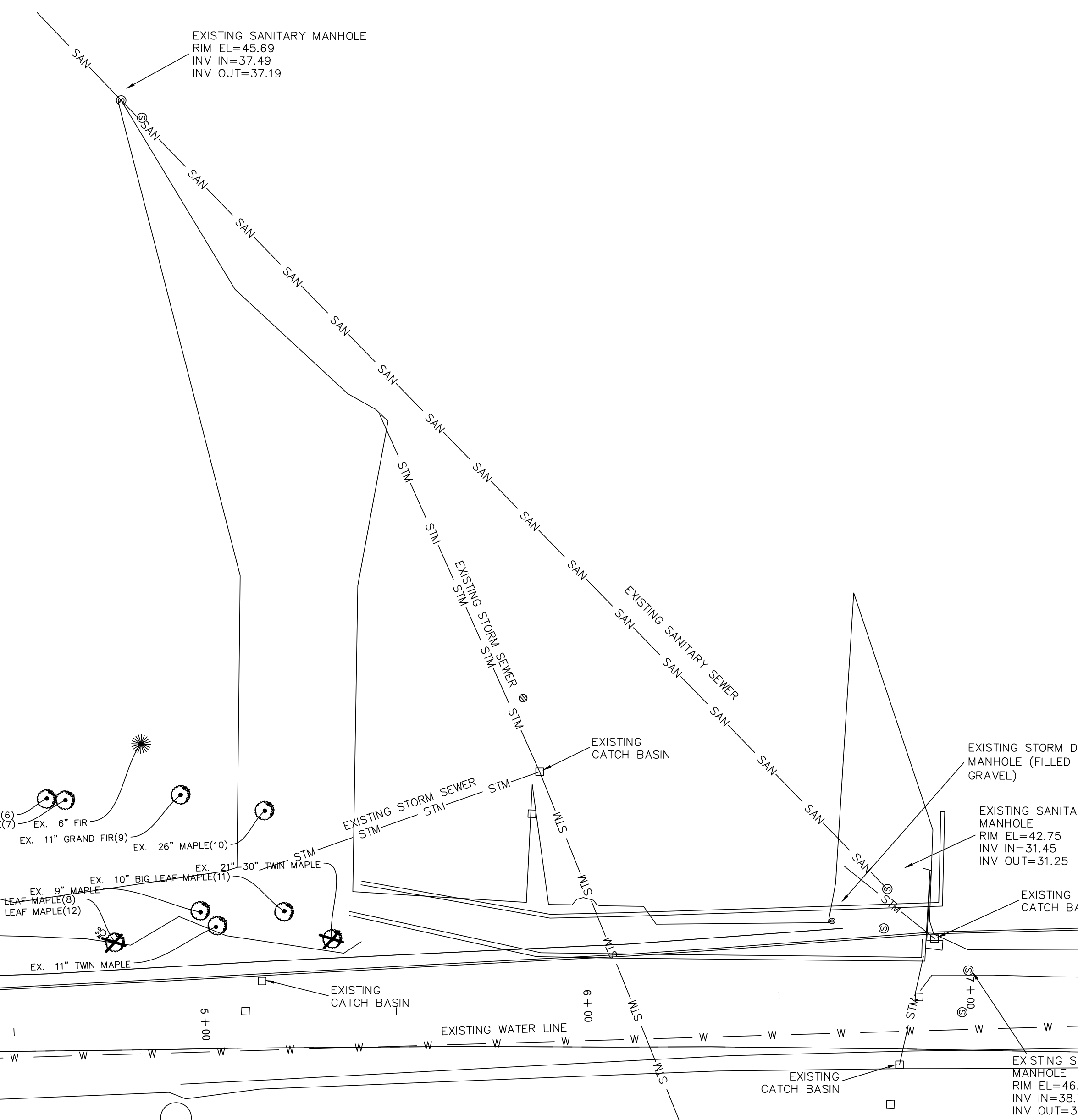
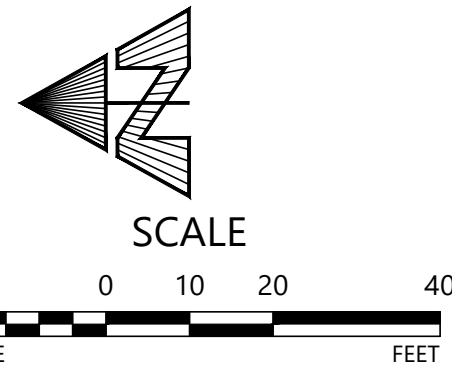
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**LEGEND**  
 BUILDING  
 PROPERTY LINE  
 FENCE LINE  
 WALL/CURB  
 CURB  
 RETAINING WALL  
 TREE TO BE REMOVED



REGISTERED PROFESSIONAL  
ENGINEER  
10,053  
OREGON  
FEB 29, 1978  
CREGORY KURAHASHI  
EXPIRES 6/30/2021

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**THE PAD**  
**TOWNHOME APARTMENTS**  
 17860 MENING AVENUE  
 SANDY, OR 97055

REVISIONS

No.	Description	Date

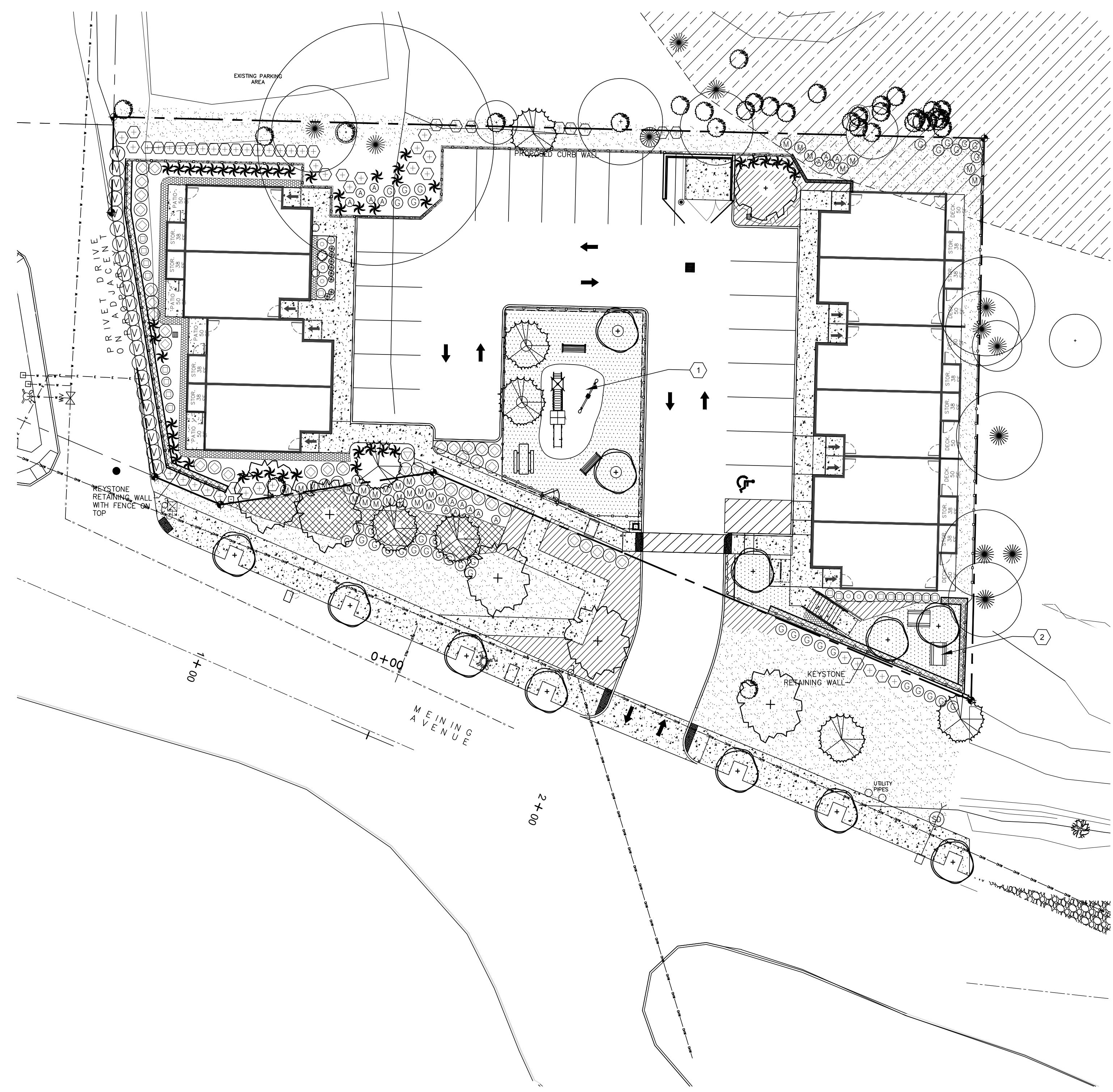
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 CHECKED BY: GTK  
 JOB NO: 20-004  
 DATE: 6/10/2021  
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SHEET TITLE  
 TREE PRESERVATION PLAN

SHEET NO.

**C-5**

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### PLANT LIST

TREES					
SYM	QUAN	BOTANICAL NAME/COMMON NAME	SIZE	COMMENT	
	12	ACER BUERGERIANUM - TRIDENT MAPLE	1-1/2" CAL B&B	AS SHOWN	
	8	CALOCEDRUS DECURRENS - INCENSE CEDAR	6" HT MIN.	REMOVE LOWEST BRANCHES	
	1	QUERCUS FRAINETTO 'FOREST GREEN' FOREST GREEN OAK	2" CAL B&B	AS SHOWN	
	5	RHAMNUS PURSHIANA	1-1/2" CAL B&B	AS SHOWN	

### SHRUBS

SYM	QUAN	BOTANICAL NAME	COMMON NAME	SIZE	COMMENT
	18	EUONYMUS FORTUNEI 'EMERALD GAJETY'	EMERALD GAJETY EUONYMUS	2 GAL	SPACE AS SHOWN
	4	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY	3 GAL	SPACE 42" O.C.
	1	JUNIPERUS VIRGINIANA 'BLUE ARROW'	BLUE ARROW JUNIPER	48" HT.B&B	AS SHOWN
	51	MAHONIA AQUIFOLIUM	OREGON GRAPE	2 GAL	FULLY BRANCHED
	1	NANDINA DOMESTICA 'WOODS DWARF'	WOOD'S DWARF HEAVENLY BAMBOO	2 GAL	SPACE AS SHOWN
	30	PHILADELPHUS LEWISII	MOCKORANGE	2 GAL	SPACE AS SHOWN
	38	ROSA GYMNOCARPA	BALDHIP ROSE	2 GAL	AS SHOWN
	20	SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	2 GAL	AS SHOWN
	6	SPIRAEA X BUMALDA 'GOLDMOUND'	GOLDMOUND BUMALD SPIREA	2 GAL	AS SHOWN
	2	VIBURNUM DAVIDII	DAVID VIBURNUM	3 GAL	AS SHOWN
	23	VIBURNUM TINUS	LAURUSTINUS	5 GAL	SPACE 48" O.C.
	37	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	3 GAL	AS SHOWN

### GROUNDCOVER

	8	HELICTOTRICHON SEMPERVIRENS - BLUE OAT GRASS	1 GAL - SPACE AS SHOWN	
	47	POLYSTICHUM MUNITUM - WESTERN SWORD FERN	1 GAL - SPACE AS SHOWN	
	74	ARCTOSTAPHYLOS UVA-URSI - KINNICKINICK	1 GAL - SPACE 2' O.C.	
	23	MAHONIA REPENS - CREeping MAHONIA	1 GAL - SPACE 30" O.C.	
	2340 SF	PT 301 - WATER SMARTER TALL FESCUE BLEND TURFWAY TALL FESCUE - FESTUCA ARUNDINACEA 'TURFWAY' HOUNDDOG 8 TALL FESCUE - FESTUCA ARUNDINACEA 'HOUNDDOG 8' BLOODHOUND TALL FESCUE - FESTUCA ARUNDINACEA 'BLOODHOUND'	7 LBS / 1000 S.F.	
	4635 SF	PT 702 - NATIVE URBAN MEADOW	4 OZ / 1000 S.F.	

### LEGEND

- EXISTING TREE TO REMAIN
- BENCH
- GRAVEL EDGING - SEE SHEET L2 FOR DETAILS
- 5' BLACK VINYL CLAD CHAIN LINK FENCING AROUND PLAY AREA

### KEY NOTES

- 1 RECREATIONAL PLAY AREA - SPECIFIC PLAY EQUIPMENT TO BE DETERMINED LATER
- 2 PICNIC AREA- PICNIC TABLES

### GENERAL NOTES

1. ALL LANDSCAPE AREAS TO BE IRRIGATED WITH AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM. SYSTEM SHALL USE DRIP IRRIGATION AND WATER CONSERVATION ROTOR IRRIGATION HEADS. NATIVE PLANTING AREAS SHALL HAVE TEMPORARY IRRIGATION THAT WILL BE REDUCED EACH YEAR UNTIL PLANTS ARE FULLY ESTABLISHED.
2. QUANTITIES ARE INTENDED TO ASSIST THE CONTRACTOR IN EVALUATING THEIR OWN TAKEOFFS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BID QUANTITIES AS SHOWN AND REQUIRED BY THE PLANS.
3. CONTRACTOR SHALL PROVIDE TOPSOIL, SOIL AMENDMENTS, AND COMPOST IN REQUIRED QUANTITIES TO CREATE THE PLANTING SOIL FOR PLANTED AND SEEDED AREAS IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
4. CONTRACTOR SHALL VERIFY THE LOCATIONS OF UTILITIES PRIOR TO BEGINNING EXCAVATION.
5. IF PLANT MATERIAL CONFLICTS WITH NEW OR EXISTING UTILITIES TO REMAIN, THE CONTRACTOR SHALL ADJUST THE PLANTING LOCATIONS IN COORDINATION WITH THE OWNER'S REPRESENTATIVE.
6. PROVIDE 3" OF BARK MULCH AROUND PLANTING.
7. RESTORE PUBLIC RIGHT IF AREA DISTURBED BY UTILITY INSTALLATION AND SEED AREA WITH NATIVE URBAN MEADOW MIX.
8. SEE SHEET L2 FOR PLANTING DETAILS AND NOTES.

### SITE DATA

TOTAL SITE AREA =	25,889 S.F.
REQUIRED LANDSCAPE AREA =	25% OF SITE AREA = 6,467.25 S.F.
TOTAL LANDSCAPE AREA PROVIDED =	32.98 % = 8,522.83 S.F.
RECREATION REQUIRED =	2000 S.F.
RECREATIONAL AREA PROVIDED	
PICNIC AREA =	651.8 S.F.
CHILDREN PLAY AREA =	2,054.1 S.F.
TOTAL RECREATION AREA =	2,705.9 S.F.



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THE PAD  
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### REVISIONS

No.	Description	Date

DRAWN BY: JJ  
CHECKED BY: JJ  
JOB NO: 20-004

DATE: 07/7/2021  
ISSUED FOR: DESIGN REVIEW

SHEET TITLE: PLANTING PLAN

SHEET NO.

L-1



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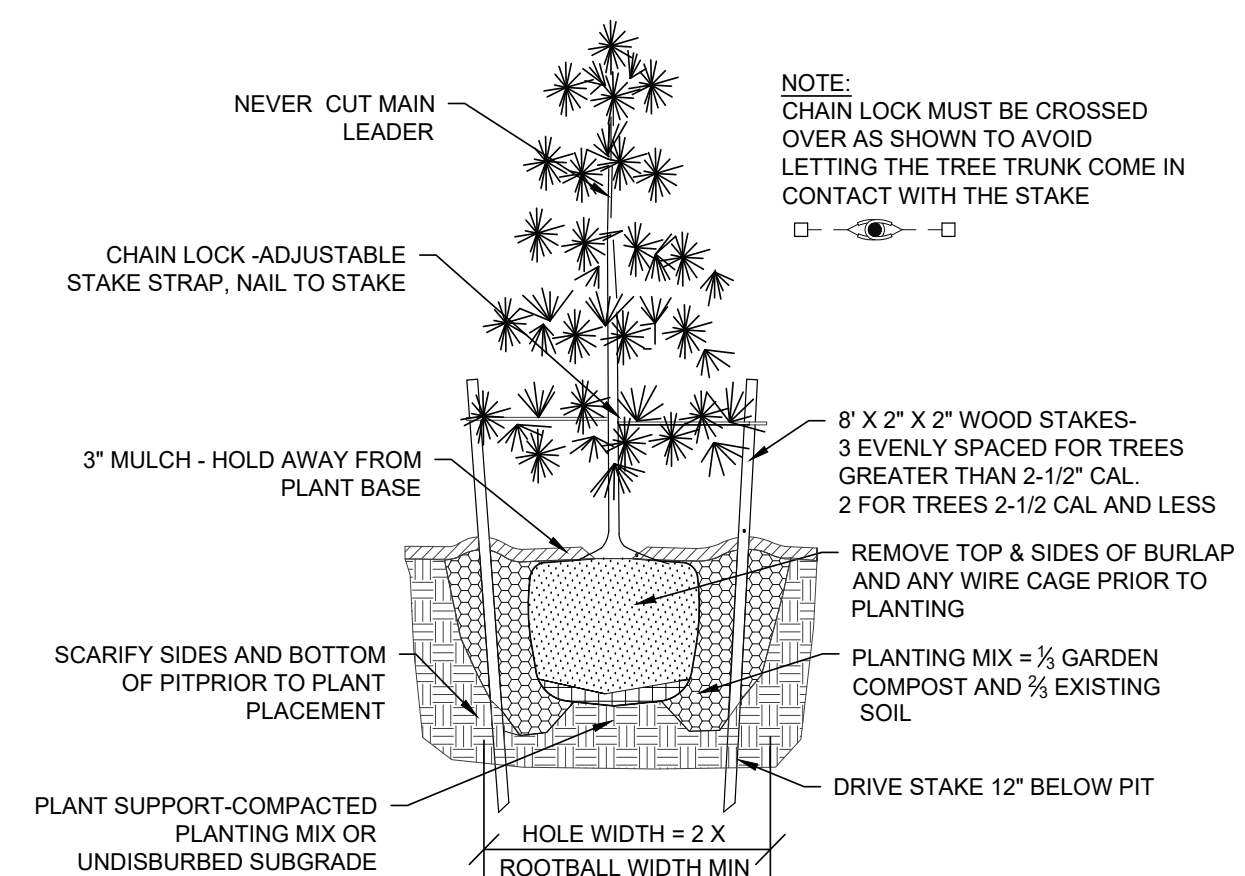
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 CHECKED BY: **JD**  
 BY: **JD**  
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 DATE: 07/7/2021  
 ISSUED FOR: DESIGN REVIEW  
 SHEET TITLE: LANDSCAPE NOTES AND DETAILS  
 SHEET NO.

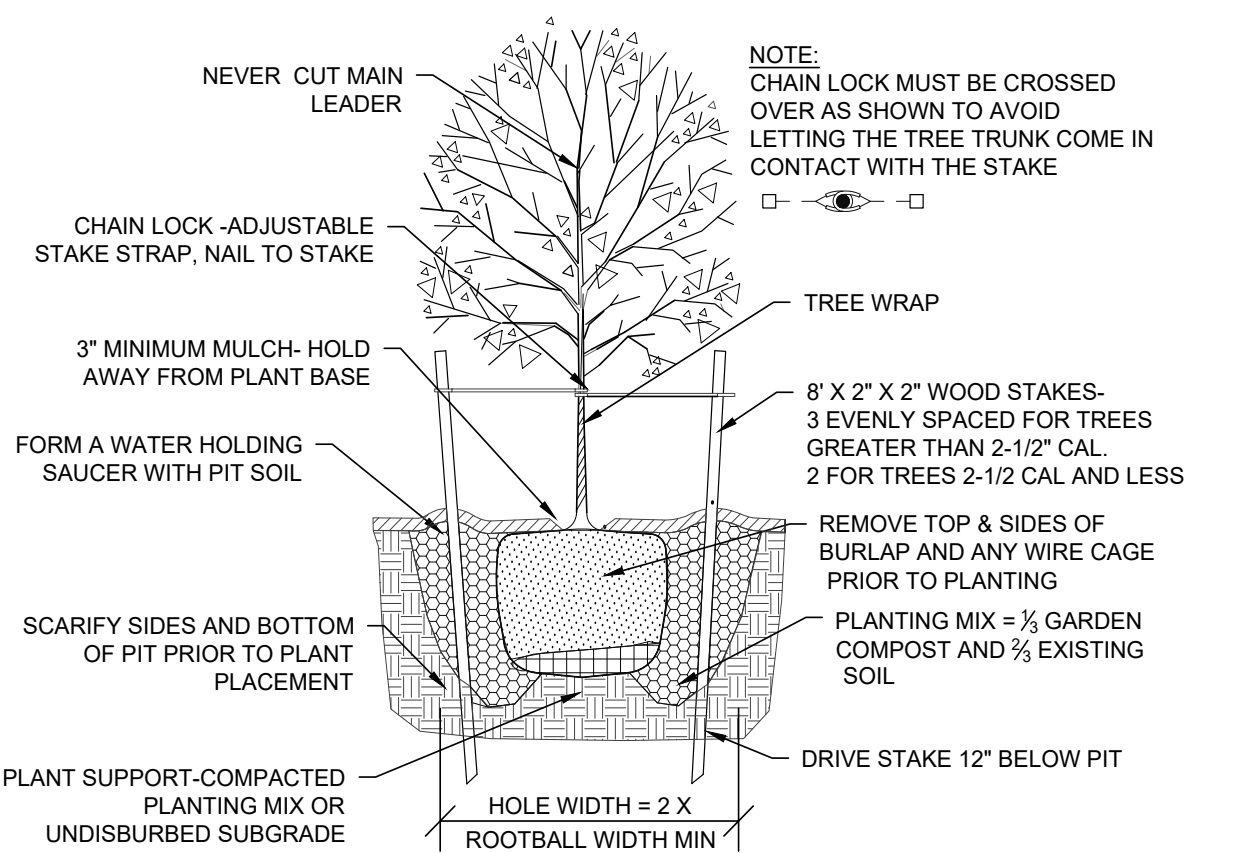
L-2

### NOTES

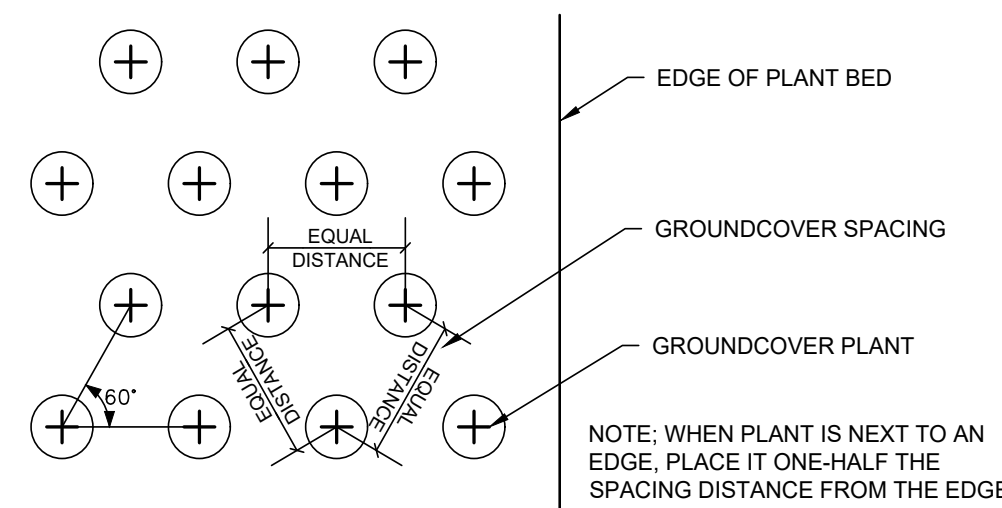
- PROVIDE ONE PERSON WHO WILL BE PRESENT AT ALL TIMES DURING THE WORK WHO IS FAMILIAR WITH PLANT MATERIALS AND IS KNOWLEDGEABLE OF GOOD HORTICULTURAL PRACTICE.
- CONTRACTOR SHALL REMOVE EXISTING VEGETATION THAT INTERFERES WITH ACCESS TO THE NEW PLANTING LOT. RECENTLY PLANTED MATERIAL SHALL BE STOCKPILED AND BE RE-PLANTED IN NEW LOCATIONS INDICATED ON THE PLANTING PLAN.
- NOTIFY THE OWNER'S REPRESENTATIVE, 48 HOURS IN ADVANCE OF WORK FOR SITE INSPECTION OF PLANT MATERIALS. THE LANDSCAPE ARCHITECT RETAINS THE RIGHT TO REJECT ANY MATERIALS WHICH DO NOT MEET MINIMUM SIZE REQUIREMENTS, OR WHICH DO NOT APPEAR HEALTHY AND WELL FORMED. REMOVE UNACCEPTABLE PLANT MATERIALS FROM WORK AREA IMMEDIATELY.
- VERIFY ALL QUANTITIES AND REPORT DISCREPANCIES TO OWNER'S REPRESENTATIVE FOR CLARIFICATION.
- CONTACT A UTILITY LOCATES COMPANY BEFORE STARTING EXCAVATIONS.
- FINAL GRADING SHALL PROVIDE DRAINAGE OF LANDSCAPE AREAS. PLANTING AREAS SHALL SLOPE AWAY FROM BUILDINGS WITH A 2% SLOPE MINIMUM. SHRUB BEDS AND LAWNS SHALL BE CROWNED WITH A 2% SLOPE UNLESS INDICATED OTHERWISE. FINAL GRADES SHALL BE 2 INCHES BELOW ADJACENT WALKS AND CURBS FOR MULCH APPLICATIONS AND 1 INCH BELOW FOR SOD INSTALLATION.
- ALL PLANTS SHALL BE HEALTHY, WELL BRANCHED, ROOTED, TRUE TO SPECIES AND VARIETY, FREE FROM DISEASE, INSECTS, PESTS AND WEEDS. THEY SHALL HAVE GOOD GROWTH HABIT FREE OF PHYSICAL DISFIGURATION, INJURY, ABRASIONS OR SUN SCALDS. PLANTS SHALL EQUAL OR EXCEED MEASUREMENTS IN THE PLANT LIST.
- PLANTS WILL CONFORM TO CURRENT REQUIREMENTS OF 'AMERICAN STANDARDS FOR NURSERY STOCK' BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
- PLANTS SHALL BE GROWN FOR THIS GENERAL LATITUDE AND ELEVATION OR SHALL BE ADEQUATELY CLIMATIZED.
- PROTECT PLANTS AT ALL TIMES DURING SHIPPING, HANDLING, STORAGE AND PLANTING FROM BREAKAGE, DESICCATION, WINDBURN, SUN DAMAGE AND WEATHER EXTREMES. STORE PLANTS IN AN UPRIGHT POSITION AND ALLOW SUFFICIENT VENTILATION. PROVIDE IRRIGATION. DO NOT PICK UP CONTAINERIZED OR BALLED PLANTS BY STEMS OR TRUCKS.
- ALL PLANTS WILL BE WELL FORMED AND POSSESS TOP AND ROOT GROWTH TYPICAL TO THE VARIETY AND IN HEALTHY PROPORTIONS TO EACH OTHER.
- CONTAINER GROWN MATERIAL SHALL HAVE ENOUGH FIBROUS ROOT MASS TO HOLD TOGETHER WHEN REMOVED FROM THE CONTAINER. ROOT BOUND MATERIAL IS UNACCEPTABLE.
- PLANTING PITS SHALL BE BACKFILLED WITH TWO-THIRDS EXISTING SOIL AND ONE-THIRD ORGANIC AMENDING MATERIAL APPROPRIATE FOR EACH SPECIES. CLEAN EXISTING SOIL OF ROOTS, PLANTS, SOD, STONES, CLODS, POCKETS OF COARSE SAND, CONCRETE SLURRY, CONCRETE LAYERS OR CHUNKS, CEMENT, ASPHALT, PLASTER, BUILDING DEBRIS, AND OTHER EXTRANEEOUS MATERIALS HARMFUL TO PLANT GROWTH. BACK FILL MATERIAL SHALL BE THOROUGHLY MIXED. NOTIFY LANDSCAPE ARCHITECT IMMEDIATELY IF AN UNUSUAL CONDITION WHICH APPEARS DETRIMENTAL TO THE NEW PLANTING IS ENCOUNTERED. PLANTING BEDS SHALL BE 4 INCHES OF AMENDING MATERIAL AND 8 INCHES EXISTING SOIL OR IF EXISTING SOIL IS INAPPROPRIATE, REMOVE IT AND REPLACE IT WITH 8 INCHES OF IMPORTED TOP SOIL AND 4 INCHES OF AMENDING MATERIAL.
- AMENDING MATERIAL SHALL BE COMPOST MATERIAL. COMPOST SHALL BE FROM A PROVIDER THAT COMPLIES WITH THE US COMPOSTING COUNCIL STANDARDS FOR COMPOST PRODUCTION. THE COMPOST SHALL BE FREE OF NOXIOUS WEED SEED OR OTHER DELETERIOUS MATERIAL. IT SHALL HAVE A P.H. BETWEEN 6 AND 7.2.
- TEST PLANTING SOIL TO DETERMINE FERTILIZER REQUIREMENTS PRIOR TO INSTALLING PLANTS. ADD FERTILIZER TO PLANTING SOIL AT THE RATES RECOMMENDED BY CERTIFIED SOIL LAB. DO NOT ADD FERTILIZER TO STORM WATER PLANTING AREAS.
- INSTALL OR REPAIR IRRIGATION SYSTEMS PRIOR TO PLANT MATERIAL INSTALLATION.
- INSTALL PLANT MATERIAL WHEN CONDITIONS ARE APPROPRIATE. DO NOT INSTALL PLANT MATERIAL DURING THE FOLLOWING CONDITIONS:
  - EXTENDED HOT WINDY WEATHER, GREATER THAN 90 DEGREES FAHRENHEIT.
  - WINDY WEATHER WITH VELOCITY GREATER THAN 20 MPH.
  - WHEN THE GROUND IS FROZEN AND COLDER THAN 32 DEGREES FAHRENHEIT.
- FIELD PLACE TREES AND SHRUBS IN LOCATIONS SHOWN ON DRAWINGS. PREPARE DEPTH OF PLANTING PIT EQUAL TO THE SIZE OF THE ROOT BALL WITH THE ROOTBALL FLUSH TO GRADE AND 1-2 INCHES HIGHER IN SLOWING DRAINING SOIL. WIDTH OF THE PLANTING PITS SHALL BE AT LEAST TWICE AS WIDE AS THE SIZE OF THE ROOT BALL.
- AFTER SETTING BALLED PLANTS COMPLETELY REMOVE TWINE OR WIRE BINDING AND FOLD BACK BURLAP FROM AT LEAST ONE THIRD OF THE ROOT BALL. NON BIODEGRADABLE WRAPPING SHALL BE REMOVED. DO NOT PLANT IF THE ROOTBALL IS BROKEN OR CRACKED.
- WHEN SETTING CONTAINERIZED PLANTS, LOOSEN ANY CIRCLED OR BOUND ROOTS TO INSURE STRAIGHT ROOT GROWTH INTO PLANT PIT OR BED SOIL. SEVERELY COILED AND ROOT BOUND PLANTS ARE UNACCEPTABLE.
- AFTER BACKFILLING  $\frac{2}{3}$  OF THE SOIL MIX THOROUGHLY WATER-IN EACH PLANT. IF RECOMMENDED PLACE FERTILIZER SLOW RELEASE TABLETS IN THE SOIL SO THEY DO NOT TOUCH THE PLANT ROOTS. TAMP IN REMAINING BACKFILL TO FINISHED GRADE AND CREATE LOW BERM WITH PLANTING SOIL AROUND PLANT TO RETAIN WATER. HOSE PLANT WITH A FINE MIST TO CLEANSE LEAVES OF DEBRIS AND REMOVE TAGS.
- APPLY A COMMERCIAL GRADE, MEDIUM GRIND, NATURALLY COLORED SOFTWOOD MULCH UNIFORMLY OVER THE PLANTING AREA A MINIMUM OF TWO INCHES (2") THICK. MULCH SHALL NOT COVER THE ROOT CROWN OR BE PLACED OVER GROUND COVER PLANTINGS.
- AMEND LAWN WITH A 4 INCH MINIMUM OF COMPOSTED GARDEN MULCH. ADD FERTILIZER AT RATES RECOMMENDED BY SOIL TESTING LABS. INCORPORATE AMENDING MATERIAL IN THE TOP 8 INCHES OF EXISTING SOIL AND THOROUGHLY BLEND. AFTER THE SOIL HAS BEEN PREPARED, APPLY PRILLED LIME AT A RATE DETERMINED BY TESTING, AND RAKE INTO SOIL SURFACE. FLOAT AND ROLL LAWN AREAS TO ENSURE A SMOOTH, FIRM, AND MOWABLE LAWN SURFACE.
- ONLY STAKE TREES IF ADDITIONAL SUPPORT IS NECESSARY AS IN THE FOLLOWING CONDITIONS: ROOT BALLS CONTAIN VERY SANDY SOIL OR VERY WET CLAY OR TREES ARE LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. IF STAKING IS DETERMINED NECESSARY, STAKE SHALL BE 2" X 2" WWPA NO.2 GRADE DOUGLAS FIR, EIGHT FEET LONG. TREE TIES SHALL BE POLY CHAIN LOCK MATERIAL AND LEAVE SLACK IN THE TIE. STAKES SHOULD NOT CONTACT THE TREE ROOTS OR ROOTBALL AND SHOULD BE EMBEDDED 12" BELOW THE PLANT PIT. REMOVE THE TREE TIES AND STAKES AFTER ONE YEAR.
- IRRIGATE WHEN NECESSARY TO AVOID DRYING OUT OF MATERIAL AND TO PROMOTE HEALTHY GROWTH UNTIL FINAL APPROVAL.
- AT JOB COMPLETION, ALL DEBRIS, EXTRA MATERIALS, SUPPLIES AND EQUIPMENT SHALL BE REMOVED FROM THE SITE. ALL SURFACES SHALL BE SWEEPED CLEAN AND MULCH AREAS CLEARED OF SOIL. ALL AREAS OF THE PROJECT SHALL BE CLEAN, ORDERLY AND COMPLETE.



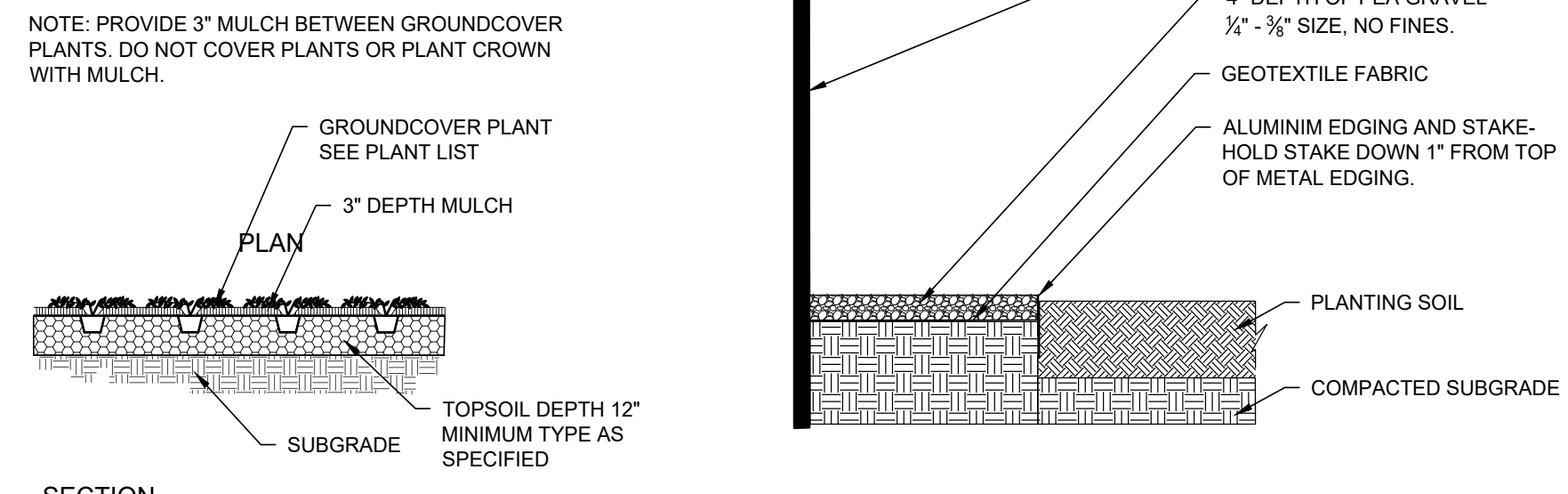
1 EVERGREEN TREE PLANTING DETAIL  
L2 NOT TO SCALE



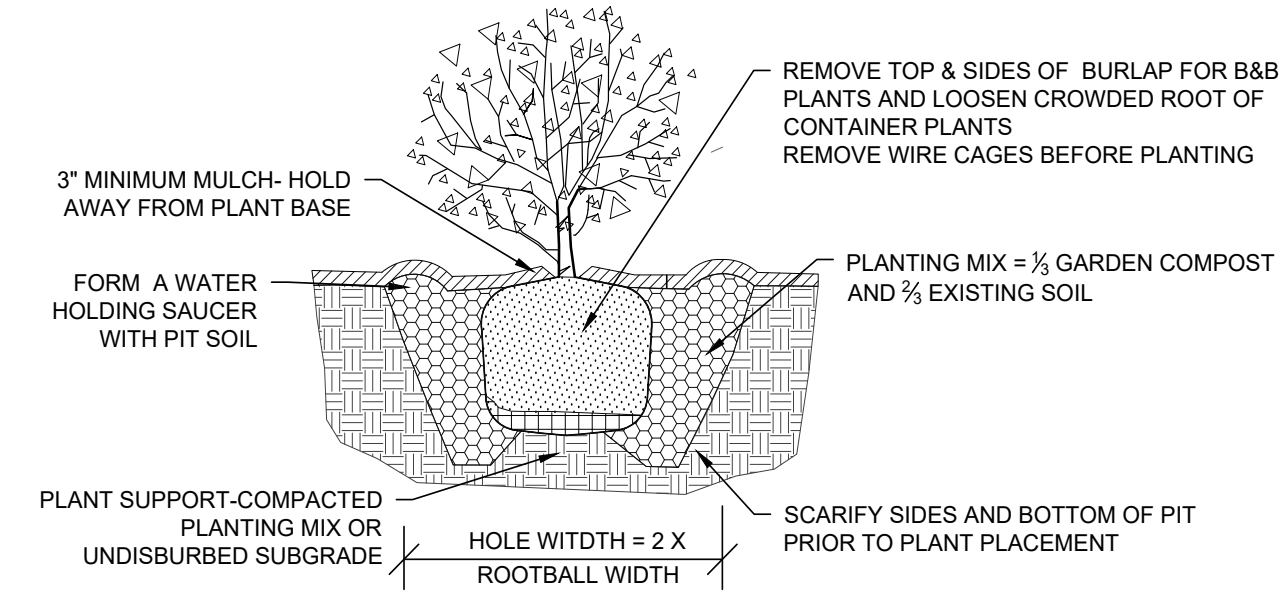
2 DECIDUOUS TREE PLANTING DETAIL  
L2 NOT TO SCALE



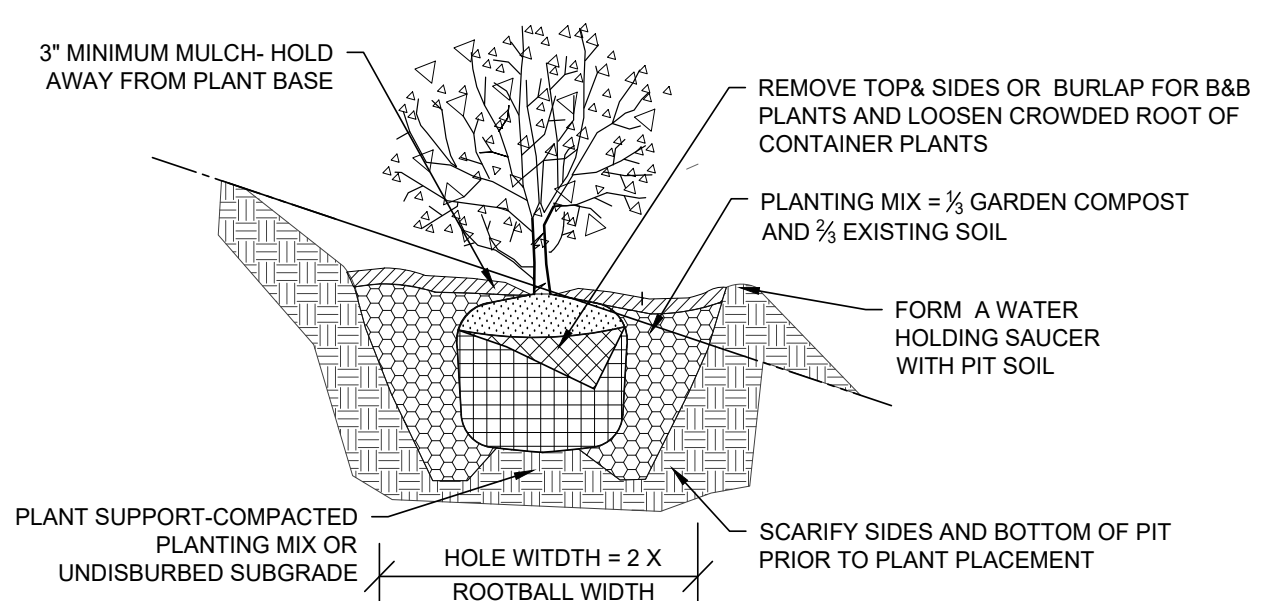
3 GROUNDCOVER PLANTING DETAIL  
L2 NOT TO SCALE



4 PEA GRAVEL EDGING DETAIL  
L2 NOT TO SCALE



5 SHRUB PLANTING DETAIL  
L2 NOT TO SCALE



6 SLOPE PLANTING DETAIL  
L2 NOT TO SCALE



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17650 MEINIG AVENUE  
SANDY, OR 97055

REVISIONS

No.	Description	Date

DRAWN BY: SJM

CHECKED BY: DH

JOB NO: 20-004

DATE: 07/16/2021

ISSUED FOR: DESIGN REVIEW

SHEET TITLE

SITE PLAN - EXISTING / DEMO

SHEET NO.

A-101

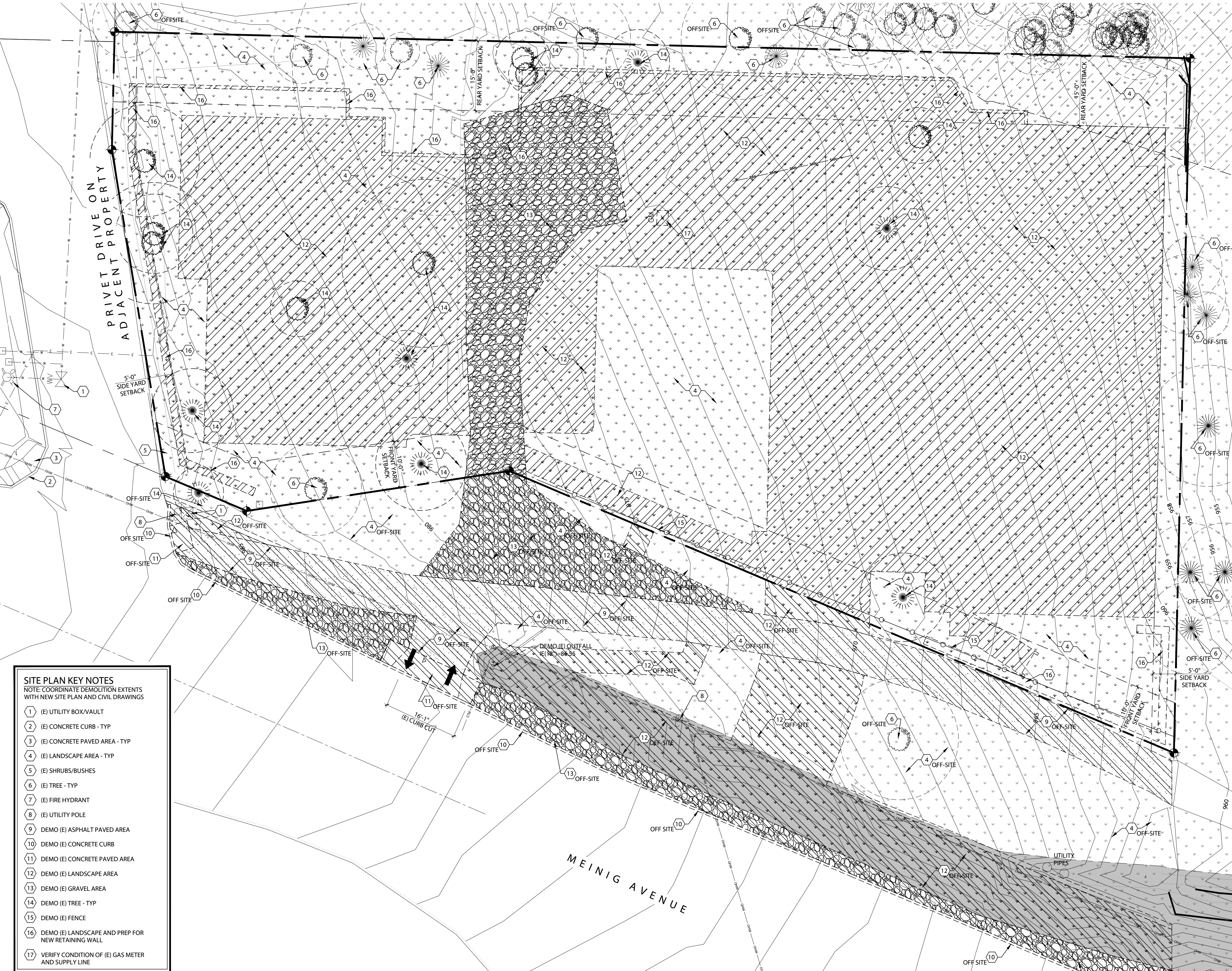
**SITE STATISTICS - EXISTING (ON SITE)**

TOTAL SITE AREA (AS SURVEYED):	25,869 SF	100%
(0.59 ACRES)		
IMPERVIOUS AREA:		
BUILDING FOOTPRINT (EXISTING):	0 SF	
HARDSCAPE (EXISTING):	0 SF	
EXISTING IMPERVIOUS AREA:	0 SF	0%
PERVIOUS AREA (GRAVEL):	1,620 SF	(6%)
PERVIOUS AREA (LANDSCAPE):	24,249 SF	(94%)
EXISTING PERVIOUS AREA:	25,869 SF	100%
EXISTING VEHICLE PARKING COUNTS:		
SITE IS UNDEVELOPED AND NO VEHICLE PARKING EXISTS		
EXISTING BICYCLE PARKING:		
SITE IS UNDEVELOPED AND NO BICYCLE PARKING EXISTS		
<b>SITE STATISTICS - EXISTING (OFF SITE)</b>		
IMPERVIOUS AREA:		
EXISTING TOTAL PERVIOUS AREA:	2,156 SF	
ASPHALT SIDEWALK (DEMO):	<2,022 SF>	
CONC. CURB RAMP (DEMO):	<134 SF>	
EXISTING IMPERVIOUS TO REMAIN:	0 SF	
PERVIOUS AREA:		
EXISTING TOTAL PERVIOUS AREA:	8,243 SF	
GRAVEL (DEMO):	<1,882 SF>	
LANDSCAPE (DEMO):	<2,690 SF>	
EXISTING LANDSCAPE TO REMAIN:	3,671 SF	

NOTE: TOTAL ADJACENT OFF-SITE AREA IS ALSO REDUCED DUE TO RELOCATION OF THE STREET CURB AS A RESULT OF WIDENING THE ROAD.

**SITE PLAN LEGEND**

	(E) CONCRETE
	(E) ASPHALT
	(E) LANDSCAPE
	(E) GRAVEL
	(E) FLOOD SLOPE HAZARD ZONE
	(E) DRAINAGE DITCH
	DEMO AREA
	(E) PROPERTY LINE
	(E) FENCE LINE
	(E) BUILDING FOOTPRINT
	(E) CONTOUR LINE - SEE CIVIL
	(E) SIGN
	(E) TREE - EVERGREEN
	(E) TREE - DECIDUOUS
	(E) SHRUBBERY
	(E) STORMWATER INLET
	(E) FIRE HYDRANT - OR - FDC
	(E) GAS METER
	VEHICLE CIRCULATION
	BUILDING ENTRY/EXIT



**SITE PLAN KEY NOTES**

NOTE: COORDINATE DEMOLITION EXTENTS WITH NEW SITE PLAN AND CIVIL DRAWINGS

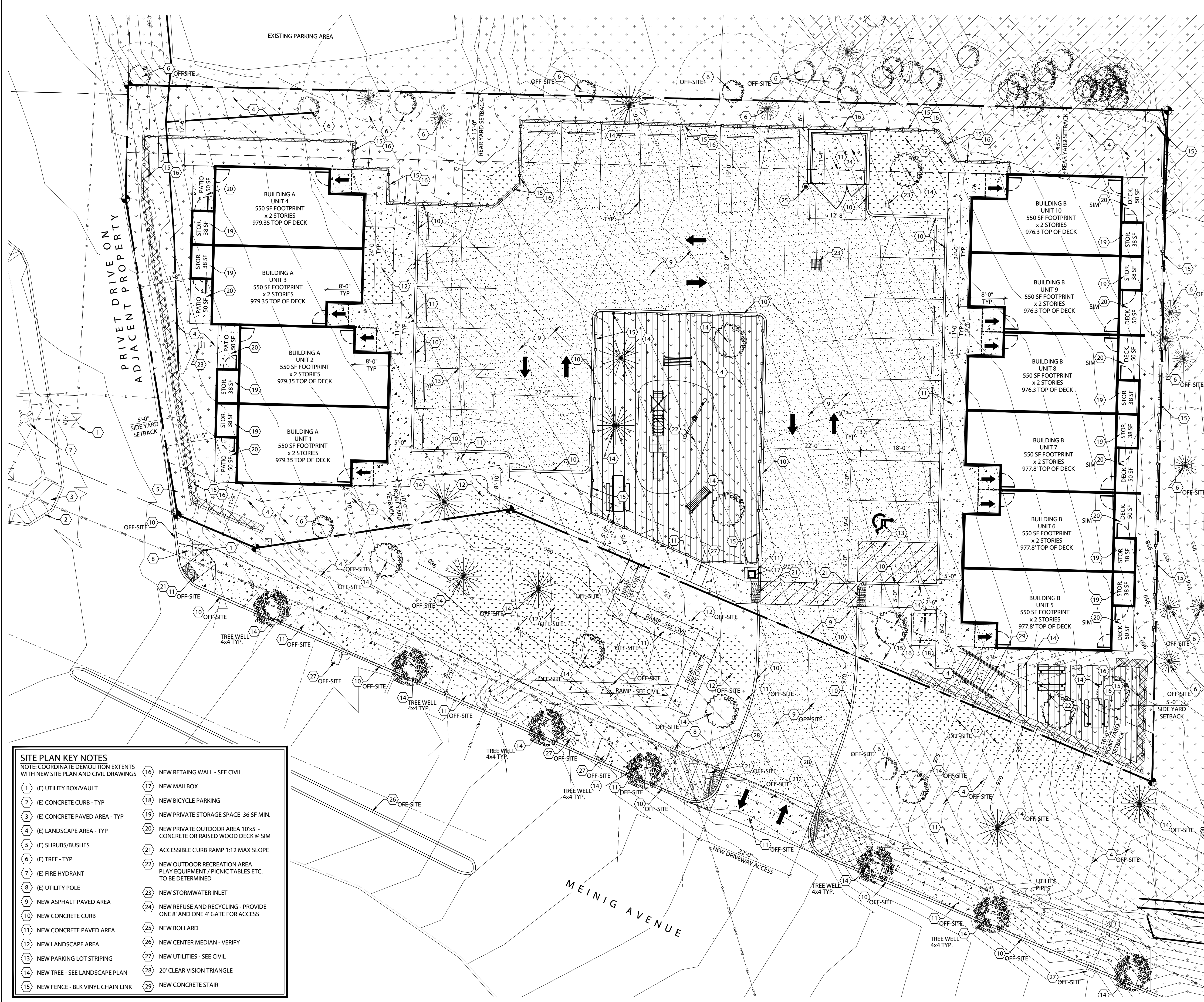
1	(E) UTILITY BOX/VAULT
2	(E) CONCRETE CURB - TYP
3	(E) CONCRETE PAVED AREA - TYP
4	(E) LANDSCAPE AREA - TYP
5	(E) SHRUBS/BUSHES
6	(E) TREE - TYP
7	(E) FIRE HYDRANT
8	(E) UTILITY POLE
9	DEMO (E) ASPHALT PAVED AREA
10	DEMO (E) CONCRETE CURB
11	DEMO (E) CONCRETE PAVED AREA
12	DEMO (E) LANDSCAPE AREA
13	DEMO (E) GRAVEL AREA
14	DEMO (E) TREE - TYP
15	DEMO (E) FENCE
16	DEMO (E) LANDSCAPE AND PREP FOR NEW RETAINING WALL
17	VERIFY CONDITION OF (E) GAS METER AND SUPPLY LINE

**1 SITE PLAN - EXISTING / DEMO**  
SCALE: 1" = 10'-0"



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**SITE PLAN KEY NOTES**  
NOTE: COORDINATE DEMOLITION EXTENTS WITH NEW SITE PLAN AND CIVIL DRAWINGS

1 (E) UTILITY BOX/Vault	16 NEW RETAINING WALL - SEE CIVIL
2 (E) CONCRETE CURB - TYP	17 NEW MAILBOX
3 (E) CONCRETE PAVED AREA - TYP	18 NEW BICYCLE PARKING
4 (E) LANDSCAPE AREA - TYP	19 NEW PRIVATE STORAGE SPACE 36 SF MIN.
5 (E) SHRUBS/BUSHES	20 NEW PRIVATE OUTDOOR AREA 10'x5' CONCRETE OR RAISED WOOD DECK @ SIM
6 (E) TREE - TYP	21 ACCESSIBLE CURB RAMP 1:12 MAX SLOPE
7 (E) FIRE HYDRANT	22 NEW OUTDOOR RECREATION AREA PLAY EQUIPMENT / PICNIC TABLES ETC. TO BE DETERMINED
8 (E) UTILITY POLE	23 NEW STORMWATER INLET
9 NEW ASPHALT PAVED AREA	24 NEW REFUSE AND RECYCLING - PROVIDE ONE 8' AND ONE 4' GATE FOR ACCESS
10 NEW CONCRETE CURB	25 NEW BOLLARD
11 NEW CONCRETE PAVED AREA	26 NEW CENTER MEDIAN - VERIFY
12 NEW LANDSCAPE AREA	27 NEW UTILITIES - SEE CIVIL
13 NEW PARKING LOT STRIPING	28 20' CLEAR VISION TRIANGLE
14 NEW TREE - SEE LANDSCAPE PLAN	29 NEW CONCRETE STAIR
15 NEW FENCE - BLK VINYL CHAIN LINK	

**1 SITE PLAN - PROPOSED**  
SCALE: 1" = 10'-0"

**SITE STATISTICS - PROPOSED (ON SITE)**

TOTAL SITE AREA (AS SURVEYED): 25,869 SF 100% (0.59 ACRES)

IMPERVIOUS AREA:  
BUILDING FOOTPRINT (NEW): 5,500 SF  
10 @ 550 SF (LIVING AREA) + 38 SF (STORAGE)

HARDSCAPE ASPHALT/CONC (NEW): 11,760 SF  
PROPOSED IMPERVIOUS AREA: 17,260 SF 67%

PERVIOUS LANDSCAPE AREA:  
EXISTING LANDSCAPE TO REMAIN: 8,003 SF  
NEW LANDSCAPE: 606 SF  
PROPOSED PERVIOUS AREA: 8,609 SF 33%

NOTE: PROPOSED REQUIRED OUTDOOR RECREATION AREA IS APPROXIMATELY 2,430 SF OF THE PROPOSED LANDSCAPE AREA

PROPOSED VEHICLE PARKING COUNTS:  
BASED ON 2 STALLS PER 2 BED UNIT  
10 UNITS = 20 STALLS  
21 STALLS PROVIDED INCLUDING ONE ACCESSIBLE

PERCENTAGE OF STREET FRONTAGE OCCUPIED BY PARKING:  
TOTAL FRONTAGE DIMENSION: 235'-0"  
TOTAL FRONTAGE OCCUPIED BY PARKING AND MANEUVERING MINUS DRIVE ACCESS: 58'-0" (25%)

NEW BICYCLE PARKING:  
1 STALL PER DWELLING UNIT REQUIRED. TENANT BICYCLE PARKING SPACE PROVIDED VIA HANGING RACK WITHIN INDIVIDUAL ATTACHED STORAGE SPACE.  
2 PUBLIC STALLS MEASURING 2.5 FEET BY 6 FEET ARE PROVIDED ADJACENT TO THE SITE DRIVEWAY ACCESS.

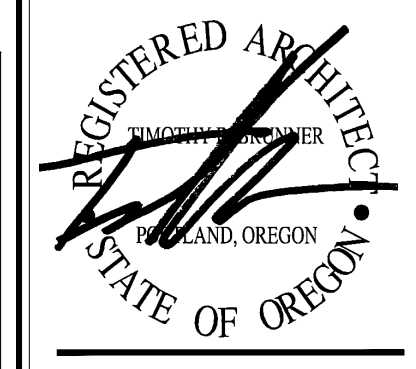
**SITE STATISTICS - PROPOSED (OFF SITE)**

IMPERVIOUS AREA:  
ASPHALT ACCESS DRIVE (NEW): 1,004 SF  
CONC SIDEWALK (NEW): 11,760 SF  
PROPOSED NEW IMPERVIOUS AREA: 12,764 SF

PERVIOUS LANDSCAPE AREA:  
EXISTING LANDSCAPE TO REMAIN: 3,671 SF  
NEW LANDSCAPE: 2,238 SF  
NEW STREET TREE WELLS @ 16 SF: 80 SF  
PROPOSED PERVIOUS AREA: 5,989 SF

**SITE PLAN LEGEND**

(E) CONCRETE	(E) CONTOUR LINE - SEE CIVIL
(N) CONCRETE	(N) CONTOUR LINE - SEE CIVIL
(E) ASPHALT	(E) PROPERTY LINE
(N) ASPHALT	(E) FENCE LINE
(E) LANDSCAPE	(N) FENCE LINE
(N) LANDSCAPE	(E) BUILDING FOOTPRINT
(N) LANDSCAPE RECREATION AREA	(N) BUILDING FOOTPRINT
(E) FLOOD SLOPE HAZARD ZONE	(E) CONTOUR LINE - SEE CIVIL
(E) PROPERTY LINE	(N) CONTOUR LINE - SEE CIVIL
(E) FENCE LINE	NEW RETAINING WALL
(N) FENCE LINE	(E) OR NEW SITE LIGHTING
(E) BUILDING FOOTPRINT	(E) OR NEW SIGN
(N) BUILDING FOOTPRINT	(E) OR NEW TREE - EVERGREEN
(E) CONTOUR LINE - SEE CIVIL	(E) OR NEW TREE - DECIDUOUS
(N) CONTOUR LINE - SEE CIVIL	(E) OR NEW SHRUBBERY
NEW RETAINING WALL	(E) OR NEW STORMWATER INLET
(E) OR NEW SITE LIGHTING	(E) OR NEW FIRE HYDRANT / FDC
(E) OR NEW SIGN	(E) OR NEW GAS METER
(E) OR NEW TREE - EVERGREEN	VEHICLE CIRCULATION
(E) OR NEW TREE - DECIDUOUS	BUILDING ENTRY/EXIT
(E) OR NEW SHRUBBERY	
(E) OR NEW STORMWATER INLET	
(E) OR NEW FIRE HYDRANT / FDC	
(E) OR NEW GAS METER	



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**THE PAD**  
**TOWNHOME APARTMENTS**  
17650 MEINIG AVENUE  
SANDY, OR 97055

**REVISIONS**

No.	Description	Date

DRAWN BY: SJM  
CHECKED BY: DH  
JOB NO: 20-004  
DATE: 07/16/2021  
ISSUED FOR: DESIGN REVIEW  
SHEET TITLE:  
SITE PLAN - PROPOSED

SHEET NO.  
**A-102**





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DATE: 07/16/2021

ISSUED FOR: DESIGN REVIEW

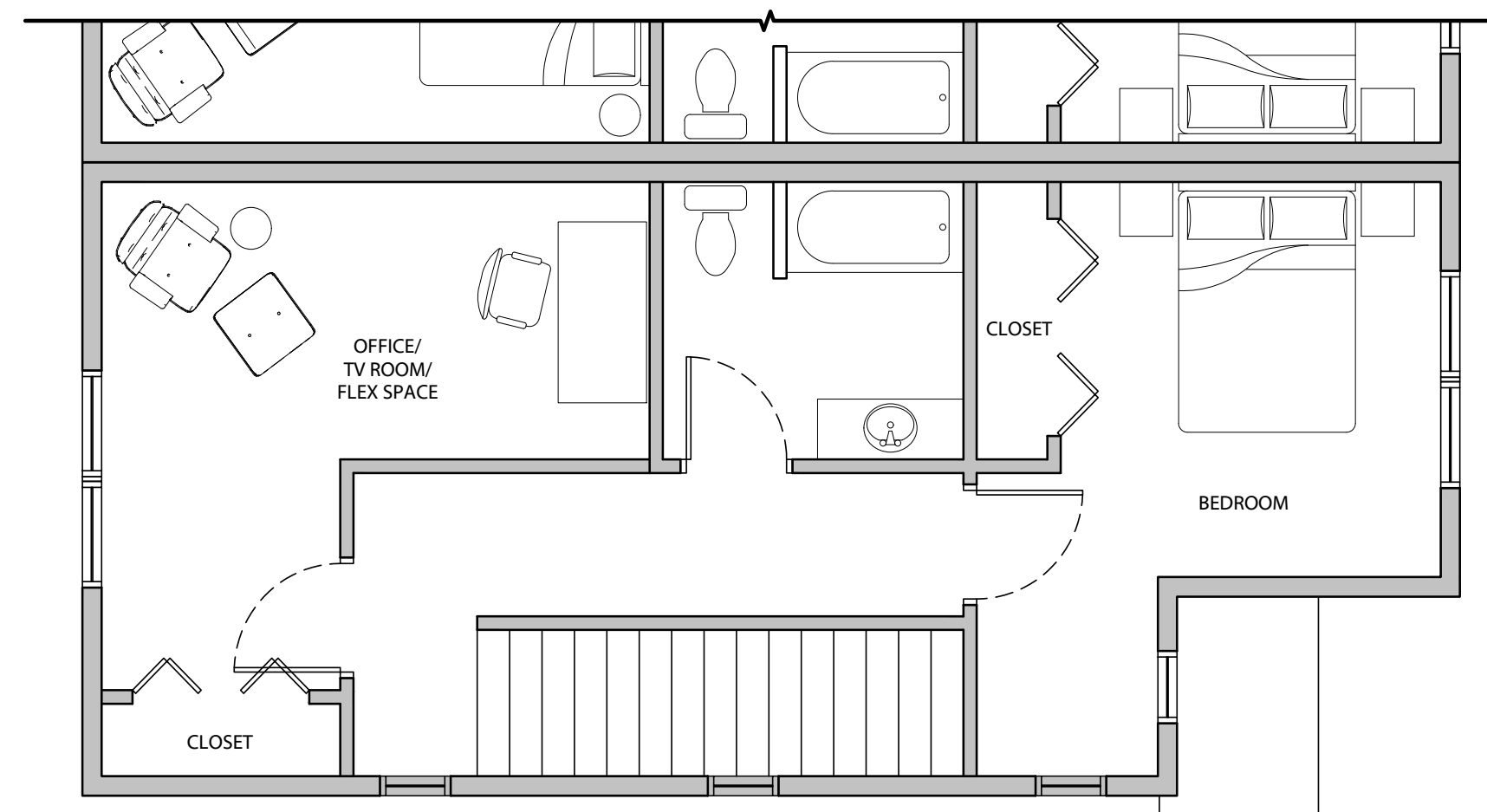
SHEET TITLE

FIRST AND SECOND FLOOR PLANS

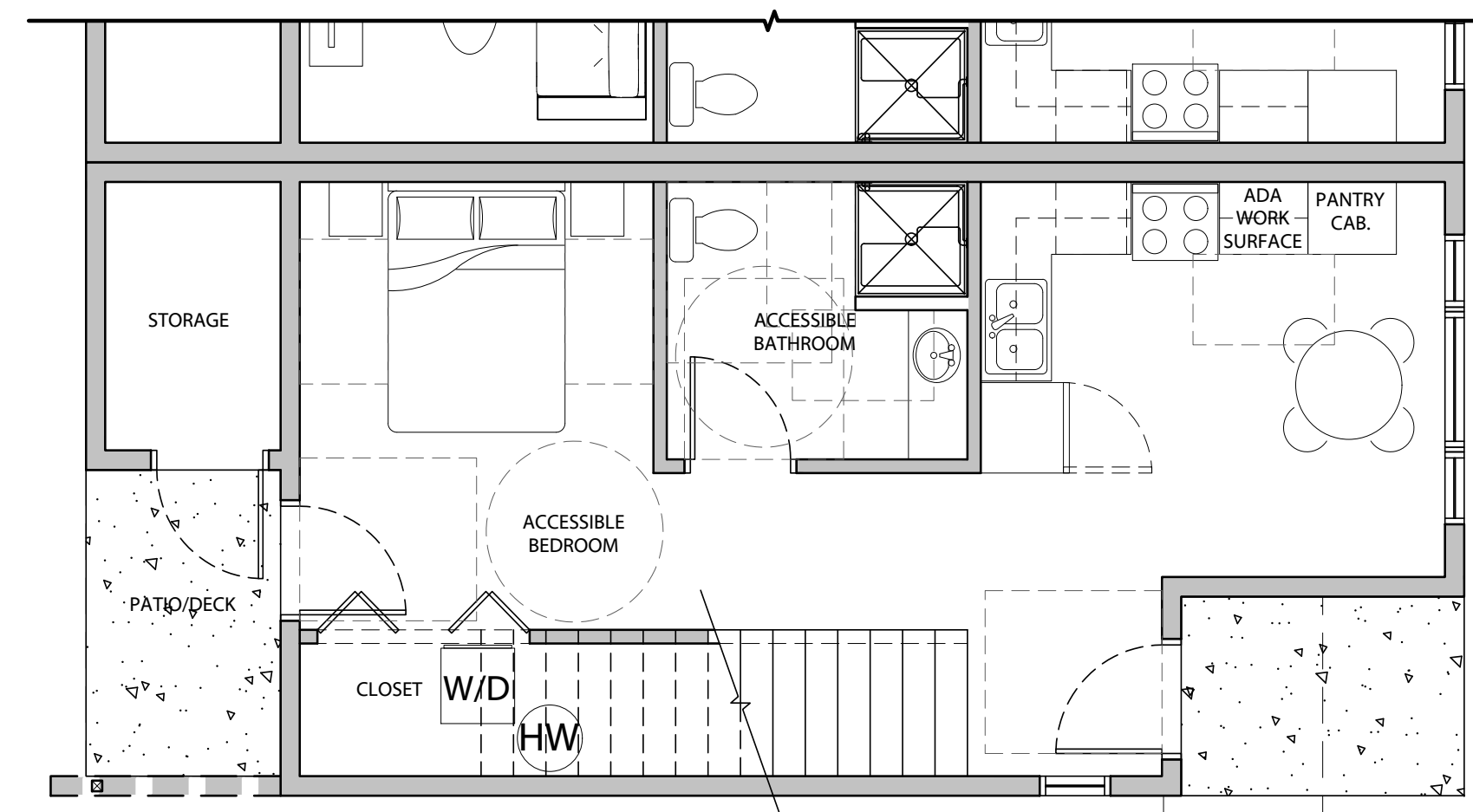
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SHEET NO.

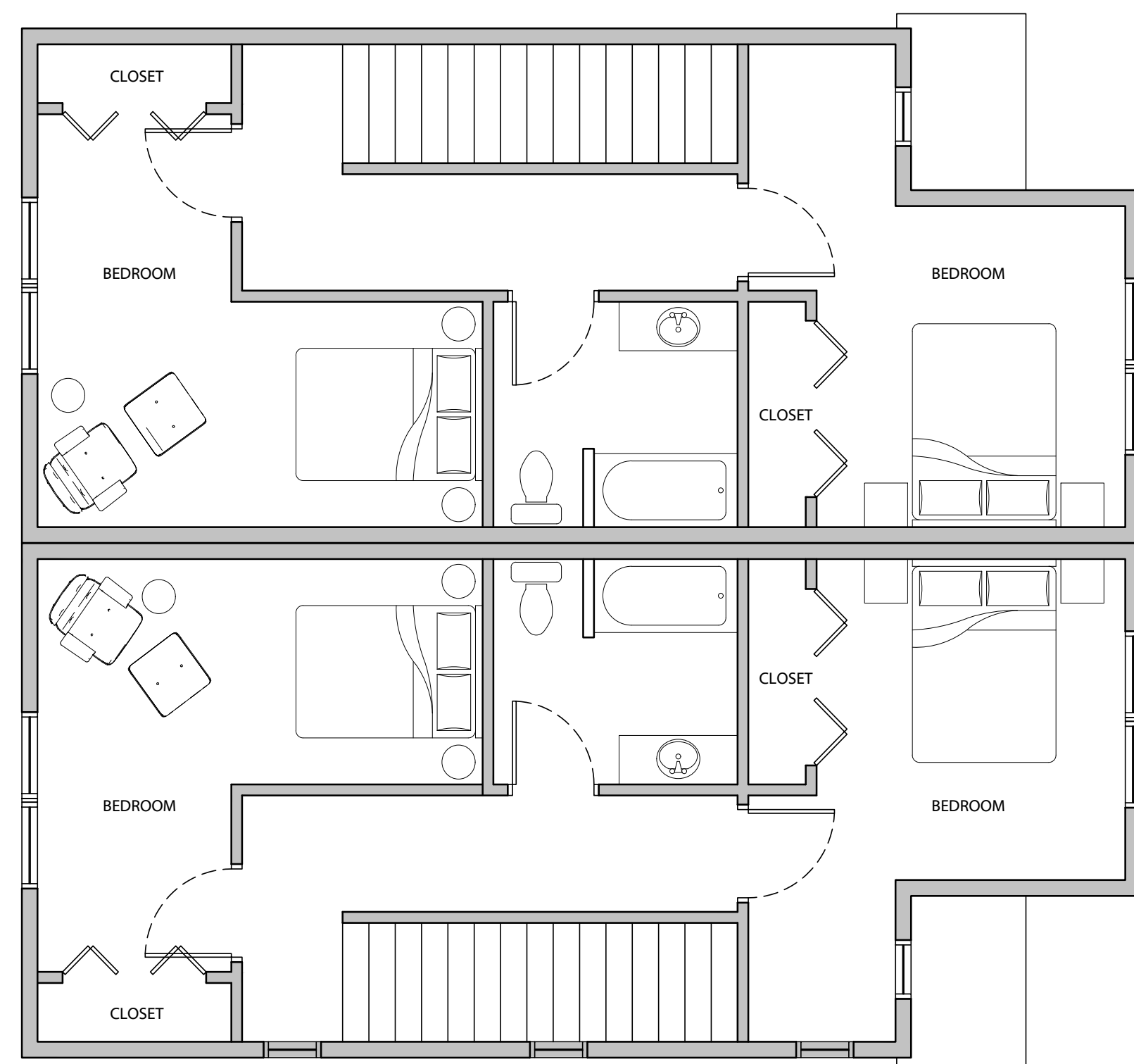
A-201



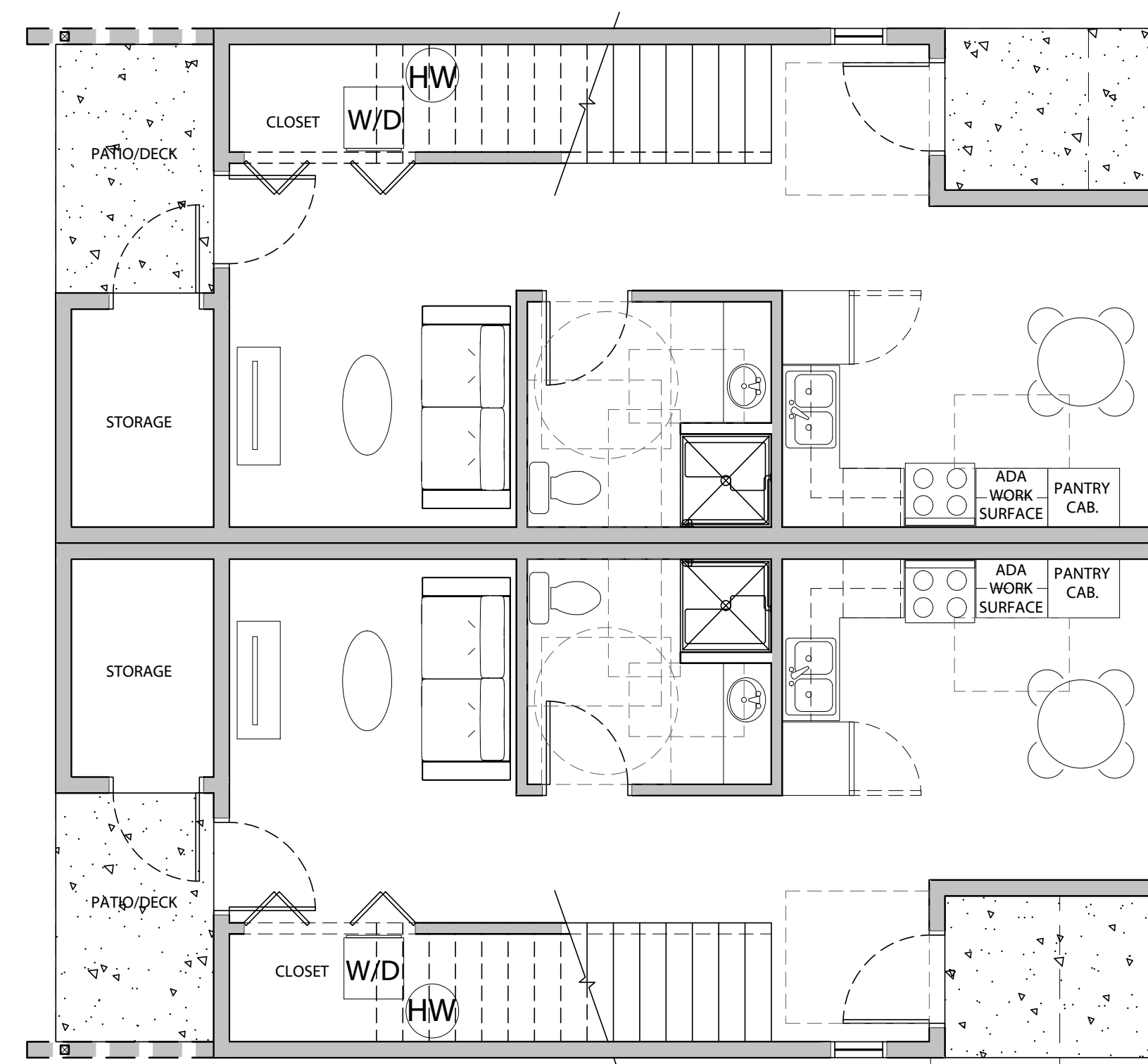
4 SECOND FLOOR PLAN - ACCESSIBLE UNIT  
 SCALE: 1/4" = 1'-0"



3 FIRST FLOOR PLAN - ACCESSIBLE UNIT  
 SCALE: 1/4" = 1'-0"



2 SECOND FLOOR PLAN - STANDARD UNIT  
 SCALE: 1/4" = 1'-0"



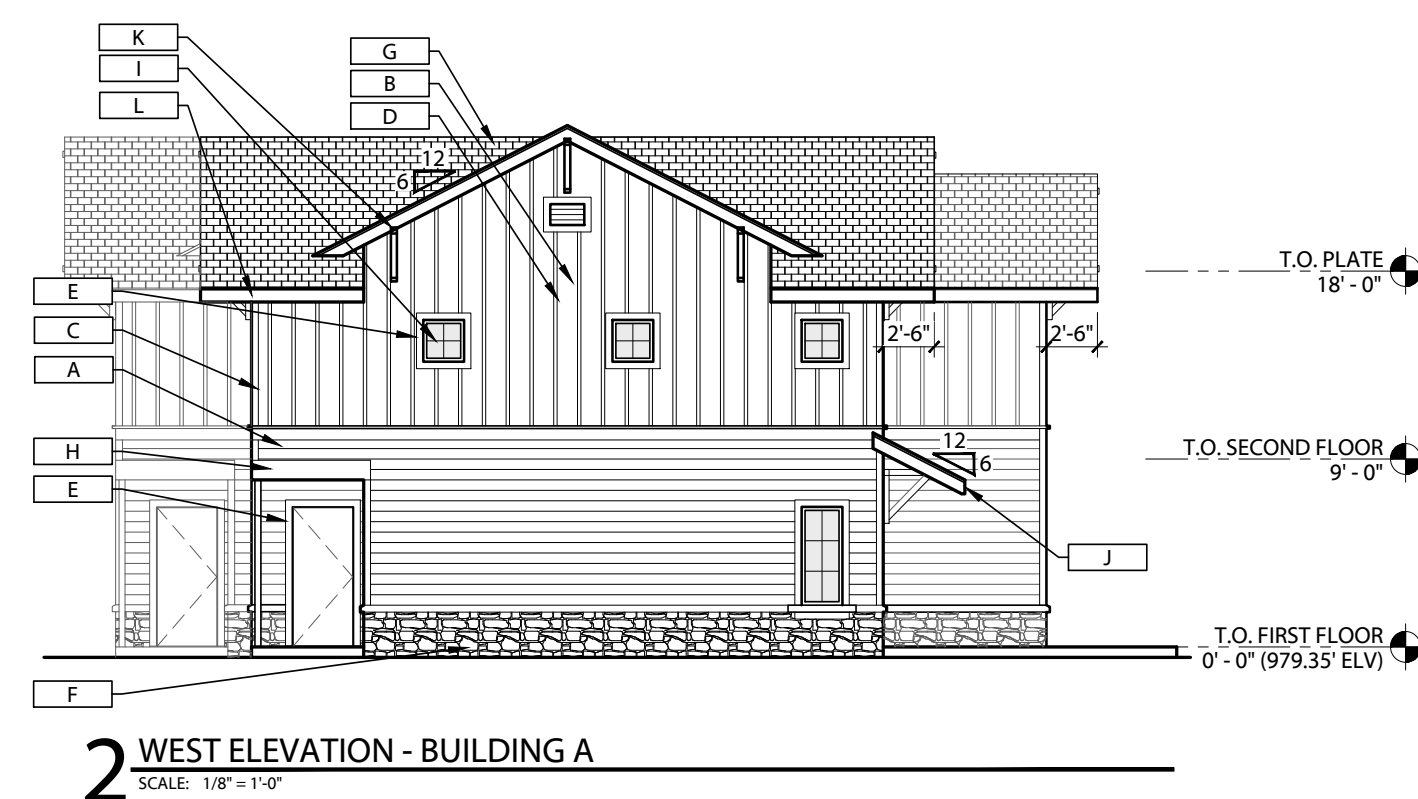
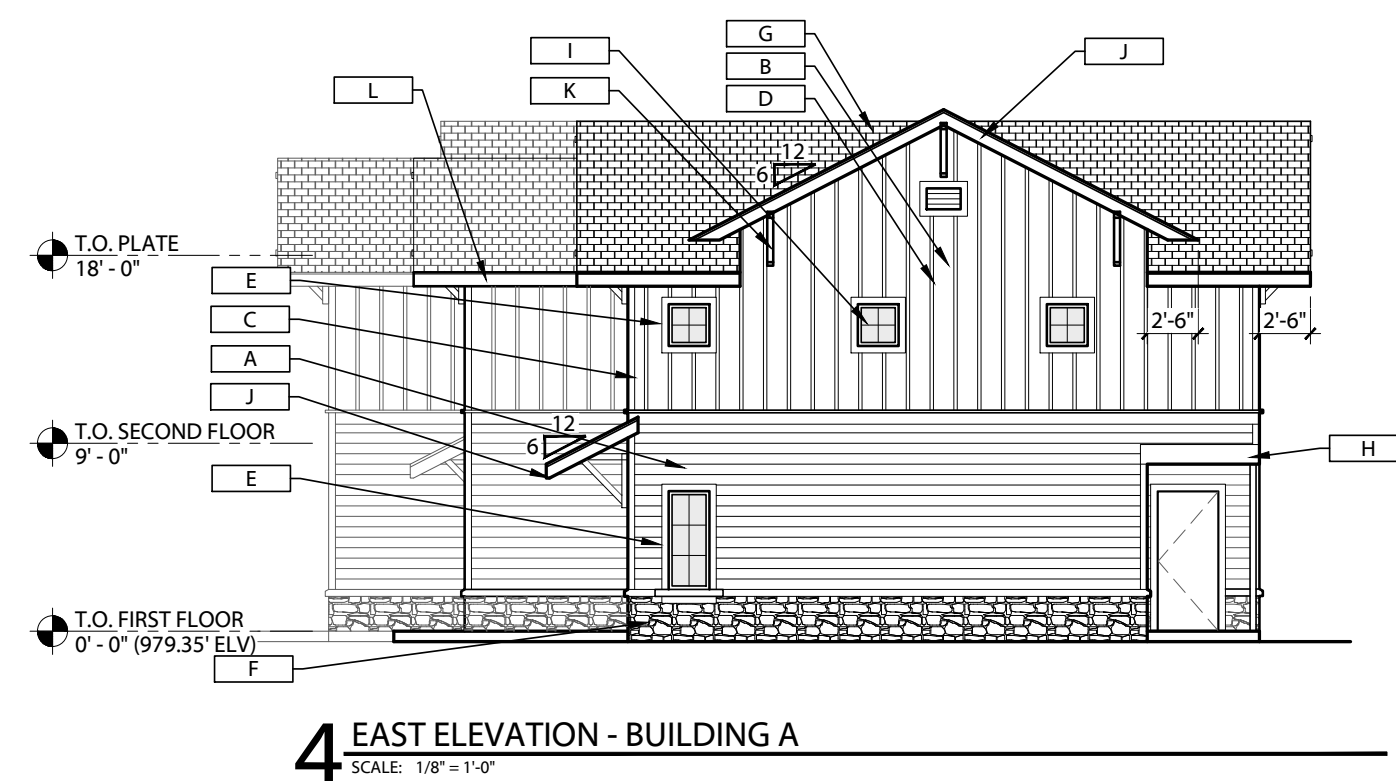
1 FIRST FLOOR PLAN - STANDARD UNIT  
 SCALE: 1/4" = 1'-0"



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EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
A	LAP SIDING	JAMES HARDIE	SELECT CEDAR MILL	WARM WHISKY	8 1/2" (7" EXPOSURE)	
B	HARDIE PANEL	JAMES HARDIE	SELECT CEDAR MILL	COBBLE STONE	PANEL	
C	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	5.5"	
D	HARDIE TRIM	JAMES HARDIE	1/2" RUSTIC GRAIN BATTEN BOARDS	COBBLE STONE	2.5"	
E	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	3.5"	
F	CULTURED STONE	MUTUAL MATERIALS	COUNTRY LEDGE STONE	SKYLINE	VARIES	
G	ASPHALT SHINGLES	OWENS CORNING	OAKRIDGE	BROWNWOOD		
H	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	11.25"	
I	VINYL WINDOWS	TBD	TBD	WHITE	VARIES	LOW-E, INSULATED GLASS

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
J	WOOD RAKE	N/A	RAKE BOARD	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER
K	WOOD BRACKET	EKENA MILLWORK	WOOD BRACKET	ARCTIC WHITE	32" X 32"	4"X4" ROUGH SAWN LUMBER - WRC OR DF
L	WOOD FASCIA	N/A	WOOD FASCIA	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER

**ELEVATIONS GENERAL NOTES**

- MATERIAL MANUFACTURERS AND FINISH TO BE DETERMINED.
- COLORS SHALL BE IN MUTED EARTH TONE PALETTE AS SUGGESTED BY SANDY STYLE DEVELOPMENT CODE - SEE COLOR RENDERS INCLUDED WITH THIS SUBMISSION

REVISIONS		
No.	Description	Date

DRAWN BY: SJM  
 CHECKED BY: DH  
 JOB NO: 20-004  
 DATE: 07/16/2021  
 ISSUED FOR: DESIGN REVIEW  
 SHEET TITLE  
 EXTERIOR ELEVATIONS  
 PROPOSED NORTH BUILDING "A"  
 SHEET NO.

A-221



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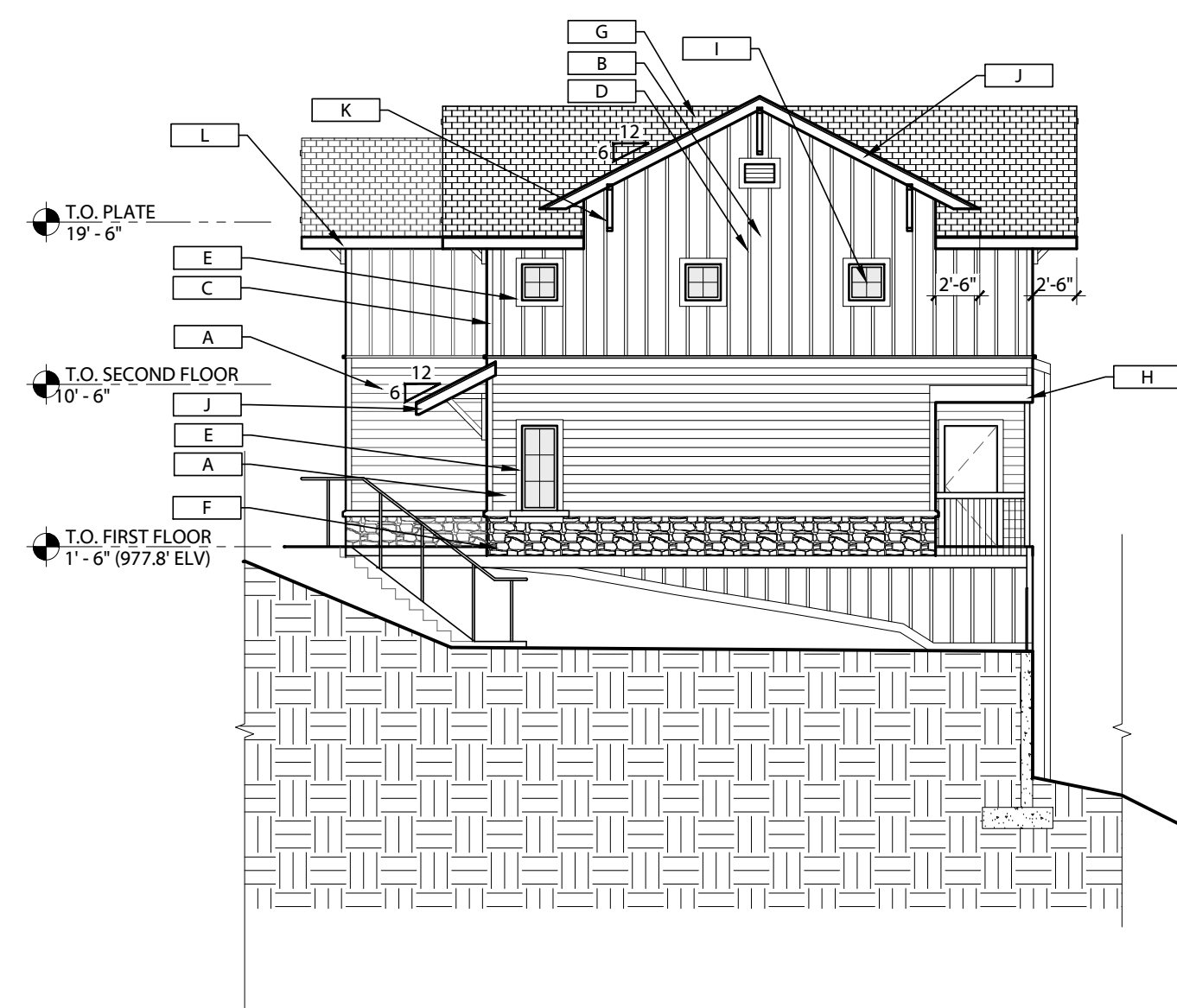
SHEET TITLE

EXTERIOR ELEVATIONS

PROPOSED SOUTH BUILDING "B"

SHEET NO.

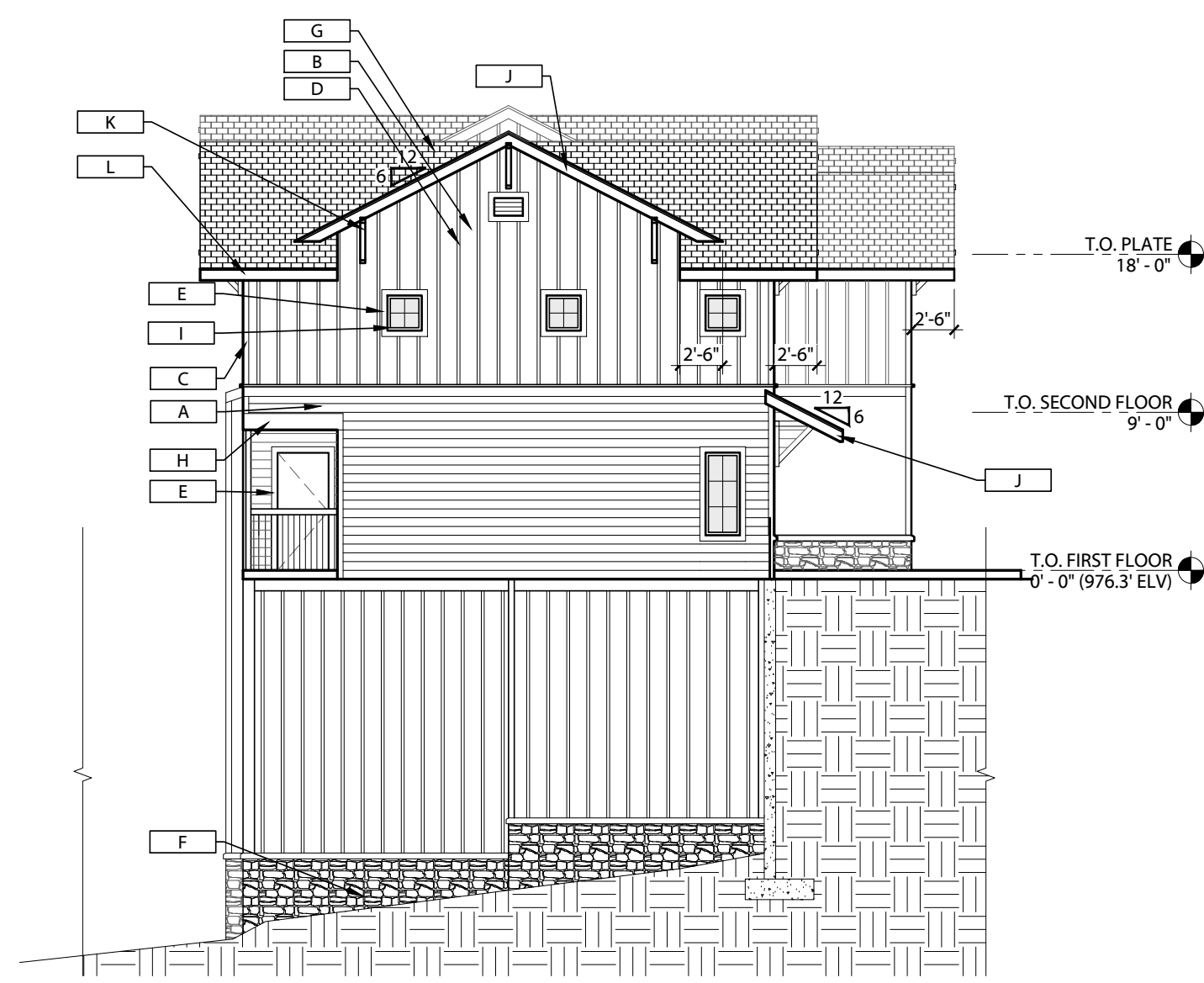
A-222



4 WEST ELEVATION - BUILDING B  
 SCALE: 1/8" = 1'-0"



3 SOUTH ELEVATION - BUILDING B  
 SCALE: 1/8" = 1'-0"



2 EAST ELEVATION - BUILDING B  
 SCALE: 1/8" = 1'-0"



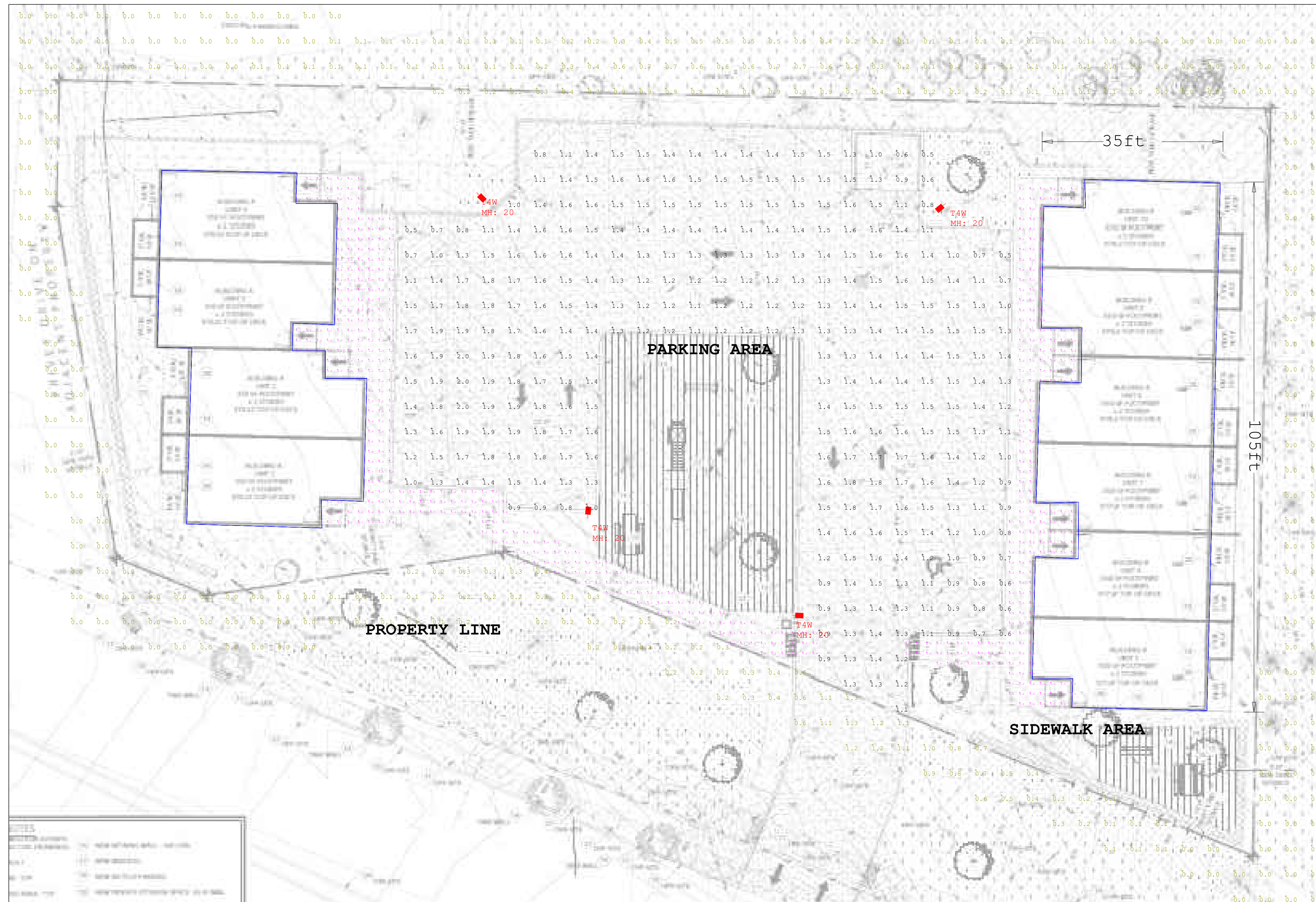
1 NORTH ELEVATION - BUILDING B  
 SCALE: 1/8" = 1'-0"

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION		DIM.	ADDITIONAL INFO
A	LAP SIDING	JAMES HARDIE	SELECT CEDAR MILL	WARM WHISKY	8 1/2" (7" EXPOSURE)	
B	HARDIE PANEL	JAMES HARDIE	SELECT CEDAR MILL	COBBLE STONE	PANEL	
C	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	5.5"	
D	HARDIE TRIM	JAMES HARDIE	3/4" RUSTIC GRAIN BATTEN BOARDS	COBBLE STONE	2.5"	
E	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	3.5"	
F	CULTURED STONE	MUTUAL MATERIALS	COUNTRY LEDGE STONE	SKYLINE	VARIES	
G	ASPHALT SHINGLES	OWENS CORNING	OAKRIDGE	BROWNWOOD		
H	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	11.25"	
I	VINYL WINDOWS	TBD	TBD	WHITE	VARIES	LOW-E, INSULATED GLASS

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION		DIM.	ADDITIONAL INFO
J	WOOD RAKE	N/A	RAKE BOARD	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER
K	WOOD BRACKET	EKENA MILLWORK	WOOD BRACKET	ARCTIC WHITE	32" X 32"	4"X4" ROUGH SAWN LUMBER - WRC OR DF
L	WOOD FASCIA	N/A	WOOD FASCIA	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER

ELEVATIONS GENERAL NOTES

- MATERIAL MANUFACTURERS AND FINISH TO BE DETERMINED.  
 - COLORS SHALL BE IN MUTED EARTH TONE PALETTE AS SUGGESTED BY SANDY STYLE DEVELOPMENT CODE - SEE COLOR RENDERERS INCLUDED WITH THIS SUBMISSION



Luminaire Schedule							
Symbol	Label	Qty	Lum. Watts	Lum. Lumens	LLF	Arrangement	Description
	T4W	4	49.8	6245	0.850	SINGLE	RAR1-80L-50-4K7-4W

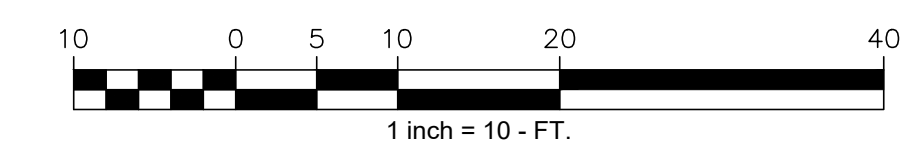
Note:

Calculation Grid (5ft x 5ft) @ Ground Level.

SidewalkGrid (2ft x 2ft) @ Ground Level.

Luminaire mounting heights are noted on each Luminaire Label.

Calculation Summary								
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	
Parking area	Illuminance	Fc	1.37	2.0	0.5	2.74	4.00	
Property line	Illuminance	Fc	0.16	1.3	0.0	N.A.	N.A.	
Sidewalk area	Illuminance	Fc	0.58	1.5	0.0	N.A.	N.A.	



# LT-1

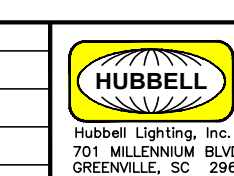
THIS LIGHTING DESIGN IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO HUBBELL LIGHTING. SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.

2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.

3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

TITLE: **PHOTOMETRIC PLAN**  
The Pad Townhouses Sandy OR

REVISED FROM DRAWING NUMBER(S):  
20-26577  
20-26577R1



DATE: 05-27-2021  
SCALE: AS NOTED  
DRAWING DESIGN NO.: 20-26577R2

# Exhibit D



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THE PAD  
 TOWNHOME APARTMENTS  
 17850 MEINING AVE  
 SANDY, OR 97055

REVISIONS		
No.	Description	Date

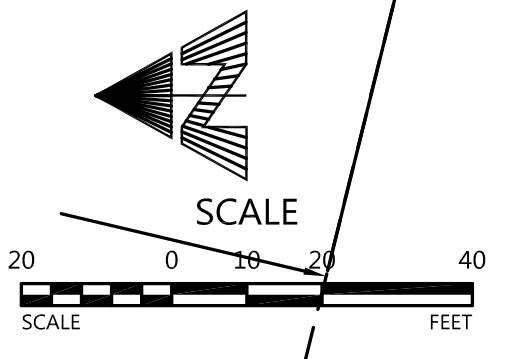
DRAWN BY: GTK  
 CHECKED BY: GTK  
 JOB NO: 20-004  
 DATE: 8/31/2021  
 ISSUED FOR: DESIGN REVIEW  
 SHEET TITLE  
 GRADING AND  
 EROSION CONTROL  
 PLAN

SHEET NO.  
**C 4.0**

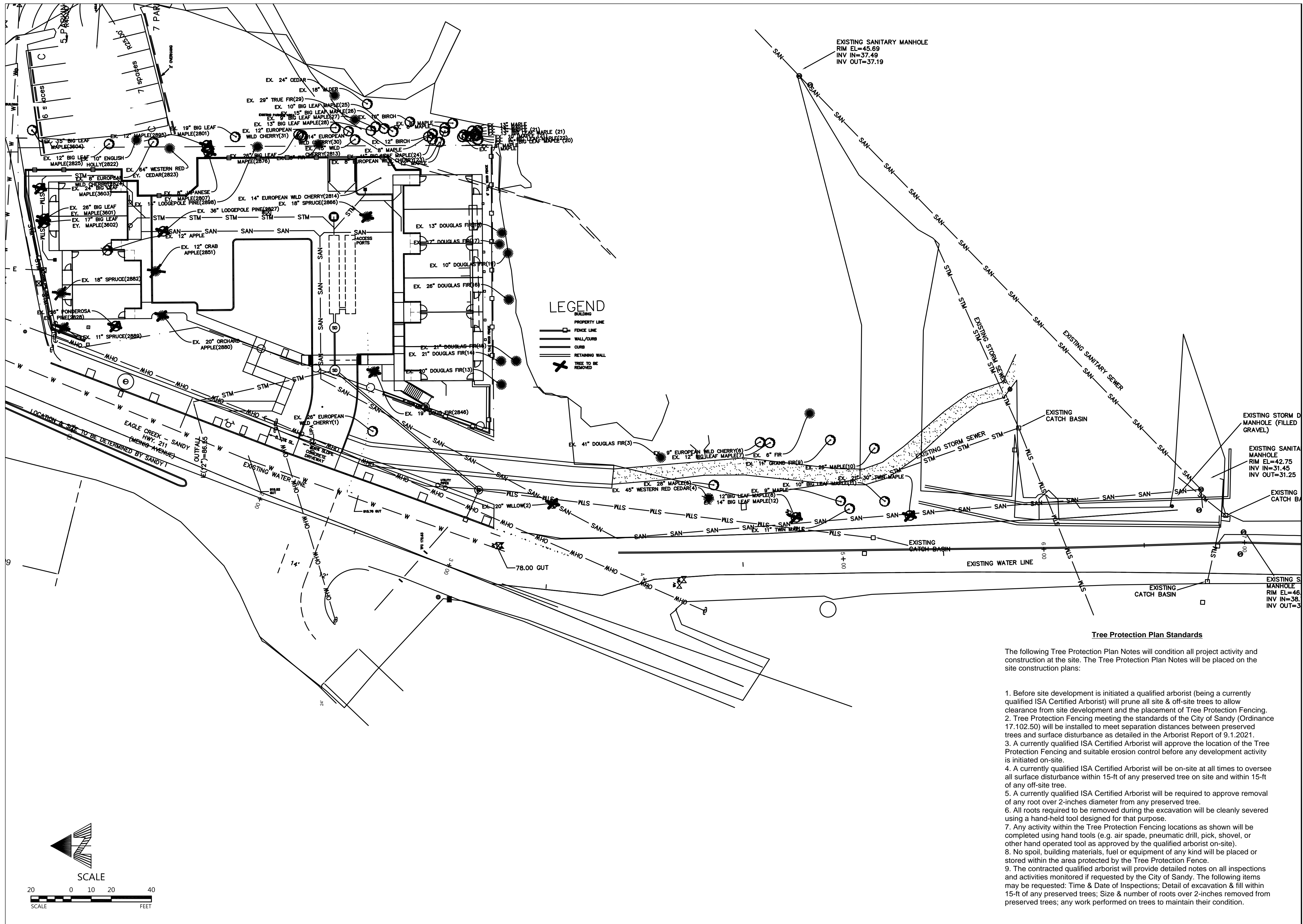


**LEGEND**

- BUILDING
- PROPERTY LINE
- FENCE LINE
- WALL/CURB
- CURB
- RETAINING WALL
- TREE TO BE REMOVED



C:\Users\greg\Contacts\Desktop\PROJECT FILES\2804 The Pad Sandy\PreApp Drawings Revised 8-27-21\2804 THE PAD PRELIMINARY PLAI  
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**Tree Protection Plan Standards**

The following Tree Protection Plan Notes will condition all project activity and construction at the site. The Tree Protection Plan Notes will be placed on the site construction plans:

1. Before site development is initiated a qualified arborist (being a currently qualified ISA Certified Arborist) will prune all site & off-site trees to allow clearance from site development and the placement of Tree Protection Fencing.
2. Tree Protection Fencing meeting the standards of the City of Sandy (Ordinance 17.102.50) will be installed to meet separation distances between preserved trees and surface disturbance as detailed in the Arborist Report of 9.1.2021.
3. A currently qualified ISA Certified Arborist will approve the location of the Tree Protection Fencing and suitable erosion control before any development activity is initiated on-site.
4. A currently qualified ISA Certified Arborist will be on-site at all times to oversee all surface disturbance within 15-ft of any preserved tree on site and within 15-ft of any off-site tree.
5. A currently qualified ISA Certified Arborist will be required to approve removal of any root over 2-inches diameter from any preserved tree.
6. All roots required to be removed during the excavation will be cleanly severed using a hand-held tool designed for that purpose.
7. Any activity within the Tree Protection Fencing locations as shown will be completed using hand tools (e.g. air spade, pneumatic drill, pick, shovel, or other hand operated tool as approved by the qualified arborist on-site).
8. No spoil, building materials, fuel or equipment of any kind will be placed or stored within the area protected by the Tree Protection Fence.
9. The contracted qualified arborist will provide detailed notes on all inspections and activities monitored if requested by the City of Sandy. The following items may be requested: Time & Date of Inspections; Detail of excavation & fill within 15-ft of any preserved trees; Size & number of roots over 2-inches removed from preserved trees; any work performed on trees to maintain their condition.



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REVISIONS		
No.	Description	Date

DRAWN BY: GTK  
CHECKED BY: GTK  
JOB NO: 20-004  
DATE: 8/31/2021  
ISSUED FOR: DESIGN REVIEW  
SHEET TITLE  
**TREE PRESERVATION PLAN**

SHEET NO.  
C 5.0



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REVISIONS		
No.	Description	Date

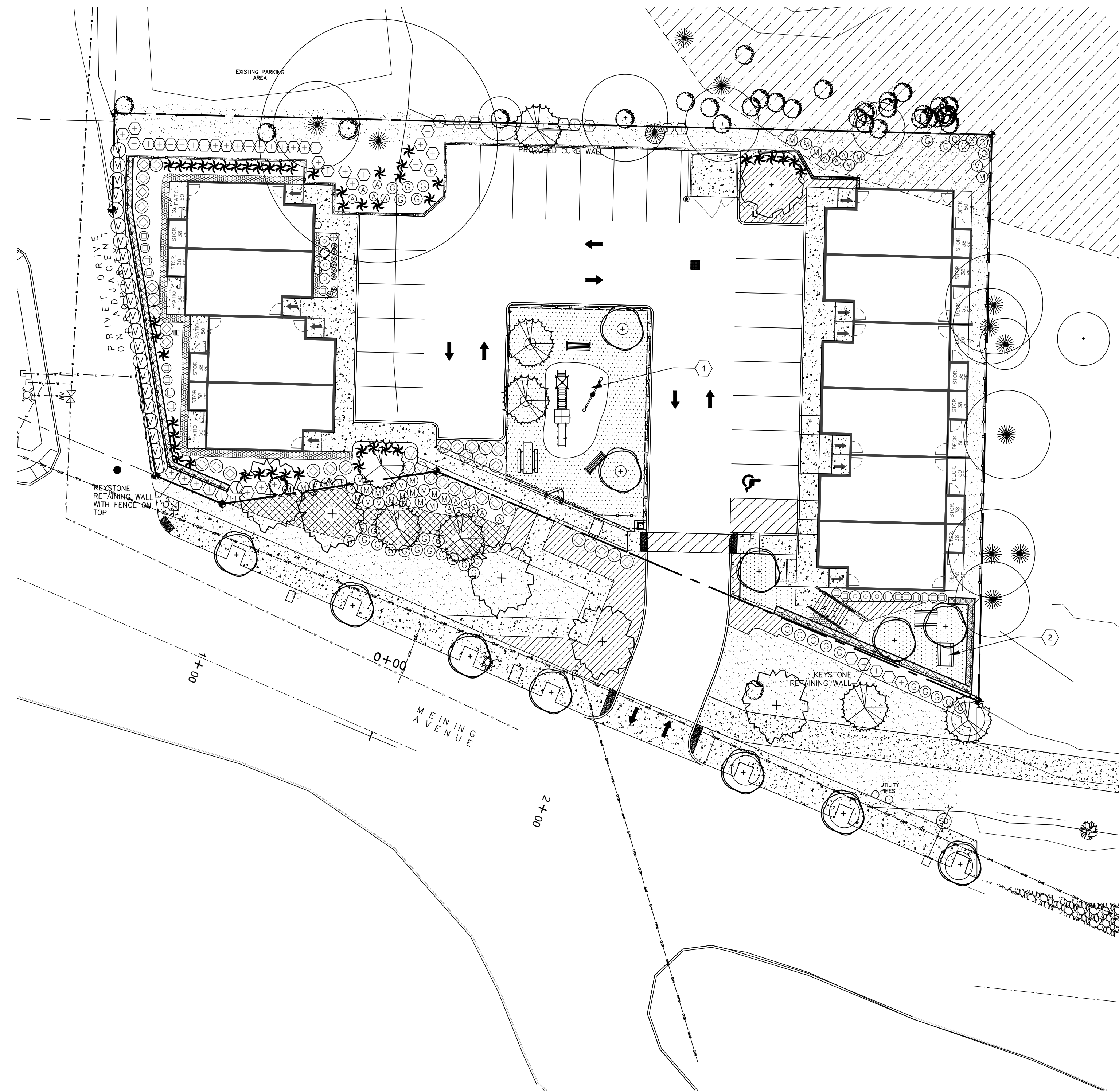
DRAWN BY: JJ  
 CHECKED BY: JJ  
 JOB NO: 20-004

DATE: 07/7/2021  
 ISSUED FOR: DESIGN REVIEW

SHEET TITLE: PLANTING PLAN

SHEET NO.

**L2**



**PLANT LIST**

TREES					
SYM	QUAN	BOTANICAL NAME/Common Name	SIZE	COMMENT	
(Symbol)	12	ACER BUERGERIANUM - TRIDENT MAPLE	1-1/2" CAL B&B	AS SHOWN	
(Symbol)	8	CALOCEDRUS DECURRENS - INCENSE CEDAR	6" HT MIN.	REMOVE LOWEST BRANCHES	
(Symbol)	1	QUERCUS FRAINETTO 'FOREST GREEN' FOREST GREEN OAK	2" CAL B&B	AS SHOWN	
(Symbol)	5	RHAMNUS PURSHIANA	1-1/2" CAL B&B	AS SHOWN	

**SHRUBS**

SYM	QUAN	BOTANICAL NAME	COMMON NAME	SIZE	COMMENT
(Symbol)	18	EUONYMUS FORTUNEI 'EMERALD GAJETY'	EMERALD GAJETY EUONYMUS	2 GAL	SPACE AS SHOWN
(Symbol)	4	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY	3 GAL	SPACE 42" O.C.
(Symbol)	1	JUNIPERUS VIRGINIANA 'BLUE ARROW'	BLUE ARROW JUNIPER	48" HT.B&B	AS SHOWN
(Symbol)	51	MAHONIA AQUIFOLIUM	OREGON GRAPE	2 GAL	FULLY BRANCHED
(Symbol)	1	NANDINA DOMESTICA 'WOODS DWARF'	WOODS DWARF HEAVENLY BAMBOO	2 GAL	SPACE AS SHOWN
(Symbol)	30	PHILADELPHUS LEWISII	MOCKORANGE	2 GAL	SPACE AS SHOWN
(Symbol)	38	ROSA GYMNOCARPA	BALDHIP ROSE	2 GAL	AS SHOWN
(Symbol)	20	SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	2 GAL	AS SHOWN
(Symbol)	6	SPIRAEA X BUMALDA 'GOLDMOUND'	GOLDMOUND BUMALD SPIREA	2 GAL	AS SHOWN
(Symbol)	2	VIBURNUM DAVIDII	DAVID VIBURNUM	3 GAL	AS SHOWN
(Symbol)	23	VIBURNUM TINUS	LAURISTINUS	5 GAL	SPACE 48" O.C.
(Symbol)	37	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	3 GAL	AS SHOWN

**GROUNDCOVER**

(Symbol)	8	HELICTOTRICHON SEMPERVIRENS - BLUE OAT GRASS	1 GAL - SPACE AS SHOWN	
(Symbol)	47	POLYSTICHUM MUNITUM - WESTERN SWORD FERN	1 GAL - SPACE AS SHOWN	
(Symbol)	74	ARCTOSTAPHYLOS LIVA-URSI - KINNICKINICK	1 GAL - SPACE 2' O.C.	
(Symbol)	23	MAHONIA REPENS - CREeping MAHONIA	1 GAL - SPACE 30" O.C.	
(Symbol)	2340 SF	PT 301- WATER SMARTER TALL FESCUE BLEND TURFWAY TALL FESCUE - FESTUCA ARUNDINACEA 'TURFWAY' HOUNDDOG 8 TALL FESCUE - FESTUCA ARUNDINACEA 'HOUNDDOG 8' BLOODHOUND TALL FESCUE - FESTUCA ARUNDINACEA 'BLOODHOUND'	7 LBS / 1000 S.F.	
(Symbol)	4635 SF	PT 702 - NATIVE URBAN MEADOW	4 OZ / 1000 S.F.	

**LEGEND**

- (Symbol) EXISTING TREE TO REMAIN
- (Symbol) BENCH
- (Symbol) GRAVEL EDGING - SEE SHEET L2 FOR DETAILS
- (Symbol) 5' BLACK VINYL CLAD CHAIN LINK FENCING AROUND PLAY AREA

**KEY NOTES**

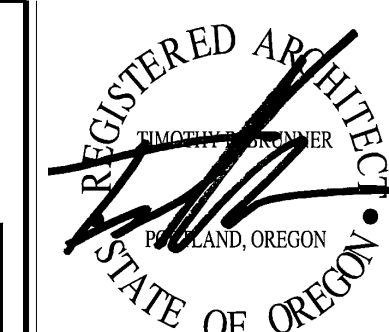
- (1) RECREATIONAL PLAY AREA - SPECIFIC PLAY EQUIPMENT TO BE DETERMINED LATER
- (2) PICNIC AREA- PICNIC TABLES

**GENERAL NOTES**

- ALL LANDSCAPE AREAS TO BE IRRIGATED WITH AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM. SYSTEM SHALL USE DRIP IRRIGATION AND WATER CONSERVATION ROTOR IRRIGATION HEADS. NATIVE PLANTING AREAS SHALL HAVE TEMPORARY IRRIGATION THAT WILL BE REDUCED EACH YEAR UNTIL PLANTS ARE FULLY ESTABLISHED.
- QUANTITIES ARE INTENDED TO ASSIST THE CONTRACTOR IN EVALUATING THEIR OWN TAKEOFFS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BID QUANTITIES AS SHOWN AND REQUIRED BY THE PLANS.
- CONTRACTOR SHALL PROVIDE TOPSOIL, SOIL AMENDMENTS, AND COMPOST IN REQUIRED QUANTITIES TO CREATE THE PLANTING SOIL FOR PLANTED AND SEEDED AREAS IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
- CONTRACTOR SHALL VERIFY THE LOCATIONS OF UTILITIES PRIOR TO BEGINNING EXCAVATION.
- IF PLANT MATERIAL CONFLICTS WITH NEW OR EXISTING UTILITIES TO REMAIN, THE CONTRACTOR SHALL ADJUST THE PLANTING LOCATIONS IN COORDINATION WITH THE OWNER'S REPRESENTATIVE.
- PROVIDE 3" OF BARK MULCH AROUND PLANTING.
- RESTORE PUBLIC RIGHT IF AREA DISTURBED BY UTILITY INSTALLATION AND SEED AREA WITH NATIVE URBAN MEADOW MIX.
- SEE SHEET L2 FOR PLANTING DETAILS AND NOTES.

**SITE DATA**

TOTAL SITE AREA =	25,869 S.F.	
REQUIRED LANDSCAPE AREA =	25% OF SITE AREA =	6,467.25 S.F.
TOTAL LANDSCAPE AREA PROVIDED =	32.98 % =	8,522.83 S.F.
RECREATION REQUIRED =		2000 S.F.
RECREATIONAL AREA PROVIDED		
PICNIC AREA =	651.8 S.F.	
CHILDREN PLAY AREA =	2,054.1 S.F.	
TOTAL RECREATION AREA =	2,705.9 S.F.	



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**THE PAD  
 TOWNHOME APARTMENTS**  
 17650 MEINIG AVE  
 SANDY, OR 97055

REVISIONS

No.	Description	Date

DRAWN BY: SJM  
 CHECKED BY: DH  
 JOB NO: 20-004  
 DATE: 07/16/2021  
 ISSUED FOR: DESIGN REVIEW  
 SHEET TITLE  
 SITE PLAN - EXISTING / DEMO  
 SHEET NO.

**A-101**

**SITE STATISTICS - EXISTING (ON SITE)**

TOTAL SITE AREA (AS SURVEYED):	25,869 SF	100%
(0.59 ACRES)		
IMPERVIOUS AREA:		
BUILDING FOOTPRINT (EXISTING):	0 SF	
HARDSCAPE (EXISTING):	0 SF	
EXISTING IMPERVIOUS AREA:	0 SF	0%
PERVIOUS AREA (GRAVEL):	1,620 SF	(6%)
PERVIOUS AREA (LANDSCAPE):	24,249 SF	(94%)
EXISTING PERVIOUS AREA:	25,869 SF	100%

EXISTING VEHICLE PARKING COUNTS:  
 SITE IS UNDEVELOPED AND NO VEHICLE PARKING EXISTS

EXISTING BICYCLE PARKING:  
 SITE IS UNDEVELOPED AND NO BICYCLE PARKING EXISTS

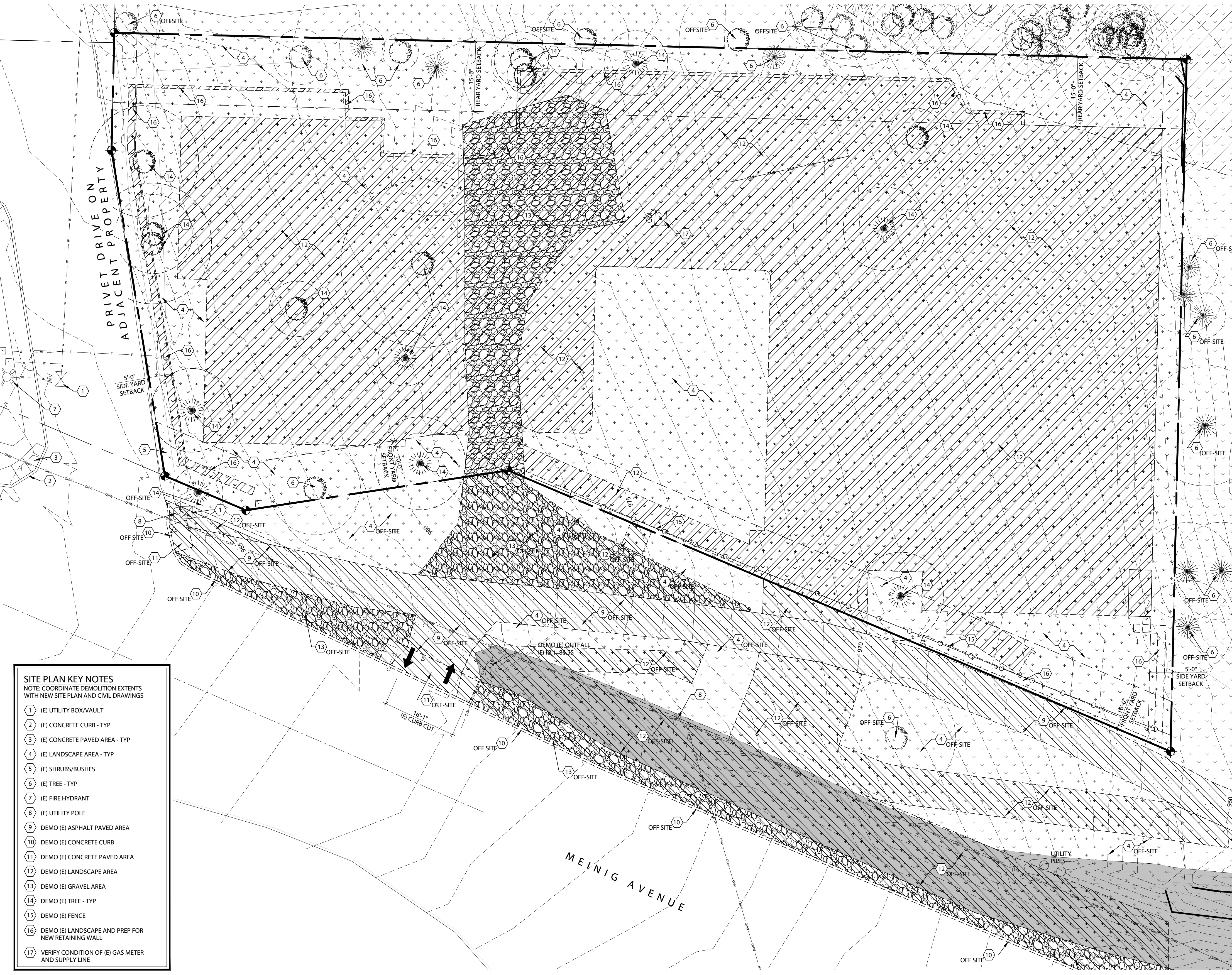
**SITE STATISTICS - EXISTING (OFF SITE)**

IMPERVIOUS AREA:		
EXISTING TOTAL PERVIOUS AREA:	2,156 SF	
ASPHALT SIDEWALK (DEMO):	<2,022 SF>	
CONC. CURB RAMP (DEMO):	<134 SF>	
EXISTING IMPERVIOUS TO REMAIN:	0 SF	
PERVIOUS AREA:		
EXISTING TOTAL PERVIOUS AREA:	8,243 SF	
GRAVEL (DEMO):	<1,882 SF>	
LANDSCAPE (DEMO):	<2,690 SF>	
EXISTING LANDSCAPE TO REMAIN:	3,671 SF	

NOTE: TOTAL ADJACENT OFF-SITE AREA IS ALSO REDUCED  
 DUE TO RELOCATION OF THE STREET CURB AS A RESULT OF  
 WIDENING THE ROAD.

**SITE PLAN LEGEND**

	(E) CONCRETE
	(E) ASPHALT
	(E) LANDSCAPE
	(E) GRAVEL
	(E) FLOOD SLOPE HAZARD ZONE
	(E) DRAINAGE DITCH
	DEMO AREA
	(E) PROPERTY LINE
	(E) FENCE LINE
	(E) BUILDING FOOTPRINT
	(E) CONTOUR LINE - SEE CIVIL
	(E) SIGN
	(E) TREE - EVERGREEN
	(E) TREE - DECIDUOUS
	(E) SHRUBBERY
	(E) STORMWATER INLET
	(E) FIRE HYDRANT - OR - FDC
	(E) GAS METER
	VEHICLE CIRCULATION
	BUILDING ENTRY/EXIT



**SITE PLAN KEY NOTES**  
 NOTE: COORDINATE DEMOLITION EXTENTS  
 WITH NEW SITE PLAN AND CIVIL DRAWINGS

1	(E) UTILITY BOX/VAULT
2	(E) CONCRETE CURB - TYP
3	(E) CONCRETE PAVED AREA - TYP
4	(E) LANDSCAPE AREA - TYP
5	(E) SHRUBS/BUSHES
6	(E) TREE - TYP
7	(E) FIRE HYDRANT
8	(E) UTILITY POLE
9	DEMO (E) ASPHALT PAVED AREA
10	DEMO (E) CONCRETE CURB
11	DEMO (E) CONCRETE PAVED AREA
12	DEMO (E) LANDSCAPE AREA
13	DEMO (E) GRAVEL AREA
14	DEMO (E) TREE - TYP
15	DEMO (E) FENCE
16	DEMO (E) LANDSCAPE AND PREP FOR NEW RETAINING WALL
17	VERIFY CONDITION OF (E) GAS METER AND SUPPLY LINE

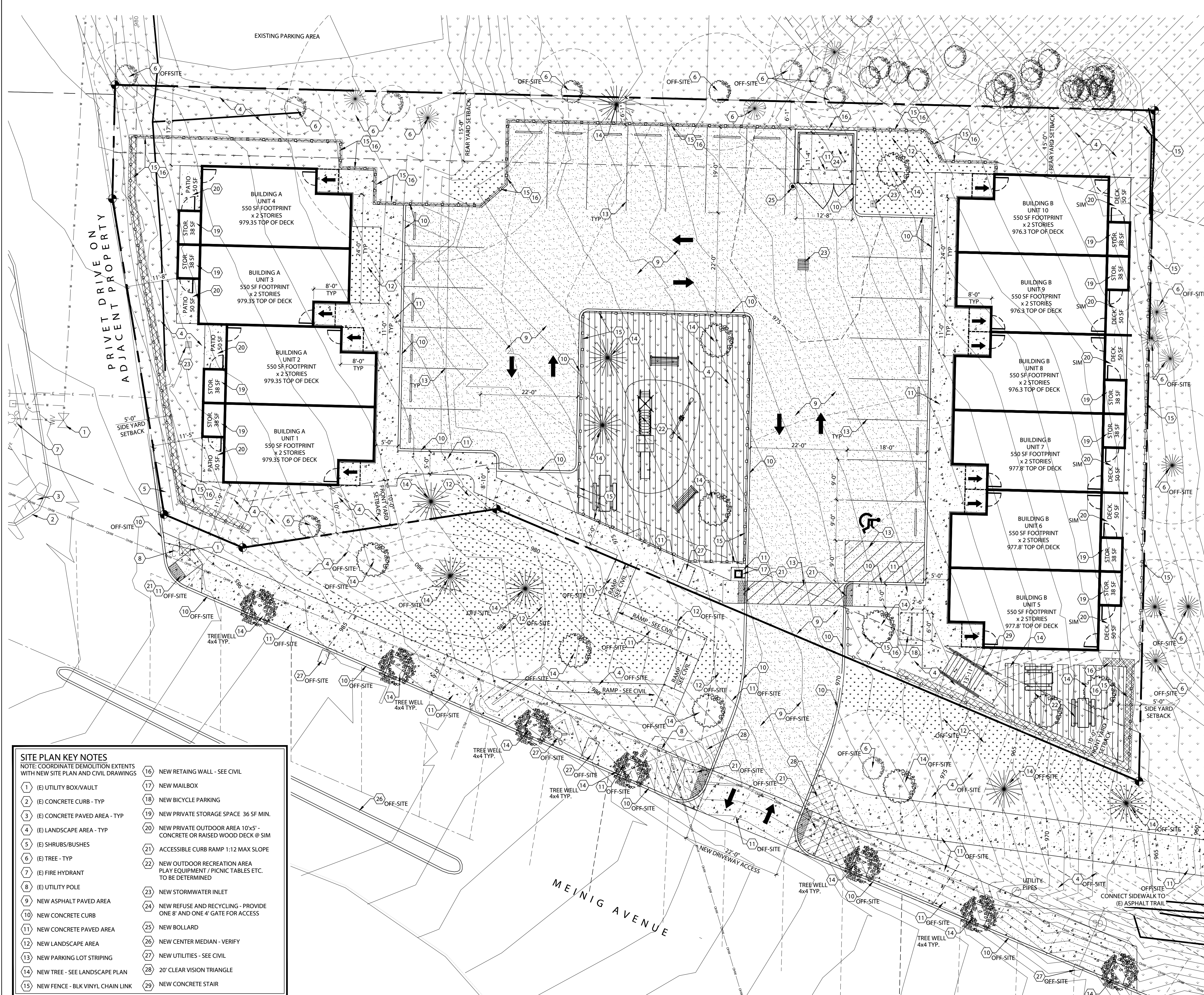
**1 SITE PLAN - EXISTING / DEMO**  
 SCALE: 1" = 10'-0"



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**SITE PLAN KEY NOTES**  
NOTE: COORDINATE DEMOLITION EXTENTS WITH NEW SITE PLAN AND CIVIL DRAWINGS

1 (E) UTILITY BOX/VAULT	16 NEW RETAINING WALL - SEE CIVIL
2 (E) CONCRETE CURB - TYP	17 NEW MAILBOX
3 (E) CONCRETE PAVED AREA - TYP	18 NEW BICYCLE PARKING
4 (E) LANDSCAPE AREA - TYP	19 NEW PRIVATE STORAGE SPACE 36 SF MIN.
5 (E) SHRUBS/BUSHES	20 NEW PRIVATE OUTDOOR AREA 10'x5' CONCRETE OR RAISED WOOD DECK @ SIM
6 (E) TREE - TYP	21 ACCESSIBLE CURB RAMP 1:12 MAX SLOPE
7 (E) FIRE HYDRANT	22 NEW OUTDOOR RECREATION AREA PLAY EQUIPMENT / PICNIC TABLES ETC. TO BE DETERMINED
8 (E) UTILITY POLE	23 NEW STORMWATER INLET
9 NEW ASPHALT PAVED AREA	24 NEW REFUSE AND RECYCLING - PROVIDE ONE 8' AND ONE 4' GATE FOR ACCESS
10 NEW CONCRETE CURB	25 NEW BOLLARD
11 NEW CONCRETE PAVED AREA	26 NEW CENTER MEDIAN - VERIFY
12 NEW LANDSCAPE AREA	27 NEW UTILITIES - SEE CIVIL
13 NEW PARKING LOT STRIPING	28 20' CLEAR VISION TRIANGLE
14 NEW TREE - SEE LANDSCAPE PLAN	29 NEW CONCRETE STAIR
15 NEW FENCE - BLK VINYL CHAIN LINK	

**1 SITE PLAN - PROPOSED**  
SCALE: 1" = 10'-0"

**SITE STATISTICS - PROPOSED (ON SITE)**

TOTAL SITE AREA (AS SURVEYED): 25,869 SF 100% (0.59 ACRES)

IMPERVIOUS AREA:  
BUILDING FOOTPRINT (NEW): 5,500 SF  
10 @ 550 SF (LIVING AREA) + 38 SF (STORAGE)

HARDSCAPE ASPHALT/CONC. (NEW): 11,760 SF  
PROPOSED IMPERVIOUS AREA: 17,260 SF 67%

PERVIOUS LANDSCAPE AREA:  
EXISTING LANDSCAPE TO REMAIN: 8,003 SF  
NEW LANDSCAPE: 606 SF  
PROPOSED PERVIOUS AREA: 8,609 SF 33%

NOTE: PROPOSED REQUIRED OUTDOOR RECREATION AREA IS APPROXIMATELY 2,430 SF OF THE PROPOSED LANDSCAPE AREA

PROPOSED VEHICLE PARKING COUNTS:  
BASED ON 2 STALLS PER 2 BED UNIT  
10 UNITS = 20 STALLS  
21 STALLS PROVIDED INCLUDING ONE ACCESSIBLE

PERCENTAGE OF STREET FRONTAGE OCCUPIED BY PARKING:  
TOTAL FRONTAGE DIMENSION: 235'-0"  
TOTAL FRONTAGE OCCUPIED BY PARKING AND MANEUVERING MINUS DRIVE ACCESS: 58'-0" (25%)

NEW BICYCLE PARKING:  
1 STALL PER DWELLING UNIT REQUIRED. TENANT BICYCLE PARKING SPACE PROVIDED VIA HANGING RACK WITHIN INDIVIDUAL ATTACHED STORAGE SPACE.  
2 PUBLIC STALLS MEASURING 2.5 FEET BY 6 FEET ARE PROVIDED ADJACENT TO THE SITE DRIVEWAY ACCESS.

**SITE STATISTICS - PROPOSED (OFF SITE)**

IMPERVIOUS AREA:  
ASPHALT ACCESS DRIVE (NEW): 1,004 SF  
CONC SIDEWALK (NEW): 11,760 SF  
PROPOSED NEW IMPERVIOUS AREA: 12,764 SF

PERVIOUS LANDSCAPE AREA:  
EXISTING LANDSCAPE TO REMAIN: 3,671 SF  
NEW LANDSCAPE: 2,238 SF  
NEW STREET TREE WELLS 85 @ 16 SF: 80 SF  
PROPOSED PERVIOUS AREA: 5,989 SF

**SITE PLAN LEGEND**

(E) CONCRETE	(E) CONCRETE
(N) CONCRETE	(N) CONCRETE
(E) ASPHALT	(E) ASPHALT
(N) ASPHALT	(N) ASPHALT
(E) LANDSCAPE	(E) LANDSCAPE
(N) LANDSCAPE	(N) LANDSCAPE
(N) LANDSCAPE RECREATION AREA	(N) LANDSCAPE RECREATION AREA
(E) FLOOD SLOPE HAZARD ZONE	(E) FLOOD SLOPE HAZARD ZONE
(E) PROPERTY LINE	(E) PROPERTY LINE
(E) FENCE LINE	(E) FENCE LINE
(N) FENCE LINE	(N) FENCE LINE
(E) BUILDING FOOTPRINT	(E) BUILDING FOOTPRINT
(N) BUILDING FOOTPRINT	(N) BUILDING FOOTPRINT
(E) CONTOUR LINE - SEE CIVIL	(E) CONTOUR LINE - SEE CIVIL
(N) CONTOUR LINE - SEE CIVIL	(N) CONTOUR LINE - SEE CIVIL
NEW RETAINING WALL	NEW RETAINING WALL
(E) OR NEW SITE LIGHTING	(E) OR NEW SITE LIGHTING
(E) OR NEW SIGN	(E) OR NEW SIGN
(E) OR NEW TREE - EVERGREEN	(E) OR NEW TREE - EVERGREEN
(E) OR NEW TREE - DECIDUOUS	(E) OR NEW TREE - DECIDUOUS
(E) OR NEW SHRUBBERY	(E) OR NEW SHRUBBERY
(E) OR NEW STORMWATER INLET	(E) OR NEW STORMWATER INLET
(E) OR NEW FIRE HYDRANT / FDC	(E) OR NEW FIRE HYDRANT / FDC
(E) OR NEW GAS METER	(E) OR NEW GAS METER
VEHICLE CIRCULATION	VEHICLE CIRCULATION
BUILDING ENTRY/EXIT	BUILDING ENTRY/EXIT



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**THE PAD  
TOWNHOME APARTMENTS**  
17650 MEINIG AVE  
SANDY, OR 97055

**REVISIONS**

No.	Description	Date

DRAWN BY: SJM  
CHECKED BY: DH  
JOB NO: 20-004  
DATE: 07/16/2021  
ISSUED FOR: DESIGN REVIEW  
SHEET TITLE  
SITE PLAN - PROPOSED

SHEET NO.  
**A-102**

**Exhibit E**

**EXHIBIT G – PRELIMINARY**  
**STORMWATER REPORT**

# SITE HYDRAULICS REPORT

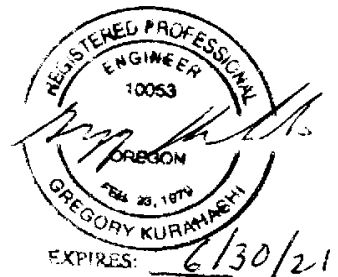
“THE PAD” DRAINAGE REPORT

FOR “THE PAD” DEVELOPMENT

SANDY, OREGON

JULY 6, 2020

Prepared By  
Kurahashi and Associates Company  
4470 SW Hall Blvd. Suite C  
Beaverton, Oregon 97005  
503 267 8434



## TABLE OF CONTENTS

**1 Introduction**

**2 Existing Stormwater System**

**3 Proposed Stormwater System**

**4 Storm Water Analysis**

**5 Appendix**

# INTRODUCTION

## 1.1 Project Overview

This report contains the hydrologic and hydraulic design parameters for the “THE PAD” Sandy Development Project at tax lot 1500; Assessor Map 2S-24E-13DB-01500, with the total area is approximately 0.478 acres. The property is situated at 17650 Meinig Avenue in Sandy, Oregon. This report reviews and confirms the information necessary to design on-site conveyance systems as well as water quality treatment facilities for “THE PAD” Sandy Development Project and the retention system on the site which will be located in the south driveway of the development.

Please note that the methodology used to analyze the storm water conveyance system uses a computer program (Hydraflow 2002 by inteliSOLV) that uses SCS unit hydrograph as the method for calculating the Storm Flow. The land for the development required the use of a Contech storm filter system for treatment. The plan includes 1 Contech manhole storm filter that is shown on the C3 Utility Plan attached in the appendix.

## 1.2 Existing Conditions

The site originally had a home, shed and yard that encompassed the central portion of the property. The structures are no longer present.

## 1.3 Proposed Improvements

The proposed development will include a 10 unit 2 story townhouse apartments. 6 units will be on the south end while 4 will be on the north end of the development. 1 handicap parking space and 20 regular parking spaces will be provided. Six 9’x18’ parking spaces will be on the north end while seven 9’x19’ parking spaces will be on the east side and seven 9’x18’ parking spaces the south side along with the 9’x18’ handicap space and 9’x18’ handicap loading zone. The southwest corner of the development will have mail boxes, picnic tables and a grassy recreation area. The East side of the lot will have a trash/recycling enclosure at the southern end. The site will have a grassy recreation area with trees and a gazebo bordered by the south, east and north portions of the development as well as the west property line. The building and parking rain water collection system will be directed to the SE area of the parking lot in front of the trash/recycling enclosure. The storm water after detention and treatment will accommodate the 1yr, 2yr, 5yr, 10yr and 25yr storms using City of Sandy 24 hour rainfall. It will be metered out to retain the flow to reduce the storms to be stored and discharged at the same rate that the project discharged at existing conditions. The discharges will no longer be overland to City and Park District property but directed to the ditch along Meinig Ave. Storm drainage will be

detained in a system of two 40' pipes 5' in diameter pipes. The project is in a location that does not allow for significant infiltration and this could be dangerous to downstream areas.

## **Existing Stormwater System**

The existing system discharged storm drainage was discharge from the original house roof to daylight on to the ground and then be discharged overland to the city property and to the Park southeasterly from the property this water has no direct discharge to a channel. Continuing the discharge in pipes or overland would require approval of the Park district and require DSL and Corps approval to discharge with pipes to the street. By directing the flow to the existing storm drainage system of pipes we would not require approval because it enters a City pipes system after discharging to a ditch along Meinig Ave.

## Storm Water Analysis

### 4.1 Design Solution:

The proposed storm water design on property includes: One catch basin, 2 5' diameter 40' long detention pipes, one detention manhole, and a water quality manhole.

### 4.2 Design Assumptions and Parameters of Detention

City of Sandy Rainfall in Inches per 24 hour period: 3.5 (2 year), 4.5 (5 year), 4.8 (10 year), 5.5 (25 year), 6.5 (100 year)

Impervious Area of Roof, Driveway Sidewalks and Patio

Prior to Development.: 0.0 Acres

CN# used for Impervious areas: 98

Length N/A

Time interval of analysis: N/A

Unit Hydrograph: N/A

Storm Distribution: Type 1A

Area of Site Prior to Development.: 0.65 Acres (Including Large Right of Way)

CN# used for Pervious areas: 77

Slope: 15%

Length: 125 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A

Impervious Area of Roof, Driveway, Sidewalks and Deck

after Development: 0.478 Acres

CN# used for Impervious areas: 98

Slope: 2%

Length: 100 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A

Area of Landscaping after Development: 0.21 Acres

CN# used for Pervious areas: 77

Slope: 15%

Length: 125 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A



### **4.3 Reservoir Analysis:**

Please note the proposed Detention utilizes no percolation.

The storage was developed using detention pipes to modify the discharge to pre-development levels.

The pipe system uses 80 lineal feet of 5 foot diameter N12 PVC conduits.

Most of the storm water collection system backwaters into the detention pipes.

Attached in the Appendix is the Reservoir Stage Storage Discharge Table (Reservoir Report)

The report analyzes a 2.4 inch orifice at the bottom of the pipe storage a 2.8 inch orifice at 2.5 feet and a 2 inch orifice at 4.15 feet which was never reached. The Final Analysis will refine the preliminary design and may change to Storm Tech Chambers.

This utilizes 1,288 cubic feet of storage of the 1571 cubic feet of pipe storage available.

### **4.4 Design Flow Analysis:**

The values of discharge for each storm are tabulated. On the tables provided for each return interval in the Appendix. Below are the comparisons of peak discharge or each return interval.

Return Interval	Existing (CFS)	Proposed (CFS)
2 Year	0.19	0.19
5 Year	0.32	0.32
10 Year	0.36	0.36
25 Year	0.43	0.43

#### 24 hour Statistical Storm Data:

Storm Inches Peak Flow (cfs)

Year in 24

	Hours	Impervious	Pervious	Combined	Existing	Detention
2	3.5"	0.37	0.06	0.43	0.19	0.19
5	4.5"	0.48	0.10	0.58	0.32	0.32
10	4.8"	0.52	0.12	0.63	0.36	0.36
25	5.5"	0.59	0.15	0.74	0.46	0.43
100	6.5"					

The allowable discharge that was the limit for Developed Discharge.

**4.5 CONCLUSION:**

Based on the analysis and findings above, the proposed stormwater drainage system complies with the requirements of the City of Sandy.

## Appendix

	PAGE
THE PAD Development UTILITY PLAN	1
THE PAD Development Original Site Conditions	2
Runoff Curve Numbers	3
RESERVOIR REPORT	4
FLOW SUMMARY REPORTS (.5 YEAR HYDO MOD. WQ), 2,5,10,25 YR. RET. PER.	5-8



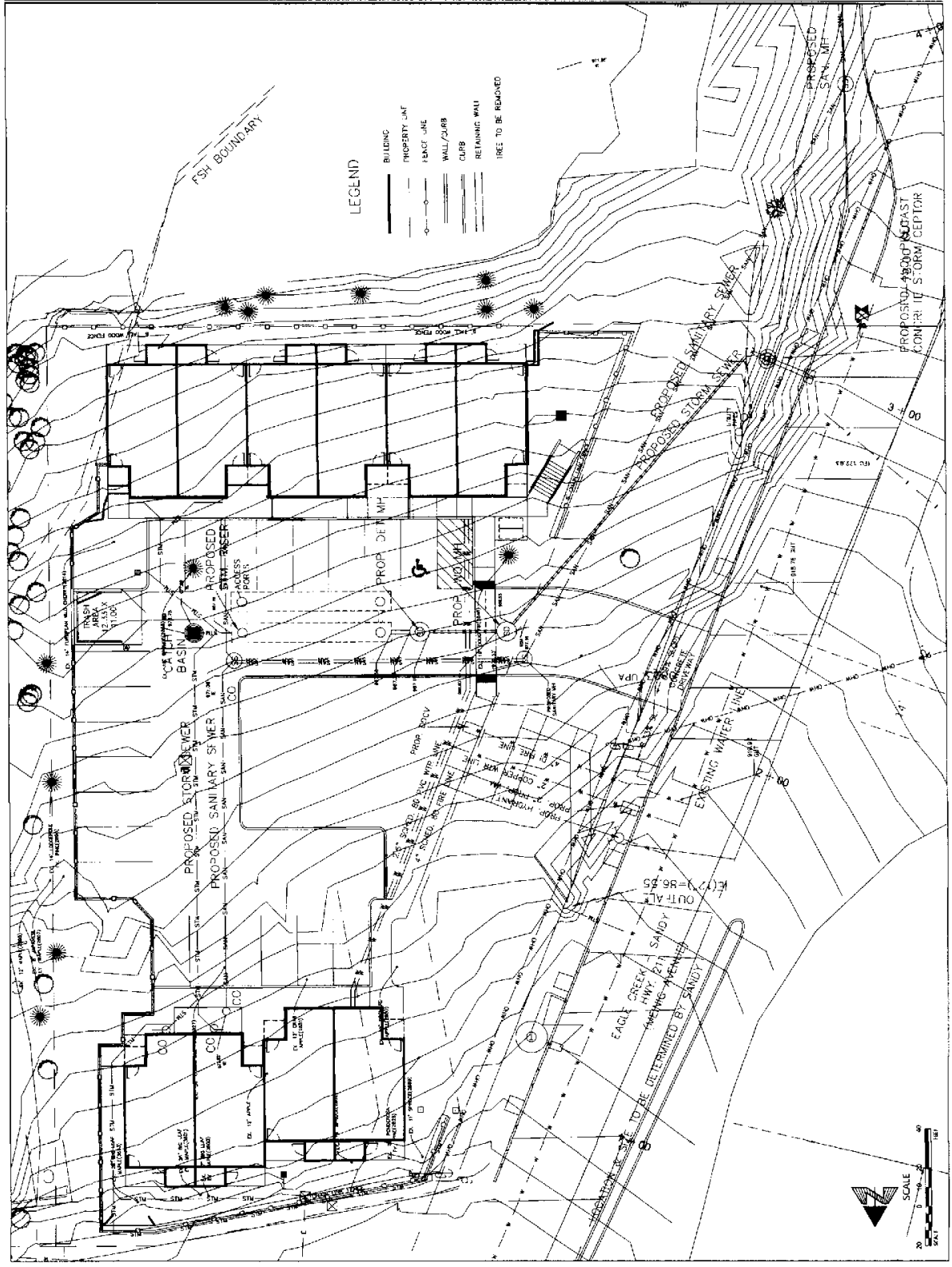
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**THE PAD**  
 TOWNHOME APARTMENTS  
 SANDY OR 2005

NO.	REVISION	DATE
1	ISSUED FOR EXISTING REVIEW	06/17/2001
2	ISSUED FOR EXISTING REVIEW	06/17/2001
3	ISSUED FOR EXISTING REVIEW	06/17/2001
4	ISSUED FOR EXISTING REVIEW	06/17/2001
5	ISSUED FOR EXISTING REVIEW	06/17/2001
6	ISSUED FOR EXISTING REVIEW	06/17/2001
7	ISSUED FOR EXISTING REVIEW	06/17/2001
8	ISSUED FOR EXISTING REVIEW	06/17/2001
9	ISSUED FOR EXISTING REVIEW	06/17/2001
10	ISSUED FOR EXISTING REVIEW	06/17/2001

DRAWN BY: JTB  
 CHECKED BY: JTB  
 DATE: 06/17/2001  
 SHEET TITLE: UTILITY PLAN  
 SHEET NO.: C 3.0



ALL UTILITIES SHOWN ARE BASED ON FIELD SURVEY AND RECORD DRAWINGS. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS OF THE UTILITIES SHOWN AND HAS FOUND THEM TO BE CORRECT.



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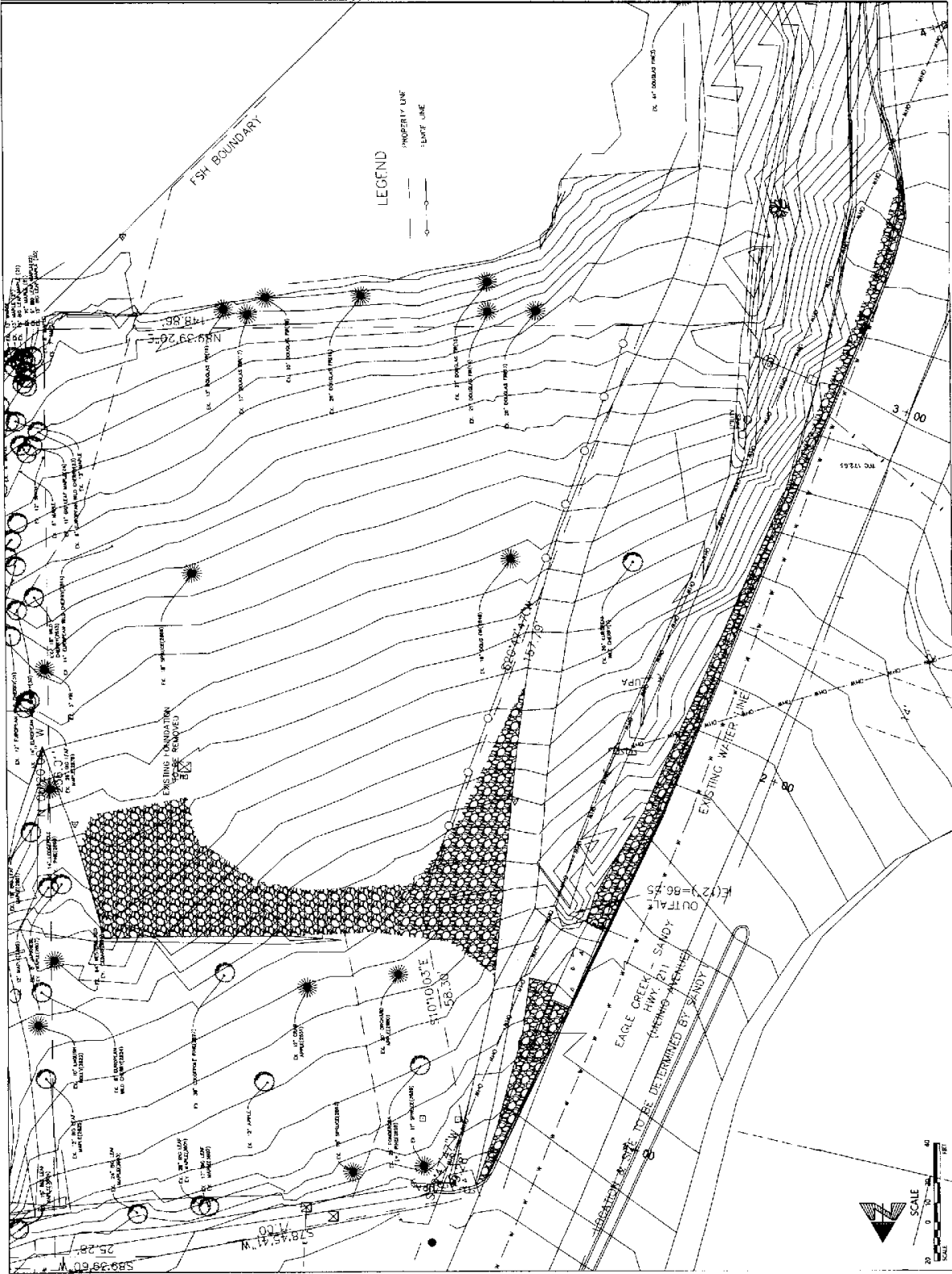
# THE PAD TOWNHOME APARTMENTS

17860 MARINERS AVE  
RANDOLPH, OR 87565

NO.	DESCRIPTION	DATE

DESIGNED BY	
CHECKED BY	
DATE	
PROJECT FOR	
SHEET TITLE	
EXISTING CONDITIONS	

SHEET NO.  
**C 1.0**



THIS PLAN IS A PRELIMINARY DESIGN AND IS SUBJECT TO CHANGE WITHOUT NOTICE. THE DESIGNER ASSUMES NO LIABILITY FOR ANY ERRORS OR OMISSIONS. THE USER OF THIS PLAN ASSUMES ALL LIABILITY FOR ANY AND ALL DAMAGES, INCLUDING REASONABLE ATTORNEY'S FEES, ARISING FROM THE USE OF THIS PLAN.

<b>Table 2.2</b>				
<b>Runoff Curve Numbers for Selected Agricultural, Suburban, and Urban Areas</b>				
(Sources: TR 55, 1986, and Stormwater Management Manual, 1992. See Section 2.1.1 for explanation)				
Cover type and hydrologic condition.	CNs for hydrologic soil group			
	A	B	C	D
<b>Curve Numbers for Pre-Development Conditions</b>				
<b>Pasture, grassland, or range-continuous forage for grazing:</b>				
Fair condition (ground cover 50% to 75% and not heavily grazed).	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
<b>Woods:</b>				
Fair (Woods are grazed but not burned, and some forest litter covers the soil).	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil).	30	55	70	77
<b>Curve Numbers for Post-Development Conditions</b>				
<b>Open space (lawns, parks, golf courses, cemeteries, landscaping, etc.)<sup>1</sup></b>				
Fair condition (grass cover on 50% - 75% of the area).	77	85	90	92
Good condition (grass cover on >75% of the area)	68	80	86	90
<b>Impervious areas:</b>				
Open water bodies: lakes, wetlands, ponds etc.	100	100	100	100
Paved parking lots, roofs <sup>2</sup> , driveways, etc. (excluding right-of-way)	98	98	98	98
<b>Permeable Pavement (See Appendix C to decide which condition below to use)</b>				
Landscaped area	77	85	90	92
50% landscaped area/50% impervious	87	91	94	96
100% impervious area	98	98	98	98
Paved	98	98	98	98
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
<b>Pasture, grassland, or range-continuous forage for grazing:</b>				
Poor condition (ground cover <50% or heavily grazed with no mulch).	68	79	86	89
Fair condition (ground cover 50% to 75% and not heavily grazed).	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
<b>Woods:</b>				
Poor (Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning).	45	66	77	83
Fair (Woods are grazed but not burned, and some forest litter covers the soil).	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil).	30	55	70	77
<b>Single family residential<sup>3</sup>:</b>				
Dwelling Unit/Gross Acre	Should only be used for subdivisions > 50 acres	Average Percent impervious area <sup>3,4</sup>		
1.0 DU/GA		15	Separate curve number shall be selected for pervious & impervious portions of the site or basin	
1.5 DU/GA		20		
2.0 DU/GA		25		
2.5 DU/GA		30		
3.0 DU/GA		34		
3.5 DU/GA		38		
4.0 DU/GA		42		
4.5 DU/GA		46		
5.0 DU/GA		48		
5.5 DU/GA		50		
6.0 DU/GA		52		
6.5 DU/GA		54		
7.0 DU/GA		56		
7.5 DU/GA		58		
PUD's, condos, apartments, commercial businesses, industrial areas & subdivisions < 50 acres	%impervious must be computed	Separate curve numbers shall be selected for pervious and impervious portions of the site		

For a more detailed and complete description of land use curve numbers refer to chapter two (2) of the Soil Conservation Service's Technical Release No. 55, (210-VI-TR-55, Second Ed., June 1986).

<sup>1</sup> Composite CN's may be computed for other combinations of open space cover type.  
<sup>2</sup> Where roof runoff and driveway runoff are infiltrated or dispersed according to the requirements in Chapter 3, the average percent impervious area may be adjusted in accordance with the procedure described under "Flow Credit for Roof Downspout Infiltration" (Section 3.1.1), and "Flow Credit for Roof Downspout Dispersion" (Section 3.1.2).  
<sup>3</sup> Assumes roof and driveway runoff is directed into street/storm system.  
<sup>4</sup> All the remaining pervious area (lawn) are considered to be in good condition for these curve numbers.

# Reservoir Report

## Reservoir No. 1 - Detention Pipe

Hydraflow Hydrographs by Intelisolve

### Pond Data

Pipe diameter = 5.00 ft Pipe length = 160.0 ft Pipe slope = 0.00 % Invert elev. = 100.00 ft

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	00	0	0
0.25	100.25	00	29	29
0.50	100.50	00	52	82
0.75	100.75	00	66	148
1.00	101.00	00	76	224
1.25	101.25	00	84	307
1.50	101.50	00	89	397
1.75	101.75	00	94	490
2.00	102.00	00	96	587
2.25	102.25	00	99	686
2.50	102.50	00	100	786
2.75	102.75	00	100	885
3.00	103.00	00	99	985
3.25	103.25	00	97	1,081
3.50	103.50	00	93	1,175
3.75	103.75	00	89	1,264
4.00	104.00	00	84	1,348
4.25	104.25	00	76	1,423
4.50	104.50	00	66	1,489
4.75	104.75	00	52	1,542
5.00	105.00	00	29	1,571

### Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 2.4	2.8	2.0	0.0
Span in	= 2.4	2.8	2.0	0.0
No. Barrels	= 1	1	1	0
Invert El. ft	= 100.00	102.50	104.15	0.00
Length ft	= 10.0	10.0	10.0	0.0
Slope %	= 1.00	1.00	1.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	0.00	0.00	0.00
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= --	--	--	--
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

### Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	100.00	0.00	0.00	0.00	--	--	--	--	--	--	0.00
0.25	29	100.25	0.05	0.00	0.00	--	--	--	--	--	--	0.05
0.50	82	100.50	0.08	0.00	0.00	--	--	--	--	--	--	0.08
0.75	148	100.75	0.10	0.00	0.00	--	--	--	--	--	--	0.10
1.00	224	101.00	0.12	0.00	0.00	--	--	--	--	--	--	0.12
1.25	307	101.25	0.13	0.00	0.00	--	--	--	--	--	--	0.13
1.50	397	101.50	0.15	0.00	0.00	--	--	--	--	--	--	0.15
1.75	490	101.75	0.16	0.00	0.00	--	--	--	--	--	--	0.16
2.00	587	102.00	0.17	0.00	0.00	--	--	--	--	--	--	0.17
2.25	686	102.25	0.18	0.00	0.00	--	--	--	--	--	--	0.18
2.50	786	102.50	0.19	0.00	0.00	--	--	--	--	--	--	0.19
2.75	885	102.75	0.20	0.06	0.00	--	--	--	--	--	--	0.26
3.00	985	103.00	0.21	0.10	0.00	--	--	--	--	--	--	0.32
3.25	1,081	103.25	0.22	0.14	0.00	--	--	--	--	--	--	0.36
3.50	1,175	103.50	0.23	0.16	0.00	--	--	--	--	--	--	0.39
3.75	1,264	103.75	0.24	0.18	0.00	--	--	--	--	--	--	0.42
4.00	1,348	104.00	0.24	0.20	0.00	--	--	--	--	--	--	0.45
4.25	1,423	104.25	0.25	0.22	0.02	--	--	--	--	--	--	0.49
4.50	1,489	104.50	0.26	0.24	0.04	--	--	--	--	--	--	0.54
4.75	1,542	104.75	0.27	0.25	0.06	--	--	--	--	--	--	0.58
5.00	1,571	105.00	0.27	0.26	0.07	--	--	--	--	--	--	0.61

Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.37	1	469.00	5,309				Pad Impervious
2	SCS Runoff	0.06	1	477.00	1,021				The Pad Pervious
3	Combine	0.43	1	470.00	6,330	1, 2			Combined Site
4	SCS Runoff	0.19	1	477.00	3,160				Existing Conditions
5	Reservoir	0.19	1	500.00	6,309	3	102.33	718	Detention Pipe
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Hydraflow Hydrographs 2002 - 2-yr return period



Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.48	1	469.00	6,931				Pad Impervious
2	SCS Runoff	0.10	1	475.00	1,578				The Pad Pervious
3	Combine	0.58	1	470.00	8,509	1, 2			Combined Site
4	SCS Runoff	0.32	1	475.00	4,884				Existing Conditions
5	Reservoir	0.32	1	489.00	8,475	3	103.03	998	Detention Pipe
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Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.52	1	469.00	7,418				Pad Impervious
2	SCS Runoff	0.12	1	475.00	1,754				The Pad Pervious
3	Combine	0.63	1	470.00	9,171	1, 2			Combined Site
4	SCS Runoff	0.36	1	475.00	5,428				Existing Conditions
5	Reservoir	0.36	1	488.00	9,131	3	103.25	1,081	Detention Pipe
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Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.59	1	469.00	8,554				Pad Impervious
2	SCS Runoff	0.15	1	474.00	2,175				The Pad Pervious
3	Combine	0.74	1	470.00	10,729	1, 2			Combined Site
4	SCS Runoff	0.46	1	474.00	6,731				Existing Conditions
5	Reservoir	0.43	1	487.00	10,673	3	103.82	1,288	Detention Pipe
6									
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## Exhibit F

# Portland Tree Consultancy

Lou Phemister  
ASCA Registered Consulting Arborist #590  
(573) 999-3886 / loupheister@outlook.com

## ARBORIST REPORT

### Tree Inventory & Tree Protection

DATE: 09.01.2021

PROPERTY ADDRESS: 17650 Meining Ave, Sandy, OR 97055

CLIENT REFERENCE: Axis Design Group

PROJECT DESCRIPTION: Tree Inventory and Condition Assessment  
for The Pad, a proposed residential development

### Introduction

An inventory of all trees 11-inches DBH and larger over was completed on the project site detailed in Figures 1a and 1b and on adjacent trees that could be influenced by development on the project site. Trees affected by excavation for utility lines are also inventoried and their location detailed in Figure 1c. The trees within the project site were tagged with numbered aluminum discs whose numbers correspond to the ID column in the inventory table. The inventory was completed on December 24th, 2020.

### Regulated Trees. Chapter 17.102 City Code

Only trees 11-inches DBH and over are regulated by the ordinance. There are 19 trees meeting that threshold on the property: Trees (2801, 2813, 2814, 2823, 2825, 2827, 2828, 2846, 2851, 2866, 2876, 2880, 2882, 2895, 2898, 3601, 3602, 3603, 3604). Of these, one tree is dying, and two are Invasive non-native species.

### Tree Retention & Protection Requirements. Chapter 17.102.50

Three trees 11-inches DBH and larger are required to be retained on site. If possible, two of the three must be conifers. Only two regulated trees are able to be retained on-site (Trees 2823 & 2898).

### Notes on On-site Tree Protection

There are two high value conifers along the edges of the property that can be expected to survive construction impacts if protected appropriately:

*Tree 2823* is a very large multi-stem Western red cedar. The tree has a crown radius of around 20-ft and, if preserved, it is recommended that a tree protection area of at least 15-ft is established around the tree. The project has been re-designed specifically to protect this tree with a separation of 20-ft between the tree and surface disturbance to the north and west and 15-ft to the south. A qualified arborist should monitor the area around the tree to ensure that any surface disturbance is kept outside the above parameters.

*Tree 2898* is a good quality Shore pine with no low branches and this tree would ideally be preserved with a recommended tree protection area of 10-ft radius. Site design shows a 5-ft separation between the tree and surface disturbance and as the tree is semi-mature it should remain in adequate condition with this 5-ft separation as long as the adjacent disturbance within 15-ft is overseen by a qualified arborist.

### Notes on Tree Protection for trees on adjacent land.

One very large True fir exists adjacent to the east property line (T 29). This tree is set back from the property line slightly and site design gives the tree 17-ft between disturbance and the base of the tree. This should be sufficient to protect the tree and maintain its present condition.

The other trees adjacent to the east property line to be preserved are sufficiently protected by a 5-ft separation between the trees and surface disturbance due to size and species type. Again, a qualified arborist should monitor these separation distances on a regular basis and provide guidance and oversight when surface excavation takes place within 15-ft of these trees.

There is a line of semi-mature Douglas fir trees adjacent to the south property line (Trees 13 to 18) in Meinig Park. Most of these trees are in good condition and all are semi-mature. The tree protection area for these trees should ideally be 15-ft minimum distance between the tree and surface disturbance. Heavy duty and well-maintained erosion control will be required. If excavation is limited (non-linear) it will be possible to excavate within the following parameters if the work is overseen by a qualified arborist.

<u>TREE ID</u>	<u>DBH</u>	<u>Separation distances from excavation or fill to the center of the tree</u>
Tree 13	20"	6-ft OC from Keystone retaining structure excavation
Tree 14	21"	11-ft OC from building foundation excavation
Tree 16	26"	16-ft OC from building foundation excavation
Tree 17	17"	8-ft OC from building foundation excavation

It is noted that the canopy spread to the north of many of these trees is 20 to 30-ft and so significant pruning of these trees will be required to allow site development. Pruning work on conifers requires skilled arborists and should only be completed by qualified arborists.

### **Tree Protection Plan Standards**

The following **Tree Protection Plan Notes** will condition all project activity and construction at the site. The Tree Protection Plan Notes will be placed on the site construction plans:

1. Before site development is initiated a qualified arborist (being a currently qualified ISA Certified Arborist) will prune all site & off-site trees to allow clearance from site development and the placement of Tree Protection Fencing.
2. Tree Protection Fencing meeting the standards of the City of Sandy (Ordinance 17.102.50) will be installed to meet separation distances between preserved trees and surface disturbance as detailed in the Arborist Report of 9.1.2021.
3. A currently qualified ISA Certified Arborist will approve the location of the Tree Protection Fencing and suitable erosion control before any development activity is initiated on-site.
4. A currently qualified ISA Certified Arborist will be on-site at all times to oversee all surface disturbance within 15-ft of any preserved tree on site and within 15-ft of any off-site tree.
5. A currently qualified ISA Certified Arborist will be required to approve removal of any root over 2-inches diameter from any preserved tree.
6. All roots required to be removed during the excavation will be cleanly severed using a hand-held tool designed for that purpose.
7. Any activity within the Tree Protection Fencing locations as shown will be completed using hand tools (e.g. air spade, pneumatic drill, pick, shovel, or other hand operated tool as approved by the qualified arborist on-site).
8. No spoil, building materials, fuel or equipment of any kind will be placed or stored within the area protected by the Tree Protection Fence.
9. The contracted qualified arborist will provide detailed notes on all inspections and activities monitored if requested by the City of Sandy. The following items may be requested: Time & Date of Inspections; Detail of excavation & fill within 15-ft of any preserved trees; Size & number of roots over 2-inches removed from preserved trees; any work performed on trees to maintain their condition.

**TREE INVENTORY TABLE (for Locations see Fig 1a, b and c)**

ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
2801	Big leaf maple <i>Acer macrophyllum</i>	19	Good	H	Early maturity. Narrow CR form, but good vitality and vigor	At E edge of small raised bank
2807	Japanese maple <i>Acer palmatum</i>	9	Good	M	Asymmetric CR heavily shaded. Codominant stem with wide angle at 4.5-ft	At edge of small raised bank
2813	European wild cherry <i>Prunus avium</i>	15	Fair	L	Heavily leaning stem, growing away from big leaf maple. INVASIVE NON NATIVE	Within E tree line
2814	European wild cherry <i>Prunus avium</i>	14	Fair	L	Straight stem lean, away from big leaf maples INVASIVE NON NATIVE	Within group of smaller trees. E property line
2822	English holly <i>Ilex aquifolium</i>	10	Good/Fair	L	Strong upright crown form, but heavily shaded by western red cedar INVASIVE NON NATIVE	Under red cedar canopy
2823	Western red cedar <i>Thuja plicata</i>	64	Good	H	Large specimen tree with no significant defects. CR low over property	On small raised bank on E property line
2824	European wild cherry <i>Prunus avium</i>	8	Poor	L	Stem has 45-degree lean. Damaged surface roots evident INVASIVE NON NATIVE	Under red cedar canopy. E side property line
2825	Big leaf maple <i>Acer macrophyllum</i>	12	Good	M	CR has vigorous upright growth and good form	Growing N and clear of red cedar canopy
2827	Lodgepole pine <i>Pinus contorta</i>	36	Good	H	Full strong CR. Twin leaders from 8-ft	Grassed center of site
2828	Ponderosa pine <i>Pinus Ponderosa</i>	26	Good/Fair	H	Healthy tree with good CR form. Very poor pruning practice	Grassed center of site
2846	Douglas fir <i>Pseudotsuga menziesii</i>	19	Good	H	Good crown form and good vitality. CR is low to ground and extends 15-ft radius	5-ft from existing fence on west side
2851	Crabapple species <i>Malus spp</i>	12	Fair	L	Thin narrow and damaged CR	Grassed center of site
2866	Spruce species <i>Picea spp</i>	18	Fair/Good	M	Fair vigor. Complete CR but thin growth form	Grassed center of site
2876	Big leaf maple <i>Acer macrophyllum</i>	26	Good/Fair	M	Twin stems from ground level. Some minor basal damage	E side within tree line
2880	Orchard apple <i>Malus domestica</i>	24	Fair	M	Large domestic apple, formerly managed tree. Has heavy sapsucker damage	Grassed center of site
2882	Spruce species <i>Picea spp</i>	18	Dying	-	Recent strong decline. May have no live foliage	Adjacent to N property line
2889	Spruce species <i>Picea spp</i>	11	Fair/Poor	L	Small reduced crown under O/E lines. Large stem lesion Low vigor	OFF SITE: ROW tree at NW property corner

ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
2895	Maple species <i>Acer spp</i>	12	Fair/Good	M	Strong vertical growth within closely spaced tree grouping	Small raised bank on E property line
2898	Lodgepole pine <i>Pinus contorta</i>	14	Good	H	Strong vertical CR development. Lower stem among cherry laurel stems	Small raised bank on E property line
3601	Big leaf maple <i>Acer macrophyllum</i>	26	Good/Fair	M	Canopy dominant tree. Full large CR. CR low over property and 35-ft radial spread	Raised bank area at N end of property
3602	Big leaf maple <i>Acer macrophyllum</i>	17	Fair/Good	M	Twisting strong stem intertwined with dominant tree T 3601	Raised bank area at N end of property
3603	Big leaf maple <i>Acer macrophyllum</i>	24	Good/Fair	M	Strong dominant CR. Spreading CR form. CR low over property and 35-ft radial spread	Raised bank area at N end of property
3604	Big leaf maple <i>Acer macrophyllum</i>	15	Poor	L	Heavy lean over PL, likely partial uproot. Basal decay and damage on off-lean basal area	Raised bank area at N end of property. NE co
1	European wild cherry <i>Prunus avium</i>	26	Fair	M	Fully mature, low vigor. Branch failures. Pruned under O/E INVASIVE NON NATIVE	OFF SITE: On slope of hwy bank. 8-ft from AP
2	Willow species <i>Salix spp</i>	20	Fair/poor	L	Multi-stem - no dominant stem Tree but in shrub form.	OFF SITE: 11-ft from AP. W side drain channel
3	Douglas fir <i>Pseudotsuga menziesii</i>	41	Good	H	Strong complete crown. On raised root mound. No defects noted	OFF SITE: 2-ft from AP
4	Western red cedar <i>Thuja plicata</i>	45	Good	H	Complete CR and branch structure. Crown slightly thin	OFF SITE: 10-ft from AP. At drain channel
5	Big leaf maple <i>Acer macrophyllum</i>	28	Fair	M	Heavily shaded by T4. Multiple branch breakouts. Shared CR space with T4	OFF SITE: 4-ft from AP. At drain channel
6	European wild cherry <i>Prunus avium</i>	9	Poor	L	Significant stem damage. Multiple stem lesions INVASIVE NON NATIVE	OFF SITE: Park landscape area
7	Big leaf maple <i>Acer macrophyllum</i>	12	Good/Fair	M	Semi-mature. Upright CR	OFF SITE: Park landscape area
8	Big leaf maple <i>Acer macrophyllum</i>	12	Fair/Poor	L	Tree shaded under adjacent tree. No upper CR	OFF SITE: On steep hwy bank
9	Grand fir <i>Abies grandis</i>	11	Good	H	Semi-mature. Strong upright growth and good upper CR growth	OFF SITE: 20-ft from AP
10	Big leaf maple <i>Acer macrophyllum</i>	26	Fair/Good	M	Group of stems from ground level	OFF SITE: 12-ft from AP
11	Big leaf maple <i>Acer macrophyllum</i>	10	Poor/Fair	M	Severely damaged CR. Scarring of stem	OFF SITE: 6-ft from AP
12	Big leaf maple <i>Acer macrophyllum</i>	14	Good/Fair	M	Early maturity. Stem scar	OFF SITE: On steep hwy bank



ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
13	Douglas fir <i>Pseudotsuga menziesii</i>	20	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
14	Douglas fir <i>Pseudotsuga menziesii</i>	21	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
15	Douglas fir <i>Pseudotsuga menziesii</i>	21	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
16	Douglas fir <i>Pseudotsuga menziesii</i>	26	Good	H	No shared space. No defects noted. CR low over site to 8-ft ht. Mid-bank location	OFF SITE: Adjacent children play area
17	Douglas fir <i>Pseudotsuga menziesii</i>	17	Good/Fair	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
18	Douglas fir <i>Pseudotsuga menziesii</i>	13	Good	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
19	Douglas fir <i>Pseudotsuga menziesii</i>	10	Good	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
20	Big leaf maple <i>Acer macrophyllum</i>	15	Fair	M	Two stems sound, one damaged. Among large adjacent group of similar species	OFF SITE: Within tree line, E side of property
21	Big leaf maple <i>Acer macrophyllum</i>	13	Fair/Good	M	Group of 3 large stems, average 13" diam	OFF SITE: Within tree line, E side of property
22	Big leaf maple <i>Acer macrophyllum</i>	9	Fair/Poor	L	A group of smaller stems. Some basal damage	OFF SITE: Within tree line, E side of property
23	European wild cherry <i>Prunus avium</i>	8	Fair	L	Leaning stem INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property
24	Big leaf maple <i>Acer macrophyllum</i>	11	Good/Fair	M	Vertical growing. One large live stem, two dead stems	OFF SITE: Within tree line, E side of property
25	Big leaf maple <i>Acer macrophyllum</i>	10	Good/Fair	M	Canopy sub-dominant. Twisting but strong stem	OFF SITE: Within tree line, E side of property
26	Big leaf maple <i>Acer macrophyllum</i>	15	Good	M	Early maturity. Strong vertical growing stem	OFF SITE: Within tree line, E side of property
27	Big leaf maple <i>Acer macrophyllum</i>	9	Dying	-	Functionally dead. Upper CR is missing	OFF SITE: Within tree line, E side of property
28	Big leaf maple <i>Acer macrophyllum</i>	13	Good/Fair	M	Narrow strong vertical CR	OFF SITE: Within tree line, E side of property
29	True fir <i>Abies spp</i>	29	Good	H	Very straight upright stem. Vitality appears good. Full upper CR	OFF SITE: Within tree line, E side of property
30	European wild cherry <i>Prunus avium</i>	14	Fair/Good	L	Vertical stem. Small high CR INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property
31	European wild cherry <i>Prunus avium</i>	12	Fair/Good	L	Vertical stem. Small high CR INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property

**Table Notes:**

DBH: Stem diameter at 4.5-ft from grade or measured as required by regulation.

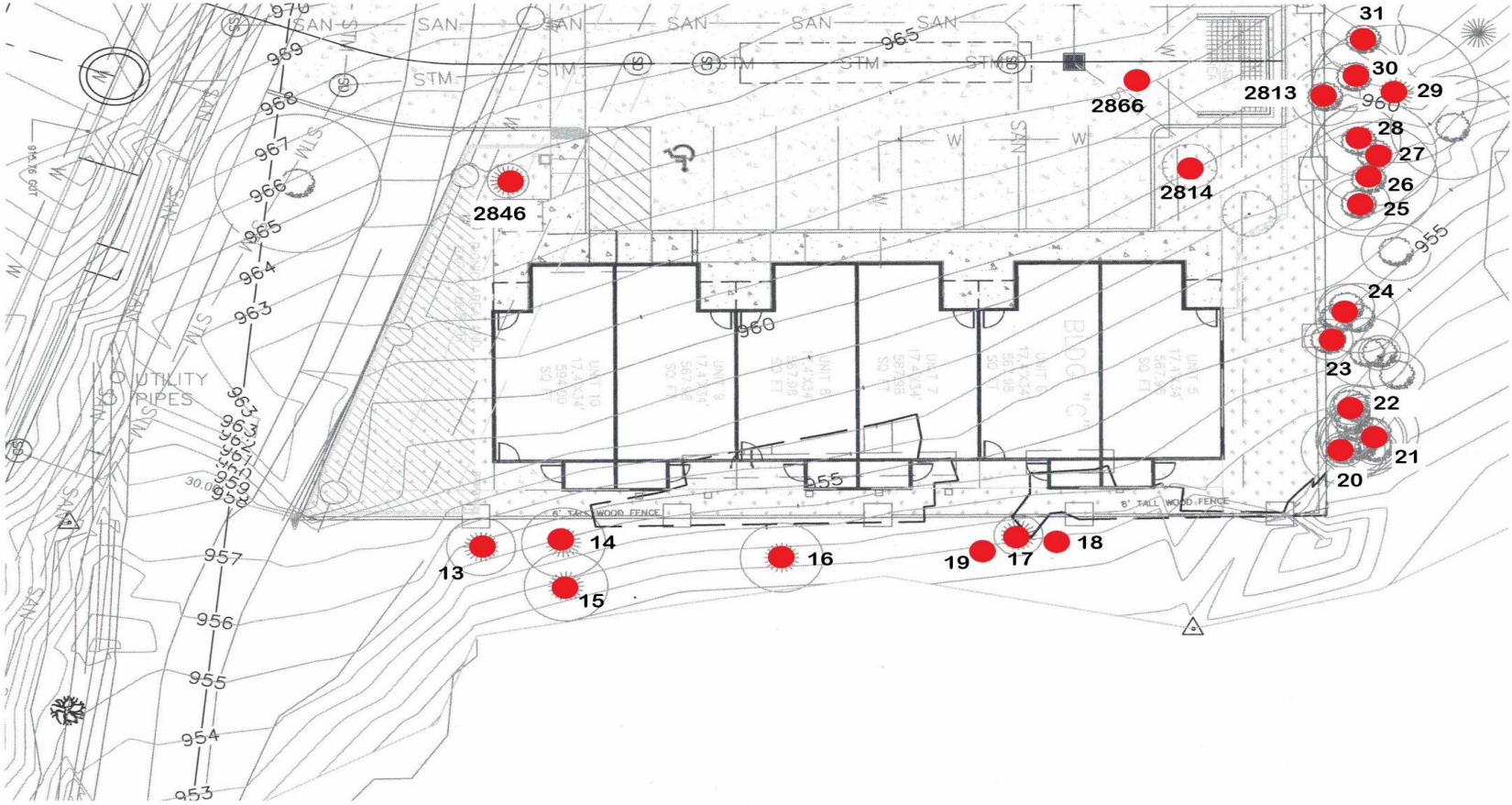
V: Amenity value of tree in the opinion of the consultant. Taking into account the species type, size, and safe and healthy life expectancy of the tree (L: Low; M: Medium; H: High).

Abbreviations: AP - asphalt path; CR - Tree crown; O/E - Hi voltage overhead electricity; PL - Parking lot; SS - Self-sown;

Figure 1a Tree survey 12.24.20 (North half of site)



Figure 1b Tree survey 12.24.20 (South half of site)



**Figure 1c Tree survey 12.24.20 (Utility alignment area)**

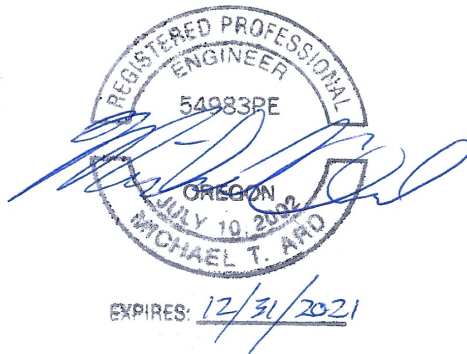


**Exhibit G**



**THE PAD  
TRAFFIC IMPACT STUDY**

**SANDY, OREGON**



**PREPARED FOR:**  
Ryan Bigbee

**PREPARED BY:**  
Michael Ard, PE  
Ard Engineering

**DATE:**  
August 25, 2020

21370 SW Langer Farms Parkway, Suite 142, Sherwood, OR 97140 - (503)862-6960



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## EXECUTIVE SUMMARY

1. A residential development is proposed on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon. The proposed development will consist of 12 townhome dwelling units. As currently proposed, the site will take access via a new driveway on Highway 211 opposite Tupper Road.
2. Upon completion of proposed development, the subject property is projected to generate 6 new site trips during the morning peak hour, 7 trips during the evening peak hour, and 88 new daily site trips.
3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.
4. Based on the queuing analysis, the northbound 95<sup>th</sup> percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a “pork-chop” diverter within the new driveway approach.
5. Based on the crash data, the study intersections are currently operating acceptably with respect to safety.
6. Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.
7. At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.





## **PROJECT DESCRIPTION & LOCATION**

### ***INTRODUCTION***

A 12-unit residential townhome development is proposed for a property located on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon.

As currently proposed, the site would take access via a new driveway intersecting Highway 211 directly opposite Tupper Road. At the request of the Oregon Department of Transportation, two alternative access scenarios are also considered within this study. Under the first alternative, access would be shared with the existing City Hall/Joe's Donuts access driveway on Highway 211 approximately 75 feet south of the near-side crosswalk at the signalized intersection of Highway 26 at Highway 211. Under the second alternative, a new driveway would be constructed at the north end of the subject property immediately adjacent to the exiting City Hall/Joe's Donuts access. All three potential access scenarios are discussed, with information regarding safety and operation at the time of project opening and farther into the future.

This report addresses the impacts of the proposed development on the surrounding street system. The purpose of this analysis is to determine whether the surrounding transportation system is capable of safely and efficiently supporting the proposed use and to identify any necessary improvements and mitigations.

### ***SITE LOCATION AND STUDY AREA DESCRIPTION***

The subject property has a total area of 0.59 acres and is zoned R-3 (High-Density Residential). The site is currently undeveloped, and the proposed development is permitted within the R-3 zone. The subject property is surrounded by existing commercial and institutional uses within the Central Business District zone to the west, north and east, and by parks property to the south.

Oregon Highway 211 (Eagle Creek Sandy Highway) is classified by the Oregon Department of Transportation as a District Highway. It has a two-lane cross-section with one through lane in each direction and added turn lanes at major intersections. It has a posted speed limit of 40 mph in the site vicinity.

Pioneer Boulevard forms the eastbound travel lanes of US Highway 26 (Mt. Hood Highway) in the site vicinity. The highway is classified by the Oregon Department of Transportation as a Statewide Highway and a Freight Route within a Special Transportation Area. It generally has two eastbound travel lanes plus a bike lane, with on-street parking and sidewalks in place on both sides of the roadway. It has a posted speed limit of 25 mph.

Tupper Road is classified by the City of Sandy as a collector street and is striped to prohibit passing. On the south side of the roadway existing curbs and sidewalks are in place in the site vicinity, while the north side has a narrow gravel shoulder.



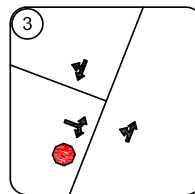
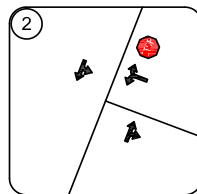
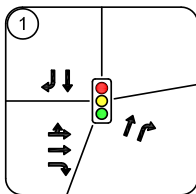
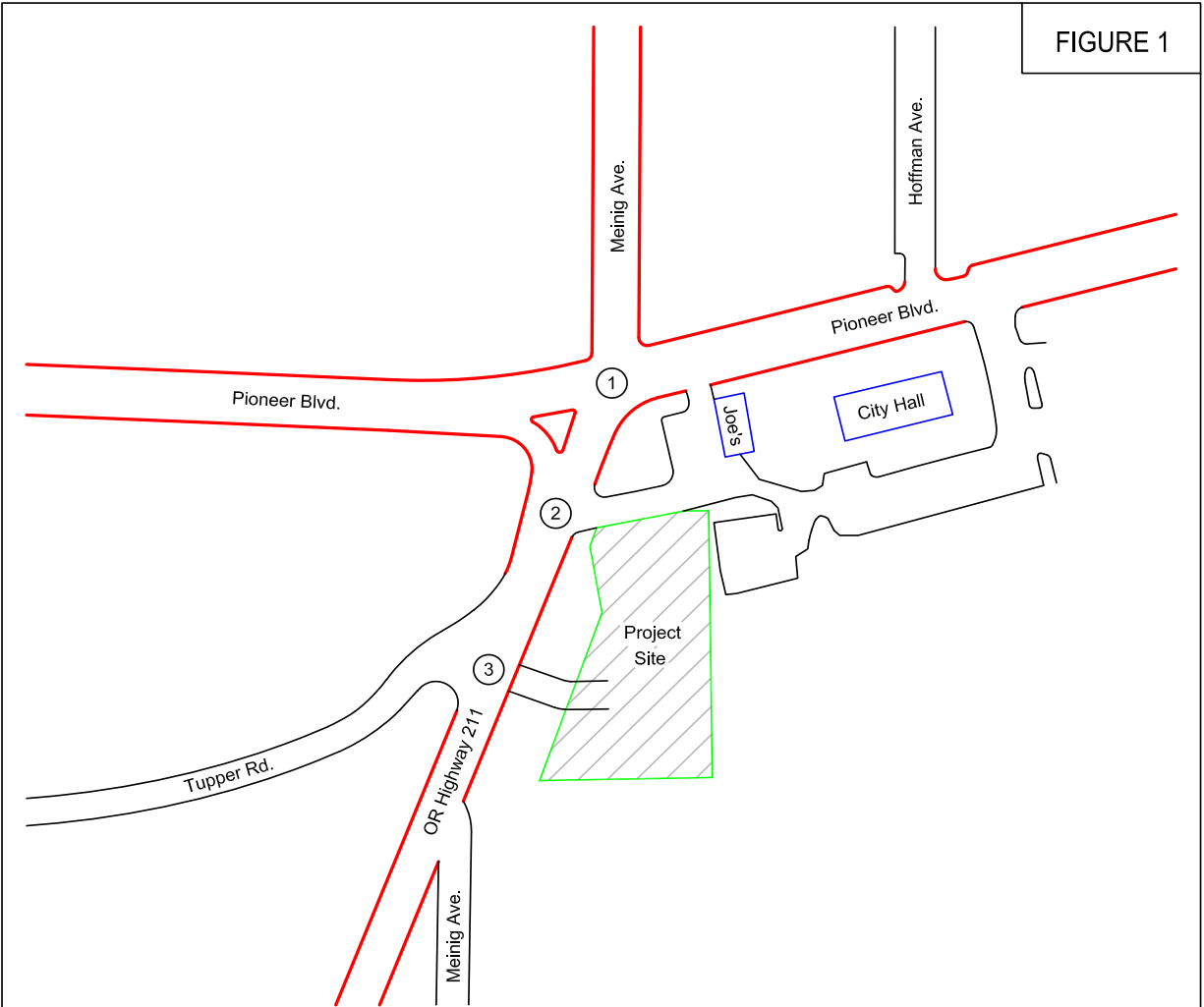
## **EXISTING CONDITIONS**

The intersection of Pioneer Boulevard/US Highway 26 at Highway 211 is currently a four-way intersection controlled by a traffic signal. The eastbound approach has a shared through/left lane, an exclusive through lane and a right-turn lane which operates under yield control. The northbound approach has a through lane and a right-turn lane. The southbound approach has a left-turn lane and a through lane. All four legs of the intersection have marked crosswalks in place with pedestrian signals.

The intersection of Highway 211 at Tupper Road is currently a T-intersection controlled by a stop sign on the eastbound Tupper Road approach. Through traffic traveling along Highway 211 does not stop. Each approach has a single, shared lane for all turning movements.

A vicinity map displaying the project site, vicinity streets, and the study intersections including lane configurations is provided in Figure 1 on page 6.

FIGURE 1



- LEGEND**
- # Study Intersection
  - Traffic Signal
  - STOP Stop Control



VICINITY MAP  
Study Intersections  
Lane Configurations and Traffic Control



### ***TRAFFIC COUNT DATA***

Due to the current COVID-19 crisis, traffic volumes in the site vicinity are not representative of typical conditions. In order to provide count data that more conservatively reflects expectations regarding future traffic volumes, historical count data was used in conjunction with modeling data and intersection observations to develop estimates of the traffic volumes that would be expected absent the impacts of the current pandemic.

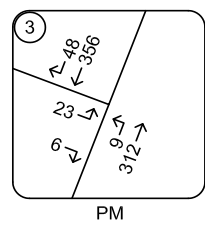
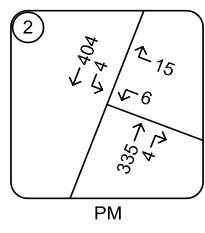
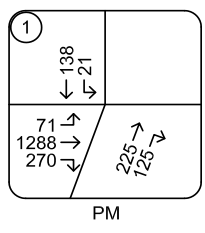
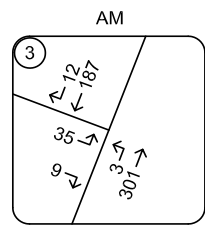
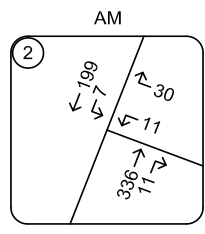
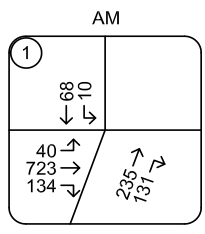
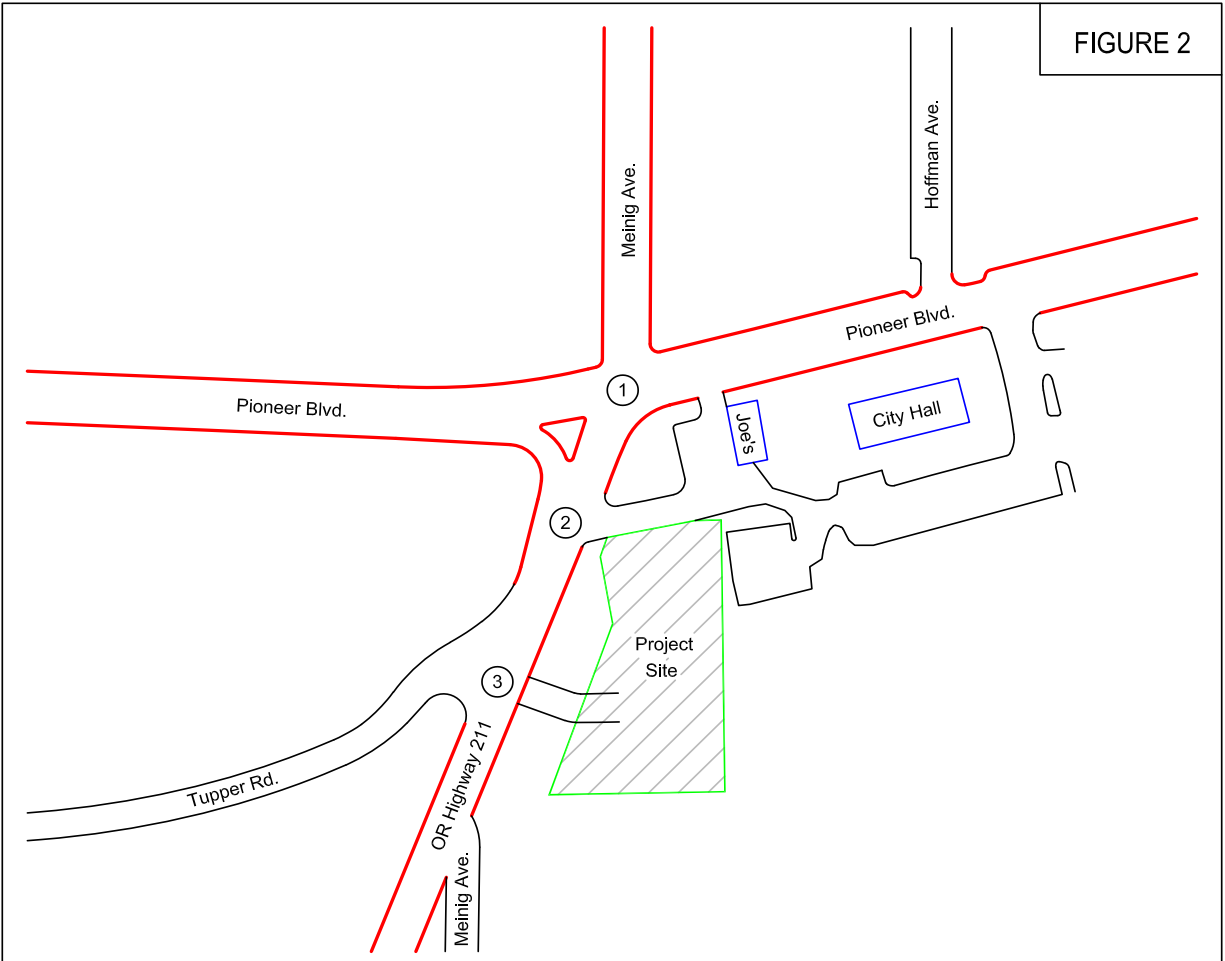
The data sources used include recent count data collected at the nearby intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive to determine through traffic volumes along the respective highways, along with seasonal data, growth data and planning model data from ODOT to determine how those volumes change over distance and time, as well as direct observation of the relative volumes for different turning movements at the intersections of Highway 26 at Highway 211 and Highway 211 at Tupper Road.

The historical count data for the intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive were conducted at the study intersections on Tuesday March 19<sup>th</sup>, 2019 from 4:00 to 6:00 PM and on Wednesday March 20<sup>th</sup>, 2019 from 7:00 to 9:00 AM. The resulting data was adjusted to reflect the projected 30<sup>th</sup>-highest hour volumes for year 2020 traffic conditions as part of the traffic impact study prepared for the Bull Run Terrace Subdivision project. These adjusted future volumes were used to determine the expected through traffic volumes along Highway 26 and Highway 211 in the site vicinity. A diagram excerpted from the Bull Run Terrace TIS showing the year 2020 traffic volumes is included in the attached technical appendix.

In addition to determination of the expected through traffic volumes, it was necessary to determine the turning movement volumes at the study intersections for year 2020 traffic conditions absent the pandemic. Turning movements were estimated based on direct observation of the relative volumes of traffic making each turning movement at the intersections. After calculating the through movement volumes, the percentage of traffic observed making turning movements was applied to determine the remaining hourly volumes.

Figure 2 on page 8 shows the existing 2020 30<sup>th</sup>-highest hour traffic volumes for the morning and evening peak hours at the study intersections.

FIGURE 2



**TRAFFIC VOLUMES**  
 2020 Existing 30th-Highest Hour (August) Conditions  
 Morning and Evening Peak Hours



**OPERATIONAL ANALYSIS**

An operational analysis was conducted for the study intersections using Synchro 10 software, with outputs calculated based on the *HIGHWAY CAPACITY MANUAL, 6<sup>th</sup> Edition*. The analysis was conducted for the weekday morning and evening peak hours.

The purpose of the existing conditions analysis is to establish how the study area intersections operate currently and allow for calibration of the operational analysis if required.

The results of the operational analysis are reported based on delay, Level of Service (LOS), and volume-to-capacity ratio (v/c). Delays are reported in seconds. Level of service is reported as a letter grade and can range from A to F, with level of service A representing nearly free-flow conditions and level of service F representing high delays and severe congestion. A report of level of service D generally indicates moderately high but tolerable delays, and typically occurs prior to reaching intersection capacity. For unsignalized intersections, the v/c represents the portion of the available intersection capacity that is being utilized on the worst intersection approach. A v/c ratio of 1.0 would indicate that the approach is operating at capacity.

A summary of the existing conditions operational analysis is provided in Table 1 below. For the signalized intersection of Highway 26 at Highway 211, the reported delays, levels of service and volume-to capacity ratios represent the overall operation of the intersection. For the two unsignalized study intersections, the reported delays and levels-of-service represent the approach lane which experiences the highest delays, while the reported v/c ratios represent the highest ratio for the major-street and minor-street movements.

The Oregon Department of Transportation requires that the study intersections operate with a volume-to-capacity ratio (v/c) of 0.90 or less.

Based on the analysis, the study intersections are currently operating acceptably. Detailed capacity analysis worksheets are provided in the technical appendix.

**Table 1 - Operational Analysis Summary: 2020 Existing 30th-Highest Hour Conditions**

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Highway 26 at Highway 211	18.2	B	0.53	20.7	C	0.71
Highway 211 at City Hall Access	11.6	B	0.22	12	B	0.25
Highway 211 at Tupper Road	12.3	B	0.19	14.7	B	0.25



## SITE TRIPS

### Proposed Development

The proposed new development will consist of 12 townhome dwelling units. To estimate the number of trips that will be generated by the proposed development, trip rates from the *TRIP GENERATION MANUAL, 10<sup>th</sup> EDITION* were used. Data from land-use code 220, *Multi-Family Housing*, were used. The trip estimates are based on the number of dwelling units.

A summary of the trip generation calculations is provided in Table 2 below. Detailed trip generation worksheets are also included in the technical appendix.

**Table 2 - Proposed Development Trip Generation Summary**

	AM Peak Hour			PM Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	
12 Multi-Family Dwelling Units	1	5	6	4	3	7	88

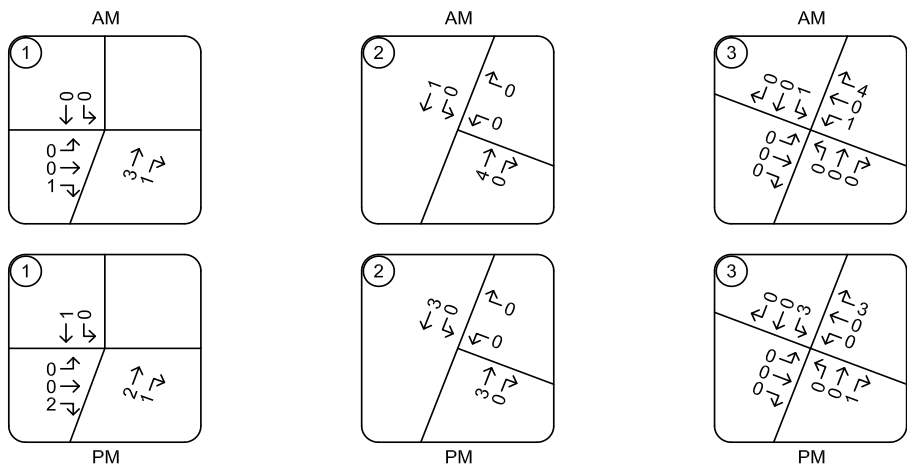
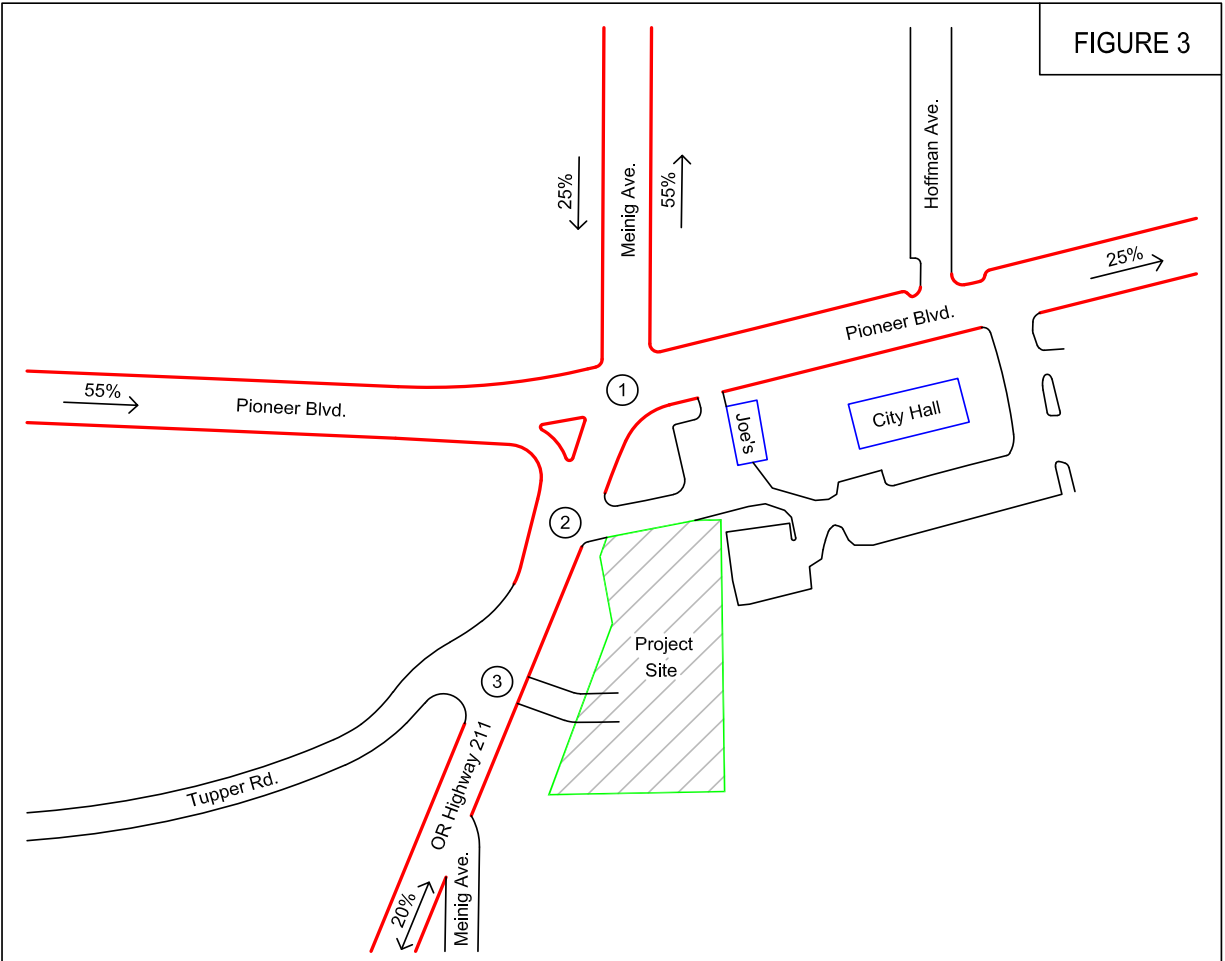
### TRIP DISTRIBUTION

The directional distribution of site trips to and from the project site was estimated based the existing travel patterns in the site vicinity, as well as the locations of likely trip destinations and major transportation routes. Overall, 55 percent of the anticipated site trips are projected to travel to and from the west on Highway 26, 25 percent are projected to travel to and from the east on Highway 26, and 20 percent are projected to travel to and from the south on Highway 211.

Since it is anticipated that any future site access to Highway 211 will be restricted to right-in, right-out movements only, drivers entering from the north will need to pass the site access and turn around prior to lawfully entering the project site. Similarly, drivers exiting the site intending to travel to the south will need to turn right then turn around to reach their intended destination. Accordingly, these trips may pass through the study intersections more than once. The additional trips resulting from vehicles turning around are included in the trip assignment diagram.

The trip distribution percentages and trip assignment for the proposed development are shown in Figure 3 on page 11.

FIGURE 3



**TRAFFIC VOLUMES**  
 Proposed Development - Primary Site Trips  
 Morning and Evening Peak Hours





## **FUTURE CONDITIONS ANALYSIS**

### ***BACKGROUND VOLUMES***

In order to determine the expected impact of site trips on the study area intersections, it is necessary to compare traffic conditions both with and without the addition of the projected traffic from the proposed development. Since the proposed use cannot be constructed and occupied immediately, the comparison is made for future traffic conditions at the time of project completion. It is anticipated that the proposed use will be completed and occupied by 2022. Accordingly, the analysis was conducted for year 2022 traffic conditions.

Similar to the existing year 2020 conditions analysis, the year 2022 traffic volumes were determined using data from the Bull Run Terrace Subdivision TIS as well as ODOT data resources and the direct observations of turning movement volumes at the study area intersections to determine the likely traffic volumes during the peak hours absent the current COVID-19 pandemic.

Since the data used was drawn from the year 2022 background traffic volume for the Bull Run Terrace Subdivision, the projected volumes already account for future site trips from development within the in-process developments considered in that report as well as the anticipated background growth rates for highway volumes in the site vicinity. Site trips from the Bull Run Terrace Subdivision were not directly included in the analysis since completion of the Bull Run Terrace project will result in diversion of trips to the new Dubarko Road connection between Highway 211 and Highway 26 at the east side of the City of Sandy. Accordingly, the 2022 background conditions analysis represents the highest traffic volumes which may reasonably occur in association with the proposed development.

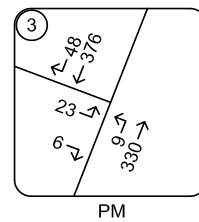
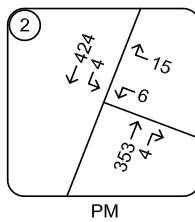
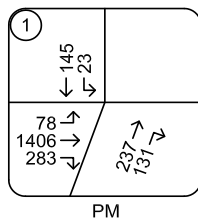
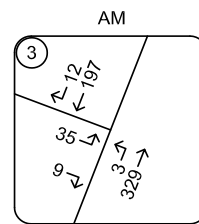
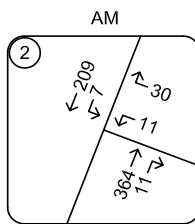
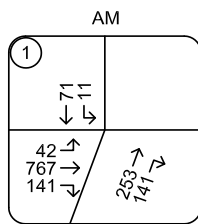
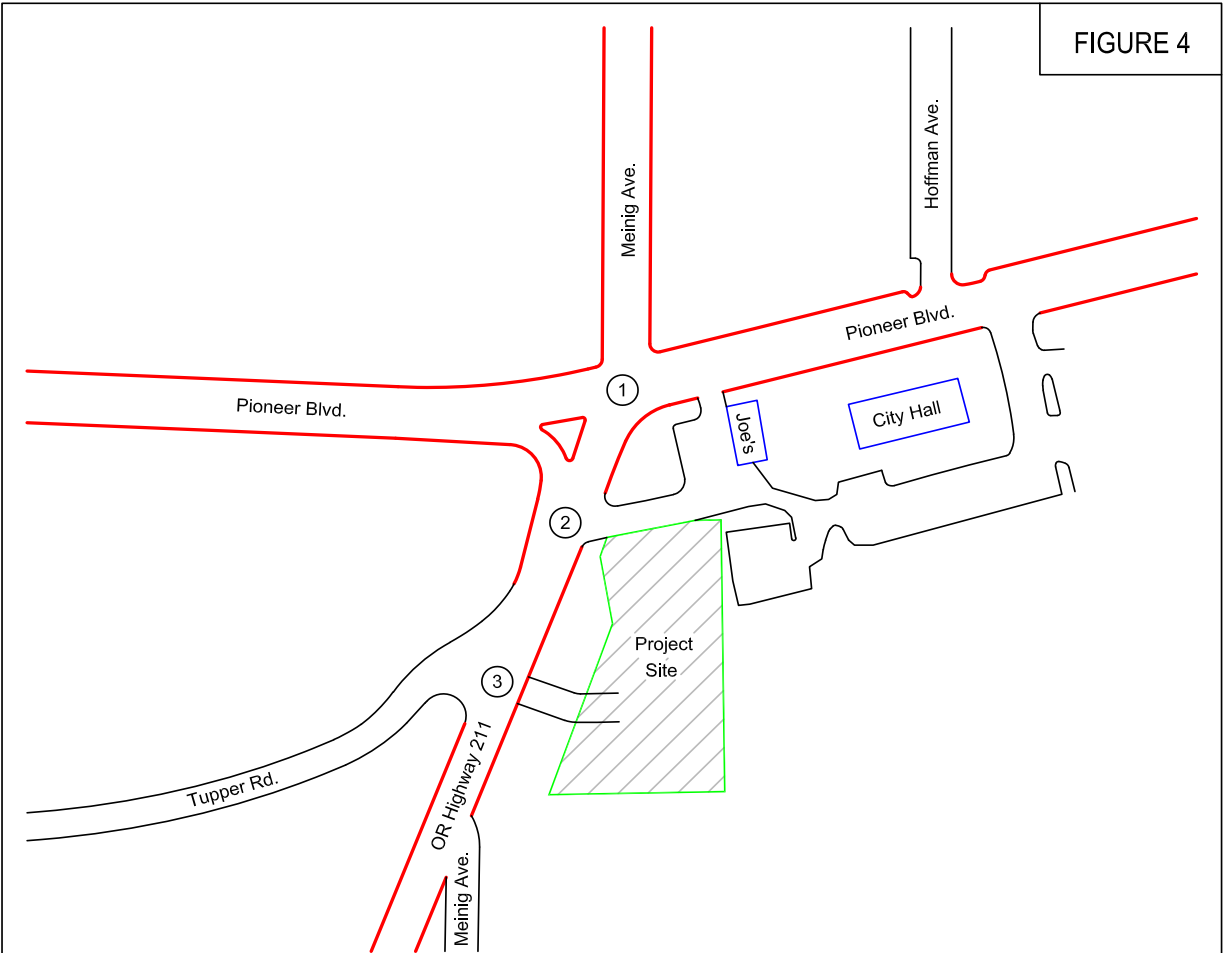
Figure 4 on page 13 shows the projected year 2022 background traffic volumes at the study intersections during the morning and evening peak hours, including anticipated future traffic from in-process developments.

### ***BACKGROUND VOLUMES PLUS SITE TRIPS***

Peak hour trips calculated to be generated by the proposed development were added to the projected year 2022 background traffic volumes to obtain the year 2022 total traffic volumes following completion of the proposed residential development. The resulting total traffic volumes are shown in figure 5 on page 14.

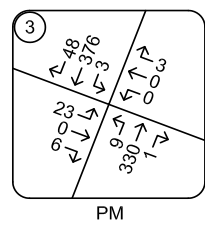
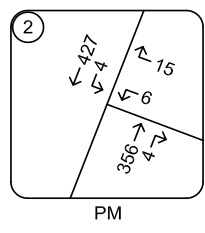
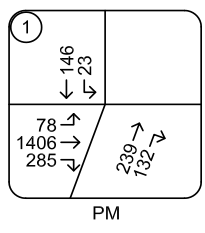
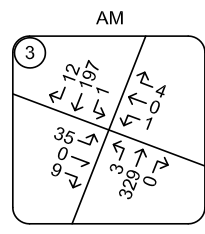
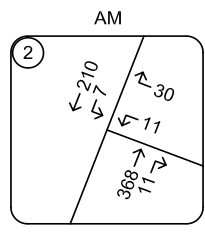
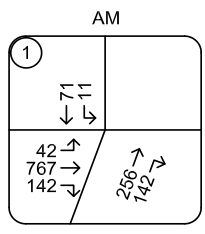
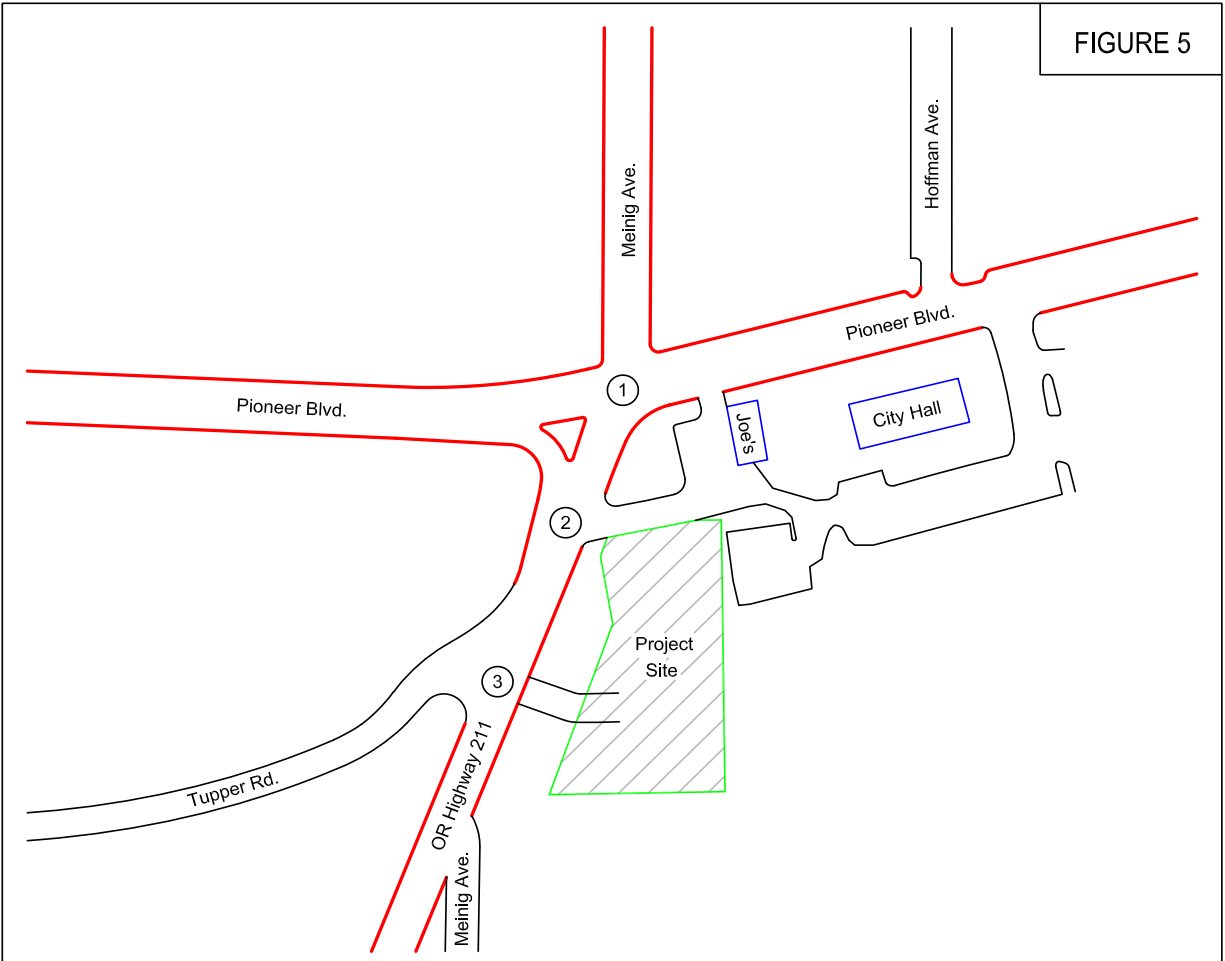
Based on discussions with ODOT staff, it is anticipated that the study intersections along Highway 211 south of Pioneer Boulevard may be restricted to right-in, right-out operation only in conjunction with the proposed development in order to reduce concerns associated with limited access spacing and queues. An additional diagram showing the year 2022 background plus site trips volumes with traffic diversions resulting from right-in, right-out restriction of these intersections is provided in Figure 6 on page 15.

FIGURE 4



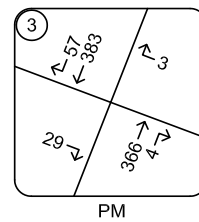
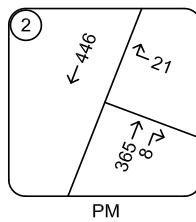
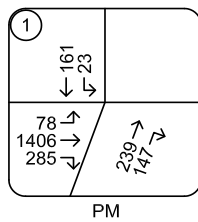
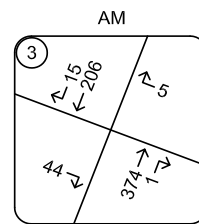
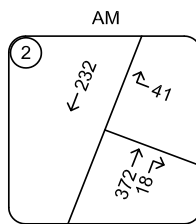
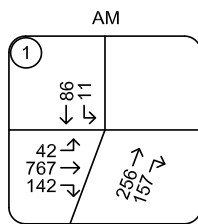
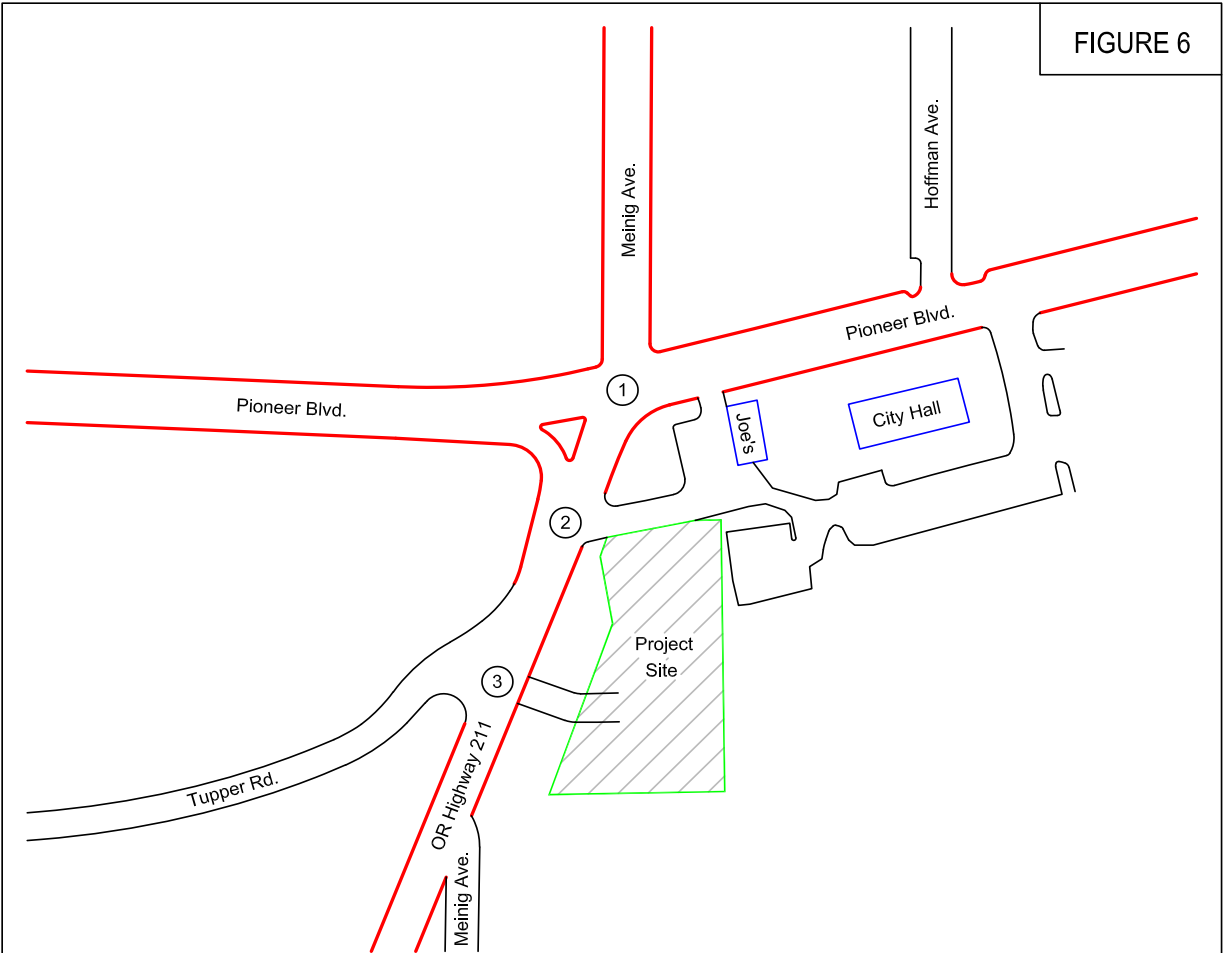
**TRAFFIC VOLUMES**  
 2022 Background Conditions  
 Morning and Evening Peak Hours

FIGURE 5



**TRAFFIC VOLUMES**  
 2022 Background Plus Site Trips  
 Morning and Evening Peak Hours

FIGURE 6



**TRAFFIC VOLUMES**  
 2022 Background Plus Site Trips Conditions (RIRO)  
 Morning and Evening Peak Hours



**OPERATIONAL ANALYSIS**

The operational analysis for future traffic conditions was again conducted using Synchro analysis software, with outputs based on the analysis methodologies contained in the *HIGHWAY CAPACITY MANUAL, 6<sup>th</sup> Edition*. The analysis was prepared for the intersections’ morning and evening peak hours.

The results of the operational analysis are summarized in Table 3 below. Detailed analysis worksheets are also included in the technical appendix.

**Table 3 - Operational Analysis Summary: Year 2022 Future Conditions**

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Pioneer Blvd. at Highway 211						
2022 Background Conditions	18.6	B	0.56	22.6	C	0.77
2022 Background plus Site	18.7	B	0.57	22.7	C	0.77
2022 Bkgd plus Site (w/ Median Barrier)	19.1	B	0.57	23.1	C	0.77
Highway 211 at City Hall Driveway						
2022 Background Conditions	11.9	B	0.23	12.3	B	0.26
2022 Background Plus Site	12.0	B	0.24	12.4	B	0.26
2022 Bkgd Plus Site (w/ Median Barrier)	11.2	B	0.24	10.8	B	0.27
Highway 211 at Tupper Road						
2022 Background Conditions	15.2	C	0.21	15.2	C	0.26
2022 Background plus Site	13.8	B	0.21	17.1	C	0.26
2022 Bkgd plus Site (w/ Median Barrier)	10.6	B	0.23	11.2	B	0.27

Based on the results of the operational analysis, the study intersections are projected to operate acceptably per ODOT standards either with or without the addition of site trips from the proposed development, and with or without conversion of the stop-controlled minor-street approaches to right-in, right-out only. No operational mitigations are necessary or recommended in conjunction with the proposed development.



### ***QUEUING ANALYSIS***

In addition to the operational analysis, a queuing analysis was conducted to determine whether northbound queues on Highway 211 may extend to the proposed site access driveway during the peak hours. The queuing analysis was prepared using SimTraffic simulation software with model calibrations as required per ODOT's Analysis Procedures Manual. The results of the analysis are reported as 95<sup>th</sup> percentile queues, which represent the queue length that is exceeded during less than 5 percent of the peak hour. Queue lengths in excess of the 95<sup>th</sup> percentile do not occur with sufficient frequency to allow for cost-effective design.

Based on the analysis, the projected 95<sup>th</sup> percentile queue lengths for the northbound Highway 211 approach to Pioneer Boulevard were determined to be 263 feet during the morning peak hour and 308 feet during the evening peak hour. (The average queue lengths during these analysis periods were projected to be 145 feet and 177 feet, respectively.)

The intersection of Highway 211 at the existing City Hall/Joe's Donuts driveway is centered approximately 70 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, the average peak-hour queues projected during the peak hours will extend beyond this driveway.

The intersection of Highway 211 at Tupper Road is centered approximately 225 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, this intersection is within the 95<sup>th</sup> percentile queue length during the morning and evening peak hours, although it is outside the average projected queue lengths during the peak hours.

Based on the queuing analysis, both unsignalized study intersections are within the 95<sup>th</sup> percentile queue lengths for northbound traffic approaching Pioneer Boulevard along Highway 211. Accordingly, it is appropriate to consider some form of turning movement restriction in order to avoid having vehicles make potentially unsafe left-turn maneuvers through stopped vehicle queues and to avoid congestion within the through travel lanes which may occur when vehicles stop within an otherwise free-flowing travel lane to wait to make left turns across these queues.

Typically, the most effective mechanism for restricting turning movements is the installation of a raised median within the major street. A raised median provides a physical barrier resulting in high compliance with the intended turning movement restriction. Where it is not possible to install a raised median within the major street, the side-street approaches may have "pork-chop" diverters installed which also physically direct vehicles toward the permitted turning movements only.

If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a "pork-chop" diverter within the new driveway approach.



## **SAFETY ANALYSIS**

### ***CRASH DATA ANALYSIS***

Using data obtained from the Oregon Department of Transportation, a review of the five most recent years of available crash history (from January 2013 through December 2017) was performed for the study intersections. In addition to examination of the crash data, crash rates are calculated for the intersections. Crash rates allow for comparison of relative risk by accounting for both the number of crashes and the number of vehicles travelling through the intersection. Crash rates are reported as the number of crashes per million entering vehicles.

The intersection of Pioneer Boulevard at OR Highway 211/Meinig Road had a total of 10 reported crashes during the 5-year analysis period. These included 6 rear-end collisions, 2 angle collisions, 1 sideswipe-overtaking collision and one fixed-object collision. The crashes resulted in one non-incapacitating injury and 4 reports of a “possible injury/complaint of pain.” The crash rate for the intersection was calculated to be 0.256 crashes per million entering vehicles. This is roughly the median crash rate for urban 3-way signalized intersections in Oregon (0.252 crashes per million entering vehicles), indicating that the intersection is operating similar to average intersections in Oregon with respect to safety.

The other study intersections had no reported crashes during the five-year analysis period.

Based on the detailed examination of crash data, no significant safety concerns were identified and no specific safety mitigations are recommended.

### ***WARRANT ANALYSIS***

Traffic signal and turn-lane warrants were examined for the study intersections.

Based on the projected side-street traffic volumes, traffic signal warrants are not projected to be met at either of the unsignalized study intersections under any of the analysis scenarios. Accordingly, no new traffic signals are recommended in conjunction with the proposed development.

Left-turn lane warrants were examined for the major-street approaches to the unsignalized study intersections. Left-turn lane warrants are intended to evaluate whether a meaningful safety benefit may be expected if the turning vehicles are provided with turn lane within the street, allowing left-turning drivers to move out of the through travel lane so that following vehicles may pass without conflicts. The left-turn lane warrant analysis methodology utilizes the number of travel lanes in conjunction with the volume of advancing and opposing traffic to determine the minimum number of left-turning vehicles which would result in a meaningful safety benefit. This threshold left-turn volume may be as low as 10 vehicles per hour. Notably, fewer than 10 left-turn movements are projected for all unsignalized major-street approaches during each of the peak hours. Accordingly, by inspection left-turn lane warrants will not be met. No new left-turn lanes are recommended in conjunction with the proposed development.

Right-turn lane warrants were also examined for the major-street approaches to the unsignalized study intersections. Right-turn lanes reduce the likelihood of rear-end collisions as vehicles slow or



stop to turn right from a free-flowing through travel lane. Generally, right-turn lane warrants are not met where the hourly right-turn volume is 20 vehicles or fewer. However, if the total approach volume in the outside lane is in excess of 700 vehicles per hour, a shoulder or right-turn lane treatment may be appropriate even if the right-turn volume is fewer than 20 vehicles. Examining the study intersections shows that none of the highway through lanes carries more than 700 vehicles per hour under any of the analysis scenarios. Accordingly, right-turn lane warrants will not be met for any intersections with fewer than 20 right-turning vehicles per hour.

Only one unsignalized major-street right-turn movement carries more than 20 vehicles per hour. This movement is the southbound right-turn movement from Highway 211 onto Tupper Road. Accordingly, a detailed right-turn lane warrant analysis was prepared for this intersection approach. Based on the analysis, right turn lane warrants would not be met under year 2022 background conditions or year 2022 background plus site trips conditions. With conversion of the intersection to right-in, right-out only and assuming that all northbound left-turning traffic diverts by passing Tupper Road northbound, turning around, then returning southbound, right-turn lane warrants would be marginally met. However, since some left-turning drivers would be expected to divert by turning left onto Dubarko Road prior to reaching Tupper Road, the actual volume of southbound right-turning traffic is expected to be below the threshold that would trigger the need for a right-turn lane. Additionally, no site trips from the proposed development would make this turning movement. Accordingly, installation of a new southbound right-turn lane serving Tupper Road is not recommended in conjunction with the proposed development.

Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.

#### ***INTERSECTION SIGHT DISTANCE***

Based on the posted speed limit of 40 mph, a minimum of 445 feet of intersection sight distance is required to the south of the proposed site access on Highway 211. Vehicles approaching from the north are within a 25-mph speed zone on SE Meinig Avenue, requiring a minimum of 280 feet of intersection sight distance to the north.

In accordance with the procedures described in *A Policy On Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials, intersection sight distance was measured from a driver's eye position within the proposed driveway 15 feet behind the edge of the traveled way and 3.5 feet above the driveway surface. The available intersection sight distances in each direction were measured to the oncoming driver's eye position within the oncoming travel lane 3.5 feet above the roadway surface.

Intersection sight distance was measured to be in excess of 600 feet to the south from the proposed site access location. Sight distance to the north is restricted by a crest vertical curve where Highway 211 meets Pioneer Boulevard. The available intersection sight distance in this direction was measured to be 330 feet.

In addition to evaluation of intersection sight distance for the northbound and southbound approaches along Highway 211/SE Meinig Avenue, it is appropriate to evaluate whether adequate





stopping sight distance is available for vehicles turning from Highway 26 onto Highway 211 to stop if necessary to avoid a collision.

Vehicles turning from Highway 26 would be expected to turn at speeds of up to approximately 20 mph. Based on this design speed and the 6 percent downhill grade on the approach, the minimum required stopping sight distance for this approach speed was calculated to be 120 feet. The available intersection sight distance for vehicles approaching from this direction was measured to be 203 feet. Accordingly, the access can operate safely with respect to vehicles approaching from Highway 26.

Based on the sight distance analysis, adequate sight lines can be attained for safe and efficient operation at the proposed site access location on Highway 211.

#### ***SITE ACCESS ALTERNATIVES ANALYSIS***

At the direction of ODOT staff, three total site access scenarios were examined. The potential site access options include:

- 1) Shared site access to Highway 211 at the existing City Hall/Joe's Donuts Driveway;
- 2) A new site access driveway on Highway 211 immediately south of the existing City Hall/Joes' Donuts driveway; and
- 3) A new site access driveway on Highway 211 directly opposite Tupper Road.

These potential site access scenarios were evaluated in order to determine the relative merits of each. It should be noted that given the low delays, high levels of service and low v/c ratios projected in the operational analysis portion of this report, it is anticipated that any of the three site access scenarios would result in acceptable operation per ODOT standards. However, the access scenarios differ significantly in near-term and long-term access spacing and safety, as well as viability.

#### **Access Scenario 1**

A shared access to Highway 211 at the existing City Hall/Joe's Donuts Driveway would result in increasing traffic volumes at an intersection in very close proximity to the traffic signal at Pioneer Boulevard. Based on the queuing analysis, this existing driveway is well within the average queue length for northbound vehicles approaching the signal during both the morning and evening peak hours. Conflicts between turning vehicles and through traffic would remain frequent, and the increased traffic volumes using the driveway would exacerbate existing problems at this driveway.

In addition to the operational concerns associated with shared access at the existing City Hall/Joe's Donuts driveway, sharing this access would require approval from the City of Sandy for sharing the access. This approval was previously formally requested of the Sandy City Council and was denied. City staff are also unsupportive of a shared access. As such, this option was determined to be infeasible.

#### **Access Scenario 2**

Although the subject property cannot share access with the existing city driveway, it would be possible to construct a new driveway immediately south of and adjacent to the City Hall/Joe's



Donuts driveway within the subject property. The idea would be to align the driveway at the north end of the property and provide an easement for future use by the city. Given such an easement, at any time that the city and/or Joe's makes substantive changes to their sites the existing driveway could be closed and consolidated with the driveway serving the subject property. In the long term, this would result in (marginally) increased access spacing between the driveway and Pioneer Boulevard as well as a reduction in the number of points of access to Highway 211.

This access alternative also has some substantial weaknesses.

First, since near-term operation would require that both the existing city driveway and the proposed site access operate simultaneously. Since drivers turning right onto Highway 211 primarily focus on conflicts approaching along the highway, they may begin turns only to find they are obstructed by a vehicle that has entered Highway 211 from the adjacent driveway. This may lead to both operational and safety concerns.

Second, since the new driveway would need to be located at the extreme north end of the subject property, it would be placed at the location providing the least possible access spacing between the new driveway and the traffic signal at Pioneer Boulevard. Again, this driveway would be located well within the average northbound queue length during the morning and evening peak hours.

Third, this scenario would result in an immediate degradation to access spacing and safety in the site vicinity which would continue indefinitely until such time as the City of Sandy could be forced to move their access to a shared alignment with the proposed development. Since no improvements are currently planned within the City Hall or Joe's Donuts sites, it is expected that this degradation would continue well into the future.

Fourth, providing exclusive site access to The Pad at the north end of the subject property would result in a permanent driveway which cannot be either closed or relocated at any point in the future. Since Joe's Donuts and the Sandy City Hall currently also have access to Highway 26 (two driveways), it may be possible to close their existing driveway at some point in the future. However, if site access for the Pad is placed at the north end of the subject property, it will not be possible to remove that access in the future.

Fifth, the subject property is located on a slope, with the north end of the site forming the highest point of the subject property. If access is taken at the north end of the site, it will be necessary to provide a long driveway carrying site traffic to the lower elevation from which vehicles will access parking spaces within the site. This will result in a meaningful reduction in the development potential of the subject property.

Based on the analysis, selection of site access at the north end of the site is not recommended.

### Access Scenario 3

Under the third access scenario, a new driveway would be constructed intersecting Highway 211 directly opposite Tupper Road.



Since there is an existing intersection at this location, construction of the driveway would result in no change to the existing access spacing on Highway 211. Although access spacing between the site access and the City Hall/Joe's Donuts access would only be approximately 150 feet, this would be considerably in excess of the access spacing that results from implementation of Access Scenario 2, with ample room for drivers simultaneously exiting the two driveways to anticipate and avoid collisions with each other.

Although the site access would be located within the 95<sup>th</sup> percentile queue length for northbound traffic on Highway 211, it would be well outside the average queue length during the peak hours. This indicates that although there may be some obstruction of the site access by through traffic, the standing queues would be expected to clear during each signal cycle, allowing for safe and efficient access to and from the site in conjunction with the proposed right-in, right-out restriction.

Although this site access would also be permanent (similar to Access Scenario 2), it may be possible to remove the City Hall/Joe's Donuts access in the future since alternative access is available for these uses. Accordingly, selection of this access alternative results not only in maximizing access spacing in the near term, but in the potential for maximizing access spacing in the long term as well.

Since Tupper Road intersects Highway 211 near the middle of the subject property, this access scenario also results in the most efficient site plan, since vehicles entering the site from the middle of the property can easily access dwelling units on the north and south sides of the site without the need for significant changes in elevation.

Based on the detailed analysis of the three site access scenarios, it is recommended that site access be taken to Highway 211 directly opposite Tupper Road.



## CONCLUSIONS

Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.

Based on the queuing analysis, the northbound 95<sup>th</sup> percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a “pork-chop” diverter within the new driveway approach.

Based on the crash data, the study intersections are currently operating acceptably with respect to safety.

Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.

At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.

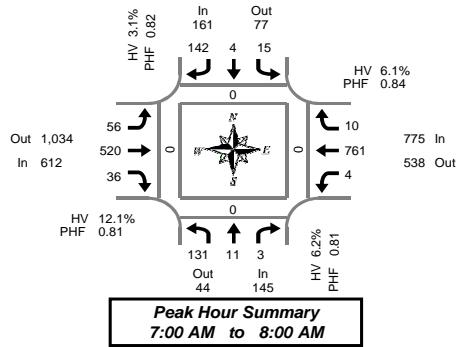


## APPENDIX

# Total Vehicle Summary



Clay Carney  
(603) 833-2740



## SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019  
7:00 AM to 9:00 AM

### 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	16	0	0	0	0	0	17	0	5	26	2	0	0	74	0	0	140	0	0	0	0
7:05 AM	10	0	1	0	1	0	10	0	2	18	3	0	1	65	2	0	113	0	0	0	0
7:10 AM	17	1	0	0	2	0	11	0	7	36	2	0	2	74	1	0	153	0	0	0	0
7:15 AM	12	0	0	0	1	2	9	0	9	40	2	0	1	84	1	0	161	0	0	0	0
7:20 AM	15	0	0	0	3	0	11	0	3	40	1	0	0	68	0	0	141	0	0	0	0
7:25 AM	14	1	0	0	1	1	16	0	2	40	4	0	0	70	1	0	150	0	0	0	0
7:30 AM	7	1	1	0	0	0	16	0	8	43	2	0	0	67	0	0	145	0	0	0	0
7:35 AM	12	2	0	0	3	0	12	0	0	56	5	0	0	57	1	0	148	0	0	0	0
7:40 AM	8	2	0	0	0	0	11	0	4	59	3	0	0	53	0	0	140	0	0	0	0
7:45 AM	12	1	1	0	2	0	11	0	4	53	3	0	0	45	2	0	134	0	0	0	0
7:50 AM	4	2	0	0	1	0	10	0	9	47	4	0	0	62	0	0	139	0	0	0	0
7:55 AM	4	1	0	0	1	1	8	0	3	62	5	0	0	42	2	0	129	0	0	0	0
8:00 AM	5	0	1	0	2	1	13	0	2	46	2	0	0	41	0	0	113	0	0	0	0
8:05 AM	6	0	0	0	1	1	5	0	8	50	2	0	0	42	2	0	117	0	0	0	0
8:10 AM	3	0	0	0	2	1	10	0	5	45	4	0	0	53	1	0	124	0	0	0	1
8:15 AM	12	0	0	0	2	0	7	0	3	38	1	0	0	34	1	0	98	0	0	0	0
8:20 AM	6	2	0	0	2	0	9	0	5	38	1	0	1	49	0	0	113	0	0	0	0
8:25 AM	8	0	0	0	1	0	11	0	4	44	3	0	0	39	2	0	112	0	0	0	1
8:30 AM	5	0	0	0	2	1	10	0	4	66	2	0	0	47	0	0	137	1	0	0	0
8:35 AM	10	0	0	0	3	0	13	0	6	59	5	0	0	45	1	0	142	0	0	0	0
8:40 AM	7	0	0	0	5	1	15	0	10	62	3	0	1	43	1	0	148	0	0	0	0
8:45 AM	5	0	0	0	1	0	12	0	5	69	5	0	0	63	0	0	160	0	0	0	0
8:50 AM	9	2	0	0	3	0	12	0	7	56	8	0	1	46	1	0	145	0	0	0	0
8:55 AM	8	1	0	0	2	0	13	0	6	51	8	0	2	44	1	0	136	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

### 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	43	1	1	0	3	0	38	0	14	80	7	0	3	213	3	0	406	0	0	0	0
7:15 AM	41	1	0	0	5	3	36	0	14	120	7	0	1	222	2	0	452	0	0	0	0
7:30 AM	27	5	1	0	3	0	39	0	12	158	10	0	0	177	1	0	433	0	0	0	0
7:45 AM	20	4	1	0	4	1	29	0	16	162	12	0	0	149	4	0	402	0	0	0	0
8:00 AM	14	0	1	0	5	3	28	0	15	141	8	0	0	136	3	0	354	0	0	0	1
8:15 AM	26	2	0	0	5	0	27	0	12	120	5	0	1	122	3	0	323	0	0	0	1
8:30 AM	22	0	0	0	10	2	38	0	20	187	10	0	1	135	2	0	427	1	0	0	0
8:45 AM	22	3	0	0	6	0	37	0	18	176	21	0	3	153	2	0	441	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

### Peak Hour Summary 7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	145	44	189	0	161	77	238	0	612	1,034	1,646	0	775	538	1,313	0	1,693	0	0	0	0
%HV	6.2%				3.1%				12.1%				6.1%				8.0%				
PHF	0.81				0.82				0.81				0.84				0.93				

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	11	3	145	15	4	142	161	56	520	36	612	4	761	10	775	1,693
%HV	6.9%	0.0%	0.0%	6.2%	13.3%	25.0%	1.4%	3.1%	8.9%	12.7%	8.3%	12.1%	75.0%	5.5%	20.0%	6.1%	8.0%
PHF	0.74	0.55	0.75	0.81	0.63	0.33	0.81	0.82	0.74	0.77	0.75	0.81	0.25	0.84	0.63	0.84	0.93

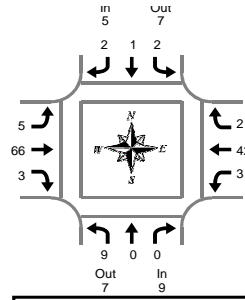
### Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	131	11	3	0	15	4	142	161	56	520	36	0	4	761	10	0	1,693	0	0	0	0
7:15 AM	102	10	3	0	17	7	132	0	57	581	37	0	1	684	10	0	1,641	0	0	0	1
7:30 AM	87	11	3	0	17	4	123	0	55	581	35	0	1	584	11	0	1,512	0	0	0	2
7:45 AM	82	6	2	0	24	6	122	0	63	610	35	0	2	542	12	0	1,506	1	0	0	2
8:00 AM	84	5	1	0	26	5	130	0	65	624	44	0	5	546	10	0	1,545	1	0	0	2

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



**Peak Hour Summary**  
7:00 AM to 8:00 AM

## SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019  
7:00 AM to 9:00 AM

### Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	0	1	0	0	0	0	1	6	1	8	0	6	0	6	15
7:05 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0	5	10
7:10 AM	3	0	0	3	0	0	0	0	0	3	0	3	2	2	1	5	11
7:15 AM	1	0	0	1	0	1	0	1	2	6	0	8	1	1	0	2	12
7:20 AM	2	0	0	2	1	0	0	1	0	5	0	5	0	1	0	1	9
7:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	1	0	1	8
7:30 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	7	0	7	14
7:35 AM	0	0	0	0	1	0	0	1	0	7	0	7	0	6	0	6	14
7:40 AM	0	0	0	0	0	0	0	0	1	8	0	9	0	1	0	1	10
7:45 AM	0	0	0	0	0	0	1	1	0	6	0	6	0	4	0	4	11
7:50 AM	0	0	0	0	0	0	1	1	0	3	0	3	0	7	0	7	11
7:55 AM	2	0	0	2	0	0	0	0	1	4	1	6	0	1	1	2	10
8:00 AM	1	0	0	1	0	0	1	1	0	10	1	11	0	2	0	2	15
8:05 AM	0	0	0	0	1	0	1	2	0	9	0	9	0	7	1	8	19
8:10 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	6	0	6	8
8:15 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	3	0	3	7
8:20 AM	0	0	0	0	0	0	1	1	0	5	0	5	1	2	0	3	9
8:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	3	0	3	10
8:30 AM	0	0	0	0	1	0	0	1	2	6	0	8	0	3	0	3	12
8:35 AM	0	0	0	0	0	0	0	0	1	5	0	6	0	8	0	8	14
8:40 AM	0	0	0	0	0	0	1	1	0	5	0	5	0	1	0	1	7
8:45 AM	0	0	0	0	0	0	0	0	0	9	0	9	0	3	0	3	12
8:50 AM	0	0	0	0	0	0	0	0	1	4	0	5	1	8	0	9	14
8:55 AM	0	0	0	0	0	0	3	3	0	0	2	2	0	3	0	3	8
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

### Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	0	0	4	0	0	0	0	1	14	1	16	2	13	1	16	36
7:15 AM	3	0	0	3	1	1	0	2	2	17	1	20	1	3	0	4	29
7:30 AM	0	0	0	0	1	0	0	1	1	22	0	23	0	14	0	14	38
7:45 AM	2	0	0	2	0	0	2	2	1	13	1	15	0	12	1	13	32
8:00 AM	1	0	0	1	1	0	2	3	0	21	1	22	0	15	1	16	42
8:15 AM	0	0	0	0	0	0	1	1	0	15	1	16	1	8	0	9	26
8:30 AM	0	0	0	0	1	0	1	2	3	16	0	19	0	12	0	12	33
8:45 AM	0	0	0	0	0	0	3	3	1	13	2	16	1	14	0	15	34
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

### Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	9	7	16	5	7	12	74	53	127	47	68	115	135
PHF	0.38			0.63			0.80			0.73			0.89

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
PHF	0.38	0.00	0.00	0.38	0.50	0.25	0.25	0.63	0.63	0.75	0.75	0.80	0.25	0.75	0.50	0.73	0.89

### Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
7:15 AM	6	0	0	6	3	1	4	8	4	73	3	80	1	44	2	47	141
7:30 AM	3	0	0	3	2	0	5	7	2	71	3	76	1	49	2	52	138
7:45 AM	3	0	0	3	2	0	6	8	4	65	3	72	1	47	2	50	133
8:00 AM	1	0	0	1	2	0	7	9	4	65	4	73	2	49	1	52	135

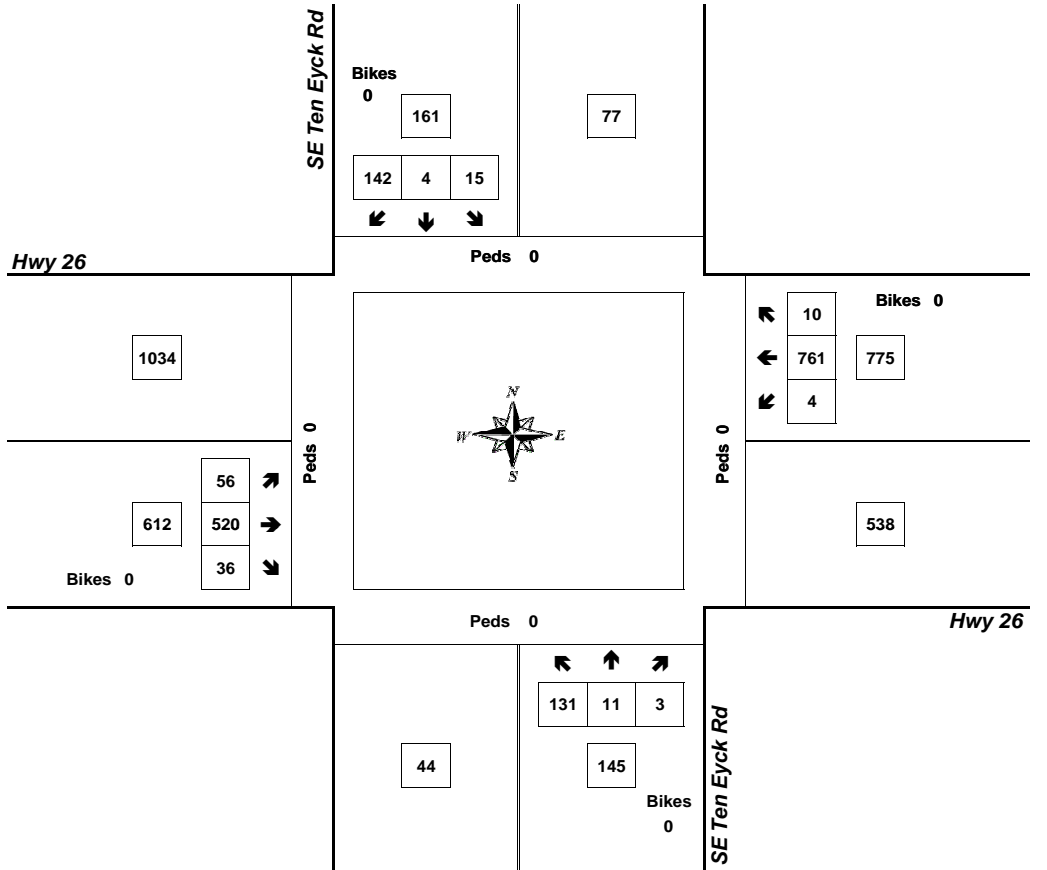
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**SE Ten Eyck Rd & Hwy 26**

7:00 AM to 8:00 AM  
Wednesday, March 20, 2019



Approach	PHF	HV%	Volume
EB	0.81	12.1%	612
WB	0.84	6.1%	775
NB	0.81	6.2%	145
SB	0.82	3.1%	161
<b>Intersection</b>	<b>0.93</b>	<b>8.0%</b>	<b>1,693</b>

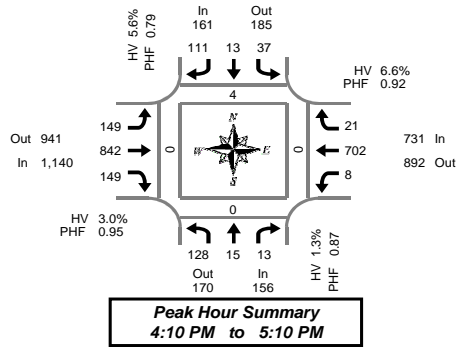
Count Period: 7:00 AM to 9:00 AM



# Total Vehicle Summary



Clay Carney  
(503) 833-2740



## SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019  
4:00 PM to 6:00 PM

### 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	0	2	0	4	3	11	0	8	58	12	0	1	49	2	0	154	0	1	0	0
4:05 PM	10	1	0	0	7	1	5	0	12	63	8	0	1	53	3	0	164	0	0	0	0
4:10 PM	7	2	3	0	1	0	17	0	12	76	11	0	0	65	1	0	195	0	0	0	0
4:15 PM	14	0	1	0	7	1	9	0	18	71	15	0	0	62	1	0	199	0	0	0	0
4:20 PM	9	0	1	0	4	1	11	0	9	75	10	0	0	62	7	0	189	0	0	0	0
4:25 PM	12	2	0	0	5	0	10	0	12	61	14	0	0	52	0	0	168	0	0	0	0
4:30 PM	11	1	4	0	3	2	12	0	17	87	16	1	1	58	1	0	213	0	0	0	0
4:35 PM	15	0	0	0	2	2	6	0	6	59	14	0	0	65	3	0	172	0	0	0	0
4:40 PM	7	1	1	0	3	0	7	0	7	54	9	0	1	57	0	0	147	1	0	0	0
4:45 PM	8	1	0	0	4	1	3	0	13	71	15	1	3	51	3	0	173	0	0	0	0
4:50 PM	13	2	1	0	1	1	6	0	19	74	8	0	0	56	0	0	181	0	0	0	0
4:55 PM	7	1	0	0	1	0	12	0	10	67	14	0	3	57	1	0	173	1	0	0	0
5:00 PM	13	3	1	0	2	2	14	0	12	81	12	0	0	49	1	0	190	2	0	0	0
5:05 PM	12	2	1	0	4	3	4	0	14	86	11	0	0	68	3	1	188	0	0	0	0
5:10 PM	8	0	0	0	6	2	10	0	13	60	12	0	0	68	2	0	181	2	0	0	0
5:15 PM	8	2	1	0	6	2	8	0	9	70	11	0	0	57	1	0	175	0	0	0	0
5:20 PM	8	1	1	1	1	4	10	0	15	73	10	0	0	43	1	0	167	0	1	0	0
5:25 PM	9	1	0	0	4	2	8	0	14	74	11	0	0	43	0	0	166	0	0	0	0
5:30 PM	5	0	1	0	4	0	5	0	15	64	10	0	0	44	0	0	148	1	0	0	0
5:35 PM	5	1	0	0	7	0	9	0	17	50	4	1	0	39	0	0	132	0	0	0	0
5:40 PM	4	0	0	0	2	1	5	0	11	56	7	0	0	30	1	0	117	2	0	0	2
5:45 PM	4	1	0	0	3	2	8	0	14	76	6	0	3	41	1	0	159	0	0	0	0
5:50 PM	7	1	0	0	0	1	6	0	14	69	8	0	0	42	0	0	148	0	0	0	0
5:55 PM	10	1	0	0	2	3	0	16	65	10	0	0	0	51	1	0	159	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

### 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	21	3	5	0	12	4	33	0	32	197	31	0	2	167	6	0	513	0	1	0	0
4:15 PM	35	2	2	0	16	2	30	0	39	207	39	0	0	176	8	0	556	0	0	0	0
4:30 PM	33	2	5	0	8	4	25	0	30	200	39	1	2	180	4	0	532	1	0	0	0
4:45 PM	28	4	1	0	6	2	21	0	42	212	37	1	6	164	4	0	527	1	0	0	0
5:00 PM	33	5	2	0	12	7	28	0	39	207	35	0	0	185	6	1	559	4	0	0	0
5:15 PM	25	4	2	1	11	8	26	0	38	217	32	0	0	143	2	0	508	0	1	0	0
5:30 PM	14	1	1	0	13	1	19	0	43	170	21	1	0	113	1	0	397	3	0	0	2
5:45 PM	21	3	0	0	3	5	17	0	44	210	24	0	3	134	2	0	466	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

### Peak Hour Summary 4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	156	170	326	0	161	185	346	0	1,140	941	2,081	2	731	892	1,623	1	2,188	4	0	0	0
%HV	1.3%				5.6%				3.0%				6.6%				4.3%				
PHF	0.87				0.79				0.95				0.92				0.94				

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	128	15	13	156	37	13	111	161	149	842	149	1,140	8	702	21	731	2,188
%HV	1.6%	0.0%	0.0%	1.3%	0.0%	0.0%	8.1%	5.6%	4.0%	3.0%	2.0%	3.0%	0.0%	6.7%	4.8%	6.6%	4.3%
PHF	0.84	0.63	0.65	0.87	0.58	0.65	0.75	0.79	0.89	0.94	0.85	0.95	0.33	0.93	0.58	0.92	0.94

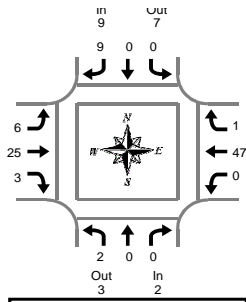
### Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	117	11	13	0	42	12	109	0	143	816	146	2	10	687	22	0	2,128	2	1	0	0
4:15 PM	129	13	10	0	42	15	104	0	150	826	150	2	8	705	22	1	2,174	6	0	0	0
4:30 PM	119	15	10	1	37	21	100	0	149	836	143	2	8	672	16	1	2,126	6	1	0	0
4:45 PM	100	14	6	1	42	18	94	0	162	806	125	2	6	605	13	1	1,991	8	1	0	2
5:00 PM	93	13	5	1	39	21	90	0	164	804	112	1	3	575	11	1	1,930	7	1	0	2

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



**Peak Hour Summary**  
4:10 PM to 5:10 PM

## SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019  
4:00 PM to 6:00 PM

### Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	4	0	10	1	11
4:05 PM	0	0	0	0	1	0	0	1	0	6	0	0	6	0	3	1	4
4:10 PM	0	0	0	0	0	0	0	0	0	2	0	0	2	0	8	0	8
4:15 PM	2	0	0	2	0	0	2	2	2	3	0	5	0	3	0	3	12
4:20 PM	0	0	0	0	0	0	2	2	1	3	0	4	0	5	1	6	12
4:25 PM	0	0	0	0	0	0	1	1	0	5	1	6	0	4	0	4	11
4:30 PM	0	0	0	0	0	0	2	2	1	0	0	1	0	3	0	3	6
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5
4:40 PM	0	0	0	0	0	0	1	1	0	3	0	3	0	2	0	2	6
4:45 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	7
4:55 PM	0	0	0	0	0	0	1	1	1	2	1	4	0	0	0	0	5
5:00 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	1	0	1	6
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7
5:10 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	4	0	4	8
5:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	0	2	4
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	5	0	5	6
5:25 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3
5:30 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	3	0	3	7
5:35 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:45 PM	1	0	0	1	0	0	0	0	0	2	0	2	0	3	0	3	6
5:50 PM	1	0	0	1	0	0	0	0	0	1	1	2	0	4	0	4	7
5:55 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	5	0	5	8
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176

### Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	1	0	0	1	0	12	0	12	0	21	2	23	36
4:15 PM	2	0	0	2	0	0	5	5	3	11	1	15	0	12	1	13	35
4:30 PM	0	0	0	0	0	0	3	3	1	3	0	4	0	10	0	10	17
4:45 PM	0	0	0	0	0	0	1	1	2	3	1	6	0	11	0	11	18
5:00 PM	0	0	0	0	0	0	0	0	1	9	1	11	0	10	0	10	21
5:15 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	8	0	8	13
5:30 PM	0	0	0	0	0	0	0	0	1	6	1	8	0	7	0	7	15
5:45 PM	2	0	0	2	0	0	0	0	1	5	1	7	0	12	0	12	21
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176

### Heavy Vehicle Peak Hour Summary

4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	3	5	9	7	16	34	58	92	48	25	73	93
PHF	0.25			0.45			0.57			0.71			0.66

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	0	2	0	0	9	9	6	25	3	34	0	47	1	48	93
PHF	0.25	0.00	0.00	0.25	0.00	0.00	0.45	0.45	0.50	0.57	0.38	0.57	0.00	0.73	0.25	0.71	0.66

### Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	0	0	2	1	0	9	10	6	29	2	37	0	54	3	57	106
4:15 PM	2	0	0	2	0	0	9	9	7	26	3	36	0	43	1	44	91
4:30 PM	0	0	0	0	0	0	4	4	5	19	2	26	0	39	0	39	69
4:45 PM	0	0	0	0	0	0	1	1	5	22	3	30	0	36	0	36	67
5:00 PM	2	0	0	2	0	0	0	0	4	24	3	31	0	37	0	37	70

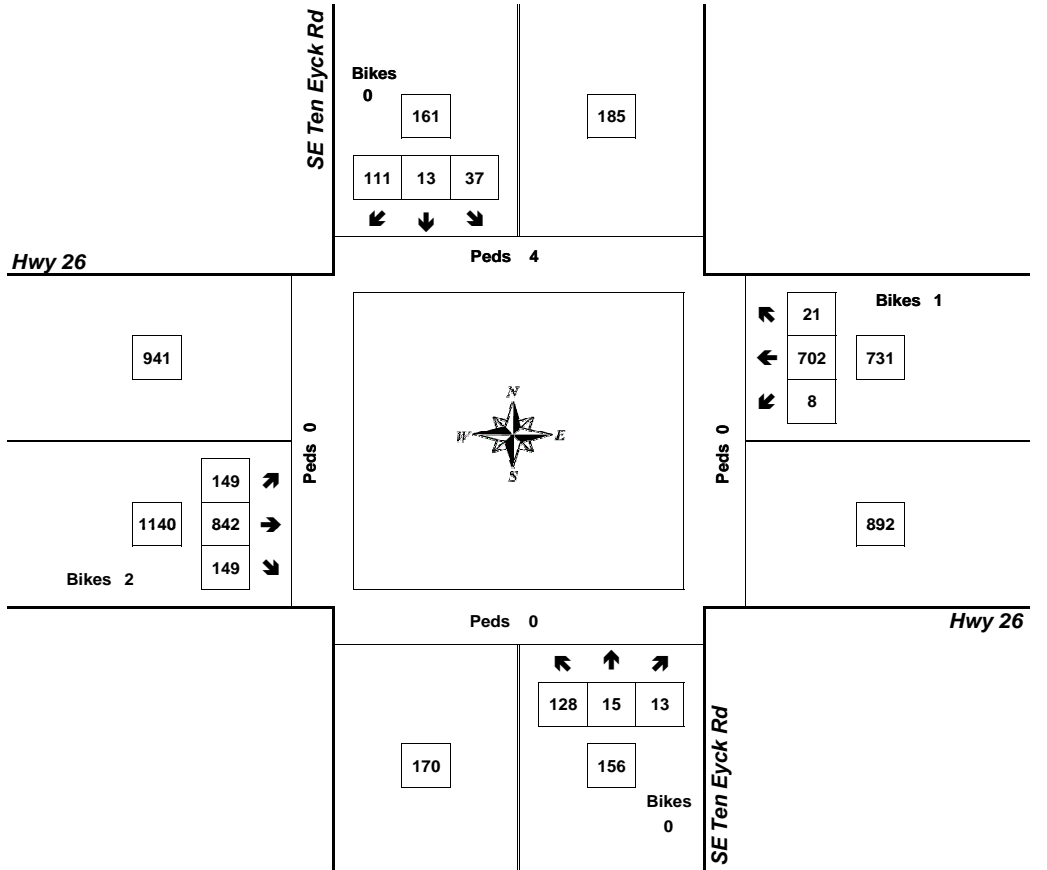
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**SE Ten Eyck Rd & Hwy 26**

4:10 PM to 5:10 PM  
Tuesday, March 19, 2019



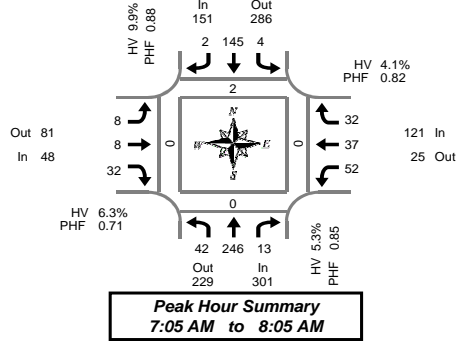
Approach	PHF	HV%	Volume
EB	0.95	3.0%	1,140
WB	0.92	6.6%	731
NB	0.87	1.3%	156
SB	0.79	5.6%	161
<b>Intersection</b>	<b>0.94</b>	<b>4.3%</b>	<b>2,188</b>

Count Period: 4:00 PM to 6:00 PM

# Total Vehicle Summary



Clay Carney  
(603) 833-2740



## Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019  
7:00 AM to 9:00 AM

**Peak Hour Summary**  
7:05 AM to 8:05 AM

### 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	2	18	1	0	0	8	0	0	0	0	0	0	4	5	0	0	38	0	1	0	0
7:05 AM	3	20	1	0	0	12	0	0	0	0	0	0	3	1	5	0	45	0	0	0	0
7:10 AM	5	23	0	0	0	12	0	0	2	2	4	0	4	3	9	0	64	0	0	0	0
7:15 AM	5	32	0	0	0	9	0	0	1	0	2	0	4	2	2	0	57	1	0	0	0
7:20 AM	8	13	0	0	2	13	1	0	0	0	2	0	5	3	5	0	52	0	0	0	0
7:25 AM	1	23	2	0	0	13	0	0	1	1	5	0	4	3	3	0	56	0	0	0	0
7:30 AM	3	17	0	0	1	12	0	0	0	0	3	0	4	9	1	0	50	1	0	0	0
7:35 AM	2	23	0	0	0	17	0	0	0	0	7	0	6	5	1	0	61	0	0	0	0
7:40 AM	2	23	1	0	0	6	1	0	1	2	4	0	6	4	1	0	51	0	0	0	0
7:45 AM	4	20	3	0	0	14	0	0	0	1	0	0	3	1	0	0	46	0	0	0	0
7:50 AM	5	15	3	0	0	10	0	0	1	1	1	0	5	4	2	0	47	0	0	0	0
7:55 AM	1	21	2	0	1	15	0	0	1	0	3	0	3	1	1	0	49	0	0	0	0
8:00 AM	3	16	1	0	0	12	0	0	1	1	1	0	5	1	2	0	43	0	0	0	0
8:05 AM	2	15	0	0	0	7	0	0	1	1	2	0	4	0	3	0	35	1	0	0	0
8:10 AM	2	19	1	0	1	8	0	0	3	1	2	0	3	4	1	0	45	1	0	0	0
8:15 AM	3	27	1	0	0	8	0	0	0	0	1	0	1	3	2	0	46	0	0	0	0
8:20 AM	0	19	0	0	0	10	0	0	0	1	0	0	1	3	0	0	34	0	0	0	0
8:25 AM	6	8	1	0	0	8	0	0	0	1	1	0	1	1	2	0	29	0	0	0	0
8:30 AM	3	27	2	0	0	10	0	0	0	1	1	0	2	2	5	0	53	0	0	0	0
8:35 AM	1	14	0	0	0	16	0	0	0	1	0	0	2	2	0	0	36	0	0	0	0
8:40 AM	0	19	1	0	0	15	0	0	0	1	1	0	1	3	1	0	42	0	0	0	0
8:45 AM	1	21	1	0	0	15	1	0	0	2	3	0	1	2	4	0	51	0	0	0	0
8:50 AM	0	21	0	0	0	9	0	0	0	2	0	0	3	3	2	0	40	0	0	0	0
8:55 AM	4	20	1	0	1	10	0	0	1	3	2	0	3	3	3	0	51	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

### 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	10	61	2	0	0	32	0	0	2	2	4	0	11	9	14	0	147	0	1	0	0
7:15 AM	14	68	2	0	2	35	1	0	2	1	9	0	13	8	10	0	165	1	0	0	0
7:30 AM	7	63	1	0	1	35	1	0	1	2	14	0	16	18	3	0	162	1	0	0	0
7:45 AM	10	56	8	0	1	39	0	0	2	2	4	0	11	6	3	0	142	0	0	0	0
8:00 AM	7	50	2	0	1	27	0	0	5	3	5	0	12	5	6	0	123	1	0	0	0
8:15 AM	9	54	2	0	0	26	0	0	0	2	2	0	3	7	4	0	109	0	0	0	0
8:30 AM	4	60	3	0	0	41	0	0	0	3	2	0	5	7	6	0	131	0	0	0	0
8:45 AM	5	62	2	0	1	34	1	0	1	7	5	0	7	8	9	0	142	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

### Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	301	229	530	0	151	286	437	0	48	81	129	0	121	25	146	0	621	2	0	0	0
%HV	5.3%				9.9%				6.3%				4.1%				6.3%				
PHF	0.85				0.88				0.71				0.82				0.90				

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	42	246	13	301	4	145	2	151	8	8	32	48	52	37	32	121	621
%HV	2.4%	5.7%	7.7%	5.3%	25.0%	9.7%	0.0%	9.9%	12.5%	0.0%	6.3%	6.3%	1.9%	0.0%	12.5%	4.1%	6.3%
PHF	0.58	0.82	0.41	0.85	0.33	0.86	0.50	0.88	0.67	0.50	0.53	0.71	0.81	0.51	0.50	0.82	0.90

### Rolling Hour Summary

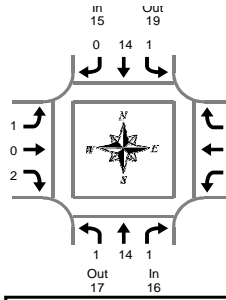
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	41	248	13	0	4	141	2	0	7	7	31	0	51	41	30	0	616	2	1	0	0
7:15 AM	38	237	13	0	5	136	2	0	10	8	32	0	52	37	22	0	592	3	0	0	0
7:30 AM	33	223	13	0	3	127	1	0	8	9	25	0	42	36	16	0	536	2	0	0	0
7:45 AM	30	220	15	0	2	133	0	0	7	10	13	0	31	25	19	0	505	1	0	0	0
8:00 AM	25	226	9	0	2	128	1	0	6	15	14	0	27	27	25	0	505	1	0	0	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



Out 1  
In 3

## Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019

7:00 AM to 9:00 AM

**Peak Hour Summary**  
7:05 AM to 8:05 AM

### Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total					
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
7:05 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
7:10 AM	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	1	3
7:15 AM	0	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	2
7:20 AM	0	0	0	0	1	1	0	2	0	0	0	0	1	0	0	1	0	0	1	1	3
7:25 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	0	0	0	0	3
7:30 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3
7:35 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3
7:40 AM	0	3	1	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	5
7:45 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:55 AM	1	0	0	1	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	4
8:00 AM	0	6	0	6	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	8
8:05 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	1	0	0	1	0	0	1	4
8:10 AM	0	2	0	2	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	4
8:15 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
8:20 AM	0	2	0	2	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	5
8:25 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
8:30 AM	0	3	0	3	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	5
8:35 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	7
8:40 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:50 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:55 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	0	1	0	0	0	3
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	80				

### Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total					
7:00 AM	0	2	0	2	0	1	0	1	0	0	1	1	0	1	1	0	2	0	0	0	6
7:15 AM	0	1	0	1	1	1	0	2	1	0	1	2	1	0	2	3	0	0	0	0	8
7:30 AM	0	5	1	6	0	4	0	4	0	0	0	0	0	0	1	1	0	0	0	11	
7:45 AM	1	0	0	1	0	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	7
8:00 AM	0	8	0	8	0	5	0	5	0	0	0	0	0	2	1	0	3	0	0	0	16
8:15 AM	1	6	0	7	0	4	0	4	0	1	0	1	0	0	0	0	0	0	0	0	12
8:30 AM	0	7	0	7	0	7	0	7	0	0	0	0	0	0	0	0	0	0	0	0	14
8:45 AM	0	2	0	2	0	3	0	3	0	0	0	0	0	1	0	1	0	0	0	0	6
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	80				

### Heavy Vehicle Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	16	17	33	15	19	34	3	1	4	5	2	7	39
PHF	0.57			0.63			0.38			0.42			0.81

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	14	1	16	1	14	0	15	1	0	2	3	1	0	4	5	39
PHF	0.25	0.58	0.25	0.57	0.25	0.58	0.00	0.63	0.25	0.00	0.25	0.38	0.25	0.00	0.50	0.42	0.81

### Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	8	1	10	1	12	0	13	1	0	2	3	1	1	4	6	32
7:15 AM	1	14	1	16	1	16	0	17	1	0	1	2	3	1	3	7	42
7:30 AM	2	19	1	22	0	19	0	19	0	1	0	1	2	1	1	4	46
7:45 AM	2	21	0	23	0	22	0	22	0	1	0	1	2	1	0	3	49
8:00 AM	1	23	0	24	0	19	0	19	0	1	0	1	2	2	0	4	48

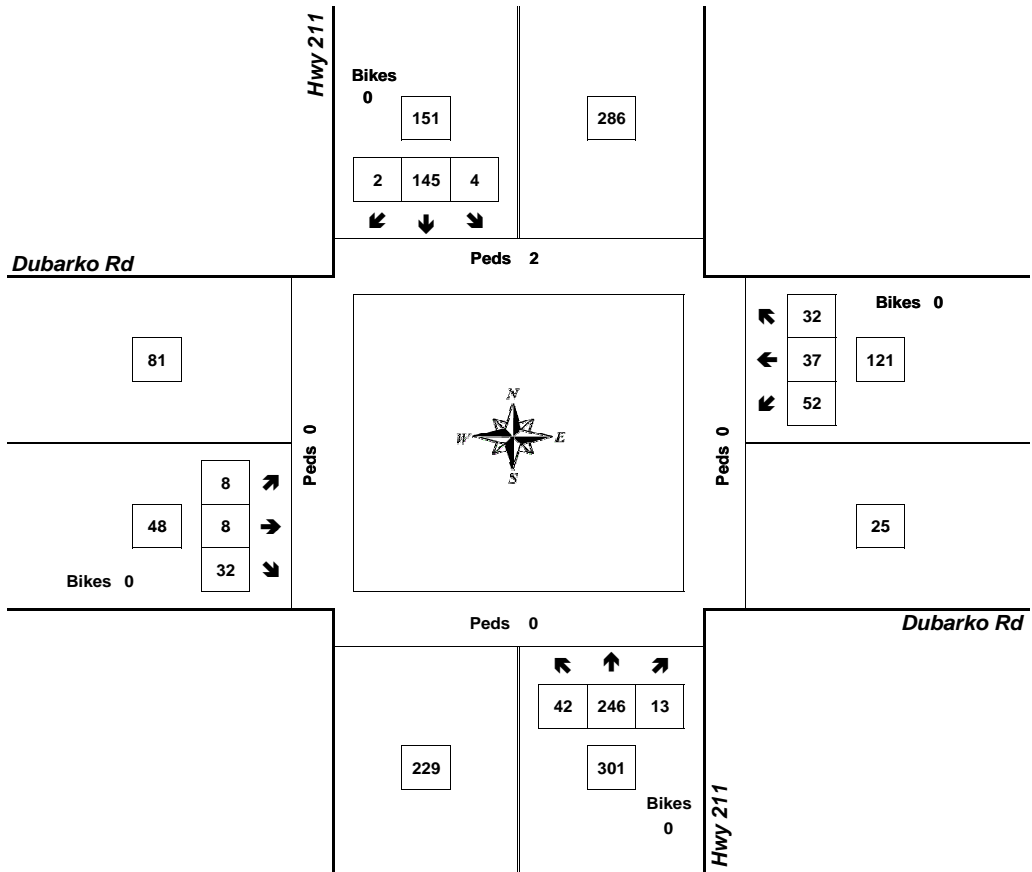
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**Hwy 211 & Dubarko Rd**

7:05 AM to 8:05 AM  
Wednesday, March 20, 2019



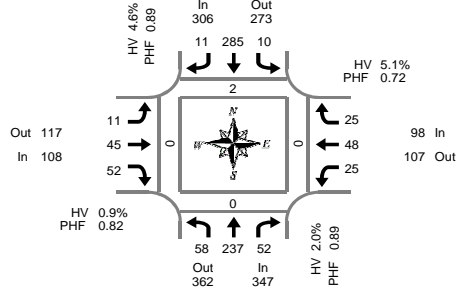
Approach	PHF	HV%	Volume
EB	0.71	6.3%	48
WB	0.82	4.1%	121
NB	0.85	5.3%	301
SB	0.88	9.9%	151
<b>Intersection</b>	<b>0.90</b>	<b>6.3%</b>	<b>621</b>

Count Period: 7:00 AM to 9:00 AM

# Total Vehicle Summary



Clay Carney  
(603) 833-2740



## Hwy 211 & Dubarko Rd

Tuesday, March 19, 2019  
4:00 PM to 6:00 PM

### Peak Hour Summary 4:05 PM to 5:05 PM

### 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	14	0	0	2	25	1	0	0	3	3	0	2	3	3	0	60	0	0	1	0
4:05 PM	4	28	3	0	1	31	0	0	1	7	6	0	2	6	2	0	91	0	0	0	0
4:10 PM	10	17	2	0	1	19	0	0	0	4	3	0	3	4	3	0	66	0	0	0	0
4:15 PM	4	20	6	0	2	20	1	0	2	7	3	1	1	5	1	0	72	0	0	0	0
4:20 PM	6	12	1	0	1	14	1	0	2	3	4	0	5	7	4	0	60	1	0	0	0
4:25 PM	5	16	4	0	1	21	1	0	3	3	4	0	2	4	1	0	65	0	0	0	0
4:30 PM	4	22	3	0	0	19	3	0	1	2	2	0	5	5	1	0	67	1	0	0	0
4:35 PM	2	23	7	0	0	29	1	0	1	2	1	0	0	1	3	0	70	0	0	0	0
4:40 PM	2	17	4	0	0	22	0	0	0	2	1	0	1	3	3	0	55	0	0	0	0
4:45 PM	10	23	7	0	2	29	1	0	0	6	8	0	3	2	0	0	91	0	0	0	0
4:50 PM	3	22	6	0	1	19	1	0	1	0	4	0	1	1	2	0	61	0	0	0	0
4:55 PM	4	20	3	0	0	20	2	0	0	6	2	0	1	6	1	0	65	0	0	0	0
5:00 PM	4	17	6	0	1	42	0	0	0	3	14	0	1	4	4	0	96	0	0	0	0
5:05 PM	2	24	5	0	0	20	0	0	0	4	5	0	1	2	3	0	66	0	0	0	0
5:10 PM	8	24	4	0	1	13	1	0	1	8	2	0	2	1	3	0	68	0	0	0	0
5:15 PM	4	13	4	0	1	19	1	0	0	4	3	0	5	3	0	0	57	0	0	0	0
5:20 PM	1	19	6	0	1	29	1	0	1	2	2	0	1	4	0	0	67	0	0	0	0
5:25 PM	5	14	6	0	0	17	1	0	1	3	9	0	2	4	3	0	65	0	0	0	0
5:30 PM	5	19	6	0	0	19	1	0	1	5	5	0	0	2	3	0	66	0	0	0	0
5:35 PM	5	15	1	0	2	24	0	0	1	5	6	0	1	2	1	0	63	0	0	0	0
5:40 PM	5	19	7	0	0	29	1	0	0	8	3	0	1	2	0	1	75	0	0	0	0
5:45 PM	4	15	8	0	0	16	1	0	0	7	3	0	3	0	0	0	57	0	0	0	0
5:50 PM	4	13	2	0	0	20	3	0	2	5	3	0	0	5	3	0	60	0	0	0	0
5:55 PM	5	13	2	0	1	18	0	0	0	2	3	0	2	1	1	0	48	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0

### 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	18	59	5	0	4	75	1	0	1	14	12	0	7	13	8	0	217	0	0	1	0
4:15 PM	15	48	11	0	4	55	3	0	7	13	11	1	8	16	6	0	197	1	0	0	0
4:30 PM	8	62	14	0	0	70	4	0	2	6	4	0	6	9	7	0	192	1	0	0	0
4:45 PM	17	65	16	0	3	68	4	0	1	12	14	0	5	9	3	0	217	0	0	0	0
5:00 PM	14	65	15	0	2	75	1	0	1	15	21	0	4	7	10	0	230	0	0	0	0
5:15 PM	10	46	16	0	2	65	3	0	2	9	14	0	8	11	3	0	189	0	0	0	0
5:30 PM	15	53	14	0	2	72	2	0	2	18	14	0	2	6	4	1	204	0	0	0	0
5:45 PM	13	41	12	0	1	54	4	0	2	14	9	0	5	6	4	0	165	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0

### Peak Hour Summary 4:05 PM to 5:05 PM

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	347	362	709	0	306	273	579	0	108	117	225	1	98	107	205	0	859	2	0	0	0
%HV	2.0%				4.6%				0.9%				5.1%				3.1%				
PHF	0.89				0.89				0.82				0.72				0.94				

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	58	237	52	347	10	285	11	306	11	45	52	108	25	48	25	98	859
%HV	3.4%	1.7%	1.9%	2.0%	0.0%	4.9%	0.0%	4.6%	0.0%	0.0%	1.9%	0.9%	4.0%	2.1%	12.0%	5.1%	3.1%
PHF	0.73	0.91	0.72	0.89	0.63	0.88	0.55	0.89	0.39	0.63	0.65	0.82	0.52	0.75	0.78	0.72	0.94

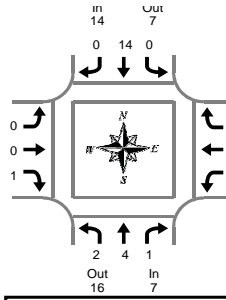
### Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	58	234	46	0	11	288	12	0	11	45	41	1	26	47	24	0	823	2	0	1	0
4:15 PM	54	240	56	0	9	288	12	0	11	46	50	1	23	41	26	0	836	2	0	0	0
4:30 PM	49	238	61	0	7	278	12	0	6	42	53	0	23	36	23	0	828	1	0	0	0
4:45 PM	56	229	61	0	9	280	10	0	6	54	63	0	19	33	20	1	840	0	0	0	0
5:00 PM	52	205	57	0	7	266	10	0	7	56	58	0	19	30	21	1	788	0	0	0	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Hwy 211 & Dubarko Rd

Tuesday, March 19, 2019  
4:00 PM to 6:00 PM

**Peak Hour Summary**  
4:05 PM to 5:05 PM

### Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	4	0	4	0	0	1	1	0	0	0	1	7
4:05 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:10 PM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	3
4:15 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	0	0	5
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2
4:25 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	1	3
4:35 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	1	1	3
4:40 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
4:50 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:55 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:00 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
5:05 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:10 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:20 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:40 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	2	0	2	0	0	1	1	1	0	0	1	4
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

### Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	1	0	3	0	5	0	5	0	0	1	1	1	0	1	2	11
4:15 PM	0	1	0	1	0	6	0	6	0	0	0	0	1	1	0	2	9
4:30 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	2	2	7
4:45 PM	0	1	1	2	0	1	0	1	0	0	1	1	0	0	0	0	4
5:00 PM	0	2	0	2	0	3	0	3	0	0	0	0	0	0	0	0	5
5:15 PM	1	2	1	4	0	0	0	0	0	0	0	0	0	0	0	0	4
5:30 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	3	0	3	0	0	1	1	1	0	0	1	5
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

### Heavy Vehicle Peak Hour Summary 4:05 PM to 5:05 PM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	16	23	14	7	21	1	3	4	5	1	6	27
PHF	0.58			0.58			0.25			0.42			0.68

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	4	1	7	0	14	0	14	0	0	1	1	1	1	3	5	27
PHF	0.25	0.50	0.25	0.58	0.00	0.58	0.00	0.58	0.00	0.00	0.25	0.25	0.25	0.25	0.38	0.42	0.68

### Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	4	1	7	0	16	0	16	0	0	2	2	2	1	3	6	31
4:15 PM	0	5	1	6	0	14	0	14	0	0	1	1	1	1	2	4	25
4:30 PM	1	6	2	9	0	8	0	8	0	0	1	1	0	0	2	2	20
4:45 PM	1	6	2	9	0	5	0	5	0	0	1	1	0	0	0	0	15
5:00 PM	1	5	1	7	0	7	0	7	0	0	1	1	1	0	0	1	16



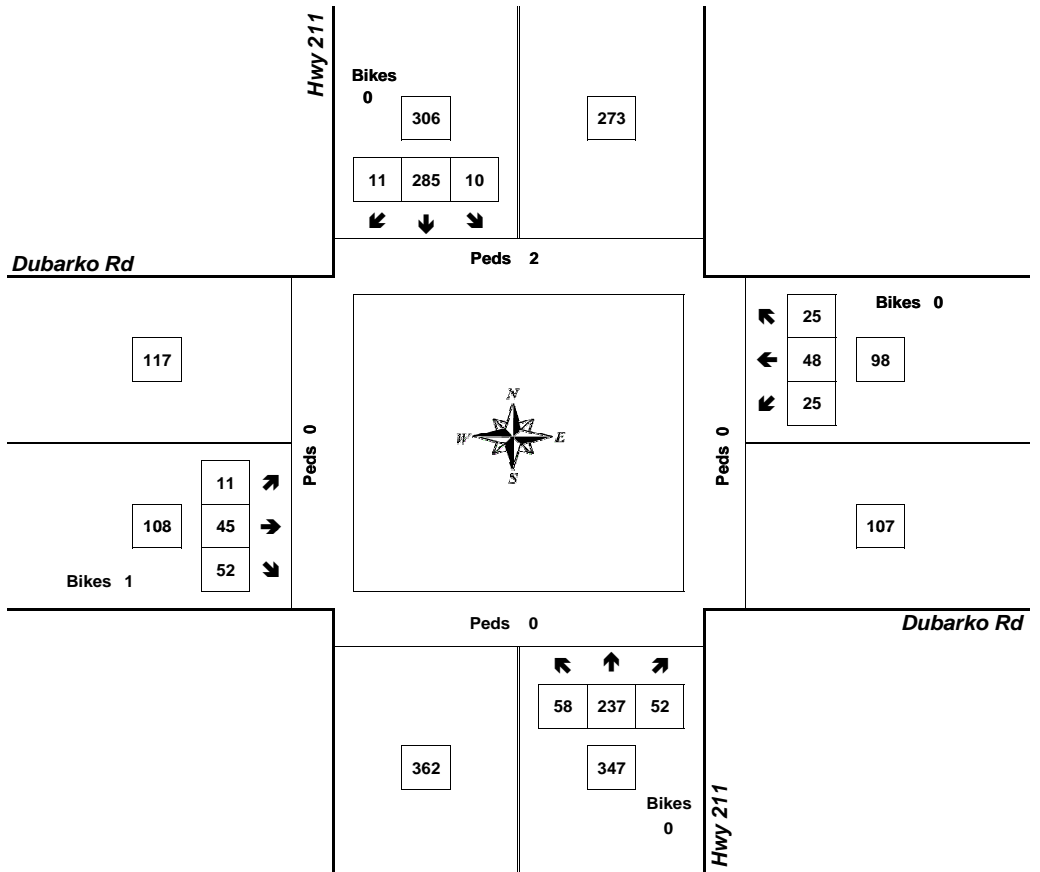
**Peak Hour Summary**



Clay Carney  
(503) 833-2740

**Hwy 211 & Dubarko Rd**

4:05 PM to 5:05 PM  
Tuesday, March 19, 2019



Approach	PHF	HV%	Volume
EB	0.82	0.9%	108
WB	0.72	5.1%	98
NB	0.89	2.0%	347
SB	0.89	4.6%	306
<b>Intersection</b>	<b>0.94</b>	<b>3.1%</b>	<b>859</b>

Count Period: 4:00 PM to 6:00 PM

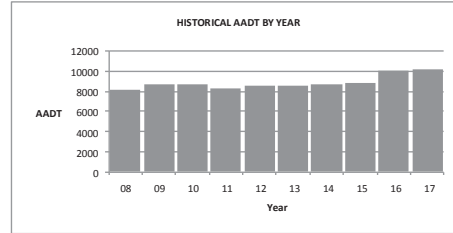
HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
026	22.72	1		0.02 mile northwest of S.E. 362nd Drive, west city limits of Sandy		29500		41400	MODEL
026	23.85	1		0.02 mile west of Bluff Road		30100		42600	MODEL
026	23.89	1		0.02 mile east of Bluff Road		15100		21600	MODEL
026	24.02	1		0.02 mile west of Beers Avenue		15100		21600	MODEL
026	24.35	1		0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14800		21600	MODEL
026	24.42	1		0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12000		17100	MODEL
026	24.59	1		0.02 mile west of Ten Eyck Road		11200		16000	MODEL
026	23.89	2	W	0.02 mile east of Bluff Road		15200		21300	MODEL
026	24.04	2	W	0.02 mile west of Beers Avenue		15200		21300	MODEL
026	24.36	2	W	0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14500		20700	MODEL
026	24.40	2	W	0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12100		16900	MODEL
026	24.61	2	W	0.02 mile west of Ten Eyck Road		11700		16400	MODEL
026	25.10	1		0.02 mile west of Langensand Road		18000		25400	MODEL
026	25.66	1		0.10 mile east of Vista Loop Drive		19700		27600	MODEL

HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
172	-0.13	1		0.10 mile east of Clackamas Highway (OR224)			5600	8800	MODEL
172	1.45	1		0.10 mile southwest of Judd Road			5800	9100	MODEL
172	1.65	1		0.10 mile northeast of Judd Road			6200	9600	MODEL
172	3.65	1		0.05 mile west of 362nd Drive			7600	11600	MODEL
172	3.75	1		0.05 mile east of 362nd Drive			5300	7900	MODEL
172	5.07	1		0.10 mile west of Bornstedt Road			4200	6900	MODEL
172	5.29	1		0.10 mile south of Dubarko Road			6500	10700	MODEL
172	5.50	1		0.11 mile north of Dubarko Road			5700	9200	MODEL
172	5.83	1		0.05 mile south of Mt. Hood Highway (US26-Eastbound)			5700	9200	MODEL
172	5.92	1		0.02 mile south of Mt. Hood Highway (US26-Westbound)			5000	8100	MODEL

<b>Location:</b>	US26; MP 46.38; MT. HOOD HIGHWAY NO. 26; 0.30 mile east of Camp Creek Rd	<b>Site Name:</b>	Rhododendron (03-006)
	(USFS 28)		<b>Installed:</b>

**HISTORICAL TRAFFIC DATA**

Year	AADT	Percent of AADT				
		Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	8162	233	22.9	20.1	19.1	18.2
2009	8737	197	22.3	19.6	18.4	17.8
2010	8714	207	21.6	19.8	18.9	18.5
2011	8330	214	24.7	20.0	18.6	18.1
2012	8480	227	24.0	21.0	20.2	19.4
2013	8527	213	23.4	21.1	20.3	19.1
2014	8652	216	23.2	21.1	20.3	19.2
2015	8861	242	21.4	20.3	19.4	18.7
2016	10071	208	22.9	19.6	18.8	17.9
2017	10223	200	19.9	19.1	18.1	17.5



**2017 TRAFFIC DATA**

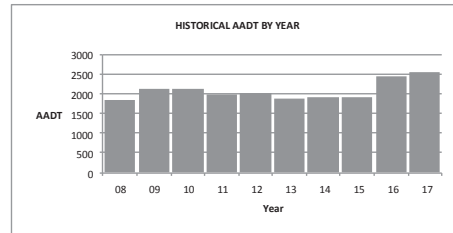
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October	6589	64	8087	79
November	5493	54	7313	72
December	8753	86	10161	99

For Vehicle Classification data near your project, please go to the following web page:  
[https://www.oregon.gov/ODOT/Data/Documents/TVT\\_2017.xlsx](https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx)

<b>Location:</b>	OR35; MP 57.79; MT. HOOD HIGHWAY NO. 26; 0.02 mile east of Warm Springs Highway No. 53 (US26)	<b>Site Name:</b>	Mt. Hood Meadows (03-007)
			<b>Installed:</b>

**HISTORICAL TRAFFIC DATA**

Year	AADT	Percent of AADT				
		Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	1854	398	56.8	44.2	39.9	36.1
2009	2130	***	***	***	***	***
2010	2145	374	49.2	39.5	34.8	33.2
2011	1976	476	79.2	49.1	45.0	39.1
2012	2023	452	65.4	43.4	40.3	37.7
2013	1868	427	68.1	48.7	42.0	37.1
2014	1908	400	60.0	41.9	37.4	33.6
2015	1931	393	50.4	38.6	34.4	32.6
2016	2455	366	55.9	38.3	33.1	31.2
2017	2565	340	52.1	37.7	32.5	31.3

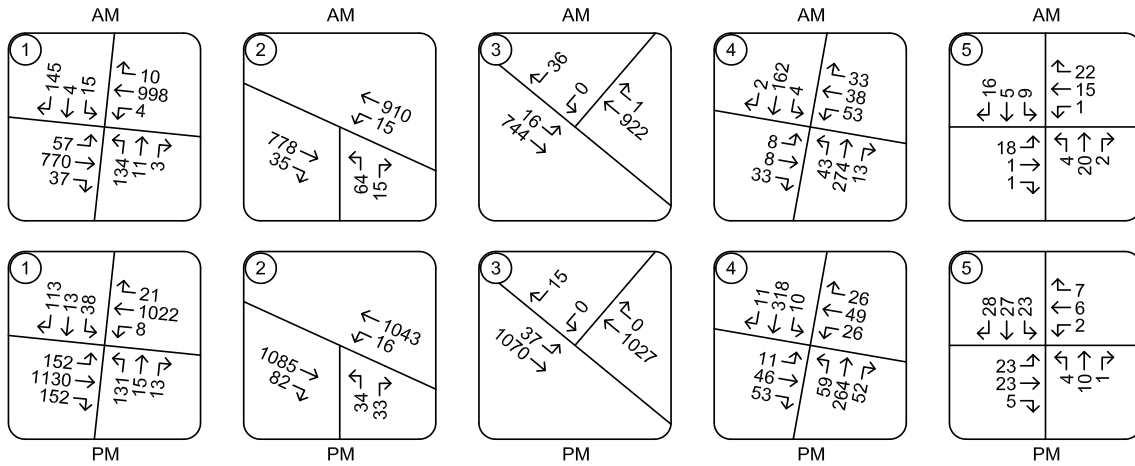
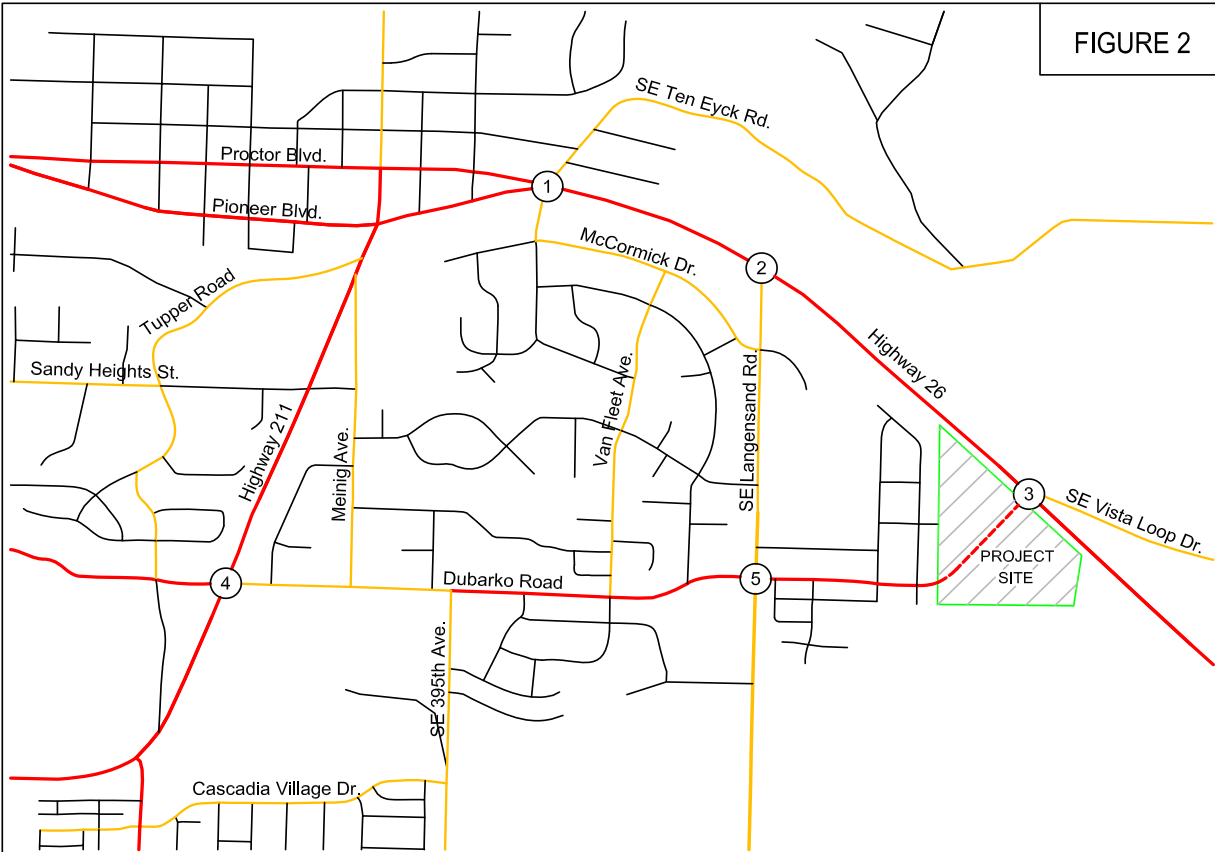


**2017 TRAFFIC DATA**

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2449	95	3616	141
February	1978	77	3362	131
March	1781	69	2833	110
April	1116	44	2050	80
May	1202	47	1609	63
June	1794	70	2070	81
July	2405	94	2837	111
August	2302	90	2614	102
September	3956	154	3993	156
October	1387	54	1614	63
November	768	30	1156	45
December	2499	97	2966	116

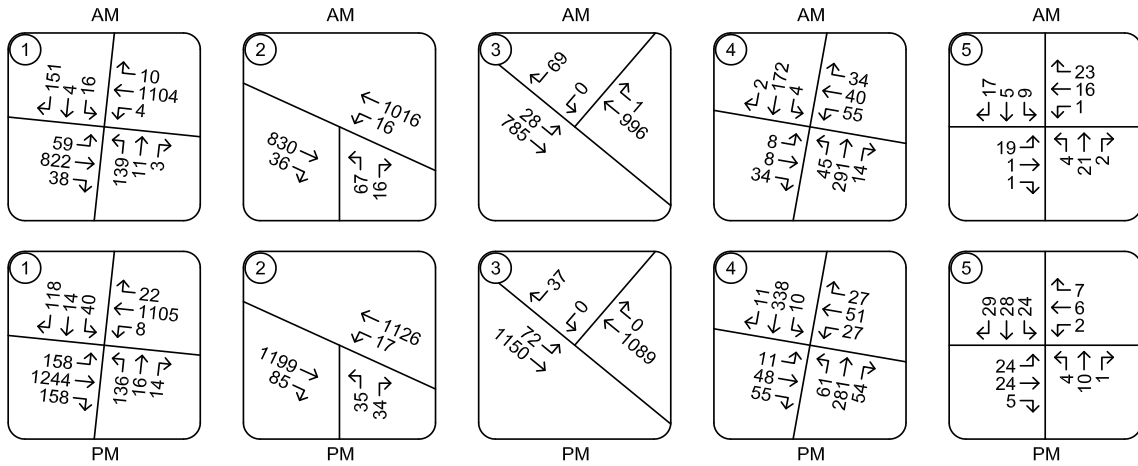
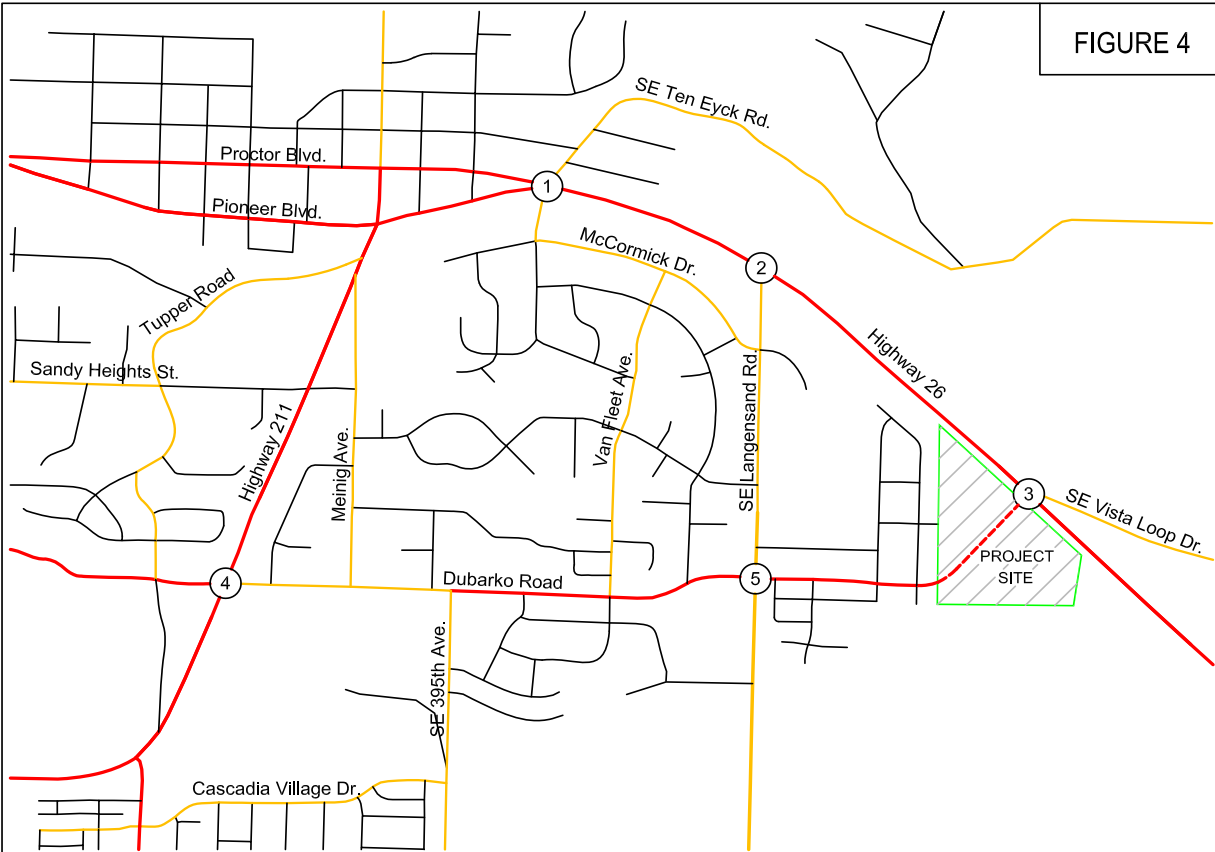
For Vehicle Classification data near your project, please go to the following web page:  
[https://www.oregon.gov/ODOT/Data/Documents/TVT\\_2017.xlsx](https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx)

FIGURE 2



**TRAFFIC VOLUMES**  
 2020 Existing 30th-Highest Hour (August) Conditions  
 Morning and Evening Peak Hours

FIGURE 4



**TRAFFIC VOLUMES**  
 2022 Background Conditions  
 Morning and Evening Peak Hours

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0
Future Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2664	1154					1500	1245	1354	1432	
Flt Permitted		1.00	1.00					1.00	1.00	0.40	1.00	
Satd. Flow (perm)		2664	1154					1500	1245	573	1432	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	43	777	144	0	0	0	0	253	141	11	73	0
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	109	0	0	0
Lane Group Flow (vph)	0	820	105	0	0	0	0	253	32	11	73	0
Confl. Peds. (#/hr)	3		6						8	5		
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						4			8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		60.4	60.4					20.6	20.6	20.6	20.6	
Effective Green, g (s)		60.4	60.4					20.6	20.6	20.6	20.6	
Actuated g/C Ratio		0.67	0.67					0.23	0.23	0.23	0.23	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1787	774					343	284	131	327	
v/s Ratio Prot								c0.17			0.05	
v/s Ratio Perm		0.31	0.09						0.03	0.02		
v/c Ratio		0.46	0.14					0.74	0.11	0.08	0.22	
Uniform Delay, d1		7.0	5.4					32.2	27.5	27.3	28.2	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9	0.4					8.0	0.2	0.3	0.3	
Delay (s)		7.9	5.7					40.2	27.7	27.6	28.5	
Level of Service		A	A					D	C	C	C	
Approach Delay (s)		7.6			0.0			35.7			28.4	
Approach LOS		A			A			D			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			16.5		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)					9.0		
Intersection Capacity Utilization			52.6%		ICU Level of Service					A		
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Future Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	43	777	0				0	253	141	11	73	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	97	1845					0	303	252	110	291	0
Arrive On Green	0.70	0.70	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	139	2638	1210				0	1514	1257	763	1452	0
Grp Volume(v), veh/h	439	381	0				0	253	141	11	73	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1257	763	1452	0
Q Serve(g_s), s	12.1	10.6	0.0				0.0	14.4	9.1	1.3	3.8	0.0
Cycle Q Clear(g_c), s	12.1	10.6	0.0				0.0	14.4	9.1	15.7	3.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	994	949					0	303	252	110	291	0
V/C Ratio(X)	0.44	0.40					0.00	0.83	0.56	0.10	0.25	0.00
Avail Cap(c_a), veh/h	994	949					0	530	440	225	508	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.9	5.6	0.0				0.0	34.6	32.4	42.1	30.3	0.0
Incr Delay (d2), s/veh	1.4	1.3	0.0				0.0	6.0	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	2.9	0.0				0.0	5.6	2.8	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	6.9	0.0				0.0	40.5	34.4	42.5	30.7	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		820	A					394			84	
Approach Delay, s/veh		7.1						38.3			32.3	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		67.5		22.5				22.5				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		49.5		31.5				31.5				
Max Q Clear Time (g_c+I1), s		14.1		16.4				17.7				
Green Ext Time (p_c), s		6.5		1.6				0.3				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			18.2									
HCM 6th LOS			B									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												



HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Vol, veh/h	11	30	336	11	7	199
Future Vol, veh/h	11	30	336	11	7	199
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	365	12	8	216
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	609	377	0	0	380	
Stage 1	374	-	-	-	-	
Stage 2	235	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	458	670	-	-	1178	
Stage 1	696	-	-	-	-	
Stage 2	804	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	452	666	-	-	1175	
Mov Cap-2 Maneuver	452	-	-	-	-	
Stage 1	694	-	-	-	-	
Stage 2	795	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	11.6	0		0.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	591	1175	-	
HCM Lane V/C Ratio	-	-	0.075	0.006	-	
HCM Control Delay (s)	-	-	11.6	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

Scenario 1 The Pad 12:41 pm 08/11/2020 2020 Existing AM Peak Hour  
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HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	35	9	3	301	187	12
Future Vol, veh/h	35	9	3	301	187	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	327	203	13
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	547	214	218	0	-	0
Stage 1	212	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	498	826	1352	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	823	1349	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	724	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.3	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1349	-	539	-	-	
HCM Lane V/C Ratio	0.002	-	0.089	-	-	
HCM Control Delay (s)	7.7	0	12.3	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Scenario 1 The Pad 12:41 pm 08/11/2020 2020 Existing AM Peak Hour  
MTA

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HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕	↗					↕	↗	↘	↕		
Traffic Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0	
Future Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.36	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	537	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	76	1370	287	0	0	0	0	239	133	22	147	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	53	0	0	0	
Lane Group Flow (vph)	0	1446	246	0	0	0	0	239	80	22	147	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		79.1	79.1					21.9	21.9	21.9	21.9		
Effective Green, g (s)		79.1	79.1					21.9	21.9	21.9	21.9		
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2082	898					307	254	106	298		
v/s Ratio Prot								c0.15			0.10		
v/s Ratio Perm		0.50	0.20						0.06	0.04			
v/c Ratio		0.69	0.27					0.78	0.32	0.21	0.49		
Uniform Delay, d1		8.7	5.4					41.8	37.6	36.8	39.1		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.9	0.8					11.8	0.7	1.0	1.3		
Delay (s)		10.6	6.2					53.5	38.4	37.8	40.4		
Level of Service		B	A					D	D	D	D		
Approach Delay (s)		9.9			0.0			48.1			40.1		
Approach LOS		A			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			18.4									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			74.0%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Future Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	76	1370	0				0	239	133	22	147	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	109	2053					0	303	252	105	296	0
Arrive On Green	0.72	0.72	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1287	815	1514	0
Grp Volume(v), veh/h	774	672	0				0	239	133	22	147	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1287	815	1514	0
Q Serve(g_s), s	31.2	26.0	0.0				0.0	16.1	10.2	2.9	9.5	0.0
Cycle Q Clear(g_c), s	31.2	26.0	0.0				0.0	16.1	10.2	19.0	9.5	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1106	1056					0	303	252	105	296	0
V/C Ratio(X)	0.70	0.64					0.00	0.79	0.53	0.21	0.50	0.00
Avail Cap(c_a), veh/h	1106	1056					0	402	333	157	392	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	7.8	0.0				0.0	42.1	39.7	51.1	39.4	0.0
Incr Delay (d2), s/veh	3.7	2.9	0.0				0.0	7.5	1.7	1.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	8.1	0.0				0.0	6.6	3.3	0.6	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	10.8	0.0				0.0	49.6	41.4	52.1	40.7	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1446	A					372			169	
Approach Delay, s/veh		11.6						46.6			42.2	
Approach LOS		B						D			D	
Timer - Assigned Phs		2	4					8				
Phs Duration (G+Y+Rc), s		84.0	26.0					26.0				
Change Period (Y+Rc), s		4.5	4.5					4.5				
Max Green Setting (Gmax), s		72.5	28.5					28.5				
Max Q Clear Time (g_c+I1), s		33.2	18.1					21.0				
Green Ext Time (p_c), s		15.4	1.2					0.5				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			20.7									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	6	15	335	4	4	404
Future Vol, veh/h	6	15	335	4	4	404
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	356	4	4	430
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	802	364	0	0	363	
Stage 1	361	-	-	-	-	
Stage 2	441	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	353	681	-	-	1196	
Stage 1	705	-	-	-	-	
Stage 2	648	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	349	677	-	-	1193	
Mov Cap-2 Maneuver	349	-	-	-	-	
Stage 1	703	-	-	-	-	
Stage 2	643	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	12	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	534	1193	-	
HCM Lane V/C Ratio	-	-	0.042	0.004	-	
HCM Control Delay (s)	-	-	12	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Scenario 2 The Pad 1:20 pm 08/11/2020 2020 Existing PM Peak Hour  
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Synchro 11 Light Report  
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HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	23	6	9	312	356	48
Future Vol, veh/h	23	6	9	312	356	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	332	379	51
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	761	409	432	0	-	0
Stage 1	407	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	373	642	1128	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	640	1126	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	14.7	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1126	-	403	-	-	
HCM Lane V/C Ratio	0.009	-	0.077	-	-	
HCM Control Delay (s)	8.2	0	14.7	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Scenario 2 The Pad 1:20 pm 08/11/2020 2020 Existing PM Peak Hour  
MTA

Synchro 11 Light Report  
Page 4

# Trip Generation Calculation Worksheet



Land Use Description: Multi-Family Housing (Low-Rise)  
ITE Land Use Code: 220  
Independent Variable: Dwelling Units  
Quantity: 12 Dwelling Units

## Summary of ITE Trip Generation Data

### **AM Peak Hour of Adjacent Street Traffic**

Trip Rate: 0.46 trips per dwelling unit  
Directional Distribution: 23% Entering 77% Exiting

### **PM Peak Hour of Adjacent Street Traffic**

Trip Rate: 0.56 trips per dwelling unit  
Directional Distribution: 63% Entering 37% Exiting

### **Total Weekday Traffic**

Trip Rate: 7.32 trips per dwelling unit  
Directional Distribution: 50% Entering 50% Exiting

## Site Trip Generation Calculations

12 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	5	6
PM Peak Hour	4	3	7
Weekday	44	44	88

Data Source: *Trip Generation Manual, 10th Edition*, Institute of Transportation Engineers, 2017

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↑	0	0	0	0	↑	↔↑	↔↑	↑	0	
Traffic Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0	
Future Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	548	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	45	825	152	0	0	0	0	272	152	12	76	0	
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	107	0	0	0	
Lane Group Flow (vph)	0	870	113	0	0	0	0	272	45	12	76	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		59.2	59.2					21.8	21.8	21.8	21.8		
Effective Green, g (s)		59.2	59.2					21.8	21.8	21.8	21.8		
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1752	759					363	301	132	346		
v/s Ratio Prot								c0.18			0.05		
v/s Ratio Perm		0.33	0.10						0.04	0.02			
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22		
Uniform Delay, d1		7.8	5.8					31.6	26.8	26.4	27.3		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.0	0.4					8.2	0.2	0.3	0.3		
Delay (s)		8.8	6.3					39.8	27.0	26.7	27.6		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		8.5			0.0			35.2			27.5		
Approach LOS		A			A			D			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			16.9									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			54.7%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group



HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Future Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	272	152	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1812					0	323	269	111	310	0
Arrive On Green	0.69	0.69	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	745	1452	0
Grp Volume(v), veh/h	466	404	0				0	272	152	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	745	1452	0
Q Serve(g_s), s	13.8	12.0	0.0				0.0	15.5	9.7	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.0	0.0				0.0	15.5	9.7	16.9	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	975	931					0	323	269	111	310	0
V/C Ratio(X)	0.48	0.43					0.00	0.84	0.57	0.11	0.24	0.00
Avail Cap(c_a), veh/h	975	931					0	547	455	221	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.6	6.3	0.0				0.0	33.9	31.6	42.0	29.4	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.4	0.0				0.0	5.9	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	7.8	0.0				0.0	39.8	33.5	42.5	29.8	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					424			88	
Approach Delay, s/veh		8.0						37.5			31.5	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.3		23.7				23.7				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.5				18.9				
Green Ext Time (p_c), s		6.9		1.7				0.3				

Intersection Summary		
HCM 6th Ctrl Delay		18.6
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Vol, veh/h	11	30	364	11	7	209
Future Vol, veh/h	11	30	364	11	7	209
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	396	12	8	227
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	651	408	0	0	411	
Stage 1	405	-	-	-	-	
Stage 2	246	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	433	643	-	-	1148	
Stage 1	673	-	-	-	-	
Stage 2	795	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	427	639	-	-	1145	
Mov Cap-2 Maneuver	427	-	-	-	-	
Stage 1	671	-	-	-	-	
Stage 2	786	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	11.9	0		0.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	564	1145	-	
HCM Lane V/C Ratio	-	-	0.079	0.007	-	
HCM Control Delay (s)	-	-	11.9	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	35	9	3	329	197	12
Future Vol, veh/h	35	9	3	329	197	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	358	214	13
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	589	225	229	0	0	
Stage 1	223	-	-	-	-	
Stage 2	366	-	-	-	-	
Critical Hdwy	6.42	6.22	4.12	-	-	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	2.218	-	-	
Pot Cap-1 Maneuver	471	814	1339	-	-	
Stage 1	814	-	-	-	-	
Stage 2	702	-	-	-	-	
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	468	811	1336	-	-	
Mov Cap-2 Maneuver	468	-	-	-	-	
Stage 1	810	-	-	-	-	
Stage 2	701	-	-	-	-	
Approach	EB	NB		SB		
HCM Control Delay, s	12.8	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1336	-	512	-	-	
HCM Lane V/C Ratio	0.002	-	0.093	-	-	
HCM Control Delay (s)	7.7	0	12.8	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑		
Traffic Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0	
Future Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	505	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	83	1496	301	0	0	0	0	252	139	24	154	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	260	0	0	0	0	252	97	24	154	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.7	78.7					22.3	22.3	22.3	22.3		
Effective Green, g (s)		78.7	78.7					22.3	22.3	22.3	22.3		
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2071	894					313	259	102	304		
v/s Ratio Prot								c0.16			0.10		
v/s Ratio Perm		0.55	0.21						0.08	0.05			
v/c Ratio		0.76	0.29					0.81	0.37	0.24	0.51		
Uniform Delay, d1		9.8	5.6					41.8	37.8	36.7	39.0		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					13.9	0.9	1.2	1.3		
Delay (s)		12.5	6.4					55.7	38.7	37.9	40.3		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.5			0.0			49.7			40.0		
Approach LOS		B			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			19.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			80.1%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Future Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	252	139	24	154	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2026					0	318	265	106	311	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	802	1514	0
Grp Volume(v), veh/h	846	733	0				0	252	139	24	154	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	802	1514	0
Q Serve(g_s), s	39.0	31.8	0.0				0.0	17.0	10.6	3.2	9.9	0.0
Cycle Q Clear(g_c), s	39.0	31.8	0.0				0.0	17.0	10.6	20.2	9.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1091	1042					0	318	265	106	311	0
V/C Ratio(X)	0.78	0.70					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1091	1042					0	388	322	142	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.1	9.1	0.0				0.0	41.5	38.9	51.1	38.7	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	8.9	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	10.1	0.0				0.0	7.1	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	13.1	0.0				0.0	50.3	40.5	52.1	39.9	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					391			178	
Approach Delay, s/veh		14.4						46.9			41.5	
Approach LOS		B						D			D	
Timer - Assigned Phs		2	4					8				
Phs Duration (G+Y+Rc), s		82.9	27.1					27.1				
Change Period (Y+Rc), s		4.5	4.5					4.5				
Max Green Setting (Gmax), s		73.5	27.5					27.5				
Max Q Clear Time (g_c+I1), s		41.0	19.0					22.2				
Green Ext Time (p_c), s		16.4	1.2					0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			22.6									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	6	15	353	4	4	424
Future Vol, veh/h	6	15	353	4	4	424
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	376	4	4	451
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	843	384	0	0	383	
Stage 1	381	-	-	-	-	
Stage 2	462	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	334	664	-	-	1175	
Stage 1	691	-	-	-	-	
Stage 2	634	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	330	660	-	-	1172	
Mov Cap-2 Maneuver	330	-	-	-	-	
Stage 1	689	-	-	-	-	
Stage 2	629	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	12.3	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	513	1172	-	
HCM Lane V/C Ratio	-	-	0.044	0.004	-	
HCM Control Delay (s)	-	-	12.3	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	23	6	9	330	376	48
Future Vol, veh/h	23	6	9	330	376	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	351	400	51
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	801	430	453	0	-	0
Stage 1	428	-	-	-	-	-
Stage 2	373	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	354	625	1108	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	349	623	1106	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	648	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	15.2	0.2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1106	-	384	-	-	
HCM Lane V/C Ratio	0.009	-	0.08	-	-	
HCM Control Delay (s)	8.3	0	15.2	-	-	
HCM Lane LOS	A	A	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↑					↑	↔↑	↔↑	↑		
Traffic Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0	
Future Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	545	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	45	825	153	0	0	0	0	275	153	12	76	0	
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	107	0	0	0	
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	46	12	76	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		59.0	59.0					22.0	22.0	22.0	22.0		
Effective Green, g (s)		59.0	59.0					22.0	22.0	22.0	22.0		
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1746	756					366	304	133	350		
v/s Ratio Prot								c0.18			0.05		
v/s Ratio Perm		0.33	0.10						0.04	0.02			
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22		
Uniform Delay, d1		7.9	5.9					31.5	26.7	26.3	27.1		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.0	0.4					8.4	0.2	0.3	0.3		
Delay (s)		8.9	6.3					39.9	26.9	26.6	27.4		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		8.6			0.0			35.3			27.3		
Approach LOS		A			A			D			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			17.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			54.7%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group



HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	153	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1806					0	326	271	111	313	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	742	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	153	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	742	1452	0
Q Serve(g_s), s	13.8	12.1	0.0				0.0	15.7	9.8	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.1	0.0				0.0	15.7	9.8	17.1	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	972	928					0	326	271	111	313	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.56	0.11	0.24	0.00
Avail Cap(c_a), veh/h	972	928					0	547	455	219	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.5	42.0	29.2	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	6.0	1.8	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.8	33.3	42.4	29.6	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					428			88	
Approach Delay, s/veh		8.1						37.5			31.4	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.1		23.9				23.9				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.7				0.3				

Intersection Summary

HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	11	30	368	11	7	210
Future Vol, veh/h	11	30	368	11	7	210
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	400	12	8	228
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	656	412	0	0	415	
Stage 1	409	-	-	-	-	
Stage 2	247	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	430	640	-	-	1144	
Stage 1	671	-	-	-	-	
Stage 2	794	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	424	636	-	-	1141	
Mov Cap-2 Maneuver	424	-	-	-	-	
Stage 1	669	-	-	-	-	
Stage 2	785	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	12	0		0.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	561	1141	-	
HCM Lane V/C Ratio	-	-	0.079	0.007	-	
HCM Control Delay (s)	-	-	12	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Future Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	38	0	10	1	0	4	3	358	0	1	214	13
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	593	589	225	594	595	360	229	0	0	358	0	0
Stage 1	225	225	-	364	364	-	-	-	-	-	-	-
Stage 2	368	364	-	230	231	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	417	421	814	417	417	684	1339	-	-	1201	-	-
Stage 1	778	718	-	655	624	-	-	-	-	-	-	-
Stage 2	652	624	-	773	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	412	418	811	410	414	683	1336	-	-	1201	-	-
Mov Cap-2 Maneuver	412	418	-	410	414	-	-	-	-	-	-	-
Stage 1	774	716	-	653	622	-	-	-	-	-	-	-
Stage 2	645	622	-	761	711	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	13.8	11			0.1			0				
HCM LOS	B	B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1336	-	-	458	603	1201	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.104	0.009	0.001	-	-				
HCM Control Delay (s)	7.7	0	-	13.8	11	8	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-				

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑		
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0	
Future Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	502	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	83	1496	303	0	0	0	0	254	140	24	155	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	98	24	155	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2069	893					314	260	102	305		
v/s Ratio Prot								c0.16			0.10		
v/s Ratio Perm		0.55	0.21						0.08	0.05			
v/c Ratio		0.76	0.29					0.81	0.38	0.24	0.51		
Uniform Delay, d1		9.9	5.7					41.8	37.8	36.6	38.9		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					14.2	0.9	1.2	1.3		
Delay (s)		12.6	6.5					55.9	38.7	37.8	40.2		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.6			0.0			49.8			39.9		
Approach LOS		B			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			19.8									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			80.2%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	140	24	155	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2022					0	320	266	106	313	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	800	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	140	24	155	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	800	1514	0
Q Serve(g_s), s	39.2	32.0	0.0				0.0	17.1	10.6	3.2	10.0	0.0
Cycle Q Clear(g_c), s	39.2	32.0	0.0				0.0	17.1	10.6	20.3	10.0	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1089	1040					0	320	266	106	313	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1089	1040					0	388	322	141	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.2	9.2	0.0				0.0	41.4	38.8	51.1	38.6	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	9.0	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.3	10.2	0.0				0.0	7.2	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.2	0.0				0.0	50.4	40.5	52.1	39.8	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					394			179	
Approach Delay, s/veh		14.5						46.9			41.4	
Approach LOS		B						D			D	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.8		27.2				27.2				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.2		19.1				22.3				
Green Ext Time (p_c), s		16.3		1.2				0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			22.7									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	6	15	356	4	4	427
Future Vol, veh/h	6	15	356	4	4	427
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	379	4	4	454
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	849	387	0	0	386	
Stage 1	384	-	-	-	-	
Stage 2	465	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	
Critical Hdwy Stg 1	5.42	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	
Pot Cap-1 Maneuver	331	661	-	-	1172	
Stage 1	688	-	-	-	-	
Stage 2	632	-	-	-	-	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	327	657	-	-	1169	
Mov Cap-2 Maneuver	327	-	-	-	-	
Stage 1	686	-	-	-	-	
Stage 2	627	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	12.4	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	510	1169	-	
HCM Lane V/C Ratio	-	-	0.044	0.004	-	
HCM Control Delay (s)	-	-	12.4	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Future Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	24	0	6	0	0	3	10	351	1	3	400	51

Major/Minor	Minor2	Minor1		Major1		Major2						
Conflicting Flow All	809	806	430	809	831	354	453	0	0	352	0	0
Stage 1	434	434	-	372	372	-	-	-	-	-	-	-
Stage 2	375	372	-	437	459	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	299	316	625	299	305	690	1108	-	-	1207	-	-
Stage 1	600	581	-	648	619	-	-	-	-	-	-	-
Stage 2	646	619	-	598	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	293	311	623	292	300	689	1106	-	-	1207	-	-
Mov Cap-2 Maneuver	293	311	-	292	300	-	-	-	-	-	-	-
Stage 1	592	578	-	641	612	-	-	-	-	-	-	-
Stage 2	635	612	-	589	563	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.1	10.3	0.2	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1106	-	-	329	689	1207	-	-
HCM Lane V/C Ratio	0.009	-	-	0.094	0.005	0.003	-	-
HCM Control Delay (s)	8.3	0	-	17.1	10.3	8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↔↑					↑	↔↑	↔↑	↑		
Traffic Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0	
Future Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	547	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	45	825	153	0	0	0	0	275	169	12	92	0	
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	106	0	0	0	
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	63	12	92	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		58.9	58.9					22.1	22.1	22.1	22.1		
Effective Green, g (s)		58.9	58.9					22.1	22.1	22.1	22.1		
Actuated g/C Ratio		0.65	0.65					0.25	0.25	0.25	0.25		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1743	755					368	305	134	351		
v/s Ratio Prot								c0.18			0.06		
v/s Ratio Perm		0.33	0.10						0.05	0.02			
v/c Ratio		0.50	0.15					0.75	0.21	0.09	0.26		
Uniform Delay, d1		8.0	6.0					31.4	27.0	26.2	27.4		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.0	0.4					8.1	0.3	0.3	0.4		
Delay (s)		9.0	6.4					39.4	27.3	26.5	27.8		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		8.6			0.0			34.8			27.6		
Approach LOS		A			A			C			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			17.3									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			90.0							9.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			55.6%									ICU Level of Service	B
Analysis Period (min)			15										

c Critical Lane Group



HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	169	12	92	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1804					0	328	273	111	314	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	731	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	169	12	92	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	731	1452	0
Q Serve(g_s), s	13.9	12.1	0.0				0.0	15.7	10.9	1.4	4.8	0.0
Cycle Q Clear(g_c), s	13.9	12.1	0.0				0.0	15.7	10.9	17.1	4.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	971	927					0	328	273	111	314	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.62	0.11	0.29	0.00
Avail Cap(c_a), veh/h	971	927					0	547	455	217	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.9	41.9	29.5	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	2.3	0.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.3	0.3	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.6	34.2	42.4	30.0	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					444			104	
Approach Delay, s/veh		8.2						37.6			31.4	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.0		24.0				24.0				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.9		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.8				0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			19.1									
HCM 6th LOS			B									
<b>Notes</b>												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	41	372	18	0	232
Future Vol, veh/h	0	41	372	18	0	232
Conflicting Peds, #/hr	0	3	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	0	45	404	20	0	252
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	420	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.22	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.318	-	-	-	
Pot Cap-1 Maneuver	0	633	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	-	629	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	11.2	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT			
Capacity (veh/h)	-	-	629			
HCM Lane V/C Ratio	-	-	0.071			
HCM Control Delay (s)	-	-	11.2			
HCM Lane LOS	-	-	B			
HCM 95th %tile Q(veh)	-	-	0.2			

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↘			↘	
Traffic Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Future Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	48	0	0	5	0	407	1	0	224	16

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	-	-	236	-	-	408	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	803	0	0	643	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	-	-	800	-	-	643	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	10.6	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	800	643	-	-
HCM Lane V/C Ratio	-	-	0.06	0.008	-	-
HCM Control Delay (s)	-	-	9.8	10.6	-	-
HCM Lane LOS	-	-	A	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM Signalized Intersection Capacity Analysis  
 1: Highway 211/Meinig Ave & Pioneer Blvd




















08/11/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↑	↗					↑	↗	↘	↑		
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0	
Future Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frpb, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	502	1500		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	83	1496	303	0	0	0	0	254	156	24	171	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	114	24	171	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2069	893					314	260	102	305		
v/s Ratio Prot								c0.16			0.11		
v/s Ratio Perm		0.55	0.21						0.09	0.05			
v/c Ratio		0.76	0.29					0.81	0.44	0.24	0.56		
Uniform Delay, d1		9.9	5.7					41.8	38.3	36.6	39.4		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					14.2	1.2	1.2	2.4		
Delay (s)		12.6	6.5					55.9	39.5	37.8	41.7		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.6			0.0			49.7			41.2		
Approach LOS		B			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			20.2									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			80.2%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary  
 1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 										
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	156	24	171	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2020					0	321	267	106	314	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1289	789	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	156	24	171	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1289	789	1514	0
Q Serve(g_s), s	39.3	32.0	0.0				0.0	17.1	12.0	3.3	11.1	0.0
Cycle Q Clear(g_c), s	39.3	32.0	0.0				0.0	17.1	12.0	20.4	11.1	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1088	1039					0	321	267	106	314	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.58	0.23	0.55	0.00
Avail Cap(c_a), veh/h	1088	1039					0	388	322	140	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.3	9.2	0.0				0.0	41.3	39.3	51.0	39.0	0.0
Incr Delay (d2), s/veh	5.5	4.0	0.0				0.0	8.9	2.0	1.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	10.3	0.0				0.0	7.1	3.9	0.7	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.3	0.0				0.0	50.2	41.3	52.0	40.4	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					410			195	
Approach Delay, s/veh		14.6						46.8			41.9	
Approach LOS		B						D			D	
Timer - Assigned Phs		2	4					8				
Phs Duration (G+Y+Rc), s		82.7	27.3					27.3				
Change Period (Y+Rc), s		4.5	4.5					4.5				
Max Green Setting (Gmax), s		73.5	27.5					27.5				
Max Q Clear Time (g_c+I1), s		41.3	19.1					22.4				
Green Ext Time (p_c), s		16.3	1.2					0.4				

Intersection Summary		
HCM 6th Ctrl Delay		23.1
HCM 6th LOS		C
Notes		

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC  
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	21	365	8	0	446
Future Vol, veh/h	0	21	365	8	0	446
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	0	22	388	9	0	474
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	399	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.22	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.318	-	-	-	
Pot Cap-1 Maneuver	0	651	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	-	647	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	10.8	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT			
Capacity (veh/h)	-	-	647			
HCM Lane V/C Ratio	-	-	0.035			
HCM Control Delay (s)	-	-	10.8			
HCM Lane LOS	-	-	B			
HCM 95th %tile Q(veh)	-	-	0.1			

HCM 6th TWSC  
3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔			↔		↔			↔	
Traffic Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Future Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	31	0	0	3	0	389	4	0	407	61

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	-	-	442	-	-	391	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	615	0	0	658	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	-	613	-	-	658	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	10.5	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	613	658	-	-
HCM Lane V/C Ratio	-	-	0.05	0.005	-	-
HCM Control Delay (s)	-	-	11.2	10.5	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

Queuing and Blocking Report  
 2022 Background Plus Site AM Peak Hour

08/12/2020

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	322	286	100	310	125	59	155
Average Queue (ft)	153	104	32	145	62	11	48
95th Queue (ft)	273	225	102	263	138	39	112
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				1			
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		7	0	17	0	0	2
Queuing Penalty (veh)		9	1	24	1	0	0

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	48	44	44
Average Queue (ft)	26	3	3
95th Queue (ft)	52	24	21
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	35	12	13
Average Queue (ft)	29	4	1	0
95th Queue (ft)	57	23	9	6
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 37



Queuing and Blocking Report  
 2022 Background Plus Site PM Peak Hour

08/12/2020

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	616	600	100	307	125	108	254
Average Queue (ft)	304	272	59	177	90	28	108
95th Queue (ft)	505	497	134	308	162	82	200
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)	1	1		1			0
Queuing Penalty (veh)	0	0		3			0
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		17	1	28	2	1	15
Queuing Penalty (veh)		49	6	37	4	1	3

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	44	69	48
Average Queue (ft)	15	5	3
95th Queue (ft)	42	36	25
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	34	83	36
Average Queue (ft)	23	3	7	1
95th Queue (ft)	52	20	41	13
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 103

CDS380 08/11/2020 OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
**PIONEER BLVD at MEINIG AVE, Clackamas County, 01/01/2014 to 05/31/2018**  
 1 - 5 of 10 Crash records shown.

SR#	P	R	J	S	M	D	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	A	S	PH	INJ	G	E	LOC	RES	LOC	ACT	EVENT	CAUSE
INVEST	E	A	I	C	O	DAY	TIME	DIST	FIRST STREET	(MEDIAN)	TRAF	RNDFT	SURF	COLL	TRLR	QTY	FROM	PH	INJ	G	E	LOC	RES	LOC	ACT	EVENT	CAUSE	
UNLOC?	D	C	S	V	L	K	LAT	LONG	LES	(LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	TYPE	SVRTY	X	RES	E	LOC	RES	LOC	ACT	EVENT	CAUSE		
02013	N	N	N	N	N	N	05/02/2015	16	MEINIG AVE	CROSS	N	N	BAIN	S-1STOP	01	NONE	0	STRGHT									29	
NONE							SA		PIONEER BLVD	N	TRF	SIGNAL	N	WET	REAR	UNKN	N	-S	01	DRVR	NONE	00	Unk	Unk			00	
N							3P	-122.15	017200100800	0			DAY	PDO	UNKNOWN												026	
N							45:23	35.113								02	NONE	0	STOP								011	
																PRVTE	N	-S	01	DRVR	NONE	23	M	OR-Y	OR-25		000	
																PSNGR	CAR										000	
00025	N	N	N	N	N	N	01/03/2014	16	MEINIG AVE	CROSS	N	N	CLR	S-STRGHT	01	NONE	0	STRGHT									13	
NONE							FR		PIONEER BLVD	S	TRF	SIGNAL	N	DRY	SS-O	PRVTE	S	-N									000	
N							10A	-122.15	017200100800	0			DAY	PDO	PSNGR	CAR			01	DRVR	NONE	68	M	OR-Y	OR-25		000	
N							45:23	35.125776																			045	
							46:7267279									02	NONE	0	STRGHT								000	
																PRVTE	S	-N									000	
																PSNGR	CAR		01	DRVR	NONE	44	M	OR-Y	OR-25		000	
03127	N	N	N	N	N	N	08/03/2015	16	MEINIG AVE	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT									29	
NONE							NO		PIONEER BLVD	S	TRF	SIGNAL	N	DRY	REAR	PRVTE	S	-N									000	
N							12P	-122.15	017200100800	0			DAY	INJ	PSNGR	CAR			01	DRVR	NONE	24	M	OR-Y	OR-25		000	
N							45:23	35.113																			026	
																02	NONE	0	STOP								011	
																PRVTE	S	-N									000	
																PSNGR	CAR		01	DRVR	INJC	23	F	OR-Y	OR-25		000	
04757	N	N	N	N	N	N	10/14/2016	16	MEINIG AVE	CROSS	N	N	Y	UNK	FIX	OBJ	01	NONE	9	TURN-R							100	
CITY							FR		PIONEER BLVD	S	TRF	SIGNAL	N	WET	FIX	N/A	W	-S									000	
N							11P	-122.15	017200100800	1			DAY	PDO	PSNGR	CAR			01	DRVR	NONE	00	Unk	Unk			000	
N							45:23	35.58																			000	
02544	N	N	N	N	N	N	06/27/2017	14	MEINIG AVE	CROSS	N	N	CLR	S-1STOP	01	NONE	9	STRGHT									29	
NONE							TU		PIONEER BLVD	SW	YIELD	N	DRY	REAR	N/A	NH-SE			01	DRVR	NONE	00	Unk	Unk		000		
N							2P	-122.15	002600100800	1			DAY	PDO	PSNGR	CAR			01	DRVR	NONE	00	Unk	Unk		000		
N							45:23	35.113																			000	
																02	NONE	9	STOP								011	
																N/A	NH-SE			01	DRVR	NONE	00	Unk	Unk		000	
																PSNGR	CAR		01	DRVR	NONE	00	Unk	Unk			000	

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submission of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash File.







OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
**EAGLE CRK-SANDY HY at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**

CDS380  
 08/11/2020  
 CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DPT	UNLOC?	D C S V L K LAT	DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	TRLR	SPCL USE	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
							FIRST STREET	DIRCT	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR	SPCL USE	MOVE						
							SECOND STREET	DIRCT	LEGS	TRAF-	RNDST	SURF	COLL	OWNER		FROM						
							LONG	LOCIN	(LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE		TO						

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submission of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
**MEINIG AVE at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018**

CDS380  
 08/11/2020  
 CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DPT	UNLOC?	D M	P R J S W DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
	E A U I C O DAY	DIST	FROM	LONG	FIRST STREET	DIRRECT	DIRECT	LEGS	(MEDIAN)	TEAF-	RNDBT	SURF	COLL	TRLR QTY	FROM						
					SECOND STREET	LOCIN	LOCIN	(LANES)		CONTL	DRVWY	LIGHT	SVRTY	V# TYPE	TO						

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

## Right-Turn Lane Warrant Analysis (ODOT Methodology)



Project Name: The Pad Residential Development  
 Approach: Southbound Highway 211 at Tupper Road  
 Scenario: 2022 Background Plus Site Trips (RIRO)

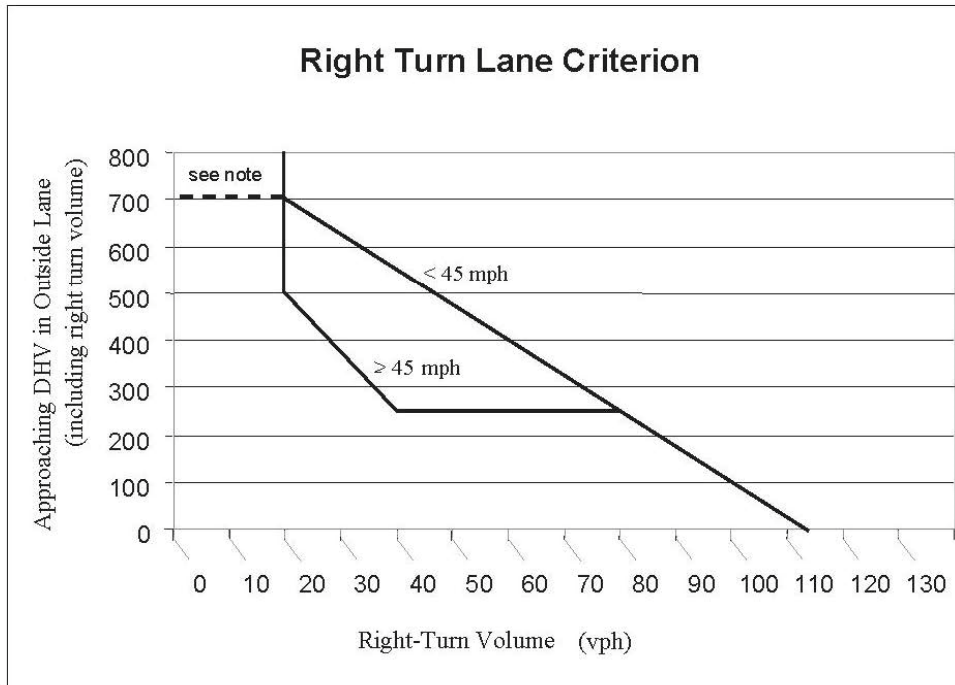
Major-Street Design Speed: 40 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	15	54
Approaching DVH in Outside Lane:	221	437
Calculated Turn Volume Threshold:	84	55
Right Turn Volume Exceeds Threshold?	<b>NO</b>	<b>NO</b>

### Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria are determined using the curve in Exhibit 7-2.

### **Exhibit 7-2 Right Turn Lane Criterion**



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.



**Stopping Sight Distance**

Design Speed **20** mph  
 Reaction Time 2.5 seconds  
 Acceleration 11.2 ft/sec<sup>2</sup>  
 Grade (percent) **-6.00%**

**Distance 119.8 feet****Reaction Distance**

Travel Speed  
 Travel Speed  
 Reaction Time

**Reaction Distance**

20 mph  
 29.4 fps  
 2.5 seconds

**73.5 feet****Braking Distance**

Travel Speed  
 Acceleration  
 Grade (percent)

**Braking Distance**

20 mph  
 11.2 ft/sec<sup>2</sup>  
 -6.00%

**46.3 feet**

For standard roadways >400 ADT, use 2.5 seconds perception/reaction time and 11.2 ft/sec<sup>2</sup> deceleration.  
 (95th percentile reaction time and 10th percentile deceleration)

For VLV roadways < 400 ADT, use 2.0 seconds perception/reaction time and 13.4 ft/sec<sup>2</sup> deceleration.  
 (90th percentile reaction time and 50th percentile deceleration)

## Exhibit H

### The Pad Townhouses (File No. 21-046) Supplemental Narrative

#### Introduction

This narrative supplements the previously submitted project narrative dated July 14, 2021. The purpose of this narrative is to provide findings regarding the requirements of Chapter 17.82, Special Setbacks on Transit Streets. As shown on submitted plans, all units will be oriented toward a private sidewalk leading to the sidewalk proposed to be constructed along Meinig Avenue. In addition, Units 1 and 5 closest to the street feature a covered entrance at the building corner nearest the street. These entrances will be visible from the transit street.

#### CHAPTER 17.82 - SPECIAL SETBACKS ON TRANSIT STREETS

##### 17.82.00 - INTENT

The intent is to provide for convenient, direct, and accessible pedestrian access to and from public sidewalks and transit facilities; provide a safe, pleasant and enjoyable pedestrian experience by connecting activities within a structure to the adjacent sidewalk and/or transit street; and, promote the use of pedestrian, bicycle, and transit modes of transportation.

**Response:** *The proposed design features all units oriented to a private sidewalk connecting to the public sidewalk along Meinig Avenue/Highway 211. This design is intended to provide pedestrians with a convenient, direct, and accessible route to and from the building entrances and the street.*

##### 17.82.10 - APPLICABILITY

This chapter applies to all residential development located adjacent to a transit street. A transit street is defined as any street designated as a collector or arterial, unless otherwise designated in the Transit System Plan.

**Response:** *The Pad Townhouse site is located adjacent to Meinig Avenue/Highway 211, identified as a major arterial in the City's Transportation System Plan and this Chapter is applicable.*

##### 17.82.20 - BUILDING ORIENTATION

A. All residential dwellings shall have their primary entrances oriented toward a transit street rather than a parking area, or if not adjacent to a transit street, toward a public right-of-way or private walkway which leads to a transit street.

**Response:** *This section requires a residential dwelling to either have their primary entrance oriented toward a transit street rather than a parking lot or toward a public right-of-way or private walkway leading to a transit street. As shown on the submitted plans, all units are oriented toward a private sidewalk connecting to the Meinig Avenue sidewalk. In addition, the two end units closest to the transit street (Units 1 and 5) feature their primary entrance at the corner of the units closest to and visible from the street. The proposal complies with this standard.*

- B. Dwellings shall have a primary entrance connecting directly between the street and building interior. A clearly marked, convenient, safe and lighted pedestrian route shall be provided to the entrance, from the transit street. The pedestrian route shall consist of materials such as concrete, asphalt, stone, brick, permeable pavers, or other materials as approved by the Director. The pedestrian path shall be permanently affixed to the ground with gravel subsurface or a comparable subsurface as approved by the Director.

**Response:** *A concrete sidewalk will be constructed leading from the front door of each unit to a continuous concrete sidewalk in front of all units and to the sidewalk along Meinig Avenue. The proposal complies with this section.*

- C. Primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth.

**Response:** *As shown on submitted Architectural Plans, all units features a covered porch in compliance with this standard.*

- D. If the site has frontage on more than one transit street, the dwelling shall provide one main entrance oriented to a transit street or to a corner where two transit streets intersect.

**Response:** *The subject property has frontage on only one transit street and this section is not applicable.*

9/28/21, 9:30 AM

City of Sandy Mail - RE: The Pad Townhomes (File No. 21-046 DR/TREE/ADJN AR)



**Exhibit I**

Marisol Martinez <mmartinez@ci.sandy.or.us>

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**RE: The Pad Townhomes (File No. 21-046 DR/TREE/ADJN AR)**

1 message

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**'Belt, Charlene R (BPA) - TERR-ROSS MHQA' via Planning** <planning@ci.sandy.or.us> Tue, Sep 28, 2021 at 9:24 AM  
Reply-To: "Belt, Charlene R (BPA) - TERR-ROSS MHQA" <crbelt@bpa.gov>  
To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

Hi Shelley,

BPA has reviewed the materials submitted for File No. File No. 21-046 DR/TREE/ADJN AR and found no impact to our facilities. Thank you for the opportunity to comment.

**Charlene Belt**

Realty Specialist / COR

Real Property Field Services, Ross MHQA

Bonneville Power Administration  
1211 NE Minnehaha St, Vancouver, WA 98665  
(503) 230-5518 (office) / [crbelt@bpa.gov](mailto:crbelt@bpa.gov)



## Exhibit J

# SANDY FIRE DISTRICT NO. 72 Fire Prevention Division

### E-mail Memorandum

To: [planning@ci.sandy.or.us](mailto:planning@ci.sandy.or.us)  
From: Gary Boyles  
Date: September 28, 2021  
Re: The Pad Townhomes (File No. 21-046)

Review and comments are based upon the current version of the Oregon Fire Code (OFC) as adopted by the Oregon Office of State Fire Marshal. The scope of this review is typically limited to fire apparatus access and water supply, although the applicant shall comply with all applicable OFC requirements. When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access and water supply may be modified as approved by the fire code official. References, unless otherwise specified, include provisions found in the Metro Code Committee's Fire Code Applications Guide, OFC Chapter 5 and appendices B, C and D.

### COMMENTS:

#### General

1. Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval prior to building permit submittal.
2. Where fire apparatus access roads or a water supply for fire protection are required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except where approved alternative methods of protection are provided.
3. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs.

#### Fire Apparatus Access

**FIRE APPARATUS ACCESS ROAD** (as defined by the OFC). A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as *fire lane*, public street, private street, parking lot lane and access roadway.

1. Fire apparatus access roads shall be within 150 feet of all portions of the exterior wall of the first story of any building as measured by an approved route around the exterior of the building. An approved turnaround will be required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet.
2. Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround.
3. Fire apparatus access roadway grades shall not exceed 10 percent. Intersections and turnarounds shall be as level as possible and have a maximum of 5 percent grade with the exception of crowning for water run-off. Considerations of grades up to 15 percent may be allowed with a proposed alternate in accordance with the provisions of ORS 455.610(5).
4. Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet and an unobstructed vertical clearance of 13 feet 6 inches is to be maintained.
5. Facilities, buildings, or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete, or other approved driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (gross vehicle weight).
6. The inside turning radius and outside turning radius for fire apparatus access roads shall be not less than 28 feet and 48 feet respectively, measured from the same center point.
7. Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "NO PARKING-FIRE LANE" signs shall be placed on one or both sides of the roadway and in turnarounds as needed.

#### Firefighting Water Supplies

1. The minimum available fire-flow and flow duration for commercial and industrial buildings shall be as specified in OFC Appendix B. In no case shall the resulting fire-flow be less than 1,500 gpm at 20 psi residual.
2. Fire flow testing will be required to determine available fire flow. Testing will be the responsibility of the applicant. Applicant to contact the City of Sandy Public Works for testing information and requirements and notify the Fire Marshal prior to fire flow testing.
3. For commercial and industrial buildings served by a municipal water system where a portion of the building is more than 400 feet from a fire hydrant on a fire apparatus access road (600 feet for buildings equipped throughout with an approved automatic sprinkler system), as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided.

4. If applicable, fire department connections (FDC) shall be located within 100 feet of a fire hydrant. All FDC's shall be permanently labeled with appropriate address in which it serves and shall be accessible and visible from the fire apparatus access road.
5. The minimum number and distribution of fire hydrants shall be in accordance with City of Sandy requirements and OFC Appendix C.
6. Fire hydrants installed within the Sandy Fire District shall comply with the following requirements:
  - a. Flow requirements and location of fire hydrants will be reviewed and approved by Sandy Fire upon building permit submittal.
  - b. Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port. If a new building, structure, or dwelling is already served by an existing hydrant, the existing hydrant shall also be OSHA safety red and have a 4-inch non-threaded metal faced hydrant connection with cap installed.

**NOTE:**

Sandy Fire District comments may not be all inclusive based on information provided. A more detailed review may be needed for future development to proceed.

**Please do not hesitate to contact Fire Marshal Gary Boyles at 503-891-7042 or [fmboyles.sandyfire@gmail.com](mailto:fmboyles.sandyfire@gmail.com) should you have any questions or concerns.**



**Exhibit K**

Marisol Martinez <mmartinez@ci.sandy.or.us>

**Fwd: Comments on land use app #21-046**

**Shelley Denison** <sdenison@ci.sandy.or.us>  
To: Marisol Martinez <mmartinez@ci.sandy.or.us>

Mon, Oct 18, 2021 at 11:33 AM

Hey Marisol,

Could you put this in the file? Thanks!

----- Forwarded message -----

From: **Andi Howell** <ahowell@ci.sandy.or.us>  
Date: Mon, Oct 18, 2021 at 11:04 AM  
Subject: Re: Comments on land use app #21-046  
To: Shelley Denison <sdenison@ci.sandy.or.us>

Transit will not be requesting amenities with this development.

thank you.

**Andi Howell**  
Transit Director

City of Sandy  
16610 Champion Way  
Sandy, OR 97055  
503-489-0925  
ahowell@ci.sandy.or.us

[Sandy Transit Web and Trip Planner](#)



On Mon, Oct 18, 2021 at 10:35 AM Shelley Denison <sdenison@ci.sandy.or.us> wrote:  
It's the one off Highway 211, just west of Meinig Park.

On Mon, Oct 18, 2021 at 10:26 AM Andi Howell <ahowell@ci.sandy.or.us> wrote:  
Apologies, is this the new development off of Boernstedt?

**Andi Howell**  
Transit Director

City of Sandy  
16610 Champion Way  
Sandy, OR 97055  
503-489-0925  
ahowell@ci.sandy.or.us

[Sandy Transit Web and Trip Planner](#)





On Mon, Oct 18, 2021 at 9:28 AM Shelley Denison <[sdenison@ci.sandy.or.us](mailto:sdenison@ci.sandy.or.us)> wrote:  
Hey Andi,

Marisol sent you the materials for 21-046 a couple of weeks ago, and I'm wanting to get started on the staff report. Do you have any comments on this one?

Thanks!

--

**Shelley Denison**  
**Associate Planner**

City of Sandy  
Development Services Department  
<39250 Pioneer Blvd>  
<Sandy, OR 97055>  
503-783-2587  
[sdenison@ci.sandy.or.us](mailto:sdenison@ci.sandy.or.us)

*"Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody." - Jane Jacobs*

--

**Shelley Denison**  
**Associate Planner**

City of Sandy  
Development Services Department  
<39250 Pioneer Blvd>  
<Sandy, OR 97055>  
503-783-2587  
[sdenison@ci.sandy.or.us](mailto:sdenison@ci.sandy.or.us)

*"Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody." - Jane Jacobs*

--

**Shelley Denison**  
**Associate Planner**

City of Sandy  
Development Services Department  
<39250 Pioneer Blvd>  
<Sandy, OR 97055>  
503-783-2587  
[sdenison@ci.sandy.or.us](mailto:sdenison@ci.sandy.or.us)

*"Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody." - Jane Jacobs*

## Exhibit M

### MEMORANDUM

TO: SHELLEY DENISON, ASSOCIATE PLANNER  
FROM: MIKE WALKER, DIRECTOR OF PUBLIC WORKS  
RE: PUBLIC WORKS COMMENTS - FILE NO. 21-046 TREE/ADJ/VAR  
DATE: OCTOBER 27, 2021

The following are Public Works' comments on the above-referenced application.

#### **Transportation**

The Traffic Impact Analysis submitted with the application was more than a year old when the application was submitted. The TIA does not reflect the current jurisdictional responsibility for Hwy 211. ODOT transferred jurisdiction of Hwy 211 to the City in February 2021.

The TIA discusses an application (Bull Run Terrace) that was pending at the time the TIA was prepared. This application was denied and a separate application for a portion of the same site has been submitted. This new application does not show the extension of Dubarko Rd. connecting with Hwy 26 as was depicted in the original application. The future conditions analysis for the instant application does not include the trip generation from The Bull Run Terrace development and instead assumes that the Dubarko/US 26 connection will be made.

The TIA recognizes that the proposed access for development would impact traffic on Hwy 211 as southbound vehicles wishing to turn into the site would be blocked by the queue for northbound traffic on Hwy 211. This would have a cascading effect on right turns from Pioneer Blvd. and southbound through traffic on Hwy 211.

The traffic analysis proposes a couple of alternatives to mitigate these impacts, including a center median in Hwy 211 or a right-in-right out treatment at the site access to prevent left turns into or out of the site.

While on the surface these seem like reasonable mitigation efforts the narrative demonstrates that a center median would also block the intersection of Tupper Rd. with Hwy 211 turning it into a right-in-right out intersection.

There isn't a reasonable nexus between the traffic impacts from the development of a 12-unit multi-family dwelling and the need to construct a separate left turn lane on Hwy 211 to serve the site. The applicant's TIA exposes current and future deficiencies on Hwy 211 between Pioneer Blvd. and Meinig Ave.

Now that Hwy 211 is a City facility a project to develop left turn refuge or continuous center turn lane on Hwy 211 between Pioneer and Meinig should be scoped and included in the TSP update that is currently underway.

The applicant shall be required to construct site frontage improvements including but not limited to half-street improvements, curbs, sidewalks, street trees, street lighting and storm drainage improvements per sections 15.20 and 17.84 SMC. In addition, the applicant shall construct a connection between the proposed site frontage sidewalk and the existing paved pedestrian path in Meinig Park and the Hwy 211 right-of-way.

The applicant shall be required to construct a center median that doesn't interfere with left turns to and from the Tupper/Hwy 211 intersection or a right-in-right-out site access as mitigation for the traffic, operational and safety impacts of the development. Construction plans for either option should be submitted to the City for review and approval. Any required street widening on Hwy 211 necessary to accomplish either alternative shall be constructed by the applicant.

#### **Utilities**

The site utilities plan shows a sanitary sewer connection to an abandoned force main in the Hwy 211 right-of-way. This pipe cannot provide sanitary sewer service to the site. The applicant will need to request a private sanitary easement from the City across the Meinig Park site to access the only public sewer line capable of providing gravity sanitary sewer service to the site. The request should start with a preliminary design for city review, then a request to the Sandy Parks Advisory Board who would then make a recommendation to the City Council. The City Council will make the final decision regarding granting of a sanitary sewer easement.

The proposed stormwater plan shows a gravity storm drain discharging to an existing roadside ditch in the Hwy 211 right-of-way. The applicant shall extend a storm line in the Hwy 211 right-of-way to the existing ditch inlet to convey stormwater in a pipe to the public system.

#### **General**

The tree preservation plan depicts as many as three trees located off site or in the public right-of-way as being removed. Presumably the trees are proposed for removal to accommodate the construction of a sanitary sewer line. Since the sanitary sewer line depicted on the site utility plan has been abandoned since 1980 and is not capable of providing sanitary sewer service to the site the tree preservation plan shall be revised to reflect the actual alignment of any sanitary sewer line in an easement subject to approval by the City.

Public utility and street plans for land use applications are submitted to comply with the requirements in 17.100.60 SMC. Land use approval does not connote approval of utility or street construction plans which are subject to a separate submittal and review process.



## Staff Report

---

**Meeting Date:** November 22, 2021

**From** Emily Meharg, Senior Planner

**SUBJECT:** 21-037 SUB/VAR/ADJ/TREE Sandy Woods II Subdivision

---

### **BACKGROUND / CONTEXT:**

The applicant, Silver V Construction, Inc. submitted an application for a 43-lot subdivision on a 17.68-acre parcel located south of Kelso Road, west of Jewelberry Avenue, and north of the Sandy Woods Phase I Subdivision. The 43 lots range in size from 7,500 square feet to 12,450 square feet. All 43 lots are proposed to gain access from Kelso Road with a secondary fire access under the BPA powerlines to the south of the subdivision. The proposal also includes a creek and tree preservation tract (split into three separate tracts identified as Tracts K, M, and O), a stormwater tract (Tract L), a wetland tract (Tract J), and a public walkway tract (Tract N). All lots are proposed to contain either a single-family home or a duplex as allowed in the permitted uses section of the Single Family Residential (SFR) zoning district. The proposal also includes frontage improvements, utility extensions, and removal of 249 trees from the subject property. In addition, the applicant requested the following three variances:

- A. Variance to Section 17.100.110(F) to exceed the 400-foot maximum length for a cul-de-sac.
- B. Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street A.
- C. Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street B.

Upon a more thorough review of the proposal, staff determined that the third requested variance (Variance C) is not needed since the longer proposed block length is due to existing natural features; however, a variance to Section 17.100.120(D) for the north side of Street B is needed. Staff also identified two additional adjustment requests: 1) a Type I Adjustment to Section 17.100.120(B) to exceed the 400-foot maximum block length for the west side of Street A between Kelso Road and Street B by less than 10 percent; and 2) a Type II Adjustment to Section 17.34.30(C) to reduce the required 20-foot minimum lot frontage by 20 percent for Lot 77. The variance and adjustment requests are discussed in more detail in Chapter 17.66 of the staff report.

### **RECOMMENDATION:**

Staff recommends the Planning Commission **approve** the subdivision request with conditions. Staff further recommends the Planning Commission **approve** the following three variances and two adjustments with the conditions as outlined below:

- Type III Variance to allow the cul-de-sac to exceed the 400-foot maximum length. To better protect the stream and wetland natural areas that traverse the site, staff recommends the lots on the cul-de-sac that abut the natural area tracts (Tracts K, M, and O) be required to install fences along the property line that abuts the natural area tract to prevent encroachment into the natural areas. This would apply to Lots 44, 66, 67, 68, 69, 77, 78, 79, 80, and 86. The fences shall be installed prior to final plat.
- Special Variance to allow the east side of Street A to exceed the 400-foot maximum block length. The applicant shall update the plan set to detail a 15-foot-wide bicycle and pedestrian tract with a 10-foot-wide improved surface located mid-block on the east side of Street A and stubbed to the east property boundary. Staff recommends the applicant consider locating the bike/ped tract in line with Street B. Alternatively, staff recommends the applicant locate the tract between Lots 44 and 45, which already has a 15-foot-wide public sanitary sewer easement. The bicycle/pedestrian path could be located on top of the sanitary sewer easement with both in a separate tract.
- Special Variance to allow Street B to not provide a bicycle/pedestrian accessway on the north block face of Street B. To better protect the wetland in the northwest corner of the subject property, staff recommends the lots that abut the wetland tract (Tract J) be required to install fences along the property line that abuts the tract to prevent encroachment into the wetland. This would apply to Lots 54, 55, and 59-65. The fences shall be installed prior to final plat.
- Type I Adjustment to allow the west side of Street A to exceed the 400-foot maximum block length by approximately 14 feet.
- Type II Adjustment to Section 17.34.30(C) to allow the 20-foot minimum lot frontage to be reduced to 16 feet for Lot 77. The applicant shall update the plan set to detail the lot frontage of Lot 77 at 16 feet. The applicant shall detail a minimum paved width of 10 feet on the accessway (pole) portion of the flag lot. The applicant shall be required to install a fence along the Lot 77 property line that abuts Tract O to prevent encroachment into the natural area. The fences shall be installed prior to final plat.

Staff recommends the Planning Commission make a determination on the maximum allowed combined height of a fence and retaining wall in a Tract without a building and located along a public right-of-way.

**LIST OF ATTACHMENTS/EXHIBITS:**

Staff Report

Exhibits:

**Applicant's Submittals:**

- A. Land Use Application
- B. Project Narrative (dated June 4, 2021)
- C. Plan Set
  - Cover Page
  - Sheet 1 – Site Plan
  - Sheet 2 – Site Plan with Trees
  - Sheet 3 – Existing Conditions Plan

- Sheet 4 – Tree Retention/Removal Plan
  - Sheet 5 - Tree List
  - Sheet 6 – Offsite Sanitary Sewer Plan
  - Sheet 7 – Onsite Sanitary & Waterline Plan
  - Sheet 8 – Storm Drain Plan
  - Sheet 9 – Driveway & Street Lighting Plan
  - Sheet 10 – Residential Parking Analysis
  - Sheet 11 – Future Street Plan
  - Sheet 12 – Grading & ESC Plan
  - Sheet 13 – Retaining Walls
  - Sheet 14 – Kelso Road Plan & Profile
  - Sheet 15 – Onsite Street Profiles
- D. Storm Drainage Report (dated June 2021)
- E. Transportation Impact Study (dated March 2021)
- F. Arborist Report (dated June 3, 2021)
- G. Arborist Report Addendum (dated July 13, 2021)
- H. Wetland Delineation for Remainder of Property (dated May 2017)
- I. Wetland Delineation for Wetland in Northwest Corner (dated May 2017 and August 2020)
- J. DSL Wetland Concurrence for Entire Original Property (dated January 29, 2019)
- K. DSL Wetland Concurrence for Wetland in Northwest Corner (dated October 29, 2020)
- L. Clackamas County Design Modification Request
- M. Incompleteness Letter Response (dated August 3, 2021)

**Agency Comments:**

- N. City Transportation Engineer (dated October 14, 2021)
- O. Fire Marshal (dated October 26, 2021)
- P. Parks and Trails Advisory Board (dated October 27, 2021)
- Q. City Public Works Director (dated October 29, 2021)

**Public Comments:**

- R. Joseph Plitt (received November 4, 2021)

**Additional Documents Submitted by Staff:**

- S. Third Party Arborist Report (dated October 16, 2021)

**PLANNING COMMISSION STAFF REPORT  
TYPE III LAND USE PROPOSAL**

This proposal was reviewed concurrently as a Type III subdivision with tree removal, three variances, and two adjustments. The following exhibits and findings of fact explain the proposal and support the staff recommendation.

**DATE:** November 15, 2021

**FILE NO.:** 21-037 SUB/VAR/ADJ/TREE

**PROJECT NAME:** Sandy Woods II Subdivision

**APPLICANT/OWNER:** Silver V Construction, Inc.

**PHYSICAL ADDRESS:** No situs

**LEGAL DESCRIPTION:** T2SR4E11, Tax Lots 2202, 2203, 2204, and 4800

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## EXHIBITS

### **Applicant's Submittals:**

- A. Land Use Application
- B. Project Narrative (dated June 4, 2021)
- C. Plan Set
  - Cover Page
  - Sheet 1 – Site Plan
  - Sheet 2 – Site Plan with Trees
  - Sheet 3 – Existing Conditions Plan
  - Sheet 4 – Tree Retention/Removal Plan
  - Sheet 5 - Tree List
  - Sheet 6 – Offsite Sanitary Sewer Plan
  - Sheet 7 – Onsite Sanitary & Waterline Plan
  - Sheet 8 – Storm Drain Plan
  - Sheet 9 – Driveway & Street Lighting Plan
  - Sheet 10 – Residential Parking Analysis
  - Sheet 11 – Future Street Plan
  - Sheet 12 – Grading & ESC Plan
  - Sheet 13 – Retaining Walls
  - Sheet 14 – Kelso Road Plan & Profile
  - Sheet 15 – Onsite Street Profiles
- D. Storm Drainage Report (dated June 2021)
- E. Transportation Impact Study (dated March 2021)
- F. Arborist Report (dated June 3, 2021)
- G. Arborist Report Addendum (dated July 13, 2021)
- H. Wetland Delineation for Remainder of Property (dated May 2017)
- I. Wetland Delineation for Wetland in Northwest Corner (dated May 2017 and August 2020)
- J. DSL Wetland Concurrence for Entire Original Property (dated January 29, 2019)
- K. DSL Wetland Concurrence for Wetland in Northwest Corner (dated October 29, 2020)
- L. Clackamas County Design Modification Request
- M. Incompleteness Letter Response (dated August 3, 2021)

### **Agency Comments:**

- N. City Transportation Engineer (dated October 14, 2021)
- O. Fire Marshal (dated October 26, 2021)
- P. Parks and Trails Advisory Board (dated October 27, 2021)
- Q. City Public Works Director (dated October 29, 2021)

### **Public Comments:**

- R. Joseph Plitt (received November 4, 2021)

### **Additional Documents Submitted by Staff:**

- S. Third Party Arborist Report (dated October 16, 2021)

## FINDINGS OF FACT

### GENERAL FINDINGS

1. These findings are based on the applicant's submittals received on June 11, 2021, with additional items received on June 15, 2021 and June 18, 2021. Staff found the application incomplete on July 8, 2021. On July 15, 2021, August 4, 2021, and August 6, 2021, the applicant submitted additional items. Staff found the application complete on September 9, 2021 for the purpose of beginning the "120-day clock." The 120-day deadline is January 7, 2022.
2. This report is based upon the exhibits listed in this document, including the applicant's submittals, agency comments, and public testimony.
3. The subject site is approximately 17.68 acres. The site is located south of Kelso Road, west of Jewelberry Avenue, and north of the Sandy Woods Phase I Subdivision.
4. The parcel has a Comprehensive Plan Map designation of Low Density Residential and a Zoning Map designation of Single Family Residential (SFR).
5. The applicant, Silver V Construction, Inc. submitted an application for a 43-lot subdivision on a 17.68-acre parcel located south of Kelso Road, west of Jewelberry Avenue, and north of the Sandy Woods Phase I Subdivision. The 43 lots range in size from 7,500 square feet to 12,450 square feet. All 43 lots are proposed to gain access from Kelso Road with a secondary fire access under the BPA powerlines to the south of the subdivision. The proposal also includes a creek and tree preservation tract (split into three separate tracts identified as Tracts K, M, and O), a stormwater tract (Tract L), a wetland tract (Tract J), and a public walkway tract (Tract N). All lots are proposed to contain either a single-family home or a duplex as allowed in the permitted uses section of the Single Family Residential (SFR) zoning district. The proposal also includes frontage improvements, utility extensions, and removal of 249 trees from the subject property. In addition, the applicant requested the following three variances:
  - A. Variance to Section 17.100.110(F) to exceed the 400-foot maximum length for a cul-de-sac.
  - B. Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street A.
  - C. Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street B.
6. Upon a more thorough review of the proposal, staff determined that the third requested variance (Variance C) is not needed since the longer proposed block length is due to existing natural features; however, a variance to Section 17.100.120(D) for the north side of Street B is needed. Staff also identified two additional adjustment requests: 1) a Type I Adjustment to Section 17.100.120(B) to exceed the 400-foot maximum block length for the west side of Street A between Kelso Road and Street B by less than 10 percent; and 2) a Type II Adjustment to Section 17.34.30(C) to reduce the required 20-foot minimum lot frontage by

20 percent for Lot 77. The variance and adjustment requests are discussed in more detail in Chapter 17.66 of this staff report.

7. This subdivision request was submitted on June 11, 2021, prior to the repeal of Planned Developments effective on September 15, 2021. Therefore, code references to Planned Developments may still be mentioned in this staff report.
8. The City of Sandy completed the following notices:
  - A. A transmittal was sent to agencies asking for comment on October 6, 2021.
  - B. Notification of the proposed application was mailed to affected property owners within 500 feet of the subject property on October 26, 2021.
  - C. A legal notice was published in the Sandy Post on November 3, 2021.
9. At publication of this staff report one (1) written public comment was received (Exhibit R). The main concern expressed is a safety concern about children climbing the BPA towers to the east of the subject property.

## **LAND DIVISION CRITERIA – Chapter 17.100**

10. This land use application is for the subdivision of land and therefore is reviewed in compliance with Chapter 17.100.
11. Submittal of preliminary public utility plans and street plans is solely to satisfy the requirements of Section 17.100.60. **Preliminary plat approval does not connote utility or public improvement plan approval which will be reviewed and approved separately upon submittal of public improvement construction plans.**
12. Section 17.100.60(E) contains the approval criteria for a subdivision. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The applicant did not apply for a Planned Development. The base zoning district is single family residential (SFR), which specifies that the density shall not be less than 3 or more than 5.8 units per net acre. As discussed in Chapter 17.30 of this document, the proposed 43 lots are in compliance with the density standards. As discussed in Chapter 17.34 of this document, all lots are proposed to have a minimum lot size of 7,500 square feet and a minimum average lot width of 60 feet in compliance with Sections 17.34.30(A and B). Section 17.34.30(C) requires each lot to have a minimum lot frontage of 20 feet. All lots have a minimum lot frontage of 20 feet, with the exception of Lot 77, which is a flag lot. The applicant requested a Type II Adjustment to Section 17.34.30(C) to reduce the required minimum lot frontage by 20 percent; the adjustment request is discussed in more detail in Chapter 17.66 of this staff report. Section 17.34.30(E) contains the required minimum setbacks. Exhibit C, Sheet 2 details building footprints in compliance with the minimum setback standards, with the exception of Lot 53. Lot 53 abuts Kelso Road, which is a residential minor arterial and requires a 20-foot setback per Chapter 17.80. **The applicant shall update the building footprint on Lot 53 to comply with the required 20-foot setback from Kelso Road.** With this condition, the proposal meets the setback standards of Section 17.34.30(E) and Chapter 17.80. The proposed subdivision will connect to water and sanitary sewer in compliance with Sections 17.34.40(A and B). The proposed street layout allows for a future street network to be developed to the west of the subject property as required by Section 17.34.40(C). As discussed in Section 17.100.60(E.2) of this staff report, the presence of existing wetlands/streams on the property as well as the existing BPA easement over the adjacent properties to the south and east make a gridded street network impractical. All lots have frontage on a public street and are proposed to have at least 40 feet of street frontage, with the exception of the flag lot (Lot 77). Staff finds this proposal meets approval criteria 17.100.60 (E)(1).
13. Sections 17.100.60(E)(2) and 17.100.70 require subdivisions to be consistent with the design standards set forth in this chapter. Staff finds the proposal meets approval criteria 17.100.60 (E)(2) as explained in A. through J., below:
  - A. Section 17.100.100(A) pertains to the Street Connectivity Principle. The proposed subdivision will gain access from Kelso Road, with a stubbed street to the west, and an emergency fire access road to the south. Due to the presence of existing wetlands/streams on the property as well as the existing BPA easement over the

adjacent properties to the south and east, a gridded street network is impractical. The proposed cul-de-sac better protects the stream/wetland area than having a gridded street network bisect the stream in two places. The emergency fire access also serves as a bicycle/pedestrian connection that connects Sandy Woods II to Sandy Woods I and the Sandy Bluff Park further south. In addition, the proposal includes a pedestrian path connecting the cul-de-sac bulb and proposed Street B, as well as a pedestrian path stubbed to the east property line that will provide a connection to trails under the BPA easement in the future. Staff finds the proposal meets Section 17.100.100(A).

- B. Section 17.100.100(D) requires the street layout to use a rectangular grid pattern but allows for modifications to the rectangular grid pattern if appropriate to adapt to topography or natural conditions. As stated above, the presence of existing wetlands/streams on the property as well as the existing BPA easement over the adjacent properties to the south and east make a gridded street network impractical. Staff finds the proposal meets Section 17.100.100(D).
- C. Section 17.100.100(E) pertains to a future street plan. The proposal provides one stubbed street to the west, which will provide future access for the property to the west. The adjacent properties to the south and east are under the BPA easement, therefore, development of these sites would be extremely limited. Although the proposal doesn't include connections for vehicles to the south and east (aside from the emergency fire access to the south), the proposal does include multiple pedestrian paths that connect the cul-de-sac to Street B as well as a pathway to the east and a public access easement along the fire access lane to the south, which will connect to future trails under the BPA easement to the east and south. Staff finds the submitted proposal meets Section 17.100.100(E).
- D. Section 17.100.100(F) pertains to connections. As previously stated, the proposal includes multiple bike/pedestrian paths that both internally connect streets within the proposed subdivision and connects the proposed subdivision to future trails in the BPA easement and allows for easier pedestrian access to the nearby Sandy Bluff Park. Additional street connections are not practical due to the existing BPA easement to the south and east. Staff finds the submitted proposal meets Section 17.100.100(F).
- E. Section 17.100.110(F) discourages cul-de-sacs but states: "If deemed necessary, cul-de-sacs shall be as short as possible and shall not exceed 400 feet in length." The applicant requested a variance to Section 17.100.110(F) to exceed the 400-foot maximum length for a cul-de-sac. The applicant is also proposing two bicycle/pedestrian paths from the cul-de-sac, which provides internal connections within the proposed subdivision as well as external connections to the Sandy Woods I Subdivision and Sandy Bluff Park to the south. The variance request is discussed in Chapter 17.66 of this document. With approval of the variance as recommended by staff, the submitted proposal can meet Section 17.100.100 (F) as it relates to cul-de-sacs.
- F. Section 17.100.120(B) contains standards for block lengths. The applicant did not submit information on block lengths for all blocks; however, the applicant is requesting three variances to block length. The variance requests are discussed in further detail in

Chapter 17.66 of this staff report. With approval of the variances as recommended by staff, the submitted proposal can meet Section 17.100.120(B).

- G. Section 17.100.120(D) contains requirements for bicycle/pedestrian accessways on blocks that exceed 600 feet. The applicant proposes multiple block faces that exceed 600 feet and include a bicycle/pedestrian accessway for some of the block faces exceeding 600 feet. Staff identified one variance to Section 17.100.120(D) and one additional block face that will require the applicant to add a bicycle and pedestrian accessway, both of which are discussed further in Chapter 17.66 of this staff report. With approval of the variances as recommended by staff, the submitted proposal can meet Section 17.100.120(D).
- H. Where a subdivision is traversed by a watercourse, drainage way, channel, or stream, the applicant is required to provide a stormwater easement or drainage right-of-way conforming substantially with the lines of a watercourse per Section 17.100.130. Based on the Statewide Wetland Inventory (SWI), the site has both an intermittent stream and a riverine wetland. The applicant is proposing to place the stream/wetlands in three separate publicly dedicated tracts, with an additional wetland placed in a fourth tract in the northwest portion of the site. Staff finds the proposal meets Section 17.100.130.
- I. Per Section 17.100.170, flag lots are only allowed “where it can be shown that no other street access is possible to achieve the requested land division.” The applicant is proposing one flag lot (Lot 77). This is due to the location of the existing stream/wetland that traverses the site. The applicant is proposing one road that crosses the stream/wetland and terminates at a cul-de-sac. The stream/wetland area is currently a separate tract that also contains a majority of the tree retention for the entire Sandy Woods development (Phase I and II). With this application, the applicant is modifying the existing stream/wetland tract to accommodate the road crossing as well as a pedestrian connection. Proposing only one road crossing better preserves the stream/wetland and associated tree retention and, thus, justifies the need for the flag lot. Staff finds the proposal meets Section 17.100.170.
- J. Section 17.100.220(C) states: “The lot or parcel width at the front building line shall meet the requirements of the Development Code and shall abut a public street other than an alley for a width of at least 20 feet. A street frontage of not less than 15 feet is acceptable in the case of a flag lot division resulting from the division of an unusually deep land parcel that is of a size to warrant division into not more than two parcels.” As explained in Chapter 17.34 of this document, all lots have a minimum of 20 feet of street frontage, with the exception of the flag lot (Lot 77), which is evaluated in more detail in I, above. The applicant is requesting a Type II Adjustment to Section 17.34.30(C) to reduce the required minimum lot frontage for Lot 77 by 20 percent. With approval of the adjustment as recommended by staff, the proposal can meet Section 17.100.220(C).
14. Section 17.100.60(E)(3) requires the proposed street pattern to be connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy. Sandy’s Transportation System Plan (TSP) was adopted by Ordinance 2011-12 as an addendum to the

Comprehensive Plan in 2011. At that time, the subject property was not in City limits and was not included in the TSP; thus, consistency with the official street plan cannot be determined for the subject property. As previously stated, a gridded street pattern is impractical due to the presence of existing wetlands/streams on the property as well as the existing BPA easement over the adjacent properties to the south and east. The applicant is proposing one stubbed street to the west, which will provide future access for the property to the west. The applicant is also proposing multiple pedestrian paths, including a path connecting the cul-de-sac to Street B, a path that terminates at the east boundary of the subject property and will connect to a future trail under the BPA easement, and a public access easement along the fire access lane to the south, which will also connect to future trails under the BPA easement. Staff finds the proposal meets approval criteria 17.100.60 (E)(3).

15. Section 17.100.60(E)(4) requires that traffic volumes shall not exceed average daily traffic (ADT) standards for local streets as detailed in Chapter 17.10, Definitions. The applicant's Transportation Impact Study (Exhibit E) evaluated ADT and determined the proposed development would result in 406 daily site trips. The proposed access is from Kelso Road, which is a residential minor arterial and not a local street. The TIS assumed that 55 percent of the site trips will travel to and from the west on Kelso Road and 45 percent will travel to and from the east towards Bluff Road. Staff finds the proposal meets approval criteria 17.100.60 (E)(4).
16. Section 17.100.60(E)(5) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. City water, sanitary sewer, and stormwater are available or will be constructed by the applicant to serve the subdivision. Staff finds the proposal meets approval criteria 17.100.60 (E)(5).
17. Section 17.100.60(E)(6) requires all proposed improvements to meet City standards. A detailed review of proposed improvements is contained throughout this staff report. Staff finds that the proposal provides improvements that meet City standards, or that can meet City standards with conditions of approval. Therefore, staff finds the proposal meets approval criteria 17.100.60 (E)(6).
18. Section 17.100.60(E)(7) strives to ensure that a phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops. The applicant is not requesting a phased development. Staff finds the proposal meets approval criteria 17.100.60 (E)(7).

## **ADJUSTMENTS AND VARIANCES – Chapter 17.66**

19. The applicant requested the following three Type III Variances:
- A. Variance to Section 17.100.110(F) to exceed the 400-foot maximum length for a cul-de-sac.
  - B. Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street A.
  - C. Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street B.
20. Staff evaluated the applicant's variance requests and agrees that a variance is required to exceed the 400 foot maximum length for a cul-de-sac and to exceed the 400-foot maximum block length for the east side of Street A. Based on the presence of existing wetlands and streams on the property, staff finds that both block faces of Street B can exceed 400 feet without the need for a variance based on the Director's previous interpretation of Section 17.100.120(B), which allows for an exception to the block length maximum due to topographic, natural resource, or other similar physical conditions that justify longer blocks. However, staff finds that a variance to Section 17.100.120(D) to not provide a bicycle/pedestrian accessway on the north side of Street B is still required.
21. During a more thorough review of the applicant's proposal, staff also identified two additional adjustment requests. Staff reached out the applicant and the applicant requested that staff process the following adjustments:
- A. Type I Adjustment to Section 17.100.120(B) to exceed the 400-foot maximum block length for the west side of Street A between Kelso Road and Street B by less than 10 percent.
  - B. Type II Adjustment to Section 17.34.30(C) to reduce the required 20-foot minimum lot frontage for Lot 77 by 20 percent.

### **Variance A: Cul-de-sac Length**

22. The applicant requested a Type III Variance to Section 17.100.110(F) to exceed the 400-foot maximum length for a cul-de-sac.
23. Criteria A. of Section 17.66.70 states "The circumstances necessitating the variance are not of the applicant's making." The applicant is proposing a cul-de-sac due to the location of the existing stream/wetland that traverses the site. The stream/wetland are existing natural features and are not of the applicant's making. Rather than propose a gridded street pattern, the applicant is proposing one road that crosses the stream/wetland and terminates at a cul-de-sac. Proposing only one road crossing better preserves the stream/wetland and associated tree retention and, thus, justifies the need for the cul-de-sac. The applicant is also proposing two bicycle/pedestrian paths from the cul-de-sac, which provide both internal connections within the proposed subdivision as well as external connections to the Sandy Woods I Subdivision and Sandy Bluff Park to the south. Staff finds criterion A is met.
24. Criteria B. of Section 17.66.70 states "The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the



property is located.” The applicant has not violated the Code and the uses allowed on the lots will be the same with or without approval of this variance. Staff finds criterion B is met.

25. Criteria C. of Section 17.66.70 states “Granting of the variance will not adversely affect implementation of the Comprehensive Plan.” The variance will not have an impact on any of the policies or goals of the Comprehensive Plan. Staff finds criterion C is met.
26. Criteria D. of Section 17.66.70 states “The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.” Approval of the variance will not be materially detrimental or injurious to other property owners in the vicinity. The narrative (Exhibit B) states: “The project has been designed to only have minimal permitted disturbance to the natural features on site. The extended road length to the cul-de-sac and the creation of the tracts help support the longevity of these natural features by minimizing potential disturbance. The road and cul-de-sac extend farther south creating longer road length to allow the perennial stream setback to sit entirely within a tract and outside of future/potential lots. This will ensure the stream’s protection in the present and future.” Staff finds criterion D is met.
27. Criteria E. of Section 17.66.70 states “The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.” The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land. As explained in this staff report, the proposal meets applicable code sections, or will be able to meet the code with conditions of approval. A variance to the cul-de-sac length allows the applicant to develop the southern portion of the property while minimizing disturbance to the natural areas. Staff finds criterion E is met.
28. Criteria F. of Section 17.66.70 states “Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.” The applicant’s narrative (Exhibit B) states: “This property has several natural features in multiple areas on this site that create special circumstances for the subject site and proposed project. There are three wetlands located within the subject site and a perennial stream that runs the full width of the property, the city has requested only one road crossing over the perennial stream, and the BPA easements over the tract to the south and adjacent property to the east prohibit development on these sites and therefore, no road extensions or connections to these sites are feasible. The pre-existing neighboring conditions, natural and pre-existing features have prompted the applicant to come up with creative solutions and longer road lengths to create a feasible site design to reduce impact to these existing natural features. The applicant had no control of the neighboring site restrictions and existing natural site features.” Staff finds criterion F is met.
29. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to allow the cul-de-sac to exceed the 400-foot maximum length. To better protect the stream and wetland natural areas that traverse the site, staff**

**recommends the lots on the cul-de-sac that abut the natural area tracts (Tracts K, M, and O) be required to install fences along the property line that abuts the natural area tract to prevent encroachment into the natural areas. This would apply to Lots 44, 66, 67, 68, 69, 77, 78, 79, 80, and 86. The fences shall be installed prior to final plat.**

Variance B: Street A Length East Side

30. The applicant requested a Type III Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street A.

31. Criteria A. of Section 17.66.70 states “The circumstances necessitating the variance are not of the applicant’s making.” The applicant is proposing to exceed the block length standard on the east side of Street A. The applicant’s narrative (Exhibit B) states that the need for the additional block length for Street A is in part due to the existing BPA easement extending along the eastern boundary of subject property and is not of the applicant’s making. Staff acknowledges that the BPA easement has existed long before the proposed development and borders the eastern boundary of the proposed development; however, a street could still be stubbed to the east property line and extended further east under the BPA easement in the future. There are multiple examples of roads going under the BPA easement. Thus, while development of the adjacent property to the east is unlikely, it would still be possible to provide connectivity through the adjacent property in the future. Therefore, staff finds the requested variance to exceed 400 feet for Street A does not meet the Type III Variance review criteria and is better processed as a Special Variance.

32. To be granted a Type III Special Variance, the applicant must meet one of the following criteria in Section 17.66.80:

- A. The unique nature of the proposed development is such that:
  - 1. The intent and purpose of the regulations and of the provisions to be waived will not be violated; and
  - 2. Authorization of the special variance will not be materially detrimental to the public welfare and will not be injurious to other property in the area when compared with the effects of development otherwise permitted.
- B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or regulation.
- C. When restoration or replacement of a nonconforming development is necessary due to damage by fire, flood, or other casual or natural disaster, the restoration or replacement will decrease the degree of the previous noncompliance to the greatest extent possible.

33. Staff believes the requested variance to Section 17.100.120(B) to exceed the 400-foot block length for the east side of Street A meets Criterion A. While the applicant could provide a stubbed street to the east property line to reduce the block length of Street A, the property to the east is almost entirely encumbered by a BPA easement and is unlikely to develop. Kelso Road is a residential minor arterial and will be designed to accommodate traffic from the proposed subdivision without the need for an additional local street connecting to the east.

Staff does not believe approval of the variance will be materially detrimental or injurious to other property owners in the vicinity. Because the adjacent parcel to the east would not be able to develop due to the BPA easement, it will not be detrimental to the property owner to the east to not have a stubbed street at the east property line of the subject property. However, as detailed on the Future Street Plan (Exhibit C, Sheet 11) there will be a future trail under the BPA easement and the applicant is still required to meet Section 17.100.120(D), which requires a mid-block bicycle and pedestrian accessway on any block over 600 feet in length. The bicycle/pedestrian accessway is required to have a minimum improved surface of 10 feet within a 15-foot right-of-way or tract. The applicant is proposing a 5-foot-wide wood chip path in Tract K that stubs to the east property line; however, it doesn't meet the Section 17.100.120(D) path requirement as proposed and it would not be a good location for a 10-foot paved path due to its proximity to retention trees. Staff believes the applicant could reduce the width of Lots 44-53 by one or two feet each to provide a 15-foot-wide tract for the bicycle and pedestrian accessway while still meeting the minimum average lot width of 60 feet as required by Section 17.34.30(B). Staff recommends the applicant consider locating the bike/ped tract in line with Street B. Alternatively, staff recommends the applicant locate the tract between Lots 44 and 45, which already has a 15-foot-wide public sanitary sewer easement. The bicycle/pedestrian path could be located on top of the sanitary sewer easement with both in a separate tract. **The applicant shall update the plan set to detail a 15-foot-wide bicycle and pedestrian tract with a 10-foot-wide improved surface located mid-block on the east side of Street A and stubbed to the east property boundary.**

34. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to allow the east side of Street A to exceed the 400-foot maximum block length. The applicant shall update the plan set to detail a 15-foot-wide bicycle and pedestrian tract with a 10-foot-wide improved surface located mid-block on the east side of Street A and stubbed to the east property boundary.**

Variance C: Street B Length

35. The applicant requested a Type III Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for Street B.
36. As discussed above, staff finds that due to the locations of existing wetlands and streams on the subject property both block faces of Street B can exceed 400 feet without the need for a variance based on the Director's previous interpretation of Section 17.100.120(B), which allows for an exception to the block length maximum due to topographic, natural resource, or other similar physical conditions that justify longer blocks. With this proposal, the applicant is preserving a large wetland to the north of Street B and a stream/wetland to the south of Street B; thus, the proposal to exceed 400 feet is justified. However, staff finds that a variance to Section 17.100.120(D) to not provide a bicycle/pedestrian accessway on the north side of Street B is still required. The applicant could technically provide a midblock bike/ped accessway connecting the north side of Street B to Tract J, therefore, staff finds the variance is of the applicant's making and does not meet the Type III Variance review criteria. The variance to not provide a midblock bike/ped accessway is better processed as a Special Variance.

37. To be granted a Type III Special Variance, the applicant must meet one of the following criteria in Section 17.66.80:
- A. The unique nature of the proposed development is such that:
    - 1. The intent and purpose of the regulations and of the provisions to be waived will not be violated; and
    - 2. Authorization of the special variance will not be materially detrimental to the public welfare and will not be injurious to other property in the area when compared with the effects of development otherwise permitted.
  - B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or regulation.
  - C. When restoration or replacement of a nonconforming development is necessary due to damage by fire, flood, or other casual or natural disaster, the restoration or replacement will decrease the degree of the previous noncompliance to the greatest extent possible.
38. Staff believes the requested variance to Section 17.100.120(D) to not provide a bicycle and pedestrian accessway on the north side of Street B, which exceeds 600 feet in length, meets Criterion A. The intent of the bicycle and pedestrian accessway is to provide connectivity between streets and other public or semipublic lands or through greenway systems. While the applicant could propose a path that connects the middle of block on Street B to Kelso Road, this would negatively affect the preserved wetland. Staff does not believe the approval of the variance will be materially detrimental or injurious to other property owners in the vicinity and it will help protect the existing wetland. To better protect the existing wetland and prevent encroachment into the wetland tract, staff recommends requiring fences along the property lines of the lots that abut the wetland tract (Tract J).
39. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to allow Street B to not provide a bicycle/pedestrian accessway on the north block face of Street B. To better protect the wetland in the northwest corner of the subject property, staff recommends the lots that abut the wetland tract (Tract J) be required to install fences along the property line that abuts the tract to prevent encroachment into the wetland. This would apply to Lots 54, 55, and 59-65. The fences shall be installed prior to final plat.**

Adjustment A: Street A Length West Side

40. During a more thorough review of the application, staff identified that the west side of Street A between Kelso Road and Street B is approximately 414 feet in length, which would require a Type I Adjustment. Staff reached out to the applicant to see if the applicant wanted to apply for the Type I Adjustment as part of this application. The applicant requested that staff process the Type I Adjustment and submitted the Type I Adjustment fee on October 28, 2021.
41. Section 17.66.20 specifies that the Type I Adjustment procedure allows the Director to grant or deny an adjustment request that involves only the expansion or reduction of a quantifiable provision of the Sandy Development Code by not more than 10 percent.

42. Section 16.66.40 contains the review criteria for both Type I and Type II Adjustments. In order to be approved, an adjustment request must meet all four (4) criteria.
43. Adjustment Criteria A states: “The proposed development will not be contrary to the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City.” A 414-foot block will not be significantly different than a 400-foot block. The applicant could propose a 400-foot block on the west side of Street A between Kelso Road and Street B; however, that would just increase the length of the west side of the cul-de-sac. Exceeding the block length standard by approximately 14 feet is not contrary to the Comprehensive Plan or any other City policies or standards. Criteria A can be met for a Type I Adjustment.
44. Adjustment Criteria B states: “The proposed development will not substantially reduce the amount of privacy enjoyed by users of nearby structures when compared to the same development located as specified by this Code.” Exceeding the block length standard by approximately 14 feet will not affect the amount of privacy enjoyed by users of nearby structures. Criteria B is met.
45. Adjustment Criteria C states: “The proposed development will not adversely affect existing physical systems and natural systems, such as traffic, drainage, dramatic land forms, or parks.” Exceeding the block length standard by approximately 14 feet will not adversely affect physical and natural systems. Regardless of whether the block is 400 feet or 414 feet, the wetland in Tract J will be preserved. **To better protect the wetland in the northwest corner of the subject property, staff recommends the lots that abut the wetland tract (Tract J) be required to install fences along the property line that abuts the tract to prevent encroachment into the wetland. This would apply to Lots 54, 55, and 59-65.** Criteria C is met.
46. Adjustment Criteria D states: “Architectural features of the proposed development will be compatible to the design character of existing structures on adjoining properties and on the proposed development site.” The requested block length adjustment will not affect architectural features for existing structures on adjoining properties or future structures in Sandy Woods II. Criteria D is met.
47. For the reasons discussed above, **staff recommends the Planning Commission approve a Type I Adjustment to allow the west side of Street A to be approximately 414 feet. To better protect the wetland in the northwest corner of the subject property, staff recommends the lots that abut the wetland tract (Tract J) be required to install fences along the property line that abuts the tract to prevent encroachment into the wetland. This would apply to Lots 54, 55, and 59-65. The fences shall be installed prior to final plat.**

Adjustment B: Lot 77 Lot Frontage

48. During a more thorough review of the application, staff identified that the proposed flag lot (Lot 77) is detailed as having 15 feet of lot frontage, which does not meet the 20-foot minimum lot frontage required by Section 17.34.30(C). Staff reached out to the applicant to

see if the applicant wanted to apply for the Type II Adjustment as part of this application, which would allow the 20-foot minimum lot frontage to be reduced to 16 feet. The applicant requested that staff process the Type II Adjustment on November 8, 2021.

49. Section 17.66.30 specifies that the Type II Adjustment procedure allows the Director to grant or deny an adjustment request that involves only the expansion or reduction of a quantifiable provision of the Sandy Development Code by not more than 20 percent.
50. Section 16.66.40 contains the review criteria for both Type I and Type II Adjustments. In order to be approved, an adjustment request must meet all four (4) criteria.
51. Adjustment Criteria A states: “The proposed development will not be contrary to the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City.” Sixteen feet of lot frontage will not be significantly different than 20 feet of lot frontage. The applicant could propose a 20-foot flag for Lot 77; however, that would likely just increase the width of the driveway and decrease the length of the planter strips on either side of the flag lot. Reducing the width of the pole portion of the flag lot standard by 4 feet is not contrary to the Comprehensive Plan or any other City policies or standards provided the accessway maintains a minimum paved width of 10 feet in accordance with Section 17.100.170(C). **The applicant shall detail a minimum paved width of 10 feet on the accessway (pole) portion of the flag lot.** Criteria A can be met for a Type II Adjustment.
52. Adjustment Criteria B states: “The proposed development will not substantially reduce the amount of privacy enjoyed by users of nearby structures when compared to the same development located as specified by this Code.” Reducing the width of the accessway (pole) portion of the flag lot by 4 feet will not affect the amount of privacy enjoyed by users of nearby structures. Criteria B is met.
53. Adjustment Criteria C states: “The proposed development will not adversely affect existing physical systems and natural systems, such as traffic, drainage, dramatic land forms, or parks.” Reducing the width of the accessway (pole) portion of the flag lot by 4 feet will not adversely affect physical and natural systems. Regardless of whether the accessway is 20 feet wide or 16 feet wide, the stream and retention trees in Tract O will be preserved. **To better protect the stream and retention trees, staff recommends that the applicant be required to install a fence along the Lot 77 property line that abuts Tract O to prevent encroachment into the natural area.** Criteria C is met.
54. Adjustment Criteria D states: “Architectural features of the proposed development will be compatible to the design character of existing structures on adjoining properties and on the proposed development site.” The requested adjustment to lot frontage will not affect architectural features for existing structures on adjoining properties or future structures in Sandy Woods II. Criteria D is met.
55. For the reasons discussed above, **staff recommends the Planning Commission approve a Type II Adjustment to Section 17.34.30(C) to allow the 20-foot minimum lot frontage to be reduced to 16 feet for Lot 77. The applicant shall update the plan set to detail the lot**

**frontage of Lot 77 at 16 feet. The applicant shall detail a minimum paved width of 10 feet on the accessway (pole) portion of the flag lot. The applicant shall be required to install a fence along the Lot 77 property line that abuts Tract O to prevent encroachment into the natural area. The fences shall be installed prior to final plat.**

56. **Approval of an adjustment or variance shall be effective for a 2-year period from the date of approval, unless substantial construction has taken place.** The Director (Type I and Type II) or Planning Commission (Type III) may grant a 1-year extension if the applicant requests such an extension prior to expiration of the initial time limit.

**DENSITY CALCULATIONS – Chapter 17.30**

57. The total gross acreage for the entire property is 17.68 acres. After removal of the proposed rights-of-way (2.26 acres) and proposed publicly dedicated tracts (6.93 acres), the net site area (NSA) for the subject property is reduced to 8.49 net acres. Although the property has a stream and multiple wetlands on-site, these were not delineated and mapped as part of the annexation process and, therefore, do not show up on the City's Flood and Slope Hazard Overlay District map. The applicant is still proposing to protect the streams and wetlands, but is opting to use the County setback standards for streams and wetlands rather than the City's FSH overlay and associated restricted development area. Thus, no restricted development areas have been identified or removed for the purpose of the net acre calculation.
58. The subject property is zoned Single Family Residential (SFR); therefore, a minimum of 3 units and a maximum of 5.8 units per acre are allowed. The minimum density for the subject property is 25 units (8.49 net acres x 3 units/net acre = 25.47 rounded down to 25). The maximum density for the subject property is 49 units (8.49 net acres x 5.8 units/net acre = 49.24 rounded down to 49). The applicant identifies 43 lots, within the density range.



### **ZONING DISTRICTS – Chapter 17.34**

59. As stated in the narrative (Exhibit B), the applicant proposes constructing 43 single-family detached homes as permitted in this zoning district. Section 17.34.30 contains the design standards for this zone. As shown on Sheet 1 of the plan set (Exhibit C), all lots in the proposed subdivision contain at least 7,500 square feet. As detailed on pages 4-5 of the narrative (Exhibit B), all of the lots contain an average lot width of 60 feet or more as required.
60. Section 17.34.30(C) requires all lots to have a minimum lot frontage of 20 feet. The applicant is proposing one (1) flag lot (Lot 33), with a 15-foot-wide flag. The proposed flag lot is due to proposing a single street that crosses the existing stream and wetland that traverse the site in order to minimize negative impacts on the stream and wetland. Staff reached out to the applicant regarding the 20-foot minimum required lot frontage and presented the option of a Type II Adjustment, which would allow a 16-foot-wide flag, if approved. The applicant requested the Type II Adjustment, which is discussed in further detail in Chapter 17.66 of this staff report. With approval of the adjustment as recommended by staff, the proposal can meet the minimum lot frontage requirements of Section 17.34.30(C).
61. Section 17.34.40(A) requires that water service be connected to all dwellings in the proposed subdivision. Per the submitted narrative (Exhibit B), the applicant proposes to extend water service to serve all dwellings in the development.
62. Section 17.34.40(B) requires that all proposed dwelling units be connected to sanitary service. Per the submitted narrative (Exhibit B), the applicant proposes to extend sanitary sewer service to serve all dwellings in the development.
63. Section 17.34.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. The narrative (Exhibit B) states: “The street design in this subdivision provides for a future street connection if the neighboring site to the west is to be developed. Due to the location of the BPA easement to the south and east, there is no proposed connection to the abutting southern property. The site is proposing a new ROW connection to Kelso Rd.”
64. Section 17.34.40(D) requires that all dwelling units must have frontage or approved access to public streets. All proposed lots have frontage on and access to a public street.

**ADDITIONAL SETBACKS AND SPECIAL SETBACKS – Chapters 17.80 and 17.82**

65. Chapter 17.80 requires all residential structures to be setback at least 20 feet to collector and arterial streets. Kelso Road is classified as a residential minor arterial. **All structures on lots abutting Kelso Road shall be setback at least 20 feet.** Lot 53 is the only lot with frontage on Kelso Road. As indicated in the narrative (Exhibit B), the applicant is proposing to meet the 20-foot setback on Lot 53.
66. Section 17.82.20(A) requires that all residential dwellings shall have their primary entrances oriented toward a transit street rather than a parking area, or if not adjacent to a transit street, toward a public right-of-way or private walkway which leads to a transit street. Kelso Road is a transit street. **All residential structures on lots abutting Kelso Road shall have their primary entrances oriented to Kelso Road.** As indicated in the narrative (Exhibit B), the primary entrance for Lot 53 will be oriented towards Kelso Road.
67. Section 17.82.20(B) requires that dwellings shall have a primary entrance connecting directly between the transit street and building interior and outlines requirements for the pedestrian route. Section 17.82.20(C) requires that primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth. **The adherence to Chapter 17.82 for residential design standards shall be required for Lot 53.**

## **TRANSPORTATION – Chapters 17.84 and 17.100**

68. This finding analyzes the Traffic Impact Study.

- A. The applicant submitted a Transportation Impact Study (TIS; Exhibit E) from Kelly Engineering, dated March 2021. The study concluded that the surrounding roadway system can adequately accommodate traffic from the Sandy Woods phase 2 development and that no off-site transportation improvements or traffic control devices were identified to accommodate the development. The TIS states: “Adequate sight distance should be maintained at the site access onto SE Kelso Road. Obstructions by landscaping, signs or other objects should not be allowed.” According to the TIS, the proposed residential development would generate up to 32 site trips during the morning peak hour, 43 site trips during the evening peak hour, and 406 daily site trips. However, the TIS was based on development of 43-single family homes, as stated on page 2 of the TIS. Due to the requirements of House Bill 2001, a duplex is now allowed as an outright permitted use on any lot that allows a single-family residence. The City is not able to preclude any of the 43 lots from developing with a duplex rather than a single-family home. Thus, the TIS should have been based on 43 duplexes. The subdivision is proposed to take access solely from Kelso Road, with an emergency fire access that connects the proposed subdivision to the Sandy Woods Phase I subdivision. Thus, the only local streets that would be impacted are those proposed on the subject property. Based on the potential that 86 dwelling units could be developed, the traffic on the local streets within the proposed subdivision would not exceed 1,000 average daily trips (ADT). Thus, staff finds the application meets the standards of Sections 17.100.60(E.4) and 17.84.50(B.4).
- B. The City Transportation Engineer (Exhibit N) reviewed the TIS and finds that it meets City requirements. The City Transportation Engineer further concludes that the study area intersections will meet applicable city operational standards, no safety mitigation is proposed, and sight distance is adequate.

69. Section 17.84.50(E) requires that public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property. The proposed street layout results in one temporary dead-end street (Street B) that will be stubbed to the west property line of the subject property. The proposal also includes one cul-de-sac. The proposed subdivision does not propose to stub a street to the east or south property lines because the adjacent properties to the east and south are encumbered by a BPA easement.

70. The proposed development includes the need to name Street A and Street B. The street names shall be related to the mountain/native tree or shrub theme. Staff recommends Thielsen Avenue for Street A and Oceanspray Street for Street B but is open to other name proposals related to the mountain/native tree or shrub theme.

71. Sections 17.84.50(F and G) require public streets to be improved to City standards along the entire frontage of the property. Per the Public Works Director (Exhibit Q), the sole access to and from the site is via the intersection of Kelso Road and proposed Street A. Kelso Road is a Clackamas County facility, therefore, the County’s design standards apply to improvements adjacent to and within Kelso Road. The applicant submitted a design modification request to Clackamas County (Exhibit L) to reduce sidewalk and planter strip width to minimize

impacts to existing delineated wetlands on the Kelso Road frontage of the site west of proposed Street A. The County approved the design modification to allow a five-foot-wide curb tight sidewalk adjacent to the wetland. The County also approved a design modification allowing the Kelso Road frontage sidewalk to terminate short of the east of the site boundary adjacent to proposed Lot 53. The County's narrative response to the design modification request indicates that the applicant requested that the sidewalk improvements on Kelso Road terminate five feet from the east property line of the site due to grading required to construct the sidewalk. The County approved this modification even though there is no mention of the sidewalk terminating short of the site boundary in the design modification request or the land use application narrative submitted by the applicant. The site plan submitted with the application shows the Kelso Road sidewalk improvements terminating approximately 30 feet from the east boundary of the site and about 10 feet from the west boundary of the site. Based on the contours shown on the existing conditions plan it does not appear that any slope easement or grading on adjacent property would be necessary to allow the Kelso Road street frontage improvements to extend to the east boundary of the site per the requirements in Section 17.84.60 of the Sandy Municipal Code. It does however appear that retaining walls or grading outside the right-of-way would be required to extend the Kelso Road sidewalk to the west boundary of the site. **The applicant shall clarify if a request to terminate the Kelso Road sidewalk improvements was included with the design modification request submitted to the County and, if so, clarify whether it was for the east or west end of the development site. The frontage improvements for Tracts J, K, L, M, N, and O shall be completed prior to final plat approval.**

72. While Section 17.100.100(C) calls for a rectangular grid pattern the proposed street layout is not a rectangular grid pattern as it incorporates a cul-de-sac and a diagonal street. However, this is due to the location of existing wetlands and streams on the subject property as well as the BPA easement on the adjacent properties to the east and south. Staff finds that the proposed street layout is logical as it relates to minimizing negative impacts to existing wetlands and streams.
73. The applicant requested multiple block length variances to Section 17.100.120. The variance requests are discussed in Chapter 17.66 of this staff report.

**PEDESTRIAN AND BICYCLE IMPROVEMENTS – Chapters 17.84 and 17.100**

74. Section 17.84.20(A)(1) requires that all improvements shall be installed concurrently with development or be financially guaranteed. **All lots in the proposed subdivision will be required to install public and franchise utility improvements or financially guarantee these improvements prior to final plat approval.**
75. Section 17.84.30(A)(1) requires that all proposed sidewalks on the local streets will be five feet wide as required by the development code and separated from curbs by a tree planter strip that is a minimum of five feet in width.
76. As required by Section 17.84.30(A)(2), **six-foot sidewalks shall be constructed along Kelso Road. These frontages shall include 5-foot-wide planter strips as required.**
77. In relation to Section 17.84.30, the proposal includes multiple bicycle/pedestrian improvements. As required by Section 17.84.30(B), safe and convenient pedestrian and bicyclist facilities that strive to minimize travel distance to the extent practicable shall be provided in conjunction with new development within and between new subdivisions. The proposal includes a public access easement connecting the proposed subdivision to the existing Sandy Woods I Subdivision and, ultimately, to Sandy Bluff Park to the south. The proposal also includes a path stubbed to the east that will connect to future trails under the BPA easement. Subsection 17.84.30(B)(2) goes on to elaborate that right-of-way connecting cul-de-sacs passing through unusually long or oddly shaped blocks shall be a minimum of 15 feet wide with eight (8) feet of pavement. The applicant proposes a cul-de-sac with two pedestrian connections, both of which are a minimum of 15 feet wide with 8 feet of pavement. The pedestrian connection extending north from the cul-de-sac to Street B (Tract N) also serves as the mid-block bicycle and pedestrian accessway required by Section 17.100.120(D), which requires a minimum 10-foot-wide improved surface within a 15-foot-wide right-of-way or tract as proposed. The proposed path is located between retention Trees #1504, 1506, and 1507 on the west and Trees #1542 and 1543 on the east and will encroach into the tree protection area of multiple trees. The third-party arborist (Exhibit S) recommended that the applicant be required to evaluate if there is space for sewer line and path construction between Trees #1504 and 1542 as noted in Attachment 1 of the third-party arborist report while still adequately protecting the trees per Figure 1 of the third-party arborist report (i.e., limiting construction disturbances to no closer than a radius from a tree of 0.5 feet per inch of trunk diameter (DBH) if no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted). If there is not sufficient space to construct the sewer line and path while still protecting the trees in accordance with Figure 1 of the third-party arborist report, the third-party arborist suggests strategies such as boring and/or reduction of pathway width and associated grading be implemented to protect the trees in accordance with Figure 1 of the third-party arborist report. The pathway in Tract N is proposed at 10 feet in width, which is the minimum requirement for a bicycle and pedestrian accessway, therefore, the arborist's suggestion for a reduced path width would require an adjustment or variance. **The applicant shall evaluate if there is space for sewer line and path construction between Trees 1504 and 1542 as noted in Attachment 1 of the third-party arborist report. If there is not sufficient space**

**to construct the sewer line and path while still protecting the trees in accordance with Figure 1 of the third-party arborist report, the applicant shall implement strategies such as boring and/or reduction of associated grading to protect the trees in accordance with Figure 1 of the third-party arborist report.** With this condition included in this finding, this proposal meets the requirements of Section 17.84.30.

78. Section 17.100.120(D) requires a mid-block bicycle and pedestrian accessway on any block over 600 feet in length. The bicycle/pedestrian accessway is required to have a minimum improved surface of 10 feet within a 15-foot right-of-way or tract. As discussed in Chapter 17.66 of this staff report, the applicant is proposing a 5-foot-wide wood chip path in Tract K that stubs to the east property line; however, it doesn't meet the Section 17.100.120(D) path requirement as proposed and it would not be a good location for a 10-foot paved path due to its proximity to retention trees. Staff believes the applicant could reduce the width of Lots 44-53 by one or two feet each to provide a 15-foot-wide tract for the bicycle and pedestrian accessway while still meeting the minimum average lot width of 60 feet as required by Section 17.34.30(B). Staff recommends the applicant consider locating the bicycle/pedestrian tract in line with Street B. Alternatively, staff recommends the applicant locate the tract between Lots 44 and 45, which already has a 15-foot-wide public sanitary sewer easement. The bicycle/pedestrian path could be located on top of the sanitary sewer easement with both the path and sewer in the same tract. **The applicant shall update the plan set to detail a 15-foot-wide bicycle and pedestrian tract located mid-block on the east side of Street A and stubbed to the east property boundary.**

## **PARKING, LOADING, AND ACCESS REQUIREMENTS – Chapter 17.98**

79. Section 17.98.10(M) requires that the developer provide a Residential Parking Analysis Plan. This plan identifying the location of parking for the 43 lots is included in Exhibit C, Sheet 10.
80. Section 17.98.20(A) requires that each single-family dwelling unit or duplex is required to provide at least two off-street parking spaces. **Compliance with this requirement will be evaluated during building plan review.**
81. Section 17.98.80(A) requires access from a lower functional order street. **Vehicle Non-Access Reserve (VNAR) strips shall be depicted on the plat for the Kelso Road frontage of Lot 53 and Tract J, with the exception of the Public Works Access, to comply with Section 17.98.80(A). A VNAR strip shall also be depicted on the plat for the west end of Street B.**
82. Section 17.98.100 has specifications for driveways. The minimum driveway width for a single-family dwelling is 10 feet and the maximum width is 24 feet wide for a residential driveway approach. **Driveways shall taper to match the driveway approach width to prevent stormwater sheet flow from traversing sidewalks. Additionally, all driveways shall meet vertical clearance, slope, and vision clearance requirements. Any driveway that exceeds a slope of 8.3 percent shall install a safe pedestrian walkway, including stairs as needed, from the house to the sidewalk.**
83. Section 17.98.100(G) contains requirements for driveways on cul-de-sacs and states that the sum of the width of all driveway approaches within the bulb of the cul-de-sac shall not exceed 50 percent of the circumference of the cul-de-sac. **The cul-de-sac shall meet the requirements of Section 17.98.100(G).** Exhibit C, Sheet 9 includes an analysis of the driveway widths on the cul-de-sac and states the sum of the width of all the driveway approaches is 31 percent in compliance with the code requirement.
84. Section 17.98.130 requires that all parking and vehicular maneuvering areas shall be paved with asphalt or concrete. As required by Section 17.98.130, **all parking, driveway, and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.**
85. Section 17.98.200 contains requirements for providing on-street parking spaces for new residential development. Per Section 17.98.200, one (1) on-street parking space at least 22 feet in length has been identified within 300 feet of each of the 43 lots as required. Exhibit C, Sheet 10 shows that 52 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

### **UTILITIES – Chapters 17.84 and 17.100**

86. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted an offsite sanitary sewer plan (Exhibit C, Sheet 6), an onsite sanitary sewer and water plan (Exhibit C, Sheet 7), and a storm drain plan (Exhibit C, Sheet 8), which show the location of proposed public water, sanitary sewer, and stormwater drainage facilities. **Broadband fiber service shall be detailed with construction plans.**
87. Franchise utilities will be provided to all lots within the proposed subdivision as required in Section 17.84.80. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval. The applicant does not anticipate extending franchise utilities beyond the site. All franchise utilities other than streetlights shall be installed underground. The developer shall make all necessary arrangements with franchise utility providers. **The developer shall install underground conduit for street lighting.**
88. Section 17.84.90 outlines requirements for land for public purposes. The application includes dedication of right-of-way, a stormwater detention pond tract, four open space/wetland/stream tracts, and one public walkway tract. Eight-foot-wide public utility easements will be required along all lots adjacent to street rights-of-way for future franchise utility installations. **All easements and dedications shall be identified on the final plat.**
89. As required by Section 17.100.130, eight-foot-wide public utility easements (PUE) are required along all property lines abutting a public right-of-way.
90. Chapter 15.30 contains the City of Sandy's Dark Sky Ordinance. A lighting plan shall be coordinated with PGE and the City as part of the construction plan process and prior to installation of any fixtures as required by Section 17.100.210. The applicant shall install street lights along all street frontages wherever street lighting is determined necessary. **The locations of these fixtures shall be reviewed in detail with construction plans. Full cut-off lighting shall be required. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.**
91. Section 17.84.100 outlines the requirements for mail delivery facilities. **The location and type of mail delivery facilities shall be coordinated with the City Engineer and the Post Office as part of the construction plan process.**
92. The Fire Marshal (Exhibit O) reviewed the proposal and provided general comments as well as comments related to fire apparatus access and firefighting water supplies. **Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs. The**



address shall be plainly legible and visible from the road fronting the property and the same shall be on the dwelling plainly legible and visible when approaching. These numbers shall contrast with their background. Fire flow testing shall be completed to determine available fire flow. Testing will be the responsibility of the applicant. The applicant shall contact the City of Sandy Public Works Department for testing information and requirements and notify the Fire Marshal prior to fire flow testing. Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port. The applicant shall adhere to all other requirements of the Sandy Fire District.

93. The applicant is proposing to pave the existing 12-foot wide Public Works gravel access roadway to serve as the second emergency fire access. The Fire Marshal approved the 12-foot-wide paved path provided that 20 feet of unobstructed width is maintained. Per the Public Works Director (Exhibit Q), modifications proposed to the existing pedestrian path and stormwater facility maintenance roadway in the adjacent Sandy Woods development include placing asphalt pavement over the existing crushed rock surface to provide a 12-foot-wide emergency vehicle access route for Sandy Woods II. The existing pedestrian path and stormwater facility maintenance roadway includes locked bollards at the intersection of the path with Broken Top Avenue to prevent unauthorized vehicle access. **The applicant shall submit a proposal to prevent unauthorized vehicle use of the new pedestrian path/stormwater maintenance and emergency vehicle access roadway while still allowing emergency vehicle access.** The proposed pedestrian path/stormwater maintenance and emergency vehicle access roadway will be more than 1,000 feet long between Broken Top Avenue and the cul-de-sac bulb of proposed Street A. There is pedestrian-scale lighting on the portion of the path between existing Lots 30 and 31 in Sandy Woods I but no illumination on the rest of the proposed route. **The applicant shall submit a design for City and Fire District review to mitigate risks to pedestrians and emergency vehicles due to the lack of illumination along the pedestrian path/stormwater maintenance and emergency vehicle access roadway. Possible mitigation steps include reflective pavement edge striping and/or delineators; curve and chevron signage to define changes in horizontal alignment or illumination. The pedestrian path/stormwater maintenance and emergency vehicle access roadway design shall comply with Clackamas County Interagency Fire Code Access Guide standards for width, grade, vertical clearance, load capacity, turning radii, and gates. The applicant shall submit turning template diagrams for the intersection of the existing pedestrian path/stormwater maintenance roadway and Broken Top Avenue, and the proposed pedestrian path/stormwater maintenance and emergency vehicle access roadway and Street A. The turning template diagrams shall demonstrate that the existing driveway approach at Broken Top Avenue is wide enough for emergency vehicle access and shall define any 'No Parking' zones that would need to be posted to allow emergency and service vehicle access.**
94. Per the Public Works Director (Exhibit Q), the development site is proposed to be served by a single 8-inch diameter dead end water line connected to the existing 12-inch water line in Kelso Road. **The applicant shall submit calculations demonstrating that the proposed water line will be able to furnish the required fire and domestic flows for Sandy Woods II.**

95. The applicant intends to install sanitary sewer lines in compliance with applicable standards in Section 17.100.240. The sanitary sewer plans will be reviewed by the City Engineer and Public Works Director. **Public utility and street plans for land use applications are submitted to comply with the requirements in 17.100.60 of the Sandy Municipal Code. Land use approval does not connote approval of utility or street construction plans which are subject to a separate submittal and review process.** The Public Works Director (Exhibit Q) notes the proposed sanitary sewer extension between Tract L and the existing sanitary sewer in Olson Street is over 1,600 feet long and includes four manholes. There is no existing or proposed all-weather access to the proposed sewer line. **The applicant shall construct a 12-foot-wide crushed rock access roadway over the existing and proposed sewer easement between Tract L and manhole F-8 and between Olson Street and manhole F-6 to provide maintenance access for the off-site sewer line. Plans for public and private sewer collection and conveyance facilities shall be submitted to the Oregon Department of Environmental Quality for review and approval per ORS Chapters 454, 468 and 486B and OAR 340-052 and in particular OAR 340-052-0040(2).**
96. Section 17.100.250(A) details requirements for stormwater detention and treatment. A public stormwater quality and detention facility is proposed as Tract L to be located in the southwest section of the proposed development. In addition, the northwest corner of Tract J contains a small stormwater pond. **All site runoff shall be detained such that post-development runoff does not exceed the predevelopment runoff rate for the 2, 5, 10 and 25 year storm events. Stormwater quality treatment shall be provided for all site drainage per the standards in the City of Portland Stormwater Management Manual (COP SWMM).** Per the Public Works Director (Exhibit Q), the stormwater management plan depicts fourteen separate flow-through planters in the proposed City right-of-way adjacent to Lots 44, 45, 47, 53, 54, 63, 64, 65, 71 through 74, 76, 78, 80, 82, 83 and Tracts K, M, and O. **The street frontage of Lots 44, 45, 47, 53, 54, 63, 64, 65, 71 through 74, 76, 78, 80, 82, 83 and Tracts K, M, and O shall include Vehicle Non-Access Reserve (VNAR) strips coincident with the flow-through planter locations to prevent the construction of driveway approaches over these areas upon development of the lots. The stormwater detention pond in Tract L shall be fenced per the requirements in the City of Portland SWMM.**
97. Section 17.100.260 states that all subdivisions shall be required to install underground utilities. **The applicant shall install utilities underground with individual service to each lot.**

### **PARKLAND DEDICATION – Chapter 17.86**

98. Section 17.86.10 contains a clear and objective formula for determining the amount of land required to be dedicated. The formula is acres = proposed units x (persons/unit) x 0.0043. For the 43 lots, assuming single family homes as indicated in the narrative (Exhibit B), acres = 43 x 3 x 0.0043 = 0.55 acres. The applicant is proposing to pay a fee-in-lieu of parkland dedication.

99. Per Section 17.86.40, at the City's discretion only, the City may accept payment of a fee in lieu of land dedication. A payment in lieu of land dedication is separate from Park System Development Charges and is not eligible for a credit of Park System Development Charges. The amount of the fee in lieu of land dedication (in dollars per acre) shall be set by City Council Resolution, and it shall be based on the typical market value of developed property (finished lots) in Sandy net of related development costs. The Parks and Trails Advisory Board (Board) met on August 11, 2021. In a memo dated October 27, 2021 (Exhibit P), the Board recommended a fee-in-lieu of parkland dedication given the proposed subdivision's proximity to Sandy Bluff Park. The Board specifically states: "The 2021 Parks and Trails Master Plan states as a goal that 'Residential areas should be served by the 1/4-mile service area of a mini park or the 1/2-mile service area of a neighborhood park.' In their discussion the board noted that Sandy Woods Phase II is close to the 1/2 mile goal in its proximity to Sandy Bluff Park, which meets the criteria for a neighborhood park. The board strongly endorses the requirement to provide pedestrian access connecting Phases I and II as it will result in a safe and direct route to Sandy Bluff Park for residents of the proposed development. As a result of their discussion the board recommends accepting a Fee in Lieu of land dedication for the Sandy Woods Phase II development. The board's formal recommendation, unanimously passed, reads as follows: Motion to accept a Fee in Lieu of land dedication for the Sandy Woods Phase II proposed development. Includes the support for the requirement of the access points connecting Phase I and Phase II which provides direct access to Bluff Park and future trail connections."

100. The parks dedication requirement, and therefore any fee in-lieu payment under Section 17.86.40, is based on the impact from the number of people anticipated to live in the units in the subdivision, and a duplex includes two dwelling units, each of which can be occupied by a family (or a number of unrelated persons). Accordingly, each unit of a duplex is treated the same as a separate single-family dwelling for purposes of calculating the amount of land dedicated under Section 17.86.10 or a fee in-lieu payment under Section 17.86.40. However, pursuant to state law (ORS 197.758), each lot is allowed to be developed with a duplex. Thus, to ensure compliance with the standard, **the applicant shall pay a fee-in-lieu of parkland dedication in the amount of \$132,550 (0.55 multiplied by \$241,000) to the City prior to final plat approval, or \$145,750 (0.55 multiplied by \$265,000) if half is deferred to building permit issuance. If the applicant chooses to defer payment, the applicant shall pay \$72,875 prior to recording of final plat and the additional \$72,875 divided between the 43 lots, or \$1,694.77 with each building permit. Additionally, if any lot includes a duplex or is converted to a duplex in the future, the applicant or future property owner shall pay an additional \$3,082.56 (0.55 multiplied by \$241,000 divided by 43) with the building permit for that lot or duplex addition. With this condition, the City finds the application complies with Section 17.86.10.**

101. Section 17.86.50 contains minimum standards for open space dedication. The applicant's narrative (Exhibit B) states they are proposing to dedicate all tracts within the subdivision (J, K, L, M, N and O) to the City of Sandy and will work with the City on the dedication process and requirements. Per the Public Works Director (Exhibit Q), **Tract L shall be dedicated to the City for stormwater management, emergency vehicle and pedestrian access. Tracts J, K, M and O shall be dedicated to the City as open space and pedestrian easements.**
102. Section 17.86.50(D.1) states: "Prior to acceptance of proposed open space, the City may require the developer to submit a Phase I Environmental Site Assessment completed by a qualified professional according to American Society of Testing and Materials (ASTM) standards (ASTM E 1527). The results of this study shall indicate a clean environmental record." **The applicant shall submit a Phase I Environmental Site Assessment completed by a qualified professional according to American Society of Testing and Materials (ASTM) standards (ASTM E 1527) for all open space dedications. The results of this study shall indicate a clean environmental record.**

## **URBAN FORESTRY – 17.102**

103. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. An Arborist Report prepared by Ryan Neumann (ISA Certified Arborist PN-5539A; TRAQ Qualified) of Portland Tree Consulting and dated June 3, 2021 is included as Exhibit F. The arborist inventoried all trees 11 inches and greater diameter at breast height (DBH) as required in Section 17.102.50. The inventory of trees proposed to be retained is included in Exhibit C, Sheet 5. The Plan Set (Exhibit C) also contains a sheet with building footprints, retention trees, and the project arborist's recommended root protection zones (Sheet 2), and a Tree Retention and Removal Plan (Sheet 4). A third-party arborist review dated October 16, 2021 was conducted by Todd Prager (ASCA Registered Consulting Arborist; ISA Board Certified Master Arborist, WE-6723B; ISA Qualified Tree Risk Assessor; AICP, American Planning Association) of Teragan & Associates and is included as Exhibit S.
104. The property contains approximately 17.68 acres. However, the applicant proposed retaining all required trees for both Sandy Woods Phase I and Sandy Woods Phase II on the northern (Phase II). Thus, the retention requirements are based on the original parcel, which was 38.95 acres per the submitted narrative (Exhibit B) and, therefore, requires retention of 117 healthy trees, 11 inches DBH or greater, and likely to grow to maturity ( $38.95 \times 3 = 116.85$ ). The arborist report evaluated 494 trees 6-inches DBH or greater, 251 of which are proposed for removal. The applicant proposes to retain 152 trees 11-inches DBH or greater, including 86 conifers and 66 deciduous trees. The applicant also proposes to retain an additional 91 trees between 6 inches DBH and 11 inches DBH.
105. All of the trees at 11-inch DBH or greater that are proposed for retention are non-nuisance species and were evaluated as being "viable" by the project arborist with the following exceptions:
- Tree #1339, a 17-inch DBH Douglas fir, was evaluated as "suppressed."
  - Tree #1531, a 17-inch DBH western hemlock, was evaluated as "grows out of old stump."
  - Tree #1569, a 49-inch DBH Douglas fir, was evaluated as "trunk swoop at 45 feet."
  - Trees #1854 and #1855, 24-inch and 16-inch DBH Douglas firs, did not have any evaluation of their condition.

Staff typically reviews arborist reports that rank tree health/condition as very good, good, fair, poor, or dead/dying/diseased. Thus, staff requested more information on the "viable" ranking as part of the incompleteness letter. The project arborist submitted an addendum (Exhibit G) that states the following: "For the purposes of the submitted Tree Preservation Plan and Tree Table the working definition of 'viable' is a healthy tree that is in fair to very good condition and is expected to be reasonably healthy and provide benefits to the community for ten to twenty years. Additional information for individual trees is provided in the 'remarks' column of the tree table." The third-party arborist report (Exhibit S) states: "Based on my general review of the trees during my site visit, I observed trees in less than good health condition that would not meet the City's typical preservation tree standards. In particular, there are red alders (*Alnus rubra*) and other species that have struggled with extreme weather events that may have occurred following the initial tree assessment for the project. Therefore, the City may require a reassessment of the tree conditions to ensure there

are at least 117 retention trees that are in good condition. If a reassessment of tree conditions is required, I recommend focusing the reassessment on the trees to be retained of [sic] the edges of the lots to be occupied by houses. In addition to a health assessment, I recommend including an assessment of the structural conditions of the trees to evaluate their stability considering adjacent tree removals and potential increased wind exposure.” The arborist report submitted by the applicant is dated June 3, 2021; however, it does indicate when the actual inventory was conducted. Staff compared the June 3, 2021 tree inventory to the December 7, 2017 inventory submitted with the Sandy Woods I application and they appear to be the same. Thus, staff concluded that the tree inventory has not been updated since 2017, which was well before the wind storms in the fall of 2020 and the ice storm in the winter of 2021, all of which caused significant damage to trees in Sandy. **In order to assess whether the trees proposed for retention are still healthy and in good condition, the applicant shall submit an updated arborist evaluation confirming that a minimum of 117 trees are healthy, in good or very good condition, not nuisance species, 11-inches DBH or greater, and did not suffer any damage during the multiple storms since the original assessment.** Per the third-party arborist’s recommendations, **the updated evaluation shall also include the following:**

- Assessment of the structural condition of the trees to evaluate their stability considering adjacent tree removals and potential increased wind exposure.
- Evaluation of whether there is adequate space for excavation of foundation and construction access on Lots 47, 48, 49, 52, 53, 66, 68, 71, 82, 83, 84, and 85. If there is not adequate space, reduce building envelopes to accommodate the tree protection zones. Alternatively, modify the tree protection to allow for adequate space while providing the minimum protection zones in accordance with Figure 1 in the third-party arborist report.
- Evaluation of the feasibility of construction of the paved path in Tract N between the tree protection fencing of Trees #1504 and #1542. If there is not space to construct the sewer line and path while still protecting the trees in accordance with Figure 1 of the third-party arborist report, propose strategies such as boring and/or reduction of pathway width and associated grading.
- Description of proposed path construction in the tree protection zones of Tracts O and K.
- Evaluation of whether the grading can be adjusted using retaining walls or other strategies to protect Tree #2057 in accordance with Figure 1 in the third-party arborist report.
- Details on whether stumps of trees to be removed that are within the tree protection zones will be left in place or carefully stump ground to protect the root systems of the adjacent trees to be retained.

106. The applicant is proposing to retain multiple trees on private, developable lots. While staff encourages the applicant to retain as many trees as possible, staff has concerns about retention trees being located on developable lots. Based on previous subdivision developments, including Sandy Woods I, staff has seen that a number of the trees retained on private lots are either illegally removed once the new homeowner moves in, or the new homeowner becomes concerned the trees are hazardous due to their proximity to the house and applies for a hazard tree removal permit. Rather than create a potential future conflict

between tree retention and private homeowners, **staff recommends that as many of the 117 required retention trees as possible be located in Tracts J, K, M, and O.** Staff also has concerns about whether Trees #1337, 1399, 1486, 1487, 1585, 1802, 1803, 1805, 1973, 2035, and 2037 will be adequately protected due to the fact that a large portion of their critical root zones are located on the adjacent properties to the east or west. **After the updated inventory/retention plan is completed, if the applicant needs to count Tree #1337, 1399, 1486, 1487, 1585, 1802, 1803, 1805, 1973, 2035, or 2037 towards the minimum retention tree standard, the project arborist shall submit information regarding the percentage of the critical root zone (at 1 foot per 1 inch DBH) that is located on the adjacent properties to the east or west and whether any portion of the minimum root protection zone (at 0.5 feet per 1 inch DBH) is located on the adjacent properties to the east or west.**

107. The Arborist Report (Exhibit F) provides recommendations for protection of retained trees including identification of the recommended root protection zone for these trees. The requirements of 17.102.50(B) shall be complied with prior to any grading or tree removal on the site. The project arborist's root protection zone recommendations do not follow the standard critical root zone (CRZ) of 1 foot per 1 inch DBH (with allowance of up to 25 percent of the CRZ to be impacted), thus staff requested more information on the rationale for not using the standard CRZ as part of the incompleteness letter. The arborist report addendum (Exhibit G) states: "The modified root protection zones (RPZs) listed in the Tree Table were established by an ISA Certified Arborist after evaluating the subject trees, the grading plan, and proposed layout. Critical root zones (CRZs) have been reduced based on individual basic assessments of subject trees, working knowledge of species characteristics, and working knowledge of root crown characteristics. Modified RPZs have been used on the site to protect the health and long-term viability of trees being preserved, while providing reasonable workspace and movement of equipment and personnel on the site. Tree protection fence (TPF) will be installed at the radii listed in the 'RPZ' column of the tree table. All encroachments or grade disturbances within the RPZs of trees being preserved will be reviewed and supervised by the project arborist." The third-party arborist reviewed the applicant's tree protection plan and found that it does not meet the tree protection zone that is widely accepted in the Willamette Valley to provide adequate tree protection. The third-party arborist report includes recommended tree fencing locations in Attachment 1 of the report, which limit construction disturbances to no closer than a radius from a tree of 0.5 feet per inch of trunk diameter (DBH) if no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted. **The applicant shall install tree protection fencing as detailed on Attachment 1 of the third-party arborist report. The tree fencing shall be installed prior to any development activity on the site, including clearing, tree removal, and erosion control measures, in order to protect the trees and the soil around the trees from disturbance. Sediment fencing shall be located outside the tree protection zones. If erosion control is required inside the tree protection zones, the applicant shall use straw wattles to minimize root zone disturbance of the trees to be retained. Inspections of retention tree fencing by a City official shall be completed prior to any earthwork or grading being conducted onsite. Should the fencing need to be adjusted, the applicant or project arborist shall contact Planning Division staff and obtain staff review and approval prior to relocating the fence. The applicant shall not relocate or remove the tree protection fencing prior to issuance of a**

certificate of occupancy for the subject lots. The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing supported with metal posts placed no farther than 10 feet apart installed flush with the initial undisturbed grade. The applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches, placed every 75 feet or less) to the tree protection fencing with the following: **“TREE PROTECTION ZONE, DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING.** Please contact the project arborist if alterations to the approved location of the tree protection fencing are necessary. [Arborist’s name], Project Arborist – [Arborist’s phone number].” No construction activity shall occur within the tree protection zone, including, but not limited to, grading, clearing, excavation, access, stockpiling, dumping, or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures with City staff and the project arborist prior to any tree removal, grading, or other construction activity on the site. Up to 25 percent of the area between the minimum root protection zone of 0.5 feet per 1-inch DBH and the critical root zone of 1 foot per 1-inch DBH may be able to be impacted without compromising the tree, provided the work is monitored by a qualified arborist. The applicant shall retain an arborist on site to monitor any construction activity within the critical root protection zones of the retention trees or trees on adjacent properties that have critical root protection zones that would be impacted by development activity on the subject property.

108. The Tree Retention and Protection Plan (Exhibit C, Sheet 4) details several trees being removed that are located in close proximity to retention trees and in some cases are within the CRZ of the retention tree. Attachment 1 of the third-party arborist report species that stumps of trees to be removed that are located in the tree protection zones as detailed on Attachment 1 should be retained or carefully stump ground. **The applicant shall retain stumps or carefully stump grind trees to be removed that are in the tree protection zones detailed on Attachment 1 of the third-party arborist report. Trees proposed for removal that are located in Tracts J, K, M, or O shall be left as snags rather than completely removed in order to minimize negative impacts to the remaining retention trees and stream/wetlands. Removal of trees located within the tree protection zone of a retention tree shall be completed under the supervision of the project arborist and the applicant shall fell the trees to be removed away from the trees to be retained so they do not contact or otherwise damage the trunks or branches of the trees to be retained. Tree removal and/or snag creation shall be completed without the use of vehicles, or heavy equipment in the tree protection zone. Trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation. The applicant shall submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to assess whether any of the retention trees were damaged during construction. If retention trees were damaged and need to be replaced, the mitigation ratio shall be 4:1.**
109. The Arborist Report (Exhibit F) and addendum (Exhibit G) from Portland Tree Consulting includes recommendations related to activity within a root protection zone. **The applicant shall adhere to all recommendations contained in the arborist report including, but not limited to, the following:**



- Without the owner's authorization and the project arborist's supervision, none of the following shall be allowed within a root protection zone:
  1. New buildings;
  2. Grade change or cut and fill, during or after construction;
  3. New impervious surfaces;
  4. Utility or drainage field placement;
  5. Staging or storage of materials and equipment during construction;
  6. Vehicle maneuvering during construction.
- Any activity within a root protection zone, including adjustment of the tree protection fence, shall be approved by the project arborist and the City Development Services Director.
- The project arborist shall be available to monitor tree related issues during the development of the site and provide recommendations, supervision, and assistance in the preservation of the protected trees. The project arborist shall document and report on site visits and shall be prepared to conduct root pruning when visiting the site.

110. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The covenant shall detail the species and locations of the retention trees as well as the tree protection zones of each tree as detailed on Attachment 1 of the third-party Arborist Report.**

## **LANDSCAPING AND SCREENING – Chapter 17.92**

111. Section 17.92.10 contains general provisions for landscaping. As required by Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4.5 feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention is discussed in more detail in the Urban Forestry, Chapter 17.102 section of this document. **Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
112. Section 17.92.30 states that planting of trees is required for all parking lots with four or more parking spaces, public street frontages, and along private drives more than 150 feet long. The applicant submitted a Residential Parking Analysis (Exhibit C, Sheet 10) that details street trees. Section 17.92.30 specifies that street trees shall be chosen from the City-approved list. As required by Section 17.92.30, the development of the subdivision requires medium trees spaced 30 feet on center along all street frontages. Planter strips will be provided along all frontages as required in Section 17.100.290. The narrative (Exhibit B) notes that street trees will be planted 30 feet on center and that final street tree locations and species will be determined during final engineering design of the subdivision improvements. **The applicant shall submit proposed tree species to City staff for review and approval concurrent with construction plan review. To improve species diversity, the applicant shall include at least four (4) different tree genera, with at least two (2) different genera per block face. No more than 10 percent of the proposed street trees shall be of the same species, no more than 20 percent shall be of the same genus, and no more than 30 percent shall be of the same family.** Due to concerns with Asian Longhorn Beetle and Emerald Ash Borer as well as an interest in increasing species diversity, staff would prefer that the applicant not propose any maples or ashes as street trees at this time. **The street trees along Tracts J, K, O, and M shall be installed prior to final plat approval.**

The applicant is proposing to mass grade the buildable portion of the site. This will remove topsoil and will heavily compact the existing soil. To maximize the success of the required street trees, **the applicant shall aerate and amend the soil within the planter strip 15 feet in both directions from where the tree will be planted (or as is feasible based on locations of driveways or street corners) to a depth of 3 feet prior to planting street trees. The applicant shall aerate and amend the soil at the individual home construction phase. The applicant shall submit a letter from the project landscaper confirming that the soil in the planter strips has been aerated and amended prior to planting the trees.**

**If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval.**

113. Section 17.92.40 requires that all landscaping shall be irrigated, either with a manual or automatic system. The narrative (Exhibit B) states that the proposed landscape strips within

the public right-of-way will have irrigation sleeves coming from the adjacent property and that the property owner will be responsible for maintaining the irrigation of the planter strip once the trees are planted. **As required by Section 17.92.140, the developer and lot owners shall be required to maintain all vegetation planted in the development for two (2) years from the date of completion, and shall replace any dead or dying plants during that period.**

114. Section 17.92.50 specifies the types and sizes of plant materials that are required when planting new landscaping. Street trees are typically required to be a minimum caliper of 1.5-inches measured 6 inches from grade. **All street trees shall be a minimum of 1.5-inches in caliper measured 6 inches above the ground and shall be planted per the City of Sandy standard planting detail. Trees shall be planted, staked, and the planter strip shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy. Tree ties shall be loosely tied twine or other soft material and shall be removed after one growing season (or a maximum of 1 year).**
115. Section 17.92.60 requires revegetation in all areas that are not landscaped or remain as natural areas. The applicant did not submit any plans for re-vegetation of areas damaged through grading/construction, although most of the areas affected by grading will be improved. **Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two (2) years following the date of recording of the final plat associated with those improvements.**
116. Section 17.92.130 contains standards for a performance bond. The applicant has the option to defer the installation of street trees and/or landscaping for weather-related reasons. Staff recommends the applicant utilize this option rather than planting trees and landscaping during the dry summer months. Consistent with the warranty period in Section 17.92.140, staff recommends a two-year maintenance and warranty period for street trees based on the standard establishment period of a tree. **If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring planting within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials and labor, including a two-year maintenance and warranty period.**

### **FLOOD AND SLOPE HAZARD (FSH) OVERLAY – Chapter 17.60**

117. The subject property was outside City limits when the most recent Flood and Slope Hazard (FSH) mapping was completed and, thus, is not included on the City's FSH Overlay map. The property was annexed into City limits in 2017 by Ordinance 2017-09. Section 2 of Ordinance 2017-09 adopts the August 30, 2017 staff report as findings supporting the approval of the annexation and incorporates the report into the ordinance by reference. The Zoning finding of page 4 of the staff report states: "The Zoning Map depicts a conceptual zoning designation for the property of SFR, Single Family Residential. Density will be evaluated during land use review (i.e. subdivision) of the subject property. Considerations to restricted development areas, such as powerline easements and wetlands/creeks will be part of the evaluation."
118. Rather than map the FSH overlay, the applicant is proposing to adhere to Clackamas County's setback standards, which are included on page 50 of the applicant's narrative (Exhibit B). The County setback standards meet or exceed the City's standards as included in Section 17.60.30.
119. Section 17.60.10 relates to mapping the FSH. The applicant's narrative (Exhibit B) states: "The FSH overlay cannot be applied to this project site because it was not required at the time of annexation of this site. Therefore, Code Section 17.60 Flood & Slope Hazard (FSH) Overlay District does not apply to this project. However, the applicant will respond to sections of this code to show the project meets the intent of this chapter and the general principles of the FSH Overlay District. The wetlands on site are not deemed significant, therefore a 25' setback is required per City of Sandy Municipal Code. However, the plans show 50' setback from the wetlands, these setbacks ensure they will be protected. A 50' setback is required from top of bank of the perennial stream located on site. Both setbacks meet the City of Sandy Municipal Code (17.60.30.A), Clackamas County Code (CCSD #1, Table 4.1), and Oregon State's requirements. On the plan set included with this application, the delineated wetlands, perennial stream, the top of bank, and all required setbacks are mapped per the applicant's responsibilities of this code section. There is no significant slope on this site greater than 25% and therefore this does not apply. The project proposal meets the intent of this code section." The submitted Site Plan (Exhibit C, Sheet 1) details the 50-foot buffer around the wetlands. In addition, the stream is located within multiple tracts, which all provide at least a 50-foot setback. Staff finds the intent of Section 17.60.10 has been met.
120. Section 17.60.20 pertains to permitted uses and activities. According to the narrative (Exhibit B) there are three delineated wetlands and a perennial stream on the site. The applicant submitted wetland delineations for the entire site (Exhibit H), including a separate delineation for the wetland in the northwest corner of the site (Exhibit I). The applicant also submitted concurrence from the Oregon Department of State Lands (DSL) for all wetlands on the site (Exhibits J and K). In addition, the Oregon Statewide Wetlands Inventory (SWI) identifies both an intermittent stream and a riverine wetland on the subject property. As stated in the narrative, the applicant has designed the site development to place all the sensitive areas (three wetlands and stream/wetland traversing the site) in tracts to maximize their protection. The wetlands will remain undisturbed with the exception of a small section

located in the Kelso Road right-of-way, which will be addressed with the County application for a Design Modification Request for Kelso Road (Exhibit L). **No future lots shall be platted within the 50-foot setback from the wetlands or stream.** The applicant is proposing a public road (Street A) and utility crossing over the stream to allow development to occur on the south portion of the property. As stated in the narrative, the applicant is only proposing a single road crossing in order to reduce the impact to the stream and retention trees. The applicant is also proposing a public sewer crossing under the stream in Tract N. As stated in the narrative, the applicant intends to bore the sewer under the perennial stream to limit disturbance to the stream and any tree root systems. **The applicant shall bore the sewer under the perennial stream to limit disturbance to the stream and any tree root systems.** The sewer crossing is proposed to be located underneath the existing dirt road that crosses the perennial stream to further reduce construction impact from the sewer main extension. The applicant is also proposing a pedestrian pathway that meanders along the stream in Tracts K and O. As discussed in Chapter 17.102 of this staff report, the third-party arborist recommends the applicant submit a description of the proposed path construction in the tree protection zones of Tracts O and K.

121. Section 17.60.30 specifies required setback areas. As previously discussed, the applicant is following Clackamas County's code requirements. The applicant is proposing a 50-foot setback from the wetlands and stream, which meet the City's required setbacks in Section 17.60.30.

**HILLSIDE DEVELOPMENT, EROSION CONTROL, NUISANCES, AND ACCESSORY DEVELOPMENT – Chapters 17.56, 15.44, 8.04, and 17.74**

122. The applicant's narrative (Exhibit B) states that there are no slopes on the site greater than 25 percent; therefore, the provisions of Chapter 17.56, Hillside development, do not apply.
123. Grass seeding shall be completed as required by Section 17.100.300. The submitted preliminary Grading and ESC Plan (Exhibit C, Sheet 12) provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading. Erosion control requirements are defined in greater detail in the review of Chapter 15.44 in this document. Section 15.44.50 contains requirements for maintenance of a site including re-vegetation of all graded areas. **The applicant's Erosion Control Plan shall be designed in accordance with the standards of Section 15.44.50.**
124. **All the work within the public right-of-way and within the paved area should comply with American Public Works Association (APWA) and City requirements as amended. The applicant shall submit a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite.** The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. **All erosion control and grading shall comply with Section 15.44 of the Municipal Code. The proposed subdivision is greater than one acre which typically requires approval of a DEQ 1200-C Permit.**
125. Recent development has sparked unintended rodent issues in surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed. The result of the evaluation shall be submitted to staff and if required the evaluation shall include eradication techniques.**
126. Section 17.74.40 specifies, among other things, retaining wall and fence height in front, side, and rear yards. Retaining walls on property in residential zones shall not exceed 4 feet in height in the front yard, 8 feet in height in rear and side yards abutting other lots, and 6 feet in height in side and rear yards abutting a street. The submitted plan set (Exhibit C) details three (3) retaining walls, including two (2) rockery walls in Tract L and one (1) Keystone Block wall in Tract K along Street A. Sheet 13 of the plan set includes details on the proposed retaining walls. The maximum height of the rockery walls is 3 feet, in compliance with the code. The maximum height of the Keystone Block wall along Street A is 6 feet. In addition, the applicant is proposing a fence between the sidewalk and the proposed Keystone Block wall. The applicant did not submit details on the height or type of proposed fence. The proposed location of the Keystone Block wall and fence in Tract K is adjacent to Street A, in what would be the front yard. Thus, the maximum allowed combined height of the wall and fence would be 4 feet per Section 17.74.40(A.2). However, the applicant contends that because there is no proposed building on Tract K, there can't be a front yard based on the definition of "yard, front" in Chapter 17.10: "A yard extending across the full width of the lot, the depth of which is the minimum horizontal distance between the front lot line and a line parallel thereto at the nearest point of the main building." **Staff recommends the Planning Commission make a determination on the maximum allowed combined height**

**of a fence and retaining wall in a Tract without a building and located along a public right-of-way.**

## RECOMMENDATION

Staff recommends the Planning Commission **approve** the subdivision request with conditions. Staff further recommends the Planning Commission **approve** the following three variances and two adjustments with the conditions as outlined below:

- Type III Variance to allow the cul-de-sac to exceed the 400-foot maximum length. To better protect the stream and wetland natural areas that traverse the site, staff recommends the lots on the cul-de-sac that abut the natural area tracts (Tracts K, M, and O) be required to install fences along the property line that abuts the natural area tract to prevent encroachment into the natural areas. This would apply to Lots 44, 66, 67, 68, 69, 77, 78, 79, 80, and 86. The fences shall be installed prior to final plat.
- Special Variance to allow the east side of Street A to exceed the 400-foot maximum block length. The applicant shall update the plan set to detail a 15-foot-wide bicycle and pedestrian tract with a 10-foot-wide improved surface located mid-block on the east side of Street A and stubbed to the east property boundary. Staff recommends the applicant consider locating the bike/ped tract in line with Street B. Alternatively, staff recommends the applicant locate the tract between Lots 44 and 45, which already has a 15-foot-wide public sanitary sewer easement. The bicycle/pedestrian path could be located on top of the sanitary sewer easement with both in a separate tract.
- Special Variance to allow Street B to not provide a bicycle/pedestrian accessway on the north block face of Street B. To better protect the wetland in the northwest corner of the subject property, staff recommends the lots that abut the wetland tract (Tract J) be required to install fences along the property line that abuts the tract to prevent encroachment into the wetland. This would apply to Lots 54, 55, and 59-65. The fences shall be installed prior to final plat.
- Type I Adjustment to allow the west side of Street A to exceed the 400-foot maximum block length by approximately 14 feet.
- Type II Adjustment to Section 17.34.30(C) to allow the 20-foot minimum lot frontage to be reduced to 16 feet for Lot 77. The applicant shall update the plan set to detail the lot frontage of Lot 77 at 16 feet. The applicant shall detail a minimum paved width of 10 feet on the accessway (pole) portion of the flag lot. The applicant shall be required to install a fence along the Lot 77 property line that abuts Tract O to prevent encroachment into the natural area. The fences shall be installed prior to final plat.

Staff recommends the Planning Commission make a determination on the maximum allowed combined height of a fence and retaining wall in a Tract without a building and located along a public right-of-way.

## RECOMMENDED CONDITIONS OF APPROVAL

- A. Prior to submittal of construction plans, submittal of trade permits and/or grading or other construction permits, the applicant shall update the plans submitted with the land use application to include the following items as specified below:**



1. Update the plan set to detail the tree protection fencing located as detailed in Attachment 1 of the third-party arborist report.
2. Update the plan set to detail a 15-foot-wide bicycle and pedestrian tract located mid-block on the east side of Street A and stubbed to the east property boundary.
3. Update the building footprint on Lot 53 to comply with the required 20-foot setback from Kelso Road.
4. Update the plan set to detail the lot frontage of the flag lot (Lot 77) at 16 feet. Detail a minimum paved width of 10 feet on the accessway (pole) portion of the flag lot (Lot 77).
5. Submit an updated arborist evaluation confirming that a minimum of 117 trees are healthy, in good or very good condition, not nuisance species, 11-inches DBH or greater, and did not suffer any damage during the multiple storms since the original assessment. Per the third-party arborist's recommendations, the updated evaluation shall also include the following:
  - a. Assessment of the structural condition of the trees to evaluate their stability considering adjacent tree removals and potential increased wind exposure.
  - b. Evaluation of whether there is adequate space for excavation of foundation and construction access on Lots 47, 48, 49, 52, 53, 66, 68, 71, 82, 83, 84, and 85. If there is not adequate space, reduce building envelopes to accommodate the tree protection zones. Alternatively, modify the tree protection to allow for adequate space while providing the minimum protection zones in accordance with Figure 1 in the third-party arborist report.
  - c. Evaluation of the feasibility of construction of the paved path and sewer line in Tract N between the tree protection fencing of Trees #1504 and 1542 as noted in Attachment 1 of the third-party arborist report. If there is not space to construct the sewer line and path while still protecting the trees in accordance with Figure 1 of the third-party arborist report, propose strategies such as boring and/or reduction of pathway width and associated grading.
  - d. Description of proposed path construction in the tree protection zones of Tracts O and K.
  - e. Evaluation of whether the grading can be adjusted using retaining walls or other strategies to protect Tree #2057 in accordance with Figure 1 in the third-party arborist report.
  - f. Details on whether stumps of trees to be removed that are within the tree protection zones will be left in place or carefully stump ground to protect the root systems of the adjacent trees to be retained.
6. After the updated inventory/retention plan is completed, if the applicant needs to count Tree #1337, 1399, 1486, 1487, 1585, 1802, 1803, 1805, 1973, 2035, or 2037 towards the minimum retention tree standard, the project arborist shall submit information regarding the percentage of the critical root zone (at 1 foot per 1 inch DBH) that is located on the adjacent properties to the east or west and whether any portion of the minimum root protection zone (at 0.5 feet per 1 inch DBH) is located on the adjacent properties to the east or west.

**B. Prior to earthwork, grading, or excavation, the applicant shall complete the following and receive necessary approvals as described:**

1. Apply and receive approval for a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. All erosion control and grading shall comply with Section 15.44 of the Municipal Code. The applicant shall shift sediment fencing to outside the tree protection zones. If erosion control is required inside the tree protection zones, the applicant shall use straw wattles to minimize root zone disturbance of the trees to be retained. *(Submit to Planning Division and Public Works Department for approval)*
2. Submit proof of receipt of a Department of Environmental Quality 1200C permit or submit confirmation from DEQ if a 1200-C Permit will not be required.
3. Install tree protection fencing as detailed on Attachment 1 of the third-party Arborist Report (Exhibit S). The tree fencing shall be installed prior to any development activity on the site, including clearing, tree removal, and grading, in order to protect the trees and the soil around the trees from disturbance. The tree fencing shall adhere to the following:
  - Sediment fencing shall be located outside the tree protection zones. If erosion control is required inside the tree protection zones, the applicant shall use straw wattles to minimize root zone disturbance of the trees to be retained.
  - Should the fencing need to be adjusted, the applicant or project arborist shall contact Planning Division staff and obtain staff review and approval prior to relocating the fence.
  - The applicant shall not relocate or remove the tree protection fencing prior to issuance of a certificate of occupancy for the subject lots.
  - The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing supported with metal posts placed no farther than 10 feet apart installed flush with the initial undisturbed grade.
  - The applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches, placed every 75 feet or less) to the tree protection fencing with the following: “TREE PROTECTION ZONE, DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING. Please contact the project arborist if alterations to the approved location of the tree protection fencing are necessary. [Arborist’s name], Project Arborist – [Arborist’s phone number].”
  - No construction activity shall occur within the tree protection zone, including, but not limited to, grading, clearing, excavation, access, stockpiling, or dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles.
  - The applicant shall request an inspection of tree protection measures with City staff and the project arborist prior to any tree removal, grading, or other construction activity on the site.
  - Up to 25 percent of the area between the minimum root protection zone of 0.5 feet per 1-inch DBH and the critical root zone of 1 foot per 1-inch DBH may be able to be

impacted without compromising the tree, provided the work is monitored by a qualified arborist.

- The applicant shall retain an arborist on site to monitor any construction activity within the critical root protection zones of the retention trees or trees on adjacent properties that have critical root protection zones that would be impacted by development activity on the subject property.
  - The applicant shall retain stumps or carefully stump grind trees to be removed that are in the tree protection zones detailed on Attachment 1 of the third-party arborist report.
  - Trees proposed for removal that are located in Tracts J, K, M, or O shall be left as snags rather than completely removed in order to minimize negative impacts to the remaining retention trees and stream/wetlands.
  - Removal of trees located within the tree protection zone of a retention tree shall be completed under the supervision of the project arborist and the applicant shall fell the trees to be removed away from the trees to be retained so they do not contact or otherwise damage the trunks or branches of the trees to be retained.
  - Tree removal and/or snag creation shall be completed without the use of vehicles, or heavy equipment in the tree protection zone.
  - Trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation.
4. Adhere to the regulations of the Migratory Bird Act. If trees are removed during prime nesting season (February 1- July 31), the applicant shall check for nests prior to tree removal. If nests are discovered, the applicant shall delay tree removal until after the nesting season or shall hire a professional to relocate the nests to an appropriate nearby location, provided the species using the nest is not invasive.
  5. Request an inspection of erosion control measures and tree protection measures as specified in Section 17.102.50 C. Inspections of retention tree fencing by the Planning Division shall be completed prior to any earthwork or grading being conducted onsite.
  6. Prior to grading or any earthwork have a licensed pest control agent evaluate the site to determine if pest eradication is needed. The result of the evaluation shall be submitted to staff and if required the evaluation shall include eradication techniques.

**C. Prior to all construction activities except grading, the applicant shall submit additional information as part of construction plans and complete required items during construction as identified below: *(Submit to Public Works unless otherwise noted)***

1. Submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and USPS for review and approval prior to installation of mailboxes.
2. Submit a plan identifying the locations of street lights along with specifications of proposed lighting fixtures to be reviewed in detail with construction plans. Full cut-off lighting shall be required. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.

3. Confirm and provide documentation that all street surfacing details proposed are in conformance with the standards identified in Subsection 17.100.200 for City review and approval.
4. When the grading is completed, a final report shall be submitted to the City by the Geotechnical Engineer stating that adequate inspections and testing have been performed on the property and all of the work is in compliance with the above noted report and the OSSC.
5. Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval.
6. Obtain a Development Permit from the Clackamas County Engineering Division for design and construction of required improvements, utility installation, and access to Kelso Road. To obtain the Permit, the applicant shall submit plans prepared and stamped by an Engineer registered in the State of Oregon meeting Section 140 of the Clackamas County Roadway Standards.
7. Submit a detailed final stormwater report stamped by a licensed professional engineer for review. The calculations shall meet the water quality/quantity criteria as stated in the City of Sandy Development Code (SDC) Chapter 13.18 Standards and the City of Portland Stormwater Management Manual (SWMM) Standards that were adopted by reference into the Sandy Development Code.
8. Clarify if a request to terminate the Kelso Road sidewalk improvements was included with the design modification request submitted to Clackamas County and, if so, clarify whether it was for the east or west end of the development site.
9. Submit a proposal to prevent unauthorized use of the new pedestrian path/stormwater maintenance and emergency vehicle access roadway while still allowing emergency vehicle access.
10. Submit a design for the City and the Fire District to review that mitigates risks to pedestrians and emergency vehicles due to the lack of illumination along the proposed pedestrian path/stormwater maintenance and emergency vehicle access roadway.
11. Submit turning template diagrams for the intersection of the existing pedestrian path/stormwater maintenance roadway and Broken Top Avenue and the proposed pedestrian path/stormwater maintenance and emergency vehicle access roadway and Street A. The turning template diagrams shall demonstrate that the existing driveway approach at Broken Top Avenue is wide enough for emergency vehicle access and shall define any 'No Parking' zones that would need to be posted to allow emergency and service vehicle access.
12. Submit calculations demonstrating that the proposed water line can furnish the required fire flows and domestic flows for Sandy Woods II.

**D. Prior to Final Plat approval, the applicant shall complete all public improvements including the following or provide financial assurance for their future completion:**

1. The applicant shall pay a fee in-lieu of parkland dedication in the amount of \$132,550 (0.55 multiplied by \$241,000) to the City prior to final plat approval, or if the applicant chooses to defer payment, the applicant shall pay \$72,875 prior to recording of final plat and the additional \$72,875 divided by the 43 lots, or \$1,694.77 with each building permit.
2. Pay plan review, inspection and permit fees as determined by the Public Works Director, and install all public improvements, including but not limited to the following:
  - a. Six-foot sidewalks along Kelso Road, including a 5-foot-wide planter strip.
  - b. Five-foot sidewalks along Street A and Street B, including a 5-foot-wide planter strip.
  - c. Full street improvements on Street A and Street B.
  - d. Half street improvements on Kelso Road.
  - e. Full frontage improvements for Tracts J, K, L, M, N, and O.
  - f. Street lighting in conformance with city standards.
  - g. ADA ramps to meet the most current PROWAG requirements.
  - h. Retaining walls.
  - i. Pedestrian paths in Tracts K, L, N, and O, and the new 15-foot-wide bicycle and pedestrian tract located mid-block on the east side of Street A and stubbed to the east property boundary. The paths in Tracts N and L shall be compliant with the width and surfacing requirements in Section 17.84.30(B.2) and shall include pedestrian-scale lighting connected to the streetlighting circuit. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.
3. Construct a 12-foot-wide crushed rock access roadway over the existing and proposed sewer easement between Tract L and manhole F-8 and between Olson Street and manhole F-6 to provide maintenance access for the off-site sewer line.
4. Plant street trees along Tracts J, K, O, and M. In order to better protect newly planted trees, the applicant shall amend and aerate the soil within the planter strip 15 feet in both directions from where the tree will be planted (or as is feasible based on locations of driveways or street corners). The applicant shall submit documentation from the project landscaper stating that the soil has been amended and aerated prior to planting the street trees.
5. Install fences along the property lines that abut natural area tracts (J, K, M, and O) to prevent encroachment into the natural areas. This applies to Lots 44, 54, 55, 59-69, 77-80, and 86.
6. Vehicle Non-Access Reserve (VNAR) strips shall be depicted on the plat for the Kelso Road frontage of Lot 53 and Tract J, with the exception of the Public Works Access, to

comply with Section 17.98.80(A). A VNAR strip shall also be depicted on the plat at the west terminus of Street B.

7. The street frontage of Lots 44, 45, 47, 53, 54, 63, 64, 65, 71 through 74, 76, 78, 80, 82, 83 and Tracts K, M and O shall include Vehicle Non-Access Reserve (VNAR) strips coincident with the flow-through planter locations to prevent the construction of driveway approaches over these areas upon development of the lots.
8. Submit a Phase I Environmental Site Assessment completed by a qualified professional according to American Society of Testing and Materials (ASTM) standards (ASTM E 1527) for all open space dedications. The results of this study shall indicate a clean environmental record.
9. Dedicate the following:
  - a. Tract L shall be dedicated to the City for stormwater management, emergency vehicle access, and for pedestrian access.
  - b. Tracts J, K, M, and O shall be dedicated to the City as open space and for pedestrian access.
  - c. Tract N shall be dedicated to the City for a sanitary sewer line and for pedestrian access.
  - d. The new 15-foot-wide bicycle and pedestrian tract located mid-block on the east side of Street A and stubbed to the east property boundary shall be dedicated to the City for pedestrian access.
10. Detail eight (8) foot public utility easements (PUEs) along property lines abutting a right-of-way for all lots within the subdivision. The plat shall detail all proposed easements as required by Subsection 17.100.130.
11. If applicable, submit an on-site sewage system decommissioning form to Clackamas County WES with a copy to the City. If applicable, abandon any existing wells per the requirements of OAR 690-220 and submit proof of proper well abandonment to the City. If the site has plumbing that needs to be capped, a plumbing permit will be required.
12. Submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to assess whether any of the retention trees were damaged during construction. If retention trees were damaged and need to be replaced, the mitigation ratio shall be 4:1.
13. Record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The covenant shall detail the species and locations of the retention trees as well as the tree protection zones of each tree as detailed on Attachment 1 of the third-party Arborist Report.
14. The applicant shall bore the sewer under the perennial stream to limit disturbance to the stream and any tree root systems.

15. Meet the requirements for Substantial Completion Section 190 of the Clackamas County Roadway Standards.
16. Record a fire apparatus easement for the required fire apparatus road and provide a copy to Planning Division staff.
17. Install all required fire hydrants. Each fire hydrant shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port.
18. Pay addressing fees for the subdivision as identified in the most updated fee schedule.
19. Submit a true and exact reproducible copy (Mylar) of the Final Plat to the Planning Division for final review and signature.
20. Submit a copy of the following once the plat is recorded:
  - Tree protection covenant including a map identifying the species and locations of the retention trees as well as the tree protection zones of each tree as detailed on Attachment 1 of the third-party Arborist Report.
  - Deeds identifying dedications to the City.
  - Fire apparatus easement.

**E. Prior to issuance of building permits on any lot, the applicant shall:**

1. Submit a digital drawing of the final plat survey (CAD format).
2. The applicant shall enter into a Developer/Engineer Agreement for primary inspection services. This form will be provided to the applicant and shall be signed and returned to the Clackamas County Plans Reviewer. Submit a copy of this agreement to the Planning Division.

**F. Conditions related to individual home construction:**

1. If any lot includes a duplex that lot shall pay an additional \$3,082.56 (0.55 multiplied by \$241,000 divided by 43) with the building permit for that lot or duplex addition.
2. If the applicant chooses to defer parkland fee-in-lieu payment, the applicant shall pay \$1,694.77 with each building permit (\$72,875 divided by the 43 lots).
3. All structures shall provide building design features in conformance with the standards of Chapter 17.90.
4. Demonstrate compliance with all remaining applicable development standards at the time of proposed development on individual lots of record. All homes shall be constructed in compliance with the standards for projections into required setbacks and shall not exceed

a height of 35 feet. All garages shall be setback a minimum of 22 feet from the property line.

5. Driveways shall taper to match the driveway approach width to prevent stormwater sheet flow from traversing sidewalks. Additionally, all driveways shall meet vertical clearance, slope, and vision clearance requirements. Any driveway that exceeds a slope of 8.3 percent shall install a safe pedestrian walkway, including stairs as needed, from the house to the sidewalk.
6. All structures on Lot 53 shall maintain a minimum 20-foot setback from the Kelso Road public right-of-way.
7. The dwelling on Lot 53 shall have its primary entrance oriented toward Kelso Road. Lot 53 shall include a clearly marked, lit pedestrian pathway extending from the adjacent transit street right-of-way (Kelso Road) to the structure's primary entrance. The pedestrian route shall consist of materials such as concrete, asphalt, stone, brick, permeable pavers, or other materials as approved by the Director. The pedestrian path shall be permanently affixed to the ground with gravel subsurface or a comparable subsurface as approved by the Director. The primary dwelling entrance shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth to be evaluated for compliance at time of building permit review.
8. Install sidewalks and planter strips on all other streets (i.e., those streets with sidewalks not installed prior to final plat).
9. Street trees shall be installed approximately 30-feet-on-center in conjunction with individual home construction. Trees shall be planted in association with development of individual lots. As specified in Section 17.92.50, street trees shall be a minimum caliper of 1.5-inches measured 6 inches above grade. Street trees shall be planted per the City of Sandy standard planting detail; tree ties shall be loosely tied and removed after one growing season (or a maximum of 1 year). The planter strip shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy. In order to better protect newly planted trees, the applicant shall aerate and amend the soil within the planter strip 15 feet in both directions from where the tree will be planted (or as is feasible based on locations of driveways or street corners) to a depth of 3 feet prior to planting street trees. The applicant shall aerate and amend the soil at the individual home construction phase. The applicant shall submit a letter from the project landscaper confirming that the soil in the planter strips has been aerated and amended prior to planting the trees. Staff will review the tree species and spacing with construction plans. The street tree species shall be selected from the City of Sandy street tree list. To improve species diversity, the applicant shall include at least four (4) different tree genera, with at least two (2) different genera per street. No more than 10 percent of the proposed street trees shall be of the same species, no more than 20 percent shall be of the same genus, and no more than 30 percent shall be of the same family. Due to concerns with Asian Longhorn Beetle and Emerald Ash Borer, staff would prefer that the applicant not propose any maples or ashes as street trees at this time.



10. All planter strips shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy.
11. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans. Plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.
12. The lots on the cul-de-sac that abut the natural area tracts (Tracts K, M, and O) are required to install fences along the property line that abuts the natural area tract to prevent encroachment into the natural areas. This applies to Lots 44, 66, 67, 68, 69, 77, 78, 79, 80, and 86. The lots that abut the wetland tract (Tract J) are required to install fences along the property line that abuts the tract to prevent encroachment into the wetland. This applies to Lots 54, 55, and 59-65.
13. Development of this subdivision shall include payment of system development charges in accordance with applicable city ordinances.
14. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs. The address shall be plainly legible and visible from the road fronting the property and the same shall be on the dwelling plainly legible and visible when approaching. These numbers shall contrast with their background.
15. Driveway width for a single-family dwelling shall be a minimum of 10 feet and a maximum width of 24 feet wide. All driveways shall be constructed of asphalt, concrete or other approved materials per Subsection 17.98.130.
16. No building permits, except for one model home, will be issued until all public utilities including sanitary sewer and water service are available to serve the development and the City determines substantial completion of all public improvements. If the applicant chooses to install a model home, the applicant shall commit to a Model Home Agreement with the City of Sandy.
17. Install utilities underground with individual service to each lot.

#### **G. General Conditions**

1. Pursuant to Section 17.100.60 the final plat shall be delivered to the Director for approval within two (2) years following approval of the tentative plat, and shall incorporate any modification or condition required by approval of the tentative plat. The Director may, upon written request of the applicant, grant an extension of the tentative plat approval for up to one (1) additional year.
2. Public utility and street plans for land use applications are submitted to comply with the requirements in Section 17.100.60 of the Sandy Municipal Code. Land use approval does

not connote approval of utility or street construction plans which are subject to a separate submittal and review process.

3. Approval of adjustments or variances shall be effective for a 2-year period from the date of approval, unless substantial construction has taken place. The Director (Type I and Type II) or Planning Commission (Type III) may grant a 1-year extension if the applicant requests such an extension prior to expiration of the initial time limit.
4. All frontage improvements in, or adjacent to Clackamas County right-of-way, shall be in compliance with Clackamas County Roadway Standards.
5. The applicant shall adhere to all recommendations contained in the arborist report including, but not limited to, the following:
  - a. Without the owner's authorization and the project arborist's supervision, none of the following shall be allowed within a root protection zone:
    - i. New buildings;
    - ii. Grade change or cut and fill, during or after construction;
    - iii. New impervious surfaces;
    - iv. Utility or drainage field placement;
    - v. Staging or storage of materials and equipment during construction;
    - vi. Vehicle maneuvering during construction.
  - b. Any activity within a root protection zone, including adjustment of the tree protection fence, shall be approved by the project arborist and the City Development Services Director.
  - c. The project arborist shall be available to monitor tree related issues during the development of the site and provide recommendations, supervision, and assistance in the preservation of the protected trees. The project arborist shall document and report on site visits and shall be prepared to conduct root pruning when visiting the site.
6. If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval.
7. The cul-de-sac shall meet the requirements of Section 17.98.100(G).
8. All parking, driveway, and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.
9. All the work within the public right-of-way and within the paved area should comply with American Public Works Association (APWA) and City requirements as amended.
10. Full cut-off lighting is required. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.

11. All earthwork activities to include grading, foundation excavation, site and sub-grade preparation, cut and fill slopes shall be observed and documented by a geo-technical engineer to assure compliance with IBC standards as amended by the state of Oregon and referenced as “Oregon Structural Specialty Code” (OSSC). Site grading shall not in any way impede or impound or inundate the surface drainage flow from the adjoining properties without a proper collection system. The earthwork activities shall be observed and documented under the supervision of the geotechnical Engineer.
12. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33. Fire flow testing will be required to determine available fire flow. Testing will be the responsibility of the applicant. The applicant shall contact the City of Sandy Public Works for testing information and requirements and notify the Fire Marshal prior to fire flow testing. The applicant shall adhere to all other requirements of the Sandy Fire District.
13. The pedestrian path/stormwater maintenance and emergency vehicle access roadway design shall comply with Clackamas County Interagency Fire Code Access Guide standards for width, grade, vertical clearance, load capacity, turning radii and gates.
14. All site runoff shall be detained such that post-development runoff does not exceed the predevelopment runoff rate for the 2, 5, 10 and 25 year storm events. Stormwater quality treatment shall be provided for all site drainage per the standards in the City of Portland Stormwater Management Manual (COP SWMM).
15. The stormwater detention pond in Tract L shall be fenced per the requirements in the City of Portland SWMM.
16. No future lots shall be platted within the 50-foot setback from the wetlands or stream.
17. The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities.
18. All public utility installations shall conform to the City’s facilities master plans. All utilities shall be extended to the plat boundary for future connections. The applicant shall pay plan review, inspection, and permit fees as determined by the Public Works Director.
19. Plans for public and private sewer collection and conveyance facilities shall be submitted to the Oregon Department of Environmental Quality for review and approval per ORS Chapters 454, 468 and 4868B and OAR 340-052 and in particular OAR 340-052-0040(2).
20. The applicant shall comply with Section 17.100.260, which states all subdivisions or major partitions shall be required to install underground utilities (including, but not limited to, electrical and telephone wiring). The utilities shall be installed pursuant to the requirements of the applicable utility company. All franchise utilities shall be installed

underground and in conformance with City standards. The applicant shall call the PGE Service Coordinators at 503-323-6700 when they are ready to start the project.

21. As required by Section 17.92.140, the developer and lot owners shall be required to maintain all vegetation planted in the development on a continual basis, including necessary watering, weeding, pruning, and replacing.
22. If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the landscaping, assuring installation within 6 months. The cost of street trees shall be based on the street tree plan and at least \$500 per tree. The cost of landscaping shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials and labor, including a two-year maintenance and warranty period.
23. Grass seed planting shall take place prior to September 30th on all lots upon which a dwelling has not been started but the ground cover has been disturbed. The seeds shall be of an annual rye grass variety and shall be sown at not less than four pounds to each 1,000 square feet of land area. Erosion control measures shall be provided by the applicant in accordance with Section 15.44 of the Municipal Code.
24. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.
25. Comply with all other conditions or regulations imposed by the Sandy Fire District, or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.



Exhibit A

<b>Name of Project:</b>	Sandy Woods - Phase II
<b>Location or Address:</b>	Between 36804 & 37288 SE Kelso Rd

<b>Map &amp; Tax Lot #</b>	<b>T:</b> 2S	<b>R:</b> 4E	<b>Section:</b> 11	<b>Tax Lot (s):</b> 02202, 02203, 02204
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<b>Request:</b> 43 Lot Residential Subdivision with Tree Removal and three variance requests.

I am the (check one)  owner  lessee of the property listed above, and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

Applicant (if different than owner)	Owner Silver V Construction
Address	Address 10117 SE Sunnyside Rd Ste F1178
City/State/Zip	City/State/Zip Clackamas, OR 97015
Email	Email rosemontdevelopment@gmail.com
Phone	Phone 503-351-4747
Signature	Signature 

Staff Use Only

File #:	Date:	Fee\$:	Planner:
Type of review: Type I <input type="checkbox"/>	Type II <input type="checkbox"/>	Type III <input type="checkbox"/>	Type IV <input type="checkbox"/>
Has applicant attended a pre-app? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, date of pre-app meeting:			

Development Services Department, 39250 Pioneer Blvd, Sandy, OR 97055, 503.489.2160

## Exhibit B

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# PROJECT NARRATIVE

## Sandy Woods – Phase II

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**Date:** June 4, 2021

**Submitted to:** City of Sandy Planning Division

**Applicant:** Rosemont Development  
10117 SE Sunnyside Rd, Suite F1178  
Clackamas, OR 97015

**Prepared By:** Margo Clinton

**Property Owner(s):** Silver V Construction, Inc.  
10117 SE Sunnyside Rd Ste F1178  
Clackamas, OR 97015  
[rosemontdevelopment@gmail.com](mailto:rosemontdevelopment@gmail.com)

**Applicants Consultants:** Surveyor: Centerline Concepts  
19376 Molalla Avenue, Suite 120  
Oregon City, OR 97045  
(503) 650-0188  
[TobyB@centerlineconcepts.com](mailto:TobyB@centerlineconcepts.com)

Engineer: Sisul Engineering  
375 Portland Ave  
Gladstone, OR 97027  
(503) 657-0188  
[patsisul@sisulengineering.com](mailto:patsisul@sisulengineering.com)

**Clackamas County Assessor's Map:** 24E11 – 02202; 24E11 – 02203; 24E11 – 02204;

**Site Size:** 17.67 Acres

**Zoning District:** Single Family Residential (SFR)

**PROJECT OVERVIEW:**

This project is proposing a residential subdivision of 43 lots. This development consists of Tracts F, G, and H of Plat No. 4575 as recorded with Clackamas County. The site is currently vacant and it has a dirt road that connects to Kelso Rd that runs to the southern property line. The total site area is 769,973 square feet (17.67 acres). The net site area of the project proposal is 369,790sqft (8.49 acres). The total Right-of-Way dedication is 98,445sqft (2.26 acres), 95,180sqft is being dedicated to City of Sandy and 3,265sqft is being dedicated to Clackamas County. The proposed tracts total for 301,738sqft (6.93 acres). The project proposal includes a new right-of-way connection into SW Kelso Rd. There will be two new streets located within the subdivision and an expansive pedestrian path network within the tracts. All future lots have at least the minimum required frontage onto the future local streets and will have all necessary utilities brought to the subject site. Any onsite well or septic system will be decommissioned through the required DEQ process prior to site development commencing. The project is proposing the dedication of all the tracts created within the subdivision. Please refer to a breakdown of the tracts and their purpose below:

Tract	Size (square feet)	Use
J	137,121	Open Space, Wetland & Buffer, Stormwater Easement
L	34,622	Public Storm Drain Facility
M	79,544	Open Space, Perennial Stream, Wetland & Buffer
N	5,306	Public Walkway and Sanitary Sewer Tract/Easement
O	20,205	Perennial Stream & Buffer
K	24,940	Open Space, Perennial Stream, Wetland, and Buffers

**TITLE 17 DEVELOPMENT CODE**

**CHAPTER 17.30 - ZONING DISTRICTS**

**17.30.00 ZONING DISTRICT DESIGNATIONS**

For the purposes of this title, the city is divided into districts designated as follows:

DISTRICT	SYMBOL
<b>Parks and Open Space</b>	<b>POS</b>
<b>Residential</b>	
Single Family Residential	SFR
Low Density Residential	R-1
Medium Density Residential	R-2
High Density Residential	R-3
<b>Commercial</b>	
Central Business District	C-1
General Commercial	C-2
Village Commercial	C-3
<b>Industrial</b>	
Industrial Park	I-1
Light Industrial	I-2
General Industrial	I-3
<b>Overlay Districts</b>	
Planned Development	PD
Cultural & Historic Resource	CHR

Flood Slope Hazard	FSH
Specific Area Plan Overlay	SAP

**17.30.20 RESIDENTIAL DENSITY CALCULATION PROCEDURE**

The number of dwelling units permitted on a parcel of land is calculated after the determination of the net site area and the acreage of any restricted development areas (as defined by Chapter 17.60). Limited density transfers are permitted from restricted development areas to unrestricted areas consistent with the provisions of the Flood and Slope Hazard Area Overlay District, Chapter 17.60.

Calculation of Net Site Area (NSA): Net site area should be calculated in acres based upon a survey of the property boundaries excluding areas dedicated for public use.

- A. Minimum and Maximum Dwelling Units for Sites with No Restricted Areas: The allowable range of housing units on a piece of property is calculated by multiplying the net site area (NSA) in acres by the minimum and maximum number of dwelling units allowed in that zone.

*For example:* A site (NSA) containing 10 acres in the Single Family Residential Zoning District requires a minimum of 30 units and allows a maximum of 58 units. (NSA x 3 units/acre = 30 units minimum) (NSA x 5.8 units/acre = 58 units maximum)

- B. Minimum and Maximum Dwelling Units for Sites with Restricted Areas

- 1. Unrestricted Site Area: To calculate unrestricted site area (USA): subtract all restricted development areas (RDA) as defined by Section 17.60.20(A) from the net site area (NSA), if applicable.  
NSA - RDA = USA
- 2. Minimum Required Dwelling Units: The minimum number of dwelling units required for the site is calculated using the following formula:

$$\text{USA (in acres)} \times \text{Minimum Density (Units per Acre) of Zoning District} = \text{Minimum Number of Dwelling Units Required.}$$

- 3. Maximum Allowed Dwelling Units: The maximum number of dwelling units allowed on a site is the lesser of the results of these two formulas:
  - a. NSA (in acres) x Maximum Density of Zoning District (units/acre)
  - b. USA (in acres) x Maximum Density of Zoning District (units/acre) x 1.5 (maximum allowable density transfer based on Chapter 17.60)

*For example:* suppose a site in a zone with a maximum density of eight (8) units per acre has 6 acres of unrestricted site area (USA= 6) and two acres of restricted development area (RDA=2), for a total net site area of 8 acres (NSA= 8). Then NSA (8) x 8 units/acre = 64 and USA (6) x 8 units/acre x 1.5 = 72, so the maximum permitted number of dwelling units is 64 (the lesser of the two results).

- C. Lot Sizes: Lot sizes shall comply with any minimum lot size standards of the underlying zoning district.
- D. Rounding: A dwelling unit figure is rounded down to the nearest whole number for all total maximum or minimum figures less than four dwelling units. For dwelling unit figures greater than four dwellings units, a partial figure of one-half or greater is rounded up to the next whole number.

*For example:* A calculation of 3.7 units is rounded down to 3 units. A calculation of 4.2 units is rounded down to 4 units and a calculation of 4.5 units is rounded up to 5 units.

**APPLICANT RESPONSE:** The subject properties are zoned Single Family Residential (SFR). Which allows the minimum of 3 units per acre and maximum of 5.8. The total site area for redevelopment is 769,973sqft. The net site area is 369,790 sqft (8.49 acres). The max density based off the NSA is 49 lots (5.8\*8.49acres = 49.24 rounded down to 49). The minimum density is 25 lots (3\*8.49acres = 25.47 rounded down to 25). The FSH overlay does not apply to this site (as discussed further in this narrative) and therefore, there is no restricted site development area. All lot sizes comply with the dimensional requirements of the Sandy



**Development Code.**

**CHAPTER 17.34 - SINGLE-FAMILY RESIDENTIAL (SFR)**

**17.34.00 INTENT**

The district is intended to implement the Low Density Residential Comprehensive Plan designation by providing for low-density residential development in specific areas of the city. The purpose of this district is to allow limited development of property while not precluding more dense future development, as urban services become available. Density shall not be less than 3 or more than 5.8 units per net acre.

**17.34.10 PERMITTED USES**

- A. Primary Uses Permitted Outright:
  - 1. Single detached dwelling subject to design standards in Chapter 17.90;
  - 2. Single detached manufactured dwelling subject to design standards in Chapter 17.90;
- B. Accessory Uses Permitted Outright:
  - 1. Accessory dwelling unit subject to the provisions in Chapter 17.74;
  - 2. Accessory structure, detached or attached subject to the provisions in Chapter 17.74;
  - 3. Family day care, as defined in Chapter 17.10 subject to any conditions imposed on the residential dwellings in the zone;
  - 4. Home business subject to the provisions in Chapter 17.74;
  - 5. Livestock and small animals, excluding carnivorous exotic animals: The keeping, but not the propagating, for solely domestic purposes on a lot having a minimum area of one acre. The structures for the housing of such livestock shall be located within the rear yard and at a minimum distance of 100 feet from an adjoining lot in any residential zoning district;
  - 6. Minor utility facility;
  - 7. Other development customarily incidental to the primary use.

**APPLICANT RESPONSE:** The project is proposing single family detached homes. Therefore, this criterion is met.

**17.34.30 DEVELOPMENT STANDARDS**

Type	Standard
A. Minimum Lot Area - Single detached dwelling - Other permitted uses	7,500 square ft. No minimum
B. Minimum Average Lot Width - Single detached dwelling	60 ft.
C. Minimum Lot Frontage	20 ft. except as allowed by Section 17.100.160
D. Minimum Average Lot Depth	No minimum
E. Setbacks (Main Building) Front yard Rear yard Side yard (interior) Corner Lot	10 ft. minimum 20 ft. minimum 7.5 ft. minimum 10 ft. minimum on side abutting the street <sup>1</sup>
F. Setbacks (Garage/Carport)	22 ft. minimum for front vehicle access 15 ft. minimum if entrance is perpendicular to street (subject to Section 17.90.220) 5 ft. minimum for alley or rear access
G. Projections into Required Setbacks	See Chapter 17.74

H. Accessory Structures in Required Setbacks	See Chapter 17.74
I. Structure Height	35 ft. maximum
J. Building Site Coverage	No minimum
K. Off-Street Parking	See Chapter 17.98

<sup>1</sup> Must comply with clear vision requirements of Chapter 17.74.

**APPLICANT RESPONSE:** Below is a table that shows the proposed lot size, street frontage, and width for each lot within the proposed subdivision. All lots proposed within this subdivision meet the dimensional requirements for the residential zone. Building construction is not included with this proposal and setbacks will be addressed at the time of building permits. However, it should be noted that all lots have been designed to have a buildable footprint within the required setbacks.

Lot Breakdown			
Lot No.	Size (ft <sup>2</sup> )	Frontage (ft)	Width (ft)
44	8120	65	65
45	7720	62	62
46	7720	62	62
47	7740	62	62
48	7740	62	62
49	7740	62	62
50	8120	65	65
51	8620	69	69
52	8620	69	69
53	9210	193	74.1
54	7850	96.5	80.4
55	7770	74	74
56	7590	69	69
57	7590	69	69
58	7880	52.5	72.5
59	11320	40.1	62.9 <sub>3</sub>
60	9310	40.2	65.9 <sub>3</sub>
61	7940	53	78.3 <sub>3</sub>
62	7760	81.4	81.4
63	7760	81.3	81.3
64	7510	66.4	66.4
65	11410	166	82 <sub>3</sub>
66	11600	40.6	65.2 <sub>3</sub>
67	10320	40	61.6 <sub>3</sub>
68	9990	55	70.2 <sub>3</sub>
69	8950	54	60 <sub>3</sub>
70	7760	53.9	60 <sub>3</sub>
71	7530	60	60
72	7530	60	60
73	7530	82.8	60 <sub>3</sub>
74	7500	86.5	63.3 <sub>3</sub>
75	7500	178'	85 <sub>3</sub>
76	7500	75.3	75.3
77 <sub>1</sub>	11810/10390 <sub>4</sub>	15 <sub>1</sub>	80.7 <sub>3</sub>
78	8030	89.3	87.6
79	7500	128.9	62.5 <sub>4</sub>

80	8160	126.8	66.5 <sub>4</sub>
81	11600	40	88 <sub>3</sub>
82	7650	40.2	65.6 <sub>3</sub>
83	7550	62.5	62.5
84	7590	62.8	62
85	12450	40.9	94.6
86	10700	72.4	85.6

1 – Flag Lot

2 – Average Lot Width

3 – Mid Point Lot Width

4 – Square footage with pole removed

#### 17.34.40 MINIMUM REQUIREMENTS

- A. Must connect to municipal water.
- B. Must connect to municipal sewer if service is currently within 200 feet of the site. Sites more than 200 feet from municipal sewer, may be approved to connect to an alternative disposal system provided all of the following are satisfied:
  1. A county septic permit is secured and a copy is provided to the city;
  2. The property owner executes a waiver of remonstrance to a local improvement district and/or signs a deed restriction agreeing to complete improvements, including but not limited, to curbs, sidewalks, sanitary sewer, water, storm sewer or other improvements which directly benefit the property;
  3. The minimum size of the property is one acre or is a pre-existing buildable lot, as determined by the city;
  4. Site consists of a buildable parcel(s) created through dividing property in the city, which is less than five acres in size.
- C. The location of any real improvements to the property must provide for a future street network to be developed.
- D. Must have frontage or approved access to public streets.

**APPLICANT RESPONSE:** All the lots created within the subdivision are proposed to be connected to municipal water and sewer. The subdivision is creating buildable lots that meet the dimensional standards of this code section. The street design in this subdivision provides for a future street connection if the neighboring site to the west is to be developed. Due to the location of the BPA easement to the south and east, there is no proposed connection to the abutting southern property. The site is proposing a new ROW connection to Kelso Rd. Therefore, the applicable criteria are met.

#### 17.34.50 ADDITIONAL REQUIREMENTS

- A. Design review as specified in Chapter 17.90 is required for all uses.
- B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.
- C. Lots with alley access may be up to 10 percent smaller than the minimum lot size of the zone.

**APPLICANT RESPONSE:** All lots meet the minimum width and street frontage requirements. Therefore, these criteria do not apply.

### CHAPTER 17.56 - HILLSIDE DEVELOPMENT

#### 17.56.10 APPLICABILITY

These regulations shall apply to any parcel with slopes greater than twenty-five percent (25%) as shown on the Hillside Development Overlay District Map or with slope hazards mapped by the Department of Geology and Mineral Industries (DOGAMI). This chapter shall apply only to activities and uses that require

a building, grading, tree removal and/or land use permit.

- A. General. No person shall develop property in areas designated by SDC 17.56.10, without first demonstrating compliance with this chapter.
1. As a condition of permit issuance or land use approval, the applicant shall agree to implement the recommendations of approved studies and to allow all inspections to be conducted.
  2. Where a bond, letter of credit or other guarantee is required, the permit shall not be issued until the bond or guarantee has been obtained and approved.
- B. Exemptions:
1. An activity or use that avoids slopes of 25% or greater, DOGAMI slope hazard areas, natural drainageways and potentially hazardous analysis areas as defined in Section 17.56.30.A.
  2. The following activities, regardless of location:
    - a. An excavation that is less than three feet in depth, or which involves less than fifty cubic yards of volume;
    - b. A fill that does not exceed three feet in depth or 50 cubic yards of volume;
    - c. New construction or expansion of a structure resulting in a net increase in ground floor area of less than 1,000 square feet that does not involve grading;
    - d. Emergency actions required to prevent an imminent threat to public health or safety, or prevent imminent danger to public or private property, as determined by the Director; or
    - e. Any land use or activity that does not require a building, grading permit, or land use approval.

**APPLICANT RESPONSE:** There are no slopes on this site greater than 25%. Therefore, this code section is not applicable.

## **CHAPTER 17.60 - FLOOD & SLOPE HAZARD (FSH) OVERLAY DISTRICT**

### **17.60.00 INTENT**

This chapter is intended to promote the public health, safety and general welfare by minimizing public and private adverse impacts from flooding, erosion, landslides or degradation of water quality consistent with Statewide Planning Goals 6 (Air, Land and Water Resources Quality) and 7 (Areas Subject to Natural Disasters and Hazards) and the Sandy Comprehensive Plan (SCP).

This chapter is also intended to minimize public and private losses due to flooding in flood hazard areas by provisions designed to:

- A. Protect human life and health;
- B. Minimize expenditure of public money for costly flood control projects;
- C. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. Minimize prolonged business interruptions;
- E. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in flood hazard areas;
- F. Help maintain a stable tax base by providing for the sound use and development of flood hazard areas so as to minimize blight areas caused by flooding;
- G. Notify potential buyers that the property is in a Special Flood Hazard Area;
- H. Notify those who occupy flood hazard areas that they assume responsibility for their actions; and
- I. Participate in and maintain eligibility for flood insurance and disaster relief.

### **17.60.10 INTERPRETATION AND MAPPING**

The Director has the ultimate responsibility for maintaining the FSH Overlay District on the City of Sandy Zoning Map, determining on-site measuring methods, and otherwise interpreting the provisions of this chapter. Technical terms used in this chapter are defined in Chapter 17.10, Definitions. This chapter does not regulate development on lots or parcels entirely outside the FSH Overlay District.

- A. FSH Overlay District. The only areas subject to the restrictions and prohibitions of the FSH overlay

district are those indicated on the City of Sandy Zoning Map on file in the Planning Department and areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled, "Flood Insurance Study (FIS) for Clackamas County, Oregon and Incorporated Areas," dated January 18, 2019, with accompanying Flood Insurance Rate Maps (FIRMs). This chapter does not regulate lots or parcels entirely outside the FSH Overlay District.

1. The FIS and FIRMs are hereby adopted by reference and declared to be a part of Section 17.60 and are on file at the City of Sandy.
- B. Development Approval Required. No development shall occur within the FSH overlay district without first obtaining City approval under the provisions of this chapter. The Director shall notify the Oregon Division of State Lands whenever any inventoried wetland is proposed for development, in accordance with ORS 227.350. In riverine situations, the Director shall notify adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notification to the administrator.
- C. Interpretation. All provisions of the FSH overlay code shall be:
  1. Considered as minimum requirements;
  2. Liberally construed in favor of the governing body; and
  3. Deemed neither to limit nor repeal any other powers granted under state statutes.
- D. Applicant Responsibilities. The applicant for alteration or development within the FSH overlay district shall be responsible for preparing a survey of the entire site, based on site-specific field surveys or Corps of Engineers data that precisely maps and delineates the following areas:
  1. The name, location and dimensions of affected streams or rivers, and the tops of their respective banks.
  2. Area of Special Flood Hazard boundaries and elevations as determined by the January 18, 2019 FIS for Clackamas County and Incorporated Areas.
  3. The City of Sandy FSH overlay district boundary as depicted on the City of Sandy FSH Map.
  4. The water quality and slope setback area(s) as defined in Section 17.60.30.
  5. The size and location of locally significant wetlands shall be determined based on the City of Sandy Locally Significant Wetland Inventory (2002) unless modified by a wetland delineation approved by the Oregon Division of State Lands and submitted to the City. Wetland delineations that have formal concurrence from the Division of State Lands shall be valid for the period specified in that agency's administrative rules.
  6. Steep slope areas where the slope of the land is 25% or greater within the FSH overlay district boundary.
  7. The area enclosed by a continuous line, measured 25 feet horizontally, parallel to and upland from the top of a steep slope area, where the top of the steep slope is within the FSH overlay district boundary.
  8. Existing public rights-of-way, structures, roads and utilities.
  9. Natural vegetation, including trees or tree clusters and understory within the FSH Overlay District boundary.
  10. Existing and proposed contours at 2-foot intervals.

**APPLICANT RESPONSE:** The FSH overlay cannot be applied to this project site because it was not required at the time of annexation of this site. Therefore, Code Section 17.60 Flood & Slope Hazard (FSH) Overlay District does not apply to this project. However, the applicant will respond to sections of this code to show the project meets the intent of this chapter and the general principles of the FSH Overlay District. The wetlands on site are not deemed significant, therefore a 25' setback is required per City of Sandy Municipal Code. However, the plans show 50' setback from the wetlands, these setbacks ensure they will be protected. A 50' setback is required from top of bank of the perennial stream located on site. Both setbacks meet the City of Sandy Municipal Code (17.60.30.A), Clackamas County Code (CCSD #1, Table 4.1), and Oregon State's requirements. On the plan set included with this application, the delineated wetlands, perennial stream, the top of bank, and all required setbacks are mapped per the applicant's responsibilities of this code section. There is no significant slope on this site greater than 25% and therefore this does not apply. The project proposal meets the intent of this code section.

## 17.60.20 PERMITTED USES AND ACTIVITIES

This chapter lists permitted uses, or uses allowed under prescribed conditions, within the FSH overlay district. Where there are conflicts, this chapter supersedes the use provisions of the underlying district.

- A. Restricted Development Areas. Restricted development areas within the FSH overlay district as shown on the City of Sandy Zoning Map include:
1. Slopes of 25% or greater that (a) encompass at least 1,000 square feet and (b) have an elevation differential of at least 10 feet.
  2. Protected water features, including locally significant wetlands, wetland mitigation areas approved by the Division of State Lands, and perennial streams.
  3. Required setback areas as defined in Section 17.60.30.

**APPLICANT RESPONSE:** Section 17.60.20 does not apply to this project per the Applicant Responses stated above. However, the applicant will respond to this section to show it meets the intent of the FSH Overlay District. If the FSH were to apply, the project site includes areas that would be considered “protected water features” as described under 17.60.20.A.2. There are three areas of delineated wetlands and there is a perennial stream located on site. Please refer to the Environmental Technology Consultant’s reports and DSL decisions included with this application submittal.

- B. Permitted Uses. Permitted uses within restricted development areas are limited to the following:
1. Open space and trails provided they are constructed consistent with standards on file in the Planning Department.
  2. Removal of refuse and permitted fill.
  3. Planting of native vegetation species included on a list maintained by the Director.
  4. Removal of non-native / invasive vegetation, dead or dying trees or vegetation that is hazardous to the public.
  5. Removal of up to two trees of 6 inches or greater dbh in a calendar year, provided that each tree removed is replaced with two native trees, each of which must be 1.5 inches or greater caliper and placed within the restricted development area of the site.
  6. Construction or expansion of public facilities or private roads necessary to support permitted development.
  7. Construction or expansion of a single-family residence on a lot-of-record, under the following prescribed conditions:
    - a. The applicant must demonstrate that the lot has received planning approval from either Clackamas County or the City of Sandy and that there is insufficient buildable land on the same lot to allow the proposed construction or expansion.
    - b. The site review, engineering, erosion control, water quality and re-vegetation standards of this chapter have been fully satisfied.
    - c. The residence or addition has been sited so as to minimize excavation and disturbance to native vegetation on restricted development areas.
    - d. The maximum impervious surface coverage resulting from development on restricted development areas shall be 2,500 square feet. Exception: This standard may be exceeded to allow a superior private driveway design and location that reduces adverse impacts to protected areas. To exceed the standard, the applicant must demonstrate that a longer driveway will avoid required setbacks from protected water features, and that driveway construction will either: (a) more closely follow hillside contours and thereby reduce overall cut and fill area by at least 20%; or (b) avoid tree clusters and thereby reduce the number of 6-inch or greater dbh trees that must be removed by at least 20%.
    - e. The option of an adjustment under Section 17.60.100 has been considered as a means of avoiding or minimizing impacts on restricted development areas.
    - f. Development shall not result in cuts or fills in excess of 3 feet except for basement

construction unless specifically approved by the Director.

8. Replacement of a single-family dwelling constructed over substantially the same footprint as the original dwelling.
9. Repair or stabilization of unstable slopes.
10. Stream bank restoration, subject to a stream bank restoration plan. This plan must:
  - a. Be prepared by a team of specialists in the fields of stream morphology, water quality and riparian vegetation approved by the Planning Director.
  - b. Remove invasive vegetation and replace it with multi-layered native vegetation that provides for stream shading within the entire stream bank.
  - c. Reduce the steepness of the bank along reaches that have been highly eroded.
  - d. Reduce the velocity of water carried by the stream.
  - e. Include guarantees and funding to assure at least a 90% survival rate of native plants over a 3-year period.
11. Maintenance of existing landscaping on existing lots of record is permitted and is exempt from the requirements of the FSH Overlay District.
12. Appurtenant structures as permitted under Section 17.60.70(J).
- C. Platting of New Lots. No new lot shall be platted or approved for development that is exclusively in restricted development areas as defined in subsection 17.60.20.A.

**APPLICANT RESPONSE:** Section 17.60.20 does not apply to this project per the Applicant Responses stated above. However, the applicant will respond to this section to show compliance. As mentioned in the 17.60.20.A response, there are three delineated wetlands on site and one perennial stream. The applicant has designed the site development to place all these sensitive areas located on site within tracts to maximize their protection. All wetlands will remain undisturbed, with the exception of one small section located in the Kelso Rd improvements. This area will be addressed with the County application, as this section will be located within their ROW and part of their improvements. Public Facility Improvements are deemed a permitted use per this code section and Clackamas County's code section.

The perennial stream runs east to west the full width of the subject site. No future residential lots are platted within the required setbacks off the wetlands or stream. All the required setbacks fall within the proposed tracts or in the future right of way. All proposed improvements associate with this project and the required setbacks are allowable permitted disturbances per the City of Sandy and Clackamas County Code. This project is proposing three areas of 'disturbance' to the perennial stream and its required setback. All of these disturbances are permitted uses per the City of Sandy Municipal Code (17.60.20.B) and Clackamas County Code(CCSO #1, Table 4.1).

The first 'disturbance' will be a public road (Street A) and utility crossing. The future public road crossing over the stream will allow the development to occur on the southern portion of the property. The applicant is only proposing a single road crossing in order to reduce impact to the stream and retain trees.

The second 'disturbance' is a public sewer crossing under the stream. It is the intention of the developer to bore the sewer under the perennial stream. This will limit the level of disturbance not only to the perennial stream but also minimize damage to any tree root systems. It should be noted that the sewer crossing is proposed to be located underneath/within an existing dirt road (*See Photo A Below*) that crosses the perennial stream. The applicant has chosen this route because it will help reduce construction impact from the sewer main extension, it is already partially improved, and it provides a pedestrian connection from the cul-de-sac to Street B. The public sewer crossing will be restored to a 10' pedestrian pathway within Tract N. This sewer main extension will lie within a public utility and pedestrian path easement. This will allow a feasible path for sewer crossing while providing a pedestrian pathway that will connect the cul-de-sac to Street B.

The final 'disturbance' this project is proposing is a pedestrian pathway that meanders along the

perennial stream. This pathway will allow residents the opportunity to admire the green space and perennial stream. The pathway provides a connection from the eastern property line all the way to the western property line. This will allow for future path construction on adjacent properties. All three disturbances within the required setbacks along the stream are permitted uses listed under code section 17.60.20.B and therefore these improvements are in compliance and meet the intent of this chapter.

**Photo A**

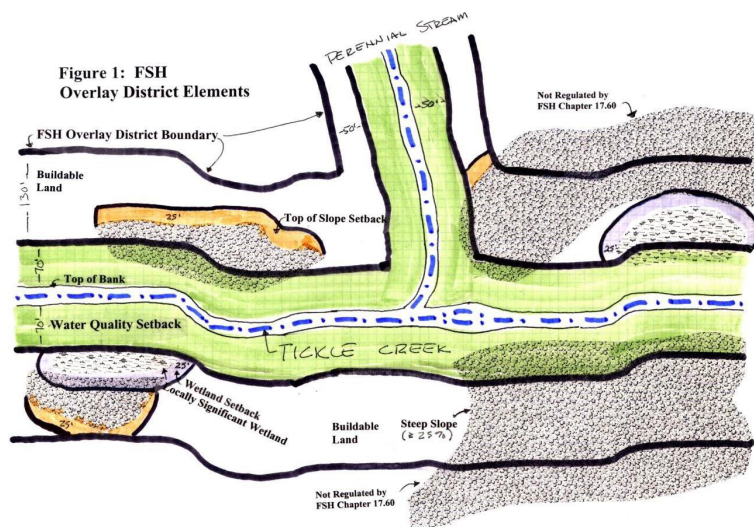


#### **17.60.30 REQUIRED SETBACK AREAS**

Setback areas shall be required to protect water quality and maintain slope stability near stream corridors and locally significant wetlands. Setbacks are measured horizontally from, parallel to and upland from the protected feature.

- A. Required Setbacks. The required special setback(s) shall be:
1. 80 feet from the top of bank of Tickle Creek;
  2. 50 feet from top of bank along other perennial streams, except for “No Name Creek” east of Towle Drive, as provided in Section 17.60.30.C.2 below.
  3. 25 feet around the edge of any mapped locally significant wetland; and
  4. 25 feet from the top of any 25% slope break where the slope break occurs within the FSH overlay district as mapped by the city.





- B. Minimize Impacts. Natural vegetation shall be preserved and enhanced and excavation minimized within required water quality setback areas.
- C. Exceptions, Intent. Exception 1 below recognizes that existing hillside, stormwater detention and erosion control measures are sufficient to maintain water quality and quantity in areas of steep slopes separated from streams and wetlands by improved public streets in existing rights-of-way. Exception 2 recognizes that “No Name Creek” east of Towle Drive has been severely impacted by culverting, erosion and invasive plants, and has only a few remaining infill sites adjacent to its banks. This exception is intended to encourage appropriate development of these infill sites and the opening and restoration of this stream reach over time.
1. Land lying within the FSH overlay district, but upland from an existing public right-of-way with an improved public street, shall not be subject to the steep slope restrictions of this chapter. Such land shall remain subject to applicable Section 17.56 Hillside Regulations and shall comply with required setbacks set forth in subsection 17.60.30.A.3 above.
    - a. Applications for development that include only areas that meet this exception and have existing improved public streets and have no locally significant mapped wetlands are not subject to the provisions of this chapter.
  2. The required setback for “No Name Creek” east of the Towle Drive crossing may be reduced to 25 feet, subject to approval of a “stream bank restoration plan” that meets the standards of Section 17.60.20.B.10.

**APPLICANT RESPONSE:** Section 17.60.30 does not apply to this project per the Applicant Responses stated above. However, the applicant will respond to this section to show compliance. The plan submitted shows a 50’ setback along the perennial stream and a 50’ setback along the wetlands. This meets the required setbacks listed in code section 17.60.30.A. The applicant will minimize the impact of permitted construction when working within the required setbacks of the perennial stream. Excavation will be minimized to the maximum extent possible. Please refer to the erosion control plan submitted with this application that show additional protection measures. Therefore, this project proposal meets the intent of this code section.

## CHAPTER 17.66 - ADJUSTMENTS & VARIANCES

### 17.66.60 VARIANCES

Variations are a means of requesting a complete waiver or major adjustment to certain development standards. They may be requested for a specific lot or as part of a land division application. The Type II

variance proves is generally reserved for major adjustments on individual lots, while variances to development standards proposed as part of a land division are processed as a Type III application (requiring public hearing).

**APPLICANT RESPONSE:** This project is proposing three variance requests. Variance request #1 is to Sandy Development Code 17.100.110.F. This request is for the length of a cul-de-sac. The code section reads as follows: *“Cul-de-sacs and dead-end streets are discouraged, if deemed necessary, cul-de-sacs shall be as short as possible and shall not exceed 400 feet in length.”* The cul-de-sac proposed with this project exceeds 400’ and the applicant is requesting a variance to this code section to allow for an exceeding length due to existing natural features on site (perennial stream, trees, and wetlands).

The second and third variance requests are to Sandy Development Code 17.100.120.B. These variance requests are for extended block lengths. The code section reads as follows: *“Residential Blocks. Blocks fronting local streets shall not exceed 400 feet in length, unless topographic, natural resource, or other similar physical conditions justify longer blocks. Blocks may exceed 400 feet if approved as part of a Planned Development, Specific Area Plan, adjustment or variance.”* The block lengths created within this subdivision exceed 400’, therefore the applicant is requesting a variance for Street A and B to allow for longer block lengths due to existing natural features on site (perennial stream, trees, and wetlands).

#### **17.66.70 TYPE II and TYPE III VARIANCE CRITERIA**

- A. The circumstances necessitating the variance are not of the applicant’s making.
- B. The hardship does not arise out of violation of this code, and approval will not allow otherwise prohibited uses in the district in which the property is located.
- C. Granting the variance will not adversely affect the implementation of the Comprehensive Plan.
- D. The Variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.
- E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.
- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.

#### **APPLICANT RESPONSE:**

##### **VARIANCE #1 to 17.100.110.F**

- A. The circumstances necessitating the variance are not of the applicant’s making.

*The subject site has many existing natural features that create circumstances necessitating a variance. These include three wetlands, one in the NW corner, along the eastern property line and one in the SW corner. Additionally, there is a perennial stream that runs the full width of the property. Additionally, development is not to occur on two adjacent sites. The southern tract of the property (Tract E) and the neighboring eastern site have BPA easements overlaying them. Additionally, The city has stated in the Pre-App notes from 1/12/2021 that they do not want two road crossings over the perennial stream and therefore favor a cul-de-sac in this location. Due to the perennial stream, its setbacks, and the preferable option of the cul-de-sac, the road to the cul-de-sac extends for more than 400’.*

- B. The hardship does not arise out of violation of this code, and approval will not allow otherwise prohibited uses in the district in which the property is located.

*The existing features on and offsite do not arise out of violation of this code. As stated, they are existing neighboring site restrictions (BPA easement) and natural features (wetlands, trees, and*

*perennial stream) that the applicant and City of Sandy would like to see minimal disturbance to. By minimizing the permitted disturbance to these natural areas, it has created longer road lengths. Approval of this variance will not allow otherwise prohibited uses in the district this property is located.*

- C. Granting the variance will not adversely affect the implementation of the Comprehensive Plan.

*The granting of this variance will not adversely affect the implementation of the comprehensive plan. As this narrative demonstrates, this project meets the City of Sandy's applicable code standards with the exception of these three variance requests, which are requested due to the desire to minimize impact to natural features.*

- D. The Variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.

*The variance requests are not materially detrimental to the public welfare or materially injurious to property in the vicinity. The project has been designed to only have minimal permitted disturbance to the natural features on site. The extended road length to the cul-de-sac and the creation of the tracts help support the longevity of these natural features by minimizing potential disturbance. The road and cul-de-sac extend farther south creating longer road length to allow the perennial stream setback to sit entirely within a tract and outside of future/potential lots. This will ensure the stream's protection in the present and future.*

- E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.

*The development will be the same as development permitted under this code and City standards to the greatest extent possible while permitting some economic use of the land. This project narrative addresses the applicable sections from the City of Sandy Code. The narrative shows that this project meets all the applicable code sections and design standards with the exception for these three variance requests.*

- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.

*This property has several natural features in multiple areas on this site that create special circumstances for the subject site and proposed project. There are three wetlands located within the subject site and a perennial stream that runs the full width of the property, the city has requested only one road crossing over the perennial stream, and the BPA easements over the tract to the south and adjacent property to the east prohibit development on these sites and therefore, no road extensions or connections to these sites are feasible. The pre-existing neighboring conditions, natural and pre-existing features have prompted the applicant to come up with creative solutions and longer road lengths to create a feasible site design to reduce impact to these existing natural features. The applicant had no control of the neighboring site restrictions and existing natural site features.*

**VARIANCE #2 & #3 to 17.100.120.B**

- A. The circumstances necessitating the variance are not of the applicant's making.

*As stated above and throughout this project narrative, the subject site has many existing natural features that create circumstances necessitating a variance. These include three wetlands, one in the NW corner, along the eastern property line and one in the SW corner. Additionally, there is a perennial stream that runs the full width of the property. Additionally, development is not to occur*

*on two of the adjacent sites. The southern tract of the property (Tract E) and the neighboring eastern site have BPA easements overlaying them. Additionally, the city has stated in the Pre-App notes from 1/12/2021 that they do not want two road crossings over the perennial stream and therefore favor a cul-de-sac, prohibiting block creation. The location of the perennial stream, wetlands, and the desire to only have one road crossing prohibit the creation of standard blocks within this project and would create multiple permanent dead-end roads. Instead, the project is proposing one cul-de-sac and a road extension to the west where future development is feasible. This reduces and limits the disturbance to the natural areas and helps retain a surplus of trees on the subject site.*

- B. The hardship does not arise out of violation of this code, and approval will not allow otherwise prohibited uses in the district in which the property is located.

*The existing features do not arise out of violation of this code. As stated, the hardships are existing adjacent site restrictions and natural features that the applicant and City of Sandy would like to see minimal disturbance to. By minimizing the permitted disturbance to these natural areas, it has created longer road lengths. Approval of this variance will not allow otherwise prohibited uses in the district this property is located.*

- C. Granting the variance will not adversely affect the implementation of the Comprehensive Plan.

*The granting of this variance will not adversely affect the implementation of the comprehensive plan. As this narrative demonstrates, this project meets the City of Sandy's applicable code standards with the exception of these three variance requests, which are requested due to the desire to minimize impact to natural features.*

- D. The Variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.

*The variance requests are not materially detrimental to the public welfare or materially injurious to property in the vicinity. The project has been designed to only have minimal permitted disturbance to the natural features on site. The extended road lengths help support the longevity of these natural features by minimizing potential disturbance. The road and cul-de-sac extend farther south and the forbidding of crossing the perennial stream twice in order to connect Street A back to Street B creates longer road lengths and lack of standard blocks. However, this allows the perennial stream setback to sit entirely within a tract and outside of a future lots. This will ensure the natural area and stream's protection.*

- E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.

*The development will be the same as development permitted under this code and City standards to the greatest extent possible while permitting some economic use of the land. This project narrative addresses the applicable sections from the City of Sandy Code. The narrative shows that this project meet all the applicable code sections and design standards except for these three variance requests.*

- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.

*This property has several natural features in multiple areas on this site that create special circumstances for the subject site and proposed project. There are three wetlands located within*

*the subject site and a perennial stream that runs the full width of the property, the city has requested only one road crossing over the perennial stream. The BPA easements over Tract E to the south and the eastern adjacent property prohibit development on these adjacent sites and therefore, no road extensions or connections to these sites are feasible. The pre-existing neighboring conditions, natural and pre-existing features have prompted the applicant to come up with creative solutions and longer road lengths to create a feasible site design to reduce impact to these existing natural features. The applicant had no control of the neighboring site restrictions and existing natural site features.*

**APPLICANT RESPONSE CONT'D:** The subject site and adjacent properties have multiple existing features that do not promote shorter road lengths and creation of standard blocks. Throughout the subject site there are wetlands (NW corner, SW corner, and eastern property line). In addition, there is a perennial stream that runs the full width of the site (east-west). The adjacent site to the east and Tract E have an existing BPA easements that do not allow for development of these sites. Therefore, road connections to the east and south were not supported and focus was on promoting development to the west. The wetland in the NW corner also prohibits a second western connection into SW Kelso Rd.

The City has specifically requested only one crossing over the perennial stream to minimize impact and reduce tree removal. These existing conditions and natural feature protection restrict the project from creating the 'traditional' and 'grid' like blocks and therefore require blocks that exceed 400' and roads that exceed 600'. To mitigate for the longer road and block lengths, the project is proposing a network of pedestrian paths throughout the site. These pathways provide pedestrian connection through the sensitive areas where vehicular roads cannot travel. Additionally, these pedestrian paths are permitted uses within the environmentally sensitive areas and their setbacks. Where the blocks exceed 600', the project has proposed pedestrian pathways and amenities.

Along Street A, located in Tract K, there is a pedestrian pathway that connects Street A to the eastern property line. Additionally, in Tract K, the project is proposing a dedicated improved area outside of the buffers for a park bench to overlook the wetland, perennial stream, and tree/forested area. To the west, across Street A, the pedestrian path continues and runs west through Tract O. This pedestrian path connects Street A to Tract N (another pedestrian path) creating a pedestrian path grid like design.

Street B's block length exceeds the 600'. To mitigate this, the project includes a pedestrian path over a sewer main extension within Tract N, this provides direct pedestrian connection from the western end of Street B to Street A's cul-de-sac. This location was selected due to an existing dirt roadway. While it does not cross the middle of the block, utilizing the existing dirt road reduces impact to the natural areas on site because it is currently improved and used for vehicular access. The pedestrian pathway located in Tract O connects Tract N to a northern location on Street A.

Additionally, to help mitigate for the length of Street A, the applicant has proposed a paved access road from the south end of the cul-de-sac. This paved access road located in Tract L will be utilized for emergency access and pedestrian foot traffic. The paved access way will split just south of Tract L. The portion running east will be reserved for pedestrians and provide connection to an easement located on the eastern adjacent property that is dedicated for future trails. The portion running west will be for emergency vehicles. This will provide direct connection to an existing emergency access road in Phase I of Sandy Woods.

An additional mitigation measure for the road crossing and extended road lengths is the amount of trees the applicant is proposing for retention. Per a previous land use decision, this project was subject to saving 117 trees between this Phase I and Phase II. Phase II is proposing the retention of 152 trees within Phase II, far exceeding the minimum requirement of 117 trees. The extra tree retention helps preserve and protect the natural amenities of the site.

While an additional road could not be included to create a block, remove a cul-de-sac, and create shorter road lengths, this pedestrian pathway network helps provide direct connection and circulation for pedestrians. It will be utilized as a scenic pathway network while preserving natural spaces throughout the subject site. This is a very enticing amenity for the future subdivision and it's residents as well as the surrounding communities.

#### **CHAPTER 17.80 - ADDITIONAL SETBACKS ON COLLECTOR & ARTERIAL STREETS**

##### **17.80.20 SPECIFIC SETBACKS**

Any structure located on streets listed above or identified in the Transportation System Plan as arterials or collectors shall have a minimum setback of 20 feet measured from the property line. This applies to applicable front, rear and side yards.

**APPLICANT RESPONSE:** Lot 53 is the only lot with frontage on an arterial. Lot 53 is proposing to meet the 20' setback requirement on an arterial. Therefore, this criterion does not apply.

#### **CHAPTER 17.82 - SPECIAL SETBACKS ON TRANSIT STREETS**

##### **17.82.20 BUILDING ORIENTATION**

- A. All residential dwellings shall have their primary entrances oriented toward a transit street rather than a parking area, or if not adjacent to a transit street, toward a public right-of-way or private walkway which leads to a transit street.
- B. Dwellings shall have a primary entrance connecting directly between the street and building interior. A clearly marked, convenient, safe and lighted pedestrian route shall be provided to the entrance, from the transit street. The pedestrian route shall consist of materials such as concrete, asphalt, stone, brick, permeable pavers, or other materials as approved by the Director. The pedestrian path shall be permanently affixed to the ground with gravel subsurface or a comparable subsurface as approved by the Director.
- C. Primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth.
- D. If the site has frontage on more than one transit street, the dwelling shall provide one main entrance oriented to a transit street or to a corner where two transit streets intersect.

**APPLICANT RESPONSE:** Primary entrances for the lot fronting Kelso Rd will be oriented towards Kelso Rd. The vehicular/garage entrance for this lot will not be via Kelso Rd but make its connection to Street A. The architectural design will be assessed at the time of building permits. Therefore, these criteria are met.

#### **CHAPTER 17.84 - IMPROVEMENTS REQUIRED WITH DEVELOPMENT**

##### **17.84.20 TIMING OF IMPROVEMENTS**

- A. All improvements required by the standards in this chapter shall be installed concurrently with development, as follows:
  1. Where a land division is proposed, each proposed lot shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to approval of the final plat.
  2. Where a land division is not proposed, the site shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to temporary or final occupancy of structures.
- B. Where specific approval for a phasing plan has been granted for a planned development and/or subdivision, improvements may similarly be phased in accordance with that plan.

**APPLICANT RESPONSE:** Each lot within the proposed subdivision will have the required public and

franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to the approval of the final plat.

#### **17.84.30 PEDESTRIAN AND BICYCLIST REQUIREMENTS**

- A. Sidewalks shall be required along both sides of all arterial, collector, and local streets, as follows:
1. Sidewalks shall be a minimum of 5 ft. wide on local streets. The sidewalks shall be separated from curbs by a tree planting area that provides separation between sidewalk and curb, unless modified in accordance with Subsection 3 below.
  2. Sidewalks along arterial and collector streets shall be separated from curbs with a planting area, except as necessary to continue an existing curb-tight sidewalk. The planting area shall be landscaped with trees and plant materials approved by the City. The sidewalks shall be a minimum of 6 ft. wide.
  3. Sidewalk improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building. Any exceptions to the standards shall generally be in the following order.
    - a) Narrow landscape strips
    - b) Narrow sidewalk or portion of sidewalk to no less than 4 feet in width
    - c) Eliminate landscape strips
    - d) Narrow on-street improvements by eliminating on-street parking
    - e) Eliminate sidewalks
  4. The timing of the installation of sidewalks shall be as follows:
    - a) Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.
    - b) Sidewalks along local streets shall be installed in conjunction with development of the site, generally with building permits, except as noted in (c) below.
    - c) Where sidewalks on local streets abut common areas, drainageways, or other publicly owned or semi-publicly owned areas, the sidewalks and planted areas shall be installed with street improvements.

**APPLICANT RESPONSE:** Frontage improvements along Kelso Rd (collector) include a 6' property tight sidewalk and a 5' curb tight planter strip. Frontage improvements for the newly constructed public roads through the subdivision will include a 5' property tight sidewalks and 5' curb tight planter strips. The timing of sidewalk installation will be to install the sidewalks fronting Kelso Rd and those sidewalks fronting all tracts at the time of the site development. The sidewalks along the local streets fronting future residential lots will be installed at the time of building construction.

- B. Safe and convenient pedestrian and bicyclist facilities that strive to minimize travel distance to the extent practicable shall be provided in conjunction with new development within and between new subdivisions, planned developments, commercial developments, industrial areas, residential areas, public transit stops, school transit stops, and neighborhood activity centers such as schools and parks, as follows:
1. For the purposes of this section, "safe and convenient" means pedestrian and bicyclist facilities that: are reasonably free from hazards which would interfere with or discourage travel for short trips; provide a direct route of travel between destinations; and meet the travel needs of pedestrians and bicyclists considering destination and length of trip.
  2. To meet the intent of "B" above, right-of-ways connecting cul-de-sacs or passing through unusually long or oddly shaped blocks shall be a minimum of 15 ft. wide with 8 feet of pavement.
  3. 12 feet wide pathways shall be provided in areas with high bicycle volumes or multiple use by bicyclists, pedestrians, and joggers.
  4. Pathways and sidewalks shall be encouraged in new developments by clustering buildings or constructing convenient pedestrian ways. Pedestrian walkways shall be provided in accordance

with the following standards:

- a) The pedestrian circulation system shall be at least five feet in width and shall connect the sidewalk on each abutting street to the main entrance of the primary structure on the site to minimize out of direction pedestrian travel.
- b) Walkways at least five feet in width shall be provided to connect the pedestrian circulation system with existing or planned pedestrian facilities which abut the site but are not adjacent to the streets abutting the site.
- c) Walkways shall be as direct as possible and avoid unnecessary meandering.
- d) Walkway/driveway crossings shall be minimized. Internal parking lot design shall maintain ease of access for pedestrians from abutting streets, pedestrian facilities, and transit stops.
- e) With the exception of walkway/driveway crossings, walkways shall be separated from vehicle parking or vehicle maneuvering areas by grade, different paving material, painted crosshatching or landscaping. They shall be constructed in accordance with the sidewalk standards adopted by the City. (This provision does not require a separated walkway system to collect drivers and passengers from cars that have parked on site unless an unusual parking lot hazard exists).
- f) Pedestrian amenities such as covered walk-ways, awnings, visual corridors and benches will be encouraged. For every two benches provided, the minimum parking requirements will be reduced by one, up to a maximum of four benches per site. Benches shall have direct access to the circulation system.

**APPLICANT RESPONSE:** Five-foot sidewalks are proposed on all the local streets and six-foot sidewalks are proposed along the property's frontage along Kelso Rd. Therefore, these criteria will be met.

- C. Where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80.

**APPLICANT RESPONSE:** The subject site is not traversed by a future trail linkage identified within the Transportation System Plan but it is adjacent. The application is proposing a connection to this trail system from the southern end of the cul-de-sac to the edge of the property near the SE corner. This will create direct connection into the future trail system to the east when said trail is developed on the adjacent property. Therefore, this project is in compliance with this code section. Additionally, it should be noted the project is proposing multiple trails throughout the site. An additional trail is proposed within Tract K that provides direct pedestrian connection from 'Street A' to the eastern property line. Another trail is proposed to connect Street B to Street A's cul-de-sac (Tract N) and an additional trail from Street A running west to intersect Tract N, providing additional pedestrian access outside of the sidewalk system from the western end of Street B to the eastern property line.

- D. To provide for orderly development of an effective pedestrian network, pedestrian facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).

**APPLICANT RESPONSE:** The sidewalks along Kelso Rd and all tracts will be installed with the land development and sidewalks proposed along local streets fronting residential lots within the subject site will be installed at the time of building construction. The sidewalks, where applicable, are designed to the property's edge allowing for connection when adjacent properties develop. Therefore, this criterion will be met.

- E. To ensure improved access between a development site and an existing developed facility such as a commercial center, school, park, or trail system, the Planning Commission or Director may require off-site pedestrian facility improvements concurrent with development.



**APPLICANT RESPONSE:** There is no existing developed facility access with the subject site. Therefore, this criterion does not apply.

#### **17.84.40 TRANSIT AND SCHOOL BUS TRANSIT REQUIREMENTS**

- A. Development sites located along existing or planned transit routes shall, where appropriate, incorporate bus pull-outs and/or shelters into the site design. These improvements shall be installed in accordance with the guidelines and standards of the transit agency. School bus pull-outs and/or shelters may also be required, where appropriate, as a condition of approval for a residential development of greater than 50 dwelling units where a school bus pick-up point is anticipated to serve a large number of children.
- B. New developments at or near existing or planned transit or school bus transit stops shall design development sites to provide safe, convenient access to the transit system, as follows:
  - 1. Commercial and civic use developments shall provide a prominent entrance oriented towards arterial and collector streets, with front setbacks reduced as much as possible to provide access for pedestrians, bicycles, and transit.
  - 2. All developments shall provide safe, convenient pedestrian walkways between the buildings and the transit stop, in accordance with the provisions of 17.84.30 B.

**APPLICANT RESPONSE:** The proposed site location does not front an existing or planned transit route and does not exceed 50 dwelling units. Therefore, this criterion does not apply.

#### **17.84.50 STREET REQUIREMENTS**

- A. Transportation Impact Study (No Dwellings). For development applications that do not propose any dwelling units, the City may require a transportation impact study that evaluates the impact of the proposed development on the transportation system. Unless the City does not require a transportation impact study, the applicant shall prepare the study in accordance with the following:
  - 1. A proposal establishing the scope of the study shall be submitted for review to the City Traffic Engineer. The scope shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. Large projects shall assess intersections and street segments where the development causes increases of more than 20 vehicles in either the AM or PM peak hours. Once the City Traffic Engineer has approved the scope of the study, the applicant shall submit the results of the study as part of its development application. Failure to submit a required study will result in an incomplete application. A traffic impact study shall bear the seal of a Professional Engineer licensed in the State of Oregon and qualified in traffic or civil engineering.
  - 2. If the study identifies level-of-service conditions less than the minimum standard established in the development code or the Sandy Transportation System Plan, or fails to demonstrate that average daily traffic on existing or proposed streets will meet the ADT 17.84 - 4 Revised by Ordinance 2020-24 effective 9/21/2020 standards established in the development code, the applicant shall propose improvements and funding strategies for mitigating identified problems or deficiencies that will be implemented concurrent with the proposed development
- B. Transportation Impact Study (Dwellings). For development applications that propose dwelling units, an applicant must submit a transportation impact study unless the application is exempt from this requirement pursuant to subsection (B)(6), below. Failure to submit the study will result in an incomplete application. A traffic impact study shall bear the seal of a Professional Engineer licensed in the State of Oregon and qualified in traffic or civil engineering. The applicant shall prepare the study in accordance with the following:
  - 1. The study area must include all existing and proposed site accesses and all existing and proposed streets and intersections where the development adds more than 20 vehicles during any peak hour as determined by using the most recent edition of the Institute of Transportation Engineers Trip Generation Manual. The determination of peak hour vehicle addition shall include the cumulative impact of the proposed development and development on abutting properties that

- received a certificate of occupancy or recorded a plat within the past 5 years.
2. The study must analyze existing conditions and projected conditions upon completion of the proposed development.
  3. The study must be performed for the weekday a.m. peak hour (one hour between 7 a.m. and 9 a.m.) and p.m. peak hour (one hour between 4 p.m. and 6 p.m.). Analysis of other time periods may be required for uses that generate their highest traffic volumes at other times of the day or on weekends.
  4. The study must demonstrate that the transportation impacts from the proposed development will comply with the City's level-of-service and average daily traffic standards and the Oregon Department of Transportation's mobility standard.
  5. If the study identifies level-of-service conditions less than the minimum standard established in the development code or the Sandy Transportation System Plan, or fails to demonstrate that average daily traffic on existing or proposed streets will meet the ADT standards established in the development code or fails to meet the Oregon Department of Transportation's mobility standard, the applicant shall propose improvements and funding strategies for mitigating identified problems or deficiencies that will be implemented concurrent with the proposed development.
  6. A transportation impact study is not required under this section if:
    - a) The cumulative impact of the proposed development and development on abutting properties that received a certificate of occupancy or recorded a plat within the past 5 years will generate no more than 20 vehicle trips in any weekday a.m. or p.m. peak hour as determined by using the most recent edition of the Institute of Transportation Engineers Trip Generation Manual; or
    - b) The proposed development completed a transportation impact study at the time of annexation within the past 5 years and that study assessed the impact of the same or more dwelling units than proposed under the new land use action; or
    - c) The application only proposes to convert an existing detached single family dwelling to a duplex.
- C. Transportation Impact Study (Dwellings) – Discretionary Track. As an alternative to the process outlined in Section 17.84.50(B), an applicant may choose to follow the process in Section 17.84.50(A).

**APPLICANT RESPONSE:** A traffic impact study was completed and included with this application packet. The study found no mitigation measures were necessary.

- D. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:
1. Arterial streets should generally be spaced in one-mile intervals.
  2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.

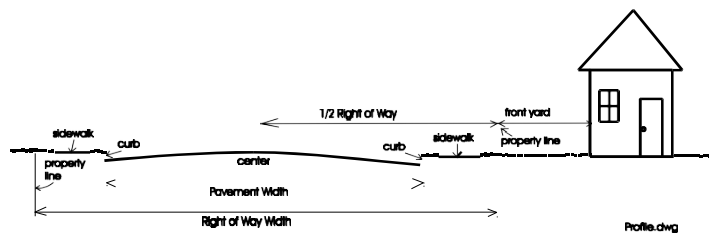
**APPLICANT RESPONSE:** This project does not include the creation of arterial streets. Therefore, this criterion does not apply.

- E. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, "through traffic" means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:
1. Straight segments of local streets should be kept to less than a quarter mile in length. As practical, local streets should include traffic calming features, and design features such as curves and "T" intersections while maintaining pedestrian connectivity.
  2. Local streets should typically intersect in "T" configurations rather than 4-way intersections to minimize conflicts and discourage through traffic. Adjacent "T" intersections shall maintain a minimum of 150 ft. between the nearest edges of the 2 rights-of-way.

3. Cul-de-sacs should generally not exceed 400 ft. in length nor serve more than 20 dwelling units, except in cases where existing topography, wetlands, or drainage systems or other existing features necessitate a longer cul-de-sac in order to provide adequate access to an area. Cul-de-sacs longer than 400 feet or developments with only one access point may be required to provide an alternative access for emergency vehicle use only, install fire prevention sprinklers, or provide other mitigating measures, determined by the City.

**APPLICANT RESPONSE:** The project proposal does not include any long straight street segments. This will promote traffic to move slower through the development and avoids “through” traffic. The distance between all “T” intersections meets 150’ spacing requirement. The project is proposing one cul-de-sac. This cul-de-sac will exceed 400’ in length but will serve less than 20 homes and there is a secondary access for emergency use at the southern end of the cul-de-sac. The streets created within this subdivision do not connect to another street system, “through” traffic is not anticipated within this subdivision. Therefore, these criteria are met.

- F. Development sites shall be provided with access from a public street improved to City standards in accordance with the following:
  1. Where a development site abuts an existing public street not improved to City standards, the abutting street shall be improved to City standards along the full frontage of the property concurrent with development.
  2. Half-street improvements are considered the minimum required improvement. Three-quarter-street or full-street improvements shall be required where traffic volumes generated by the development are such that a half-street improvement would cause safety and/or capacity problems. Such a determination shall be made by the City Engineer.
  3. To ensure improved access to a development site consistent with policies on orderly urbanization and extension of public facilities the Planning Commission or Director may require off-site improvements concurrent with development. Off-site improvement requirements upon the site developer shall be reasonably related to the anticipated impacts of the development.
  4. Reimbursement agreements for  $\frac{3}{4}$  street improvements (i.e., curb face to curb face) may be requested by the developer per Chapter 12 of the SMC.
  5. A  $\frac{1}{2}$  street improvement includes curb and pavement 2 feet beyond the center line of the right-of-way. A  $\frac{3}{4}$  street improvement includes curbs on both sides of the side and full pavement between curb faces.



**APPLICANT RESPONSE:** The project site abuts an existing public street (Kelso Rd). The application is proposing half street improvements along Kelso Rd to meet county requirements and these will be reviewed and permitted by the county and completed at the time of the site development. The new streets proposed within this subdivision include full street Improvements. Please refer to the plans for visual representation of this. Therefore, these criteria can be met.

- G. As necessary to provide for orderly development of adjacent properties, public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property(ies) in accordance with the following:

1. Temporary dead-ends created by this requirement to extend street improvements to the edge of adjacent properties may be installed without turnarounds, subject to the approval of the Fire Marshal.
2. In order to assure the eventual continuation or completion of the street, reserve strips may be required.

**APPLICANT RESPONSE:** A permanent dead-end street is proposed within this subdivision. However, there is a secondary emergency access off the cul-de-sac. There is one temporary dead-end street proposed with the project (Street B). When the western property develops, it is proposed that this street will be extended into the future development. Please refer to the plan set for visual representation of the future extensions.

- H. Where required by the Planning Commission or Director, public street improvements may be required through a development site to provide for the logical extension of an existing street network or to connect a site with a nearby neighborhood activity center, such as a school or park. Where this creates a land division incidental to the development, a land partition shall be completed concurrent with the development.

**APPLICANT RESPONSE:** This proposal includes public street improvements and provides street network that supports circulation within the subject site and will support future extension of the proposed street network to the west.

- I. Except for extensions of existing streets, no street names shall be used that will duplicate or be confused with names of existing streets. Street names and numbers shall conform to the established pattern in the surrounding area and be subject to approval of the Director.

**APPLICANT RESPONSE:** Street names have not yet been assigned to the new proposed ROW streets. It is our intention to work with the City of Sandy and Fire Department on the naming of streets prior to final plat. Therefore, this criterion can be met.

- J. Location, grades, alignment, and widths for all public streets shall be considered in relation to existing and planned streets, topographical conditions, public convenience and safety, and proposed land use. Where topographical conditions present special circumstances, exceptions to these standards may be granted by the City Engineer provided the safety and capacity of the street network is not adversely affected. The following standards shall apply:
1. Location of streets in a development shall not preclude development of adjacent properties. Streets shall conform to planned street extensions identified in the Transportation Plan and/or provide for continuation of the existing street network in the surrounding area.
  2. Grades shall not exceed 6 percent on arterial streets, 10 percent on collector streets, and 15 percent on local streets.
  3. As far as practical, arterial streets and collector streets shall be extended in alignment with existing streets by continuation of the street centerline. When staggered street alignments resulting in "T" intersections are unavoidable, they shall leave a minimum of 150 ft. between the nearest edges of the two rights-of-way.
  4. Centerline radii of curves shall not be less than 500 ft. on arterial streets, 300 ft. on collector streets, and 100 ft. on local streets.
  5. Streets shall be designed to intersect at angles as near as practicable to right angles and shall comply with the following:
    - a) The intersection of an arterial or collector street with another arterial or collector street shall have a minimum of 100 ft. of straight (tangent) alignment perpendicular to the intersection.
    - b) The intersection of a local street with another street shall have a minimum of 50 ft. of straight (tangent) alignment perpendicular to the intersection.
    - c) Where right angle intersections are not possible, exceptions can be granted by the City

Engineer provided that intersections not at right angles have a minimum corner radius of 20 ft. along the right-of-way lines of the acute angle.

- d) Intersections with arterial streets shall have a minimum curb corner radius of 20 ft. All other intersections shall have a minimum curb corner radius of 10 ft.
- 6. Right-of-way and improvement widths shall be as specified by the Transportation System Plan. Exceptions to those specifications may be approved by the City Engineer to deal with specific unique physical constraints of the site.

**APPLICANT RESPONSE:** The location of streets within the proposed development do not preclude future development of adjacent properties but rather support any future neighboring development to the west. Development to the South and East are not likely or feasible to happen due to existing site conditions and the BPA easement. Please refer to sheet 11 for a visual representation of this. Grades of the future local streets within this development are all under 10%. We are not extending any arterial or collector streets. Centerline radii curves for this project are all on local streets and are all 100 or greater. All streets are proposed within this project intersect at right angles. All intersections meet their respective curb corner radius. The proposed ROW width for all local streets within the subdivision are 50' in width. Therefore, all the above criteria can be met.

- K. Private streets may be considered within a development site provided all the following conditions are met:
  - 1. Extension of a public street through the development site is not needed for the continuation of existing street network or for future adjacent properties;
  - 2. The development site remains in one ownership, or adequate mechanisms are established (such as a homeowner's association invested with the authority to enforce payment) to ensure that a private street installed with a land division will be adequately maintained; and
  - 3. Where a private street is installed in connection with a land division, paving standards consistent with City standards for public streets shall be utilized to protect the interest of future homeowners.

**APPLICANT RESPONSE:** This project is not proposing the use of private streets. Therefore, these criteria do not apply.

#### **17.84.60 PUBLIC FACILITY EXTENSIONS**

- A. All development sites shall be provided with public water, sanitary sewer, broadband (fiber), and storm drainage.
- B. Where necessary to serve property as specified in "A" above, required public facility installations shall be constructed concurrent with development.
- C. Off-site public facility extensions necessary to fully serve a development site and adjacent properties shall be constructed concurrent with development.
- D. As necessary to provide for orderly development of adjacent properties, public facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).
- E. All public facility installations required with development shall conform to the City's facilities master plans.
- F. Private on-site sanitary sewer and storm drainage facilities may be considered provided all the following conditions exist:
  - 1. Extension of a public facility through the site is not necessary for the future orderly development of adjacent properties;
  - 2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above);
  - 3. The facilities are designed and constructed in accordance with the Uniform Plumbing Code and other applicable codes, and permits and/or authorization to proceed with construction is issued prior to commencement of work.

**APPLICANT RESPONSE:** This project will be providing public water, sanitary sewer, storm drainage and broadband (fiber) to and through the subdivision and it will be available to all proposed lots. It is the intention to work with Sandynet on a fiber design. The fiber design will be incorporated into the detailed construction drawing plans submitted to Public Works. Preliminary utility plans have been included with this submittal. Please refer to the prelim utility plan.

#### **17.84.80 FRANCHISE UTILITY INSTALLATIONS**

These standards are intended to supplement, not replace or supersede, requirements contained within individual franchise agreements the City has with providers of electrical power, telephone, cable television, and natural gas services (hereinafter referred to as "franchise utilities").

- A. Where a land division is proposed, the developer shall provide franchise utilities to the development site. Each lot created within a subdivision shall have an individual service available or financially guaranteed prior to approval of the final plat.
- B. Where necessary, in the judgment of the Director, to provide for orderly development of adjacent properties, franchise utilities shall be extended through the site to the edge of adjacent property(ies), whether or not the development involves a land division.
- C. The developer shall have the option of choosing whether or not to provide natural gas or cable television service to the development site, providing all of the following conditions exist:
  1. Extension of franchise utilities through the site is not necessary for the future orderly development of adjacent property(ies);
  2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above); and
  3. The development is non-residential.
- D. Where a land division is not proposed, the site shall have franchise utilities required by this section provided in accordance with the provisions of 17.84.70 prior to occupancy of structures.
- E. All franchise utility distribution facilities installed to serve new development shall be placed underground except as provided below. The following facilities may be installed above- ground:
  1. Poles for street lights and traffic signals, pedestals for police and fire system communications and alarms, pad mounted transformers, pedestals, pedestal mounted terminal boxes and meter cabinets, concealed ducts, substations, or facilities used to carry voltage higher than 35,000 volts;
  2. Overhead utility distribution lines may be permitted upon approval of the City Engineer when unusual terrain, soil, or other conditions make underground installation impracticable. Location of such overhead utilities shall follow rear or side lot lines wherever feasible.
- F. The developer shall be responsible for making necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.
- G. The developer shall be responsible for installation of underground conduit for street lighting along all public streets improved in conjunction with the development in accordance with the following:
  1. The developer shall coordinate with the City Engineer to determine the location of future street light poles. The street light plan shall be designed to provide illumination meeting standards set by the City Engineer.
  2. The developer shall make arrangements with the serving electric utility for trenching prior to installation of underground conduit for street lighting.

**APPLICANT RESPONSE:** It is the intention of this project to provide power, natural gas and cable tv underground to all the lots within the subdivision prior to occupancy. The applicant will work directly with each franchise on plan designs. The franchise utility conduit and pipes will be installed with the site development. Therefore, the above criteria can be met.

#### **17.84.90 LAND FOR PUBLIC PURPOSES**

- A. Easements for public sanitary sewer, water, storm drain, pedestrian and bicycle facilities shall be provided whenever these facilities are located outside a public right-of-way in accordance with the following:
1. When located between adjacent lots, easements shall be provided on one side of a lot line.
  2. The minimum easement width for a single utility is 15 ft. The minimum easement width for two adjacent utilities is 20 ft. The easement width shall be centered on the utility to the greatest extent practicable. Wider easements may be required for unusually deep facilities.

**APPLICANT RESPONSE:** This application includes two separate 15' public sanitary sewer easements. The first easement is to be centered on the shared lot line between lots 44 and 45. The second one is to be centered on the shared lot line of 69 and 70. Both sewer easements are to be located within a 15' easement or tract dedicated to the City of Sandy. Therefore, these criteria will be met.

- B. Public utility easements with a minimum width of 5 feet shall be provided adjacent to all street rights-of-way for franchise utility installations.

**APPLICANT RESPONSE:** All franchise utilities will be located within a P.U.E located adjacent to the ROW. Therefore, this criterion will be met.

- C. Where a development site is traversed by a drainageway or water course, a drainage way dedication shall be provided to the City.

**APPLICANT RESPONSE:** The subject site has a perennial stream located on it. The stream will be located all within tracts that are proposed to be deeded to the City of Sandy or within future public right of way. Therefore, this criterion will be met.

- D. Where a development is traversed by, or adjacent to, a future trail linkage identified within the Transportation System Plan, dedications of suitable width to accommodate the trail linkage shall be provided. This width shall be determined by the City Engineer, considering the type of trail facility involved.

**APPLICANT RESPONSE:** There is an easement for trails adjacent to Tract E of Plat No. 4575 as recorded with Clackamas County of subject property. Tract E area is not included within the proposed development, but the applicant has designed a secondary Fire Access and pedestrian pathway within Tract E. The project is proposing the pedestrian pathway to be within an easement to connect the proposed cul-de-sac to the existing trail easement.

- E. Where existing rights-of-way and/or easements within or adjacent to development sites are nonexistent or of insufficient width, dedications may be required. The need for and widths of those dedications shall be determined by the City Engineer.

**APPLICANT RESPONSE:** The project is proposing additional dedication along Kelso Rd in order to meet the County's design standards and all the future local streets proposed within the development will be of adequate width. The applicant will work with the County on the dedication requirements. All future streets and easements proposed within the subject property will meet the required widths. Therefore, this criterion will be met.

- F. Where easement or dedications are required in conjunction with land divisions, they shall be recorded on the plat. Where a development does not include a land division, easements and/or dedications shall be recorded on standard document forms provided by the City Engineer.

**APPLICANT RESPONSE:** The applicant will dedicate all tracts and easements with the final plat. Therefore, this criterion will be met.

- G. If the City has an interest in acquiring any portion of a proposed subdivision or planned development site for a public purpose, other than for those purposes listed above, or if the City has been advised of such interest by a school district or other public agency, and there is a reasonable assurance that steps will be taken to acquire the land, the Planning Commission may require those portions of the land be reserved for public acquisition for a period not to exceed 1 year.
- H. Environmental assessments for all lands to be dedicated to the public or City may be required to be provided by the developer. An environmental assessment shall include information necessary for the City to evaluate potential liability for environmental hazards, contamination, or required waste cleanups related to the dedicated land. An environmental assessment shall be completed prior to the acceptance of dedicated lands in accordance with the following:
  - 1. The initial environmental assessment shall detail the history of ownership and general use of the land by past owners. Upon review of the information provided by the grantor, as well as any site investigation by the City, the Director will determine if the risks of potential contamination warrant further investigation. When further site investigation is warranted, a Level I Environmental Assessment shall be provided by the grantor.

**APPLICANT RESPONSE:** It is the intention of the applicant to work with the City on the dedication of tracts of land and any initial environmental assessment they may require for said tracts proposed for dedication. Therefore, the applicable criteria can be met.

**17.84.100 MAIL DELIVERY FACILITIES**

- A. In establishing placement of mail delivery facilities, locations of sidewalks, bikeways, intersections, existing or future driveways, existing or future utilities, right-of-way and street width, and vehicle, bicycle and pedestrian movements shall be considered. The final location of these facilities shall meet the approval of the City Engineer and the Post Office. Where mail delivery facilities are being installed in conjunction with a land division, placement shall be indicated on the plat and meet the approval of the City Engineer and the Post Office prior to final plat approval.
- B. Where mail delivery facilities are proposed to be installed in areas with an existing or future curb-tight sidewalk, a sidewalk transition shall be provided that maintains the required design width of the sidewalk around the mail delivery facility. If the right-of-way width will not accommodate the sidewalk transition, a sidewalk easement shall be provided adjacent to the right-of-way.
- C. Mail delivery facilities and the associated sidewalk transition (if necessary) around these facilities shall conform with the City's standard construction specifications. Actual mailbox units shall conform with the Post Office standards for mail delivery facilities.
- D. Installation of mail delivery facilities is the obligation of the developer. These facilities shall be installed concurrently with the public improvements. Where development of a site does not require public improvements, mail delivery facilities shall be installed concurrently with private site improvements.

**APPLICANT RESPONSE:** It is the intention of the applicant to work with the designated USPS representative for this area and City Engineer on the desired location(s) for the future mailboxes during the construction engineering design. The mailboxes will be installed with the site development. Therefore, these criteria can be met.

**CHAPTER 17.86 - PARKLAND & OPEN SPACE**

**17.86.10 MINIMUM PARKLAND DEDICATION REQUIREMENTS**

Parkland Dedication: New residential subdivisions, planned developments, multi-family or manufactured home park developments shall be required to provide parkland to serve existing and future residents of those developments. Multi-family developments which provide some "congregate" services and/or facilities, such as group transportation, dining halls, emergency monitoring systems, etc., but which have



individual dwelling units rather than sleeping quarters only, are considered to be multi-family developments for the purpose of parkland dedication.

Licensed adult congregate living facilities, nursing homes, and all other similar facilities which provide their clients with individual beds and sleeping quarters, but in which all other care and services are communal and provided by facility employees, are specifically exempt from parkland dedication and system development fee requirements.

1. The required parkland shall be dedicated as a condition of approval for the following:
  - a. Tentative plat for a subdivision or partition;
  - b. Planned Development conceptual or detailed development plan;
  - c. Design review for a multi-family development or manufactured home park; and
  - d. Replat or amendment of any site plan for multi-family development or manufactured home park where dedication has not previously been made or where the density of the development involved will be increased.

2. Calculation of Required Dedication: The required parkland acreage to be dedicated is based on a calculation of the following formula rounded to the nearest 1/100 (0.00) of an acre:

*Required parkland dedication (acres) = (proposed units) x (persons/unit) x 0.0043 (per person park land dedication factor)*

- a. Population Formula: The following table shall be used to determine the number of persons per unit to be used in calculating required parkland dedication:
- b.

Type of Unit	Total Persons Per Unit
Single family residential	3.0
Standard multi-family unit	2.0
Manufactured dwelling park	2.0
Congregate multi-family unit	1.5

Persons per unit, age distribution, and local conditions change with time. The specific formula for the dedication of land will, therefore, be subject to periodic review and amendment.

- c. Per Person Parkland Dedication Factor: The total parkland dedication requirement shall be 0.0043 of an acre per person based on the adopted standard of 4.3 acres of land per one thousand of ultimate population per the Parks Master Plan<sup>1</sup>. This standard represents the citywide land-to-population ratio for city parks, and may be adjusted periodically through amendments to the Parks Master Plan.

<sup>1</sup> Parks Master Plan, Implementation Plan section, Pages 4 and 5 indicate a required park acreage total of 64.5 acres. This number, divided by population (2015) of 15,000 equates to 4.3 acres per 1000 population or 0.0043 per person.

**APPLICANT RESPONSE:** Per the calculation above, this project would require 0.57-acre park dedication. (43 x 3.0 x 0.0043 = 0.5547 = 0.55).

#### 17.86.40 CASH IN LIEU OF DEDICATION

At the city's discretion only, the city may accept payment of a fee in lieu of land dedication. The city may require payment in lieu of land when the park land to be dedicated is less than 3 acres. A payment in lieu of land dedication is separate from Park Systems Development Charges, and is not eligible for a credit of Park Systems Development Charges. The amount of the fee in lieu of land dedication (in dollars per acre) shall be set by City Council Resolution, and it shall be based on the typical market value of developed property (finished lots) in Sandy net of related development costs.

1. The following factors shall be used in the choice of whether to accept land or cash in lieu:
  - a. The topography, geology, access to, parcel size, and location of land in the development available for dedication;
  - b. Potential adverse/beneficial effects on environmentally sensitive areas;

- c. Compatibility with the Parks Master Plan, Public Facilities element of the Comprehensive Plan, and the City of Sandy Capital Improvements Program in effect at the time of dedication;
  - d. Availability of previously acquired property; and
  - e. The feasibility of dedication.
2. Cash in lieu of parkland dedication shall be paid prior to approval of the final plat or as specified below:
- a. 50 percent of the payment shall be paid prior to final plat approval, and
  - b. The remaining 50 percent of the payment pro-rated equally among the lots, plus an administrative surcharge as determined by the City Council through a resolution, will constitute a lien against the property payable at the time of sale.

**APPLICANT RESPONSE:** Based on the notes from the preapp application, the parks department preferred the fee-in-lieu of park space. The fee would be based off the \$241,000 per acre calculation (provided in the preapp conference notes), coming to a total of \$133,682.70 if paid prior to final plat approval. It is the intention of the applicant to pay the cash in lieu fee.

#### **17.86.50 MINIMUM STANDARDS FOR OPEN SPACE DEDICATION**

The applicant through a subdivision or design review process may propose the designation and protection of open space areas as part of that process. This open space will not, however, be counted toward the parkland dedication requirement of Sections 17.86.10 through 17.86.40.

1. The types of open space that may be provided are as follows:
  - a. Natural Areas: areas of undisturbed vegetation, steep slopes, stream corridors, wetlands, wildlife habitat areas or areas replanted with native vegetation after construction.
  - b. Greenways: linear green belts linking residential areas with other open space areas. These greenways may contain bicycle paths or footpaths. Connecting greenways between residences and recreational areas are encouraged.
2. A subdivision or design review application proposing designation of open space shall include the following information as part of this application:
  - a. Designate the boundaries of all open space areas; and
  - b. Specify the manner in which the open space shall be perpetuated, maintained, and administered; and
  - c. Provide for public access to trails included in the Park Master Plan, including but not limited to the Tickle Creek Path.
3. Dedication of open space may occur concurrently with development of the project. At the discretion of the city, for development that will be phased, the open space may be set aside in totality and/or dedicated in conjunction with the first phase of the development or incrementally set aside and dedicated in proportion to the development occurring in each phase.
4. Open space areas shall be maintained so that the use and enjoyment thereof is not diminished or destroyed. Open space areas may be owned, preserved, and maintained by any of the following mechanisms or combinations thereof:
  - a. Dedication to the City of Sandy or an appropriate public agency approved by the City, if there is a public agency willing to accept the dedication. Prior to acceptance of proposed open space, the City may require the developer to submit a Phase I Environmental Site Assessment completed by a qualified professional according to American Society of Testing and Materials (ASTM) standards (ASTM E 1527). The results of this study shall indicate a clean environmental record.
  - b. Common ownership by a homeowner's association that assumes full responsibility for its maintenance;
  - c. Dedication of development rights to an appropriate public agency with ownership remaining with the developer or homeowner's association. Maintenance responsibility will remain with the property owner; and/or
  - d. Deed-restricted private ownership preventing development and/or subsequent subdivision

and providing for maintenance responsibilities.

5. In the event that any private owner of open space fails to maintain it according to the standards of this Code, the City of Sandy, following reasonable notice, may demand that the deficiency of maintenance be corrected, and may enter the open space for maintenance purposes. All costs thereby incurred by the City shall be charged to those persons having the primary responsibility for maintenance of the open space.

**APPLICANT RESPONSE:** This project is proposing the dedication of open space to the City of Sandy. The applicant is proposing the dedication of all tracts within this subdivision. The project proposes to dedicate the land concurrently with the site development. The applicant will work with the City of Sandy on the dedication process and their requirements. The tracts proposed for dedication are as follows: J, K, L, M, N, and O.

## CHAPTER 17.92 - LANDSCAPING & SCREENING GENERAL STANDARDS - ALL ZONES

### 17.92.10 GENERAL PROVISIONS

- A. Where landscaping is required by this Code, detailed planting plans shall be submitted for review with development applications. No development may commence until the Director or Planning Commission has determined the plans comply with the purposes clause and specific standards in this chapter. All required landscaping and related improvements shall be completed or financially guaranteed prior to the issuance of a Certificate of Occupancy.
- B. Appropriate care and maintenance of landscaping on-site and landscaping in the adjacent public right-of-way is the right and responsibility of the property owner, unless City ordinances specify otherwise for general public and safety reasons. If street trees or other plant materials do not survive or are removed, materials shall be replaced in kind within 6 months.
- C. Significant plant and tree specimens should be preserved to the greatest extent practicable and integrated into the design of a development. Trees of 25-inches or greater circumference measured at a height of 4-½ ft. above grade are considered significant. Plants to be saved and methods of protection shall be indicated on the detailed planting plan submitted for approval. Existing trees may be considered preserved if no cutting, filling, or compaction of the soil takes place between the trunk of the tree and the area 5-ft. outside the tree's drip line. Trees to be retained shall be protected from damage during construction by a construction fence located 5 ft. outside the dripline.
- D. All landscaping shall be continually maintained, including necessary watering, weeding, pruning and replacing.

**APPLICANT RESPONSE:** Subsection 17.92.10(C) does not apply to subdivisions. Therefore, that criterion does not apply. It is the intention that street trees will be planted as sidewalks are built out with home construction and that irrigation sleeves will be added underneath the sidewalk to allow for necessary watering to the planter strips from the residential lots. Landscape will be continually maintained by the property owner who fronts the planter strip.

### 17.92.30 REQUIRED TREE PLANTINGS

Planting of trees is required for all parking lots with 4 or more parking spaces, public street frontages, and along private drives more than 150 feet long. Trees shall be planted outside the street right-of-way except where there is a designated planting strip or City adopted street tree plan.

The City maintains a list of appropriate trees for street tree and parking lot planting situations. Selection of species should be made from the city-approved list. Alternate selections may be approved by the Director following written request. The type of tree used shall determine frequency of trees in planting areas. Trees in parking areas shall be dispersed throughout the lot to provide a canopy for shade and visual relief.

Area/Type of Planting	Canopy	Spacing
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Street Tree	Medium	30 ft. on center
Street Tree	Large	50 ft. on center
Parking Lot Tree	Medium	1 per 8 cars
Parking Lot Tree	Large	1 per 12 cars

Trees may not be planted:

- Within 5 ft. of permanent hard surface paving or walkways, unless specific species, special planting techniques and specifications approved by the Director are used.
- Unless approved otherwise by the City Engineer:
  - \* Within 10 ft. of fire hydrants and utility poles
  - \* Within 20 ft. of street light standards
  - \* Within 5 ft. from an existing curb face
  - \* Within 10 ft. of a public sanitary sewer, storm drainage or water line
- Where the Director determines the trees may be a hazard to the public interest or general welfare.
- Trees shall be pruned to provide a minimum clearance of 8 ft. above sidewalks and 12 ft. above street and roadway surfaces.

**APPLICANT RESPONSE:** Preliminary street trees have been shown on plan sheet 10. The street trees shall be selected from City of Sandy’s approved street tree list. Final tree locations and species to be determined during final engineering design of the subdivision improvements. The preliminary street tree locations have been placed 30’ on center to meet the above spacing requirements. Therefore, these criteria can be met.

**17.92.40 IRRIGATION**

Landscaping shall be irrigated, either with a manual or automatic system, to sustain viable plant life.

**APPLICANT RESPONSE:** The proposed landscape strips within the public ROW will have irrigation sleeves coming from the property that abuts the adjacent strip. The property owner will be responsible for maintaining the irrigation of the planter strip once the trees are planted. Therefore, this criterion can be met.

**17.92.50 TYPES AND SIZES OF PLANT MATERIALS**

- A. At least 75% of the required landscaping area shall be planted with a suitable combination of trees, shrubs, or evergreen ground cover except as otherwise authorized by Chapter 17.92.10 F.
- B. Plant Materials. Use of native plant materials or plants acclimatized to the Pacific Northwest is encouraged where possible.
- C. Trees shall be species having an average mature spread of crown greater than 15 feet and having trunks which can be maintained in a clear condition with over 5 feet of clear wood (without branches). Trees having a mature spread of crown less than 15 feet may be substituted by grouping the same so as to create the equivalent of a 15-foot crown spread.
- D. Deciduous trees shall be balled and burlapped, be a minimum of 7 feet in overall height or 1½ inches in caliper measured 6 inches above the ground, immediately after planting. Bare root trees will be acceptable to plant during their dormant season.
- E. Coniferous trees shall be a minimum five feet in height above ground at time of planting.
- F. Shrubs shall be a minimum of 1 gallon in size or 2 feet in height when measured immediately after planting.
- G. Hedges, where required to screen and buffer off-street parking from adjoining properties shall be planted with an evergreen species maintained so as to form a continuous, solid visual screen within 2 years after planting.
- H. Vines for screening purposes shall be a minimum of 1 gallon in size or 30 inches in height immediate after planting and may be used in conjunction with fences, screens, or walls to meet physical barrier

requirements as specified.

- I. Groundcovers shall be fully rooted and shall be well branched or leafed. If used in lieu of turf in whole or in part, ground covers shall be planted in such a manner as to provide complete coverage in one year.
- J. Turf areas shall be planted in species normally grown as permanent lawns in western Oregon. Either sod or seed are acceptable. Acceptable varieties include improved perennial ryegrasses and fescues used within the local landscape industry.
- K. Landscaped areas may include architectural features or artificial ground covers such as sculptures, benches, masonry or stone walls, fences, rock groupings, bark dust, decorative hard paving and gravel areas, interspersed with planted areas. The exposed area developed with such features shall not exceed 25% of the required landscaped area. Artificial plants are prohibited in any required landscape area.

**APPLICANT RESPONSE:** Preliminary street trees have been shown on plan sheet 10. The street trees shall be selected from City of Sandy’s approved street tree list. Final tree locations and species to be determined during final engineering design of the subdivision improvements. The preliminary street tree locations have been placed 30’ on center to meet the above spacing requirements. The street trees selected for planting will have a caliper of 1.5. Therefore, the applicable criteria can be met.

**CHAPTER 17.98 - PARKING, LOADING, & ACCESS REQUIREMENTS**

**17.98.10 GENERAL PROVISIONS**

- M. Residential Parking Analysis Plan. A Residential Parking Analysis Plan shall be required for all new residential planned developments, subdivisions, and partitions to include a site plan depicting all of the following:
  - a. Location and dimension of required parking spaces as specified in Section 17.98.200.
  - b. Location of areas where parking is not permitted as specified in Sections 17.98.200(A)(3) and (5).
  - c. Location and design of parking courts (if applicable).

**APPLICANT RESPONSE:** Please refer to sheet 10 for a residential parking analysis for street parking.

**17.98.20 OFF-STREET PARKING REQUIREMENTS UPDATE BASED ON CODE UPDATES**

- A. **Off Street Parking Requirements.** Off street parking shall conform to the following standards:
  1. Commercial uses in the Central Business District (C-1) are exempt from off street parking requirements. Residential uses in the Central Business District (C-1) have to provide off street parking per this section but may get a reduction per Section 17.98.30 (B.).
  2. All square footage measurements are gross square feet of total floor area.
  3. 24 lineal inches of bench shall be considered 1 seat.
  4. Except as otherwise specified, parking for employees shall be provided based on 1 space per 2 employees for the largest shift in addition to required parking specified in Sections 8 – 11 below.
  5. Where less than 5 parking spaces are required, then only one bicycle space shall be required except as otherwise modified in Sections 8 – 11 below.
  6. In addition to requirements for residential off-street parking, new dwellings shall meet the on-street parking requirements in Section 17.98.200.
  7. Uses that rely on square footage for determining parking requirements may reduce the overall square footage of the use by deducting bathrooms, mechanical rooms, and other auxiliary rooms as approved by the Director.
  - 8.

Residential Uses	Number of Parking Spaces	Number of Bicycle Spaces
Single Family Detached/Attached	2 per dwelling	Exempt

**APPLICANT RESPONSE:** Each lot proposed within the subdivision will have at least 2 garage parking spots via the garage and driveway. Therefore, the applicable criterion can be met.

**17.98.50 SETBACKS**

- A. Parking areas, which abut a residential zoning district, shall meet the setback of the most restrictive adjoining residential zoning district.
- B. Required parking shall not be located in a required front or side yard setback area abutting a public street except in industrial districts. For single family and two-family dwellings, required off-street parking may be located in a driveway.
- C. Parking areas shall be setback from a lot line adjoining a street the same distance as the required building setbacks. Regardless of other provisions, a minimum setback of 5 feet shall be provided along the property fronting on a public street. The setback area shall be landscaped as provided in this code.

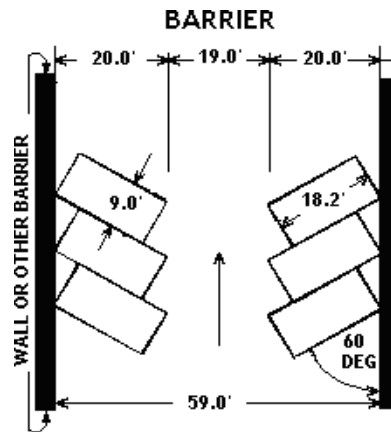
**APPLICANT RESPONSE:** The required off street parking for this project is 2 per lot. These will be located in the garage and driveway. Therefore, the applicable criteria can be met.

**17.98.60 DESIGN, SIZE AND ACCESS**

All off-street parking facilities, vehicular maneuvering areas, driveways, loading facilities, accessways, and private streets shall conform to the standards set forth in this section.

- A. Parking Lot Design. All areas for required parking and maneuvering of vehicles shall have a durable hard surface such as concrete or asphalt.
- B. Size of Space.
  - 1. A standard parking space shall be 9 feet by 18 feet.
  - 2. A compact parking space shall be 8 feet by 16 feet.
  - 3. Handicapped parking spaces shall be 13 feet by 18 feet. Accessible parking shall be provided for all uses in compliance with the requirements of the State of Oregon (ORS 447.233) and the Americans with Disabilities Act.
  - 4. Parallel parking spaces shall be a length of 22 feet.
  - 5. No more than 35 percent of the parking stalls shall be compact spaces.
- C. Aisle Width.

Parking Aisle	Single Sided One-Way	Single Sided Two-Way	Double Sided One-Way	Double Sided Two-Way
90 degree	20 feet	22 feet	25 feet	25 feet
60 degree	20 feet	20 feet	20 feet	20 feet
45 degree	20 feet	20 feet	20 feet	20 feet
Parallel	12 feet	12 feet	16 feet	16 feet



**APPLICANT RESPONSE:** The proposed offsite parking will accommodate at least two cars on each lot. It is the intention of the builder to have driveway garage spaces that will accommodate the off-street parking. Therefore, the applicable criteria can be met.

**17.98.80 ACCESS TO ARTERIAL AND COLLECTOR STREETS**

- A. Location and design of all accesses to and/or from arterials and collectors (as designated in the Transportation System Plan) are subject to review and approval by the City Engineer. Where practical, access from a lower functional order street may be required. Accesses to arterials or collectors shall be located a minimum of 150 ft. from any other access or street intersection. Exceptions may be granted by the City Engineer. Evaluations of exceptions shall consider posted speed of the street on which access is proposed, constraints due to lot patterns, and effects on safety and capacity of the adjacent public street, bicycle and pedestrian facilities.
- B. No development site shall be allowed more than one access point to any arterial or collector street (as designated in the Transportation System Plan) except as approved by the City Engineer. Evaluations of exceptions shall consider posted speed of street on which access is proposed, constraints due to lot patterns, and effects on safety and capacity of the adjacent public street, bicycle and pedestrian facilities.
- C. When developed property is to be expanded or altered in a manner that significantly affects on-site parking or circulation, both existing and proposed accesses shall be reviewed under the standards in A and B above. As a part of an expansion or alteration approval, the City may require relocation and/or reconstruction of existing accesses not meeting those standards.

**APPLICANT RESPONSE:** This project proposes one access onto a collector which is spaced 150' from the next connection onto Kelso Rd. All homes with frontage along Kelso Rd will be accessing their homes from a local street. Therefore, the criteria can be met.

**17.98.100 DRIVEWAYS**

- A. A driveway to an off-street parking area shall be improved from the public roadway to the parking area a minimum width of 20 feet for a two-way drive or 12 feet for a one-way drive but in either case not less than the full width of the standard approach for the first 20 feet of the driveway.
- B. A driveway for a single-family dwelling shall have a minimum width of 10 feet.
- C. A driveway for a two-family dwelling shall have a minimum width of 20 feet. A driveway approach must be constructed in accordance with applicable city standards and the entire driveway must be paved with asphalt or concrete.
- D. Driveways, aisles, turnaround areas and ramps shall have a minimum vertical clearance of twelve feet for their entire length and width but such clearance may be reduced in parking structures.

- E. No driveway shall traverse a slope in excess of 15 percent at any point along the driveway length.
- F. The location and design of the driveway shall provide for unobstructed sight per the vision clearance requirements. Requests for exceptions to these requirements will be evaluated by the City Engineer considering the physical limitations of the lot and safety impacts to vehicular, bicycle, and pedestrian traffic.
- G. The Sum of the width of all driveway approaches within the bulb of a cul-de-sac as measured in the Section B above shall not exceed fifty percent of the circumference of the cul-de-sac bulb. The cul-de-sac bulb circumference shall be measured at the curb line and shall not include the width of the stem street. The nearest edge of the driveway approaches in cul-de-sacs shall not be located within 15 feet of the point of curvature of the curb return on the stem street.
  - Acronyms on the next page:
    - PT: point of tangency
    - PC: point of curvature
    - PRC: point of reverse curvature
- H. The location and design of any driveway approach shall provide for unobstructed sight per the vision clearance requirements in section 17.34.30. Requests for exceptions to these requirements will be evaluated by the City Engineer considering the physical limitations of the lot and safety impacts to vehicular, bicycle, and pedestrian traffic.
- I. Driveways shall taper to match the driveway approach width to prevent stormwater sheet flow from traversing sidewalks.

**APPLICANT RESPONSE:** This project is proposing all single-family dwellings with their own driveway. This project does not propose any two-family dwellings (duplexes). All driveways proposed are at least 10ft in width, will not exceed 15% slope, meet vision clearance requirements of 17.34.30, and taper to match the driveway approach width. The sum of driveways in the cul-de-sac bulb is 31% of the circumference. Therefore, the applicable criteria can be met.

#### **17.98.110 VISION CLEARANCE**

- A. Except within the Central Business District, vision clearance areas shall be provided at intersections of all streets and at intersections of driveways and alleys with streets to promote pedestrian, bicycle, and vehicular safety. The extent of vision clearance to be provided shall be determined from standards in Chapter 17.74 and taking into account functional classification of the streets involved, type of traffic control present at the intersection, and designated speed for the streets.
- B. Traffic control devices, streetlights, and utility installations meeting approval by the City Engineer are permitted within vision clearance areas.

**APPLICANT RESPONSE:** Vision clearances will be provided for each intersection. These will be maintained to insure there are no obstructions. Traffic control devices, streetlights and utility installations will be in approvable locations by the City Engineer. These will be represented on the construction drawings submitted to Public Works. Therefore, the applicable criteria can be met.

#### **17.98.130 PAVING**

- A. Parking areas, driveways, aisles and turnarounds shall be paved with concrete, asphalt or comparable surfacing, constructed to city standards for off-street vehicle areas.
- B. Gravel surfacing shall be permitted only for areas designated for non-motorized trailer or equipment storage, propane or electrically powered vehicles, or storage of tracked vehicles.

**APPLICANT RESPONSE:** All parking, driveway and maneuvering areas are proposed to be concrete, asphalt, or approved comparable surfacing. Therefore, the above criterion can be met.

#### **17.98.200 RESIDENTIAL ON-STREET PARKING REQUIREMENTS**

- A. Residential On-Street Parking Requirements. Residential on-street parking shall conform to the



following standards:

1. In addition to required off-street parking, all new residential planned developments, subdivisions and partitions shall provide one (1) on-street parking space within 300 feet of each dwelling except as provided in Section 17.98.200(A)(6) below. The 300 feet shall be measured from the primary entrance of the dwelling
2. The location of residential on-street parking shall be reviewed for compliance with this section through submittal of a Residential Parking Analysis Plan as required in Section 17.98.10(M).
3. Residential on-street parking shall not obstruct required clear vision areas and shall not violate any local or state laws.
4. Parallel residential on-street parking spaces shall be 22 feet minimum in length.
5. Residential on-street parking shall be measured along the curb from the outside edge of a driveway wing or curb cut. Parking spaces must be set back a minimum of 15 feet from an intersection and may not be located within 10 feet of a fire hydrant.
6. Portions of residential on-street parking required by this section may be provided in parking courts that are interspersed throughout a development when the following standards are met:
  - a. No more than ten (10) parking spaces shall be provided in a parking court, except parking courts that utilize backing movements into the right-of-way in which case the parking court shall be limited to two (2) parking spaces;
  - b. Parking spaces within a parking court shall be nine (9) feet wide and 18 feet in depth. In no instance shall a vehicle or any appurtenances parked in a parking court protrude into the public right-of-way;
  - c. Notwithstanding Section 17.98.70, vehicles parked in a parking court on a local street as defined in the Transportation System Plan are permitted to back onto the public right-of-way from the parking court so long as the parking court is limited to two (2) parking spaces;
  - d. A parking court shall be located within 300 feet of the dwellings requiring parking in accordance with the requirements of Section 17.98.10(M);
  - e. No more than two (2) parking courts shall be provided within a block, with only one (1) parking court provided along a block face;
  - f. A parking court shall be paved in compliance with the standards of this chapter and the latest adopted grading and drainage standards;
  - g. A parking court adjacent to a public right-of-way, shall be privately owned and maintained.
  - h. If a parking court is adjacent to a private drive, it shall be privately owned and maintained. For each parking court there shall be a legal recorded document which includes:
    - (1) A legal description of the parking court;
    - (2) Ownership of the parking court;
    - (3) Use rights; and
    - (4) A maintenance agreement and the allocation and/or method of determining liability for maintenance of the parking court;
  - i. A parking court shall be used solely for the parking of operable passenger vehicles.

**APPLICANT RESPONSE:** Please refer to sheet 10 of the plan set included with this application. There is at least one on street parking spaces provided for each lot proposed within this subdivision. All the lots on the plan have access to on street parking within 300 feet of the primary entrance of the dwelling. However, it should be noted that the proposed development exceeds the minimum requirement of 43 on street parking spaces. Therefore, the above criteria can and/or will be met.

## CHAPTER 17.100 - LAND DIVISION

### 17.100.20 LAND DIVISION CLASSIFICATION - TYPE I, II OR III PROCEDURES

- E. Type III Land Division (Major Partition or Subdivision). A major partition or subdivision shall be a Type III procedure if unsatisfactory street conditions exist or the resulting parcels/lots do not comply with the standards of the zoning district and this chapter. The Director shall determine if unsatisfactory street conditions exist based on one of the following criteria:

1. The land division does not link streets that are stubbed to the boundaries of the property.
2. An existing street or a new proposed street will be extended beyond the boundaries of the land division to complete a street system or provide access to adjacent property.
3. The proposed street layout is inconsistent with a street pattern adopted as part of the Comprehensive Plan or officially adopted City street plan.

**APPLICANT RESPONSE:** According to the Preapp Notes, this subdivision qualifies as a Type III subdivision.

#### **17.100.60 SUBDIVISIONS**

Approval of a subdivision is required for a land division of 4 or more parcels in a calendar year. A two-step procedure is required for subdivision approval: (1) tentative plat review and approval; and (2) final plat review and approval.

- A. Preapplication Conference. The applicant for a subdivision shall participate in a preapplication conference with city staff to discuss procedures for approval, applicable state and local requirements, objectives and policies of the Sandy Comprehensive Plan, and the availability of services. The preapplication conference provides the opportunity to discuss the conceptual development of the property in advance of formal submission of the tentative plan in order to save the applicant unnecessary delay and cost.

**APPLICANT RESPONSE:** Two preapplication conferences were held for this subdivision. Therefore, this criterion is met.

- E. Approval Criteria. The Director or Planning Commission shall review the tentative plat for the subdivision based on the classification procedure (Type II or III) set forth in Section 17.12 and the following approval criteria:
1. The proposed subdivision is consistent with the density, setback and dimensional standards of the base zoning district, unless modified by a Planned Development approval.

**APPLICANT RESPONSE:** The proposed subdivision is consistent with the density, setback, and dimensional standards of base zoning district.

2. The proposed subdivision is consistent with the design standards set forth in this chapter.

**APPLICANT RESPONSE:** With the exception of the three variances requested under Sandy Development Code 17.100.110.F and 17.100.120.B, this proposed project complies with the design standards set forth in this chapter.

3. The proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy.

**APPLICANT RESPONSE:** The proposed street pattern is connected and consistent with the Comprehensive Plan and City's Transportation Plan. Please refer to the plan set for a visual representation of this and to see how the plan design supports future growth of the neighboring site.

4. Adequate public facilities are available or can be provided to serve the proposed subdivision.

**APPLICANT RESPONSE:** Adequate public facilities are available and will be extended throughout the subdivision for each lot developed to connect into it. The public utilities are being extended to and through the proposed subdivision.

5. All proposed improvements meet City standards.

**APPLICANT RESPONSE:** With the exception of the three variances requested under Sandy Development Code 17.100.110.F and 17.100.120.B, this proposed project complies with the design standards set forth in this chapter.

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.

**APPLICANT RESPONSE:** It is the intention to develop this project in one phase.

#### **17.100.70 LAND DIVISION DESIGN STANDARDS**

All land divisions shall be in conformance with the requirements of the applicable base zoning district and this chapter, as well as with other applicable provisions of this Code. Modifications to these requirements may be accomplished through a Planned Development. The design standards in this section shall be used in conjunction with street design standards included in the City of Sandy Transportation System Plan and standards and construction specifications for public improvements as set forth in adopted Public Facilities Plans and the Sandy Municipal Code.

**APPLICANT RESPONSE:** With the exception of the three variances requested under Sandy Development Code 17.100.110.F and 17.100.120.B, this proposed project complies with the design standards set forth in this chapter.

#### **17.100.100 STREETS GENERALLY**

No subdivision or partition shall be approved unless the development has frontage or approved access to an existing public street. In addition, all streets shall be graded and improved in conformance with the City's construction standards, approved by the City Engineer, in accordance with the construction plans.

- A. Street Connectivity Principle. The pattern of streets established through land divisions should be connected to: (a) provide safe and convenient options for cars, bikes and pedestrians; (b) create a logical, recognizable pattern of circulation; and (c) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened.

**APPLICANT RESPONSE:** The pattern of streets proposed in this subdivision are a grid like pattern to the extent practicable. Neighboring sites to the east and south have restrictions and natural features that do not promote future connection. The project proposes a temporary dead end to the west, this will allow for connection to the adjacent western property when/if it develops. The street design allows for safe and convenient circulation for cars, bikes and pedestrians and promote development of the site to the west. Therefore, the applicable criteria can be met.

- B. Transportation Impact Studies. Transportation impact studies may be required by the city engineer to assist the city to evaluate the impact of development proposals, determine reasonable and prudent transportation facility improvements and justify modifications to the design standards. Such studies will be prepared in accordance with the following:
  1. A proposal established with the scope of the transportation impact study shall be coordinated with, and agreed to, by the city engineer. The study requirements shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. A professional civil or traffic engineer registered in the State of Oregon shall prepare such studies.
  2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.

**APPLICANT RESPONSE:** A traffic impact analysis was prepared in compliance with the city standards and has been included with the application packet. The analysis did not identify any issues requiring

mitigation by the applicant.

- C. Topography and Arrangement. All streets shall be properly related to special traffic generators such as industries, business districts, schools, and shopping centers and to the pattern of existing and proposed land uses.

**APPLICANT RESPONSE:** There are no specific traffic generators located near the subject site. The arrangement of streets and their pattern promote circulation for vehicles, bicycles and pedestrians and support future development of neighboring site to the west. Neighboring sites to the east and south have restrictions and natural features do not promote future connection.

- D. Street Spacing. Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.

**APPLICANT RESPONSE:** The proposed street layout attempts a rectangular grid to the extent practicable. Due to existing features (perennial stream and wetlands), the site is limited to street locations. The project has selected street locations that allow future lots and roads to be outside natural protected features to the maximum extent possible.

- E. Future Street Plan. Future street plans are conceptual plans, street extensions and connections on acreage adjacent to land divisions. They assure access for future development and promote a logical, connected pattern of streets. It is in the interest of the city to promote a logical, connected pattern of streets. All applications for land divisions shall provide a future street plan that shows the pattern of existing and proposed future streets within the boundaries of the proposed land divisions, proposed connections to abutting properties, and extension of streets to adjacent parcels within a 400 foot radius of the study area where development may practically occur.

**APPLICANT RESPONSE:** Future conceptual street plans were included on sheet 11 of the application package. This plan shows that our proposed layout promotes and supports efficient street layouts for future development of the neighboring parcels.

- F. Connections. Except as permitted under Exemptions, all streets, alleys and pedestrian walkways shall connect to other streets within the development and to existing and planned streets outside the development and to undeveloped properties which have no future street plan. Streets shall terminate at other streets or at parks, schools or other public land within a neighborhood.
1. Where practicable, local roads shall align and connect with other roads when crossing collectors and arterials.
  2. Proposed streets or street extensions shall be located to provide direct access to existing or planned transit stops, and existing or planned neighborhood activity centers, such as schools, shopping areas and parks.

**APPLICANT RESPONSE:** The local roads within the subdivision connect to the Kelso Rd (minor arterial). There are no neighboring roads for the project to align with to the east, south or west. The proposed Street B extends to the western edge of the site to allow the adjacent future development of the neighboring site a connection.

#### **17.100.110 STREET STANDARDS AND CLASSIFICATION**

Street standards are illustrated in the figures included at the end of this chapter. Functional definitions of each street type are described in the Transportation System Plan as summarized below.

- A. Major arterials are designed to carry high volumes of through traffic, mixed with some unavoidable local traffic, through or around the city. Major arterials should generally be spaced at 1-mile intervals.
- B. Minor arterials are designed to collect and distribute traffic from major and minor arterials to

neighborhood collectors and local streets, or directly to traffic destinations. Minor arterials should generally be spaced at 1-mile intervals.

- C. Residential minor arterials are a hybrid between minor arterial and collector type streets that allow for moderate to high traffic volumes on streets where over 90% of the fronting lots are residential.
- D. Collector streets are designed to collect and distribute traffic from higher type arterial streets to local streets or directly to traffic destinations. Collector streets should generally be spaced at 1/2-mile intervals.
- E. Local streets provide direct access to abutting property and connect to collector streets. Local streets shall be spaced no less than 8 and no more than 10 streets per mile, except as the city may otherwise approve through an adjustment or variance pursuant to Chapter 17.66. Local streets shall not exceed ADT standards set forth in Chapter 17.10, except the ADT standard for local streets shall not apply to outright permitted development within the C-1 zone.
- F. Cul-de-sacs and dead-end streets are discouraged. If deemed necessary, cul-de-sacs shall be as short as possible and shall not exceed 400 feet in length.
- G. Public access lanes are designed to provide primary access to a limited number of dwellings when the construction of a local street is unnecessary.
- H. Alleys are designed to provide access to multiple dwellings in areas where lot frontages are narrow and driveway spacing requirements cannot be met.

**APPLICANT RESPONSE:** This project proposal includes frontage along Kelso Rd (minor arterial). All roads proposed within the development are local streets that will provide direct access onto the minor arterial and the abutting property to west. Neighboring sites to the east and south have restrictions and natural features do not promote future connection. As mentioned and discussed in the 01/12/2021 Pre-App notes for this project, the City stated they would not support two crossings over the tract and perennial stream and that a cul-de-sac would be favorable in this situation. The project proposes the extension and crossing of Street A over the perennial stream once and the Street A terminates with a cul-de-sac. This cul-de-sac exceeds 400 feet. The applicant is requesting a variance to this length. This variance is discussed in length under code section 17.66. Please refer to the applicant responses in this section for the variance request. Therefore, the project meets all the criteria of this section with the exception of 17.100.110.F, where the applicant is requesting a variance.

#### **17.100.120 BLOCKS AND ACCESSWAYS**

- A. Blocks. Blocks shall have sufficient width to provide for two tiers of lots at appropriate depths. However, exceptions to the block width shall be allowed for blocks that are adjacent to arterial streets or natural features.
- B. Residential Blocks. Blocks fronting local streets shall not exceed 400 feet in length, unless topographic, natural resource, or other similar physical conditions justify longer blocks. Blocks may exceed 400 feet if approved as part of a Planned Development, Specific Area Plan, adjustment or variance.
- D. Pedestrian and Bicycle Access Way Requirements. In any block in a residential or commercial district over 600 feet in length, a pedestrian and bicycle accessway with a minimum improved surface of 10 feet within a 15-foot right-of-way or tract shall be provided through the middle of the block. To enhance public convenience and mobility, such accessways may be required to connect to cul-de-sacs, or between streets and other public or semipublic lands or through greenway systems.

**APPLICANT RESPONSE:** The proposed project includes two tiers of lots at appropriate depths throughout the project. There are no single tier lots proposed. Both streets proposed within this project create blocks that exceed 400ft. The project is requesting two variances for the block lengths created in this subdivision due to existing natural features on site and existing conditions and easements on neighboring sites to the east and south. Please refer to code section 17.66 for the variance requests to this code section. Where the blocks and street segments exceed the length requirements, the project has proposed an extensive pedestrian path network through the sensitive areas where vehicular roads cannot travel. Additionally, these pedestrian paths are permitted uses

within the sensitive areas and their setbacks.

Along Street A, located in Tract K, there is a pedestrian pathway that connects Street A to the eastern property line. The applicant is showing a 5' pathway width in order to reduce impacts to the root protection areas of the retained trees. Additionally, in Tract K, the project is proposing a dedicated improved area outside of the buffers for a park bench to overlook the wetland, perennial stream and tree/forest area. Across Street A, the pedestrian path continues and runs west through Tract O. This pedestrian path connects Street A to Tract N (another pedestrian path).

Street B's block length exceeds the 600'. To mitigate this, the project includes a 10' pedestrian path over a sewer main extension within Tract N, this provides direct pedestrian connection from the end of Street B to Street A's cul-de-sac. This location was selected due to an existing dirt roadway. While it does not cross the middle of the block, utilizing the existing dirt road reduces impact to the natural areas on site because it is currently improved and used for vehicular access. The pedestrian pathway located in Tract O connects Tract N to a more northern location on Street A. The project shows a 5' pathway in this location as well. This is to reduce impact to the surrounding retained trees RPZs.

Additionally, to help mitigate for the length of Street A, the applicant has proposed a paved access of varying width (at least 10') that connects from the south end of the cul-de-sac. This paved access road located in Tract L will be utilized for emergency access and pedestrian foot traffic. It will split just south of Tract L. The portion running east will be reserved for pedestrians and provide connection to an easement located on an adjacent property that is dedicated for future trails. The portion running west will be for emergency vehicles. This will provide direct connection to an existing emergency access road in Phase I of Sandy Woods.

While an additional road could not be included to create a block, remove a cul-de-sac, and create shorter road lengths, this pedestrian pathway network helps provide direct connection and circulation for pedestrians. It will be utilized as a scenic pathway network while preserving natural spaces throughout the subject site and serve as a very enticing amenity to the future subdivision and residents of not only the subject site but surrounding communities. Therefore, this project meets this code section through these two variance requests.

#### **17.100.130 EASEMENTS**

A minimum eight (8) foot public utility easement shall be required along property lines abutting a right-of-way for all lots within a partition or subdivision. Where a partition or subdivision is traversed by a watercourse, drainage way, channel or stream, the land division shall provide a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse, and such further width as determined needed for water quality and quantity protection.

**APPLICANT RESPONSE:** Please refer to the plan set included with this application. The proposed 8' PUE is included on the plans.

#### **17.100.140 PUBLIC ALLEYS**

- A. Public alleys shall have a minimum width of 20 feet. Structural section and surfacing shall conform to standards set by the City Engineer.
- B. Existing alleys may remain unimproved until redevelopment occurs. When development occurs, each abutting lot shall be responsible for completion of improvements to that portion of the alley abutting the property.
- C. Parking within the alley right-of-way is prohibited except as provided in Section 17.100.140(D) below.
- D. An alley with a minimum width of 28 feet may permit parallel parking on one side of the alley only.

**APPLICANT RESPONSE:** This project is not proposing a public alley, therefore these criteria do not apply.

#### 17.100.150 RESIDENTIAL SHARED PRIVATE DRIVES

A shared private drive is intended to provide access to a maximum of two (2) dwelling units.

A. Criteria for Approval

Shared private drives may be approved by the Director when one or more of the following conditions exist:

1. Direct access to a local street is not possible due to physical aspects of the site including size, shape, or natural features.
2. The construction of a local street is determined to be unnecessary.

B. Design

1. A shared private drive constructed to city standards shall not serve more than two (2) dwelling units.
2. A shared access easement and maintenance agreement shall be established between the two units served by a shared private drive. The language of the easement and maintenance agreement shall be subject to approval by the Director.
3. Public utility easements shall be provided where necessary in accordance with Section 17.100.130.
4. Shared private drives shall be fully improved with an all weather surface (e.g. concrete, asphalt, permeable pavers) in conformance with city standards. The pavement width shall be 20 feet.
5. Parking shall not be permitted along shared private drives at any time and shall be signed and identified accordingly.

**APPLICANT RESPONSE:** This project proposal does not propose residential shared drives and therefore, these criteria do not apply.

#### 17.100.160 PUBLIC ACCESS LANES

Public access lanes are designed to provide primary access to a limited number of dwellings where the construction of a local street is not necessary. Public access lanes are intended to serve a maximum of six (6) dwelling units.

**APPLICANT RESPONSE:** This project proposal does not propose public access lanes and therefore, this criterion does not apply.

#### 17.100.170 FLAG LOTS

Flag lots can be created where it can be shown that no other street access is possible to achieve the requested land division. The flag lot shall have a minimum street frontage of 15 feet for its accessway. The following dimensional requirements shall apply to flag lots:

- A. Setbacks applicable to the underlying zoning district shall apply to the flag lot.
- B. The access strip (pole) may not be counted toward the lot size requirements.
- C. The accessway shall have a minimum paved width of 10 feet.

**APPLICANT RESPONSE:** This project proposal includes one flag lot. The setbacks of the SFR zone will apply, the access pole is not counted toward the square footage, the lot has 15' of frontage, and it will have a minimum of 10' wide paved access. Therefore, these criteria will be met.

#### 17.100.180 INTERSECTIONS

- A. Intersections. Streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two new streets at an angle of less than 75 degrees shall not be acceptable. No more than two streets shall intersect at any one point unless specifically approved by the City Engineer. The city engineer may require left turn lanes, signals, special crosswalks, curb extensions and other intersection design elements justified by a traffic study or necessary to comply with the

Development Code.

- B. Curve Radius. All local and neighborhood collector streets shall have a minimum curve radius (at intersections of rights-of-way) of 20 feet, unless otherwise approved by the City Engineer. When a local or neighborhood collector enters on to a collector or arterial street, the curve radius shall be a minimum of 30 feet, unless otherwise approved by the City Engineer.

**APPLICANT RESPONSE:** All proposed intersections intersect at right angles and meet the curve radius requirement. Therefore, the above criteria will be met.

#### **17.100.190 STREET AND TRAFFIC CONTROL SIGNS**

The City Engineer shall specify the type and location of traffic control signs, street signs and/or traffic safety devices.

**APPLICANT RESPONSE:** It is the intention of the applicant to work with the City Engineer on the street and traffic control signs.

#### **17.100.200 STREET SURFACING**

Public streets, including alleys, within the development shall be improved in accordance with the requirements of the City or the Oregon Standard Specifications. All streets shall be paved with asphaltic concrete or Portland cement concrete surfacing. Where required, speed humps shall be constructed in conformance with the City's standards and specifications.

**APPLICANT RESPONSE:** Public Street surfaces will be designed and improved in accordance with the requirements of the City. Therefore, this criterion can be met.

#### **17.100.210 STREET LIGHTING**

A complete lighting system (including, but not limited to: conduits, wiring, bases, poles, arms, and fixtures) shall be the financial responsibility of the subdivider on all cul-de-sacs, local streets, and neighborhood collector streets. The subdivider will be responsible for providing the arterial street lighting system in those cases where the subdivider is required to improve or fronts on an arterial street. Standards and specifications for street lighting shall conform to IESNA roadway illumination standards and the City's streetlighting guidelines.

**APPLICANT RESPONSE:** The applicant will work with the City on determining streetlight locations and include those locations on the detailed construction plans that are submitted to public works for review. Therefore, this criterion can be met.

#### **17.100.220 LOT DESIGN**

- A. The lot arrangement shall be such that there will be no foreseeable difficulties, for reason of topography or other conditions, in securing building permits to build on all lots in compliance with the Development Code.
- B. The lot dimensions shall comply with the minimum standards of the Development Code. When lots are more than double the minimum lot size required for the zoning district, the subdivider may be required to arrange such lots to allow further subdivision and the opening of future streets to serve such potential lots.
- C. The lot or parcel width at the front building line shall meet the requirements of the Development Code and shall abut a public street other than an alley for a width of at least 20 feet. A street frontage of not less than 15 feet is acceptable in the case of a flag lot division resulting from the division of an unusually deep land parcel which is of a size to warrant division into not more than two parcels.
- D. Double frontage lots shall be avoided except where necessary to provide separation of residential developments from arterial streets or to overcome specific disadvantages of topography or orientation.



- E. Lots shall not take access from major arterials, minor arterials or collector streets if access to a local street exists. When driveway access from major or minor arterials may be necessary for several adjoining lots, the Director or the Planning Commission may require that such lots be served by a common access drive in order to limit traffic conflicts on such streets. Where possible, driveways shall be designed and arranged to avoid requiring vehicles to back into traffic on minor or major arterials.

**APPLICANT RESPONSE:** The proposed lot arrangement was determined to ensure each lot has a buildable footprint. The lot size and dimensions being requested meet the dimensional and size requirements for the SFR zone. There are no double frontage lots proposed. One lot has frontage along Kelso Rd. This lot is proposing access onto a local street. Therefore, the applicable criteria are met.

**17.100.230 WATER FACILITIES**

Water lines and fire hydrants serving the subdivision or partition, and connecting the development to City mains, shall be installed to provide adequate water pressure to serve present and future consumer demand. The materials, sizes, and locations of water mains, valves, service laterals, meter boxes and other required appurtenances shall be in accordance with the standards of the Fire District, the City, and the State.

If the city requires the subdivider to install water lines in excess of eight inches, the city may participate in the oversizing costs. Any oversizing agreements shall be approved by the city manager based upon council policy and dependent on budget constraints. If required water mains will directly serve property outside the subdivision, the city may enter into an agreement with the subdivider setting forth methods for reimbursement for the proportionate share of the cost.

**APPLICANT RESPONSE:** It is the intention to provide the entire project with public water through a main extension. Detailed construction plans will be designed and reviewed by the city to ensure there is adequate pressure for the future subdivision and hydrants. The system will be designed to go to and through the subdivision to allow for any connections of future neighboring development. Therefore, these criteria can be met.

**17.100.240 SANITARY SEWERS**

Sanitary sewers shall be installed to serve the subdivision and to connect the subdivision to existing mains. Design of sanitary sewers shall take into account the capacity and grade to allow for desirable extension beyond the subdivision.

If required sewer facilities will directly serve property outside the subdivision, the city may enter into an agreement with the subdivider setting forth methods for reimbursement by nonparticipating landowners for the proportionate share of the cost of construction.

**APPLICANT RESPONSE:** It is the intention to provide the entire project with public sewer through a main extension. Detailed construction plans will be designed and reviewed by the city to ensure the design is adequate for the future subdivision. The system will be designed to go to and through the subdivision to allow for any connections of future neighboring development. Therefore, these criteria can be met.

**17.100.250 SURFACE DRAINAGE AND STORM SEWER SYSTEM**

- A. Drainage facilities shall be provided within the subdivision and to connect with off-site drainage ways or storm sewers. Capacity, grade and materials shall be by a design approved by the city engineer. Design of drainage within the subdivision shall take into account the location, capacity and grade necessary to maintain unrestricted flow from areas draining through the subdivision and to allow extension of the system to serve such areas.

**APPLICANT RESPONSE:** The site is located south of SE Kelso Road and north of the Bonneville Power Administration easement. Two natural drainages are located onsite within this area and they come

together on Tax Lot 24E1102300 west of this site. The northern drainage is located adjacent to and south of Kelso Road and it receives runoff from Kelso Road, several properties north of Kelso Road as far east Bluff Road and Shalimar Drive, and from a small portion of Tax Lot 24E11AB00600 on the south side of Kelso Road. Drainage from north of Kelso Road crosses underneath the roadway through two existing culverts and discharges into a wetland located in the right-of-way and on the subject property. The offsite basin contributing to the flow through the two culverts is approximately 65 acres of agricultural, rural residential, and low-density residential land.

The southern drainageway enters the property along the eastern property line between proposed Lots 44 and 86 and leaves the property along the western property line near the SW corner of proposed Tract M. The southern drainage receives run-on drainage flow from properties south of Kelso Road as far east as Bluff Road. The contributing basin is approximately 50 acres of mostly rural and low-density residential properties.

Clackamas County will require the applicant will improve the southern half of Kelso Road, which will impact the drainage system along that half of the roadway. The applicant intends to extend the two existing culverts underneath Kelso Road to the southern side of the new right-of-way improvements, but otherwise leave the two culverts to discharge in the same location. Drainage along the southern side of Kelso Road along the project frontage will be collected in a pipe and storm drainage inlet system to be approved through a Clackamas County Engineering permit process. Kelso Road runoff will primarily be discharged to Tract J. Storm drainage improvements for the southern portion of Kelso Road will include roadside stormwater planters and a stormwater facility within the upland area of Tract J. The stormwater facilities will be used to provide detention, water quality treatment, and infiltration for the Kelso Road improvements.

The southern drainageway will remain mostly in its current state. One existing culvert pipe is currently located on the southern drainageway within this site where an old access road crossed the drainageway for access between the northern and southern portions of the property. That culvert is proposed to remain in place within Tract N and will be used to facilitate a new pedestrian walkway between Street B and the Street A cul-de-sac. One new culvert is proposed on the southern drainageway, where Street A will cross the drainageway in the vicinity of Lots 44, 78, 79 & 86.

Proposed drainage improvements within the subdivision include several private rear yard stormwater facilities that will either discharge to the wetland in Tract J or the southern drainageway in Tract M. Public storm drainage management facilities include several public stormwater planters along Streets A and B and a stormwater management facility in Tract L in addition to the previously mentioned facilities along SE Kelso Road. The stormwater facility in Tract L will discharge to the southern drainageway through a new discharge pipe.

All drainage facilities will be designed as required by approving agencies, including the City of Sandy City Engineer.

- B. In addition to normal drainage design and construction, provisions shall be taken to handle any drainage from preexisting subsurface drain tile. It shall be the design engineer's duty to investigate the location of drain tile and its relation to public improvements and building construction.

**APPLICANT RESPONSE:** The applicant is not aware of any preexisting subsurface drain tiles on this site. If they are discovered, they will be addressed in a manner approved by the City Engineer and Public Works Director.

- C. The roof and site drainage from each lot shall be discharged to either curb face outlets (if minor quantity), to a public storm drain or to a natural acceptable drainage way if adjacent to the lot.

**APPLICANT RESPONSE:** Roof and site drainage will be collected and directed to curb face outlets, catch basins, a public storm drain, or to one of the two natural drainages on the site.

**17.100.260 UNDERGROUND UTILITIES**

All subdivisions or major partitions shall be required to install underground utilities (including, but not limited to, electrical and telephone wiring). The utilities shall be installed pursuant to the requirements of the utility company.

**APPLICANT RESPONSE:** All utilities will be installed underground and meet the utility company requirements.

**17.100.270 SIDEWALKS**

Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision.

**APPLICANT RESPONSE:** The project proposes sidewalks to be installed along all street frontages within the proposed subdivision and to be installed at the time of home construction. The sidewalks fronting Kelso Rd will be installed at the time of site development. Please refer to the plan set included with the application for a visual representation of the proposed sidewalk locations.

**17.100.290 STREET TREES**

Where planting strips are provided in the public right-of-way, a master street tree plan shall be submitted and approved by the Director. The street tree plan shall provide street trees approximately every 30' on center for all lots.

**APPLICANT RESPONSE:** Prelim street tree locations are shown in the plan set submitted with this application. Please refer to the plan set for a visual representation of those locations. Final locations and species will be determined during the final engineering design of the subdivision improvements. Please refer to section 17.92.30 for additional applicant responses on street trees.

**17.100.300 EROSION CONTROL**

Grass seed planting shall take place prior to September 30th on all lots upon which a dwelling has not been started but the ground cover has been disturbed. The seeds shall be of an annual rye grass variety and shall be sown at not less than four pounds to each 1000 square feet of land area.

**APPLICANT RESPONSE:** To address erosion control on the subject site, the applicant will include an erosion control plan with the construction drawings submitted to public works. This will include erosion control measures for areas disturbed during construction. In addition, It is the intention to reach out to DEQ to determine if a 1200-C permit will be required. If required, the applicant will apply for said permit with DEQ.

**17.100.310 REQUIRED IMPROVEMENTS**

The following improvements shall be installed at no expense to the city, consistent with the design standards of Chapter 17.84, except as otherwise provided in relation to oversizing.

- A. Lot, street and perimeter monumentation
- B. Mailbox delivery units
- C. Sanitary sewers
- D. Stormwater drainage facilities
- E. Sidewalks
- F. Street lights

- G. Street name signs
- H. Street trees
- I. Streets
- J. Traffic control devices and signs
- K. Underground communication lines, including broadband (fiber), telephone, and cable. Franchise agreements will dictate whether telephone and cable lines are required.
- L. Underground power lines
- M. Water distribution lines and fire hydrants
- N. Fiber (broadband)

**APPLICANT RESPONSE:** All of the improvements specified in this section will be installed by the developer at no expense to the City of Sandy consistent with the design standards of Chapter 17.84 and applicable standards.

#### **17.100.320 IMPROVEMENT PROCEDURES**

Improvements installed by a land divider either as a requirement of these regulations or at their own option shall conform to the standards of Chapter 17.84 and improvement standards and 17.100 - 20 Revised by Ordinance No. 2020-24 (effective 09/21/2020) specifications adopted by the City.

Improvements shall be installed in accordance with the following general procedure:

- A. Improvement work shall not start until plans have been checked for adequacy and approved by the City Engineer. To the extent necessary for evaluation of the proposal, improvement plans may be required before approval of the tentative plan of a partition or subdivision.
- B. Improvement work shall not start until after the City is notified. If work is discontinued for any reason it shall not resume until the City is notified.
- C. Improvements shall be constructed under the inspection and to the satisfaction of the City Engineer.
- D. All improvements installed by the subdivider shall be guaranteed for a period of one (1) year following acceptance by the City Engineer. Such guarantee shall be secured by cash deposit in the amount of the value of the improvements as set by the City Engineer. Subdividers may elect to provide a subdivision maintenance bond equal to ten (10) percent of the value of the public improvements for a period of two (2) years following acceptance by the City.
- E. As-constructed plans in both digital and hard copy formats shall be filed with the City Engineer upon completion of the improvements.

**APPLICANT RESPONSE:** It is in the intention of the applicant and development to follow the improvement procedures provided in Sandy Development Code 17.100.320 Improvement Procedures. Therefore, these criteria can be met.

**17.100.330 OPTIONS FOR IMPROVEMENTS** Before the signature of the City Engineer is obtained on the final partition or subdivision plat, the applicant shall install the required improvements, agree to install required improvements, or have gained approval to form an improvement district for installation of the improvements required with the tentative plat approval. These procedures are more fully described as follows:

- A. Install Improvements. The applicant may install the required improvements for the subdivision prior to recording the final subdivision plat. If this procedure is to be used, the subdivision plat shall contain all the required certifications except the County Surveyor. The City shall keep the subdivision plat until the improvements have been completed and approved by the City Engineer. Upon City Engineer's approval, the City shall forward the final subdivision plat for certification by the County Surveyor and then to the County Clerk for recording; or
- B. Agree to Install Improvement. The applicant may execute and file with the City an agreement specifying the period within which required improvements shall be completed. The agreement shall state that if the work is not completed within the period specified, the City may complete the work and recover the full cost and expense from the applicant. A performance bond equal to 110 percent

of the value of the guaranteed improvements shall be required. Performance bonds shall be issued by a surety registered to do business in Oregon. The value of the guaranteed improvements may include engineering, construction management, legal and other related expenses necessary to complete the work. The agreement may provide for the construction of the improvements in increments and for an extension of time under specified conditions; or 17.100 - 21 Revised by Ordinance No. 2020-24 (effective 09/21/2020)

- C. Form Improvement District. The applicant may have all or part of the public improvements constructed under an improvement district procedure. Under this procedure the applicant shall enter into an agreement with the City proposing establishment of the district for improvements to be constructed, setting forth a schedule for installing improvements, and specifying the extent of the plat to be improved. The City reserves the right under the improvement district procedure to limit the extent of improvements in a subdivision during a construction year and may limit the area of the final subdivision plat to the area to be improved. The performance bond described in section B above shall be required under the improvement district procedure. The formation of a Local Improvement District (LID) is entirely within the discretion of the City.

**APPLICANT RESPONSE:** The applicant understands the procedures set forth in Sandy Development Code 17.100.330 and will select one of the options provided when it comes time to obtain the City Engineer's signature on the subdivision plat. Therefore, this criterion can be met.

#### **17.100.340 PERFORMANCE GUARANTEE**

If the applicant chooses to utilize the opportunities provided under "A" or "B" above, the applicant shall provide a performance guarantee equal to 110 percent of the cost of the improvements to assure full and faithful performance thereof, in one of the following forms:

- A. A surety bond executed by a surety company authorized to transact business in the State of Oregon in a form approved by the City Attorney.
- B. In lieu of the surety bond, the applicant may:
  - 1. Deposit with the City cash money to be released only upon authorization of the City Engineer;
  - 2. Supply certification by a bank or other reputable lending institution that an irrevocable letter of credit in compliance with the International Chamber of Commerce Uniform Customs and Practice for Documentary Credits, UCP 600 or most current revision. has been established to cover the cost of required improvements, to be released only upon authorization of the City Engineer. The amount of the letter of credit shall equal 110% of the value of the improvements to be guaranteed; or
  - 3. Provide bonds in a form approved by the City Attorney.
- C. Such assurance of full and faithful performance shall be for a sum determined by the City Engineer as sufficient to cover the cost of required improvements, including related engineering and incidental expenses.
- D. If the applicant fails to carry out provisions of the agreement and the City has expenses resulting from such failure, the City shall call on the performance guarantee for reimbursement. If the amount of the performance guarantee exceeds the expense incurred, the remainder shall be released. If the amount of the performance guarantee is less than the expense incurred, the applicant shall be liable to the City for the difference.

**APPLICANT RESPONSE:** It is the intention of the applicant to adhere and follow the procedures of the Performance Guarantee listed in section 17.100.340. They will work with the Public Works Director during the construction engineering review stage to prepare, acquire, and implement the performance guarantee.

### **CHAPTER 17.102 - URBAN FORESTRY**

#### **17.102.20 APPLICABILITY**

This chapter applies only to properties within the Sandy Urban Growth Boundary that are greater than one acre including contiguous parcels under the same ownership.

- A. General: No person shall cut, harvest, or remove trees 11 inches DBH or greater without first obtaining a permit and demonstrating compliance with this chapter.
  - 1. As a condition of permit issuance, the applicant shall agree to implement required provisions of this chapter and to allow all inspections to be conducted.
  - 2. Tree removal is subject to the provisions of Chapter 15.44, Erosion Control, Chapter 17.56, Hillside Development, and Chapter 17.60 Flood and Slope Hazard.
- B. Exceptions: The following tree removals are exempt from the requirements of this chapter.
  - 1. Tree removal as required by the city or public utility for the installation or maintenance or repair of roads, utilities, or other structures.
  - 2. Tree removal to prevent an imminent threat to public health or safety, or prevent imminent threat to public or private property, or prevent an imminent threat of serious environmental degradation. In these circumstances, a Type I tree removal permit shall be applied for within seven days following the date of tree removal.

**APPLICANT RESPONSE:** The proposed project site contained 38.95 acres. As part of the phased development, it was decided the tree retention would be addressed across all phases and the required 117 retained trees had to be on spread across Tracts F – H. The applicant must remove trees as necessary within the subdivision in order to create buildable lots at the allowed density, to complete public improvements consistent with design standards for ROW design and improvements, utility installation and improvements. The tree removal and protection plan have been included with this application and in conformance with chapters 15.44, 17.56, and 17.60 as applicable.

#### **17.102.50 TREE RETENTION AND PROTECTION REQUIREMENTS**

- A. Tree Retention: The landowner is responsible for retention and protection of trees required to be retained as specified below:
  - 1. At least three trees 11 inches DBH or greater are to be retained for every one-acre of contiguous ownership.
  - 2. Retained trees can be located anywhere on the site at the landowner's discretion before the harvest begins. Clusters of trees are encouraged.
  - 3. Trees proposed for retention shall be healthy and likely to grow to maturity, and be located to minimize the potential for blow-down following the harvest.
  - 4. If possible, at least two of the required trees per acre must be of conifer species.
  - 5. Trees within the required protected setback areas may be counted towards the tree retention standard if they meet these requirements.

**APPLICANT RESPONSE:** A tree inventory was conducted on site by a certified arborist and a report was generated. The arborist inventoried all trees 6 DBH" and greater throughout the proposed developed area. Please refer to the arborist report submitted with this application. The original site contained 38.95 acres. The first phase has already been developed. As part of the phased development, it was decided the tree retention would be addressed for all phases and it would be required to retain 117 retained trees spread across Tracts F – H. The proposed Phase II development is within Tracts F - H. Our project proposes the retention of 152 trees at 11" DBH or greater. In addition to all these trees, there are additional 91 trees at 6" – 11" DBH proposed for retention. This project proposal exceeds the retention requirement. Please refer to the Tree Plans included in the plan set to see what trees are proposed for retention. Out of the required 117 trees for retention 86 are coniferous, roughly 73.5%. Therefore, this tree retention plan exceeds the original proposal of 117 trees and exceeds the coniferous requirement and all applicable requirements are met.

- B. **Tree Protection Area:** Except as otherwise determined by the Planning Director, all tree protection measures set forth in this section shall be instituted prior to any development activities and removed only after completion of all construction activity. Tree protection measures are required for land

disturbing activities including but not limited to tree removal, clearing, grading, excavation, or demolition work.

1. Trees identified for retention shall be marked with yellow flagging tape and protected by protective barrier fencing placed no less than 10 horizontal feet from the outside edge of the trunk.
2. Required fencing shall be a minimum of six feet tall supported with metal posts placed no farther than ten feet apart installed flush with the initial undisturbed grade.
3. 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, equipment, or parked vehicles.

**APPLICANT RESPONSE:** It is the intention of the builder to install all necessary tree protection measures required by the arborist prior to any site development. They will remain for the duration of construction and be removed upon completion of construction. Therefore, the above criteria can be met.

#### **17.102.60 TREE REPLANTING REQUIREMENTS**

1. All areas with exposed soils resulting from tree removal shall be replanted with a ground cover of native species within 30 days of harvest during the active growing season, or by June 1st of the following spring.
2. All areas with exposed soils resulting from tree removal occurring between October 1 and March 31 shall also be covered with straw to minimize erosion.
3. Removal of hazard trees as defined shall be replanted with two native trees of quality nursery stock for every tree removed.
4. Tree Removal allowed within the FSH Overlay District shall be replanted with two native trees of quality nursery stock for every tree removed.
5. Tree Removal not associated with a development plan must be replanted following the provisions of OAR Chapter 629, Division 610, Section 020-060

**APPLICANT RESPONSE:** No trees are proposed to be replanted at this time. Therefore, the criteria above do not apply.

#### **17.102.70 VARIANCES**

Under a Type III review process, the Planning Commission may allow newly-planted trees to substitute for retained trees if:

1. The substitution is at a ratio of at least two-to-one (i.e., at least two native quality nursery grown trees will be planted for every protected tree that is removed); and
2. The substitution more nearly meets the intent of this ordinance due to:
  - a. The location of the existing and proposed new trees, or
  - b. The physical condition of the existing trees or their compatibility with the existing soil and climate conditions; or
  - c. An undue hardship is caused by the requirement for retention of existing trees.
  - d. Tree removal is necessary to protect a scenic view corridor.

**APPLICANT RESPONSE:** No variances are being applied for regarding trees. Therefore, the above criteria do not apply.

### **Clackamas County Code**

#### **CLACKAMAS COUNTY - CCSD#1 STORMWATER STANDARDS**

#### **Section 4 Natural Resources and Vegetated Buffers**

Table 4.1 – Undisturbed Buffers

Sensitive Area	Upstream Drainage Area	Slope Adjacent to Sensitive Area	Width of Undisturbed Buffer
Intermittent Creeks, Rivers, Streams	Less than 50 acres	Any slope	25 feet
Intermittent Creeks, Rivers, Streams	50 to 100 acres	<25%	25 feet
Intermittent Creeks, Rivers, Streams	50 to 100 acres	≥25%	50 feet
Intermittent Creeks, Rivers, Streams	Greater than 100 acres	<25%	50 feet
Intermittent Creeks, Rivers, Streams	Greater than 100 acres	≥25%	100 to 200 feet
Perennial Creeks, Rivers, Streams	Any upstream area	<25%	50 feet
Perennial Creeks, Rivers, Streams	Any upstream area	≥25%	100 to 200 feet
Wetlands, lakes (natural), and springs.	Any drainage	<25%	50 feet
Wetlands lakes (natural), and springs.	Any drainage	≥25%	100 to 200 feet

**APPLICANT RESPONSE:** This section of the CCSD#1 outlines the County’s requirements for setback standards. Since this project is not proposing the FSH Overlay, the City has requested this project adhere to the setback standards of Clackamas County. Table 4.1 outlines the setback standards of the wetlands and streams on site. Per Environment Technology Consultants (ETC) report, it can be noted that the stream on site is classified as a perennial stream and there is less than a 25% slope surrounding the stream, therefore the require buffer is 50’ from top of bank on each side. This setback is shown on all plans. The wetlands all have less than 25% slope and therefore require a 50’ setback, This is represented on the plans. Therefore, this project meets the County and City Requirements for setbacks.

**CONCLUSION:**

As presented throughout this Project Narrative, this project is in compliance with the applicable code of the City of Sandy Development Code with the exception of three variance requests for extended road lengths. As demonstrated throughout the narrative and in the plan design. These three variance requests are being requested in order to preserve the existing natural features on site. The variances allow for minimal permitted disturbance to said areas. All the natural features on site will lie within tracts to be dedicated to the City of Sandy and outside of any future residential lots. This will ensure no construction or residential structures to be built within or near the natural features and their setbacks. The design includes a pedestrian path network adjacent to these natural features for future residents and Sandy community members to enjoy. By having these pedestrian pathways within dedicated tracts and meandering along the stream and wetlands, it allows the residents and public to enjoy the natural environment features. Additionally, the design has



created an extension of the pedestrian path to an existing easement on adjacent property. This path has created a path that will have direct connection to a mass City of Sandy Trail system. Additionally, the site design includes tree retention that exceeds the requirements. The project was required to retain a minimum of 117 trees of 11" DBH and greater. The project proposes the retention of 152 trees of 11" DBH or greater and 91 trees of 6-11" DBH. This tree retention plan not only preserves valuable trees but also adds to the overall project design but the future residents and community's enjoyment by retaining existing mature landscaping. This project design goes above and beyond the standard subdivision design by including an extensive public pathway network that is separate from the sidewalks along streets, a path that connects into a mass City trail plan, a tree retention plan that exceeds the requirements, and the preservation of the natural features on site.