City of West Linn

Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068
Telephone 503.656.4211 • Fax 503.656.4106 • westlinnoregon.gov

DEVELOPMENT REVIEW APPLICATION

For Office Use Only

STAFF CONTACT PETER	PROJECT NO(S). SUB-16-03 / WRG-16-10	
NON-REFUNDABLE FEE(S) 4000-	REFUNDABLE DEPOSIT(S) 14800	TOTAL 18800-

Type of Review (Please check all that apply):

- [ ] Annexation (ANX)
- [ ] Appeal and Review (AP) *
- [ ] Conditional Use (CUP)
- [ ] Design Review (DR)
- [ ] Easement Vacation
- [ ] Extraterritorial Ext. of Utilities
- [ ] Final Plat or Plan (FP)
- [ ] Flood Management Area
- [ ] Hillside Protection & Erosion Control
- [ ] Historic Review
- [ ] Legislative Plan or Change
- [ ] Lot Line Adjustment (LLA) */**
- [ ] Minor Partition (MIP) (Preliminary Plat or Plan)
- [ ] Non-Conforming Lots, Uses & Structures
- [ ] Planned Unit Development (PUD)
- [ ] Pre-Application Conference (PA) */**
- [ ] Street Vacation
- [x] Subdivision (SUB)
- [ ] Temporary Uses *
- [ ] Time Extension *
- [ ] Variance (VAR)
- [ ] Water Resource Area Protection/Single Lot (WAP)
- [ ] Water Resource Area Protection/Wetland (WAP)
- [x] Willamette & Tualatin River Greenway (WRG)
- [ ] Zone Change

Home Occupation, Pre-Application, Sidewalk Use, Sign Review Permit, and Temporary Sign Permit applications require different or additional application forms, available on the City website or at City Hall.

Site Location/Address: 18000 Upper Midhill Drive	Assessor's Map No.: 21E14CA
	Tax Lot(s): 200
	Total Land Area:

Brief Description of Proposal:

The Applicant is proposing a 42 Unit attached single family subdivision consistent with the standards of the R-4.5 zone. The Applicant's proposal also triggers review under the provisions of the Willamette Greenway

Applicant Name: (please print) Upper Midhill Estates, LLC attn: Ryan Zygar
Phone: 360-798-4838
Address: 931 SW King Avenue
Email: ryan@zygar.com
City State Zip: Portland, OR 97205

Owner Name (required): (please print) 18000 Midhill Drive, LLC C/O David Chiddix
Phone:
Address: 1235 N Dutton Ave #E
Email:
City State Zip: Santa Rosa, CA 95401

Consultant Name: (please print) 3J Consulting, INC attn: Andrew Tull
Phone: 503-545-1907
Address: 5075 SW Griffith Drive, Suite 150
Email: andrew.tull@3j-consulting.com
City State Zip: Beaverton, OR 97005

1. All application fees are non-refundable (excluding deposit). **Any overruns to deposit will result in additional billing.**
2. The owner/applicant or their representative should be present at all public hearings.
3. A denial or approval may be reversed on appeal. No permit will be in effect until the appeal period has expired.
4. **Three (3) complete hard-copy sets (single sided) of application materials must be submitted with this application. One (1) complete set of digital application materials must also be submitted on CD in PDF format. If large sets of plans are required in application please submit only two sets.**

* No CD required / ** Only one hard-copy set needed

RECEIVED DEC 28 2016 By______

The undersigned property owner(s) hereby authorizes the filing of this application, and authorizes on site review by authorized staff. I hereby agree to comply with all code requirements applicable to my application. Acceptance of this application does not infer a complete submittal. All amendments to the Community Development Code and to other regulations adopted after the application is approved shall be enforced where applicable. Approved applications and subsequent development is not vested under the provisions in place at the time of the initial application.

Applicant's signature 12/19/16 Date — Owner's signature *(required)* 12-20-16 Date

CONTENTS

Appendix List

GENERAL INFORMATION

Property Owner:	**18000 Midhill Drive, LLC** **1235 North Dutton Ave, Suite E** **Santa Rosa, CA 95401** **Contact: David Chiddix**
Applicant:	**Upper Midhill Estates, LLC** **931 SW King Avenue** **Portland, OR 97205** **Contact: Ryan Zygar** **Phone: 360-798-4838** **Email: ryan@zygar.com**
Applicant's Representative:	**3J Consulting, Inc.** **5075 SW Griffith Drive, Suite 150** **Beaverton, OR 97005** **Contact: Andrew Tull** **Phone: 503-545-1907** **Email: andrew.tull@3j-consulting.com**

SITE INFORMATION

Tax Lot Numbers:	**2S1E13CA0200**
Address:	**18000 Upper Midhill Drive**
Size:	**6.10 acres**
Zoning Designation:	**R-4.5 (City of West Linn)**
Neighborhood:	**Robinwood**
Comprehensive Plan:	**Medium Density Residential**
Existing Use:	**The site is vacant.**
Street Functional Classification:	**The site currently takes access from Upper Midhill Drive, a local street. Adjacent College View Drive, Scenic Drive and Hillside Drive are local streets.**
Surrounding Zoning:	**North, East and West- City of Lake Oswego** **South- R-4.5 (West Linn)**

INTRODUCTION

APPLICANT'S REQUEST

The Applicant seeks approval of an application for an Expedited Land Division ("ELD Application") and Water Resource Area ("WRA") Review ("WRA Application") for the development of 42 lots of needed housing (Chêne Blanc Estates) (the "Project" or the "Applications"). This narrative describes the Project and explains how it complies with the relevant sections of the City of West Linn's Community Development Code ("CDC") and the Oregon Revised Statutes ("ORS").

PROPOSED SITE IMPROVEMENTS

The Project site ("Property") consists of a total of 6.10 acres. The Property is located at the north end of Upper Midhill Drive, adjacent to the City of Lake Oswego to the north. The site is currently vacant. The 42 lots have direct access to both Upper Midhill Drive and Hillside Drive, which are local streets.

The intent of this subdivision is to provide forty-two (42) buildable lots on the Property. Each of the proposed lots will exceed the minimum of 4,000 square feet in size for development with attached single-family homes, a use permitted outright in the R-4.5 zone. The Project would create forty-two (42) lots for needed housing, contributing to the City's inventory of diverse and available housing stock.

The lot layout and configuration of streets and drainage are dictated by four main factors: topography, existing street grades, the abundance of significant trees, and the City's density requirements. This narrative demonstrates how these factors have been successfully addressed in compliance with all applicable criteria.

LAND USE HISTORY

In 1999, the City approved a Planned Unit Development Application allowing development of 52 townhouse lots on the Property. The townhome project included the construction of 52 attached dwellings and the creation of a series of open spaces through the City's Planned Unit Development requirements. The project also included an off-site construction proposal to allow for Highway 43 to be slightly widened and re-striped at the intersection of Arbor Drive. While the project was approved for development, the site was purchased in 2000 by a neighboring property owner and has sat vacant for the past several years.

On September 12, 2016, the City denied applications for a 34-lot Subdivision for single-family detached residential units and a Water Resource Area Permit (City File Nos. AP-16-02/SUB-15-03/WAP-16-03) on the Property. The City denied these applications on very limited grounds, concluding that the Applicant had not demonstrated that adequate public transportation facilities would be available to serve the development. The Applicant appealed the City's decision to the Land Use Board of Appeals, where the case is still pending.

NEEDED HOUSING

The ELD Application proposes development of needed housing on buildable land. Therefore, the ELD Application is only subject to clear and objective standards, conditions, and procedures.

ORS 197.303(1) defines "needed housing" as "housing types determined to meet the need shown for housing within an urban growth boundary at particular price ranges and rent levels" and includes attached single-family housing for owner and renter occupancy. ORS 197.303(1). Local governments must permit needed housing in one or more zoning districts and "with sufficient buildable land to satisfy that need." ORS 197.307(3). Local governments may only impose "clear and objective standards, conditions and procedures regulating the development of needed housing." ORS 197.307(4).

The local government's standards must be clear and objective on the face of the ordinance. ORS 227.173(2). Furthermore, in any appeal to LUBA or an appellate court that involves an ordinance required to contain "clear and objective" approval standards, conditions, and procedures for needed housing, the local government bears the burden of demonstrating that the standards, conditions, and procedures are capable of being imposed only in a "clear and objective" manner. ORS 197.831. Finally, these "clear and objective" standards, conditions, and procedures must not have the effect of "discouraging needed housing through unreasonable cost or delay." ORS 197.307(4).

The State Legislature's policy goal in enacting the "needed housing" statutes was to prevent local governments from using their land use regulations to exclude certain housing types that were needed to address housing demand in the community. *Rogue Valley Association of Realtors v. City of Ashland*, 35 Or LUBA 139, 156 (1998) *aff'd* 158 Or App 1, 970 P2d 685 *rev den* 328 Or 594 (1999) ("*Rogue Valley*").

Because local governments may only apply "clear and objective standards, conditions, and procedures" to "needed housing" applications, local governments may not apply subjective, discretionary criteria to "needed housing" applications:

> "'Needed housing' is not to be subjected to standards, conditions or procedures that involve subjective, value-laden analyses that are designed to balance or mitigate impacts of the development on (1) the property to be developed or (2) the adjoining properties or community. Such standards, conditions or procedures are not clear and objective and could have the effect of 'discouraging needed housing through unreasonable costs or delay.'"

Rogue Valley, 35 Or LUBA at 158 (emphasis added). Further, LUBA has specifically held that a standard requiring that a development be "compatible with surrounding development" was not clear and objective. *Rogue Valley*, 35 Or LUBA at 157 (citing Land Conservation and Development Commission policy that served as basis for legislative enactment of "needed housing" statute). *See also Clark v. Coos County*, 53 Or LUBA 325 (2007) (local code approval standard that requires that proposed uses be compatible with surrounding uses is not "clear and objective" when it can "plausibly be interpreted in more than one way." *Tirumali v. City of Portland*, 169 Or App 241, 246, 7 P3d 761 (2000)).

Particular housing types are "needed housing" for purposes of ORS 197.303 – 197.307 if the local government comprehensive plan identifies a need for that housing type at particular price ranges and rent levels. *Concerned Homeowners Against the Fairways v. City of Creswell*, 52 Or LUBA 620 (1996).

The City of West Linn ("City") has not taken an exception to the "needed housing" laws. Further, the City is not exempt from the "needed housing" laws on the grounds that the Applications are one of the application types identified in ORS 197.307(5).

The City's Comprehensive Plan ("Plan") identifies a need for housing of various types (including single-family) at a variety of price levels and concludes that the need can be met if vacant and infill lands in the City's adopted Buildable Lands Inventory develop consistent with existing zoning:

> "The City will meet Metro's target of 3,226 new units in the time period between 1995 and 2017. During the five-year period of January 1995 to January 2000, 1,542 permits for new housing units were issued. As of January 2000, another 670 units were in the process of being approved and another 2,241 units could be accommodated on vacant or infill land. * * *
>
> "The City has enough land within the City limits and the remaining West Linn Planning Area (including within the Urban Growth Boundary, and contiguous to, but not within City limits) to accommodate this growth and to provide for a range of housing types, at a variety of price levels, and with a suitable mix of single-family and multi-family housing.
>
> "The number of housing units assumes development of buildable, vacant land at planned densities allowed by current zoning, as well as infill development on selected parcels that are partially vacant, and construction of some accessory dwelling units (Figure 10-1, p. H-6)."

The Project proposes attached single-family housing. Because the City's Plan has identified a need for single-family housing at a variety of price levels during the planning period, the Project proposes "needed housing."

The Project is proposed to be located on "buildable lands." Lands are considered "buildable lands" for purposes of the "needed housing" laws if they are included on the City's inventory of buildable lands adopted pursuant to Statewide Planning Goal ("Goal") 10. *Group B, LLC v. City of Corvallis*, __ Or LUBA __ (LUBA No. 2015-019, August 25, 2015). The City has included the Property as "buildable lands" in its inventory of buildable lands adopted pursuant to Goal 10. *See* Plan Figure 10-1 entitled "Buildable Lands Inventory" (depicting the Property as "infill potential"). Therefore, the Property constitutes "buildable lands" for purposes of the "needed housing" laws.

For these reasons, the Project constitutes “needed housing” on “buildable lands.” As a result, the City may only apply “clear and objective” standards, conditions, and procedures to the ELD Application, and these standards, conditions, and procedures must not have the effect of discouraging “needed housing” through unreasonable cost or delay.

In an effort to fully describe the Project, the Applicant explains how the Applications satisfy all potentially applicable approval criteria in the remainder of this narrative. Notwithstanding these responses, the Applicant reserves the right to claim that particular standards, conditions, and procedures are not “clear and objective” and therefore cannot be applied to the ELD Application pursuant to ORS 197.307(4).

Specifically, and without limitation, the Applicant contends that the following CDC standards, conditions, and procedures are not “clear and objective”:

- 85.170.B.2.c.1) (determining whether Traffic Impact Analysis is required)
- 85.170.B.2.e.1)(B), (C) (Traffic Impact Analysis approval criteria)
- 85.170.B.2.f (authority to impose conditions of approval arising from Traffic Impact Analysis)
- 85.200 (ELD Application approval criteria, including statement that “adequate public facilities will be available”)
- 85.200.A (street standards)
- 85.200.B (block and lot standards)
- 85.200.E (grading standards)
- 85.200.F (water service standards)
- 85.200.G (sewer service standards)
- 85.200.H (stormwater service standards)
- 85.200.J.1 (wetland and natural drainageway standards)
- 85.200.J.3 (street tree standards)
- 85.200.J.4 (lighting standards)
- 85.200.J.5 (dedication and exaction standards)
- 48.025.B (access control standards)
- 48.070 (Planning Director’s authority to restrict access appeal provisions)
- 55.100.B.1 (heritage and significant tree protection standards)
- 99.320 (grounds for denial of application)

The Applicant’s voluntary response to these criteria in this narrative does not constitute a waiver of the Applicant’s position that responses to these criteria cannot provide a basis to deny or unreasonably condition the ELD Application.

APPROVAL CRITERIA

This section of the narrative identifies relevant provisions of the CDC and ORS. Following each provision, the Applicant explains how the provision relates to the proposal, and to the extent the provision identifies applicable approval criteria, the Applicant explains how the proposal satisfies the provision.

OREGON REVISED STATUTES

ORS 197.360 "Expedited land division" defined; applicability. (1) As used in this section:
(a) "Expedited land division" means a division of land under ORS 92.010 to 92.192, 92.205 to 92.245 or 92.830 to 92.845 by a local government that:

RESPONSE: The Project requests City approval of a subdivision into 42 lots pursuant to ORS 92.010 through ORS 92.120. The ELD Application meets this standard.

(A) Includes only land that is zoned for residential uses and is within an urban growth boundary.

RESPONSE: The Property is located within the Metro Portland Urban Growth Boundary and the City limits. The City has assigned the R-4.5 (Single-Family Residential Attached and Detached/Duplex) designation to the Property. Therefore, the Property is zoned for residential use and satisfies this definitional requirement.

(B) Is solely for the purposes of residential use, including recreational or open spaces uses accessory to residential use.

RESPONSE: The Project is solely for residential units and accessory open space, with no other uses. Therefore, the ELD Application satisfies this definitional requirement.

(C) Does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the comprehensive plan and land use regulations for full or partial protection of natural features under the statewide planning goals that protect:
(i) Open spaces, scenic and historic areas and natural resources;

RESPONSE: The Project does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the Plan and CDC for full or partial protection of open spaces, scenic and historic areas, or natural resources.

(ii) The Willamette River Greenway;

RESPONSE: The Project does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the Plan and CDC for full or partial protection of Willamette River Greenway. Although the far northwest corner of the Property is subject to Habitat Conservation Area overlay (which implements CDC Chapter 28 ("Willamette and Tualatin River Protection")), applicant is not proposing any dwellings or accessory buildings in the mapped location of these inventoried resources. *See* Plan Sheet C210.

(iii) Estuarine resources;

RESPONSE: The Project does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the Plan and CDC for full or partial protection of estuarine resources.

(iv) Coastal shorelands; and

RESPONSE: The Project does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the Plan and CDC for full or partial protection of coastal shorelands.

(v) Beaches and dunes.

RESPONSE: The Project does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the Plan and CDC for full or partial protection of beaches and dunes.

(D) Satisfies minimum street or other right-of-way connectivity standards established by acknowledged land use regulations or, if such standards are not contained in the applicable regulations, as required by statewide planning goals or rules.

RESPONSE: Minimum street or other right-of-way connectivity standards are established by CDC Chapter 85.200.A. and B, including cross-references to CDC Chapter 48, and CDC Chapter 92. These provisions are all acknowledged land use regulations. For the reasons explained in response to the specific regulations, the Project satisfies these standards, to the extent they are applicable.

(E) Will result in development that either:
(i) Creates enough lots or parcels to allow building residential units at 80 percent or more of the maximum net density permitted by the zoning designation of the site; or
(ii) Will be sold or rented to households with incomes below 120 percent of the median family income for the county in which the project is built.

RESPONSE: The applicable zoning designation of the site is R-4.5, which allows up to 9.61 lots per net acre. The Property is 5.30 net acres. Therefore, the maximum net density permitted on the Property by the R-4.5 zoning designation is 50 lots. Eighty percent of 50 is 40 lots. The Project proposes 42 residential units, which is more than 80% of the maximum net density for the Property. Therefore, the Project satisfies the requirements for this provision.

(b) "Expedited land division" includes land divisions that create three or fewer parcels under ORS 92.010 to 92.192 and meet the criteria set forth in paragraph (a) of this subsection.

RESPONSE: The ELD Application requests approval of a subdivision that creates 42 lots. The City should find that this subsection is not applicable to the ELD Application.

(2) An expedited land division as described in this section is not a land use decision or limited land use decision under ORS 197.015 or a permit under ORS 215.402 or 227.160.

RESPONSE: This subsection does not establish any approval criteria applicable to the ELD Application. Applicant acknowledges that the ELD Application is not a land use decision, limited land use decision, or permit.

(3) The provisions of ORS 197.360 to 197.380 apply to all elements of a local government comprehensive plan and land use regulations applicable to a land division, including any planned unit development standards and any procedures designed to regulate:
(a) The physical characteristics of permitted uses;
(b) The dimensions of the lots or parcels to be created; or
(c) Transportation, sewer, water, drainage and other facilities or services necessary for the proposed development, including but not limited to right-of-way standards, facility dimensions and on-site and off-site improvements.

RESPONSE: The City should find that all elements of the Plan and CDC applicable to a land division are subject to the procedures and requirements of these statutes.

(4) An application for an expedited land division submitted to a local government shall describe the manner in which the proposed division complies with each of the provisions of subsection (1) of this section.

RESPONSE: The preceding pages of this narrative describe the manner in which the proposed division complies with each of the provisions of subsection (1) of this section.

ORS 197.365 Application for expedited land division; notice requirements; procedure. Unless the applicant requests to use the procedure set forth in a comprehensive plan and land use regulations, a local government shall use the following procedure for an expedited land division, as described in ORS 197.360:

(1)(a) If the application for expedited land division is incomplete, the local government shall notify the applicant of exactly what information is missing within 21 days of receipt of the application and allow the applicant to submit the missing information. For purposes of computation of time under this section, the application shall be deemed complete on the date the applicant submits the requested information or refuses in writing to submit it.
(b) If the application was complete when first submitted or the applicant submits the requested additional information within 180 days of the date the application was first submitted, approval or denial of the application shall be based upon the standards and criteria that were applicable at the time the application was first submitted.
(2) The local government shall provide written notice of the receipt of the completed application for an expedited land division to any state agency, local government or special district responsible for

providing public facilities or services to the development and to owners of property within 100 feet of the entire contiguous site for which the application is made. The notification list shall be compiled from the most recent property tax assessment roll. For purposes of appeal to the referee under ORS 197.375, this requirement shall be deemed met when the local government can provide an affidavit or other certification that such notice was given. Notice shall also be provided to any neighborhood or community planning organization recognized by the governing body and whose boundaries include the site.

(3) The notice required under subsection (2) of this section shall:

(a) State:

(A) The deadline for submitting written comments;

(B) That issues that may provide the basis for an appeal to the referee must be raised in writing prior to the expiration of the comment period; and

(C) That issues must be raised with sufficient specificity to enable the local government to respond to the issue.

(b) Set forth, by commonly used citation, the applicable criteria for the decision.

(c) Set forth the street address or other easily understood geographical reference to the subject property.

(d) State the place, date and time that comments are due.

(e) State a time and place where copies of all evidence submitted by the applicant will be available for review.

(f) Include the name and telephone number of a local government contact person.

(g) Briefly summarize the local decision-making process for the expedited land division decision being made.

(4) After notice under subsections (2) and (3) of this section, the local government shall:

(a) Provide a 14-day period for submission of written comments prior to the decision.

(b) Make a decision to approve or deny the application within 63 days of receiving a completed application, based on whether it satisfies the substantive requirements of the local government's land use regulations. An approval may include conditions to ensure that the application meets the applicable land use regulations. For applications subject to this section, the local government:

(A) Shall not hold a hearing on the application; and

(B) Shall issue a written determination of compliance or noncompliance with applicable land use regulations that includes a summary statement explaining the determination. The summary statement may be in any form reasonably intended to communicate the local government's basis for the determination.

(c) Provide notice of the decision to the applicant and to those who received notice under subsection (2) of this section within 63 days of the date of a completed application. The notice of decision shall include:

(A) The summary statement described in paragraph (b)(B) of this subsection; and

(B) An explanation of appeal rights under ORS 197.375.

RESPONSE: Applicant does not request to use the procedure set forth in the Plan or CDC to review the ELD Application. Therefore, the City must use the procedure described in this section to review the ELD Application.

ORS 197.380 Application fees for expedited land division. Each city and county shall establish an application fee for an expedited land division. The fee shall be set at a level calculated to recover the estimated full cost of processing an application, including the cost of appeals to the referee under ORS 197.375, based on the estimated average cost of such applications. Within one year of establishing the fee required under this section, the city or county shall review and revise the fee, if necessary, to reflect actual experience in processing applications under ORS 197.360 to ORS 197.380.

RESPONSE: The City's application fee for an expedited land division is $4,000 + $300 per lot + inspection costs. The application proposes 42 lots. Therefore, the lot costs are $12,600. The application includes a check made payable to the City in the amount of $18,800, which includes the $4,000 base fee; $12,600 in lot costs for the 42 lots; a $500 inspection fee; and the $1,700 application fee for the Water Resource Area Permit. The City should find that applicant has paid the required application fees.

CITY OF WEST LINN COMMUNITY DEVELOPMENT CODE

DIVISION 2. ZONING PROVISIONS

CHAPTER 14. SINGLE-FAMILY RESIDENTIAL ATTACHED AND DETACHED/DUPLEX, R-4.5

14.030 PERMITTED USES
The following uses are permitted outright in this zoning district.

1. **Single-family detached residential unit.**
2. **Duplex residential units.**
3. **Family day care.**
4. **Single-family attached residential units.**
5. **Community recreation.**
6. **Residential home.**
7. **Utilities, minor.**
8. **Manufactured housing.**
9. **Transportation facilities (Type I). (Ord. 1180, 1986; Ord. 1226, 1988; Ord. 1248, 1989; Ord. 1354, 1994; Ord. 1584, 2008)**

Applicant's Finding:	The proposed subdivision is intended for attached single-family residential units, a use permitted outright in the R-4.5 zone. The requirements of this section have been satisfied.

14.070 DIMENSIONAL REQUIREMENTS, USES PERMITTED OUTRIGHT AND USES PERMITTED UNDER PRESCRIBED CONDITIONS

Except as may be otherwise provided by the provisions of this code, the following are the requirements for uses within this zone:

A. The minimum lot size shall be:

1. **For a single-family detached unit, 4,500 square feet.**
2. **For each attached single-family unit, 4,000 square feet.**
3. **For a duplex, 8,000 square feet or 4,000 square feet for each unit.**

B. The minimum front lot line length or the minimum lot width at the front lot line shall be 35 feet.

C. The average minimum lot width shall be 35 feet.

D. *Repealed by Ord. 1622.*

E. The minimum yard dimensions or minimum building setback areas from the lot line shall be:

1. **For a front yard, 20 feet; except for steeply sloped lots where the provisions of CDC 41.010 shall apply.**
2. **For an interior side yard, five feet.**
3. **For a side yard abutting a street, 15 feet.**
4. **For a rear yard, 20 feet.**

F. The maximum building height shall be 35 feet, except for steeply sloped lots in which case the provisions of CDC 41.010 shall apply.

G. The maximum lot coverage shall be 40 percent.

H. The minimum width of an accessway to a lot which does not abut a street or a flag lot shall be 15 feet.

I. The floor area ratio shall be 0.45. Type I and II lands shall not be counted toward lot area when determining allowable floor area ratio, except that a minimum floor area ratio of 0.30 shall be allowed regardless of the classification of lands within the property. That 30 percent shall be based upon the entire property including Type I and II lands. Existing residences in excess of this standard may be replaced to their prior dimensions when damaged without the requirement that the homeowner obtain a non-conforming structures permit under Chapter 66 CDC.

J. The sidewall provisions of Chapter 43 CDC shall apply. (Ord. 1226, 1988; Ord. 1308, 1991; Ord. 1377, 1995; Ord. 1538, 2006; Ord. 1622 § 24, 2014)

Applicant's Finding:	The proposed lots range in size from 4,000 square feet to 11,333 square feet, well over the 4,000 square foot minimum for attached single-family residential in the R-4.5 zone. The lot widths at front property line and lot width averages all exceed 35 feet, as demonstrated on the submitted plans. There are no accessways proposed as all lots access a public street. Yard dimensions, building height, lot coverage, floor area ratios and sidewall provisions will all meet the requirements of this section and will be verified at time of building permit submittal. The requirements of this section have been satisfied.

DIVISION 8. LAND DIVISION

85.170 SUPPLEMENTAL SUBMITTAL REQUIREMENTS FOR TENTATIVE SUBDIVISION OR PARTITION PLAN

B. Transportation.

2. Traffic Impact Analysis (TIA).

a. <u>Purpose</u>. The purpose of this section of the code is to implement Section 660-012-0045(2)(e) of the State Transportation Planning Rule that requires the City to adopt a process to apply conditions to development proposals in order to minimize adverse impacts to and protect transportation facilities. This section establishes the standards for when a proposal must be reviewed for potential traffic impacts; when a Traffic Impact Analysis must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; what must be in a Traffic Impact Study; and who is qualified to prepare the study.

b. <u>Typical average daily trips</u>. The latest edition of the Trip Generation manual, published by the Institute of Transportation Engineers (ITE) shall be used as the standards by which to gauge average daily vehicle trips.

c. <u>When required</u>. A Traffic Impact Analysis may be required to be submitted to the City with a land use application, when the following conditions apply:

1) The development application involves one or more of the following actions:

(A) A change in zoning or a plan amendment designation; or

Applicant's Finding: The Applicant is not proposing a change in zoning or a plan amendment designation as a part of this land use application, therefore a Traffic Impact Analysis is not required per this subsection.

The requirements of this section have been satisfied.

(B) Any proposed development or land use action that ODOT states may have operational or safety concerns along a State highway; and

Applicant's Finding: The proposed development is not located along a State highway, therefore a Traffic Impact Analysis is not required per this subsection.

The requirements of this section have been satisfied.

(C) The development shall cause one or more of the following effects, which can be determined by field counts, site observation, traffic impact analysis or study, field measurements, crash history, Institute of Transportation Engineers Trip Generation manual; and information and studies provided by the local reviewing jurisdiction and/or ODOT:

(1) An increase in site traffic volume generation by 250 average daily trips (ADT) or more (or as required by the City Engineer); or

Applicant's Finding: The *Institute of Transportation Engineers Trip Generation Manual, 9th Edition* estimates an average increase in daily trips as 9.5 trips/ residential lot. The proposed 42-lot subdivision will generate 302 average daily trips (ADT), exceeding the 250 ADT threshold. Therefore, the submittal includes a Transportation Impact Analysis prepared by Kittelson & Associates, Inc. in support of the Project. The Applicant notes that the projected daily trip generation of the site, as developed with the Project, is less than that proposed in the September 2016 application denied by the City.

The requirements of this section have been satisfied.

(2) An increase in use of adjacent streets by vehicles exceeding the 20,000-pound gross vehicle weights by 10 vehicles or more per day; or

Applicant's Finding: The proposed development is intended to serve primarily residential traffic and is not estimated to increase the use of adjacent streets by vehicles exceeding 20,000-pound gross vehicle weights by 10 vehicles or more per day; therefore, a Traffic Impact Analysis is not required per this subsection.

The requirements of this section have been satisfied.

(3) The location of the access driveway does not meet minimum intersection sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles queue or hesitate on the State highway, creating a safety hazard; or

Applicant's Finding: Proposed access driveways have been designed to meet the minimum intersection site distance for new single family homes.

The requirements of this section have been satisfied.

(4) The location of the access driveway does not meet the access spacing standard of the roadway on which the driveway is located; or

Applicant's Finding: Proposed access driveways have been designed to meet the minimum intersection site distance for new single family homes.

The requirements of this section have been satisfied.

(5) A change in internal traffic patterns that may cause safety problems, such as backup onto the highway or traffic crashes in the approach area.

Applicant's Finding: No changes to local traffic patterns hold the potential to cause off-site safety problems.

The requirements of this section have been satisfied.

d. Traffic impact analysis requirements.

1) Preparation. A Traffic Impact Analysis shall be prepared by a professional engineer qualified under OAR 734-051-0040. The City shall commission the traffic analysis and it will be paid for by the applicant.

2) Transportation Planning Rule compliance. See CDC 105.050(D), Transportation Planning Rule Compliance.

3) Pre-application conference. The applicant will meet with West Linn Public Works prior to submitting an application that requires a traffic impact application. This meeting will determine the required elements of the TIA and the level of analysis expected.

e. Approval criteria.

1) Criteria. When a Traffic Impact Analysis is required, approval of the development proposal requires satisfaction of the following criteria:

(A) The Traffic Impact Analysis was prepared by a professional traffic engineer qualified under OAR 734-051-0040; and

(B) If the proposed development shall cause one or more of the effects in subsection (B)(2) of this section, or other traffic hazard or negative impact to a transportation facility, the Traffic Impact Analysis includes mitigation measures that meet the City's level of service and are satisfactory to the City Engineer, and ODOT when applicable; and

(C) The proposed site design and traffic and circulation design and facilities, for all transportation modes, including any mitigation measures, are designed to:

(1) Have the least negative impact on all applicable transportation facilities; and

(2) Accommodate and encourage non-motor vehicular modes of transportation to the extent practicable; and

(3) Make the most efficient use of land and public facilities as practicable; and

(4) Provide the most direct, safe and convenient routes practicable between on-site destinations, and between on-site and off-site destinations; and

(5) Otherwise comply with applicable requirements of the City of West Linn Community Development Code.

f. Conditions of approval. The City may deny, approve, or approve the proposal with appropriate conditions.

1) Dedication of land for streets, transit facilities, sidewalks, bikeways, paths, or accessways shall be required where the existing transportation system will be impacted by or is inadequate to handle the additional burden caused by the proposed use.

2) Improvements such as paving, curbing, installation or contribution to traffic signals, or construction of sidewalks, bikeways, accessways, paths, or streets that serve the proposed use where the existing transportation system may be burdened by the proposed use may be required.

Applicant's Finding: The transportation impact analysis submitted with this application was prepared by a professional traffic engineer and finds that the proposed subdivision can be constructed while maintaining safe and acceptable traffic operations at the study intersection and adjacent roadways. The following is a list of recommended mitigation measures:

- Construct an extension of Upper Midhill Road consistent with the City's local street standard.
- Shrubbery and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.
- Coordinate with ODOT to implement an interim two-way left-turn lane along Willamette Drive to allow motorists at the eastbound and westbound approaches to the Willamette Drive/Arbor Drive intersection to complete two-stage left-turn movements onto Willamette Drive.

The requirements of this section have been satisfied.

85.200 APPROVAL CRITERIA

No tentative subdivision or partition plan shall be approved unless adequate public facilities will be available to provide service to the partition or subdivision area prior to final plat approval and the Planning Commission or Planning Director, as applicable, finds that the following standards have been satisfied, or can be satisfied by condition of approval.

A. Streets.

1. General. The location, width and grade of streets shall be considered in their relation to existing and planned streets, to the generalized or reasonable layout of streets on adjacent undeveloped lot or parcels, to topographical conditions, to public convenience and safety, to accommodate various types of transportation (automobile, bus, pedestrian, bicycle), and to the proposed use of land to be served by the streets. The functional class of a street aids in defining the primary function and associated design standards for the facility. The hierarchy of the facilities within the network in regard to the type of traffic served (through or local trips), balance of function (providing access and/or capacity), and the level of use (generally measured in vehicles per day) are generally dictated by the functional class. The street system shall assure an adequate traffic or circulation system with intersection angles, grades, tangents, and curves appropriate for the traffic to be carried. Streets should provide for the continuation, or the appropriate projection, of existing principal streets in surrounding areas and should not impede or adversely affect development of adjoining lands or access thereto.

To accomplish this, the emphasis should be upon a connected continuous pattern of local, collector, and arterial streets rather than discontinuous curvilinear streets and cul-de-sacs. Deviation from this

pattern of connected streets should only be permitted in cases of extreme topographical challenges including excessive slopes (35 percent-plus), hazard areas, steep drainageways, wetlands, etc. In such cases, deviations may be allowed but the connected continuous pattern must be reestablished once the topographic challenge is passed. Streets should be oriented with consideration of the sun, as site conditions allow, so that over 50 percent of the front building lines of homes are oriented within 30 degrees of an east-west axis.

Internal streets are the responsibility of the developer. All streets bordering the development site are to be developed by the developer with, typically, half-street improvements or to City standards prescribed by the City Engineer. Additional travel lanes may be required to be consistent with adjacent road widths or to be consistent with the adopted Transportation System Plan (TSP) and any adopted updated plans.

An applicant may submit a written request for a waiver of abutting street improvements if the TSP prohibits the street improvement for which the waiver is requested. Those areas with numerous (particularly contiguous) under-developed or undeveloped tracts will be required to install street improvements. When an applicant requests a waiver of street improvements and the waiver is granted, the applicant shall pay an in-lieu fee equal to the estimated cost, accepted by the City Engineer, of the otherwise required street improvements. As a basis for this determination, the City Engineer shall consider the cost of similar improvements in recent development projects and may require up to three estimates from the applicant. The amount of the fee shall be established prior to the Planning Commission's decision on the associated application. The in-lieu fee shall be used for in kind or related improvements. Streets shall also be laid out to avoid and protect tree clusters and significant trees, but not to the extent that it would compromise connectivity requirements per this subsection (A)(1), or bring the density below 70 percent of the maximum density for the developable net area. The developable net area is calculated by taking the total site acreage and deducting Type I and II lands; then up to 20 percent of the remaining land may be excluded as necessary for the purpose of protecting significant tree clusters or stands as defined in CDC 55.100(B)(2).

Applicant's Finding: This site is located north end of Upper Midhill Drive, a local street. The development will include the extension of Hillside Drive, also a local street. The development of this site will not negatively affect the connectivity of these two streets. Figure 8-6 of the West Linn Transportation System Plan - Future Local Street Connectivity Improvements, does not identify a new street connection within or adjacent to this site. However, the proposed subdivision will include connection of Upper Midhill Drive to Hillside Drive to provide connectivity throughout this site.

The extension of Upper Midhill and Hillside will require right-of-way dedication with this subdivision. The Applicant proposes additional right-of-way within the site for the extension of both of these streets, as discussed below. Sidewalks and planter strips are also proposed.

This section requires the developer to be responsible for the construction of internal streets. The Applicant proposes full responsibility for construction of the extensions of Upper Midhill and Hillside.

The requirements of this section have been satisfied.

2. <u>Right-of-way and roadway widths</u>. In order to accommodate larger tree-lined boulevards and sidewalks, particularly in residential areas, the standard right-of-way widths for the different street classifications shall be within the range listed below. But instead of filling in the right-of-way with pavement, they shall accommodate the amenities (e.g., boulevards, street trees, sidewalks). The exact width of the right-of-way shall be determined by the City Engineer or the approval authority. The following ranges will apply:

Street Classification	**Right-of-Way**
Local Street	**40' – 60'**

Additional rights-of-way for slopes may be required. Sidewalks shall not be located outside of the right-of-way unless to accommodate significant natural features or trees.

Applicant's Finding: The Applicant proposes dedication of a variable width between 48' and 50' of right-of-way within the site for both Upper Midhill and Hillside, as shown on the preliminary plat, sheet C200. These dedications are consistent with the Transportation System Plan (TSP) requirements of 40'-60' ROW for a local street.

The requirements of this section have been satisfied.

3. <u>Street widths</u>. Street widths shall depend upon which classification of street is proposed. The classifications and required cross sections are established in Chapter 8 of the adopted TSP.

Applicant's Finding: The width of the paved section of the extensions of Upper Midhill and Hillside will be 24 feet, per the TSP standard for a local street.

The requirements of this section have been satisfied.

4. The decision-making body shall consider the City Engineer's recommendations on the desired right-of-way width, pavement width and street geometry of the various street types within the subdivision after consideration by the City Engineer of the following criteria:

a. The type of road as set forth in the Transportation Master Plan.
b. The anticipated traffic generation.
c. On-street parking requirements.
d. Sidewalk and bikeway requirements.
e. Requirements for placement of utilities.
f. Street lighting.
g. Drainage and slope impacts.

h. Street trees.

i. Planting and landscape areas.

j. Existing and future driveway grades.

k. Street geometry.

l. Street furniture needs, hydrants.

Applicant's Finding: The City's Development Engineer has reviewed the proposal and made recommendations to the applicant, which are incorporated into the proposed roadway configuration.

The Applicant has specifically requested a modification along the western edge of the extension of Hillside Drive. This modification would involve the placement of a curb-tight sidewalk along the western edge of the street. The curb-tight sidewalk has been proposed in order to reduce grading impacts and wall construction along the roadway's western edge. The western edge of Hillside currently abuts several existing structures.

The requirements of this section have been satisfied.

5. Additionally, when determining appropriate street width, the decision-making body shall consider the following criteria:

a. When a local street is the only street serving a residential area and is expected to carry more than the normal local street traffic load, the designs with two travel and one parking lane are appropriate.

b. Streets intended to serve as signed but unstriped bike routes should have the travel lane widened by two feet.

c. Collectors should have two travel lanes and may accommodate some parking. Bike routes are appropriate.

d. Arterials should have two travel lanes. On-street parking is not allowed unless part of a Street Master Plan. Bike lanes are required as directed by the Parks Master Plan and Transportation Master Plan.

Applicant's Finding: The local street load will not exceed that expected of a residential area. This site is also not designated as a bike route and does not include collector or arterial streets.

The requirements of this section have been satisfied.

6. <u>Reserve strips</u>. Reserve strips or street plugs controlling the access to streets are not permitted unless owned by the City.

Applicant's Finding: The applicant does not propose reserve strips or street plugs with this application. All rights-of-way will be dedicated to the edge of the adjoining properties.

The requirements of this section have been satisfied.

7. Alignment. All streets other than local streets or cul-de-sacs, as far as practical, shall be in alignment with existing streets by continuations of the centerlines thereof. The staggering of street alignments resulting in "T" intersections shall, wherever practical, leave a minimum distance of 200 feet between the centerlines of streets having approximately the same direction and otherwise shall not be less than 100 feet.

Applicant's Finding: The extension of both local streets will be in direct alignment. One "L" shaped intersection between Hillside and Upper Midhill Drive is proposed, where the two streets intersect at the northwestern corner of the site.

The requirements of this section have been satisfied.

8. Future extension of streets. Where necessary to give access to or permit a satisfactory future subdivision of adjoining land, streets shall be extended to the boundary of the subdivision and the resulting dead-end streets may be approved without turnarounds. (Temporary turnarounds built to Fire Department standards are required when the dead-end street is over 100 feet long.)

Applicant's Finding: The Applicant proposes to construct Upper Midhill to connect to Hillside, both local public streets.

The requirements of this section have been satisfied.

9. Intersection angles. Streets shall be laid out to intersect angles as near to right angles as practical, except where topography requires lesser angles, but in no case less than 60 degrees unless a special intersection design is approved. Intersections which are not at right angles shall have minimum corner radii of 15 feet along right-of-way lines which form acute angles. Right-of-way lines at intersections with arterial streets shall have minimum curb radii of not less than 35 feet. Other street intersections shall have curb radii of not less than 25 feet. All radii shall maintain a uniform width between the roadway and the right-of-way lines. The intersection of more than two streets at any one point will not be allowed unless no alternative design exists.

Applicant's Finding: The proposed street configuration includes one intersection between Hillside and Upper Midhill Drive. The proposed intersection has limited options for alignment due to the grading necessary to connect these two streets. The proposed angle between Upper Midhill and Hillside Drive is approximately 74 degrees.

The requirements of this section have been satisfied.

10. Additional right-of-way for existing streets. Wherever existing street rights-of-way adjacent to or within a tract are of inadequate widths based upon the standards of this chapter, additional right-of-way shall be provided at the time of subdivision or partition.

Applicant's Finding:	Additional right-of-way for extensions of Upper Midhill and Hillside, as discussed above, will be dedicated at time of subdivision. The requirements of this section have been satisfied.

11. Cul-de-sacs.
a. New cul-de-sacs and other closed-end streets (not including stub streets intended to be connected) on sites containing less than 5 acres, or sites accommodating uses other than residential or mixed use development, are not allowed unless the applicant demonstrates that there is no feasible alternative due to :****

Applicant's Finding:	No cul-de-sacs are proposed with this subdivision. The requirements of this section have been satisfied.

12. Street names. No street names shall be used which will duplicate or be confused with the names of existing streets within the City. Street names that involve difficult or unusual spellings are discouraged. Street names shall be subject to the approval of the Planning Commission or Planning Director, as applicable. Continuations of existing streets shall have the name of the existing street. Streets, drives, avenues, ways, boulevards, and lanes shall describe through streets. Place and court shall describe cul-de-sacs. Crescent, terrace, and circle shall describe loop or arcing roads.

Applicant's Finding:	The street names of Upper Midhill and Hillside Drive are established. No new street names are proposed. The requirements of this section have been satisfied.

13. Grades and curves. Grades shall not exceed 8 percent on major or secondary arterials, 10 percent on collector streets, or 15 percent on any other street unless by variance. Willamette Drive/Highway 43 shall be designed to a minimum horizontal and vertical design speed of 45 miles per hour, subject to Oregon Department of Transportation (ODOT) approval. Arterials shall be designed to a minimum horizontal and vertical design speed of 35 miles per hour. Collectors shall be designed to a minimum horizontal and vertical design speed of 30 miles per hour. All other streets shall be designed to have a minimum centerline radii of 50 feet. Super elevations (i.e., banking) shall not exceed four percent. The centerline profiles of all streets may be provided where terrain constraints (e.g., over 20 percent slopes) may result in considerable deviation from the originally proposed alignment.

Applicant's Finding:	The grade of the extensions of Upper Midhill and Hillside Drive will not exceed 15 percent, per this standard. All city centerline radii standards will be met. The requirements of this section have been satisfied.

14. <u>Access to local streets</u>. Intersection of a local residential street with an arterial street may be prohibited by the decision-making authority if suitable alternatives exist for providing interconnection of proposed local residential streets with other local streets. Where a subdivision or partition abuts or contains an existing or proposed major arterial street, the decision-making authority may require marginal access streets, reverse-frontage lots with suitable depth, visual barriers, noise barriers, berms, no-access reservations along side and rear property lines, and/or other measures necessary for adequate protection of residential properties from incompatible land uses, and to ensure separation of through traffic and local traffic.

Applicant's Finding:	The subject property does not abut nor contain an existing or proposed Major Arterial Street, nor is an intersection of a Local Residential Street with an Arterial Street proposed. The requirements of this section have been satisfied.

15. <u>Alleys</u>. Alleys shall be provided in commercial and industrial districts unless other permanent provisions for access to off-street parking and loading facilities are made as approved by the decision-making authority. While alley intersections and sharp changes in alignment should be avoided, the corners of necessary alley intersections shall have radii of not less than 10 feet. Alleys may be provided in residential subdivisions or multi-family projects. The decision to locate alleys shall consider the relationship and impact of the alley to adjacent land uses. ***

Applicant's Finding:	No alleys are proposed with this subdivision. The requirements of this section have been satisfied.

16. <u>Sidewalks</u>. Sidewalks shall be installed per CDC <u>92.010</u>(H), Sidewalks. The residential sidewalk width is six feet plus planter strip as specified below. Sidewalks in commercial zones shall be constructed per subsection (A)(3) of this section. See also subsection C of this section. Sidewalk width may be reduced with City Engineer approval to the minimum amount (e.g., four feet wide) necessary to respond to site constraints such as grades, mature trees, rock outcroppings, etc., or to match existing sidewalks or right-of-way limitations.

Applicant's Finding:	The applicant proposes to install a 6-foot sidewalk plus planter strip along the both sides of Upper Midhill and Hillside within this property, per this standard. The requirements of this section have been satisfied.

17. Planter strip. The planter strip is between the curb and sidewalk providing space for a grassed or landscaped area and street trees. The planter strip shall be at least 6 feet wide to accommodate a fully matured tree without the boughs interfering with pedestrians on the sidewalk or vehicles along the curbline. Planter strip width may be reduced or eliminated, with City Engineer approval, when it cannot be corrected by site plan, to the minimum amount necessary to respond to site constraints such as grades, mature trees, rock outcroppings, etc., or in response to right-of-way limitations.

Applicant's Finding:	The applicant proposes to install a minimum 6-foot planter strip between all proposed sidewalks and paved street sections on Upper Midhill. The Applicant proposes a curb-tight sidewalk configuration along the western edge of Hillside in order to reduce the intensity of grading and wall construction required adjacent to the site's neighboring single family homes. The requirements of this section have been satisfied.

18. Streets and roads shall be dedicated without any reservations or restrictions.

Applicant's Finding:	No reservations or restrictions are proposed with the street dedication. The requirements of this section have been satisfied.

19. All lots in a subdivision shall have access to a public street. Lots created by partition may have access to a public street via an access easement pursuant to the standards and limitations set forth for such accessways in Chapter 48 CDC.

Applicant's Finding:	All lots have direct access to a public street. The requirements of this section have been satisfied.

20. Gated streets. Gated streets are prohibited in all residential areas on both public and private streets. A driveway to an individual home may be gated.

Applicant's Finding:	Gated streets are not proposed. The requirements of this section have been satisfied.

21. Entryway treatments and street isle design. When the applicant desires to construct certain walls, planters, and other architectural entryway treatments within a subdivision, the following standards shall apply:

a. All entryway treatments except islands shall be located on private property and not in the public right-of-way.

b. Planter islands may be allowed provided there is no structure (i.e., brick, signs, etc.) above the curbline, except for landscaping. Landscaped islands shall be set back a minimum of 24 feet from the curbline of the street to which they are perpendicular.

c. All islands shall be in public ownership. The minimum aisle width between the curb and center island curbs shall be 14 feet. Additional width may be required as determined by the City Engineer.

d. Brick or special material treatments are acceptable at intersections with the understanding that the City will not maintain these sections except with asphalt overlay, and that they must meet the Americans with Disabilities Act (ADA) standards. They shall be laid out to tie into existing sidewalks at intersections.

e. Maintenance for any common areas and entryway treatments (including islands) shall be guaranteed through homeowners association agreements, CC&Rs, etc.

f. Under Chapter 52 CDC, subdivision monument signs shall not exceed 32 square feet in area.

Applicant's Finding: The applicant does not propose to construct entryway treatments to the subdivision at this time.

The requirements of this section have been satisfied.

22. Based upon the determination of the City Manager or the Manager's designee, the applicant shall construct or cause to be constructed, or contribute a proportionate share of the costs, for all necessary off-site improvements identified by the transportation analysis commissioned to address CDC 85.170(B)(2) that are required to mitigate impacts from the proposed subdivision. The proportionate share of the costs shall be determined by the City Manager or Manager's designee, who shall assume that the proposed subdivision provides improvements in rough proportion to identified impacts of the subdivision. Off-site transportation improvements will include bicycle and pedestrian improvements as identified in the adopted City of West Linn TSP.

Applicant's Finding: The submitted Transportation Impact Analysis recommends the following mitigation measures:

- Construct an extension of Upper Midhill Road consistent with the City's local street standard, including curb, gutter, and sidewalks on both sides of the street.
- Shrubbery and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.
- Coordinate with ODOT to implement an interim two-way left-turn lane along Willamette Drive to allow motorists at the eastbound and westbound approaches to the Willamette Drive/Arbor Drive intersection to complete two-stage left-turn movements onto Willamette Drive.

The Applicant proposes to accomplish these mitigation measures with this subdivision project. The requirements of this section have been satisfied.

B. Blocks and lots.

1. <u>General</u>. **The length, width, and shape of blocks shall be designed with due regard for the provision of adequate building sites for the use contemplated; consideration of the need for traffic safety, convenience, access, circulation, and control; and recognition of limitations and opportunities of topography and solar access.**

Applicant's Finding:	The lot layout is based on due regard for the provision of adequate building sites; traffic safety, convenience, access, circulation and control; and the limitations and opportunities of topography and existing roadway network. The lots are generously sized to accommodate homes that are similar in nature to those in surrounding subdivisions. The extensions of Upper Midhill Drive and Hillside Drive allow all traffic access from a local-classification street. The site is adjacent to the City's boundary to the north, east and west, limiting connectivity options. The lots are all deep in the north-south direction, thus enhancing solar access on the building sites. The requirements of this section have been satisfied.

2. <u>Sizes</u>. **The recommended block size is 400 feet in length to encourage greater connectivity within the subdivision. Blocks shall not exceed 800 feet in length between street lines, except for blocks adjacent to arterial streets or unless topographical conditions or the layout of adjacent streets justifies a variation. Designs of proposed intersections shall demonstrate adequate sight distances to the City Engineer's specifications. Block sizes and proposed accesses must be consistent with the adopted TSP.**

Applicant's Finding:	Though the site has topographic considerations as well as the location adjacent to the City limits, no block length exceeds 800 feet. Hillside Drive connects to Hillside Drive less than 800 feet from where it turns 90 degrees to connect with Upper Midhill Drive. Upper Midhill Drive connects to College View Drive less than 800 feet from where it turns 90 degrees to connect with Hillside Drive. The entire site is looped to enhance connectivity and meet the intent of the block length standards. The requirements of this section have been satisfied.

3. <u>Lot size and shape</u>. **Lot or parcel size, width, shape, and orientation shall be appropriate for the location of the subdivision or partition, for the type of use contemplated, for potential utilization of solar access, and for the protection of drainageways, trees, and other natural features. No lot or parcel shall be dimensioned to contain part of an existing or proposed street. All lots or parcels shall be buildable. "Buildable" describes lots that are free of constraints such as wetlands, drainageways, etc., that would make home construction impossible. Lot or parcel sizes shall not be less than the size required by the zoning code unless as allowed by planned unit development (PUD).**

Depth and width of properties reserved or laid out for commercial and industrial purposes shall be adequate to provide for the off-street parking and service facilities required by the type of use proposed.

Chapter 14- Single-Family Residential Detached and Attached, R-4.5 standards are as follows:

Lot Size (Detached Dwelling Units)	**4,500 square feet**
Lot Size (Attached Dwelling Units)	**4,000 square feet**
Front Lot Line Length/Minimum Lot Width at Front Lot Line	**35 feet**
Average Minimum Lot Width	**35 feet**

Applicant's Finding: All proposed lots are a minimum of 4,000 square feet in size to accommodate single-family attached dwelling units. All 42 proposed lots exceed the minimum requirements for front lot line length, lot width and lot depth.

The requirements of this section have been satisfied.

4. <u>Access</u>. Access to subdivisions, partitions, and lots shall conform to the provisions of Chapter <u>48</u> CDC, Access, Egress and Circulation.

Applicant's Finding: Section 48.020.B states: "All lots shall have access from a public street or from a platted private street approved under the land division chapter." All proposed lots will have access from a public street.

The requirements of this section have been satisfied.

5. <u>Double frontage lots and parcels</u>. Double frontage lots and parcels have frontage on a street at the front and rear property lines. Double frontage lots and parcels shall be avoided except where they are essential to provide separation of residential development from arterial streets or adjacent non-residential activities, or to overcome specific disadvantages of topography and orientation. A planting screen or impact mitigation easement at least 10 feet wide, and across which there shall be no right of access, may be required along the line of building sites abutting such a traffic artery or other incompatible use.

Applicant's Finding: In the September 2016 decision for this site (City File Nos. AP-16-02/SUB-15-03/WAP-16-03), the City Council determined that a proposed subdivision of the Property did not create any double frontage lots. Although a few lots within that subdivision would have frontage on two streets, this outcome resulted from the Applicant constructing a street connection on previously-dedicated right-of-way. None of the lots would have access to both streets. Likewise, in the current case, existing conditions, including topography, need for connectivity, the need to utilize previously-dedicated right-of-way, and the location of existing streets, require that two lots (Lots 15 and 16) in the Subdivision front on two different local streets. Because the Applicant did not cause these existing conditions, these lots are not correctly characterized as double-frontage lots.

The requirements of this section have been satisfied.

6. <u>Lot and parcel side lines</u>. The lines of lots and parcels, as far as is practicable, should run at right angles to the street upon which they face, except that on curved streets they should be radial to the curve.

Applicant's Finding:	Though the shape of the subject site is somewhat irregular, all side lot lines run at approximate right angles to the streets upon which they face as far as practicable. The requirements of this section have been satisfied.

7. <u>Flag lots</u>. Flag lots can be created where it can be shown that no other reasonable street access is possible to achieve the requested land division. A single flag lot shall have a minimum street frontage of 15 feet for its accessway. Where two to four flag lots share a common accessway, the minimum street frontage and accessway shall be eight feet in width per lot. Common accessways shall have mutual maintenance agreements and reciprocal access and utility easements. ***

Applicant's Finding:	There are no flag lots proposed with this subdivision. The requirements of this section have been satisfied.

8. <u>Large lots or parcels</u>. In dividing tracts into large lots or parcels which, at some future time, are likely to be redivided, the approval authority may:
a. require that the blocks be of such size and shape, and be so divided into building sites, and contain such easements and site restrictions as will provide for extension and opening of streets at intervals which will permit a subsequent division of any tract into lots or parcels of smaller size; or
b. alternately, in order to prevent further subdivision or partition of oversized and constrained lots or parcels, restrictions may be imposed on the subdivision or partition plat.

Applicant's Finding:	Two of the lots created within the subdivision are large enough to be sub-divided in the future, Lots 30 and 37. While technically feasible based upon lot size, the configuration of these two lots will not allow for re-division as access could not be provided to any future development other than the general home locations shown on the proposed plans. The requirements of this section have been satisfied.

C. Pedestrian and bicycle trails.

1. Trails or multi-use pathways shall be installed, consistent and compatible with federal ADA requirements and with the Oregon Transportation Planning Rule, between subdivisions, cul-de-sacs, and streets that would otherwise not be connected by streets due to excessive grades, significant tree(s), and other constraints natural or manmade. Trails shall also accommodate bicycle or pedestrian traffic between neighborhoods and activity areas such as schools, libraries, parks, or commercial districts. Trails shall also be required where designated by the Parks Master Plan.

Applicant's Finding:	The proposed extensions of Upper Midhill Drive and Hillside Drive include sidewalks and, therefore, additional trails or pedestrian connections are not required. There are no existing trail connections which require connection from this site. The requirements of this section have been satisfied.

D. Transit facilities.

1. The applicant shall consult with Tri-Met and the City Engineer to determine the appropriate location of transit stops, bus pullouts, future bus routes, etc., contiguous to or within the development site. If transit service is planned to be provided within the next two years, then facilities such as pullouts shall be constructed per Tri-Met standards at the time of development. More elaborate facilities, like shelters, need only be built when service is existing or imminent. Additional rights-of-way may be required of developers to accommodate buses.

Applicant's Finding:	Transit facilities have not been identified by Tri-Met or the City Development Engineer adjacent to this property. The requirements of this section have been satisfied.

E. <u>Grading</u>. Grading of building sites shall conform to the following standards unless physical conditions demonstrate the propriety of other standards:

1. All cuts and fills shall comply with the excavation and grading provisions of the Uniform Building Code and the following:

a. Cut slopes shall not exceed one and one-half feet horizontally to one foot vertically (i.e., 67 percent grade).

b. Fill slopes shall not exceed two feet horizontally to one foot vertically (i.e., 50 percent grade). Please see the following illustration.***

2. The character of soil for fill and the characteristics of lot and parcels made usable by fill shall be suitable for the purpose intended.

3. If areas are to be graded (more than any four-foot cut or fill), compliance with CDC 85.170(C) is required.

4. The proposed grading shall be the minimum grading necessary to meet roadway standards, and to create appropriate building sites, considering maximum allowed driveway grades.

5. Type I lands shall require a report submitted by an engineering geologist, and Type I and Type II lands shall require a geologic hazard report.

6. Repealed by Ord. 1635.

7. On land with slopes in excess of 12 percent, cuts and fills shall be regulated as follows:

a. Toes of cuts and fills shall be set back from the boundaries of separate private ownerships at least three feet, plus one-fifth of the vertical height of the cut or fill. Where an exception is required from that requirement, slope easements shall be provided.

b. Cuts shall not remove the toe of any slope where a severe landslide or erosion hazard exists (as described in subsection (G)(5) of this section).

c. Any structural fill shall be designed by a registered engineer in a manner consistent with the intent of this code and standard engineering practices, and certified by that engineer that the fill was constructed as designed.

d. Retaining walls shall be constructed pursuant to Section 2308(b) of the Oregon State Structural Specialty Code.

e. Roads shall be the minimum width necessary to provide safe vehicle access, minimize cut and fill, and provide positive drainage control.

8. Land over 50 percent slope shall be developed only where density transfer is not feasible. The development will provide that:

a. At least 70 percent of the site will remain free of structures or impervious surfaces.

b. Emergency access can be provided.

c. Design and construction of the project will not cause erosion or land slippage.

d. Grading, stripping of vegetation, and changes in terrain are the minimum necessary to construct the development in accordance with subsection J of this section.

Applicant's Finding: A geotechnical engineering report is included with this submittal. A preliminary grading plan has been included in the submitted plans which complies with all criteria of this subsection. The Applicant has provided a plan which minimizes cuts and fills and reduces the need for significant retaining walls where possible.

The requirements of this section have been satisfied.

F. <u>Water</u>.

1. A plan for domestic water supply lines or related water service facilities shall be prepared consistent with the adopted Comprehensive Water System Plan, plan update, March 1987, and subsequent superseding revisions or updates.

2. Adequate location and sizing of the water lines.

3. Adequate looping system of water lines to enhance water quality.

4. For all non-single-family developments, there shall be a demonstration of adequate fire flow to serve the site.

5. A written statement, signed by the City Engineer, that water service can be made available to the site by the construction of on-site and off-site improvements and that such water service has sufficient

volume and pressure to serve the proposed development's domestic, commercial, industrial, and fire flows.

Applicant's Finding:	The applicant will connect all lots to public water per the submitted Composite Utility Plan, sheet C300. This plan is consistent with the adopted Comprehensive Water System Plan. The requirements of this section have been satisfied.

G. Sewer.

1. A plan prepared by a licensed engineer shall show how the proposal is consistent with the Sanitary Sewer Master Plan (July 1989). Agreement with that plan must demonstrate how the sanitary sewer proposal will be accomplished and how it is gravity-efficient. The sewer system must be in the correct basin and should allow for full gravity service.

2. Sanitary sewer information will include plan view of the sanitary sewer lines, including manhole locations and depth or invert elevations.

3. Sanitary sewer lines shall be located in the public right-of-way, particularly the street, unless the applicant can demonstrate why the alternative location is necessary and meets accepted engineering standards.

4. Sanitary sewer line should be at a depth that can facilitate connection with down-system properties in an efficient manner.

5. The sanitary sewer line should be designed to minimize the amount of lineal feet in the system.

6. The sanitary sewer line shall avoid disturbance of wetland and drainageways. In those cases where that is unavoidable, disturbance shall be mitigated pursuant to Chapter 32 CDC, Water Resource Area Protection, all trees replaced, and proper permits obtained. Dual sewer lines may be required so the drainageway is not disturbed.

7. Sanitary sewer shall be extended or stubbed out to the next developable subdivision or a point in the street that allows for reasonable connection with adjacent or nearby properties.

8. The sanitary sewer system shall be built pursuant to DEQ, City, and Tri-City Service District sewer standards. The design of the sewer system should be prepared by a licensed engineer, and the applicant must be able to demonstrate the ability to satisfy these submittal requirements or standards at the pre-construction phase.

9. A written statement, signed by the City Engineer, that sanitary sewers with sufficient capacity to serve the proposed development and that adequate sewage treatment plant capacity is available to the City to serve the proposed development.

Applicant's Finding:	The applicant will connect all lots to public sanitary sewer per the submitted Composite Utility Plan, Sheet C300. The proposed sanitary sewer system is consistent with the Sanitary Sewer Master Plan, is in the correct basin and allows for full gravity service. The requirements of this section have been satisfied.

H. Storm

1. A stormwater quality and detention plan shall be submitted which complies with the submittal criteria and approval standards contained within Chapter 33 CDC. It shall include profiles of proposed drainageways with reference to the adopted Storm Drainage Master Plan.

2. Storm treatment and detention facilities shall be sized to accommodate a 25-year storm incident. A registered civil engineer shall prepare a plan and statement which shall be supported by factual data that clearly shows that there will be no adverse off-site impacts from increased intensity of runoff downstream or constriction causing ponding upstream. The plan and statement shall identify all on- or off-site impacts and measures to mitigate those impacts. The plan and statement shall, at a minimum, determine the off-site impacts from a 25-year storm.

3. Plans shall demonstrate how storm drainage will be collected from all impervious surfaces including roof drains. Storm drainage connections shall be provided to each dwelling unit/lot. The location, size, and type of material selected for the system shall correlate with the 25-year storm incident.

4. Treatment of storm runoff shall meet municipal code standards.

Applicant's Finding: The proposed stormwater treatment and detention has been designed to meet City standards, as detailed in the submitted stormwater report. The project will be served by a stormwater facility located at midpoint of the development in Tract B.

The requirements of this section have been satisfied.

I. Utility easements. Subdivisions and partitions shall establish utility easements to accommodate the required service providers as determined by the City Engineer. The developer of the subdivision shall make accommodation for cable television wire in all utility trenches and easements so that cable can fully serve the subdivision.

Applicant's Finding: The applicant will establish utility easements as determined by the City Engineer and shown on the preliminary plat.

The requirements of this section have been satisfied.

J. Supplemental provisions.

1. Wetland and natural drainageways. Wetlands and natural drainageways shall be protected as required by Chapter 32 CDC, Water Resource Area Protection. Utilities may be routed through the protected corridor as a last resort, but impact mitigation is required.

Applicant's Finding: There is an ephemeral drainageway on the northwest property line that will be protected as required by Chapter 32. There are two small wetlands on the site that will be removed and mitigated to accommodate the public roadway network. Given the minimum density requirements and the need to grade and connect roadways on site, routing utilities and roadways through the two small wetlands cannot be avoided, and is therefore allowed under Chapter 32. This is discussed further in response to the provisions of Chapter 32.

2. Willamette and Tualatin Greenways. The approval authority may require the dedication to the City or setting aside of greenways which will be open or accessible to the public. Except for trails or paths, such greenways will usually be left in a natural condition without improvements. Refer to Chapter 28 CDC for further information on the Willamette and Tualatin River Greenways.

Applicant's Finding: No greenways exist on this site or have been identified for dedication on this property. This property is not adjacent to the Willamette or Tualatin River and, therefore, a River Greenway is not feasible on this site.

The requirements of this section have been satisfied.

3. Street trees. Street trees are required as identified in the appropriate section of the municipal code and Chapter 54 CDC.

Applicant's Finding: Street trees will be installed as part of the public improvements with the development of this subdivision.

The requirements of this section have been satisfied.

4. Lighting. To reduce ambient light and glare, high or low pressure sodium light bulbs shall be required for all subdivision street or alley lights. The light shall be shielded so that the light is directed downwards rather than omni-directional.

Applicant's Finding: Any street light installation within the subdivision will utilize LED fixtures.

The requirements of this section have been satisfied.

5. Dedications and exactions. The City may require an applicant to dedicate land and/or construct a public improvement that provides a benefit to property or persons outside the property that is the subject of the application when the exaction is roughly proportional. No exaction shall be imposed unless supported by a determination that the exaction is roughly proportional to the impact of development.

Applicant's Finding: The applicant is proposing right-of-way dedication and improvements that are roughly proportional to the development of a 42-lot subdivision for attached single-family units. The proposed improvements include the creation and improvement of a local street network from which the proposed homes will take access, a new infrastructure system for the provision of urban services to the development, and specified improvements to allow for the creation of central median to allow for left-turn movements at the intersection of Highway 43 and Arbor Drive.

The requirements of this section have been satisfied.

6. Underground utilities. All utilities, such as electrical, telephone, and television cable, that may at times be above ground or overhead shall be buried underground in the case of new development. The exception would be in those cases where the area is substantially built out and adjacent properties have above-ground utilities and where the development site's frontage is under 200 feet and the site is less than one acre. High voltage transmission lines, as classified by Portland General Electric or electric service provider, would also be exempted. Where adjacent future development is expected or imminent, conduits may be required at the direction of the City Engineer. All services shall be underground with the exception of standard above-grade equipment such as some meters, etc.

Applicant's Finding: All utilities will be installed in compliance with this section.

The requirements of this section have been satisfied.

7. Density requirement. Density shall occur at 70 percent or more of the maximum density allowed by the underlying zoning. These provisions would not apply when density is transferred from Type I and II lands as defined in CDC 02.030. Development of Type I or II lands are exempt from these provisions. Land divisions of three lots or less would also be exempt.

Applicant's Finding: The R-4.5 zone permits a maximum density of 9.61 dwelling units per net acre. Net acre is defined as "The total gross acres less the public right-of-way and other acreage deductions, as applicable". The net acreage of this site after removal of dedicated right-of way is 5.30 acres. At 9.61 dwelling units per net acre, the maximum number of dwelling units on this site is 50. The minimum density of this site is 70% of 50 units, or 35 units. Applicant is proposing 42 units, which exceeds the minimum density of 35 units.

The requirements of this section have been satisfied.

8. Mix requirement. The "mix" rule means that developers shall have no more than 15 percent of the R-2.1 and R-3 development as single-family residential. The intent is that the majority of the site shall be developed as medium high density multi-family housing.

Applicant's Finding: This property is zoned R-4.5 and, therefore, the use of the parcel as an entirely residential development is permitted.

The requirements of this section have been satisfied.

9. <u>Heritage trees/significant tree and tree cluster protection</u>. All heritage trees, as defined in the Municipal Code, shall be saved. Diseased heritage trees, as determined by the City Arborist, may be removed at his/her direction. All non-heritage trees and clusters of trees (three or more trees with overlapping dripline; however, native oaks need not have an overlapping dripline) that are considered significant by virtue of their size, type, location, health, or numbers shall be saved pursuant to CDC 55.100(B)(2). Trees are defined per the municipal code as having a trunk six inches in diameter or 19 inches in circumference at a point five feet above the mean ground level at the base of the trunk.

Applicant's Finding:	No heritage trees have been identified on this site. Tree preservation is discussed further in this report in Section 55.100. The requirements of this section have been satisfied.

DIVISION 3. SUPPLEMENTAL PROVISIONS AND EXCEPTIONS

CHAPTER 32. WATER RESOURCE AREA PROTECTION

Chapter 32 provides for protection of water resource areas, but also allows development of roads and utilities within water resource areas if it cannot be avoided. Such development requires approval through a Water Resource Area Protection (WRAP) review. The following findings for Chapter 32 address both the supplemental findings requirements of Chapter 85 and the required findings for the requested WRAP approval.

32.010 PURPOSES

32.010(I) Provide for uses and activities in WRAs that have negligible impact on such areas; and to provide for other uses that must be located in such areas in a way that will avoid or, when avoidance is not possible, minimize potential impacts.

This application for development within the two small wetlands WRAs is consistent with the purpose of Chapter 32, because the internal street layout cannot avoid impact to the wetlands while serving the minimum lot density and providing connection to the existing rights of way and construction of street widths and grades required by city street standards. Because the two small isolated wetlands provide minimal functional benefits, and because there are no opportunities for on-site mitigation, the impact of eliminating the wetlands is mitigated through the purchase of Wetland Banking Credits from the Oregon Department of State Lands.

32.020 APPLICABILITY

32.020. A. This chapter applies to all development, activity or uses within WRAs identified on the WRA Map. It also applies to all verified, unmapped WRAs. The WRA Map shall be amended to include the previously unmapped WRAs.

There are no WRAs identified on the city's WRA map. However, the applicant has located and provided delineations for three unmapped WRAs. There is a drainageway along the northwest property line and two small wetland areas isolated from any apparent drainage or riparian areas. The wetland delineation and the response by the Division of State Lands are attached.

32.030. PROHIBITED USES

Development within WRAs is prohibited unless allowed by the matrix in Section 32.030. That matrix allows "driveways/streets/bridges," both in the Water Resource and in the Water Resource Area, if "a WRA crossing is the only available route." Crossing the two small wetland WRAs cannot be avoided because the internal street layout cannot avoid the wetlands while meeting the minimum lot density and providing connection to the existing rights of way and construction of street widths and grades required by city street standards.

32.050. APPLICATION

A. An application requesting approval for a use or activity regulated by this chapter shall be initiated by the property owner, or the owner's authorized agent, and shall include an application form and the appropriate deposit or fee as indicated on the master fee schedule.

Applicant's Finding:	The Applicant has submitted the required forms, fees, and application materials. The requirements of this section have been satisfied.

B. A pre-application conference shall be a prerequisite to the filing of the application.

Applicant's Finding:	The Applicant attended a pre-application conference with the City of West Linn prior to submitting this application. The requirements of this section have been satisfied.

C. The applicant shall submit maps and diagrams at 11 by 17 inches and a written narrative addressing the approval criteria and requirements of this chapter, and any additional copies required by the Planning Director.

Applicant's Finding:	The Applicant has submitted full and half sized plans for this Application. All required copies have been submitted. The requirements of this section have been satisfied.

D. Where review of soil maps, Department of Geology and Mineral Industries (DOGAMI) maps, or on-site inspection by the City Engineer reveals evidence of slope failures or that WRA slopes are potentially unstable or prone to failure, geotechnical studies may be required to demonstrate that the proposed development will not cause, or contribute to, slope failure or increased erosion or sedimentation in the WRA or adversely impact surface or modify groundwater flow or hydrologic conditions. These geotechnical studies shall include all necessary measures to avoid or correct the potential hazard.

Applicant's Finding: The Applicant has submitted a geotechnical report which addresses slopes on the property. In this instance, the WRA is not located in an area with unusually steep slopes or areas of geological concern.

The requirements of this section have been satisfied.

E. Applications proposing that streets or utilities cross water resources, or any other development that modifies the water resource, shall present evidence in the form of adopted utility master plans or transportation master plans, or findings from a registered Oregon civil engineer, certified engineering geologist or similarly qualified professional to demonstrate that the development or improvements are consistent with accepted engineering practices.

Applicant's Finding: The Applicant has documented at several points within this narrative that if connectivity is to be achieved, as required by this code and desired by the City, the WRA's on site will be impacted due to the amount of grading necessary to facilitate the desired connection. The plans attached to this application have been prepared by a registered Oregon Civil Engineer.

The requirements of this section have been satisfied.

F. Site plan. The applicant shall submit a site plan which contains the following information, as applicable:

1. The name, address, and telephone number of the applicant, the scale (lineal) of the plan, and a north arrow.

2. Property lines, rights-of-way, easements, etc.

3. Topographic information at two-foot contour increments identifying both existing grades and proposed grade changes.

4. A slope map delineating slopes zero to 25 percent and over 25 percent.

5. Boundaries of the WRA, specifically delineating the water resource, and any riparian corridor boundary. If the proposal includes development of a wetland, a wetlands delineation prepared by a professional wetland specialist will be required. The wetland delineation may be required to be accepted or waived through the Department of State Lands (DSL) delineation review process.

6. Location of existing and proposed development, including all existing and proposed structures, accessory structures, any areas of fill or excavation, water resource crossings, alterations to vegetation, or other alterations to the site's natural state.

7. Identify the location and square footage of previously disturbed areas, areas that are to be temporarily disturbed, and area to be permanently disturbed or developed.

8. When an application proposes development within the WRA, an inventory of vegetation within the WRA, sufficient to categorize the existing condition of the WRA, including:

a. The type and general quality of ground cover, including the identification of dominant species and any occurrence of non-native, invasive species;

b. Square footage of ground cover; and

c. Square footage of tree canopy as measured either through aerial photographs or by determining the tree drip lines. Where only a portion of a WRA is to be disturbed, the tree inventory need only apply to the impacted area. The remaining treed area shall be depicted by outlining the canopy cover.

9. Locations of all significant trees as defined by the City Arborist.

10. Identify adopted transportation, utility and other plan documents applicable to this proposal.

11. For cases processed under CDC 32.110 (hardship), provide the maximum disturbed area (MDA) calculations.

Applicant's Finding:	The Applicant has submitted all of the submission materials required by this section.
	The requirements of this section have been satisfied.

G. <u>Construction management plan</u>. The applicant shall submit a construction management plan which includes the following:

1. The location of proposed TDAs (site ingress/egress for construction equipment, areas for storage of material, construction activity areas, grading and trenching, etc.) that will subsequently be restored to original grade and replanted with native vegetation, shall be identified, mapped and enclosed with fencing per subsection (G)(3) of this section.

2. Appropriate erosion control measures consistent with Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual, rev. 2008, and a tentative schedule of work.

3. The WRA shall be protected, prior to construction, with an anchored chain link fence (or equivalent approved by the City) at its perimeter that shall remain undisturbed, except as specifically authorized by the approval authority. Additional fencing to delineate approved TDAs may be required. Fencing shall be mapped and identified in the construction management plan and maintained until construction is complete.

Applicant's Finding:	The Applicant has submitted a site construction plan which is compliant with the requirements of this chapter.
	The requirements of this section have been satisfied.

H. Mitigation plan prepared in accordance with the requirements in CDC 32.090.

Applicant's Finding:	The Applicant proposes to mitigate off-site in accordance with the requirements of the Oregon Department of State Lands. No mitigation plan has therefore been prepared. The requirements of this section have been satisfied.

I. Re-vegetation plan prepared in accordance with the requirements in CDC 32.100.

Applicant's Finding:	The Applicant has provided a preliminary planting and landscape plan for the site. The requirements of this section have been satisfied.

J. The Planning Director may modify the submittal requirements per CDC 99.035.

Applicant's Finding:	The Applicant submitted all information which has been requested by the Planning Director. The requirements of this section have been satisfied.

K. The following additional requirements apply to applications being submitted under the alternative review process pursuant to CDC 32.070 and 32.080.

1. Identify the affected WRA and describe the functions it performs (see Table 32-4).

2. Provide a scaled map that delineates the proposed WRA boundaries determined to be sufficient to sustain the functions occurring at the site and a narrative that justifies the proposal, consistent with CDC 32.080.

3. Identify the recommended WRA boundary at the site with colored tape, survey markers or other easily identified means for field inspection by staff.

4. Consultant required for alternate review process.

a. The narrative and analysis required by CDC 32.070 and 32.080 shall be prepared and signed by a qualified natural resource professional, such as a wildlife biologist, botanist, or hydrologist. The Planning Director shall determine the scope of work and specific products required from the consultant. The Planning Director may require a mitigation plan pursuant to CDC 32.090 and/or a re-vegetation plan pursuant to CDC 32.100.

b. The Planning Director may waive the consultant requirement for simple or minor projects if he or she determines that it is not necessary in order to satisfy the requirements of this chapter. (Ord. 1623 § 1, 2014)

Applicant's Finding:	The Applicant has submitted for a WRA permit under the requirements of 32.060, the standard review process. The Applicant has not pursued a permit under 32.070 or 32.080 through an alternative review process. The requirements of this section do not apply.

32.060 APPROVAL CRITERIA (STANDARD PROCESS)

A. WRA protection/minimizing impacts.

1. Development shall be conducted in a manner that will avoid or, if avoidance is not possible, minimize adverse impact on WRAs.

Applicant's Finding: The site contains three areas subject to the City's WRA standards. The first area is an elongated drainage corridor that consists of a man-made overland drainage route serving off-site subdivisions. It is believed this drainage area was created on the Applicant's property by mistake as a drainage tract that was probably intended to contain the drainage route was created as part of the neighboring subdivision.

The second area consists of two small wetlands that are isolated from any apparent drainage or riparian areas.

The first WRA area, along the site's northern boundary, will be avoided by the proposed development. The two isolated wetlands will be impacted by the development as they fall within an area which is planned to be heavily impacted by the construction of a new public roadway.

Where possible, adverse impacts on the site's water quality resource areas has been avoided.

The requirements of this section have been satisfied.

2. Mitigation and re-vegetation of disturbed WRAs shall be completed per CDC 32.090 and 32.100 respectively.

Applicant's Finding: There are two small wetlands on the site that will be removed to accommodate the public roadway network. Given the minimum density requirements and the need to grade and connect roadways on site, there is no alternative to routing utilities and roadways through the two wetlands. Applicant has not proposed on-site mitigation for the proposed buffer areas; however, the Applicant is proposing to mitigate for the wetland through the purchase of wetland mitigation credits through Department of State Lands wetland mitigation banking system.

The proposed mitigation through the Department of State Lands has been discussed with the City's Planning Director and is permitted through CDC 32.090.B.4. As permitted by CDC 32.090.D, the Applicant has proposed to mitigate for impacts to the on-site wetlands through the State of Oregon's mitigation banking system at the rates charged at the time of application.

The requirements of this section have been satisfied.

B. Storm water and storm water facilities.

1. Proposed developments shall be designed to maintain the existing WRAs and utilize them as the primary method of storm water conveyance through the project site unless:

a. The surface water management plan calls for alternate configurations (culverts, piping, etc.); or

b. Under CDC 32.070, the applicant demonstrates that the relocation of the water resource will not adversely impact the function of the WRA including, but not limited to, circumstances where the WRA is poorly defined or not clearly channelized.

Re-vegetation, enhancement and/or mitigation of the re-aligned water resource shall be required as applicable.

Applicant's Finding: The proposed development does not propose to use any of the existing WRA's on site as part of the project's stormwater management system. The existing drainage along the northern edge of the site is believed to have been constructed as part of another development's stormwater management system however this system is located uphill from the proposed development and therefore not suitable for providing service to the subject property.

The other small wetland facilities are isolated and will be filled in order to allow the site's proposed roadways to connect. No alternative to preservation of the proposed WRA's exists. Mitigation for the impacted WRA's has been proposed through a state required wetland mitigation bank.

The requirements of this section have been satisfied.

2. Public and private storm water detention, storm water treatment facilities and storm water outfall or energy dissipaters (e.g., rip rap) may encroach into the WRA if:

a. Accepted engineering practice requires it;

b. Encroachment on significant trees shall be avoided when possible, and any tree loss shall be consistent with the City's Tree Technical Manual and mitigated per CDC 32.090;

c. There shall be no direct outfall into the water resource, and any resulting outfall shall not have an erosive effect on the WRA or diminish the stability of slopes; and

d. There are no reasonable alternatives available.

A geotechnical report may be required to make the determination regarding slope stability.

Applicant's Finding: The proposed storm water facilities will not be located or encroach into any WRA.

The requirements of this section are not applicable.

3. Roadside storm water conveyance swales and ditches may be extended within rights-of-way located in a WRA. When possible, they shall be located along the side of the road furthest from the water resource. If the conveyance facility must be located along the side of the road closest to the water resource, it shall be located as close to the road/sidewalk as possible and include habitat friendly design features (treatment train, rain gardens, etc.).

Applicant's Finding:	The applicant is not proposing to locate roadside stormwater conveyance swales or ditches within a WRA. The requirements of this section are not applicable.

4. Storm water detention and/or treatment facilities in the WRA shall be designed without permanent perimeter fencing and shall be landscaped with native vegetation.

Applicant's Finding:	The proposed storm water facilities will not encroach into a WRA located on site. The requirements of this section are not applicable.

5. Access to public storm water detention and/or treatment facilities shall be provided for maintenance purposes. Maintenance driveways shall be constructed to minimum width and use water permeable paving materials. Significant trees, including roots, shall not be disturbed to the degree possible. The encroachment and any tree loss shall be mitigated per CDC 32.090. There shall also be no adverse impacts upon the hydrologic conditions of the site.

Applicant's Finding:	Access to storm water detention and treatment facilities will not be located within any WRA. The requirements of this section have been satisfied.

C. Dedications and easements. The City shall request dedications of the WRA to the City when acquisition of the WRA by dedication or easement would serve a public purpose. When such a dedication or easement is mutually agreed upon, the applicant shall provide the documentation for the dedication or easement. Nothing in this section shall prohibit the City from condemning property if:

1. The property is necessary to serve an important public purpose; and

2. Alternative means of obtaining the property are unsuccessful.

Applicant's Finding:	The Applicant has proposed to maintain a 15 foot WRA buffer along an ephemeral stream located along the property's northern boundary. While originally proposed as a tract, the City has requested that the WRA buffer be integrated into the lots which adjoin the ephemeral stream.

The requirements of this section are not applicable.

D. WRA width. Except for the exemptions in CDC 32.040, applications that are using the alternate review process of CDC 32.070, or as authorized by the approval authority consistent with the provisions of this chapter, all development is prohibited in the WRA as established in Table 32-2 below:

Applicant's Finding:	Two small wetlands on the site will be removed and mitigated. The ephemeral stream, which runs along the site's northern boundary, has been provided with a fifteen (15) foot wide protective buffer. No encroachments into this buffer have been proposed. The width of the WRA is consistent with the requirements of this section.

E. Roads, driveways and utilities.

1. New roads, driveways, or utilities shall avoid WRAs unless the applicant demonstrates that no other practical alternative exists. In that case, road design and construction techniques shall minimize impacts and disturbance to the WRA by the following methods:

a. New roads and utilities crossing riparian habitat areas or streams shall be aligned as close to perpendicular to the channel as possible.

b. Roads and driveways traversing WRAs shall be of the minimum width possible to comply with applicable road standards and protect public safety. The footprint of grading and site clearing to accommodate the road shall be minimized.

c. Road and utility crossings shall avoid, where possible:

1) Salmonid spawning or rearing areas;

2) Stands of mature conifer trees in riparian areas;

3) Highly erodible soils;

4) Landslide prone areas;

5) Damage to, and fragmentation of, habitat; and

6) Wetlands identified on the WRA Map.

2. Crossing of fish bearing streams and riparian corridors shall use bridges or arch-bottomless culverts or the equivalent that provides comparable fish protection, to allow passage of wildlife and fish and to retain the natural stream bed.

3. New utilities spanning fish bearing stream sections, riparian corridors, and wetlands shall be located on existing roads/bridges, elevated walkways, conduit, or other existing structures or installed underground via tunneling or boring at a depth that avoids tree roots and does not alter the hydrology sustaining the water resource, unless the applicant demonstrates that it is not physically possible or it is cost prohibitive. Bore pits associated with the crossings shall be restored upon project completion. Dry, intermittent streams may be crossed with open cuts during a time period approved by the City and any agency with jurisdiction.

Applicant's Finding:	The Applicant has demonstrated that because of the site's grades and proximity to existing roadways that no alternative exists which would allow the site's two adjoining roadways to be connected. The Applicant has therefore proposed to

impact the two small, isolated wetlands which are located near the center of the site. Street widths are the minimum allowed. Because no practical alternative exists, the requirements of this section are met. Because of the small size and isolated nature of the two small wetlands, each wetland will be completely eliminated by a road crossing and related grading, thereby eliminating the surrounding unmapped water resource area. There will be no development within the more significant types of water resource areas identified by 32.060(E)(1)c.

4. No fill or excavation is allowed within the ordinary high water mark of a water resource, unless all necessary permits are obtained from the City, U.S. Army Corps of Engineers and Oregon Department of State Lands (DSL).

Applicant's Finding: The Applicant is in the process of applying for all necessary permits from the City, the US Army Corps of Engineers, and the Department of State Lands. No construction activities will be initiated prior to the issuance of all required permits.

5. Crossings of fish bearing streams shall be aligned, whenever possible, to serve multiple properties and be designed to accommodate conduit for utility lines. The applicant shall, to the extent legally permissible, work with the City to provide for a street layout and crossing location that will minimize the need for additional stream crossings in the future to serve surrounding properties.

Applicant's Finding: There are two small wetlands on the site that will be removed and mitigated to accommodate the public roadway network. Given the minimum density requirements and the need to grade and connect roadways on site, there is no alternative to routing utilities and roadways through the two wetlands. This is discussed further in response to the provisions of Chapter 32.

The requirements of this section have been satisfied.

F. Passive recreation. Low impact or passive outdoor recreation facilities for public use including, but not limited to, multi-use paths and trails, not exempted per CDC 32.040(B)(2), viewing platforms, historical or natural interpretive markers, and benches in the WRA, are subject to the following standards:

1. Trails shall be constructed using non-hazardous, water permeable materials with a maximum width of four feet or the recommended width under the applicable American Association of State Highway and Transportation Officials (AASHTO) standards for the expected type and use, whichever is greater.

2. Paved trails are limited to the area within 20 feet of the outer boundary of the WRA, and such trails must comply with the storm water provisions of this chapter.

3. All trails in the WRA shall be set back from the water resource at least 30 feet except at stream crossing points or at points where the topography forces the trail closer to the water resource.

4. Trails shall be designed to minimize disturbance to existing vegetation, work with natural contours, avoid the fall line on slopes where possible, avoid areas with evidence of slope failure and ensure that trail runoff does not create channels in the WRA.

5. Foot bridge crossings shall be kept to a minimum. When the stream bank adjacent to the foot bridge is accessible (e.g., due to limited vegetation or topography), where possible, fences or railings shall be installed from the foot bridge and extend 15 feet beyond the terminus of the foot bridge to discourage trail users and pets from accessing the stream bank, disturbing wildlife and habitat areas, and causing vegetation loss, stream bank erosion and stream turbidity. Bridges shall not be made of continuous impervious materials or be treated with toxic substances that could leach into the WRA.

6. Interpretive facilities (including viewpoints) shall be at least 10 feet from the top of the water resource's bankfull flow/OHW or delineated wetland edge and constructed with a fence between users and the resource. Interpretive signs may be installed on footbridges.

Applicant's Finding: There are two small wetlands on the site that will be removed and mitigated. Due to the small size and relatively low value of the small ephemeral stream which is located on site, and the difficulty associated with maintaining access to a resource located behind a series of homes, passive recreation will not be provided within the WRA area.

The requirements of this section have been satisfied.

G. Daylighting Piped Streams.

1. As part of any application, covered or piped stream sections shown on the WRA Map are encouraged to be "daylighted" or opened. Once it is daylighted, the WRA will be limited to 15 feet on either side of the stream. Within that WRA, water quality measures are required which may include a storm water treatment system (e.g., vegetated bioswales), continuous vegetative ground cover (e.g., native grasses) at least 15 feet in width that provides year round efficacy, or a combination thereof.

Applicant's Finding: No piped streams exist on the site which will require daylighting as part of this application.

The requirements of this section have been satisfied.

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H. The following habitat friendly development practices shall be incorporated into the design of any improvements or projects in the WRA to the degree possible:

1. Restore disturbed soils to original or higher level of porosity to regain infiltration and storm water storage capacity.

Applicant's Finding: The Applicant is not proposing any improvements within the fifteen foot wide WRA buffer area which exists along the site's northern boundary. The area is generally in good condition and is vegetated with an existing stand of deciduous and coniferous trees. The trees in this area have been proposed to be retained in order to meet the City's tree retention standards and to buffer the existing residential neighborhoods located adjacent to the site from the proposed development activities. The existing trees proposed for retention provide a habitat value and will continue to do so through their preservation.

As no site improvements have been proposed within the WRA on site which has been proposed for retention, the requirements of this section do not apply.

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32.070 ALTERNATE REVIEW PROCESS

This section establishes a review and approval process that applicants can use when there is reason to believe that the width of the WRA prescribed under the standard process (CDC 32.060(D)) is larger than necessary to protect the functions of the water resource at a particular site. It allows a qualified professional to determine what water resources and associated functions (see Table 32-4 below) exist at a site and the WRA width that is needed to maintain those functions. (Ord. 1623 § 1, 2014)

Applicant's Finding: The Applicant has not proposed a review under an alternative review process. The requirements of this section do not apply.

32.080 APPROVAL CRITERIA (ALTERNATE REVIEW PROCESS)

Applications reviewed under the alternate review process shall meet the following approval criteria:

A. The proposed WRA shall be, at minimum, qualitatively equal, in terms of maintaining the level of functions allowed by the WRA standards of CDC 32.060(D).

Applicant's Finding: The Applicant has not proposed a review under an alternative review process. The requirements of this section do not apply.

32.090 MITIGATION PLAN

A A mitigation plan shall only be required if development is proposed within a WRA (including development of a PDA). (Exempted activities of CDC 32.040 do not require mitigation unless specifically stated. Temporarily disturbed areas, including TDAs associated with exempted activities, do not require mitigation, just grade and soil restoration and re-vegetation.) The mitigation plan shall satisfy all applicable provisions of CDC 32.100, Re-Vegetation Plan Requirements.

B. Mitigation shall take place in the following locations, according to the following priorities (subsections (B)(1) through (4) of this section):

1. On-site mitigation by restoring, creating or enhancing WRAs.

2. Off-site mitigation in the same sub-watershed will be allowed, but only if the applicant has demonstrated that:

a. It is not practicable to complete mitigation on-site, for example, there is not enough area on-site; and

b. The mitigation will provide equal or superior ecological function and value.

3. Off-site mitigation outside the sub-watershed will be allowed, but only if the applicant has demonstrated that:

a. It is not practicable to complete mitigation on-site, for example, there is not enough area on-site; and

b. The mitigation will provide equal or superior ecological function and value.

4. Purchasing mitigation credits though DSL or other acceptable mitigation bank.

C. <u>Amount of mitigation</u>.

1. The amount of mitigation shall be based on the square footage of the permanent disturbance area by the application. For every one square foot of non-PDA disturbed area, on-site mitigation shall require one square foot of WRA to be created, enhanced or restored.

2. For every one square foot of PDA that is disturbed, on-site mitigation shall require one half a square foot of WRA vegetation to be created, enhanced or restored.

3. For any off-site mitigation, including the use of DSL mitigation credits, the requirement shall be for every one square foot of WRA that is disturbed, two square feet of WRA shall be created, enhanced or restored. The DSL mitigation credits program or mitigation bank shall require a legitimate bid on the cost of on-site mitigation multiplied by two to arrive at the appropriate dollar amount.

D. The Planning Director may limit or define the scope of the mitigation plan and submittal requirements commensurate with the scale of the disturbance relative to the resource and pursuant to the authority of Chapter 99 CDC. The Planning Director may determine that a consultant is required to complete all or a part of the mitigation plan requirements.

E. A mitigation plan shall contain the following information:

1. A list of all responsible parties including, but not limited to, the owner, applicant, contractor, or other persons responsible for work on the development site.

2. A map showing where the specific adverse impacts will occur and where the mitigation activities will occur.

3. A re-vegetation plan for the area(s) to be mitigated that meets the standards of CDC 32.100.

4. An implementation schedule, including timeline for construction, mitigation, mitigation maintenance, monitoring, and reporting. All in-stream work in fish bearing streams shall be done in accordance with the Oregon Department of Fish and Wildlife.

5. Assurances shall be established to rectify any mitigation actions that are not successful within the first three years. This may include bonding or other surety. (Ord. 1623 § 1, 2014)

Applicant's Finding:	Mitigation for the 3,963 square feet of wetland area is proposed through the purchase of wetland credits through the Department of State Land. Wetland Mitigation Credits are available within the area at a purchase price of approximately $200,000 per acre. As on-site mitigation is not proposed, a mitigation plan has not been prepared.

The requirements of this section have been satisfied.

CHAPTER 42. CLEAR VISION AREAS

42.020 CLEAR VISION AREAS REQUIRED, USES PROHIBITED

A. A clear vision area shall be maintained on the corners of all property adjacent to an intersection as provided by CDC 42.040 and 42.050.

B. A clear vision area shall contain no planting, fence, wall, structure or temporary or permanent obstruction (except for an occasional utility pole or tree) exceeding three feet in height, measured from the top of the curb, or, where no curb exists, from the street centerline grade, except that trees exceeding this height may be located in this area, provided all branches below eight feet are removed. (Ord. 1192, 1987)

42.030 EXCEPTIONS

The following described area in Willamette shall be exempt from the provisions of this chapter. The parcels of land zoned General Commercial which abut Willamette Falls Drive, located between 10th and 16th Streets. Beginning at the intersection of Willamette Falls Drive and 11th Street on 7th Avenue to 16th Street; on 16th Street to 9th Avenue; on 9th Avenue to 14th Street to the Tualatin River; following the Tualatin River and Willamette River to 12th Street; on 12th Street to 4th Avenue; on 4th Avenue to 11th Street; on 11th Street to Willamette Falls Drive. This described area does not include the northerly side of Willamette Falls Drive.

42.040 COMPUTATION; STREET AND ACCESSWAY 24 FEET OR MORE IN WIDTH

The clear vision area for all street intersections and street and accessway intersections (accessways having 24 feet or more in width) shall be that triangular area formed by the right-of-way or property lines along such lots and a straight line joining the right-of-way or property line at points which are 30 feet distant from the intersection of the right-of-way line and measured along such lines.

42.050 COMPUTATION; ACCESSWAY LESS THAN 24 FEET IN WIDTH

The clear vision area for street and accessway intersections (accessways having less than 24 feet in width) shall be that triangular area whose base extends 30 feet along the street right-of-way line in both directions from the centerline of the accessway at the front setback line of a single-family and two-family residence, and 30 feet back from the property line on all other types of uses.

Applicant's Finding: All clear vision areas at the intersections of public streets with driveways or other public streets on the subject site will be free of plantings, fences, walls, structures and obstructions, meeting the requirements for clear vision areas.

The requirements of this section have been satisfied.

CHAPTER 44. FENCES

44.020 SIGHT-OBSCURING FENCE; SETBACK AND HEIGHT LIMITATIONS

A. A sight- or non-sight-obscuring fence may be located on the property line or in a yard setback area subject to the following:

1. The fence is located within:

a. A required front yard area, and it does not exceed three feet, except pillars and driveway entry features subject to the requirements of Chapter 42 CDC, Clear Vision Areas, and approval by the Planning Director;

b. A required side yard which abuts a street and it is within that portion of the side yard which is also part of the front yard setback area and it does not exceed three feet;

c. A required side yard which abuts a street and it is within that portion of the side yard which is not also a portion of the front yard setback area and it does not exceed six feet provided the provisions of Chapter 42 CDC are met;

d. A required rear yard which abuts a street and it does not exceed six feet; or

e. A required side yard area which does not abut a street or a rear yard and it does not exceed six feet.

Applicant's Finding: New fences are not indicated on the proposed plans because the exact locations have yet to be determined. All fences constructed as part of this subdivision will meet the requirements of these standards.

B. Fence or wall on a retaining wall. When a fence is built on a retaining wall or an artificial berm, the following standards shall apply:

1. When the retaining wall or artificial berm is 30 inches or less in height from finished grade, the maximum fence or wall height on top of the retaining wall shall be six feet.

2. When the retaining wall or earth berm is greater than 30 inches in height, the combined height of the retaining wall and fence or wall from finished grade shall not exceed eight and one-half feet.

3. Fences or walls located on top of retaining walls or earth berms in excess of 30 inches above finished grade may exceed the total allowed combined height of eight and one-half feet; provided, that the fence or wall is located a minimum of two feet from the retaining wall and the fence or wall height shall not exceed six feet.

Applicant's Finding: Any fences built on retaining walls will meet these standards.

The requirements of this section have been satisfied.

44.030 SCREENING OF OUTDOOR STORAGE

A. All service, repair, and storage activities carried on in connection with any commercial, business or industrial activity and not conducted within an enclosed building shall be screened from view of all adjacent properties and adjacent streets by a sight-obscuring fence.

B. The sight-obscuring fence shall be in accordance with provisions of Chapter 42 CDC, Clear Vision Areas, and shall be subject to the provisions of Chapter 55 CDC, Design Review.

Applicant's Finding:	This site is residential and no service, repair, or storage activities in connection with commercial, business, or industry activities are proposed.

44.040 LANDSCAPING

Landscaping which is located on the fence line and which impairs sight vision shall not be located within the clear vision area as provided in Chapter 42 CDC.

44.050 STANDARDS FOR CONSTRUCTION

A. The structural side of the fence shall face the owner's property; and

B. The sides of the fence abutting adjoining properties and the street shall be maintained. (Ord. 1291, 1990

Applicant's Finding:	Any fences built will meet these standards. The requirements of this section have been satisfied.

CHAPTER 48. ACCESS, EGRESS AND CIRCULATION

48.025 ACCESS CONTROL

B. Access control standards.

1. Traffic impact analysis requirements. The City or other agency with access jurisdiction may require a traffic study prepared by a qualified professional to determine access, circulation and other transportation requirements. (See also CDC 55.125, Traffic Impact Analysis.)

Applicant's Finding:	The Applicant has provided a Traffic Impact Analysis under Appendix D of this land use application. The requirements of this section have been satisfied.

2. The City or other agency with access permit jurisdiction may require the closing or consolidation of existing curb cuts or other vehicle access points, recording of reciprocal access easements (i.e., for shared driveways), development of a frontage street, installation of traffic control devices, and/or other mitigation as a condition of granting an access permit, to ensure the safe and efficient operation of the street and highway system. Access to and from off-street parking areas shall not permit backing onto a public street.

Applicant's Finding:	The Applicant has proposed a street network which provides safe and logical vehicular circulation through the site as well as opportunities for on-street parking. A reciprocal access easement and maintenance agreement will be required for lots utilizing shared driveways. The requirements of this section have been satisfied.

3. Access options. When vehicle access is required for development (i.e., for off-street parking, delivery, service, drive-through facilities, etc.), access shall be provided by one of the following methods (planned access shall be consistent with adopted public works standards and TSP). These methods are "options" to the developer/subdivider.

a) Option 1. Access is from an existing or proposed alley or mid-block lane. If a property has access to an alley or lane, direct access to a public street is not permitted.

b) Option 2. Access is from a private street or driveway connected to an adjoining property that has direct access to a public street (i.e., "shared driveway"). A public access easement covering the driveway shall be recorded in this case to assure access to the closest public street for all users of the private street/drive.

c) Option 3. Access is from a public street adjacent to the development lot or parcel. If practicable, the owner/developer may be required to close or consolidate an existing access point as a condition of approving a new access. Street accesses shall comply with the access spacing standards in subsection (B)(6) of this section.

Applicant's Finding:	The Applicant is proposing access to the site via Option 3. The proposed design utilizes existing undeveloped right-of-way in addition to newly dedicated right-of-way for a public street. Access to the site will be provided at the terminus of Upper Midhill Drive and Hillside Drive. The requirements of this section have been satisfied.

4. Subdivisions fronting onto an arterial street. New residential land divisions fronting onto an arterial street shall be required to provide alleys or secondary (local or collector) streets for access to individual lots. When alleys or secondary streets cannot be constructed due to topographic or other physical constraints, access may be provided by consolidating driveways for clusters of two or more lots (e.g., includes flag lots and mid-block lanes).

Applicant's Finding:	The proposed development does not front onto an arterial road. The requirements of this section are not applicable.

5. Double-frontage lots. When a lot or parcel has frontage onto two or more streets, access shall be provided first from the street with the lowest classification. For example, access shall be provided from a local street before a collector or arterial street. When a lot or parcel has frontage opposite that of the adjacent lots or parcels, access shall be provided from the street with the lowest classification.

Applicant's Finding:	In the September 2016 decision for this site (City File Nos. AP-16-02/SUB-15-03/WAP-16-03), the City Council determined that a proposed subdivision of the Property did not create any double frontage lots. Although a few lots within that subdivision would have frontage on two streets, this outcome resulted from the

Applicant constructing a street connection on previously-dedicated right-of-way. None of the lots would have access to both streets. Likewise, in the current case, existing conditions, including topography, need for connectivity, the need to utilize previously-dedicated right-of-way, and the location of existing streets, require that two lots (Lots 15 and 16) in the Subdivision front on two different local streets. Because the Applicant did not cause these existing conditions, these lots are not correctly characterized as double-frontage lots.

The requirements of this section have been satisfied.

6. Access spacing.
a. The access spacing standards found in Chapter 8 of the adopted Transportation System Plan (TSP) shall be applicable to all newly established public street intersections and non-traversable medians.
b. Private drives and other access ways are subject to the requirements of CDC 48.060.

Applicant's Finding: The Applicant's proposed spacing meets the requirements of Chapter 8 of the City's Transportation System Plan.

The requirements of this section have been satisfied.

7. Number of access points. For single-family (detached and attached), two-family, and duplex housing types, one street access point is permitted per lot or parcel, when alley access cannot otherwise be provided; except that two access points may be permitted corner lots (i.e., no more than one access per street), subject to the access spacing standards in subsection (B)(6) of this section. The number of street access points for multiple family, commercial, industrial, and public/institutional developments shall be minimized to protect the function, safety and operation of the street(s) and sidewalk(s) for all users. Shared access may be required, in conformance with subsection (B)(8) of this section, in order to maintain the required access spacing, and minimize the number of access points.

Applicant's Finding: The Applicant is proposing only one access point for each new single family lot.

The requirements of this section have been satisfied.

8. Shared driveways. The number of driveway and private street intersections with public streets shall be minimized by the use of shared driveways with adjoining lots where feasible. The City shall require shared driveways as a condition of land division or site design review, as applicable, for traffic safety and access management purposes in accordance with the following standards:
a. Shared driveways and frontage streets may be required to consolidate access onto a collector or arterial street. When shared driveways or frontage streets are required, they shall be stubbed to adjacent developable parcels to indicate future extension. "Stub" means that a driveway or street temporarily ends at the property line, but may be extended in the future as the adjacent lot or parcel

develops. "Developable" means that a lot or parcel is either vacant or it is likely to receive additional development (i.e., due to infill or redevelopment potential).

b. Access easements (i.e., for the benefit of affected properties) shall be recorded for all shared driveways, including pathways, at the time of final plat approval or as a condition of site development approval.

c. Exception. Shared driveways are not required when existing development patterns or physical constraints (e.g., topography, lot or parcel configuration, and similar conditions) prevent extending the street/driveway in the future.

Applicant's Finding:	The Applicant has not proposed any shared access drives. The requirements of this section have been satisfied.

C. Street connectivity and formation of blocks required. In order to promote efficient vehicular and pedestrian circulation throughout the City, land divisions and large site developments shall produce complete blocks bounded by a connecting network of public and/or private streets, in accordance with the following standards:

1. Block length and perimeter. The maximum block length shall not exceed 800 feet or 1,800 feet along an arterial.

2. Street standards. Public and private streets shall also conform to Chapter 92 CDC, Required Improvements, and to any other applicable sections of the West Linn Community Development Code and approved TSP.

3. Exception. Exceptions to the above standards may be granted when blocks are divided by one or more pathway(s), in conformance with the provisions of CDC 85.200(C), Pedestrian and Bicycle Trails, or cases where extreme topographic (e.g., slope, creek, wetlands, etc.) conditions or compelling functional limitations preclude implementation, not just inconveniences or design challenges. (Ord. 1635 § 25, 2014; Ord. 1636 § 33, 2014)

Applicant's Finding:	Though the site has topographic considerations as well as the location adjacent to the City limits, no block length exceeds 800 feet. Hillside Drive connects to Hillside Drive less than 800 feet from where it turns 90 degrees to connect with Upper Midhill Drive. Upper Midhill Drive connects to College View Drive less than 800 feet from where it turns 90 degrees to connect with Hillside Drive. The entire site is looped to enhance connectivity and meet the intent of the block length standards. The requirements of this section have been satisfied.

48.030 MINIMUM VEHICULAR REQUIREMENTS FOR RESIDENTIAL USES

A. Direct individual access from single-family dwellings and duplex lots to an arterial street, as designated in the transportation element of the Comprehensive Plan, is prohibited for lots or parcels created after the effective date of this code where an alternate access is either available or is expected

to be available by imminent development application. Evidence of alternate or future access may include temporary cul-de-sacs, dedications or stubouts on adjacent lots or parcels, or tentative street layout plans submitted at one time by adjacent property owner/developer or by the owner/developer, or previous owner/developer, of the property in question.

In the event that alternate access is not available as determined by the Planning Director and City Engineer, access may be permitted after review of the following criteria:

1. **Topography.**
2. **Traffic volume to be generated by development (i.e., trips per day).**
3. **Traffic volume presently carried by the street to be accessed.**
4. **Projected traffic volumes.**
5. **Safety considerations such as line of sight, number of accidents at that location, emergency vehicle access, and ability of vehicles to exit the site without backing into traffic.**
6. **The ability to consolidate access through the use of a joint driveway.**
7. **Additional review and access permits may be required by State or County agencies.**

Applicant's Finding: The proposed development does not include direct access to arterials.

The requirements of this section do not apply.

B. When any portion of any house is less than 150 feet from the adjacent right-of-way, access to the home is as follows:

1. One single-family residence, including residences with an accessory dwelling unit as defined in CDC 02.030, shall provide 10 feet of unobstructed horizontal clearance. Dual-track or other driveway designs that minimize the total area of impervious driveway surface are encouraged.

Applicant's Finding: All proposed driveways within 150 feet of the adjacent right-of-way associated with Upper Midhill Drive and Hillside Drive will provide at least 10 feet of unobstructed horizontal clearance.

The requirements of this section have been satisfied.

2. Two to four single-family residential homes equals a 14- to 20-foot-wide paved or all-weather surface. Width shall depend upon adequacy of line of sight and number of homes.

Applicant's Finding: The Applicant is not proposing any shared driveways.

The requirements of this section have been satisfied.

3. Maximum driveway grade shall be 15 percent. The 15 percent shall be measured along the centerline of the driveway only. Variations require approval of a Class II variance by the Planning Commission pursuant to Chapter 75 CDC. Regardless, the last 18 feet in front of the garage shall be

under 12 percent grade as measured along the centerline of the driveway only. Grades elsewhere along the driveway shall not apply.

Applicant's Finding:	All proposed driveways will meet the maximum grade standards of this code. The requirements of this section have been satisfied.

4. The driveway shall include a minimum of 20 feet in length between the garage door and the back of sidewalk, or, if no sidewalk is proposed, to the paved portion of the right-of-way.

Applicant's Finding:	All proposed homes will have individual driveway areas of at least 20 feet in length to allow for parking of vehicles off of the common access ways or public roads. The requirements of this section have been satisfied.

C. When any portion of one or more homes is more than 150 feet from the adjacent right-of-way, the provisions of subsection B of this section shall apply in addition to the following provisions.
1. A turnaround may be required as prescribed by the Fire Chief.
2. Minimum vertical clearance for the driveway shall be 13 feet, six inches.
3. A minimum centerline turning radius of 45 feet is required unless waived by the Fire Chief.

Applicant's Finding:	The Applicant is not proposing any homes that will be more than 150 feet from the adjacent right-of-way. The requirements of this section are not applicable.

4. There shall be sufficient horizontal clearance on either side of the driveway so that the total horizontal clearance is 20 feet.

Applicant's Finding:	All proposed driveways will have a horizontal clearance of at least 20 feet. The requirements of this section have been satisfied.

D. Access to five or more single-family homes shall be by a street built to full construction code standards. All streets shall be public. This full street provision may only be waived by variance.

Applicant's Finding:	Access to the proposed lots will be provided by the extensions of Upper Midhill Drive and Hillside Drive, which are both public streets. The requirements of this section have been satisfied.

48.060 WIDTH AND LOCATION OF CURB CUTS AND ACCESS SEPARATION REQUIREMENTS

A. Minimum curb cut width shall be 16 feet.

Applicant's Finding:	All proposed curb cuts exceed the minimum 16 foot standard. The requirements of this section have been satisfied.

B. Maximum curb cut width shall be 36 feet, except along Highway 43 in which case the maximum curb cut shall be 40 feet. For emergency service providers, including fire stations, the maximum shall be 50 feet.

Applicant's Finding:	The maximum width of the curb cuts provided is less than 36 feet. The requirements of this section have been satisfied.

C. No curb cuts shall be allowed any closer to an intersecting street right-of-way line than the following:

1. On an arterial when intersected by another arterial, 150 feet.
2. On an arterial when intersected by a collector, 100 feet.
3. On an arterial when intersected by a local street, 100 feet.
4. On a collector when intersecting an arterial street, 100 feet.
5. On a collector when intersected by another collector or local street, 35 feet.
6. On a local street when intersecting any other street, 35 feet.

Applicant's Finding:	The Applicant's proposed driveway spacing exceeds the minimum 35 foot spacing requirements for local streets intersecting any other streets. The requirements of this section have been satisfied.

D. There shall be a minimum distance between any two adjacent curb cuts on the same side of a public street, except for one-way entrances and exits, as follows:

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3. Between any two curb cuts on the same lot or parcel on a local street, 30 feet.

Applicant's Finding:	Where possible, 30 feet of spacing has been provided between curb cuts along Upper Midhill Drive and Hillside Drive. Where not possible, the Applicant has complied with the following subsection. The requirements of this section have been satisfied.

E. A rolled curb may be installed in lieu of curb cuts and access separation requirements.

Applicant's Finding:	Due to the smaller size of the proposed lots, the Applicant will implement a rolled curb design in lieu of curb cuts which meet the required access separation standards.

The requirements of this section have been satisfied.

F. Curb cuts shall be kept to the minimum, particularly on Highway 43. Consolidation of driveways is preferred. The standard on Highway 43 is one curb cut per business if consolidation of driveways is not possible.

Applicant's Finding: The development does not propose any curb cuts on Highway 43. The requirements of this section do not apply.

G. Adequate line of sight pursuant to engineering standards should be afforded at each driveway or accessway. (Ord. 1270, 1990; Ord. 1584, 2008; Ord. 1636 § 35, 2014)

Applicant's Finding: The proposed driveways will comply with the City's engineering standards for sight distance. This requirement will be verified at the time of building permit submission for each individual home site and driveway.

The requirements of this section have been satisfied.

48.070 PLANNING DIRECTOR'S AUTHORITY TO RESTRICT ACCESS APPEAL PROVISIONS

A. In order to provide for increased traffic movement on congested streets and eliminate turning movement problems, the Planning Director and the City Engineer, or his designee, may restrict the location of driveways on said street and require the location of driveways on adjacent streets upon the finding that the proposed access would:

1. Provide inadequate access for emergency vehicles; or

Applicant's Finding: The proposed development continues a public street network into the site which will be constructed in accordance with the City's requirements for emergency vehicle access. Adequate access for emergency vehicles has been provided throughout the site.

The requirements of this section have been satisfied.

2. Cause or increase hazardous conditions to exist which would constitute a clear and present danger to the public health safety and general welfare.

Applicant's Finding: The site has no hazardous conditions which would be exacerbated by the development proposal.

The requirements of this section have been satisfied.

48.080 BICYCLE AND PEDESTRIAN CIRCULATION

A. Within all multi-family developments (except two-family/duplex dwellings), each residential dwelling shall be connected to vehicular parking stalls, common open space, and recreation facilities by a pedestrian pathway system having a minimum width of six feet and constructed of an all-weather material. The pathway material shall be of a different color or composition from the driveway. (Bicycle routes adjacent to the travel lanes do not have to be of different color or composition.)

B. Bicycle and pedestrian ways within a subdivision shall be constructed according to the provisions in CDC 85.200(A)(3).

Applicant's Finding:	The Applicant has provided for the extension of Upper Midhill Drive and Hillside Drive into the proposed development. The streets will provide facilities for both pedestrians and cyclists consistent with the City's Standards for public streets. The requirements of this section have been satisfied.

CHAPTER 54. LANDSCAPING

54.020 APPROVAL CRITERIA

A. Every development proposal requires inventorying existing site conditions which include trees and landscaping. In designing the new project, every reasonable attempt should be made to preserve and protect existing trees and to incorporate them into the new landscape plan. Similarly, significant landscaping (e.g., bushes, shrubs) should be integrated. The rationale is that saving a 30-foot-tall mature tree helps maintain the continuity of the site, they are qualitatively superior to two or three two-inch caliper street trees, they provide immediate micro-climate benefits (e.g., shade), they soften views of the street, and they can increase the attractiveness, marketability, and value of the development.

Applicant's Finding:	This ELD Application includes a tree inventory and preservation plan focused on maintaining significant trees and clusters. Roads, utilities, and lots have been carefully placed to allow the retention of as many trees as possible.

B. To encourage tree preservation, the parking requirement may be reduced by one space for every significant tree that is preserved in the parking lot area for a maximum reduction of 10 percent of the required parking. The City Parks Supervisor or Arborist shall determine the significance of the tree and/or landscaping to determine eligibility for these reductions.

Applicant's Finding:	No parking areas, aside from driveways, are required for residential subdivisions. No parking reduction is requested.

C. Developers must also comply with the municipal code chapter on tree protection.

Applicant's Finding:	The developer will comply with all municipal code requirements for tree protection.

D. Heritage trees. Heritage trees are trees which, because of their age, type, notability, or historical association, are of special importance. Heritage trees are trees designated by the City Council following review of a nomination. A heritage tree may not be removed without a public hearing at least 30 days prior to the proposed date of removal. Development proposals involving land with heritage tree(s) shall be required to protect and save the tree(s). Further discussion of heritage trees is found in the municipal code.

Applicant's Finding: No heritage trees have been identified on this site.

The requirements of this section have been satisfied.

E. (Not applicable to single-family residential)

F. Landscaping (trees) in new subdivision.

1. Street trees shall be planted by the City within the planting strips (minimum six-foot width) of any new subdivision in conformity with the street tree plan for the area, and in accordance with the planting specifications of the Parks and Recreation Department. All trees shall be planted during the first planting season after occupancy. In selecting types of trees, the City Arborist may determine the appropriateness of the trees to local conditions and whether that tree has been overplanted, and whether alternate species should be selected. Also see subsection (C) of this section.

2. The cost of street trees shall be paid by the developer of the subdivision.

3. The fee per street tree, as established by the City, shall be based upon the following:

a. The cost of the tree;

b. Labor and equipment for original placement;

c. Regular maintenance necessary for tree establishment during the initial two-year period following the City schedule of maintenance; and

d. A two-year replacement warranty based on the City's established failure rate. (Ord. 1408, 1998; Ord. 1463, 2000)

Applicant's Finding: The applicant will pay for the installation of street trees by the City and maintain the trees for the two-year establishment period.

The requirements of this section have been satisfied.

54.030 PLANTING STRIPS FOR MODIFIED AND NEW STREETS

All proposed changes in width in a public street right-of-way or any proposed street improvement shall, where feasible, include allowances for planting strips. Plans and specifications for planting such areas shall be integrated into the general plan of street improvements. This chapter requires any multi-family, commercial, or public facility which causes change in public right-of-way or street improvement to comply with the street tree planting plan and standards.

Applicant's Finding:	Minimum width 6-foot-wide planting strips will be installed between the sidewalk and the asphalt within the right-of-way in all occasions except where a modification has been proposed. The requirements of this section have been satisfied.

54.040 INSTALLATION

A. All landscaping shall be installed according to accepted planting procedures.

B. The soil and plant materials shall be of good quality.

C. Landscaping shall be installed in accordance with the provisions of this code.

D. Certificates of occupancy shall not be issued unless the landscaping requirements have been met or other arrangements have been made and approved by the City such as the posting of a bond.

Applicant's Finding:	All landscaping installation will meet the requirements of this section. The requirements of this section have been satisfied.

54.050 PROTECTION OF STREET TREES

Street trees may not be topped or trimmed unless approval is granted by the Parks Supervisor or, in emergency cases, when a tree imminently threatens power lines.

Applicant's Finding:	The Applicant is not proposing to top or trim any existing street trees as part of the Project. The requirements of this section have been satisfied.

54.060 MAINTENANCE

A. The owner, tenant and their agent, if any, shall be jointly and severally responsible for the maintenance of all landscaping which shall be maintained in good condition so as to present a healthy, neat, and orderly appearance and shall be kept free from refuse and debris.

B. All plant growth in interior landscaped areas shall be controlled by pruning, trimming, or otherwise so that:

1. **It will not interfere with the maintenance or repair of any public utility;**

2. **It will not restrict pedestrian or vehicular access; and**

3. **It will not constitute a traffic hazard because of reduced visibility.**

Applicant's Finding:	The owners of this property, including future homeowners, will be responsible for maintenance of landscaping. The requirements of this section have been satisfied.

54.070 SPECIFICATION SUMMARY
*****25% of residential/multi-family site must be landscaped.**

Applicant's Finding:	A minimum of 25% of this site will be landscaped as part of the yards of future homes. The requirements of this section have been satisfied.

DIVISION 4. DESIGN REVIEW

CHAPTER 55. DESIGN REVIEW

55.100 APPROVAL STANDARDS - CLASS II DESIGN REVIEW

B. Relationship to the natural and physical environment.

1. **The buildings and other site elements shall be designed and located so that all heritage trees, as defined in the municipal code, shall be saved. Diseased heritage trees, as determined by the City Arborist, may be removed at his/her direction.**

Applicant's Finding:	No heritage trees were identified on this site. The requirements of this section have been satisfied.

2. All heritage trees, as defined in the municipal code, all trees and clusters of trees ("cluster" is defined as three or more trees with overlapping driplines; however, native oaks need not have an overlapping dripline) that are considered significant by the City Arborist, either individually or in consultation with certified arborists or similarly qualified professionals, based on accepted arboricultural standards including consideration of their size, type, location, health, long term survivability, and/or numbers, shall be protected pursuant to the criteria of subsections (B)(2)(a) through (f) of this section. In cases where there is a difference of opinion on the significance of a tree or tree cluster, the City Arborist's findings shall prevail. It is important to acknowledge that all trees are not significant and, further, that this code section will not necessarily protect all trees deemed significant.

Applicant's Finding:	The findings of subsections (B)(2)(a) through (f) are found below. The requirements of this section have been satisfied.

a. Non-residential and residential projects on Type I and II lands shall protect all heritage trees and all significant trees and tree clusters by either the dedication of these areas or establishing tree conservation easements. Development of Type I and II lands shall require the careful layout of streets, driveways, building pads, lots, and utilities to avoid heritage trees and significant trees and tree clusters, and other natural resources pursuant to this code. The method for delineating the protected trees or tree clusters ("dripline + 10 feet") is explained in subsection (B)(2)(b) of this section. Exemptions of subsections (B)(2)(c), (e), and (f) of this section shall apply.

Applicant's Finding: This site is not classified as Type I or Type II and, therefore, this standard is not applicable to the vast majority of the property. The Applicant has submitted a slope analysis showing the slopes present on the site. A very small portion of Type I and Type II lands exist on the property; however, these areas fall within a portion of the site located adjacent to a Water Quality Resource and in the southernmost corner of the property. No significant trees have been identified within the steeper sloped portions of the site. These areas adjacent to the WRA will not be developed at the time of site construction and tree protection within these areas will be achieved. The southernmost corner of the site will require development to allow for the necessary extension of the roadway network.

The requirements of this section have been satisfied.

b. Non-residential and residential projects on non-Type I and II lands shall set aside up to 20 percent of the area to protect trees and tree clusters that are determined to be significant, plus any heritage trees. Therefore, in the event that the City Arborist determines that a significant tree cluster exists at a development site, then up to 20 percent of the non-Type I and II lands shall be devoted to the protection of those trees, either by dedication or easement. The exact percentage is determined by establishing the driplines of the trees or tree clusters that are to be protected. In order to protect the roots which typically extend further, an additional 10-foot measurement beyond the dripline shall be added. The square footage of the area inside this "dripline plus 10 feet" measurement shall be the basis for calculating the percentage (see figure below). The City Arborist will identify which tree(s) are to be protected. Development of non-Type I and II lands shall also require the careful layout of streets, driveways, building pads, lots, and utilities to avoid significant trees, tree clusters, heritage trees, and other natural resources pursuant to this code. Exemptions of subsections (B)(2)(c), (e), and (f) of this section shall apply. Please note that in the event that more than 20 percent of the non-Type I and II lands comprise significant trees or tree clusters, the developer shall not be required to save the excess trees, but is encouraged to do so.

Applicant's Finding: The proposed subdivision is located on primarily non-Type I and II lands. Streets, driveways, building pads, lots and utilities have been carefully laid out so as to avoid significant trees and clusters with particular attention to the vegetation around the boundary of the site. The site plan's concept includes deeper than necessary lots around the boundary with the specific goal of retaining a buffer of trees between this site and the neighboring, developed properties. Every reasonable effort has been made to retain trees as they enhance the value of the properties for the developer and the future homeowners. The applicant has inventoried all trees on site and has consulted with the City's arborist to determine which trees on site are significant. The applicant is proposing tree preservation consistent with these requirements, as detailed in the tree plan.

There are a total of 169 trees identified as significant on this site. The significant tree canopy area on site totals 238,212 square feet or 5.4 acres. Of these trees, 50 significant trees will be retained through the site development and homebuilding process. A total of 77,863 square feet of significant canopy will be retained or 1.7 acres. The proposed retention represents 33 percent of the site's existing canopy. In addition to the trees determined to be significant, 62 additional non-significant trees have been proposed for retention. The retention of these trees has been made possible through the Applicant's careful placement of streets, driveways, building pads, lots and utilities throughout the project site. With larger than required back yards and purposeful placement of utilities, the site's preservation requirement of 20% of the significant tree canopy has been met and exceeded.

The requirements of this section have been satisfied.

c. Where stubouts of streets occur on abutting properties, and the extension of those streets will mean the loss of significant trees, tree clusters, or heritage trees, it is understood that tree loss may be inevitable. In these cases, the objective shall be to minimize tree loss. These provisions shall also apply in those cases where access, per construction code standards, to a lot or parcel is blocked by a row or screen of significant trees or tree clusters.

Applicant's Finding: No street stub outs are proposed on abutting properties.

The requirements of this section have been satisfied.

d. For both non-residential and residential development, the layout shall achieve at least 70 percent of maximum density for the developable net area. The developable net area excludes all Type I and II lands and up to 20 percent of the remainder of the site for the purpose of protection of stands or clusters of trees as defined in subsection (B)(2) of this section.

Applicant's Finding: The R-4.5 zone permits a maximum density of 9.61 dwelling units per net acre. Net acre is defined as "The total gross acres less the public right-of-way and other acreage deductions, as applicable". The net acreage of this site after removal of dedicated right-of way is 5.30 acres. At 9.61 dwelling units per net acre, the maximum number of dwelling units on this site is 50. The minimum density of this site is 70% of 50 units, or 35 units, which is less than the number of dwelling units proposed.

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The requirements of this section have been satisfied.

e. For arterial and collector street projects, including Oregon Department of Transportation street improvements, the roads and graded areas shall avoid tree clusters where possible. Significant trees, tree clusters, and heritage tree loss may occur, however, but shall be minimized.

Applicant's Finding:	No arterial or collector street projects are included with this development application. The requirements of this section have been satisfied.

f. If the protection of significant tree(s) or tree clusters is to occur in an area of grading that is necessary for the development of street grades, per City construction codes, which will result in an adjustment in the grade of over or under two feet, which will then threaten the health of the tree(s), the applicant will submit evidence to the Planning Director that all reasonable alternative grading plans have been considered and cannot work. The applicant will then submit a mitigation plan to the City Arborist to compensate for the removal of the tree(s) on an "inch by inch" basis (e.g., a 48-inch Douglas fir could be replaced by 12 trees, each four-inch). The mix of tree sizes and types shall be approved by the City Arborist.

Applicant's Finding:	19 significant trees with a total DBH of 434 inches are proposed for removal due to street construction. The Applicant is proposing to mitigate for the removal of 434 inches of DBH by planting street trees and landscape trees on the project site. The remaining trees which are not able to be planted on site will be mitigated for either in off-site plantings in a location chosen by the City's arborist or the Applicant will pay a fee in lieu to the City for trees which cannot be planted on site. The requirements of this section have been satisfied.

DIVISION 8. LAND DIVISIONS

CHAPTER 92. REQUIRED IMPROVEMENTS

92.010 PUBLIC IMPROVEMENTS FOR ALL DEVELOPMENT

The following improvements shall be installed at the expense of the developer and meet all City codes and standards:

A. <u>Streets within subdivisions</u>.

1. All streets within a subdivision, including alleys, shall be graded for the full right-of-way width and improved to the City's permanent improvement standards and specifications which include sidewalks and bicycle lanes, unless the decision-making authority makes the following findings:

a. The right-of-way cannot be reasonably improved in a manner consistent with City road standards or City standards for the protection of wetlands and natural drainageways.

b. The right-of-way does not provide a link in a continuous pattern of connected local streets, or, if it does provide such a link, that an alternative street link already exists or the

applicant has proposed an alternative street which provides the necessary connectivity, or the applicant has proven that there is no feasible location on the property for an alternative street providing the link.

2. When the decision-making authority makes these findings, the decision-making authority may impose any of the following conditions of approval:

a. A condition that the applicant initiate vacation proceedings for all or part of the right-of-way.

b. A condition that the applicant build a trail, bicycle path, or other appropriate way.

If the applicant initiates vacation proceedings pursuant to subsection (A)(2)(a) of this section, and the right-of-way cannot be vacated because of opposition from adjacent property owners, the City Council shall consider and decide whether to process a City-initiated street vacation pursuant to Chapter 271 ORS.

Construction staging area shall be established and approved by the City Engineer. Clearing, grubbing, and grading for a development shall be confined to areas that have been granted approval in the land use approval process only. Clearing, grubbing, and grading outside of land use approved areas can only be approved through a land use approval modification and/or an approved Building Department grading permit for survey purposes. Catch basins shall be installed and connected to pipe lines leading to storm sewers or drainageways.

B. Extension of streets to subdivisions. The extension of subdivision streets to the intercepting paving line of existing streets with which subdivision streets intersect shall be graded for the full right-of-way width and improved to a minimum street structural section and width of 24 feet.

C. Local and minor collector streets within the rights-of-way abutting a subdivision shall be graded for the full right-of-way width and approved to the City's permanent improvement standards and specifications. The City Engineer shall review the need for street improvements and shall specify whether full street or partial street improvements shall be required. The City Engineer shall also specify the extent of storm drainage improvements required. The City Engineer shall be guided by the purpose of the City's systems development charge program in determining the extent of improvements which are the responsibility of the subdivider.

D. Monuments. Upon completion of the first pavement lift of all street improvements, monuments shall be installed and/or reestablished at every street intersection and all points of curvature and points of tangency of street centerlines with an iron survey control rod. Elevation benchmarks shall be established at each street intersection monument with a cap (in a monument box) with elevations to a U.S. Geological Survey datum that exceeds a distance of 800 feet from an existing benchmark.

E. Surface drainage and storm sewer system. A registered civil engineer shall prepare a plan and statement which shall be supported by factual data that clearly shows that there will be no adverse impacts from increased intensity of runoff off site of a 100-year storm, or the plan and statement shall identify all off-site impacts and measures to mitigate those impacts commensurate to the particular land use application. Mitigation measures shall maintain pre-existing levels and meet buildout volumes, and meet planning and engineering requirements.

F. Sanitary sewers. Sanitary sewers shall be installed to City standards to serve the subdivision and to connect the subdivision to existing mains.

1. If the area outside the subdivision to be directly served by the sewer line has reached a state of development to justify sewer installation at the time, the Planning Commission may recommend to the City Council construction as an assessment project with such arrangement with the subdivider as is desirable to assure financing his share of the construction.

2. If the installation is not made as an assessment project, the City may reimburse the subdivider an amount estimated to be a proportionate share of the cost for each connection made to the sewer by property owners outside of the subdivision for a period of 10 years from the time of installation of the sewers. The actual amount shall be determined by the City Administrator considering current construction costs.

G. Water system. Water lines with valves and fire hydrants providing service to each building site in the subdivision and connecting the subdivision to City mains shall be installed. Prior to starting building construction, the design shall take into account provisions for extension beyond the subdivision and to adequately grid the City system. Hydrant spacing is to be based on accessible area served according to the City Engineer's recommendations and City standards. If required water mains will directly serve property outside the subdivision, the City may reimburse the developer an amount estimated to be the proportionate share of the cost for each connection made to the water mains by property owners outside the subdivision for a period of 10 years from the time of installation of the mains. If oversizing of water mains is required to areas outside the subdivision as a general improvement, but to which no new connections can be identified, the City may reimburse the developer that proportionate share of the cost for oversizing. The actual amount and reimbursement method shall be as determined by the City Administrator considering current or actual construction costs.

H. Sidewalks.

1. Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision, except that in the case of primary or secondary arterials, or special type industrial districts, or special site conditions, the Planning Commission may approve a subdivision without sidewalks if alternate pedestrian routes are available.

In the case of the double-frontage lots, provision of sidewalks along the frontage not used for access shall be the responsibility of the developer. Providing front and side yard sidewalks shall be the responsibility of the land owner at the time a request for a building permit is received. Additionally, deed restrictions and CC&Rs shall reflect that sidewalks are to be installed prior to occupancy and it is the responsibility of the lot or homeowner to provide the sidewalk, except as required above for double-frontage lots.

2. On local streets serving only single-family dwellings, sidewalks may be constructed during home construction, but a letter of credit shall be required from the developer to ensure construction of all missing sidewalk segments within four years of final plat approval pursuant to CDC 91.010(A)(2).

3. The sidewalks shall measure at least six feet in width and be separated from the curb by a six-foot minimum width planter strip. Reductions in widths to preserve trees or other topographic features, inadequate right-of-way, or constraints, may be permitted if approved by the City Engineer in consultation with the Planning Director.

4. Sidewalks should be buffered from the roadway on high volume arterials or collectors by landscape strip or berm of three and one-half-foot minimum width.

5. The City Engineer may allow the installation of sidewalks on one side of any street only if the City Engineer finds that the presence of any of the factors listed below justifies such waiver:

a. The street has, or is projected to have, very low volume traffic density;

b. The street is a dead-end street;

c. The housing along the street is very low density; or

d. The street contains exceptional topographic conditions such as steep slopes, unstable soils, or other similar conditions making the location of a sidewalk undesirable.

I. <u>Bicycle routes</u>. If appropriate to the extension of a system of bicycle routes, existing or planned, the Planning Commission may require the installation of separate bicycle lanes within streets and separate bicycle paths.

J. <u>Street name signs</u>. All street name signs and traffic control devices for the initial signing of the new development shall be installed by the City with sign and installation costs paid by the developer.

K. <u>Dead-end street signs</u>. Signs indicating "future roadway" shall be installed at the end of all discontinued streets. Signs shall be installed by the City per City standards, with sign and installation costs paid by the developer.

L. <u>Signs indicating future use</u> shall be installed on land dedicated for public facilities (e.g., parks, water reservoir, fire halls, etc.). Sign and installation costs shall be paid by the developer.

M. <u>Street lights</u>. Street lights shall be installed and shall be served from an underground source of supply. The street lighting shall meet IES lighting standards. The street lights shall be the shoe-box style light (flat lens) with a 30-foot bronze pole in residential (non-intersection) areas. The street light shall be the cobra head style (drop lens) with an approximate 50-foot (sized for intersection width) bronze pole. The developer shall submit to the City Engineer for approval of any alternate residential, commercial, and industrial lighting, and alternate lighting fixture design. The developer and/or homeowners association is required to pay for all expenses related to street light energy and maintenance costs until annexed into the City.

N. <u>Utilities</u>. The developer shall make necessary arrangements with utility companies or other persons or corporations affected for the installation of underground lines and facilities. Electrical lines and other wires, including but not limited to communication, street lighting, and cable television, shall be placed underground.

O. <u>Curb cuts and driveways</u>. Curb cuts and driveway installations are not required of the subdivider at the time of street construction, but, if installed, shall be according to City standards. Proper curb cuts and hard-surfaced driveways shall be required at the time buildings are constructed.

P. <u>Street trees</u>. Street trees shall be provided by the City Parks and Recreation Department in accordance with standards as adopted by the City in the Municipal Code. The fee charged the subdivider for providing and maintaining these trees shall be set by resolution of the City Council.

Q. <u>Joint mailbox facilities</u> shall be provided in all residential subdivisions, with each joint mailbox serving at least two, but no more than eight, dwelling units. Joint mailbox structures shall be placed in the street right-of-way adjacent to roadway curbs. Proposed locations of joint mailboxes shall be designated on a copy of the tentative plan of the subdivision, and shall be approved as part of the tentative plan approval. In addition, sketch plans for the joint mailbox structures to be used shall be submitted and approved by the City Engineer prior to final plat approval. (Ord. 1180, 1986; Ord. 1192, 1987; Ord. 1287, 1990; Ord. 1321, 1992; Ord. 1339, 1993; Ord. 1401, 1997; Ord. 1408, 1998; Ord. 1442, 1999)

Applicant's Finding:	All improvements will be installed per the submitted plans and in conformance with the requirements of this title. The requirements of this section have been satisfied.

92.030 IMPROVEMENT PROCEDURES

In addition to other requirements, improvements installed by the developer, either as a requirement of these regulations or at the developer's own option, shall conform to the requirements of this title and permanent improvement standards and specifications adopted by the City and shall be installed in accordance with the following procedure:

A. Improvement work shall not be commenced until plans have been checked for adequacy and approved by the City. To the extent necessary for evaluation of the proposal, the improvement plans may be required before approval of the tentative plan of a subdivision or partition. Plans shall be prepared in accordance with the requirements of the City.

B. Improvement work shall not be commenced until the City has been notified in advance, and if work has been discontinued for any reason, it shall not be resumed until the City has been notified.

C. Improvements shall be constructed under the Engineer. The City may require changes in typical sections and details in the public interest if unusual conditions arise during construction to warrant the change.

D. All underground utilities, sanitary sewers, and storm drains installed in streets by the subdivider or by any utility company shall be constructed prior to the surfacing of the streets. Stubs for service connections for underground utilities and sanitary sewers shall be placed to a length obviating the necessity for disturbing the street improvements when service connections are made.

E. A digital and mylar map showing all public improvements as built shall be filed with the City Engineer upon completion of the improvements. (Ord. 1408, 1998)

Applicant's Finding:	All improvements will be installed in conformance with the requirements of this title. The requirements of this section have been satisfied.

DIVISION 9. ADMINISTRATIVE PROCEDURES

CHAPTER 99 PROCEDURES FOR DECISION MAKING: QUASI-JUDICIAL

99.030 APPLICATION PROCESS: WHO MAY APPLY, PRE-APPLICATION CONFERENCE, REQUIREMENTS, REFUSAL OF APPLICATION, FEES

A. Who may apply.

1. Applications for approval required under this chapter may be initiated by:

a. The owner of the property that is the subject of the application or the owner's duly authorized representative;

b. The purchaser of such property who submits a duly executed written contract or copy thereof, which has been recorded with the Clackamas Clerk;

c. A lessee in possession of such property who submits written consent of the owner to make such application; or

d. Motion by the Planning Commission or City Council.

2. Any person authorized by this chapter to submit an application for approval may be represented by an agent who is authorized in writing by such a person to make the application.

Applicant's Finding: The owner of the property is initiating this application for approval.

The requirements of this section have been satisfied.

B. Pre-application conferences.

1. Subject to subsection (B)(4) of this section, a pre-application conference is required for, but not limited to, ***l. land divisions.

Applicant's Finding: A pre-application meeting was held October 20, 2016.

The requirements of this section have been satisfied.

C. The requirements for making an application.

1. The application shall be made on forms provided by the Director as provided by CDC 99.040(A)(1);

2. The application shall be complete and shall contain the information requested on the form, shall address the appropriate submittal requirements and approval criteria in sufficient detail for review and action, and shall be accompanied by the deposit or fee required by CDC 99.033. No application will be accepted if not accompanied by the required fee or deposit. In the event an additional deposit is required by CDC 99.033 and not provided within the time required, the application shall be rejected without further processing or deliberation and all application materials shall be returned to the applicant, notwithstanding any determination of completeness. (Ord. 1527, 2005; Ord. 1568, 2008; Ord. 1590 § 1, 2009; Ord. 1599 § 6, 2011)

Applicant's Finding:	This application has been made on forms provided by the City's Planning Department. The application contains the necessary information and the required fee. The requirements of this section have been satisfied.

99.033 FEES

The Council shall adopt a schedule of fees reasonably calculated to defray the expenses of the administrative process. The Council may establish either a set fee or a deposit system in which the applicant pays a deposit and the City determines the total administrative cost at the end of the process and refunds any unused amount of the deposit to the applicant. No additional deposit shall be required for additional costs that are incurred because the matter is referred to or called up by a higher decision-making authority. The Council shall charge no fees for City-initiated land use applications or appeals filed by a recognized neighborhood association pursuant to the provisions of CDC 99.240. (Ord. 1527, 2005; Ord. 1568, 2008; Ord. 1604 § 70, 2011)

Applicant's Finding:	The required fee was submitted with the land use application. The requirements of this section have been satisfied.

99.038 NEIGHBORHOOD CONTACT REQUIRED FOR CERTAIN APPLICATIONS

Prior to submittal of an application for any subdivision, conditional use permit, multi-family project, planned unit development of four or more lots, non-residential buildings of over 1,500 square feet, or a zone change that requires a Comprehensive Plan amendment, the applicant shall contact and discuss the proposed development with any affected neighborhood as provided in this section. Although not required for other or smaller projects, contact with neighbors is highly recommended. The Planning Director may require neighborhood contact pursuant to this section prior to the filing of an application for any other development permit if the Director deems neighborhood contact to be beneficial.

A. Purpose. The purpose of neighborhood contact is to identify potential issues or conflicts regarding a proposed application so that they may be addressed prior to filing. This contact is intended to result in a better application and to expedite and lessen the expense of the review process by avoiding needless delays, appeals, remands, or denials. The City expects an applicant to take the reasonable concerns and recommendations of the neighborhood into consideration when preparing an application. The City expects the neighborhood association to work with the applicant to provide such input.

B. The applicant shall contact by letter all recognized neighborhood associations whose boundaries contain all or part of the site of the proposed development and all property owners within 500 feet of the site.

C. The letter shall be sent by to the president of the neighborhood association, and to one designee as submitted to the City by the neighborhood association, and shall be sent by regular mail to the other officers of the association and the property owners within 500 feet. If another neighborhood association boundary is located within the 500-foot notice radius, the letter shall be sent to that association's president, and to one designee as submitted to the City by the neighborhood association as well. The letter shall briefly describe the nature and location of the proposed development, and invite the association and interested persons to a meeting to discuss the proposal in more detail. The meeting shall be scheduled at the association's regularly scheduled monthly meeting, or at another time at the discretion of the association, and not less than 20 days from the date of mailing of the notice. If the

meeting is scheduled as part of the association's regular monthly meeting, the letter shall explain that the proposal may not be the only topic of discussion on the meeting agenda. The letter shall encourage concerned citizens to contact their association president, or their association designee, with any questions that they may want to relay to the applicant.

Neighborhood contact shall be initiated by the applicant by mailing the association president, and to one designee as submitted to the City by the neighborhood association, a letter, return receipt requested, formally requesting, within 60 days, a date and location to have their required neighborhood meeting. The 60 days shall be calculated from the date that the applicant mails this letter to the association. If the neighborhood association does not want to meet within the 60-day timeframe, or if there is no neighborhood association, the applicant may hold a public meeting during the evening after 6:00 p.m., or on the weekend no less than 20 days from the date of mailing of the notice. All meetings shall be held at a location open to the public within the boundaries of the association or at a public facility within the City of West Linn. If the meeting is held at a business, it shall be posted at the time of the meeting as the meeting place and shall note that the meeting is open to the public and all interested persons may attend.

D. On the same date the letters described in subsections A through C of this section are mailed, the applicant shall provide and post notice on the property subject to the proposed application. The notice shall be posted at a location visible from the public right-of-way. If the site is not located adjacent to a through street, then an additional sign shall be posted on the nearest through street. The sign notice shall be at least 11 inches by 17 inches in size on durable material and in clear, legible writing. The notice shall state that the site may be subject to a proposed development (e.g., subdivision, variance, conditional use) and shall set forth the name of the applicant and a telephone number where the applicant can be reached for additional information. The site shall remain posted until the conclusion of the meeting.

E. An application shall not be accepted as complete unless and until the applicant demonstrates compliance with this section by including with the application:

1. A copy of the certified letter to the neighborhood association with a copy of return receipt;

2. A copy of the letter to officers of the association and to property owners within 500 feet, including an affidavit of mailing and a copy of the mailing list containing the names and addresses of such owners and residents;

3. A copy of the required posted notice, along with an affidavit of posting;

4. A copy of the minutes of the meetings, produced by the neighborhood association, which shall include a record of any verbal comments received, and copies of any written comments from property owners, residents, and neighborhood association members. If there are no minutes, the applicant may provide a summary of the meeting comments. The applicant shall also send a copy of the summary to the chair of the neighborhood association. The chair shall be allowed to supplement the summary with any additional comments regarding the content of the meeting, as long as such comments are filed before the record is closed;

5. An audiotape of the meeting; and

6. In the event that it is discovered by staff that the aforementioned procedures of this section were not followed, or that a review of the audio tape and meeting minutes show the applicant

has made a material misrepresentation of the project at the neighborhood meeting, the application shall be deemed incomplete until the applicant demonstrates compliance with this section. (Ord. 1425, 1998; Ord. 1474, 2001; Ord. 1568, 2008; Ord. 1590 § 1, 2009)

Applicant's Finding: This section requires the applicant to contact and discuss the proposed development with any affected neighborhood as provided in this section.

A meeting was held with the Robinwood Neighborhood Association on November 8, 2016. The meeting was scheduled and noticed per the requirements of this section, and the required neighborhood meeting documentation is submitted with this application. The applicant provided renderings and information regarding the proposed subdivision and answered all questions asked by the members of the neighborhood association. This submittal includes all materials required by this section.

The requirements of this section have been satisfied.

99.320 DENIAL OF APPLICATION – RESUBMITTAL

An application which has been denied, and if appealed, has not been reversed by a higher authority, including the Land Use Board of Appeals, the Land Conservation and Development Commission, or the courts, may not be resubmitted for the same or a substantially similar proposal, or for the same or substantially similar action, for a period of at least 12 months from the date the final decision is made denying the application.

<u>RESPONSE</u>: There are three responses to this provision. First, this section is not applicable because, pursuant to ORS 197.365, the Applicant has not requested to use the procedure set forth in the Plan and CDC for review of the proposed land division. As a result, the procedural provisions of the Plan and CDC, including CDC 99.320, do not apply to the ELD Application.

Second, this section is not applicable because it is not a “clear and objective” standard, condition, or procedure. As explained above, the ELD Application requests approval of “needed housing” on “buildable lands.” Therefore, the City must only apply “clear and objective” standards, conditions, and procedures to the ELD Application. This provision requires the City to exercise discretion to determine whether or not the ELD Application is the same or a substantially similar proposal to the one denied by the City in September or to determine whether or not the ELD Application requests the same or a substantially similar action. Because this provision requires the City to exercise discretion, it is not clear and objective and cannot be applied to the ELD Application.

Third, and in the alternative, to the extent this provision is applicable, the City should find that this provision does not bar submittal of the Applications at this time. The Applications do not request approval of the same project; therefore, they are not the “same” for purposes of this section. The phrase “substantially similar” is not defined in the CDC. However, in construing a similar provision, LUBA held that the plain meaning of this phrase is that a second application is barred only when there is a "high degree of similarity." *Henkel v. Clackamas County*, 56 Or LUBA 495 (2008).

The City should find that the Applications are not substantially similar to the previous proposal or action because, cumulatively, there are significant differences between them:

FACTOR	**PREVIOUS PROPOSAL**	**CURRENT PROPOSAL**
Subject Property	18000 Upper Midhill Drive	18000 Upper Midhill Drive
Applicant	Upper Midhill Estates LLC	Upper Midhill Estates LLC
Type of Application	Land Division Under CDC	Expedited Land Division Under ORS 197.360-197.380
Needed Housing	No	Yes
Review Procedure	Pursuant to CDC; Standard Timeline; Hearing Required	Pursuant to ORS 197.360-197.380; Expedited Timeline; Hearing Not Required
Final Decision-Maker	City Council	City-appointed referee
Approval Criteria	CDC 85.200 and related CDC provisions	Only clear and objective standards, conditions, and procedures in CDC
Zoning	R-4.5	R-4.5
Use	Detached single-family units	Attached single-family units
Number of Lots/Units	34	42
Lot Sizes	Varied—average of 6,540 SF	Varied—average of 4,765 SF
Lot Dimensions	50 foot widths, typically.	35-40 foot widths, typically.
Water Resource Area Impacts		
Traffic Mitigation	Payment of Fee in Lieu for Improvements to Highway 43	Propose interim improvements to create left-turn lanes along Highway 43

Additionally, the proposals are not "substantially similar" because they cannot result in the same outcome. It is not legally possible for the City to deny the current proposal on the same grounds it used to deny the previous proposal. The City denied the previous proposal on the grounds that the Applicant had not demonstrated that the application satisfied the "adequate public facilities" standard of CDC 85.200. The "adequate public facilities" standard is subjective in nature and thus not applicable to the ELD Application, which requests approval of needed housing. Therefore, the current proposal is not destined to be denied for the same reason as the previous proposal.

For these reasons, the City should find either that CDC 99.320 is not applicable, or alternately, it is applicable but does not bar submittal of the current applications because the Applications do not request approval of the same or a substantially similar proposal or the same or substantially similar action.

SUMMARY AND CONCLUSION

Based upon the materials submitted herein, the Applicant respectfully requests that the City approve these applications for a 42-lot Expedited Land Division for needed housing and for a Water Resource Area Permit.

DEVELOPMENT REVIEW APPLICATION

For Office Use Only		
STAFF CONTACT	PROJECT NO(S).	
NON-REFUNDABLE FEE(S)	REFUNDABLE DEPOSIT(S)	TOTAL

Type of Review (Please check all that apply):

- [ ] Annexation (ANX)
- [ ] Appeal and Review (AP) *
- [ ] Conditional Use (CUP)
- [ ] Design Review (DR)
- [ ] Easement Vacation
- [ ] Extraterritorial Ext. of Utilities
- [ ] Final Plat or Plan (FP)
- [ ] Flood Management Area
- [ ] Hillside Protection & Erosion Control
- [ ] Historic Review
- [ ] Legislative Plan or Change
- [ ] Lot Line Adjustment (LLA) */**
- [ ] Minor Partition (MIP) (Preliminary Plat or Plan)
- [ ] Non-Conforming Lots, Uses & Structures
- [ ] Planned Unit Development (PUD)
- [ ] Pre-Application Conference (PA) */**
- [ ] Street Vacation
- [x] Subdivision (SUB)
- [ ] Temporary Uses *
- [ ] Time Extension *
- [ ] Variance (VAR)
- [ ] Water Resource Area Protection/Single Lot (WAP)
- [ ] Water Resource Area Protection/Wetland (WAP)
- [ ] Willamette & Tualatin River Greenway (WRG)
- [ ] Zone Change

Home Occupation, Pre-Application, Sidewalk Use, Sign Review Permit, and Temporary Sign Permit applications require different or additional application forms, available on the City website or at City Hall.

Site Location/Address:
18000 Upper Midhill Drive

Assessor's Map No.: 21E14CA
Tax Lot(s): 200
Total Land Area:

Brief Description of Proposal:

The Applicant is proposing a 42 Unit attached single family subdivision consistent with the standards of the R-4.5 zone. The Applicant's proposal also triggers review under the provisions of the Willamette Greenway

Applicant Name: (please print) Upper Midhill Estates, LLC attn: Ryan Zygar
Phone: 360-798-4838
Address: 931 SW King Avenue
Email: ryan@zygar.com
City State Zip: Portland, OR 97205

Owner Name (required): (please print) 18000 Midhill Drive, LLC C/O David Chiddix
Phone:
Address: 1235 N Dutton Ave #E
Email:
City State Zip: Santa Rosa, CA 95401

Consultant Name: (please print) 3J Consulting, INC attn: Andrew Tull
Phone: 503-545-1907
Address: 5075 SW Griffith Drive, Suite 150
Email: andrew.tull@3j-consulting.com
City State Zip: Beaverton, OR 97005

1. All application fees are non-refundable (excluding deposit). **Any overruns to deposit will result in additional billing.**
2. The owner/applicant or their representative should be present at all public hearings.
3. A denial or approval may be reversed on appeal. No permit will be in effect until the appeal period has expired.
4. **Three (3) complete hard-copy sets (single sided) of application materials must be submitted with this application. One (1) complete set of digital application materials must also be submitted on CD in PDF format. If large sets of plans are required in application please submit only two sets.**

* No CD required / ** Only one hard-copy set needed

The undersigned property owner(s) hereby authorizes the filing of this application, and authorizes on site review by authorized staff. I hereby agree to comply with all code requirements applicable to my application. Acceptance of this application does not infer a complete submittal. All amendments to the Community Development Code and to other regulations adopted after the application is approved shall be enforced where applicable. Approved applications and subsequent development is not vested under the provisions in place at the time of the initial application.

[signature] 12/19/16
Applicant's signature Date

[signature] 12-20-16
Owner's signature *(required)* Date

City of West Linn

PRE-APPLICATION CONFERENCE MEETING

REVISED SUMMARY NOTES

October 20, 2016

SUBJECT:	Application for a 45 lot attached single family subdivision or 41 townhome styled subdivision, a Water Resource Area (WRA) permit and a Willamette and Tualatin River (WRG/HCA) Protection Area permit at 1800 Upper Midhill Drive.
FILE:	PA-16-28
ATTENDEES:	Applicants: Ryan Zygar, Andrew Tull, Aaron Murphy, Michael Robinson Staff: Peter Spir (Planning), Khoi Le, Morgan Palmer (Engineering) ODOT: Seth Brumley, Andy Jeffrey Public: Peter Lang, Scarlett Harris, Dorianne Palmer

The following is a summary of the meeting discussion provided to you from staff meeting notes. Additional information may be provided to address any "follow-up" items identified during the meeting. These comments are PRELIMINARY in nature. Please contact the Planning Department with any questions regarding approval criteria, submittal requirements, or any other planning-related items. Please note disclaimer statement below.

SITE INFORMATION:

Site Address:	1800 Upper Midhill Drive (21E14CA tax lot 200)
Site Area:	266,726 square feet
Neighborhood:	Robinwood NA
Comp. Plan:	Medium density residential
Zoning:	R-4.5 (Single Family Residential Attached and Detached/Duplex / 4,500 square foot minimum lot size for detached homes)
Applicable code:	CDC Chapter 32: Water Resource Area (WRA) CDC Chapter 28: Willamette and Tualatin River (WRG/HCA) Protection Area CDC Chapter 85: Land Division CDC Chapter 14: R-4.5 CDC Chapter 99.060(E) and ORS 197.360-380: Expedited Land Division (ELD)

PROJECT DETAILS:

The proposal is to develop a subdivision either for 45 attached single family attached lots or 41 single family detached lots. The R-4.5 zone allows single family detached and attached homes outright. Two single family attached units require 4,000 square feet per unit (see CDC 14.070). Per 55.025 (C) single-family attached structures are exempt from design review. However 55.100(F) requires "Shared outdoor recreation areas" for projects with 10 or more single-family attached dwellings on lots under 4,000 square feet. Issues also include off-site improvements and double frontage lots. ODOT staff provided comments on the proposed re-striping on Willamette Drive from Arbor Drive to Shady Hollow Drive.

As an option to the standard land division procedure, the City is required by the State to make the applicant aware that he may be eligible to apply for an ELD per ORS 197.360. The applicant was notified of the ELD process and informed that he must declare his intent to use either the standard procedure set forth in the City of West Linn CDC or the ELD procedure. A form to declare intent to use the ELD procedure or to use the standard procedure was distributed.

Per ORS 197.360(1), ELDs cannot "*provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the comprehensive plan and land use regulations for full or partial protection of natural features under the statewide planning goals that protect: (i) Open spaces, scenic and historic areas and* *natural resources…."* There are some small delineated wetlands at the north end of the site. The northwest corner includes a 12,800 square foot Habitat Conservation Area (HCA). The Comprehensive Plan's Goal 5 Chapter "Water Quality Resource" map identifies "Metro Habitat Protection Areas" which coincide with the adopted HCA map regulated by CDC Chapter 28. The applicability of the Comprehensive Plan's Goal 5 Chapter "Wildlife Habitat Inventory" map which covers a larger area must be determined. The burden of establishing the eligibility for ELD is on the applicant.

Engineering/TVFR Comments: Contact Khoi Le at kle@westlinnoregon.gov for Engineering comments and Ty Darby at tdarby@tvfr.com for TVFR comments.

PROCESS:

The application requires a neighborhood meeting per CDC 99.038. Please follow those requirements very carefully. Contact the Robinwood Neighborhood Association, at RobinwoodNA@westlinnoregon.gov and Skyline Ridge Neighborhood Association, at SkylineNA@westlinnoregon.gov.

Land use applications include a subdivision (Chapter 85), a WRA permit (Chapter 32) and a Willamette and Tualatin River (WRG/HCA) Protection Area permit (Chapter 28). For an ELD, refer to CDC Chapter 99.060(E) and ORS 197.360-380 in addition to Chapters 85, 32 and 28. The CDC is online at http://westlinnoregon.gov/cdc. Because this is a resubmittal, the applicant must demonstrate that the standards of CDC 99.320 are met.

An updated traffic study is required. The applicant should verify that the 2015 application still satisfies the tree inventory, wetland delineation, and geotechnical (including drainage) report requirements.

N/A is not an acceptable response to the approval criteria. The submittal requirements may be waived, but the applicant must first identify the specific submittal requirement and request, in letter form, that it be waived by the Planning Manager and must identify the specific grounds for that waiver. The waiver may or may not be granted by the Planning Director. Waivers may also be subsequently overruled by the decision making body.

Submit the application to the Planning Department with an application form signed by the property owner. (The signed standard procedure or ELD declaration document must be submitted.) The deposit for a subdivision is $4,200 plus $200 per lot. The final plat fee is $2,000. There is also a $500 fee for final site inspection. An ELD deposit fee is $4,000 plus $300 per lot plus referee costs. The deposit for a WRA is $2,600 and an inspection fee of $250. The deposit for a WRG/HCA is $1,700.

Once the application and deposit/fee are submitted, the City has 30 days to determine if the application is complete or not; 21 days in the case of an ELD. If the application is not complete, the applicant has 180 days to make it complete or provide written notice to staff that no other information will be provided. Once the submittal is deemed complete, staff will provide notice per CDC Chapter 99 or per ORS 197.365 in the case of an ELD. For a standard subdivision application, staff will schedule a public hearing with the Planning Commission. For an ELD, the Planning Commission will hold a meeting and render a decision with no testimony taken at the meeting. Appeals of the Planning Commission's decision on a standard subdivision application are heard by City Council. Appeals of the ELD are heard by a referee.

Typical land use applications can take 6-10 months from beginning to end.

City of West Linn

CHENE BLANC

Pre-Application Meeting Sign-In Sheet **PA-16-28** **10/20/2016**

Name	Address	Email Address
Seth Brumley ODOT		seth.a.brumley@odot.state.or.us
Andy Jeffrey ODOT		andy.jeffrey@odot.state.or.us
Peter D. Lang		langpe@comcast.net 2312 College View Dr. 97068
Scarlett Harris (resident)	18040 Upper Midhill	scarlettisred@gmail.com
Dorianne Palmer "	2391 College View Dr.	cooperdel2@msn.com
Ryan J. Zygar	18000 Upper Midhill West Linn, OR	ryan@zygar.com
Aaron Murphy 3J Consulting		aaron.murphy@3j-consulting.com
Andrew Tull 3J Consulting		andrew.tull@3j-consulting.com

NEIGHBORHOOD MEETING

AFFIDAVIT OF POSTING NOTICE

STATE OF OREGON)

SS

County of Clackamas)

I, Mercedes Smith, being duly sworn, state that I represent the party initiating interest in a proposed subdivision affecting the land located at 18000 Upper Midhill Drive in West Linn, Oregon and that pursuant to Community development Code Section 99, did on the 18th day of October, 2016 personally post notice indicating that the site may be proposed for a subdivision application.

A sign was posted along the northern property line.

This 31ST day of October, 2016.

Signature

Subscribed and sworn to, or affirmed, before me this 31st day of October, 2016.

Audrey L Jones

Notary Public for the State of Oregon

County of Washington

My Commission Expires: October 19, 2019

OFFICIAL STAMP
AUDREY L. JONES
NOTARY PUBLIC - OREGON
COMMISSION NO. 943641
MY COMMISSION EXPIRES OCTOBER 19, 2019

NEIGHBORHOOD MEETING

AFFIDAVIT OF MAILING

STATE OF OREGON)

SS

County of Clackamas)

I, Mercedes Smith, being duly sworn, state that I represent the party initiating interest in a proposed subdivision affecting the land located at 18000 Upper Midhill Drive in West Linn, Oregon and that pursuant to Community development Code Section 99, did on the 18th day of October, 2016 caused to have mailed, to each of the persons on the attached list, a notice of a meeting to discuss the proposed development of the aforementioned property.

I further state that said notices were enclosed in plainly addressed envelopes to said persons and were deposited on the date indicated above in the United States Post Office with postage prepaid thereon.

This 31ST day of October, 2016.

Signature

Subscribed and sworn to, or affirmed, before me this 31st day of October, 2016.

OFFICIAL STAMP
AUDREY L. JONES
NOTARY PUBLIC - OREGON
COMMISSION NO. 943641
MY COMMISSION EXPIRES OCTOBER 19, 2019

Notary Public for the State of Oregon

County of Washington

My Commission Expires: October 19, 2019

Civil Engineering
Water Resources
Land Use Planning

November 6, 2016

Robinwood Neighborhood Association
Kazi Ahmed, President
18649 Midhill Cir
West Linn, OR 97068

18000 Upper Midhill Drive
Proposed Residential Development

Dear Mr. Ahmed

3J Consulting acts on behalf of Upper Midhill Estates LLC., regarding the planned subdivision of a property located off of 18000 Upper Midhill Drive. The location of the property is shown on the attached map. The tax lot number for the property is 21E 14CA 200. The property is located inside the City of West Linn's boundaries and it is zoned R-4.5 for Single Family Dwellings.

Upper Midhill Estates is considering a subdivision or an expedited land division of the 6.13 acre property in order to create 41 to 45 new single-family attached residential lots. The proposed lots will take access from Upper Midhill Drive and Hillside Drive.

Before finalizing an application to the City's Planning Department for the proposed subdivision, we would like to take the opportunity to discuss this proposal with the members of the Robinwood and neighborhood association and property owners residing within 500 feet of the property.

The purpose of this meeting will be to provide a forum for surrounding property owners and residents to review the proposal and to identify issues so they can be given proper consideration. These meetings are required the public to share with the project team any special information about the property involved. The project team will try to answer questions related to how the project meets the relevant development standards consistent with West Linn's land use regulations.

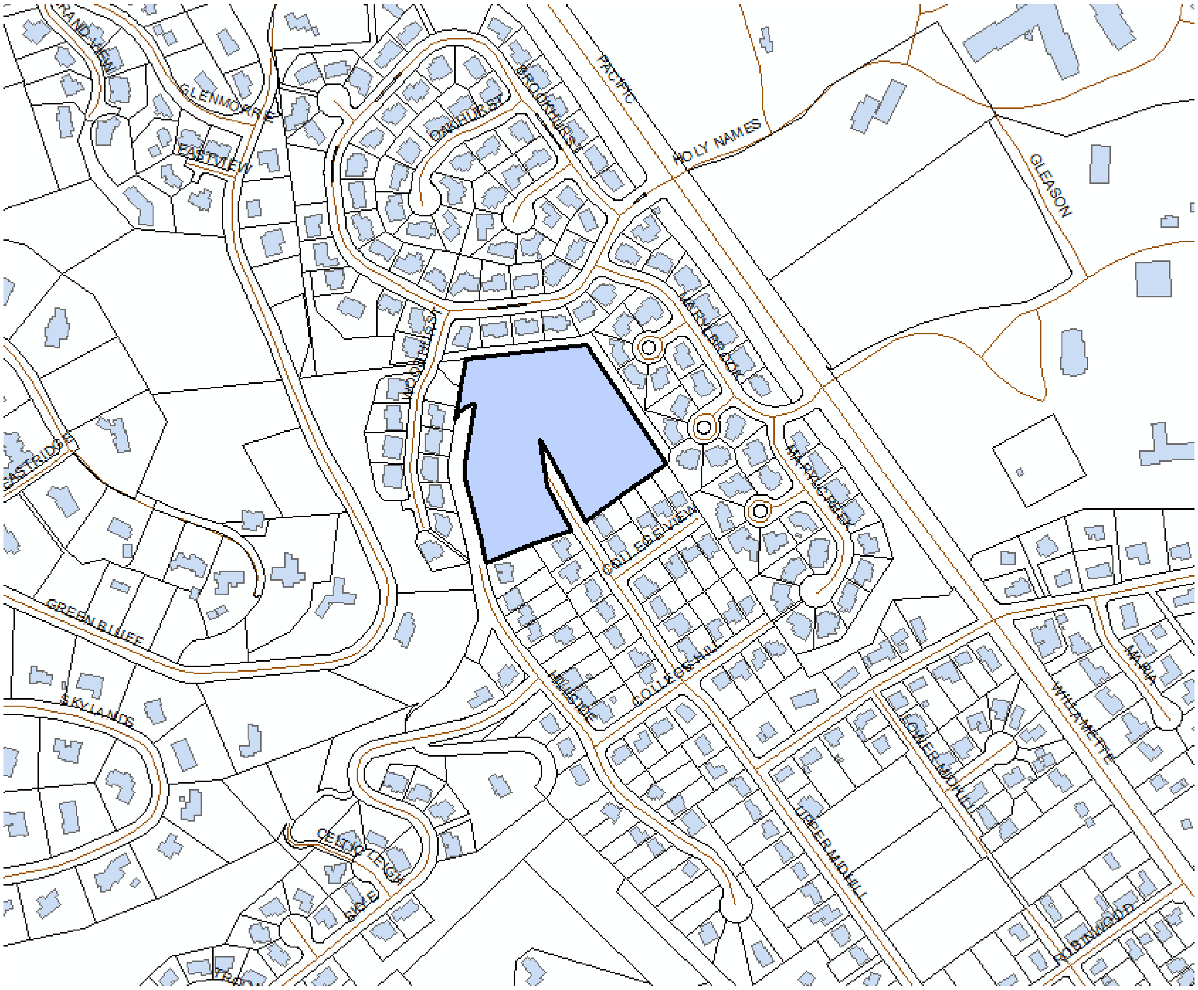
We would like to formally request a meeting with the neighborhood association. Further to our discussions over the phone, we understand that the Neighborhood Association would be able to include us during your agenda for the Robinwood Neighborhood Association's November 8th regular meeting. If you could please confirm that this meeting is possible, we will send notification to residents located within the City's 500 foot notification boundary.

Please note that this will be an informational meeting based upon preliminary development plans and that these plans may change before the application is submitted to the City.

If the proposed meeting is acceptable, we would ask that you please respond to this letter with an email to andrew.tull@3j-consulting.com or phone call to 503-946-9365.

Sincerely,

Andrew Tull
Principal Planner
3J Consulting, Inc


GLENMORRIE
EASTVIEW
OAKHURST
PACIFIC
HOLY NAMES
GLEASON
GREEN BLUFF
SKYLANDS
HILLSIDE
UPPER MIDHILL
LOWER MIDHILL
WILLAMETTE
MARIA
ROBINWOOD

SITE MAP

Civil Engineering
Water Resources
Land Use Planning

November 6, 2016

Robinwood Neighborhood Association
Kevin Bryck , NA Designee
18840 Nixon Avenue
West Linn, OR 97068

18000 Upper Midhill Drive
Proposed Residential Development

Dear Kevin,

3J Consulting acts on behalf of Upper Midhill Estates LLC., regarding the planned subdivision of a property located off of 18000 Upper Midhill Drive. The location of the property is shown on the attached map. The tax lot number for the property is 21E 14CA 200. The property is located inside the City of West Linn’s boundaries and it is zoned R-4.5 for Single Family Dwellings.

Upper Midhill Estates is considering a subdivision or an expedited land division of the 6.13 acre property in order to create 41 to 45 new single-family attached residential lots. The proposed lots will take access from Upper Midhill Drive and Hillside Drive.

Before finalizing an application to the City's Planning Department for the proposed subdivision, we would like to take the opportunity to discuss this proposal with the members of the Robinwood and neighborhood association and property owners residing within 500 feet of the property.

The purpose of this meeting will be to provide a forum for surrounding property owners and residents to review the proposal and to identify issues so they can be given proper consideration. These meetings are required the public to share with the project team any special information about the property involved. The project team will try to answer questions related to how the project meets the relevant development standards consistent with West Linn's land use regulations.

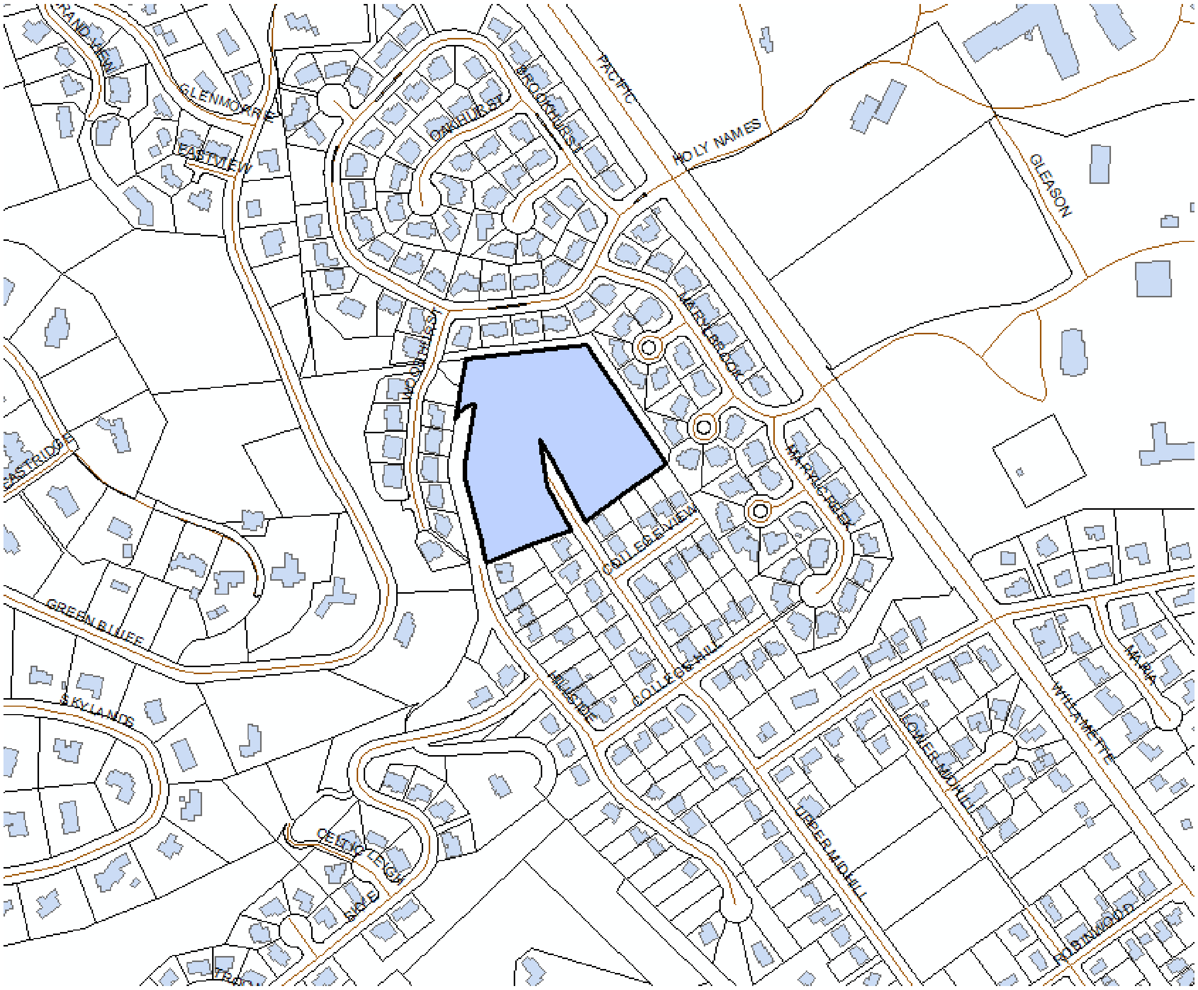
We would like to formally request a meeting with the neighborhood association. Further to our discussions over the phone, we understand that the Neighborhood Association would be able to include us during your agenda for the Robinwood Neighborhood Association’s November 8th regular meeting. If you could please confirm that this meeting is possible, we will send notification to residents located within the City’s 500 foot notification boundary.

Please note that this will be an informational meeting based upon preliminary development plans and that these plans may change before the application is submitted to the City.

If the proposed meeting is acceptable, we would ask that you please respond to this letter with an email to andrew.tull@3j-consulting.com or phone call to 503-946-9365.

Sincerely,

Andrew Tull
Principal Planner
3J Consulting, Inc


GLENMORRIE
EASTVIEW
OAKHURST
PACIFIC
HOLY NAMES
GLEASON
GREEN BLUFF
SKYLANDS
UPPER MIDHILL
LOWER MIDHILL
WILLAMETTE
MARIA
ROBINWOOD

SITE MAP

Civil Engineering
Water Resources
Land Use Planning

October 18, 2016

18000 Upper Midhill Drive
Proposed Residential Subdivision

To Our Neighbors,

3J Consulting acts on behalf of Upper Midhill Estates LLC., regarding the planned subdivision of a property located off of 18000 Upper Midhill Drive. The location of the property is shown on the attached map. The tax lot number for the property is 21E 14CA 200. The property is located inside the City of West Linn's boundaries and it is zoned R-4.5 for Single Family Dwellings.

Upper Midhill Estates is considering a subdivision of the 6.13 acre property in order to create 41 to 45 new single-family residential lots. The proposed lots will take access from Upper Midhill Drive and Hillside Drive.

Before finalizing an application to the City's Planning Department for the proposed subdivision, we would like to take the opportunity to discuss this proposal with the members of the Robinwood Neighborhood Association and neighborhood associations and property owners residing within 500 feet of the property.

A meeting to discuss this project has been scheduled at the following time and location:

Informational Meeting
Tuesday, November 8th, 2016 at 7:00 pm
Robinwood Station Community Center
3706 Cedaroak Drive, West Linn, 97068

The purpose of this meeting will be to provide a forum for surrounding property owners and residents to review the proposal and to identify issues so they can be given property consideration. This meeting will provide the opportunity for the public share with the project team any special information about the property involved. The project team will try to answer questions related to how the project meets the relevant development standards consistent with West Linn's land use regulations.

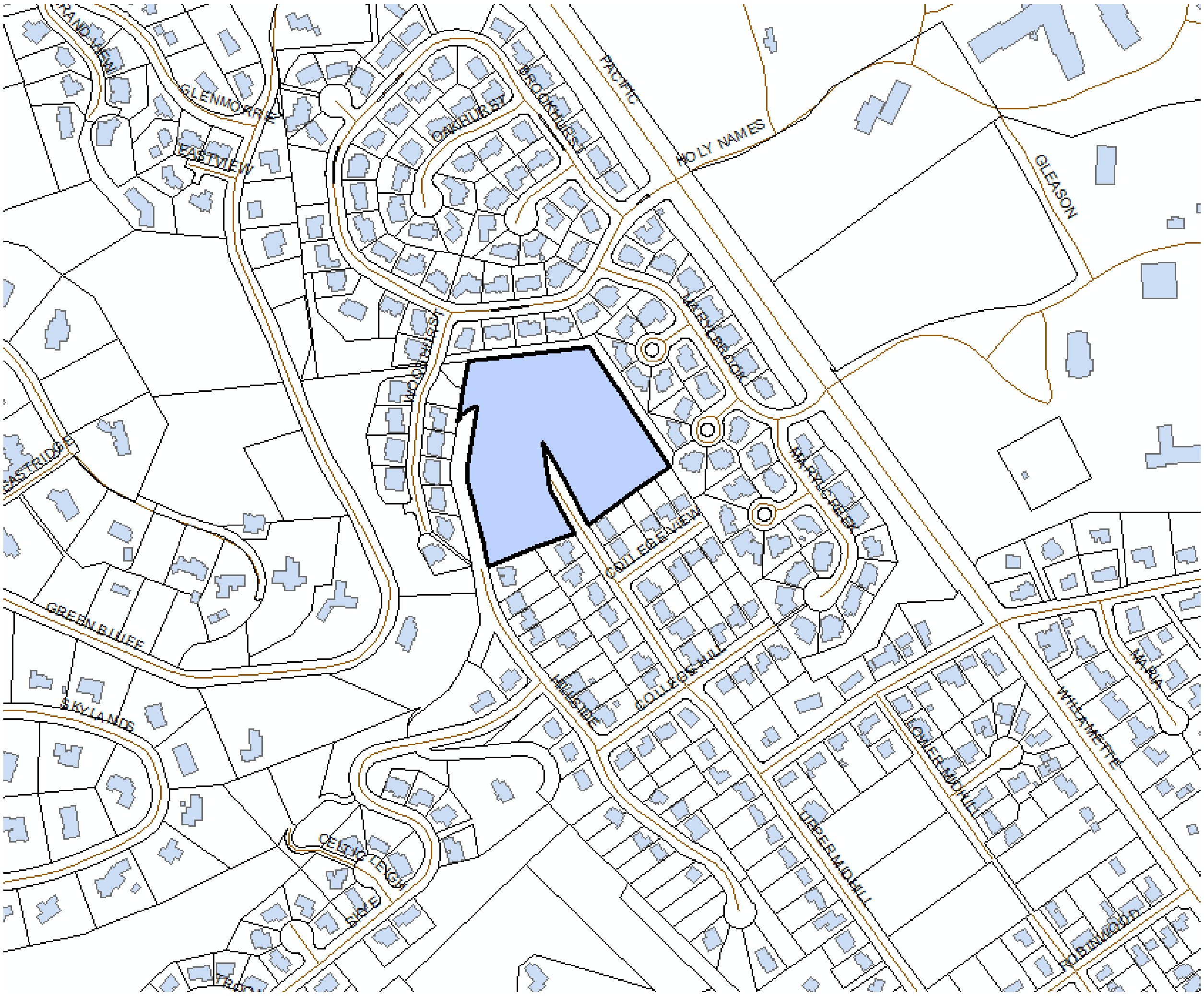
Please note that this will be an informational meeting based upon preliminary development plans and that these plans may change before the application is submitted to the City. Concerned citizens are encouraged to contact their association president or designee with any questions they may want to relay to the applicant.

We look forward to discussing this proposal with you. Please feel free to contact us by emailing andrew.tull@3j-consulting.com if you have any questions.

Sincerely,

Andrew Tull
Principal Planner
3J Consulting, Inc.

3J Consulting, Inc.
5075 SW Griffith Drive, Suite 150, Beaverton, OR 97005
Ph: 503-946-9365
www.3j-consulting.com


GLENMORRIE
EASTVIEW
OAKHURST
PACIFIC
HOLY NAMES
GLEASON
GREEN BLUFF
SKYLANDS
COLLEGE HILL
WILLAMETTE
ROBINWOOD

SITE MAP

NEIGHBORHOOD MEETING NOTICE

POTENTIAL RESIDENTIAL SUBDIVISION

MEETING INFORMATION:

ROBINWOOD NEIGHBORHOOD ASSOCIATION
NOVEMBER 8, 2016 AT 7:00PM
ROBINWOOD STATION COMMUNITY CENTER
3706 CEDAROAK DRIVE
WEST LINN, OR 97068

CONTACT PERSON: ANDREW TULL
3J CONSULTING, INC.
PHONE NUMBER: 503-946-9365

7016 1370 0001 5067 5380

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☐ Return Receipt (hardcopy) $ $0.00
☐ Return Receipt (electronic) $ $0.00
☐ Certified Mail Restricted Delivery $ $0.00
☐ Adult Signature Required $ $0.00
☐ Adult Signature Restricted Delivery $
Postage $0.47
$
Total Postage and Fees $6.47
$
Postmark Here
10/06/2016

Sent To KAZI AHMED
Street and Apt. No., or PO Box No. 18649 MIDHILL CIR
City, State, ZIP+4® WEST LINN, OR 97068

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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☐ Return Receipt (hardcopy) $ $0.00
☐ Return Receipt (electronic) $ $0.00
☐ Certified Mail Restricted Delivery $ $0.00
☐ Adult Signature Required $ $0.00
☐ Adult Signature Restricted Delivery $
Postage $0.47
$
Total Postage and Fees $6.47
$
Postmark Here
10/06/2016

Sent To KEVIN BRYCK
Street and Apt. No., or PO Box No. 18840 NIXON AVE
City, State, ZIP+4® WEST LINN, OR 97068

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

TRACEY GILDAY
1341 STONEHAVEN DR.
WEST LINN, OR 97068

9590 9402 1224 5246 1399 44

2. Article Number (Transfer from service label)

7014 2870 0001 6538 3496

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Tracey Gilday ☐ Agent ☐ Addressee

B. Received by (Printed Name) TRACY Gilday C. Date of Delivery

WEST LINN OR OCT 24 2016 USPS

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
...ail
...ail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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UNITED STATES POSTAL SERVICE®
1000
97068

3J
Civil Engineering
Water Resources
Land Use Planning

5075 SW Griffith Drive
Suite 150
Beaverton, OR 97005

Refused

Kevin Bryck
Robinwood NA Designee
18840 Nixon Ave.
West Linn, OR 97068

FWD

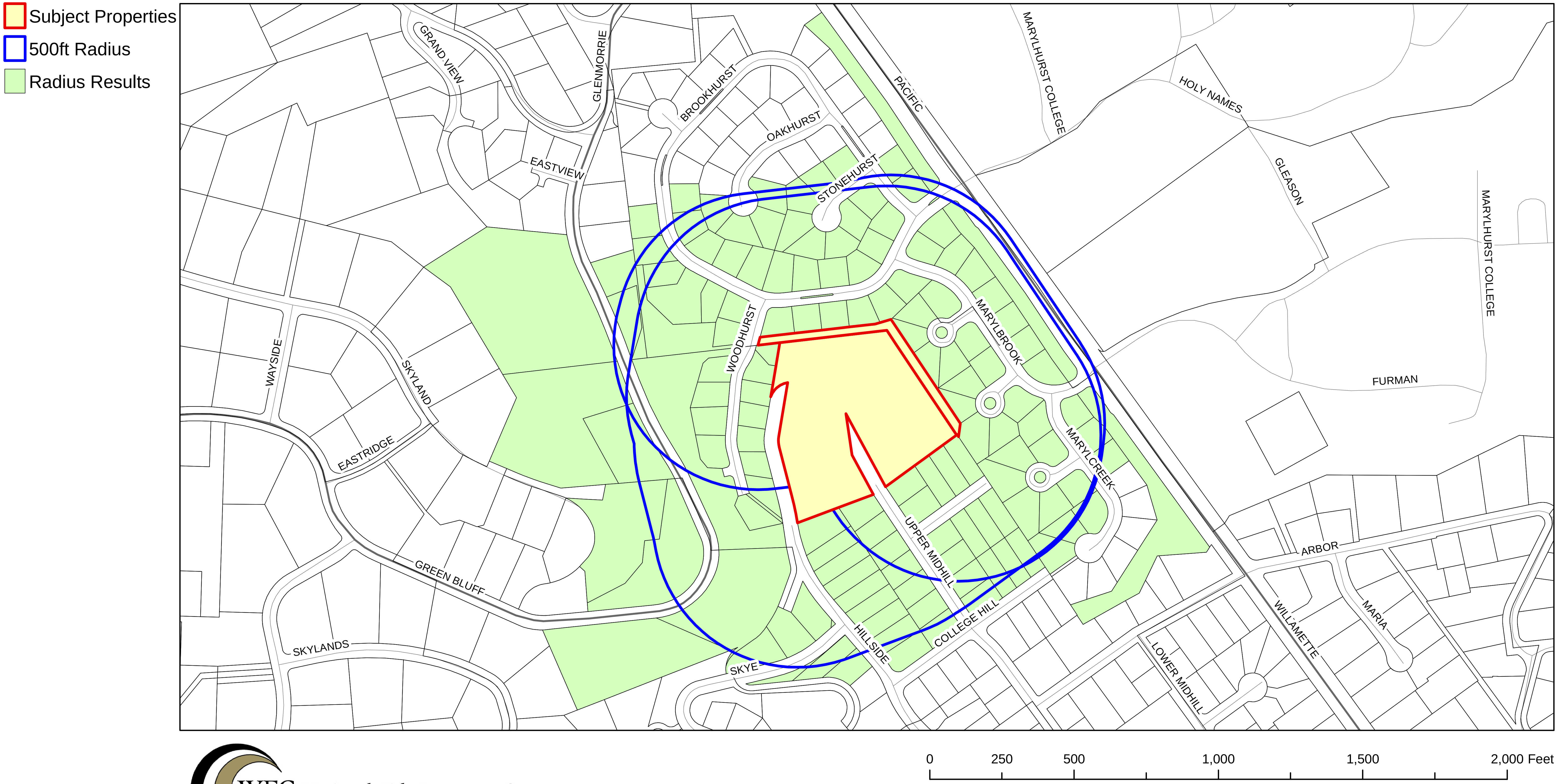
RETURN RECEIPT REQUESTED

9400922489303160

97068-161450
97068>0003

NIXIE 970 SE 1 0010/
RETURN TO SENDER
REFUSED
UNABLE TO FORWARD
BC: 97005304425 *1529-04146

18000 Upper Midhill Dr., West Linn OR 97068

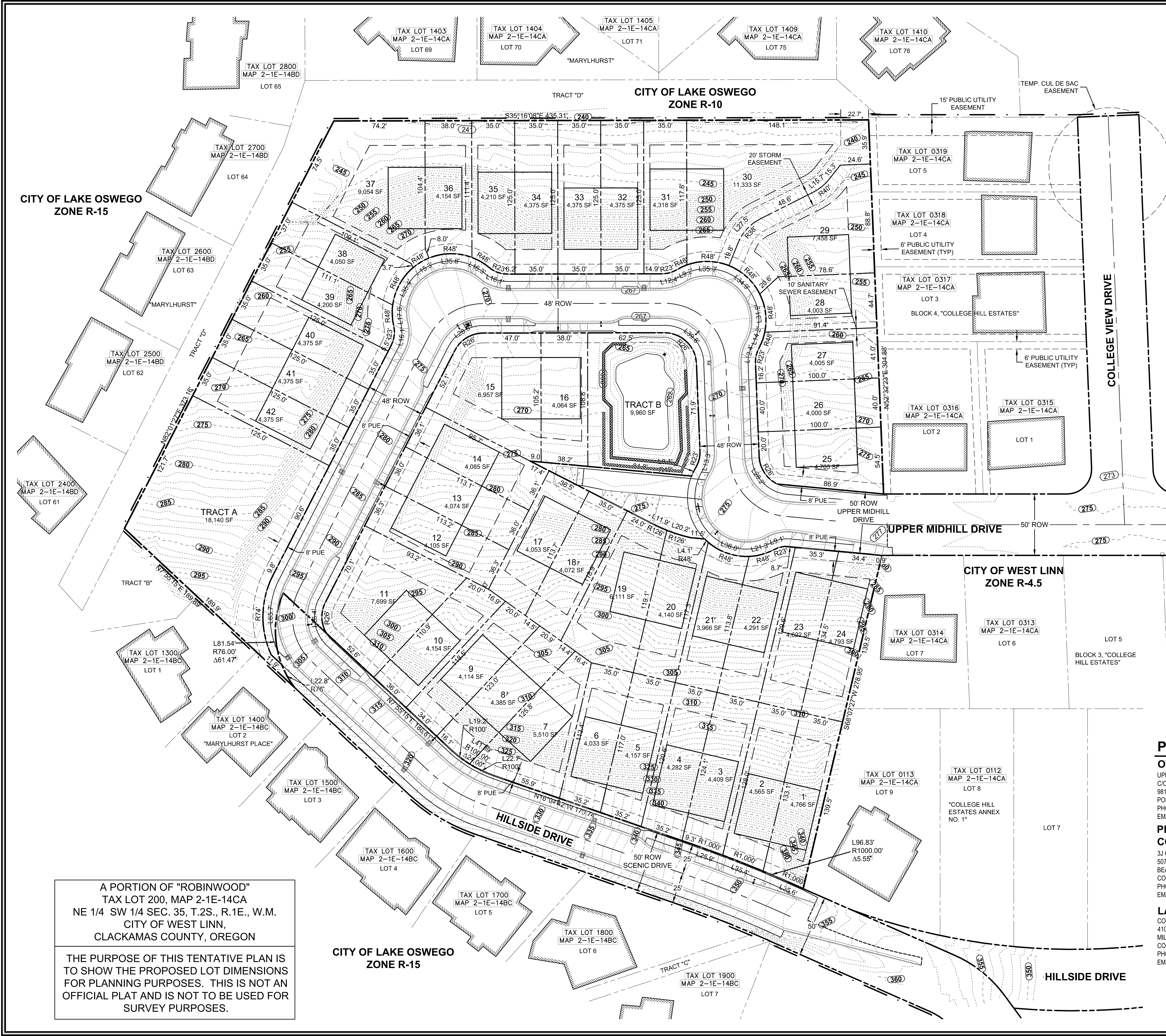


WFG National Title Insurance Company
a Williston Financial Group company

Customer Service Department
12909 SW 68th Parkway, Suite 350
Portland, OR 97223
(503) 603-1700 cs@wfgnationaltitle.com

This map is a copy of public record and is provided solely for information purposes. WFG National Title assumes no liability for variations, if any, in dimensions, area or location of the premises or the location of improvements.

NOT FOR CONSTRUCTION



A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

THE PURPOSE OF THIS TENTATIVE PLAN IS TO SHOW THE PROPOSED LOT DIMENSIONS FOR PLANNING PURPOSES. THIS IS NOT AN OFFICIAL PLAT AND IS NOT TO BE USED FOR SURVEY PURPOSES.

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- EASEMENT LINE
- PROPOSED LOT LINE
- PROPOSED EASEMENT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED SETBACK LINE
- CITY BOUNDARY LINE
- 207 1 FOOT CONTOUR
- 210 5 FOOT CONTOUR

SITE STATISTICS

SITE ADDRESS	18000 UPPER MIDHILL DRIVE, WEST LINN, OREGON
TAX LOT	2S1E14CA 00200
JURISDICTION	CITY OF WEST LINN
GROSS SITE AREA	265,860 +/- SF (6.10 AC)
PROPERTY ZONING	R-4.5
FLOOD HAZARD MAP NUMBER	41005C0019D ZONE X (UNSHADED)

SUBDIVISION STATISTICS

RIGHT OF WAY DEDICATION	34,637 SF (0.80 AC)
MINIMUM ALLOWABLE EFFECTIVE LOT SIZE	4,000 SF
MINIMUM LOT DENSITY	6.67 LOTS / ACRE
MAXIMUM LOT DENSITY	9.61 LOTS / ACRE
PROPOSED LOT DENSITY	6.89 LOTS / ACRE
MAXIMUM BUILDING HEIGHT	35 FEET

SETBACKS

SETBACK LOCATION	STANDARD:
FRONT	20'
SIDE (NON ATTACHED)	5'
REAR	20'
STREET SIDE	15'

SURVEYOR'S NOTE

1. VERTICAL DATUM: NAVD'88 UTILIZING GPS POSITIONING TIED TO THE ORGN WITH REAL TIME CORRECTORS REFERENCED TO DATUM NAD 83(2011) EPOCH 2010.00. THIS DATUM REALIZATION WAS VERIFIED THROUGH DIRECT OBSERVATION TO NGS CONTROL POINT Q723 HAVING A POINT IDENTIFICATION OF RD1491. THIS POINT IS DESCRIBED AS A STAINLESS STEEL ROD W/ SLEEVE NEAR THE INTERSECTION OF STATE HIGHWAY 224 AND LAKE ROAD. THE ELEVATION OF THIS POINT IS PUBLISHED AS 31.131 AND WAS ESTABLISHED BY NGS THROUGH DIFFERENTIAL LEVELING AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JUNE 1991 AND HAS A VERTICAL ORDER OF FIRST CLASS II.

2. BASIS OF BEARINGS: CENTERLINE OF UPPER MIDHILL DRIVE AS PER THE PLAT OF "COLLEGE HILL ESTATES"

PROJECT TEAM

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EMAIL: ryan@zygar.com

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811 Know what's below. Call before you dig.

DESIGN REVIEW 11/02/2016

REVISION SUMMARY	BY	DATE

TENTATIVE PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
UPPER MIDHILL DRIVE, LLC
1800 UPPER MIDHILL DRIVE, WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE OREGON JUNE 16, 2011 JESSE T. EMERSON EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
TENT. PLAN

SHEET NUMBER
C200

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C200 PRELIMINARY PLAT.DWG

NOT FOR CONSTRUCTION

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

Scale: 1 inch = 40 feet

40 20 0 20 40

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- EASEMENT LINE
- EXISTING CONCRETE
- EXISTING CURB
- EXISTING FENCE LINE
- PROPOSED CURB FACE
- PROPOSED CURB BACK
- PROPOSED LIP OF GUTTER
- PROPOSED LOT LINE
- PROPOSED EASEMENT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- EXISTING ROCK WALL
- PROPOSED RETAINING WALL
- A A' PROPOSED STREET SECTION - SEE SHEET C201
- PROPOSED ON-STREET PARKING

SITE NOTES

1. CONSTRUCT STANDARD CURB & GUTTER PER CITY OF WEST LINN STANDARD DETAIL WL-501 (TYPICAL CURBS).
2. CONSTRUCT 6 FT WIDE DETATCHED SIDEWALK PER CITY OF WEST LINN STANDARD DETAIL WL-508 (CONCRETE SIDEWALK CROSS SECTION).
3. CONSTRUCT 6 FT CURB TIGHT SIDEWALK PER CITY OF WEST LINN STANDARD DETAIL WL-508 (CONCRETE SIDEWALK CROSS SECTION).
4. INSTALL ASPHALT SECTION. SEE TYPICAL SECTIONS A-A' AND B-B' ON SHEET C201.
5. INSTALL ACCESS DRIVE. SEE TYPICAL SECTION C-C' ON SHEET C201.
6. INSTALL RETAINING WALL.
7. NOT USED.
8. ROADWAY TAPER PER AASHTO STANDARDS TO MEET EXISTING ROAD WIDTHS ON UPPER MIDHILL DRIVE. STA: 1+12 TO 2+28.
9. ROADWAY TAPER PER AASHTO STANDARDS TO MEET EXISTING ROAD WIDTHS ON HILLSIDE DRIVE. STA: 14+10 TO 14+91.
10. TRANSITION SIDEWALK TO CURB TIGHT. MATCH EXISTING CURB TIGHT SIDEWALK AS SHOWN.
11. PROVIDE CORNERING "EYE BROW" PER CLACKAMAS COUNTY ROADWAY STANDARD DRAWING C400.
12. INSTALL STREET SIGN "UPPER MIDHILL DRIVE" AND "HILLSIDE DRIVE".

Know what's below. Call before you dig.

DESIGN REVIEW 11/02/2016

REVISION SUMMARY | BY | DATE

PRELIMINARY SITE PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
SITE PLAN

SHEET NUMBER
C210

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C210 SITE PLAN.DWG

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: November 30, 2016

Project #: 18758.0

To: Khoi Le, City of West Linn
Avi Tayar, Oregon Department of Transportation, Region 1

CC: Ryan Zygar, Chene Blanc Estates, LLC

From: Matt Bell, Anthony Yi, and Alexander Kado

Project: Chene Blanc Estates Residential Development

Subject: Transportation Impact Analysis

REGISTERED PROFESSIONAL ENGINEER
59948PE
OREGON
July 12, 2005
ANTHONY S. YI
EXPIRES: 6/30/2018

This memorandum summarizes the results of a transportation impact analysis prepared for the proposed Chene Blanc Estates residential development located at the northern terminus of Upper Midhill Drive in West Linn, Oregon. Figure 1 illustrates the site vicinity map. The proposed development plan includes 42 townhomes located along an extension of Upper Midhill Drive that connects to Hillside Drive to the west. Figure 2 illustrates the conceptual site plan. Construction of the proposed development is expected to occur in 2017 with full build-out and occupancy in 2018.

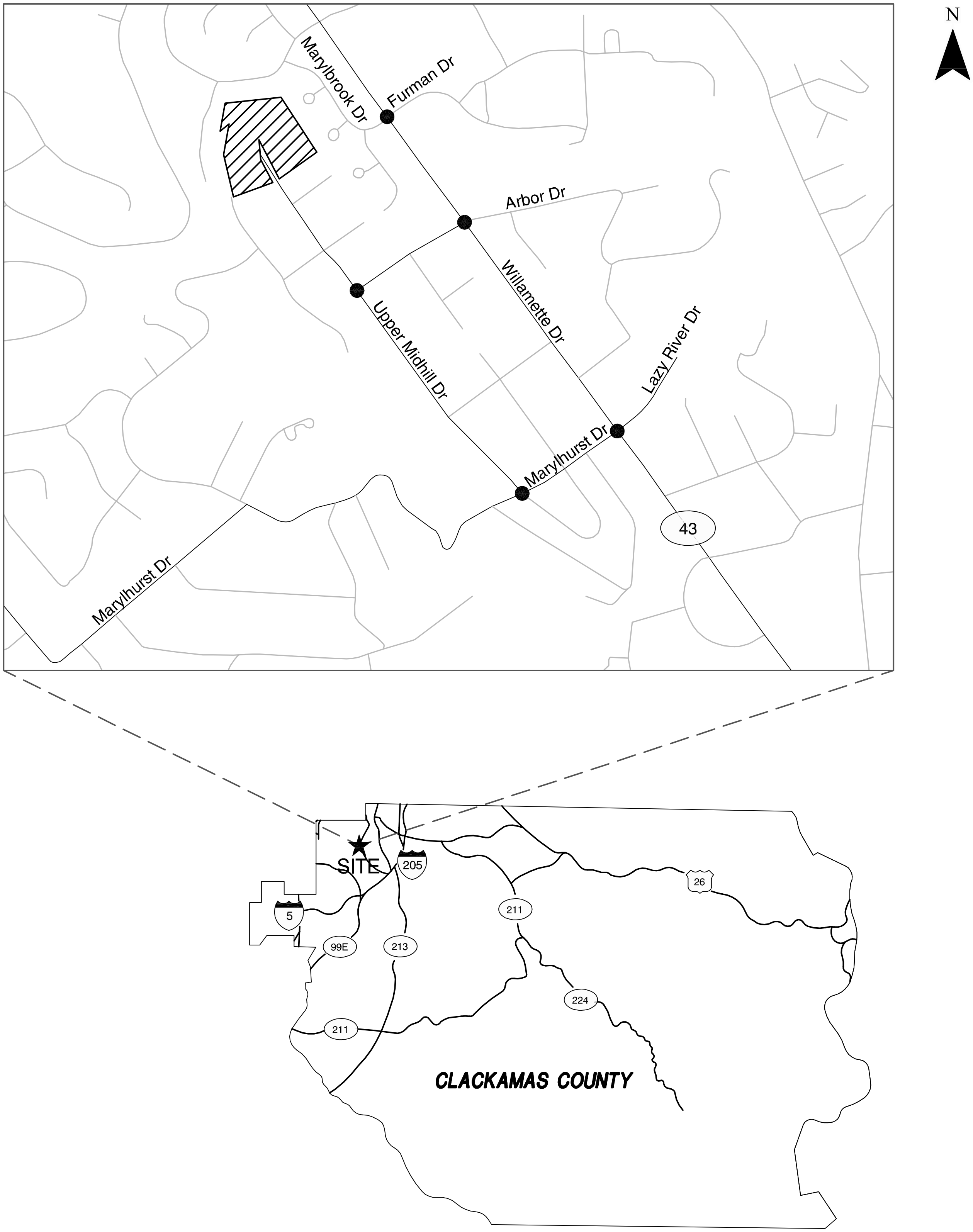
The results of this analysis indicate that the proposed development can be constructed while maintaining safe and acceptable traffic operations at the study intersections assuming provision of the following recommended mitigation measures:

- Construct an extension of Upper Midhill Drive consistent with the City's local street standard with curb, gutter, and sidewalks on both sides of the roadways.
- Coordinate with ODOT to implement an interim improvement at the Willamette Drive/Arbor Drive intersection that provides a center TWLTL through the intersection.
- Shrubbery and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.

Additional details of the study methodology, findings, and recommendations are provided herein.

SCOPE OF THE REPORT

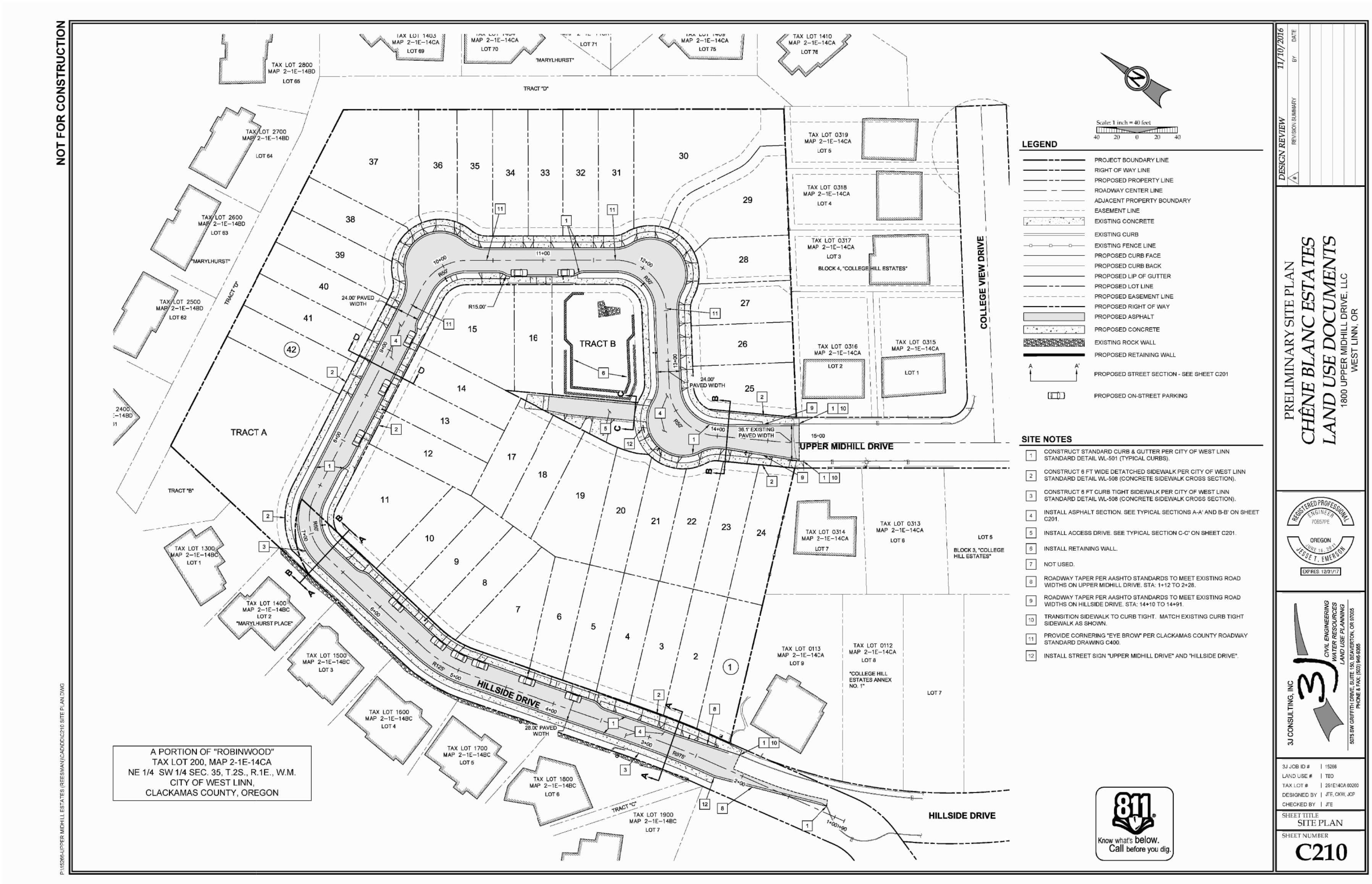
This analysis determines the transportation-related impacts associated with the proposed Chene Blanc Estates residential development and was prepared in accordance with the City of West Linn and Oregon Department of Transportation Department (ODOT) requirements for transportation impact analyses. The study intersections and scope of this project were selected in coordination with City and ODOT staff. The operational analyses were performed at the following study intersections:



● - Study Intersections

Site Vicinity Map
West Linn, OR

Figure
1



RECEIVED: 2016-01-13

Conceptual Site Plan
West Linn, OR

Figure
2

H:\projfile\18758 - West Linn Reesman Property Residential\dwgs\figs\18758_fig4.dwg Nov 15, 2016 - 8:21am - mbell Layout Tab: Fig02

- Willamette Drive (OR 43)/Marylbrook Drive
- Willamette Drive (OR 43)/Arbor Drive
- Willamette Drive (OR 43)/Marylhurst Drive
- Upper Midhill Drive/Arbor Drive
- Upper Midhill Drive/Marylhurst Drive

This report evaluates these transportation issues:

- Year 2016 existing land-use and transportation-system conditions within the site vicinity during the weekday a.m. and p.m. peak periods;
- Developments and transportation improvements planned in the study area;
- Year 2018 background traffic conditions (without the proposed development) during the weekday a.m. and p.m. peak periods;
- Trip generation and distribution estimates for the proposed development; and
- Year 2018 total traffic conditions (with full build-out and occupancy of the proposed development) during the weekday a.m. and p.m. peak periods.

EXISTING CONDITIONS

The existing conditions analysis identifies the site conditions and the current physical and operational characteristics of the roadways within the study area. These conditions will be compared with future conditions later in this report. Kittelson & Associates, Inc. (KAI) staff visited and inventoried the proposed development site and surrounding study area in November 2016. At that time, KAI collected information regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

SITE CONDITIONS AND ADJACENT LAND USES

The proposed development site is located within the West Linn city limits, is currently vacant, and is zoned for medium density residential. The adjacent land uses include single family residential homes and a small city park located further south along Upper Midhill Drive.

TRANSPORTATION FACILITIES

Table 1 summarizes the characteristics of the transportation facilities within the site vicinity.

Table 1: Existing Transportation Facilities

Roadway	Functional Classification[1]	Number of Lanes	Posted Speed (mph)	Sidewalks	Bicycle Lanes	On-Street Parking
Willamette Drive	Principal Arterial	2	35	Partial	Yes	No
Upper Midhill Drive	Local Street	2	25	Partial	No	Yes
Arbor Drive	Local Street	2	25	No	No	No
Marylhurst Drive	Collector	2	25	No	No	No

1. City of West Linn Transportation System Plan (TSP – Reference 1).

Roadway Facilities

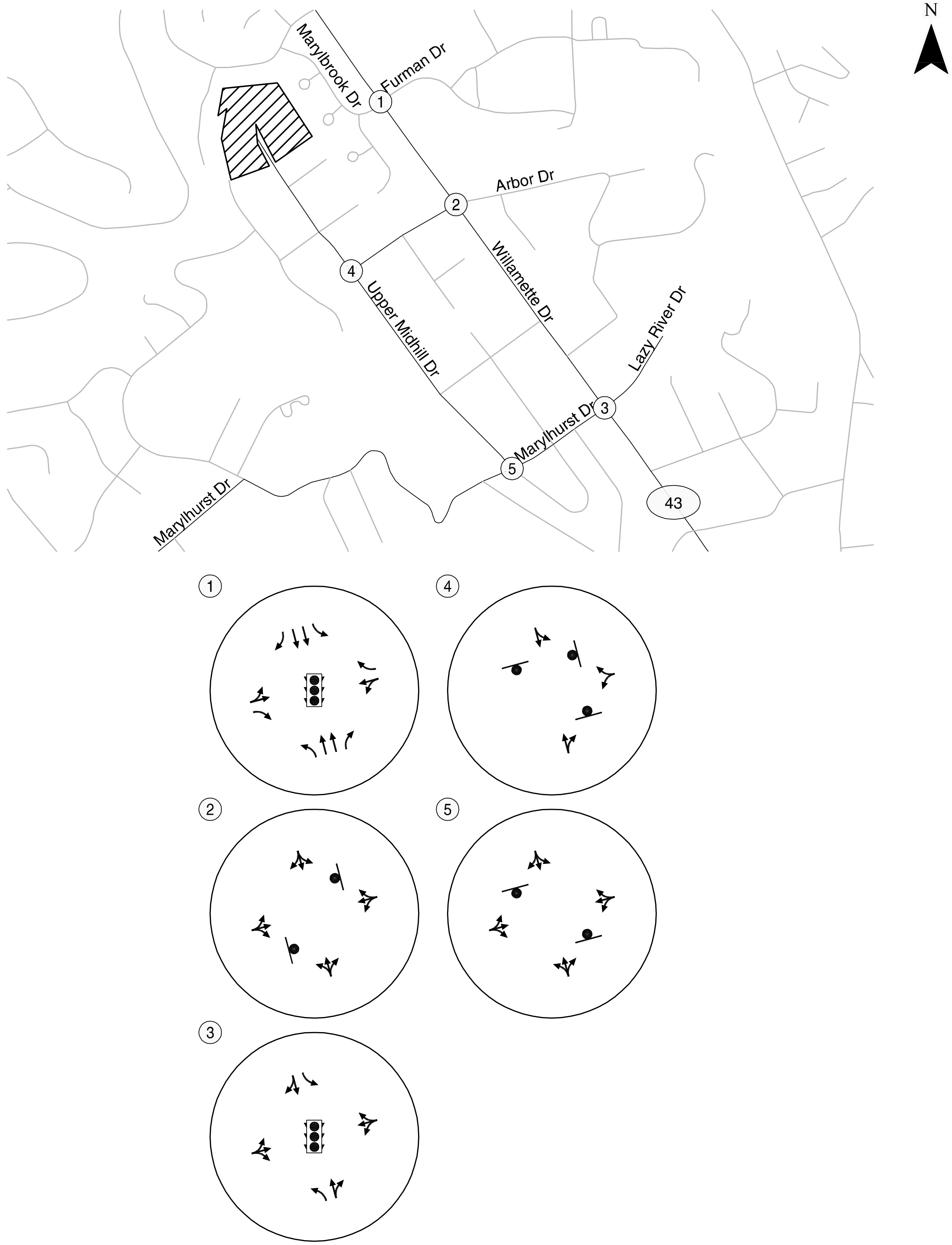
Willamette Drive is the major north-south arterial within the City of West Linn providing access to the cities of Lake Oswego and Portland to the north, and Oregon City to the south. Marylhurst Drive is an east-west collector, which provides access to Willamette Drive via a signalized intersection. Arbor Drive is an east-west local street that provides access to Willamette Drive via a two-way stop-control intersection. Upper Midhill Drive is a north-south local street that connects the proposed development to Arbor Drive and Marylhurst Drive. The segment of Upper Midhill Drive located south of Arbor Drive is relatively narrow; however, two vehicles can pass each other on the roadway. Also, should redevelopment occur along Upper Midhill Drive, it is assumed the roadway will be improved to the City's local street standard. Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersections.

Pedestrian and Bicycle Facilities

There is a continuous network of sidewalks and paths that connect the proposed development to the transit stops located at the Willamette Drive/Marybrook Drive intersection, which is also the main entrance to Marylhurst University. While there are gaps in the sidewalk network that connect the proposed development to the transit stops located at the Willamette Drive/Arbor Drive intersection, as well as other destinations along Willamette Drive and Upper Midhill Drive, the existing network of sidewalks and shoulders currently provide pedestrians with access to adjacent land uses. Crosswalks are provided at the Willamette Drive/Marylhurst Drive and Willamette Drive/Marylbrook intersections, which are signalized with pedestrian pushbuttons and countdown signal heads. Bike lanes are provided within the site vicinity along Willamette Drive, which provides continuous bike lanes north and south of the proposed development.

Transit Facilities

Local transit service is provided within the site vicinity by TriMet. TriMet Line 35 provides frequent service along Willamette Drive, Monday through Friday from 6:00 a.m. to 12:00 a.m. on 15-30 minute headways. Limited service is provided on Saturdays and Sundays. Line 35 serves two stops located adjacent to Arbor Drive (Stop 6301 and 6302) and two stops located adjacent to Marylhurst Drive (Stop 9216 and 6337). The stops located adjacent to Arbor Drive are not supported by sidewalks or crosswalks, while the stops located adjacent to Marylhurst Drive have sidewalks and a signalized crossing at the Willamette Drive/Marylhurst Drive intersection. Based on ridership data provided by TriMet for Spring 2016, approximately five people get on and six people get off the bus at the Willamette Drive/Arbor Drive intersection and approximately nine people get on and 33 people get off the bus at the Willamette Drive/Marlybrook Drive intersection on an average midweek day.



Existing Lane Configurations &
Traffic Control Devices
West Linn, OR

Figure
3

TRAFFIC VOLUMES AND PEAK HOUR OPERATIONS

Manual turning movement counts were conducted at the study intersections in October 2016, while Marylhurst University and other schools within the West Linn area were in session. All the counts were conducted on a typical mid-week day during the morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak time periods. The system-wide morning and evening peak hours were found to occur between 7:00 and 8:00 a.m. and 4:15 and 5:15 p.m., respectively. Figure 4 provides a summary of the year 2016 turning-movement counts for the weekday a.m. and p.m. peak hours. The traffic counts shown in Figure 4 were seasonally adjusted to 30th Highest Hour Volumes (30HV) in accordance with the methodology outlined in the ODOT Analysis Procedures Manual (APM – Reference 2). Appendix "A" contains the traffic count worksheets used in this study.

Current Levels of Service

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the 2000 *Highway Capacity Manual* (HCM – Reference 3). *A description of level of service and the criteria by which it is determined is presented in Appendix "B".* Appendix "B" also indicates how level of service is measured and what is generally considered an acceptable range.

The City of West Linn requires all signalized and unsignalized intersections to maintain LOS D or better, while ODOT requires all signalized and unsignalized intersections to maintain a volume-to-capacity (v/c) ration of 0.99. The City controls the Upper Midhill Drive/Arbor Drive and Upper Midhill Drive/Marylhurst Drive intersections while the ODOT controls the intersections located along Willamette Drive.

All intersection level-of-service evaluations used the peak 15-minute flow rates that occurred during the weekday a.m. and p.m. peak hours. Using the peak 15-minute flow rates ensures that this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour. The transportation system will likely operate under conditions better than those described in this report during all other time periods.

Figure 4 summarizes the results of the analysis under existing traffic conditions. As shown, all of the study intersections currently operate acceptably during the weekday a.m. and p.m. peak hours with the exception of the Willamette Drive/Arbor Drive intersection. Additional information on the operational issues identified at the study intersection is provided below. *Appendix "C" includes the worksheets used to evaluate existing traffic conditions at the study intersections.*

Willamette Drive/Arbor Drive

The eastbound approach to the Willamette Drive/Arbor Drive intersection currently operates at LOS F and above capacity during the weekday a.m. peak hour. This is primarily due to the relatively low volume of eastbound traffic along Arbor Drive conflicting with the relatively high volume of northbound and southbound traffic along Willamette Drive. Potential mitigation measures are discussed later in this report.

Traffic Safety

The crash history of the study intersections was reviewed in an effort to identify any potential safety issues. ODOT provided the five most recent years of crash data available for the study intersections, including January 1, 2010 through December 31, 2014. Table 2 summarizes the crash history of the study intersections over the five-year period.

Table 2: Study Intersection Crash Summary (January 1, 2009 – December 31, 2013)

Location	Crash Type						Severity			Total	Crash Rate
	Angle	Turn	Rear-End	Side Swipe	Fixed Object	Ped/ Bike	PDO	Injury	Fatal		
Willamette Drive/Marylbrook Drive	0	2	2	0	0	1	0	5	0	5	0.17
Willamette Drive/Arbor Drive	0	3	6	0	0	0	2	7	0	9	0.31
Willamette Drive/Marylhurst Drive	0	1	4	0	0	0	1	4	0	5	0.16
Upper Midhill Drive/Arbor Drive	0	0	0	0	0	0	0	0	0	0	0.00
Upper Midhill Drive/Marylhurst Drive	0	0	0	0	0	0	0	0	0	0	0.00

PDO = Property Damage Only

The crash rates shown in Table 2 were compared to the 90th percentile rates for similar facilities shown in Table 4-1 of the ODOT APM. Per the APM, any intersection that has a crash rate equal to or greater than the corresponding 90th percentile rate is considered a high-risk intersection and is recommended for further review. Based on these criteria, none of the study intersections are recommended for further review. However, given the operational issues at the Willamette Drive/Arbor Drive intersection, further review of the intersection is provided below.

Willamette Drive/Arbor Drive

As shown in Table 2, the Willamette Drive/Arbor Drive intersection experienced the highest number of crashes over the five year period. Further review of the crashes indicates that a majority of the rear-end crashes occurred in the northbound direction when a motorist failed to avoid another slowed or stopped motorist waiting to turn left onto Arbor Drive. Potential mitigation measures are identified later in this report that will reduce the potential for these types of crashes in the future. No other trends or patterns were identified in the crash data that requires mitigation associated with the proposed development. *Appendix "D" contains the crash data obtained from ODOT.*

TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis identifies how the study area's transportation system will operate in the year the proposed development is expected to be fully built, year 2018. The impact of traffic generated by the proposed development was examined as follows:

- Developments and transportation improvements planned in the site vicinity were identified.

- Year 2018 background traffic conditions (without the proposed development) were analyzed at the study intersections during the weekday a.m. and p.m. peak hours.
  - Background traffic conditions were developed by applying a 2-percent growth rate to the existing traffic volumes to account for regional growth in the site vicinity between years 2016 and 2018.
- Site-generated trips were estimated for build-out of the site.
- Site trip-distribution patterns were derived after the existing traffic patterns and the location of major trip origins and destinations in West Linn and the Metro area.
- Year 2018 total traffic conditions (with full build-out and occupancy of the proposed development) were analyzed at the study intersections during the weekday a.m. and p.m. peak hours.

YEAR 2018 BACKGROUND TRAFFIC CONDITIONS

The year 2018 background traffic conditions analysis identifies how the study area's transportation system will operate without the proposed development. This analysis includes traffic attributed to planned developments within the study area and to general growth in the region, but does not include traffic from the proposed development.

Planned Developments and Transportation Improvements

No planned developments or transportation improvements were identified within the site vicinity that will impact traffic operations under year 2018 traffic conditions.

Traffic Volumes

The growth rate used in this analysis was developed based on a review of historical traffic volumes along Willamette Drive and discussions with City staff. Based on the review and discussions, a 2-percent growth rate was applied to the existing traffic volumes to account for regional growth between 2016 and 2018. Figure 5 illustrates the resulting forecast year 2018 background traffic volumes during the weekday a.m. and p.m. peak hours.

Intersection Level-of-Service

The traffic volumes shown in Figure 5 were used to conduct an operations analysis at the study intersections under year 2018 background traffic conditions. As shown, all of the study intersections are expected to operate acceptably during the weekday a.m. and p.m. peak hours with the exception of the Willamette Drive/Arbor Drive intersection. Additional information on the operational issues identified at the study intersection is provided below. *Appendix "E" includes the worksheets used to evaluate year 2018 background traffic conditions at the study intersections.*

CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/ AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL
STD = MOBILITY STANDARD

Year 2018 Background Traffic Conditions Weekday AM & PM Peak Hour West Linn, OR

Figure 5

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

Willamette Drive/Arbor Drive

The eastbound approach to the Willamette Drive/Arbor Drive intersection is expected to continue to operate at LOS F and above capacity during the weekday a.m. peak hour. Potential mitigation measures are identified later in this report.

PROPOSED DEVELOPMENT PLAN

Chene Blanc Estates, LLC is proposing to develop the 6.14 acre site located at the northern terminus of Upper Midhill Drive. The proposed development plan consists of 42 townhomes located along an extension of Upper Midhill Drive that will connect to Scenic Drive to the west. Construction of the proposed development is expected to occur in 2017 with full build-out and occupancy in 2018.

Trip Generation

A trip generation estimate was prepared for the proposed development based on information provided in the standard reference manual, *Trip Generation, 9th Edition*, published by the Institute of Transportation Engineers (ITE – Reference 4). ITE land use code 230 (Residential Condominium/Townhouse) was used to represent the proposed development. Table 3 summarizes the trip generation estimate for the daily, weekday a.m. and weekday p.m. peak hours.

Table 3: Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
				Total	In	Out	Total	In	Out
Residential Condominium/Townhouse	230	42 units	302	26	4	22	30	20	10

As shown in Table 3, the proposed development is estimated to generate approximately 302 daily trips, including 26 trips (4 inbound, 22 outbound) during the weekday a.m. peak hour and 30 trips (20 inbound, 10 outbound) during the weekday p.m. peak hour.

Site Trip Distribution/Trip Assignment

The site-generated trips were distributed onto the study area roadway system according to existing traffic patterns and the location of major trip origins and destinations in West Linn and the Metro area. Figure 6 illustrates the estimated trip distribution pattern for the proposed development.

The site-generated trips were assigned to the network by distributing the trips shown in Table 3 according to the trip distribution pattern shown in Figure 6. Figure 6 also illustrates the site-generated trips that are expected to use the study intersections during the weekday a.m. and p.m. peak hours. As shown, no additional trips were added to the eastbound left-turn movement at the Willamette Drive/Arbor Drive intersection due to the existing and projected future operational issues associated with that movement. It is assumed that all trips from the site headed north on Willamette Drive will use the traffic signal at Willamette Drive/Marylhurst Drive.

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LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
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AWSC= ALL-WAY STOP CONTROL
STD = MOBILITY STANDARD

Existing Traffic Conditions Weekday AM & PM Peak Hour West Linn, OR

Figure 4

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Estimated Trip Distribution Pattern & Site Generated Trips
Weekday AM & PM Peak Hour
West Linn, OR

Figure
6

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YEAR 2018 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with the traffic generated by the proposed development. The year 2018 background traffic volumes shown in Figure 5 were added to the site-generated traffic shown in Figure 6 to arrive at the total traffic volumes shown in Figure 7.

Intersection Level of Service

The traffic volumes shown in Figure 7 were used to conduct an operations analysis at the study intersections under year 2018 total traffic conditions. As shown, all of the study intersections are expected to operate acceptably during the weekday a.m. and p.m. peak hours with the exception of the Willamette Drive/Arbor Drive intersection. Additional information on the operational issues identified at the study intersection is provided below. *Appendix "F" includes the worksheets used to evaluate year 2018 total traffic conditions at the study intersections.*

Willamette Drive/Arbor Drive

The eastbound approach to the Willamette Drive/Arbor Drive intersection is expected to operate at LOS F and above capacity during the weekday a.m. and p.m. peak hours under year 2018 total traffic conditions. Potential mitigation measures are identified below.

Mitigation

The provision of a two-way left-turn lane (TWLTL) along Willamette Drive would allow motorists at the eastbound and westbound approaches to the Willamette Drive/Arbor Drive intersection to complete two-stage left-turn movements onto Willamette Drive. This would decrease the delay associated with turning left onto Willamette Drive and increase the capacity of the intersection. The provision of a TWLTL would also improve safety by providing separation between slowed or stopped motorists waiting to turn left from Willamette Drive and motorists that are continuing through the intersection.

Figure 8 summarizes the results of the traffic operations analysis at the Willamette Drive/Arbor Drive intersection under year 2018 total traffic conditions with the proposed mitigation. As shown, the intersection is expected to operate acceptably. Figure 9 illustrates a conceptual design of the proposed mitigation. *Appendix "G" includes the worksheets used to evaluate year 2018 total traffic conditions at the Willamette Drive/Arbor Drive intersection with the proposed mitigation.*

The provision of a TWLTL, and subsequent increase in capacity, could result in a shift in traffic volumes from the Willamette Drive/Marylhurst Drive intersection to the Willamette Drive/Arbor Drive intersection. Figure 8 also summarizes the results of a traffic operations analysis at the Willamette Drive/Arbor Drive intersection with the proposed mitigation and a potential shift in all site generated traffic to the intersection. As shown, the intersection is expected to operate acceptably. *Appendix "G" also includes the worksheets used to evaluate year 2018 total traffic conditions at the Willamette Drive/Arbor Drive intersection with the proposed mitigation and potential shift in traffic volumes.*

CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
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Year 2018 Total Traffic Conditions
Weekday AM & PM Peak Hour
West Linn, OR

Figure 7

CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/ AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
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TWC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL
STD = MOBILITY STANDARD

Year 2018 Total Traffic Conditions - Mitigated
Weekday AM & PM Peak Hour
West Linn, OR

Figure
8

SCALE
0 50 100

Willamette Drive (OR 43)/Arbor Drive Intersection Concept
West Linn, OR

Figure
9

OR 43 Conceptual Design Plan

The City of West Linn and the Oregon Department of Transportation (ODOT) recently completed a concept plan for OR 43. The OR 43 Concept Plan identifies the City's preferred cross-section for OR 43 along with lane configurations and traffic control devices at several major intersections. The plan identifies a three lane cross section within the vicinity of the OR 43/Arbor Drive intersection with two 11-foot travel lanes and one 13-foot center two-way left-turn lane (TWLTL). The overall paved width of OR 43, which includes 2-feet of shy distance on both sides of the roadway, is identified as 39-feet. The plan also identifies separated bicycle facilities (cycle tracks), landscape strips, and sidewalks within the vicinity of the OR 43/Arbor Drive intersection. The improvements associated with the OR 43 Concept Plan have been included in the 2016-2019 Statewide Transportation Improvement Program (STIP) and have dedicated funding from the City and ODOT. Design of the improvements is expected to occur in 2018 and construction is expected to occur in 2019. The first phase of construction will include the segment from the northern City limits to Hidden Springs Road.

Given that the City and ODOT have plans to improve OR 43 within the vicinity of the OR 43/Arbor Drive intersection, the proposed mitigation measures are intended to be implemented on an interim basis and therefore have been designed to fit within the existing paved width of the roadway. Field measurements indicate that the existing paved width is approximately 46-feet (the current cross section includes two 12 to 13-foot travel lanes and two 9 to 12-foot shoulders), which would allow for two 11-foot travel lanes, one 13-foot TWLTL, and two 5.5-foot shoulders (an alternative could include two 11-foot travel lanes, one 12-foot TWLTL, and two 6-foot shoulders). Per discussions with ODOT staff, the interim improvements will require a design exception; however, it is important to note that many of the design exceptions will be consistent with the design exceptions submitted for the OR 43 concept plan.

CONCLUSIONS AND RECOMMENDATIONS

The results of the traffic impact analysis indicate that the proposed Chene Blanc Estates residential development can be constructed while maintaining safe and acceptable traffic operations at the study intersection and adjacent roadways assuming provision of the recommended mitigation measures. The findings of this analysis and our recommendations are discussed below.

FINDINGS

Existing Conditions

- All of the study intersections operate acceptably during the weekday a.m. and p.m. peak hours with the exception of the Willamette Drive/Arbor Drive intersection.
  - Mitigation measures have been identified as described below.

- The Willamette Drive/Arbor Drive intersection experienced the highest number of crashes over the five year study period, a majority of which involved vehicles turning to/from the minor street.
  - Mitigation measures have been identified as described below.
  - No other trends or patterns were identified in the crash data that require mitigation associated with this project.
- The segment of Upper Midhill Drive located south of Arbor Drive is relatively narrow; however, two vehicles can pass each other on the roadway. Also, should redevelopment occur along Upper Midhill Drive, it is assumed the roadway will be improved to the City's local street standard.

Year 2018 Background Traffic Conditions

- No planned developments or transportation improvements were identified within the site vicinity that will impact traffic operations under 2016 traffic conditions.
- All of the study intersections are forecast to operate acceptably during the weekday a.m. and p.m. peak hours with the exception of the Willamette Drive/Arbor Drive intersection.
  - Mitigation measures have been identified as described below.

Proposed Development Plan

- The proposed development will include 42 townhomes located along an extension of Upper Midhill Drive.
- The proposed development is estimated to generate approximately 302 daily trips, including 26 trips (4 inbound, 22 outbound) during the weekday a.m. peak hour and 30 trips (20 inbound, 10 outbound) during the weekday p.m. peak hour.

Year 2018 Total Traffic Conditions

- All of the study intersections are forecast to operate acceptably during the weekday a.m. and p.m. peak hours with the exception of the Willamette Drive/Arbor Drive intersection.
  - Mitigation measures have been identified as described below.

RECOMMENDATIONS

The following list summarizes the mitigation measures recommended as part of this proposed development.

- Construct an extension of Upper Midhill Drive consistent with the City's local street standard with curb, gutter, and sidewalks on both sides of the roadways.

- Coordinate with ODOT to implement an interim improvement at the Willamette Drive/Arbor Drive intersection that provides a center TWLTL through the intersection.
- Shrubbery and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.

REFERENCES

1. City of West Linn. *Transportation System Plan*. 2015.
2. Oregon Department of Transportation. *Analysis Procedures Manual*. 2015.
3. Transportation Research Board. *Highway Capacity Manual*. 2000.
4. Institute of Transportation Engineers. *Trip Generation, 9th Edition*. 2012.

APPENDIX

A. Traffic Counts

B. Description of Level of Service

C. Existing Traffic Conditions Worksheets

D. Crash Data

E. Year 2016 Background Traffic Conditions Worksheets

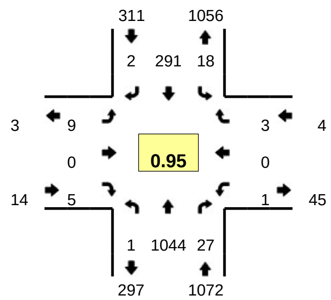
F. Year 2016 Total Traffic Conditions Worksheets

G. Year 2016 Total Traffic Conditions Worksheets - Mitigated

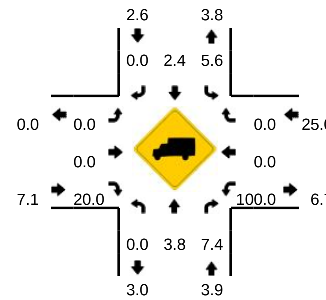
Appendix A Traffic Counts

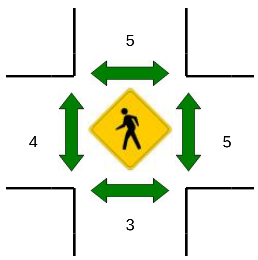
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

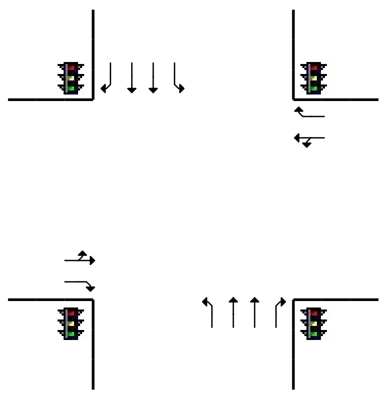
LOCATION: OR 43 -- Marylbrook Dr | **QC JOB #:** 13939501
CITY/STATE: Lake Oswego, OR | **DATE:** Thu, Oct 20 2016

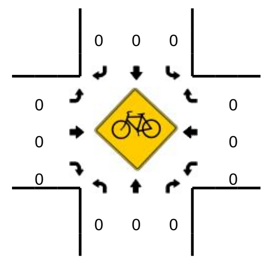


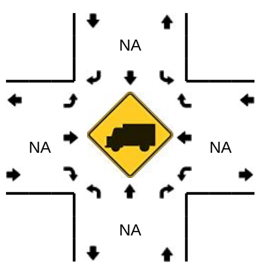
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

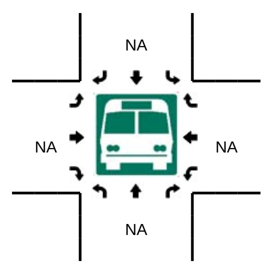












5-Min Count Period Beginning At	OR 43 (Northbound) Left	Thru	Right	U	OR 43 (Southbound) Left	Thru	Right	U	Marylbrook Dr (Eastbound) Left	Thru	Right	U	Marylbrook Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	100	0	0	1	13	0	0	1	0	0	0	0	0	0	0	115	
7:05 AM	0	99	2	0	3	22	0	0	0	0	0	0	0	0	0	0	126	
7:10 AM	0	98	1	0	0	27	0	0	1	0	2	0	0	0	0	0	129	
7:15 AM	0	85	0	0	0	26	0	0	1	0	0	0	0	0	0	0	112	
7:20 AM	0	95	1	0	1	22	0	0	0	0	0	0	1	0	0	0	120	
7:25 AM	0	94	3	0	4	26	0	0	2	0	0	0	0	0	0	0	129	
7:30 AM	0	84	0	0	3	23	0	0	0	0	0	0	0	0	0	0	110	
7:35 AM	0	85	3	0	0	28	0	0	1	0	0	0	0	0	2	0	119	
7:40 AM	1	70	4	0	2	30	1	0	1	0	0	0	0	0	1	0	110	
7:45 AM	0	76	3	0	2	22	1	0	1	0	1	0	0	0	0	0	106	
7:50 AM	0	73	6	0	1	29	0	0	1	0	0	0	0	0	0	0	110	
7:55 AM	0	85	4	0	1	23	0	0	0	0	2	0	0	0	0	0	115	1401
8:00 AM	0	74	4	0	2	27	0	0	1	0	0	0	0	0	0	0	108	1394
8:05 AM	1	49	3	0	1	34	0	0	1	0	0	0	0	0	1	0	90	1358
8:10 AM	0	78	0	0	2	27	0	0	1	0	0	0	1	0	0	0	109	1338
8:15 AM	0	71	4	0	2	29	0	0	1	0	0	0	0	0	1	0	108	1334
8:20 AM	0	64	4	0	0	37	0	0	0	0	0	0	1	0	1	0	107	1321
8:25 AM	0	69	2	0	2	34	1	0	0	0	0	0	0	0	0	0	108	1300
8:30 AM	0	79	3	0	3	36	0	0	0	0	0	0	2	0	2	0	125	1315
8:35 AM	0	80	3	0	3	30	0	0	4	0	2	0	0	0	0	0	122	1318
8:40 AM	0	77	3	0	3	25	0	0	0	0	0	0	0	0	0	0	108	1316
8:45 AM	0	75	1	0	6	20	1	0	0	0	0	0	2	0	2	0	107	1317
8:50 AM	0	84	5	0	5	17	1	0	0	0	1	0	0	0	1	0	114	1321
8:55 AM	1	79	3	0	6	27	0	0	0	0	0	0	3	0	2	0	121	1327

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	1188	12	0	16	248	0	0	8	0	8	0	0	0	0	0	1480
Heavy Trucks	0	52	4		0	4	0		0	0	4		0	0	0		64
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/3/2016 3:34 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: OR 43 -- Marylbrook Dr — **QC JOB #:** 13939502
CITY/STATE: Lake Oswego, OR — **DATE:** Thu, Oct 20 2016

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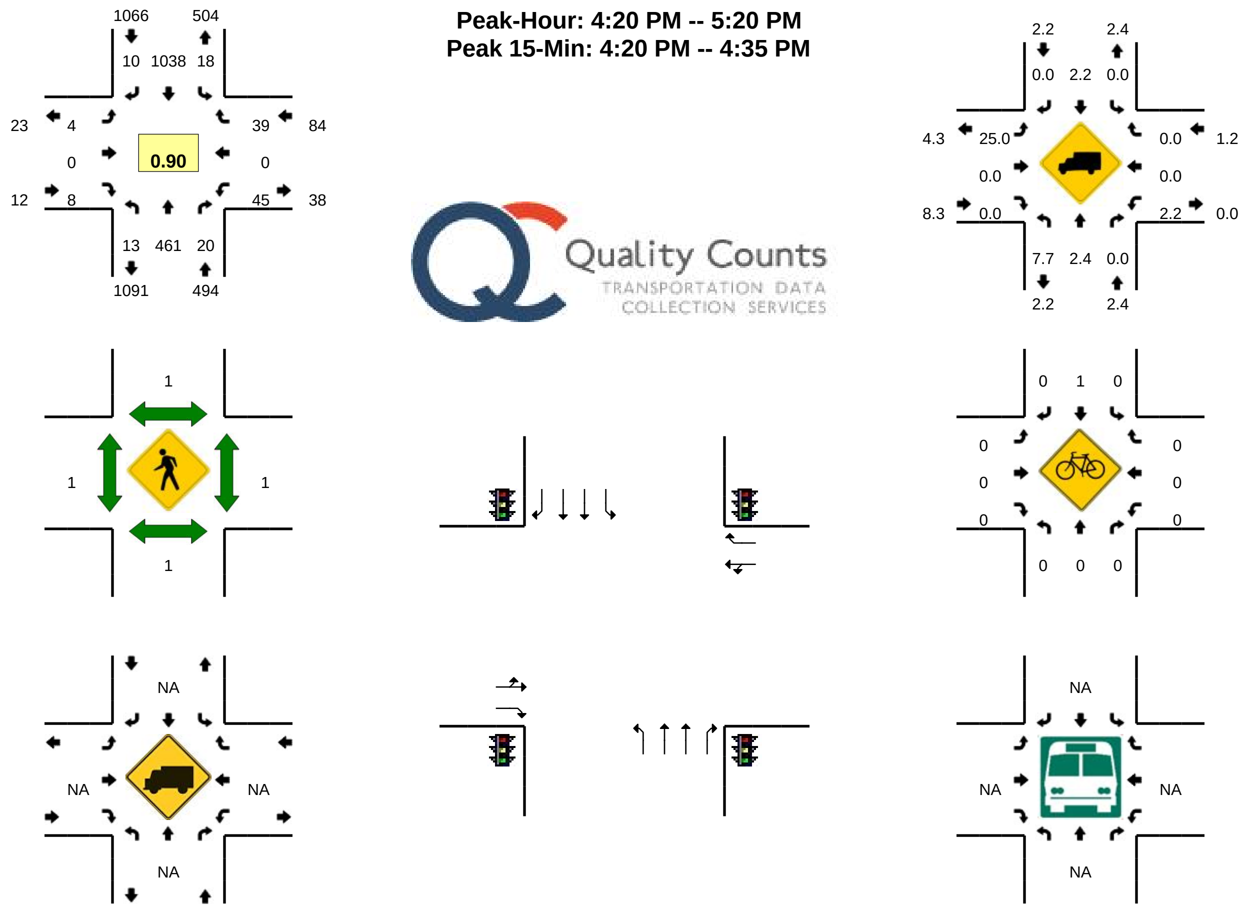
Peak 15-Min: 4:20 PM -- 4:35 PM



5-Min Count Period Beginning At	OR 43 (Northbound) Left	Thru	Right	U	OR 43 (Southbound) Left	Thru	Right	U	Marylbrook Dr (Eastbound) Left	Thru	Right	U	Marylbrook Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	38	0	0	0	77	0	0	0	0	1	0	1	0	3	0	120	
4:05 PM	3	41	0	0	0	80	1	0	0	0	1	0	1	0	3	0	130	
4:10 PM	2	34	2	0	2	83	1	0	0	0	1	0	4	0	2	0	131	
4:15 PM	0	27	0	0	2	77	0	0	0	0	1	0	6	0	7	0	120	
4:20 PM	0	53	0	0	5	98	0	0	0	0	1	0	3	0	1	0	161	
4:25 PM	2	33	1	0	0	95	0	0	1	0	1	0	1	0	7	0	141	
4:30 PM	0	48	3	0	1	98	1	0	0	0	1	0	3	0	4	0	159	
4:35 PM	1	38	2	0	2	85	1	0	1	0	0	0	12	0	5	0	147	
4:40 PM	0	31	2	0	2	91	0	0	1	0	1	0	3	0	2	0	133	
4:45 PM	2	29	1	0	1	86	1	0	0	0	0	0	5	0	3	0	128	
4:50 PM	1	34	0	0	2	79	2	0	1	0	1	0	3	0	2	0	125	
4:55 PM	2	43	2	0	2	75	0	0	0	0	0	0	1	0	1	0	126	1621
5:00 PM	1	31	2	0	2	82	2	0	0	0	1	0	3	0	7	0	131	1632
5:05 PM	2	39	4	0	1	88	0	0	0	0	2	0	5	0	2	0	143	1645
5:10 PM	1	44	2	0	0	82	1	0	0	0	0	0	5	0	3	0	138	1652
5:15 PM	1	38	1	0	0	79	2	0	0	0	0	0	1	0	2	0	124	1656
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5:30 PM	1	51	3	0	0	101	0	0	0	0	0	0	0	0	3	0	159	1585
5:35 PM	0	35	3	0	3	75	0	0	0	0	2	0	1	0	2	0	121	1559
5:40 PM	1	46	4	0	2	76	0	0	0	0	0	0	0	0	3	0	132	1558
5:45 PM	2	38	4	0	2	70	2	0	1	0	0	0	2	0	1	0	122	1552
5:50 PM	1	36	1	0	3	74	0	0	0	0	2	0	1	0	4	0	122	1549
5:55 PM	0	23	4	0	5	83	3	0	0	0	0	0	1	0	2	0	121	1544

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	8	536	16	0	24	1164	4	0	4	0	12	0	28	0	48	0	1844
Heavy Trucks	0	20	0		0	28	0		0	0	0		0	0	0		48
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: OR 43 -- Arbor Dr | **QC JOB #:** 13939503

CITY/STATE: West Linn, OR | **DATE:** Thu, Oct 20 2016

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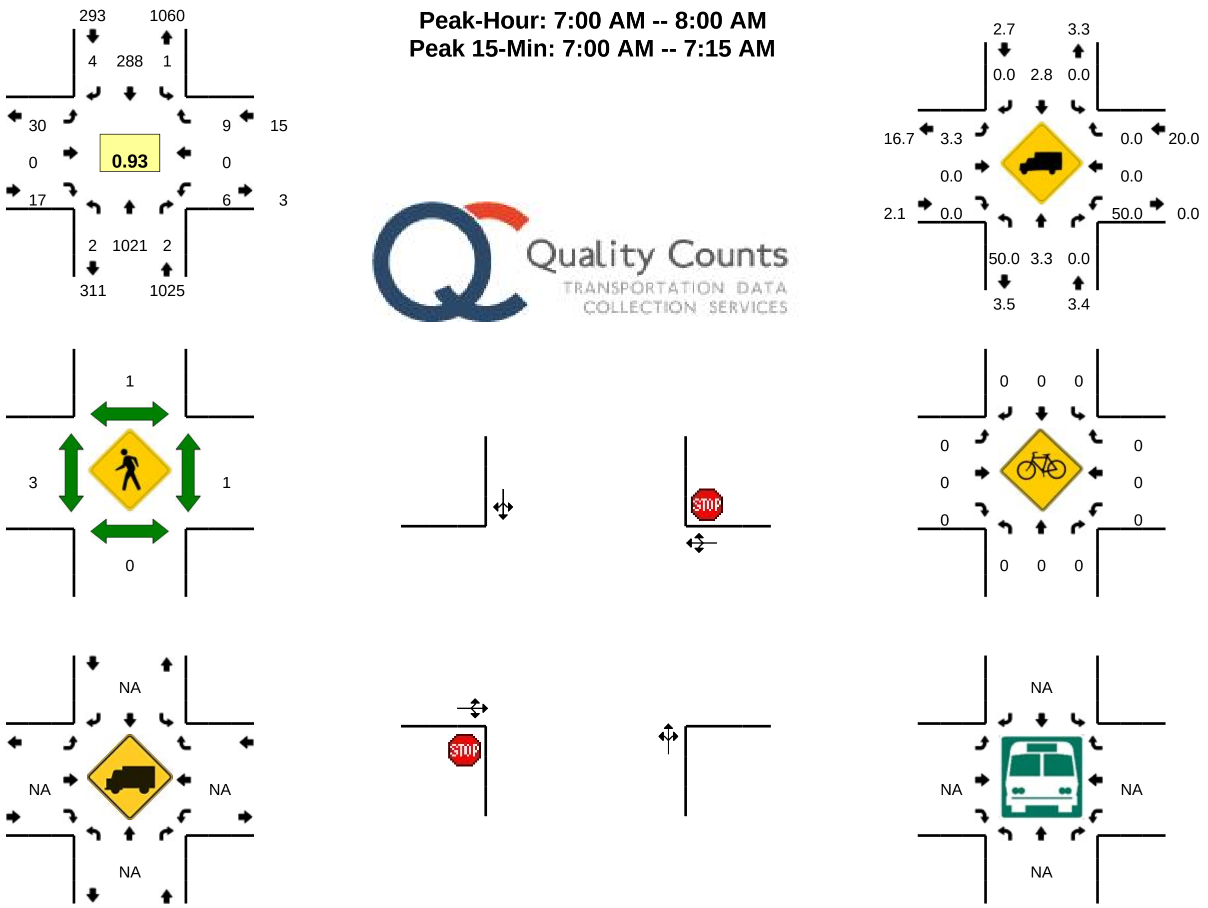
Peak 15-Min: 7:00 AM -- 7:15 AM



5-Min Count Period Beginning At	OR 43 (Northbound) Left	Thru	Right	U	OR 43 (Southbound) Left	Thru	Right	U	Arbor Dr (Eastbound) Left	Thru	Right	U	Arbor Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	99	0	0	0	11	1	0	6	0	1	0	0	0	2	0	120	
7:05 AM	0	96	0	0	0	21	0	0	2	0	1	0	0	0	1	0	121	
7:10 AM	0	94	0	0	0	29	1	0	1	0	2	0	0	0	1	0	128	
7:15 AM	0	81	0	0	0	26	0	0	3	0	0	0	0	0	0	0	110	
7:20 AM	0	93	0	0	0	22	1	0	4	0	2	0	0	0	1	0	123	
7:25 AM	0	89	0	0	1	26	0	0	4	0	1	0	1	0	1	0	123	
7:30 AM	0	84	0	0	0	22	0	0	0	0	1	0	1	0	0	0	108	
7:35 AM	1	88	1	0	0	30	0	0	3	0	1	0	0	0	1	0	125	
7:40 AM	0	78	0	0	0	26	0	0	3	0	2	0	0	0	1	0	110	
7:45 AM	0	62	0	0	0	25	0	0	2	0	2	0	1	0	1	0	93	
7:50 AM	0	72	0	0	0	27	1	0	0	0	2	0	0	0	0	0	102	
7:55 AM	1	85	1	0	0	23	0	0	2	0	2	0	3	0	0	0	117	1380
8:00 AM	1	75	0	0	0	28	0	0	4	0	2	0	1	0	1	0	112	1372
8:05 AM	0	60	0	0	0	33	1	0	3	0	3	0	0	0	0	0	100	1351
8:10 AM	2	74	0	0	0	29	0	0	3	0	3	0	0	0	1	0	112	1335
8:15 AM	1	61	0	0	0	27	1	0	4	0	2	0	0	0	0	0	96	1321
8:20 AM	0	67	0	0	0	40	0	0	2	0	2	0	1	0	0	0	112	1310
8:25 AM	2	64	0	0	0	34	0	0	4	0	0	0	0	0	1	0	105	1292
8:30 AM	1	83	1	0	0	36	2	0	2	0	4	0	1	0	3	0	133	1317
8:35 AM	2	73	0	0	0	32	1	0	8	0	2	0	1	0	0	0	119	1311
8:40 AM	1	79	0	0	0	25	0	0	0	0	1	0	0	0	1	0	107	1308
8:45 AM	1	74	0	0	0	22	0	0	3	0	3	0	1	0	0	0	104	1319
8:50 AM	1	85	0	0	0	19	0	0	1	0	0	0	0	0	1	0	107	1324
8:55 AM	2	80	0	0	1	29	0	0	1	0	3	0	0	0	0	0	116	1323

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	1156	0	0	0	244	8	0	36	0	16	0	0	0	16	0	1476
Heavy Trucks	0	36	0		0	8	0		0	0	0		0	0	0		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Type of peak hour being reported: Intersection Peak   Method for determining peak hour: Total Entering Volume

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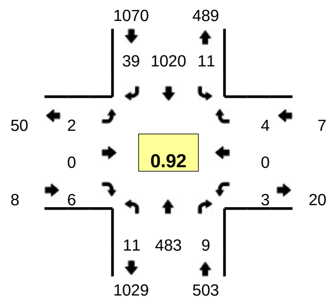
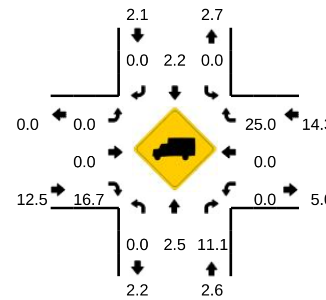
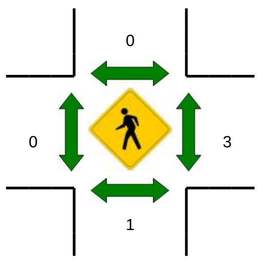
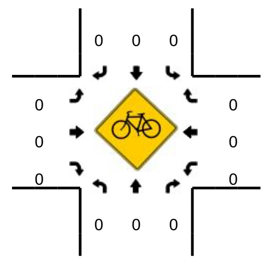
CITY/STATE: West Linn, OR   **DATE:** Thu, Oct 20 2016

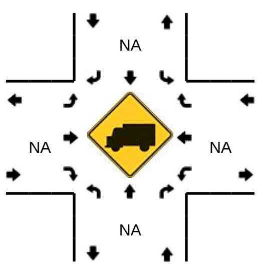


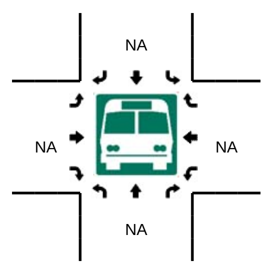
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:20 PM -- 4:35 PM











5-Min Count Period Beginning At	OR 43 (Northbound)				OR 43 (Southbound)				Arbor Dr (Eastbound)				Arbor Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	37	0	0	0	80	2	0	2	0	2	0	0	0	1	0	124	
4:05 PM	2	44	1	0	0	82	0	0	0	0	0	0	1	1	0	0	131	
4:10 PM	1	32	2	0	0	87	1	0	2	0	1	0	0	0	0	0	126	
4:15 PM	1	46	2	0	1	83	2	0	0	0	0	0	0	0	0	0	135	
4:20 PM	2	41	0	0	0	97	6	0	0	0	1	0	0	0	1	0	148	
4:25 PM	0	34	0	0	0	95	1	0	0	0	1	0	0	0	0	0	131	
4:30 PM	0	51	0	0	0	96	4	0	1	0	1	0	0	0	0	0	153	
4:35 PM	4	38	1	0	1	85	2	0	0	0	0	0	0	0	0	0	131	
4:40 PM	0	37	0	0	3	83	7	0	1	0	3	0	0	0	1	0	135	
4:45 PM	1	25	1	0	1	78	4	0	0	0	0	0	1	0	1	0	112	
4:50 PM	1	36	0	0	0	75	2	0	0	0	0	0	0	0	0	0	114	
4:55 PM	1	46	0	0	0	86	3	0	0	0	0	0	0	0	0	0	136	1576
5:00 PM	1	39	1	0	1	79	4	0	0	0	0	0	1	0	1	0	127	1579
5:05 PM	0	39	2	0	3	76	2	0	0	0	0	0	1	0	0	0	123	1571
5:10 PM	0	51	2	0	1	87	2	0	0	0	0	0	0	0	0	0	143	1588
5:15 PM	0	44	1	0	0	78	4	0	0	0	0	0	0	0	1	0	128	1581
5:20 PM	1	36	0	0	0	73	4	0	0	0	0	0	0	0	2	0	116	1549
5:25 PM	2	37	0	0	0	77	3	0	1	0	0	0	0	0	0	0	120	1538
5:30 PM	3	54	0	0	2	74	6	0	1	0	0	0	0	0	0	0	140	1525
5:35 PM	0	35	3	0	1	85	1	0	0	0	1	0	0	0	1	0	127	1521
5:40 PM	2	44	3	0	0	70	4	0	0	0	0	0	0	0	1	0	124	1510
5:45 PM	1	47	0	0	0	72	1	0	0	0	1	0	0	0	0	0	122	1520
5:50 PM	1	42	0	0	1	75	7	0	0	0	1	0	0	0	0	0	127	1533
5:55 PM	1	27	0	0	0	67	2	0	0	0	1	0	0	0	0	0	98	1495

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	504	0	0	0	1152	44	0	4	0	12	0	0	0	4	0	1728
Heavy Trucks	0	20	0		0	32	0		0	0	0		0	0	0		52
Pedestrians		4				0				0				12			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

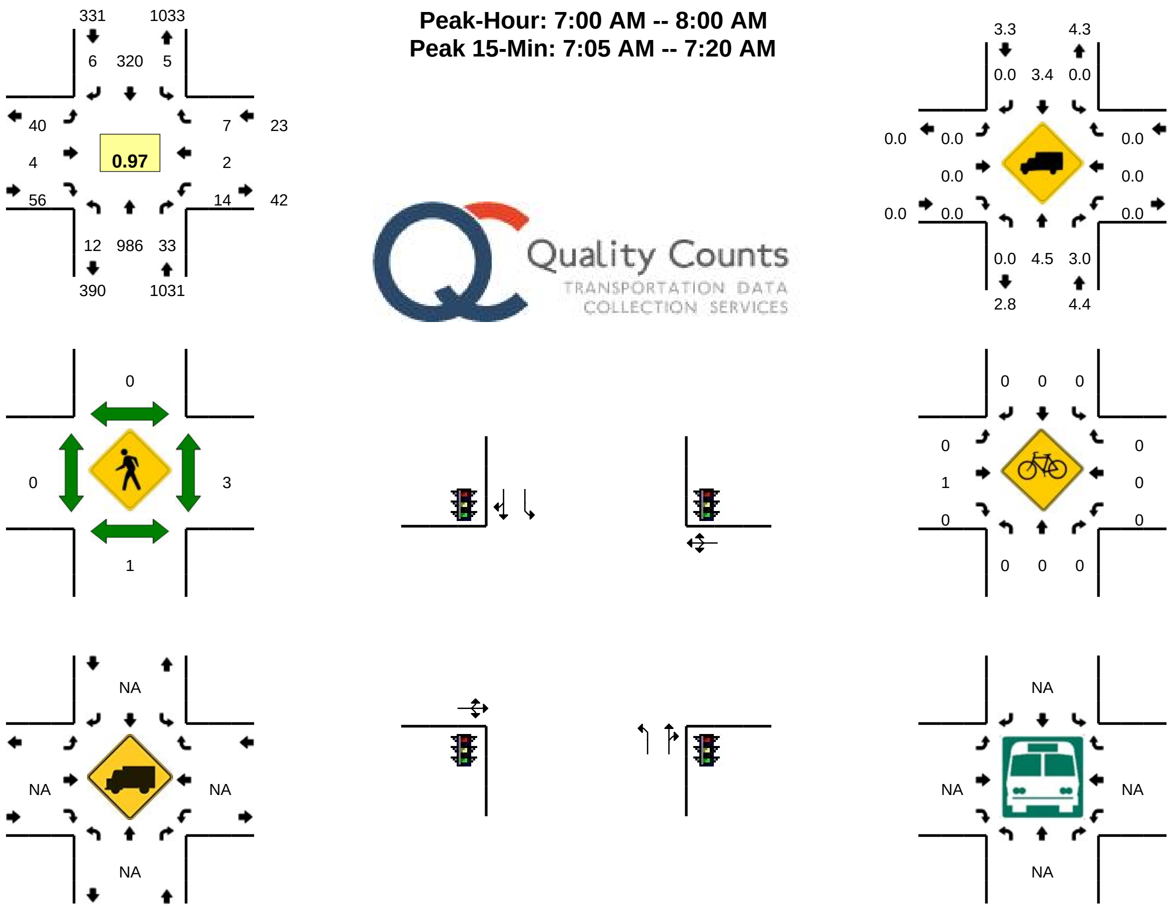
Comments:

Report generated on 11/3/2016 3:34 PM   SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak　　　Method for determining peak hour: Total Entering Volume

LOCATION: OR 43 -- Marylhurst Dr　　　**QC JOB #:** 13939505
CITY/STATE: West Linn, OR　　　**DATE:** Thu, Oct 20 2016

Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:05 AM -- 7:20 AM



5-Min Count Period Beginning At	OR 43 (Northbound) Left	Thru	Right	U	OR 43 (Southbound) Left	Thru	Right	U	Marylhurst Dr (Eastbound) Left	Thru	Right	U	Marylhurst Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	95	3	0	0	15	0	0	2	1	1	0	0	0	0	0	117	
7:05 AM	0	97	2	0	1	17	0	0	6	0	2	0	3	0	0	0	128	
7:10 AM	0	87	3	0	0	29	2	0	1	0	3	0	1	0	1	0	127	
7:15 AM	0	83	4	0	1	27	0	0	3	0	9	0	1	1	0	0	129	
7:20 AM	1	81	3	0	1	31	0	0	2	0	7	0	2	0	0	0	128	
7:25 AM	1	80	2	0	0	24	0	0	7	1	2	0	0	0	1	0	118	
7:30 AM	2	81	3	0	0	26	0	0	3	0	6	0	1	0	1	0	123	
7:35 AM	5	82	0	0	0	25	2	0	4	0	3	0	2	0	2	0	125	
7:40 AM	1	69	1	0	0	39	1	0	3	0	8	0	0	1	0	0	123	
7:45 AM	0	69	3	0	0	32	0	0	2	1	8	0	1	0	0	0	116	
7:50 AM	0	79	5	0	1	29	1	0	3	1	3	0	2	0	1	0	125	
7:55 AM	2	83	4	0	1	26	0	0	4	0	4	0	1	0	1	0	126	1485
8:00 AM	3	68	2	0	2	27	0	0	1	0	5	0	0	0	1	0	109	1477
8:05 AM	1	58	7	0	1	28	1	0	2	0	8	0	3	0	0	0	109	1458
8:10 AM	3	67	3	0	2	33	0	0	5	0	12	0	2	0	1	0	128	1459
8:15 AM	5	65	2	0	0	33	0	0	5	0	10	0	4	0	0	0	124	1454
8:20 AM	0	55	2	0	0	40	0	0	2	0	6	0	0	0	0	0	105	1431
8:25 AM	3	68	4	0	2	34	1	0	3	0	3	0	1	0	0	0	119	1432
8:30 AM	2	82	2	0	1	34	0	0	2	1	2	0	3	0	0	0	129	1438
8:35 AM	2	66	4	0	1	33	2	0	4	0	2	0	3	0	1	0	118	1431
8:40 AM	4	78	2	0	1	23	3	0	0	0	3	0	0	0	2	0	116	1424
8:45 AM	1	72	4	0	1	27	1	0	2	0	2	0	1	1	2	0	114	1422
8:50 AM	4	84	4	0	0	18	1	0	3	0	2	0	2	0	1	0	119	1416
8:55 AM	4	72	7	0	1	30	1	0	8	0	2	0	4	0	0	0	129	1419

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	1068	36	0	8	292	8	0	40	0	56	0	20	4	4	0	1536
Heavy Trucks	0	32	0		0	12	0		0	0	0		0	0	0		44
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

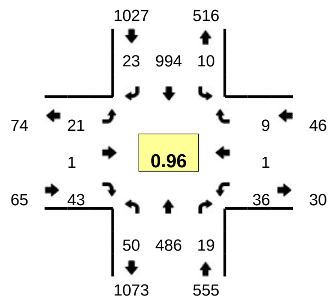
Comments:

Report generated on 11/3/2016 3:34 PM　　　SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

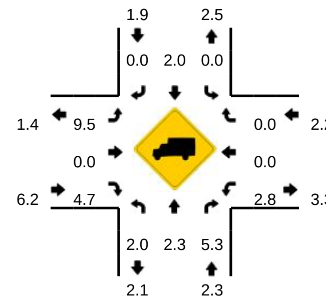
LOCATION: OR 43 -- Marylhurst Dr — **QC JOB #:** 13939506

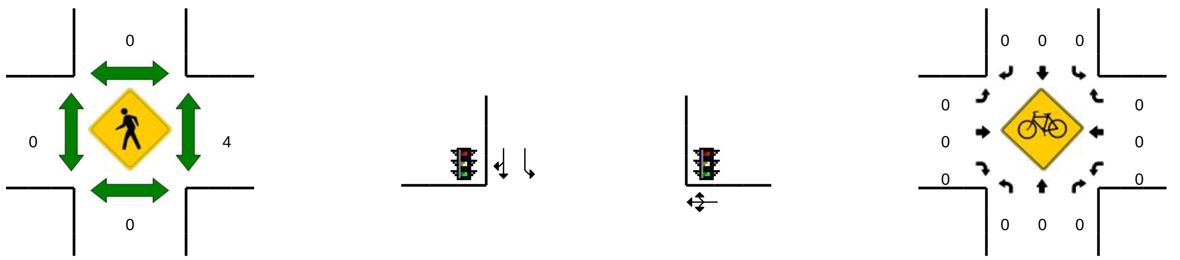
CITY/STATE: West Linn, OR — **DATE:** Thu, Oct 20 2016

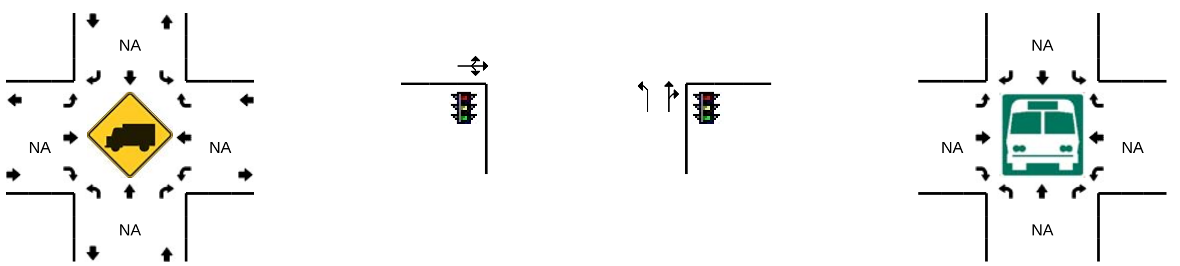


Peak-Hour: 4:15 PM -- 5:15 PM

Peak 15-Min: 4:15 PM -- 4:30 PM







5-Min Count Period Beginning At	OR 43 (Northbound) Left	Thru	Right	U	OR 43 (Southbound) Left	Thru	Right	U	Marylhurst Dr (Eastbound) Left	Thru	Right	U	Marylhurst Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	4	46	4	0	3	99	1	0	1	0	2	0	0	1	0	0	161	
4:05 PM	0	49	0	0	0	72	1	0	2	0	2	0	4	0	0	0	130	
4:10 PM	7	38	2	0	0	80	4	0	0	0	2	0	3	0	0	0	136	
4:15 PM	2	41	1	0	1	93	4	0	2	0	6	0	2	0	1	0	153	
4:20 PM	4	42	3	0	1	90	1	0	2	0	4	0	0	0	0	0	147	
4:25 PM	3	41	3	0	2	81	1	0	4	1	1	0	3	0	0	0	140	
4:30 PM	5	46	0	0	2	85	0	0	0	0	2	0	3	1	1	0	145	
4:35 PM	3	38	2	0	1	90	4	0	2	0	4	0	2	0	0	0	146	
4:40 PM	7	44	0	0	0	79	0	0	0	0	0	0	7	0	1	0	138	
4:45 PM	3	25	2	0	1	81	2	0	0	0	7	0	4	0	1	0	126	
4:50 PM	5	32	0	0	0	65	2	0	2	0	7	0	2	0	1	0	116	
4:55 PM	1	48	1	0	0	89	0	0	2	0	2	0	2	0	0	0	145	1683
5:00 PM	5	48	1	0	0	81	2	0	1	0	2	0	1	0	1	0	142	1664
5:05 PM	10	39	4	0	1	74	3	0	4	0	4	0	7	0	1	0	147	1681
5:10 PM	2	42	2	0	1	86	4	0	2	0	4	0	3	0	2	0	148	1693
5:15 PM	7	44	1	0	0	81	0	0	1	0	5	0	6	0	0	0	145	1685
5:20 PM	7	40	3	0	0	72	1	0	1	0	6	0	6	1	1	0	138	1676
5:25 PM	2	41	0	0	2	73	0	0	1	0	5	0	4	0	0	0	128	1664
5:30 PM	8	46	1	0	1	81	2	0	4	0	3	0	4	0	1	0	151	1670
5:35 PM	2	54	1	0	2	86	3	0	5	0	3	0	1	0	0	0	157	1681
5:40 PM	5	38	0	0	0	65	2	0	4	0	8	0	3	1	1	0	127	1670
5:45 PM	9	36	2	0	1	69	1	0	3	0	5	0	1	0	0	0	127	1671
5:50 PM	1	45	2	0	0	77	4	0	1	0	3	0	2	1	0	0	136	1691
5:55 PM	4	38	1	0	0	68	2	0	2	0	2	0	2	0	0	0	119	1665

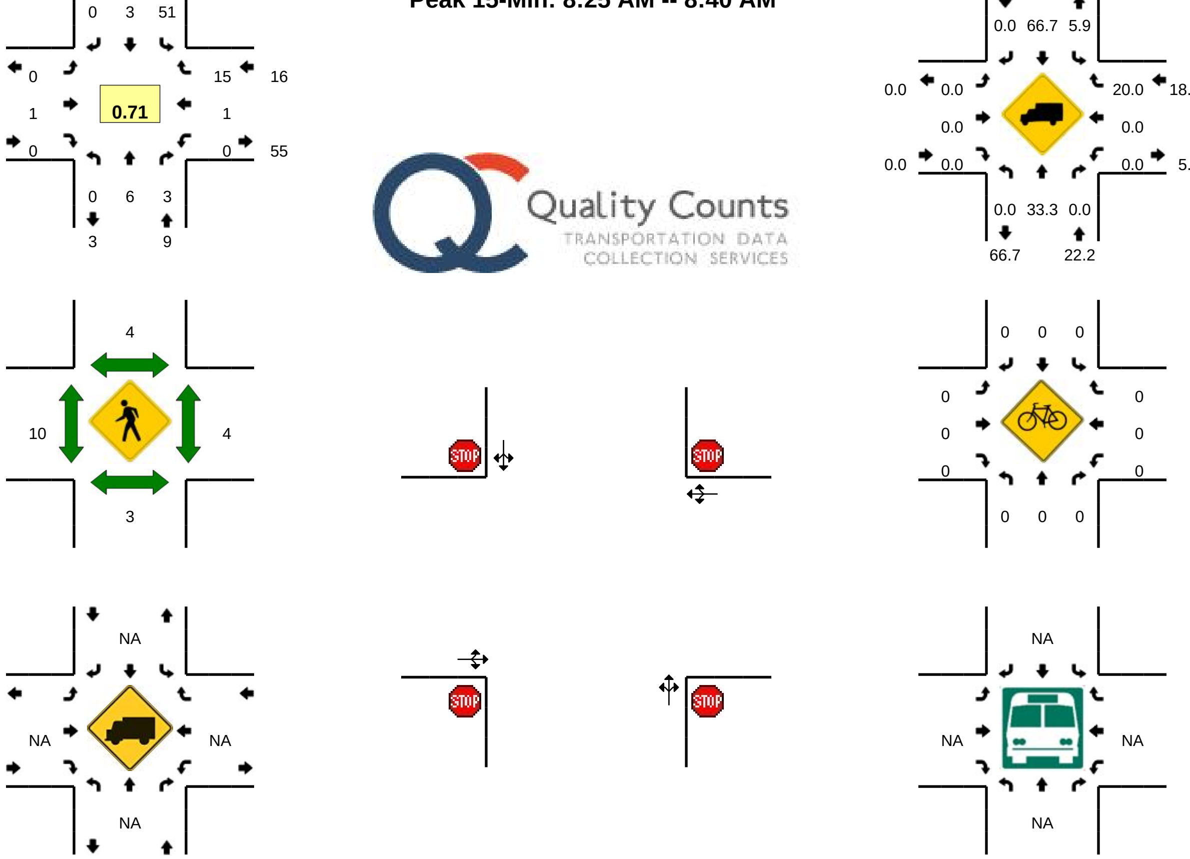
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	36	496	28	0	16	1056	24	0	32	4	44	0	20	0	4	0	1760
Heavy Trucks	4	20	4		0	20	0		8	0	4		0	0	0		60
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Type of peak hour being reported: Intersection Peak
Method for determining peak hour: Total Entering Volume

LOCATION: Upper Midhill Dr -- Arbor Dr
QC JOB #: 13939507
CITY/STATE: West Linn, OR
DATE: Thu, Oct 20 2016

Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 8:25 AM -- 8:40 AM



5-Min Count Period Beginning At	Upper Midhill Dr (Northbound) Left	Thru	Right	U	Upper Midhill Dr (Southbound) Left	Thru	Right	U	Arbor Dr (Eastbound) Left	Thru	Right	U	Arbor Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	5	
7:05 AM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	
7:10 AM	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4	
7:15 AM	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	5	
7:20 AM	0	0	1	0	4	0	0	0	0	0	0	0	0	0	1	0	6	
7:25 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	
7:30 AM	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	3	
7:35 AM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	4	
7:40 AM	0	0	1	0	7	1	0	0	0	0	0	0	0	0	0	0	9	
7:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
7:50 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	3	
7:55 AM	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	5	49
8:00 AM	0	2	0	0	5	1	0	0	0	0	0	0	0	0	2	0	10	54
8:05 AM	0	0	0	0	8	1	0	0	0	0	0	0	0	0	1	0	10	62
8:10 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	4	62
8:15 AM	0	0	0	0	4	0	0	0	0	1	0	0	0	0	2	0	7	64
8:20 AM	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	61
8:25 AM	0	1	0	0	5	0	0	0	0	0	0	0	0	0	2	0	8	67
8:30 AM	0	1	1	0	7	0	0	0	0	0	0	0	0	1	1	0	11	75
8:35 AM	0	0	1	0	4	0	0	0	0	0	0	0	0	0	4	0	9	80
8:40 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	72
8:45 AM	0	0	0	0	5	1	0	0	0	0	0	0	0	0	1	0	7	78
8:50 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	3	78
8:55 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	3	76

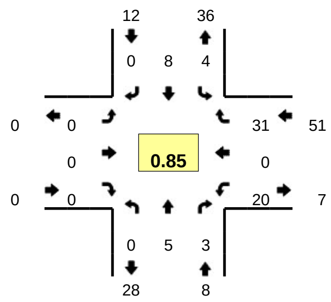
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	8	8	0	64	0	0	0	0	0	0	0	0	4	28	0	112
Heavy Trucks	0	0	0		12	0	0		0	0	0		0	0	4		16
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

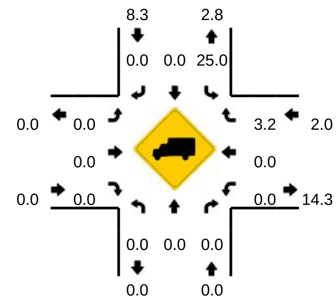
Comments:

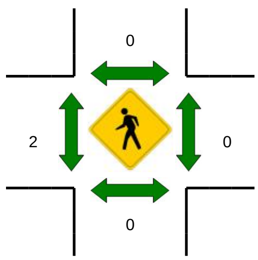
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

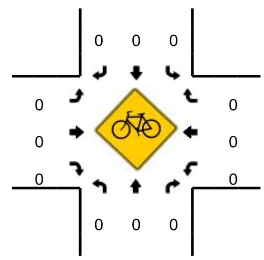
LOCATION: Upper Midhill Dr -- Arbor Dr | **QC JOB #:** 13939508
CITY/STATE: West Linn, OR | **DATE:** Thu, Oct 20 2016

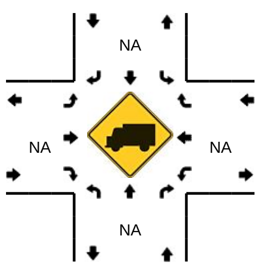
Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 4:35 PM -- 4:50 PM

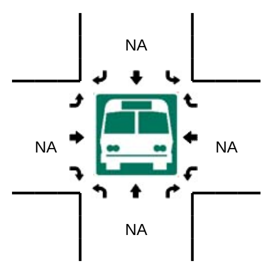












5-Min Count Period Beginning At	Upper Midhill Dr (Northbound) Left	Thru	Right	U	Upper Midhill Dr (Southbound) Left	Thru	Right	U	Arbor Dr (Eastbound) Left	Thru	Right	U	Arbor Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	3	
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	
4:10 PM	0	1	0	0	3	0	0	0	0	0	0	0	0	0	2	0	6	
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0	4	
4:20 PM	0	1	0	0	0	1	0	0	0	0	0	0	1	0	5	0	8	
4:25 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	3	
4:30 PM	0	1	0	0	2	1	0	0	0	0	0	0	1	0	3	0	8	
4:35 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	5	0	7	
4:40 PM	0	0	0	0	2	0	0	0	0	0	0	0	2	0	4	0	8	
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	4	0	1	0	6	
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	
4:55 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	3	0	5	64
5:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	2	0	3	0	6	67
5:05 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	4	0	6	70
5:10 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2	66
5:15 PM	0	1	0	0	0	2	0	0	0	0	0	0	2	0	2	0	7	69
5:20 PM	0	1	0	0	0	1	0	0	0	0	0	0	2	0	1	0	5	66
5:25 PM	0	1	0	0	1	0	0	0	0	0	0	0	2	0	1	0	5	68
5:30 PM	0	0	0	0	1	2	0	0	0	0	0	0	4	0	4	0	11	71
5:35 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	66
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	0	5	63
5:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	59
5:50 PM	0	1	0	0	2	0	0	0	0	0	0	0	2	0	5	0	10	66
5:55 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	5	66

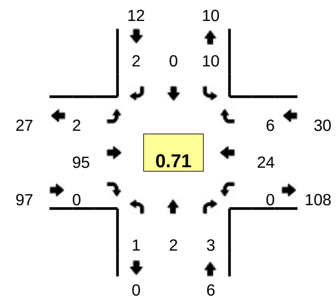
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	8	0	8	4	0	0	0	0	0	0	24	0	40	0	84
Heavy Trucks	0	0	0		4	0	0		0	0	0		0	0	0		4
Pedestrians		0				0				8				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

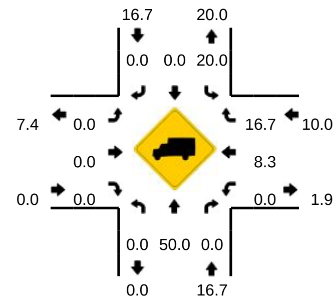
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

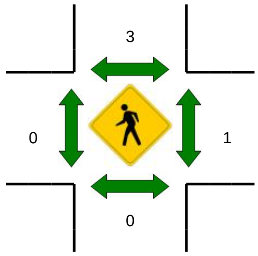
LOCATION: Upper Midhill Dr -- Marylhurst Dr | **QC JOB #:** 13939509

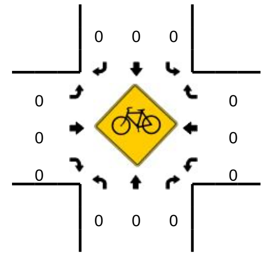
CITY/STATE: West Linn, OR | **DATE:** Thu, Oct 20 2016

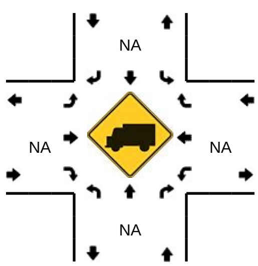


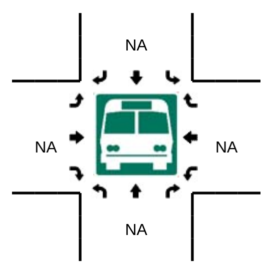
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 8:05 AM -- 8:20 AM











5-Min Count Period Beginning At	Upper Midhill Dr (Northbound) Left	Thru	Right	U	Upper Midhill Dr (Southbound) Left	Thru	Right	U	Marylhurst Dr (Eastbound) Left	Thru	Right	U	Marylhurst Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4	
7:05 AM	0	0	1	0	2	0	1	0	1	7	0	0	0	0	0	0	12	
7:10 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	4	
7:15 AM	0	0	0	0	3	0	0	0	0	8	0	0	0	1	0	0	12	
7:20 AM	0	0	0	0	0	0	0	0	1	10	0	0	0	1	0	0	12	
7:25 AM	0	0	1	0	0	0	0	0	0	6	0	0	0	0	0	0	7	
7:30 AM	0	0	1	0	0	0	0	0	0	7	0	0	0	2	1	0	11	
7:35 AM	0	0	1	0	1	0	1	0	0	8	0	0	0	2	1	0	14	
7:40 AM	0	0	0	0	2	0	0	0	0	6	0	0	0	3	0	0	11	
7:45 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	12	
7:50 AM	0	0	0	0	0	0	0	0	1	5	0	0	0	3	0	0	9	
7:55 AM	0	2	0	0	0	0	0	0	0	7	0	0	0	2	1	0	12	120
8:00 AM	0	0	0	0	1	0	0	0	0	1	0	0	0	2	1	0	5	121
8:05 AM	0	0	0	0	4	0	0	0	0	9	0	0	0	3	0	0	16	125
8:10 AM	0	0	1	0	0	0	0	0	1	17	0	0	0	2	0	0	21	142
8:15 AM	0	0	0	0	1	0	0	0	0	9	0	0	0	4	0	0	14	144
8:20 AM	0	0	0	0	1	0	0	0	0	10	0	0	0	0	0	0	11	143
8:25 AM	1	0	0	0	0	0	1	0	0	4	0	0	0	1	2	0	9	145
8:30 AM	0	0	0	0	2	0	0	0	0	2	0	0	0	2	0	0	6	140
8:35 AM	0	0	1	0	0	0	0	0	0	1	0	0	0	4	1	0	7	133
8:40 AM	0	0	0	0	1	0	0	0	0	1	0	0	0	5	2	0	9	131
8:45 AM	0	0	0	0	1	0	0	0	0	3	0	0	0	3	0	0	7	126
8:50 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	2	0	0	8	125
8:55 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0	0	9	122

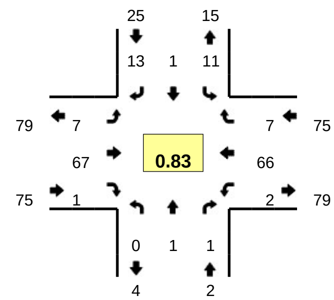
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	4	0	20	0	0	0	4	140	0	0	0	36	0	0	204
Heavy Trucks	0	0	0		8	0	0		0	0	0		0	0	0		8
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

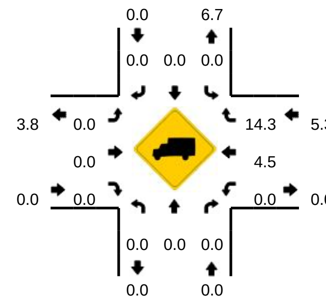
Comments:

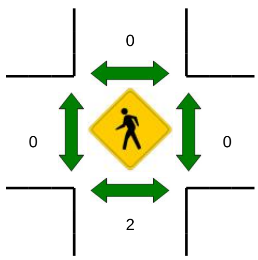
Type of peak hour being reported: Intersection Peak　　Method for determining peak hour: Total Entering Volume

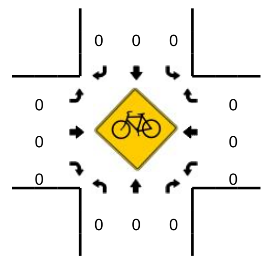
LOCATION: Upper Midhill Dr -- Marylhurst Dr　　**QC JOB #:** 13939510
CITY/STATE: West Linn, OR　　**DATE:** Thu, Oct 20 2016

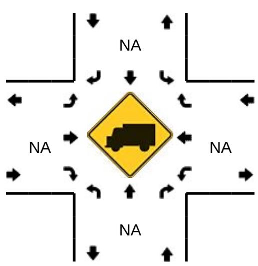
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

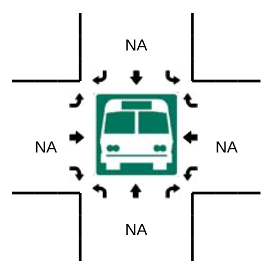












5-Min Count Period Beginning At	Upper Midhill Dr (Northbound)				Upper Midhill Dr (Southbound)				Marylhurst Dr (Eastbound)				Marylhurst Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	1	8	0	0	12	
4:05 PM	0	0	1	0	0	0	1	0	0	3	0	0	0	0	0	0	5	
4:10 PM	1	4	0	0	0	4	0	0	1	7	0	0	0	4	0	0	21	
4:15 PM	0	0	0	0	0	0	0	0	1	2	0	0	0	5	0	0	8	
4:20 PM	0	1	0	0	1	0	0	0	1	5	0	0	0	4	1	0	13	
4:25 PM	0	0	0	0	0	0	0	0	2	6	0	0	0	1	1	0	10	
4:30 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	3	1	0	7	
4:35 PM	0	0	0	0	0	0	0	0	0	6	0	0	1	4	0	0	11	
4:40 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	7	0	0	8	
4:45 PM	0	0	0	0	0	0	3	0	0	2	0	0	0	2	0	0	7	
4:50 PM	0	0	0	0	2	0	0	0	0	6	0	0	0	7	0	0	15	
4:55 PM	0	0	0	0	0	0	1	0	0	5	0	0	0	0	1	0	7	124
5:00 PM	0	0	0	0	2	0	1	0	2	11	0	0	0	12	1	0	29	141
5:05 PM	0	0	0	0	1	0	1	0	0	4	0	0	0	6	0	0	12	148
5:10 PM	0	0	0	0	1	0	1	0	1	4	0	0	0	4	1	0	12	139
5:15 PM	0	0	0	0	0	0	0	0	1	4	0	0	0	4	1	0	10	141
5:20 PM	0	0	0	0	1	0	2	0	0	6	0	0	0	4	2	0	15	143
5:25 PM	0	1	0	0	0	0	2	0	0	5	0	0	0	1	0	0	9	142
5:30 PM	0	0	0	0	1	0	3	0	0	8	0	0	0	10	0	0	22	157
5:35 PM	0	0	0	0	0	0	2	0	0	4	0	0	0	3	0	0	9	155
5:40 PM	0	0	0	0	0	0	0	0	0	9	0	0	0	3	2	0	14	161
5:45 PM	0	0	0	0	2	1	0	0	3	5	1	0	1	8	0	0	21	175
5:50 PM	0	0	1	0	1	0	1	0	0	1	0	0	1	5	0	0	10	170
5:55 PM	0	0	0	0	2	0	0	0	0	6	0	0	0	6	0	0	14	177

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	16	0	12	0	12	76	0	0	0	88	8	0	212
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Appendix B Description of Level of Service

DESCRIPTION OF LEVEL OF SERVICE

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from "A" to "F".1

Signalized Intersections

The six level-of-service grades are described qualitatively for signalized intersections in Table B1. Additionally, Table B2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service "D" is generally considered to represent the minimum acceptable design standard.

Table B1: Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

1 Most of the material in this appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2000).

Table B2: Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2000 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table B3. A quantitative definition of level of service for unsignalized intersections is presented in Table B4. Using this definition, Level of Service "E" is generally considered to represent the minimum acceptable design standard.

Table B3: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	• Many times there is more than one vehicle in queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. • There is almost always more than one vehicle in queue. • Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table B4: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

Appendix C Existing Traffic Conditions Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	5	1	0	3	1	1087	27	18	303	2
Future Volume (vph)	9	0	5	1	0	3	1	1087	27	18	303	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		0.99	1.00		1.00	1.00	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	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1795	1325		899	1587	1798	3471	1459	1702	3539	1565
Flt Permitted		1.00	1.00		1.00	1.00	0.56	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)		1889	1325		947	1587	1057	3471	1459	414	3539	1565
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	0	5	1	0	3	1	1144	28	19	319	2
RTOR Reduction (vph)	0	0	5	0	0	3	0	0	5	0	0	0
Lane Group Flow (vph)	0	9	0	0	1	0	1	1144	23	19	319	2
Confl. Peds. (#/hr)	5		3	3		5	4		5	5		4
Heavy Vehicles (%)	0%	0%	20%	100%	0%	0%	0%	4%	7%	6%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Effective Green, g (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.83	0.82	0.82	0.85	0.83	0.83
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		51	35		25	42	881	2835	1192	378	2930	1295
v/s Ratio Prot							0.00	c0.33		c0.00	0.09	
v/s Ratio Perm		c0.00	0.00		0.00	0.00	0.00		0.02	0.04		0.00
v/c Ratio		0.18	0.00		0.04	0.00	0.00	0.40	0.02	0.05	0.11	0.00
Uniform Delay, d1		47.6	47.3		47.4	47.3	1.5	2.5	1.7	1.3	1.6	1.5
Progression Factor		1.00	1.00		1.00	1.00	0.39	0.22	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2	0.0		0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Delay (s)		48.8	47.4		47.9	47.4	0.6	0.9	1.7	1.4	1.7	1.5
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		48.3			47.5			0.9			1.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	17	6	0	9	2	1076	2	1	304	4
Future Volume (Veh/h)	30	0	17	6	0	9	2	1076	2	1	304	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	32	0	18	6	0	10	2	1157	2	1	327	4
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27		0.27	0.27	0.27				0.27		
vC, conflicting volume	1507	1498	332	1512	1499	1160	334			1160		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1526	1493	332	1544	1496	245	334			245		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	0	100	97	68	100	95	100			100		
cM capacity (veh/h)	25	33	713	19	33	216	998			361		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	50	16	1161	332
Volume Left	32	6	2	1
Volume Right	18	10	2	4
cSH	38	44	998	361
Volume to Capacity	1.33	0.36	0.00	0.00
Queue Length 95th (ft)	129	31	0	0
Control Delay (s)	426.0	126.7	0.1	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	426.0	126.7	0.1	0.1
Approach LOS	F	F		

Intersection Summary			
Average Delay	15.0		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	4	56	14	2	7	12	1027	33	5	333	6
Future Volume (vph)	40	4	56	14	2	7	12	1027	33	5	333	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.92			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695			1766		1805	1817		1805	1841	
Flt Permitted		0.86			0.68		0.55	1.00		0.17	1.00	
Satd. Flow (perm)		1486			1232		1043	1817		324	1841	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	4	58	14	2	7	12	1059	34	5	343	6
RTOR Reduction (vph)	0	54	0	0	6	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	49	0	0	17	0	12	1092	0	5	349	0
Confl. Peds. (#/hr)			1	1					3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	3%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		7.4			7.4		78.6	77.6		78.6	77.6	
Effective Green, g (s)		7.4			7.4		78.6	77.6		78.6	77.6	
Actuated g/C Ratio		0.07			0.07		0.79	0.78		0.79	0.78	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		109			91		827	1409		269	1428	
v/s Ratio Prot							0.00	c0.60		c0.00	0.19	
v/s Ratio Perm		c0.03			0.01		0.01			0.01		
v/c Ratio		0.45			0.18		0.01	0.78		0.02	0.24	
Uniform Delay, d1		44.4			43.5		2.3	6.3		6.7	3.1	
Progression Factor		1.00			1.00		1.00	1.00		2.31	1.88	
Incremental Delay, d2		2.2			0.7		0.0	4.2		0.0	0.4	
Delay (s)		46.5			44.2		2.3	10.5		15.5	6.2	
Level of Service		D			D		A	B		B	A	
Approach Delay (s)		46.5			44.2			10.4			6.3	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	3	2	2	38	4
Future Volume (vph)	0	3	2	2	38	4
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	0	4	3	3	49	5

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	4	6	54
Volume Left (vph)	0	0	49
Volume Right (vph)	4	3	0
Hadj (s)	-0.04	-0.30	0.18
Departure Headway (s)	4.0	3.7	4.1
Degree Utilization, x	0.00	0.01	0.06
Capacity (veh/h)	883	976	873
Control Delay (s)	7.0	6.7	7.4
Approach Delay (s)	7.0	6.7	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	82	0	0	15	4	0	2	4	8	0	2
Future Volume (Veh/h)	3	82	0	0	15	4	0	2	4	8	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	4	101	0	0	19	5	0	2	5	10	0	2
Pedestrians					1						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	26			101			132	135	102	140	132	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			101			132	135	102	140	132	24
tC, single (s)	4.1			4.1			7.1	7.0	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.5	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	99	100	100
cM capacity (veh/h)	1599			1504			840	673	958	824	759	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	105	24	7	12
Volume Left	4	0	0	10
Volume Right	0	5	5	2
cSH	1599	1504	854	856
Volume to Capacity	0.00	0.00	0.01	0.01
Queue Length 95th (ft)	0	0	1	1
Control Delay (s)	0.3	0.0	9.2	9.3
Lane LOS	A		A	A
Approach Delay (s)	0.3	0.0	9.2	9.3
Approach LOS			A	A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	9	50	0	44	12	477	19	20	1079	8
Future Volume (vph)	4	0	9	50	0	44	12	477	19	20	1079	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00	1.00	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	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1442	1592		1765	1594	1671	3505	1568	1802	3539	1578
Flt Permitted		0.72	1.00		0.76	1.00	0.21	1.00	1.00	0.46	1.00	1.00
Satd. Flow (perm)		1094	1592		1403	1594	373	3505	1568	863	3539	1578
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	0	10	56	0	49	13	530	21	22	1199	9
RTOR Reduction (vph)	0	0	9	0	0	45	0	0	5	0	0	2
Lane Group Flow (vph)	0	4	1	0	56	4	13	530	16	22	1199	7
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Heavy Vehicles (%)	25%	0%	0%	2%	0%	0%	8%	3%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Effective Green, g (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.80	0.78	0.78	0.80	0.78	0.78
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		82	120		105	120	323	2743	1227	709	2770	1235
v/s Ratio Prot							c0.00	0.15		0.00	c0.34	
v/s Ratio Perm		0.00	0.00		c0.04	0.00	0.03		0.01	0.02		0.00
v/c Ratio		0.05	0.01		0.53	0.03	0.04	0.19	0.01	0.03	0.43	0.01
Uniform Delay, d1		47.2	47.0		49.0	47.1	2.5	3.1	2.6	2.2	3.9	2.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.0		4.0	0.1	0.0	0.2	0.0	0.0	0.2	0.0
Delay (s)		47.4	47.1		53.0	47.2	2.5	3.2	2.6	2.2	4.1	2.6
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		47.1			50.3			3.2			4.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	6	3	0	4	11	503	9	11	1087	40
Future Volume (Veh/h)	2	0	6	3	0	4	11	503	9	11	1087	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	7	3	0	4	12	547	10	12	1182	43
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1808	1812	1204	1814	1828	555	1225			560		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1986	2001	198	2012	2063	474	288			479		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	83	100	96	72	100	99	96			99		
cM capacity (veh/h)	12	15	183	11	14	502	292			1005		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	7	569	1237
Volume Left	2	3	12	12
Volume Right	7	4	10	43
cSH	43	25	292	1005
Volume to Capacity	0.21	0.28	0.04	0.01
Queue Length 95th (ft)	17	21	3	1
Control Delay (s)	109.5	201.8	1.4	0.4
Lane LOS	F	F	A	A
Approach Delay (s)	109.5	201.8	1.4	0.4
Approach LOS	F	F		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1	43	36	1	9	50	506	19	10	1035	23
Future Volume (vph)	21	1	43	36	1	9	50	506	19	10	1035	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.97		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1598			1740		1770	1848		1801	1857	
Flt Permitted		0.91			0.75		0.14	1.00		0.45	1.00	
Satd. Flow (perm)		1477			1356		259	1848		858	1857	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	22	1	45	38	1	9	52	527	20	10	1078	24
RTOR Reduction (vph)	0	42	0	0	8	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	26	0	0	40	0	52	546	0	10	1101	0
Confl. Peds. (#/hr)									4	4		
Heavy Vehicles (%)	10%	0%	5%	3%	0%	0%	2%	2%	5%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		6.9			6.9		82.5	78.1		75.7	74.7	
Effective Green, g (s)		6.9			6.9		82.5	78.1		75.7	74.7	
Actuated g/C Ratio		0.07			0.07		0.82	0.78		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		101			93		280	1443		658	1387	
v/s Ratio Prot							c0.01	c0.30		0.00	c0.59	
v/s Ratio Perm		0.02			c0.03		0.14			0.01		
v/c Ratio		0.26			0.43		0.19	0.38		0.02	0.79	
Uniform Delay, d1		44.1			44.7		9.8	3.4		3.0	7.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			2.3		0.2	0.8		0.0	4.8	
Delay (s)		45.1			46.9		10.0	4.2		3.0	12.6	
Level of Service		D			D		A	A		A	B	
Approach Delay (s)		45.1			46.9			4.7			12.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	13	35	4	3	5	6
Future Volume (vph)	13	35	4	3	5	6
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	18	49	6	4	7	8

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	67	10	15
Volume Left (vph)	18	0	7
Volume Right (vph)	49	4	0
Hadj (s)	-0.35	0.27	0.55
Departure Headway (s)	3.6	4.3	4.6
Degree Utilization, x	0.07	0.01	0.02
Capacity (veh/h)	983	809	768
Control Delay (s)	6.9	7.4	7.7
Approach Delay (s)	6.9	7.4	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	7.1		
Level of Service	A		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	54	0	1	55	6	0	1	0	7	0	8
Future Volume (Veh/h)	7	54	0	1	55	6	0	1	0	7	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	11	82	0	2	83	9	0	2	0	11	0	12
Pedestrians								1			1	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	93			83			208	202	83	198	198	88
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			83			208	202	83	198	198	88
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1513			1526			738	691	981	757	695	974

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	93	94	2	23
Volume Left	11	2	0	11
Volume Right	0	9	0	12
cSH	1513	1526	691	857
Volume to Capacity	0.01	0.00	0.00	0.03
Queue Length 95th (ft)	1	0	0	2
Control Delay (s)	0.9	0.2	10.2	9.3
Lane LOS	A	A	B	A
Approach Delay (s)	0.9	0.2	10.2	9.3
Approach LOS			B	A

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D Crash Data

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

OR 43 Oswego Highway (Hwy 003) (aka State St) & Marylbrook Drive
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
REAR-END	0	1	0	1	0	1	0	0	1	1	0	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2014 TOTAL	0	2	0	2	0	3	0	1	1	2	0	2	0	0
YEAR: 2012														
PEDESTRIAN	0	1	0	1	0	1	0	1	0	1	0	1	0	0
REAR-END	0	1	0	1	0	3	0	0	1	1	0	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	0	1	1	0	0
2012 TOTAL	0	3	0	3	0	6	0	2	1	2	1	3	0	0
FINAL TOTAL	0	5	0	5	0	9	0	3	2	4	1	5	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CONTINUOUS SYSTEM CRASH LISTING

003 OSWEGO

OR 43 Oswego Highway (Hwy 003) (aka State St) & Marylbrook Drive

January 1, 2010 through December 31, 2014

```
      S  D
      P   R S W                                RD#  FC   CONN #                          INT-TYP                                          SPCL USE
SER#  E A U C O  DATE          COUNTY          CMPT/MLG  FIRST  STREET          RD CHAR (MEDIAN)  INT-REL  OFFRD WTHR  CRASH TYP       TRLR QTY  MOVE                          A  S
INVEST E L G H R DAY/TIME      CITY            MILEPNT   SECOND STREET          DIRECT    LEGS    TRAF-    RNDBT SURF  COLL TYP        OWNER     FROM          PRTC  INJ     G  E  LICNS PED
UNLOC? D C S L K LAT/LONG      URBAN AREA      LRS       INTERSECTION SEQ#      LOCTN   (#LANES)  CNTL     DRVWY LIGHT SVRTY        V# VEH TYPE  TO         P# TYPE  SVRTY  E  X  RES   LOC  ERROR           ACTN EVENT         CAUSE

04841  N N N     12/15/2012  CLACKAMAS        1   14                            INTER     CROSS   N            N RAIN  S-1STOP     01 NONE    0 STRGHT                                                                  07
NONE           Sat    2P     LAKE OSWEGO      MN   0   MARYLBROOK DR            SE                TRF SIGNAL   N WET   REAR           PRVTE     SE NW                                               000                00
                             PORTLAND UA       7.91    STATE ST                 06          0                  N DAY   INJ            PSNGR CAR          01 DRVR NONE  65 M OR-Y        026           000                07
No     45 23 50.62  -122 39  9.31             000300100S00              1                                                                                               OR<25

                                                                                                                                   02 NONE    0 STOP
                                                                                                                                      PRVTE     SE NW                                               011                00
                                                                                                                                      PSNGR CAR          01 DRVR NONE  71 M OR-Y        000           000                00
                                                                                                                                                                            OR<25
                                                                                                                                                         02 PSNG INJC  58 F             000           000                00
                                                                                                                                                         03 PSNG INJC  14 F             000           000                00
                                                                                                                                                         04 PSNG INJC  22 F             000           000                00

04573  N N N N N 11/26/2012  CLACKAMAS        1   14                            INTER     3-LEG   N            N CLR   PED         01 NONE    0 TURN-L                                                                  02
CITY           Mon    7A     LAKE OSWEGO      MN   0   MARYLBROOK DR            NW                TRF SIGNAL   N DRY   PED            PRVTE     SW NW                                               000                00
                             PORTLAND UA       7.91    STATE ST                 05          0                  N DAY   INJ            PSNGR CAR          01 DRVR NONE  24 F OTH-Y       029           000                02
No     45 23 50.62  -122 39  9.31             000300100S00              1                                                                                               N-RES
                                                                                                                                                STRGHT   01 PED  INJB  72 M        01  000           035                00
                                                                                                                                                SW NE

00978  N N N N N 03/10/2014  CLACKAMAS        1   14                            INTER     CROSS   N            N RAIN  S-1STOP     01 NONE    0 STRGHT                                                       093        27
CITY           Mon    4P     LAKE OSWEGO      MN   0   MARYLBROOK DR            NW                TRF SIGNAL   N WET   REAR           PRVTE     NW SE                                               000                00
                             PORTLAND UA       7.91    STATE ST                 06          0                  N DAY   INJ            PSNGR CAR          01 DRVR INJC  17 M OR-Y        016,026       038  093           27
No     45 23 50.62  -122 39  9.31             000300100S00              1                                                                                               OR<25

                                                                                                                                   02 NONE    0 STOP
                                                                                                                                      PRVTE     NW SE                                               011                00
                                                                                                                                      PSNGR CAR          01 DRVR NONE  27 F OR-Y        000           000                00
                                                                                                                                                                            OR<25

03767  N N N N N 10/10/2012  CLACKAMAS        1   14                            INTER     CROSS   N            N CLR   ANGL-OTH    01 NONE    0 STRGHT                                                                  02
CITY           Wed    8P     LAKE OSWEGO      MN   0   MARYLBROOK DR            CN                TRF SIGNAL   N DRY   TURN           PRVTE     SE NW                                               000                00
                             PORTLAND UA       7.91    STATE ST                 02          0                  N DLIT  INJ            PSNGR CAR          01 DRVR INJC  81 F OR-Y        000           000                00
No     45 23 50.62  -122 39  9.31             000300100S00              1                                                                                               OR<25
                                                                                                                                                         02 PSNG INJC  90 F             000           000                00

                                                                                                                                   02 NONE    0 TURN-R
                                                                                                                                      PRVTE     NE NW                                               016                00
                                                                                                                                      PSNGR CAR          01 DRVR NONE  64 M OR-Y        028           000                02
                                                                                                                                                                            OR<25

02232  N N N N N 06/10/2014  CLACKAMAS        1   14                            INTER     CROSS   N            N CLR   O-1 L-TURN  01 NONE    0 TURN-L                                                                  02
CITY           Tue    7A     LAKE OSWEGO      MN   0   MARYLBROOK DR            CN                TRF SIGNAL   N DRY   TURN           PRVTE     NW NE                                               000                00
                             PORTLAND UA       7.91    STATE ST                 04          0                  N DAY   INJ            PSNGR CAR          01 DRVR INJB  70 M OR-Y        028,004       000                02
No     45 23 50.62  -122 39  9.31             000300100S00              1                                                                                               OR<25

                                                                                                                                   02 NONE    0 STRGHT
                                                                                                                                      PRVTE     SE NW                                               000                00
                                                                                                                                      PSNGR CAR          01 DRVR INJC  65 F OR-Y        000           000                00
                                                                                                                                                                            OR<25
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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

OR 43 Oswego Highway (Hwy 003) (aka Willamette Dr) & Arbor Drive
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
REAR-END	0	2	0	2	0	2	0	1	1	2	0	2	0	0
2014 TOTAL	0	2	0	2	0	2	0	1	1	2	0	2	0	0
YEAR: 2013														
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2013 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR: 2012														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2012 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR: 2011														
REAR-END	0	1	0	1	0	3	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	2	0	2	0	2	0	0	2	2	0	2	0	0
2011 TOTAL	0	3	0	3	0	5	0	1	2	3	0	3	0	0
YEAR: 2010														
REAR-END	0	2	0	2	0	2	0	2	0	2	0	2	0	0
2010 TOTAL	0	2	0	2	0	2	0	2	0	2	0	2	0	0
FINAL TOTAL	0	7	2	9	0	9	0	6	3	9	0	9	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

003 OSWEGO
OR 43 Oswego Highway (Hwy 003) (aka Willamette Dr) & Arbor Drive
January 1, 2010 through December 31, 2014

SER# / INVEST / UNLOC?	S P E D / D R A L C U G S C H L O R K S W	DATE / DAY/TIME / LAT/LONG	COUNTY / CITY / URBAN AREA	RD# FC / CMPT/MLG / MILEPNT / LRS	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
01365	N N N N N	04/25/2010	CLACKAMAS	1 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
CITY		Sun 2P	WEST LINN	MN 0	ARBOR DR	SE		STOP SIGN	N	DRY	REAR		PRVTE	SE NW									000		00
			PORTLAND UA	8.07	WILLAMETTE DR	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	17	F	OR-Y		026	000		07
No		45 23 43.37 -122 39 1.39		000300100S00	1															OR<25					
												02	NONE 0	STOP											
													PRVTE	SE NW									012		00
													PSNGR CAR		01	DRVR	INJC	56	F	OR-Y		000	000		00
																				OR<25					
03239	N N N	09/10/2010	CLACKAMAS	1 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											27,07
CITY		Fri 12P	WEST LINN	MN 0	ARBOR DR	SE		STOP SIGN	N	DRY	REAR		PRVTE	SE NW									000		00
			PORTLAND UA	8.07	WILLAMETTE DR	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	20	F	OR-Y		016,026	000		27,07
No		45 23 43.71 -122 39 1.78		000300100S00	1															OR<25					
												02	NONE 0	STOP											
													PRVTE	SE NW									012		00
													PSNGR CAR		01	DRVR	INJC	76	F	OR-Y		000	000		00
																				OR<25					
03242	N N N N N	09/02/2011	CLACKAMAS	1 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	32,27
CITY		Fri 4P	WEST LINN	MN 0	ARBOR DR	SE		STOP SIGN	N	DRY	REAR		PRVTE	SE NW									000		00
			PORTLAND UA	8.07	WILLAMETTE DR	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	19	M	OR-Y		052,016,026	000		32,27
No		45 23 43.71 -122 39 1.78		000300100S00	1															OR<25					
												02	NONE 0	STOP											
													PRVTE	SE NW									011	013	00
													PSNGR CAR		01	DRVR	INJC	51	F	OR-Y		000	000		00
																				OR<25					
												03	POLCE 0	STOP											
													PUBLC	SE NW									012		00
													PSNGR CAR		01	DRVR	INJC	33	M	OR-Y		000	000		00
																				OR<25					
03374	N N N	09/11/2012	CLACKAMAS	1 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07
CITY		Tue 6P	WEST LINN	MN 0	ARBOR DR	SE		STOP SIGN	N	DRY	REAR		PRVTE	SE NW									000		00
			PORTLAND UA	8.07	WILLAMETTE DR	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	23	M	SUSP		043,026	000		07
No		45 23 43.71 -122 39 1.78		000300100S00	1															OR<25					
												02	NONE 0	STOP											
													PRVTE	SE NW									011	013	00
													PSNGR CAR		01	DRVR	NONE	41	M	OR-Y		000	000		00
																				OR<25					
												03	NONE 0	STOP											
													PRVTE	SE NW									022		00
													PSNGR CAR		01	DRVR	NONE	45	M	OR-Y		000	000		00
																				OR<25					

003 OSWEGO

OR 43 Oswego Highway (Hwy 003) (aka Willamette Dr) & Arbor Drive
January 1, 2010 through December 31, 2014

```
      S  D
      P   R S W                                RD#  FC   CONN #                      INT-TYP                                        SPCL USE
SER#   E A U C O  DATE        COUNTY           CMPT/MLG  FIRST  STREET      RD CHAR (MEDIAN)  INT-REL  OFFRD WTHR  CRASH TYP   TRLR QTY  MOVE                      A  S
INVEST E L G H R  DAY/TIME    CITY             MILEPNT   SECOND STREET      DIRECT    LEGS    TRAF-    RNDBT SURF  COLL TYP    OWNER     FROM      PRTC INJ      G  E  LICNS PED
UNLOC? D C S L K  LAT/LONG    URBAN AREA       LRS       INTERSECTION SEQ#  LOCTN   (#LANES)  CNTL     DRVWY LIGHT SVRTY   V# VEH TYPE  TO    P# TYPE SVRTY  E  X  RES   LOC ERROR          ACTN EVENT      CAUSE

00938  N N N N N 03/06/2014  CLACKAMAS       1    14                       INTER      CROSS  N          N CLD   S-1STOP   01 NONE   0 STRGHT                                                     013        07
CITY             Thu   10A  WEST LINN       MN    0   ARBOR DR           SE                UNKNOWN    N WET   REAR         PRVTE     SE NW                                              000              00
                            PORTLAND UA      8.07    WILLAMETTE DR       06          0                N DAY   INJ         PSNGR CAR        01 DRVR NONE  24  M  OR-Y       043,026      000              07
No      45 23 43.71  -122 39  1.78          000300100S00            1                                                                                   OR<25

                                                                                                                      02 NONE   0 STOP
                                                                                                                         PRVTE     SE NW                                              011  013         00
                                                                                                                        PSNGR CAR        01 DRVR NONE  21  M  OR-Y       000          000              00
                                                                                                                                                             OR<25

                                                                                                                      03 NONE   0 STOP
                                                                                                                         PRVTE     SE NW                                              022              00
                                                                                                                        PSNGR CAR        01 DRVR INJC  23  F  OR-Y       000          000              00
                                                                                                                                                             OR<25

00991  Y N N N N 03/11/2014  CLACKAMAS       1    14                       INTER      CROSS  N          N CLR   S-1STOP   01 NONE   0 STRGHT                                                     013        32,01
CITY             Tue    6P  WEST LINN       MN    0   ARBOR DR           SE                UNKNOWN    N DRY   REAR         PRVTE     SE NW                                              000              00
                            PORTLAND UA      8.07    WILLAMETTE DR       06          0                N DAY   INJ         PSNGR CAR        01 DRVR NONE  20  M  OR-Y       052,047,026  000              32,01
No      45 23 43.71  -122 39  1.78          000300100S00            1                                                                                   OR<25

                                                                                                                      02 NONE   0 STOP
                                                                                                                         PRVTE     SE NW                                              011  013         00
                                                                                                                        PSNGR CAR        01 DRVR INJC  25  F  OR-Y       000          000              00
                                                                                                                                                             OR<25

                                                                                                                      03 NONE   0 STOP
                                                                                                                         PRVTE     SE NW                                              022              00
                                                                                                                        PSNGR CAR        01 DRVR NONE  43  M  OR-Y       000          000              00
                                                                                                                                                             OR<25

00637  Y N N     02/23/2011  CLACKAMAS       1    14                       INTER      CROSS  N          N SNOW  ANGL-OTH  01 NONE   0 TURN-R                                                     124        01,08
NONE             Wed    2P  WEST LINN       MN    0   ARBOR DR           SW                UNKNOWN    N ICE   TURN         PRVTE     NW SW                                              000  124         00
                            PORTLAND UA      8.07    WILLAMETTE DR       06          0                N DAY   INJ         PSNGR CAR        01 DRVR NONE  22  F  OR-Y       047,001      000              01,08
No      45 23 43.71  -122 39  1.78          000300100S00            1                                                                                   OR<25

                                                                                                                      02 NONE   0 STOP
                                                                                                                         PRVTE     SW NE                                              011              00
                                                                                                                        PSNGR CAR        01 DRVR INJC  62  M  OR-Y       000          000              00
                                                                                                                                                             OR<25

01551  N N N N N 05/06/2011  CLACKAMAS       1    14                       INTER      CROSS  N          N RAIN  ANGL-OTH  01 NONE   0 STRGHT                                                                02
CITY             Fri    5P  WEST LINN       MN    0   ARBOR DR           CN                STOP SIGN  N WET   TURN         PRVTE     SE NW                                              000              00
                            PORTLAND UA      8.07    WILLAMETTE DR       02          0                N DAY   INJ         PSNGR CAR        01 DRVR NONE  25  M  OR-Y       000          000              00
No      45 23 43.71  -122 39  1.78          000300100S00            1                                                                                   OR<25

                                                                                                                      02 NONE   0 TURN-L
                                                                                                                         PRVTE     NE SE                                              015              00
                                                                                                                        PSNGR CAR        01 DRVR INJB  18  F  NONE       028          000              02
                                                                                                                                                             OR<25
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TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

003 OSWEGO

OR 43 Oswego Highway (Hwy 003) (aka Willamette Dr) & Arbor Drive
January 1, 2010 through December 31, 2014

SER# / INVEST / UNLOC?	S P E E D	A L C	D R U G S	S C H L	W O R K	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# FC / CMPT/MLG / MILEPNT / LRS	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS / RES	PED LOC	ERROR	ACTN EVENT	CAUSE
00682	N	N	N			02/26/2013	CLACKAMAS	1 14		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
COUNTY						Tue 7A	WEST LINN	MN 0	ARBOR DR	CN		STOP SIGN	N	DRY	TURN		PRVTE	NW SE									000	00
							PORTLAND UA	8.07	WILLAMETTE DR	03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	24	F	OR-Y		000	000	00
No						*45 23 42.34 -122 39 0.22*		000300100S00	1															OR<25				
																02	NONE 0	TURN-L										
																	UNKN	SW NW									015	00
																	PSNGR CAR		01	DRVR	NONE	00	U	UNK		028	000	02
																								UNK				

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

OR 43 Oswego Highway (Hwy 003) (aka Willamette Dr) & Marylhurst Drive / Lazy River Drive
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
REAR-END	0	2	0	2	0	2	0	1	1	2	0	2	0	0
2014 TOTAL	0	2	0	2	0	2	0	1	1	2	0	2	0	0
YEAR: 2012														
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	1	0	1	0	0
2012 TOTAL	0	0	1	1	0	0	0	0	1	1	0	1	0	0
YEAR: 2010														
REAR-END	0	2	0	2	0	3	0	1	1	2	0	2	0	0
2010 TOTAL	0	2	0	2	0	3	0	1	1	2	0	2	0	0
FINAL TOTAL	0	4	1	5	0	5	0	2	3	5	0	5	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

003 OSWEGO   OR 43 Oswego Highway (Hwy 003) (aka Willamette Dr) & Marylhurst Drive / Lazy River Drive
January 1, 2010 through December 31, 2014

```
      S  D
      P  R S W                                   RD#  FC   CONN #                     INT-TYP                                       SPCL USE
SER#  E A U C O DATE       COUNTY                CMPT/MLG FIRST  STREET       RD CHAR (MEDIAN)  INT-REL OFFRD WTHR  CRASH TYP     TRLR QTY  MOVE                        A  S
INVEST E L G H R DAY/TIME  CITY                  MILEPNT  SECOND STREET       DIRECT    LEGS    TRAF-   RNDBT SURF  COLL TYP      OWNER     FROM       PRTC  INJ      G  E  LICNS PED
UNLOC? D C S L K LAT/LONG  URBAN AREA            LRS      INTERSECTION SEQ#   LOCTN   (#LANES) CNTL    DRVWY LIGHT SVRTY     V# VEH TYPE  TO     P# TYPE  SVRTY    E  X  RES   LOC ERROR        ACTN EVENT      CAUSE

01333  N N N N N 04/21/2010 CLACKAMAS            1    14                      INTER     CROSS  N          N CLR  S-1STOP    01 NONE   0 STRGHT                                                                07
CITY             Wed    8A  WEST LINN            MN    0   LAZY RIVER DR      SE               TRF SIGNAL N DRY  REAR          PRVTE     SE NW                                                  001            00
                            PORTLAND UA           8.43   WILLAMETTE DR      06          0                 N DAY  INJ          PSNGR CAR        01 DRVR INJB  55 F OR-Y      043,026      000            07
No      45 23 30.18  -122 38 46.89               000300100S00             1                                                                                      OR<25

                                                                                                                           02 NONE   0 STOP
                                                                                                                              PRVTE     SE NW                                                  011            00
                                                                                                                              PSNGR CAR        01 DRVR NONE  41 M OR-Y      000          000            00
                                                                                                                                                                 OR<25

01650  N N N N N 05/17/2010 CLACKAMAS            1    14                      INTER     CROSS  N          N RAIN S-1STOP    01 NONE   0 STRGHT                                                      013       27,07
CITY             Mon    4P  WEST LINN            MN    0   LAZY RIVER DR      SE               TRF SIGNAL N WET  REAR          PRVTE     SE NW                                                  000            00
                            PORTLAND UA           8.43   WILLAMETTE DR      06          0                 N DAY  INJ          PSNGR CAR        01 DRVR NONE  21 M OR-Y      016,043,026  000            27,07
No      45 23 30.18  -122 38 46.89               000300100S00             1                                                                                      OR<25

                                                                                                                           02 NONE   0 STOP
                                                                                                                              PRVTE     SE NW                                                  011  013       00
                                                                                                                              PSNGR CAR        01 DRVR INJC  64 M OR-Y      000          000            00
                                                                                                                                                                 OR<25

                                                                                                                           03 NONE   0 STOP
                                                                                                                              PRVTE     SE NW                                                  022            00
                                                                                                                              PSNGR CAR        01 DRVR INJC  53 F OR-Y      000          000            00
                                                                                                                                                                 OR<25

00989  N N N     03/11/2014 CLACKAMAS            1    14                      INTER     CROSS  N          N CLR  S-1STOP    01 NONE   0 STRGHT                                                      115       27,07
NONE             Tue    5P  WEST LINN            MN    0   MARYLHURST DR      SE               TRF SIGNAL N DRY  REAR          PRVTE     SE NW                                                  000            00
                            PORTLAND UA           8.43   WILLAMETTE DR      06          0                 N DAY  INJ          PSNGR CAR        01 DRVR INJC  16 F OR-Y      016,026      038  115       27,07
No      45 23 30.18  -122 38 46.89               000300100S00             1                                                                                      OR<25

                                                                                                                           02 NONE   0 STOP
                                                                                                                              PRVTE     SE NW                                                  011            00
                                                                                                                              PSNGR CAR        01 DRVR NONE  32 F OTH-Y     000          000            00
                                                                                                                                                                 N-RES

04724  N N N     11/21/2014 CLACKAMAS            1    14                      INTER     CROSS  N          N RAIN S-1STOP    01 NONE   0 STRGHT                                                                29
NO RPT           Fri    3P  WEST LINN            MN    0   MARYLHURST DR      NW               TRF SIGNAL N WET  REAR          PRVTE     NW SE                                                  000            00
                            PORTLAND UA           8.43   WILLAMETTE DR      06          0                 N DAY  INJ          PSNGR CAR        01 DRVR NONE  34 M OR-Y      026          000            29
No      45 23 30.18  -122 38 46.89               000300100S00             1                                                                                      OR<25

                                                                                                                           02 NONE   0 STOP
                                                                                                                              PRVTE     NW SE                                                  011            00
                                                                                                                              PSNGR CAR        01 DRVR INJC  62 M OR-Y      000          000            00
                                                                                                                                                                 OR<25

04783  N N N     12/10/2012 CLACKAMAS            1    14                      INTER     CROSS  N          N UNK  O-1 L-TURN 01 NONE   0 TURN-L                                                                02
NONE             Mon   10A  WEST LINN            MN    0   LAZY RIVER DR      CN               TRF SIGNAL N WET  TURN          UNKN      NW NE                                                  000            00
                            PORTLAND UA           8.43   WILLAMETTE DR      04          0                 N DAY  PDO          UNKNOWN          01 DRVR NONE  00 F UNK       028,004      000            02
No      45 23 30.18  -122 38 46.89               000300100S00             1                                                                                      UNK
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003 OSWEGO OR 43 Oswego Highway (Hwy 003) (aka Willamette Dr) & Marylhurst Drive / Lazy River Drive
January 1, 2010 through December 31, 2014

SER# INVEST UNLOC?	S P E E D	A L C	D R U G S	S C H L	W O R K	DATE DAY/TIME *LAT/LONG*	COUNTY CITY URBAN AREA	RD# FC CMPT/MLG MILEPNT LRS	CONN # FIRST STREET SECOND STREET INTERSECTION SEQ#	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CNTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
																02	NONE 0	STRGHT										
																	PRVTE	SE NW									000	00
																	PSNGR CAR		01	DRVR	NONE	59	F	OTH-Y N-RES		000	000	00

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Upper Midhill Drive & Arbor Drive
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Upper Midhill Drive & Marylhurst Drive
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED OR DISABLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP A VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
046	W/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. WITH TRAFFIC
047	A/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. FACING TRAFFIC
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF ROAD
052	MERGING	MERGING
055	SPRAY	BLINDED BY WATER SPRAY
088	OTHER	OTHER ACTION

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED RO
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST NOT VISIBLE; NON-REFLECTIVE CLOTHIN
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1 L-TURN	FROM OPPOSITE DIRECTION-ONE LEFT TURN,ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TOO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY; WRONG SIDE DIVIDED ROAD
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WORK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAY ON RD	STANDING OR LYING IN ROADWAY
071	NM IMP USE	IMPROPER USE OF TRAFFIC LANE BY NON-MOTORIST
073	ELUDING	ELUDING / ATTEMPT TO ELUDE
079	F NEG CURV	FAILED TO NEGOTIATE A CURVE
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVER-CORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHI(
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN MAJOR COLLECTOR
18	URBAN MINOR COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY

PEDESTRIAN LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH OR PARKING LANE
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
14	NOT AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
16	NOT AT INTERSECTION - IN PARKING LANE

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING

095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

Appendix E Year 2018 Background Traffic Conditions Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	5	1	0	3	1	1109	28	18	309	2
Future Volume (vph)	9	0	5	1	0	3	1	1109	28	18	309	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		0.99	1.00		1.00	1.00	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	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1795	1325		899	1587	1798	3471	1459	1702	3539	1565
Flt Permitted		1.00	1.00		1.00	1.00	0.56	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		1889	1325		947	1587	1051	3471	1459	403	3539	1565
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	0	5	1	0	3	1	1167	29	19	325	2
RTOR Reduction (vph)	0	0	5	0	0	3	0	0	5	0	0	0
Lane Group Flow (vph)	0	9	0	0	1	0	1	1167	24	19	325	2
Confl. Peds. (#/hr)	5		3	3		5	4		5	5		4
Heavy Vehicles (%)	0%	0%	20%	100%	0%	0%	0%	4%	7%	6%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Effective Green, g (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.83	0.82	0.82	0.85	0.83	0.83
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		51	35		25	42	876	2835	1192	369	2930	1295
v/s Ratio Prot							0.00	c0.34		c0.00	0.09	
v/s Ratio Perm		c0.00	0.00		0.00	0.00	0.00		0.02	0.04		0.00
v/c Ratio		0.18	0.00		0.04	0.00	0.00	0.41	0.02	0.05	0.11	0.00
Uniform Delay, d1		47.6	47.3		47.4	47.3	1.5	2.5	1.7	1.3	1.6	1.5
Progression Factor		1.00	1.00		1.00	1.00	0.32	0.21	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2	0.0		0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Delay (s)		48.8	47.4		47.9	47.4	0.5	0.9	1.7	1.4	1.7	1.5
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		48.3			47.5			0.9			1.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	0	17	6	0	9	2	1097	2	1	310	4
Future Volume (Veh/h)	31	0	17	6	0	9	2	1097	2	1	310	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	0	18	6	0	10	2	1180	2	1	333	4
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.28	0.28		0.28	0.28	0.28				0.28		
vC, conflicting volume	1536	1527	338	1541	1528	1183	340			1183		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1628	1596	338	1646	1600	371	340			371		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	0	100	97	64	100	95	100			100		
cM capacity (veh/h)	21	30	707	17	30	190	992			336		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	51	16	1184	338
Volume Left	33	6	2	1
Volume Right	18	10	2	4
cSH	33	39	992	336
Volume to Capacity	1.57	0.41	0.00	0.00
Queue Length 95th (ft)	142	35	0	0
Control Delay (s)	550.5	153.0	0.1	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	550.5	153.0	0.1	0.1
Approach LOS	F	F		

Intersection Summary			
Average Delay	19.3		
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	4	57	14	2	7	12	1047	34	5	340	6
Future Volume (vph)	41	4	57	14	2	7	12	1047	34	5	340	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.92			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1696			1766		1805	1817		1805	1841	
Flt Permitted		0.86			0.73		0.54	1.00		0.15	1.00	
Satd. Flow (perm)		1486			1333		1030	1817		291	1841	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	42	4	59	14	2	7	12	1079	35	5	351	6
RTOR Reduction (vph)	0	53	0	0	6	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	52	0	0	17	0	12	1113	0	5	357	0
Confl. Peds. (#/hr)			1	1					3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	3%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		8.5			8.5		77.5	76.5		77.5	76.5	
Effective Green, g (s)		8.5			8.5		77.5	76.5		77.5	76.5	
Actuated g/C Ratio		0.08			0.08		0.78	0.76		0.78	0.76	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		126			113		806	1390		240	1408	
v/s Ratio Prot							0.00	c0.61		c0.00	0.19	
v/s Ratio Perm		c0.03			0.01		0.01			0.02		
v/c Ratio		0.41			0.15		0.01	0.80		0.02	0.25	
Uniform Delay, d1		43.4			42.4		2.6	7.1		8.1	3.4	
Progression Factor		1.00			1.00		1.00	1.00		2.25	1.83	
Incremental Delay, d2		1.6			0.4		0.0	4.9		0.0	0.4	
Delay (s)		45.0			42.8		2.6	12.1		18.3	6.7	
Level of Service		D			D		A	B		B	A	
Approach Delay (s)		45.0			42.8			12.0			6.9	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	3	2	2	39	4
Future Volume (vph)	0	3	2	2	39	4
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	0	4	3	3	51	5

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	4	6	56
Volume Left (vph)	0	0	51
Volume Right (vph)	4	3	0
Hadj (s)	-0.04	-0.30	0.18
Departure Headway (s)	4.0	3.7	4.1
Degree Utilization, x	0.00	0.01	0.06
Capacity (veh/h)	881	976	873
Control Delay (s)	7.0	6.7	7.4
Approach Delay (s)	7.0	6.7	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	84	0	0	15	4	0	2	4	8	0	2
Future Volume (Veh/h)	3	84	0	0	15	4	0	2	4	8	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	4	104	0	0	19	5	0	2	5	10	0	2
Pedestrians					1						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	26			104			136	138	105	142	136	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			104			136	138	105	142	136	24
tC, single (s)	4.1			4.1			7.1	7.0	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.5	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	99	100	100
cM capacity (veh/h)	1599			1500			836	670	954	821	756	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	108	24	7	12
Volume Left	4	0	0	10
Volume Right	0	5	5	2
cSH	1599	1500	851	852
Volume to Capacity	0.00	0.00	0.01	0.01
Queue Length 95th (ft)	0	0	1	1
Control Delay (s)	0.3	0.0	9.3	9.3
Lane LOS	A		A	A
Approach Delay (s)	0.3	0.0	9.3	9.3
Approach LOS			A	A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	9	51	0	45	12	486	19	20	1100	8
Future Volume (vph)	4	0	9	51	0	45	12	486	19	20	1100	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00	1.00	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	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1442	1592		1765	1594	1671	3505	1568	1802	3539	1578
Flt Permitted		0.72	1.00		0.76	1.00	0.21	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)		1093	1592		1403	1594	363	3505	1568	855	3539	1578
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	0	10	57	0	50	13	540	21	22	1222	9
RTOR Reduction (vph)	0	0	9	0	0	46	0	0	5	0	0	2
Lane Group Flow (vph)	0	4	1	0	57	4	13	540	16	22	1222	7
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Heavy Vehicles (%)	25%	0%	0%	2%	0%	0%	8%	3%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Effective Green, g (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.80	0.78	0.78	0.80	0.78	0.78
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		82	120		105	120	316	2743	1227	703	2770	1235
v/s Ratio Prot							c0.00	0.15		0.00	c0.35	
v/s Ratio Perm		0.00	0.00		c0.04	0.00	0.03		0.01	0.02		0.00
v/c Ratio		0.05	0.01		0.54	0.03	0.04	0.20	0.01	0.03	0.44	0.01
Uniform Delay, d1		47.2	47.0		49.0	47.1	2.5	3.1	2.6	2.2	4.0	2.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.0		4.5	0.1	0.0	0.2	0.0	0.0	0.2	0.0
Delay (s)		47.4	47.1		53.5	47.2	2.6	3.2	2.6	2.2	4.2	2.6
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		47.1			50.5			3.2			4.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	6	3	0	4	11	513	9	11	1109	41
Future Volume (Veh/h)	2	0	6	3	0	4	11	513	9	11	1109	41
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	7	3	0	4	12	558	10	12	1205	45
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1842	1846	1228	1850	1864	566	1250			571		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2070	2085	298	2096	2150	480	393			485		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	80	100	96	68	100	99	95			99		
cM capacity (veh/h)	10	14	160	9	12	495	266			994		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	7	580	1262
Volume Left	2	3	12	12
Volume Right	7	4	10	45
cSH	38	21	266	994
Volume to Capacity	0.24	0.33	0.05	0.01
Queue Length 95th (ft)	19	24	4	1
Control Delay (s)	128.7	239.9	1.7	0.5
Lane LOS	F	F	A	A
Approach Delay (s)	128.7	239.9	1.7	0.5
Approach LOS	F	F		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1	44	37	1	9	51	516	19	10	1056	23
Future Volume (vph)	21	1	44	37	1	9	51	516	19	10	1056	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.98		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1598			1740		1770	1849		1801	1858	
Flt Permitted		0.91			0.74		0.13	1.00		0.45	1.00	
Satd. Flow (perm)		1477			1344		239	1849		846	1858	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	22	1	46	39	1	9	53	538	20	10	1100	24
RTOR Reduction (vph)	0	43	0	0	8	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	26	0	0	41	0	53	557	0	10	1123	0
Confl. Peds. (#/hr)									4	4		
Heavy Vehicles (%)	10%	0%	5%	3%	0%	0%	2%	2%	5%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Effective Green, g (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Actuated g/C Ratio		0.07			0.07		0.82	0.78		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		103			94		264	1442		649	1386	
v/s Ratio Prot							c0.01	c0.30		0.00	c0.60	
v/s Ratio Perm		0.02			c0.03		0.16			0.01		
v/c Ratio		0.25			0.43		0.20	0.39		0.02	0.81	
Uniform Delay, d1		44.0			44.6		10.8	3.5		3.0	8.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			2.3		0.2	0.8		0.0	5.2	
Delay (s)		45.0			46.9		11.1	4.2		3.0	13.4	
Level of Service		D			D		B	A		A	B	
Approach Delay (s)		45.0			46.9			4.8			13.3	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	13	36	4	3	5	6
Future Volume (vph)	13	36	4	3	5	6
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	18	50	6	4	7	8

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	68	10	15
Volume Left (vph)	18	0	7
Volume Right (vph)	50	4	0
Hadj (s)	-0.35	0.27	0.55
Departure Headway (s)	3.6	4.3	4.6
Degree Utilization, x	0.07	0.01	0.02
Capacity (veh/h)	984	809	768
Control Delay (s)	6.9	7.4	7.7
Approach Delay (s)	6.9	7.4	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	7.1		
Level of Service	A		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	55	0	1	56	6	0	1	0	7	0	8
Future Volume (Veh/h)	7	55	0	1	56	6	0	1	0	7	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	11	83	0	2	85	9	0	2	0	11	0	12
Pedestrians								1			1	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	95			84			212	205	84	200	200	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	95			84			212	205	84	200	200	90
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1510			1524			734	688	980	754	692	972

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	94	96	2	23
Volume Left	11	2	0	11
Volume Right	0	9	0	12
cSH	1510	1524	688	854
Volume to Capacity	0.01	0.00	0.00	0.03
Queue Length 95th (ft)	1	0	0	2
Control Delay (s)	0.9	0.2	10.2	9.3
Lane LOS	A	A	B	A
Approach Delay (s)	0.9	0.2	10.2	9.3
Approach LOS			B	A

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F Year 2018 Total Traffic Conditions Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	5	1	0	3	1	1119	28	18	311	2
Future Volume (vph)	9	0	5	1	0	3	1	1119	28	18	311	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		0.99	1.00		1.00	1.00	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	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1795	1325		899	1587	1798	3471	1459	1702	3539	1565
Flt Permitted		1.00	1.00		1.00	1.00	0.55	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		1889	1325		947	1587	1049	3471	1459	398	3539	1565
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	0	5	1	0	3	1	1178	29	19	327	2
RTOR Reduction (vph)	0	0	5	0	0	3	0	0	5	0	0	0
Lane Group Flow (vph)	0	9	0	0	1	0	1	1178	24	19	327	2
Confl. Peds. (#/hr)	5		3	3		5	4		5	5		4
Heavy Vehicles (%)	0%	0%	20%	100%	0%	0%	0%	4%	7%	6%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Effective Green, g (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.83	0.82	0.82	0.85	0.83	0.83
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		51	35		25	42	875	2835	1192	365	2930	1295
v/s Ratio Prot							0.00	c0.34		c0.00	0.09	
v/s Ratio Perm		c0.00	0.00		0.00	0.00	0.00		0.02	0.04		0.00
v/c Ratio		0.18	0.00		0.04	0.00	0.00	0.42	0.02	0.05	0.11	0.00
Uniform Delay, d1		47.6	47.3		47.4	47.3	1.5	2.5	1.7	1.4	1.6	1.5
Progression Factor		1.00	1.00		1.00	1.00	0.32	0.22	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2	0.0		0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Delay (s)		48.8	47.4		47.9	47.4	0.5	0.9	1.7	1.4	1.7	1.5
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		48.3			47.5			0.9			1.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Future Volume (Veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	0	25	6	0	10	3	1190	2	1	333	6
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.29	0.29		0.29	0.29	0.29				0.29		
vC, conflicting volume	1549	1540	339	1561	1542	1193	342			1193		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1666	1636	339	1707	1643	458	342			458		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	0	100	96	61	100	94	100			100		
cM capacity (veh/h)	21	30	706	15	29	179	990			328		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	16	1195	340
Volume Left	33	6	3	1
Volume Right	25	10	2	6
cSH	36	36	990	328
Volume to Capacity	1.61	0.44	0.00	0.00
Queue Length 95th (ft)	156	37	0	0
Control Delay (s)	541.7	168.3	0.1	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	541.7	168.3	0.1	0.1
Approach LOS	F	F		

Intersection Summary			
Average Delay	21.3		
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	4	62	14	2	7	13	1048	34	5	346	6
Future Volume (vph)	51	4	62	14	2	7	13	1048	34	5	346	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.93			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1703			1766		1805	1817		1805	1841	
Flt Permitted		0.85			0.76		0.53	1.00		0.14	1.00	
Satd. Flow (perm)		1475			1382		1015	1817		271	1841	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	53	4	64	14	2	7	13	1080	35	5	357	6
RTOR Reduction (vph)	0	46	0	0	6	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	75	0	0	17	0	13	1114	0	5	363	0
Confl. Peds. (#/hr)			1	1					3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	3%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		9.9			9.9		76.2	75.1		76.0	75.0	
Effective Green, g (s)		9.9			9.9		76.2	75.1		76.0	75.0	
Actuated g/C Ratio		0.10			0.10		0.76	0.75		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		146			136		782	1364		221	1380	
v/s Ratio Prot							0.00	c0.61		c0.00	0.20	
v/s Ratio Perm		c0.05			0.01		0.01			0.02		
v/c Ratio		0.51			0.12		0.02	0.82		0.02	0.26	
Uniform Delay, d1		42.8			41.1		2.9	8.0		9.2	3.9	
Progression Factor		1.00			1.00		1.00	1.00		2.03	1.76	
Incremental Delay, d2		2.3			0.3		0.0	5.5		0.0	0.5	
Delay (s)		45.0			41.4		2.9	13.5		18.8	7.3	
Level of Service		D			D		A	B		B	A	
Approach Delay (s)		45.0			41.4			13.4			7.5	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	6	3	2	45	20
Future Volume (vph)	0	6	3	2	45	20
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	0	8	4	3	58	26

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	8	7	84
Volume Left (vph)	0	0	58
Volume Right (vph)	8	3	0
Hadj (s)	-0.04	-0.26	0.14
Departure Headway (s)	4.1	3.7	4.1
Degree Utilization, x	0.01	0.01	0.09
Capacity (veh/h)	863	953	880
Control Delay (s)	7.1	6.8	7.5
Approach Delay (s)	7.1	6.8	7.5
Approach LOS	A	A	A

Intersection Summary			
Delay	7.4		
Level of Service	A		
Intersection Capacity Utilization	20.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	84	0	0	15	5	0	2	4	23	0	3
Future Volume (Veh/h)	3	84	0	0	15	5	0	2	4	23	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	4	104	0	0	19	6	0	2	5	28	0	4
Pedestrians					1						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	27			104			138	139	105	143	136	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			104			138	139	105	143	136	24
tC, single (s)	4.1			4.1			7.1	7.0	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.5	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	97	100	100
cM capacity (veh/h)	1597			1500			831	669	954	820	755	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	108	25	7	32
Volume Left	4	0	0	28
Volume Right	0	6	5	4
cSH	1597	1500	851	844
Volume to Capacity	0.00	0.00	0.01	0.04
Queue Length 95th (ft)	0	0	1	3
Control Delay (s)	0.3	0.0	9.3	9.4
Lane LOS	A		A	A
Approach Delay (s)	0.3	0.0	9.3	9.4
Approach LOS			A	A

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	9	51	0	45	12	491	19	20	1109	8
Future Volume (vph)	4	0	9	51	0	45	12	491	19	20	1109	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00	1.00	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	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1442	1592		1765	1594	1671	3505	1568	1802	3539	1578
Flt Permitted		0.72	1.00		0.76	1.00	0.20	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)		1093	1592		1403	1594	358	3505	1568	849	3539	1578
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	0	10	57	0	50	13	546	21	22	1232	9
RTOR Reduction (vph)	0	0	9	0	0	46	0	0	5	0	0	2
Lane Group Flow (vph)	0	4	1	0	57	4	13	546	16	22	1232	7
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Heavy Vehicles (%)	25%	0%	0%	2%	0%	0%	8%	3%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Effective Green, g (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.80	0.78	0.78	0.80	0.78	0.78
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		82	120		105	120	312	2743	1227	698	2770	1235
v/s Ratio Prot							c0.00	0.16		0.00	c0.35	
v/s Ratio Perm		0.00	0.00		c0.04	0.00	0.03		0.01	0.02		0.00
v/c Ratio		0.05	0.01		0.54	0.03	0.04	0.20	0.01	0.03	0.44	0.01
Uniform Delay, d1		47.2	47.0		49.0	47.1	2.6	3.1	2.6	2.2	4.0	2.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.0		4.5	0.1	0.0	0.2	0.0	0.0	0.2	0.0
Delay (s)		47.4	47.1		53.5	47.2	2.6	3.2	2.6	2.2	4.2	2.6
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		47.1			50.5			3.2			4.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Future Volume (Veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	10	3	0	4	17	563	10	12	1205	54
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.91	0.23			0.91		
vC, conflicting volume	1862	1866	1233	1872	1888	571	1259			576		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2124	2139	316	2161	2220	483	431			489		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	78	100	94	63	100	99	93			99		
cM capacity (veh/h)	9	12	156	8	11	492	257			989		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	7	590	1271
Volume Left	2	3	17	12
Volume Right	10	4	10	54
cSH	43	19	257	989
Volume to Capacity	0.28	0.38	0.07	0.01
Queue Length 95th (ft)	24	26	5	1
Control Delay (s)	119.4	286.5	2.5	0.5
Lane LOS	F	F	A	A
Approach Delay (s)	119.4	286.5	2.5	0.5
Approach LOS	F	F		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	46	37	1	9	56	521	19	10	1059	23
Future Volume (vph)	26	1	46	37	1	9	56	521	19	10	1059	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.98		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1600			1740		1770	1849		1801	1858	
Flt Permitted		0.90			0.71		0.13	1.00		0.44	1.00	
Satd. Flow (perm)		1468			1285		236	1849		840	1858	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	1	48	39	1	9	58	543	20	10	1103	24
RTOR Reduction (vph)	0	45	0	0	8	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	31	0	0	41	0	58	562	0	10	1126	0
Confl. Peds. (#/hr)									4	4		
Heavy Vehicles (%)	10%	0%	5%	3%	0%	0%	2%	2%	5%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Effective Green, g (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Actuated g/C Ratio		0.07			0.07		0.82	0.78		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		102			89		261	1442		644	1386	
v/s Ratio Prot							c0.01	c0.30		0.00	c0.61	
v/s Ratio Perm		0.02			c0.03		0.17			0.01		
v/c Ratio		0.31			0.46		0.22	0.39		0.02	0.81	
Uniform Delay, d1		44.2			44.7		11.1	3.5		3.0	8.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			2.7		0.3	0.8		0.0	5.3	
Delay (s)		45.4			47.4		11.3	4.3		3.0	13.5	
Level of Service		D			D		B	A		A	B	
Approach Delay (s)		45.4			47.4			4.9			13.4	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	13	50	10	3	8	13
Future Volume (vph)	13	50	10	3	8	13
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	18	69	14	4	11	18

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	87	18	29
Volume Left (vph)	18	0	11
Volume Right (vph)	69	4	0
Hadj (s)	-0.39	0.53	0.55
Departure Headway (s)	3.6	4.6	4.6
Degree Utilization, x	0.09	0.02	0.04
Capacity (veh/h)	976	752	757
Control Delay (s)	7.0	7.7	7.8
Approach Delay (s)	7.0	7.7	7.8
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	55	0	1	56	11	0	1	0	14	0	8
Future Volume (Veh/h)	8	55	0	1	56	11	0	1	0	14	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	12	83	0	2	85	17	0	2	0	21	0	12
Pedestrians								1			1	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	103			84			218	215	84	206	206	94
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	103			84			218	215	84	206	206	94
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	97	100	99
cM capacity (veh/h)	1500			1524			727	679	980	747	686	967

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	95	104	2	33
Volume Left	12	2	0	21
Volume Right	0	17	0	12
cSH	1500	1524	679	814
Volume to Capacity	0.01	0.00	0.00	0.04
Queue Length 95th (ft)	1	0	0	3
Control Delay (s)	1.0	0.2	10.3	9.6
Lane LOS	A	A	B	A
Approach Delay (s)	1.0	0.2	10.3	9.6
Approach LOS			B	A

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix G Year 2018 Total Traffic Conditions Worksheets – Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Future Volume (Veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	0	25	6	0	10	3	1190	2	1	333	6
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.30	0.30		0.30	0.30	0.30				0.30		
vC, conflicting volume	1548	1540	339	1558	1542	1193	342			1193		
vC1, stage 1 conf vol	341	341		1198	1198							
vC2, stage 2 conf vol	1207	1199		360	344							
vCu, unblocked vol	1663	1636	339	1697	1642	459	342			459		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)	6.1	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	77	100	96	96	100	94	100			100		
cM capacity (veh/h)	143	154	706	135	155	178	990			328		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	58	16	3	1192	1	339
Volume Left	33	6	3	0	1	0
Volume Right	25	10	0	2	0	6
cSH	218	159	990	1700	328	1700
Volume to Capacity	0.27	0.10	0.00	0.70	0.00	0.20
Queue Length 95th (ft)	26	8	0	0	0	0
Control Delay (s)	27.4	30.2	8.6	0.0	16.0	0.0
Lane LOS	D	D	A		C	
Approach Delay (s)	27.4	30.2	0.0		0.0	
Approach LOS	D	D				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Future Volume (Veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	10	3	0	4	17	563	10	12	1205	54
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1857	1866	1233	1845	1888	571	1259			576		
vC1, stage 1 conf vol	1256	1256		605	605							
vC2, stage 2 conf vol	601	610		1240	1283							
vCu, unblocked vol	2162	2196	319	2117	2278	490	434			495		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	98	100	94	97	100	99	93			99		
cM capacity (veh/h)	126	122	155	115	95	490	257			990		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	7	17	573	12	1259
Volume Left	2	3	17	0	12	0
Volume Right	10	4	0	10	0	54
cSH	150	204	257	1700	990	1700
Volume to Capacity	0.08	0.03	0.07	0.34	0.01	0.74
Queue Length 95th (ft)	6	3	5	0	1	0
Control Delay (s)	31.1	23.3	20.0	0.0	8.7	0.0
Lane LOS	D	C	C		A	
Approach Delay (s)	31.1	23.3	0.6		0.1	
Approach LOS	D	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	0	28	6	0	9	4	1097	2	1	310	6
Future Volume (Veh/h)	41	0	28	6	0	9	4	1097	2	1	310	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	44	0	30	6	0	10	4	1180	2	1	333	6
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.28	0.28		0.28	0.28	0.28				0.28		
vC, conflicting volume	1540	1532	339	1555	1534	1183	342			1183		
vC1, stage 1 conf vol	341	341		1190	1190							
vC2, stage 2 conf vol	1199	1191		365	344							
vCu, unblocked vol	1642	1614	339	1696	1621	372	342			372		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)	6.1	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	71	100	96	96	100	95	100			100		
cM capacity (veh/h)	150	159	706	141	160	190	990			336		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	16	4	1182	1	339
Volume Left	44	6	4	0	1	0
Volume Right	30	10	0	2	0	6
cSH	220	168	990	1700	336	1700
Volume to Capacity	0.34	0.10	0.00	0.70	0.00	0.20
Queue Length 95th (ft)	35	8	0	0	0	0
Control Delay (s)	29.4	28.6	8.7	0.0	15.7	0.0
Lane LOS	D	D	A		C	
Approach Delay (s)	29.4	28.6	0.0		0.0	
Approach LOS	D	D				

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	11	3	0	4	21	513	9	11	1109	50
Future Volume (Veh/h)	7	0	11	3	0	4	21	513	9	11	1109	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	12	3	0	4	23	558	10	12	1205	54
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1864	1873	1233	1854	1895	566	1259			571		
vC1, stage 1 conf vol	1256	1256		612	612							
vC2, stage 2 conf vol	608	617		1242	1283							
vCu, unblocked vol	2190	2224	319	2152	2306	485	434			490		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	94	100	92	97	100	99	91			99		
cM capacity (veh/h)	126	122	155	106	89	494	257			994		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	20	7	23	568	12	1259
Volume Left	8	3	23	0	12	0
Volume Right	12	4	0	10	0	54
cSH	142	193	257	1700	994	1700
Volume to Capacity	0.14	0.04	0.09	0.33	0.01	0.74
Queue Length 95th (ft)	12	3	7	0	1	0
Control Delay (s)	34.5	24.4	20.4	0.0	8.7	0.0
Lane LOS	D	C	C		A	
Approach Delay (s)	34.5	24.4	0.8		0.1	
Approach LOS	D	C				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

Morgan Holen & Associates LLC
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November 8, 2015

Planning and Building
City of West Linn
22500 Salamo Road #1000
West Linn, Oregon 97068

Re: Arborist Report and Tree Preservation Plan for Chêne Blanc Estates
West Linn, Oregon
Project No. MHA15012 Upper Midhill Drive

Please find enclosed the Arborist Report and Tree Preservation Plan for the Chêne Blanc Estates project located at 18000-18001 Upper Midhill Drive in West Linn, Oregon. Please contact us if you have questions or need any additional information.

Respectfully,
Morgan Holen & Associates, LLC

Morgan E. Holen

Morgan E. Holen, Owner
ISA Certified Arborist, PN-6145A
ISA Tree Risk Assessment Qualified
Forest Biologist

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Arborist Report and Tree Preservation Plan

Chêne Blanc Estates
West Linn, Oregon

November 8, 2015

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Table of Contents

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Chêne Blanc Estates – West Linn, Oregon
Arborist Report and Tree Preservation Plan
November 8, 2015

MHA15012

Purpose

This Arborist Report and Tree Preservation Plan for the Chêne Blanc Estates project in West Linn, Oregon, is provided pursuant to City of West Linn Community Development Code Chapter 55, Municipal Code Sections 8.500 and 8.600, and the West Linn Tree Technical Manual. This report describes the existing trees located on the project site, as well as recommendations for tree removal, retention and protection. This report is based on observations made by International Society of Arboriculture (ISA) Certified Arborist (PN-6145A) and Qualified Tree Risk Assessor Morgan Holen during site visits conducted on July 23 and 24, 2015, a subsequent site meeting with the City Arborist Mike Perkins on October 7, 2015, and site plan coordination with 3J Consulting.

Scope of Work and Limitations

Morgan Holen & Associates, LLC, was contracted by Upper Midhill Estates, LLC, to collect tree inventory data for individual trees measuring six inches and larger in diameter and to develop an arborist report and tree preservation plan for the project. The site is planned for residential development with new streets, 34 building lots, and water quality facilities. Site plans were provided by 3J Consulting illustrating the location of existing trees and potential construction impacts.

Visual Tree Assessment (VTA) was performed on individual trees located across the site. The enclosed tree inventory data and sheet C110 in the Land Use Plan Set demonstrate that all trees on the site were physically identified. VTA is the standard process whereby the inspector visually assesses the tree from a distance and up close, looking for defect symptoms and evaluating overall condition and vitality of individual trees. Trees were evaluated in terms of general condition and potential construction impacts. Following the inventory fieldwork, we coordinated with 3J Consulting to discuss tree protection recommendations.

The client may choose to accept or disregard the recommendations contained herein, or seek additional advice. Neither this author nor Morgan Holen & Associates, LLC, have assumed any responsibility for liability associated with the trees on or adjacent to this site.

General Description

The Chêne Blanc Estates project site is located at 18000-18001 Upper Midhill Drive in West Linn, Oregon. The site is undeveloped and heavily treed with a forested stand of mixed species in variable condition. The trees are undergoing natural stand dynamics, whereby trees are competing with one another; over time, some trees become dominant or codominant while others are suppressed beneath the dominant overstory. The stand is generally in good condition as an intact and undisturbed group. However, the stand has not been managed and invasive Himalayan blackberry (*Rubus armeniacus*) and English ivy (*Hedera helix*) are prolific throughout the understory. The blackberry was recently cleared to allow for better site access and VTA, but English ivy is growing up tree trunks in some areas and overtopping trees which will lead to their demise. In general, native Oregon white oak (*Quercus garryana*) and Douglas-fir (*Pseudotsuga menziesii*) are the dominant tree species in the stand and relatively in the best condition; bigleaf maple (*Acer macrophyllum*) and Oregon ash (*Fraxinus latifolia*) are the next most common tree species but are relatively in poorer condition. The location of individual trees is shown on site plan drawings and tree numbers correspond with the enclosed tree data.

Tree Inventory

In all, 502 existing trees were inventoried, including 18 different species. Table 1 provides a summary of the number of inventoried trees by species and general condition rating. The enclosed tree data provides a complete description of the individual trees.

Table 1. Number of Trees by Species and Condition – Chêne Blanc Estates.

Common Name	Species Name	Dead	Poor	Fair	Good	Total	Percent*
bigleaf maple	*Acer macrophyllum*	2	27	22	3	**54**	**11%**
black hawthorn	*Crataegus douglasii*		1			**1**	0.2%
deciduous	unknown		2			**2**	0.4%
Douglas-fir	*Pseudotsuga menziesii*	2	28	52	32	**114**	**23%**
English hawthorn	*Crataegus monogyna*		2	2		**4**	1%
English holly	*Ilex aquifolium*		1			**1**	0.2%
European white birch	*Betula pendula*		1			**1**	0.2%
grand fir	*Abies grandis*		1	1	2	**4**	1%
madrone	*Arbutus menziesii*		2	7	1	**10**	2%
Oregon ash	*Fraxinus latifolia*	1	27	39	2	**69**	**14%**
Oregon white oak	*Quercus garryana*	2	33	108	70	**213**	**42%**
Port-Orford-cedar	*Chamaecyparis lawsoniana*				1	**1**	0.2%
red alder	*Alnus rubra*		1	3		**4**	1%
Scouler's willow	*Salix scouleriana*		2	1		**3**	0.6%
sweet cherry	*Prunus avium*		3	7		**10**	2%
western redcedar	*Thuja plicata*		2	6	1	**9**	2%
yew	*Taxus brevifolia*			1		**1**	0.2%
pine	*Pinus* spp.				1	**1**	0.2%
Total		**7** (1%)	**133** (26%)	**249** (50%)	**113** (23%)	**502**	**100%**

*Total percent actually exceeds 100% due to rounding.

Oregon white oak and Douglas-fir account for 65% of the inventoried trees and 90% of the trees classified as being in generally good condition. These trees are scattered across the site. Where these two species are growing in close proximity to one another, the Douglas-firs are crowding the oaks because they grow faster; both species are intolerant of shade. The Douglas-firs classified as being in fair or poor condition include trees with reduced vigor, dieback, old broken tops, a history of branch failure, high live crowns, and other structural defects. The Oregon white oaks classified as being in fair or poor condition include trees that have reduced vigor, small live crowns, structural defects, ivy infestation, and those that have been overtopped by adjacent Douglas-firs. Overall, these two species have the best potential for retention with development on this site.

Bigleaf maple and Oregon ash account for 25% of the inventoried trees, but only five of these trees were classified as being in good condition. In general, these trees are relatively smaller than the Oregon white oaks and Douglas-firs. Common defects include poor structure, ivy infestation, small crowns, high live crowns and crowns with major asymmetry, dead and broken branches, and decay. On this site, these two species are less suitable for retention with development.

The remaining 10% of the inventoried trees include a mix of species:

- One black hawthorn (*Crataegus douglasii*) in poor condition with an old broken top, multiple leaders, advanced decay, and ivy infestation.
- Two deciduous trees of unknown species, one of which is in poor condition and heavily infested with ivy and the other which is mostly dead, with dead and broken branches and severe ivy infestation.
- Sixteen non-native and invasive trees, including four English hawthorn (*Crataegus monogyna*), one English holly (*Ilex aquifolium*), one European white birch (*Betula pendula*), and 10 sweet cherry (*Prunus avium*).
- Four grand fir (*Abies grandis*) including two in good condition and one each in fair condition with an old broken top and high live crown and in poor condition being overtopped by an adjacent Douglas-fir.
- Ten madrone (*Arbutus menziesii*), including one in good condition, seven in fair condition with dieback and structural defects, and two in poor condition with severe dieback and decay.
- One Port-Orford-cedar (*Chamaecyparis lawsoniana*) in good condition with no major defects.
- Four red alder (*Alnus rubra*) including three in fair condition with moderate defects and one in poor condition with basal and trunk decay.
- Three Scouler's willow (*Salix scouleriana*) including one in fair condition with codominant stems and ivy infestation and two in poor condition with dieback and decay.
- Nine western redcedar (*Thuja plicata*) including one in good condition with minor crown asymmetry, six in fair condition with moderate defects and minor decay, and two in poor condition with dead tops and trunk decay.
- One yew (*Arbutus menziesii*) in fair condition with moderate structure.
- One pine of unknown species in good condition with a forked top, but no major defects.

Significant trees will be determined by the City Arborist. Based on our evaluation of the size, type, location, health, and long term survivability of the individual trees, 169 (34%) trees were identified as potentially being significant.

Tree Preservation Plan

We coordinated with the project team to discuss trees suitable for preservation in terms of potential construction impacts. Table 2 provides a summary of the number of non-significant and potentially significant trees by treatment recommendation. Note that two of the inventoried trees are located off-site and will be protected during construction (trees 2703 and 2704, an invasive English hawthorn in poor condition and a Douglas-fir in fair condition with a one-sided crown, respectively).

Table 2. Number of Inventoried Trees by Treatment Recommendation and Significance.

Treatment	Remove	Retain	Total
Non-Significant Trees	269	62	**331**
Potentially Significant Trees	119	50	**169**
Off-Site Tree to Protect	0	2	**2**
Total	**388**	**114**	**502**

Of the 502 inventoried trees, two are located off-site and will be protected during construction, while 112 on-site trees are planned for retention and 388 on-site trees are planned for removal either for construction or because of poor or non-viable condition.

The 112 trees planned for retention include 50 potentially significant trees (36 Oregon white oak, 12 Douglas-fir, one madrone, and one yew). These trees are primarily located in the rear of proposed building lots. During the tree inventory fieldwork and again during the on-site meeting with the City's Arborist, we evaluated these trees in terms of potential impacts from adjacent tree removal. Generally, trees located within the interior of a forested stand could be negatively impacted by adjacent tree removal and present increased potential for windthrow; the interior trees are adapted to the shelter provided by dominant and edge grown trees and are likely to have smaller live crowns and relatively poor height to diameter ratios that may predispose them to failure. Only those significant trees most suitable for preservation and considered safe to retain with adjacent tree removal were considered for retention. These trees will require special consideration to assure their protection during construction.

The other 62 trees planned for retention are not likely to be considered significant, but their retention will help to keep the stand relatively intact along the north and east property boundaries and maintain some screening benefits. These trees include a mix of species in highly variable condition, which could benefit from general maintenance including removal of ivy growing up tree trunks and pruning to remove dead and defective branches. They are generally located among significant trees planned for retention and will not be impacted by the proposed construction. It is important to note that these trees should be re-evaluated during construction, at the time of site clearing, to verify that they are suitable for preservation and will not present hazard risk potential to the adjacent homes planned for development due to condition, structural defects, and exposure from nearby tree removal. We discussed this approach with the City's Arborist during our on-site meeting and he agreed that a re-evaluation at the time of clearing should be recommended and is a reasonable approach in order to help minimize tree removal to the greatest extent possible.

The 388 trees planned for removal include 119 potentially significant trees and 269 trees that are not likely to be considered significant due to size, type, location, health, and viability. Treatment recommendations provided in the enclosed tree data note the reason that removal is necessary. Of the 119 potentially significant trees, removal is planned for: 64 trees because of proposed building, 31 trees for street construction within the right of way, and 24 trees because of grading that is necessary for other site improvements. Of the 269 trees that are not likely to be considered significant, removal is planned for: 46 trees because of poor or non-viable condition, 137 trees because of proposed building, 45 trees for street construction within the right of way, and 41 trees because of grading for other site improvements. Table 3 provides a summary of the number of trees planned for removal by reason and potential for significance.

Table 3. Number of Trees Planned for Removal by Reason and Potential Significance.

Reason for Removal	Not Significant	Potentially Significant	Total	Percent*
Condition	46	0	**46**	**12%**
Building	137	64	**201**	**52%**
Street (ROW improvements)	45	31	**76**	**20%**
Other Grading	41	24	**65**	**17%**
Total	**269**	**119**	**388**	**100%**

*Total percent actually exceeds 100% due to rounding.

Trees to be retained should be protected with tree protection fencing established at the dripline at a minimum for non-significant trees and at the dripline plus 10-feet for significant trees. In addition to the tree protection standards provided in the next section, we also recommended re-evaluation of trees planned for retention at the time of clearing, removal of English ivy from tree trunks, and minor pruning to remove dead and defective branches for safety (to be performed by a Qualified Tree Service).

In some cases, the proposed development is likely to encroach within tree protection zones and alternative tree protection measures will be needed. In particular, standard tree protection zones overlap with allowable building footprints in the rear of lots 1-10, 13-19, and 21-34. Tree protection fencing initially installed at the dripline or dripline plus 10-feet for significant trees should only be adjusted based on coordination with the project arborist. Exploratory excavation is recommended during the site improvement phase of construction in order to locate roots of protected trees and assess potential impacts to critical roots. The contractor should coordinate with the project arborist to adjust tree protection fencing, monitor exploratory excavation, and evaluate potential root impacts. The arborist should then prepare a supplemental memorandum containing recommendations to minimize root impacts at specific trees on these lots. If critical roots are encountered, customized home plans may be needed to avoid critical root impacts and/or modified foundations may be necessary to allow encroachment into the critical root zone while avoiding excavation and root pruning by using pier and beam designs to span foundations across root zones. Tree protection recommendations specific to each lot should be required at the time of plat based on what is learned during exploratory excavation and evaluation of potential impacts in terms of lot specific building plans.

Work beneath the dripline of protected trees should be supervised by the project arborist in coordination with the City's Arborist.

Tree Protection Standards
Trees to be protected will need special consideration to assure their protection during construction. Any work that is necessary within the standard tree protection zone should be performed under the guidance of a qualified arborist. It is the Client's responsibility to implement this plan and to monitor the construction process. Tree protection measures include:

<u>Before Construction</u>

1. **Tree Protection Zone.** The project arborist shall designate the Tree Protection Zone (TPZ) for each tree to be protected. Where feasible, the size of the TPZ shall be established at the dripline of the tree plus 10-feet. Alternatively, the TPZ shall be established at the dripline of protected trees. Where infrastructure (driveways, buildings, and utilities) must be installed closer to the tree(s), the TPZ may be established within the dripline area if the project arborist, in coordination with the City Arborist, determines that the tree(s) will not be unduly damaged. The location of TPZs shall be shown on construction drawings.
2. **Protection Fencing.** Protection fencing shall serve as the tree protection zone and shall be erected before demolition, grubbing, grading, or construction begins. All trees to be retained shall be protected by six-foot-high chain link fences installed at the edge of the TPZ. Protection fencing shall be secured to two-inch diameter galvanized iron posts, driven to a depth of a least two feet, placed no further than 10-feet apart. If fencing is located on pavement, posts may be supported by an appropriate grade level concrete base. Protection fencing shall remain in place until final inspection of the project permit, or in consultation with the project arborist.
3. **Signage.** An 8.5x11 –inch sign stating, "WARNING: Tree Protection Zone," shall be displayed on each protection fence at all times.
4. **Designation of Cut Trees.** Trees to be removed shall be clearly marked with construction flagging, tree-marking paint, or other methods approved in advanced by the project arborist. Trees shall be carefully removed so as to avoid either above or below ground damage to those

trees to be preserved. Roots of stumps that are adjacent to retained trees shall be carefully severed prior to stump extraction.

5. **Preconstruction Conference.** The project arborist shall be on site to discuss methods of tree removal and tree protection prior to any construction.
6. **Verification of Tree Protection Measures.** Prior to commencement of construction, the project arborist shall verify in writing to the City Arborist that tree protection fencing has been satisfactorily installed.

<u>During Construction</u>

7. **Tree Protection Zone Maintenance.** The protection fencing shall not be moved, removed, or entered by equipment except under direction of the project arborist, in coordination with the City Arborist.
8. **Storage of Material or Equipment.** The contractor shall not store materials or equipment within the TPZ.
9. **Excavation within the TPZ.** Excavation with the TPZ shall be avoided if alternatives are available. If excavation within the TPZ is unavoidable, the project arborist shall evaluate the proposed excavation to determine methods to minimize impacts to trees. This can include tunneling, hand digging or other approaches. All construction within the TPZ shall be under the on-site technical supervision of the project arborist, in coordination with the City Arborist.
10. **Tree Protection Zone.** The project arborist shall monitor construction activities and progress, and provide written reports to the developer and the City at regular intervals. Tree protection inspections shall occur monthly or more frequently if needed.
11. **Quality Assurance.** The project arborist shall supervise proper execution of this plan during construction activities that could encroach on retained trees. Tree protection site inspection monitoring reports shall be provided to the Client and City on a regular basis throughout construction.

<u>Post Construction</u>

12. **Final Report.** After the project has been completed, the project arborist shall provide a final report to the developer and the City. The final report shall include concerns about any trees negatively impacted during construction, and describe the measures needed to maintain and protect the remaining trees for a minimum of two years after project completion.

Please contact us if you have questions or need any additional information. Thank you for choosing Morgan Holen & Associates, LLC, to provide consulting arborist services for the Chêne Blanc Estates project in West Linn.

Thank you,
Morgan Holen & Associates, LLC

Morgan E. Holen

Morgan E. Holen, Owner
ISA Certified Arborist, PN-6145A
ISA Tree Risk Assessment Qualified
Forest Biologist

Enclosures: MHA15012 Chêne Blanc Estates – Tree Data 7-24-15

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2037	Douglas-fir	*Pseudotsuga menziesii*	30	20	G	no major defects, twig dieback	Yes	Remove	ROW
2038	Douglas-fir	*Pseudotsuga menziesii*	38	24	G	resin flow S side of trunk	Yes	Remove	ROW
2039	Douglas-fir	*Pseudotsuga menziesii*	32	18	G	no major defects, some ivy	Yes	Remove	ROW
2040	Douglas-fir	*Pseudotsuga menziesii*	26	12	P	windsnap	No	Remove	ROW
2042	Douglas-fir	*Pseudotsuga menziesii*	36	20	F	forked leaders, some ivy	Yes	Remove	Building
2043	Douglas-fir	*Pseudotsuga menziesii*	32	17	F	old broken top, ivy	Yes	Remove	Building
2044	Douglas-fir	*Pseudotsuga menziesii*	26	14	G	no major defects	Yes	Remove	Grading
2045	Port-Orford-cedar	*Chamaecyparis lawsoniana*	18	12	G	no major defects	No	Remove	ROW
2046	Douglas-fir	*Pseudotsuga menziesii*	6	8	F	growing into oak canopy	No	Remove	ROW
2047	bigleaf maple	*Acer macrophyllum*	20	24	F	trunk decay 0-6'	No	Remove	Building
2048	Oregon white oak	*Quercus garryana*	29	30	F	one-sided crown, poor scaffold branch structure, poor branch distribution	No	Remove	Building
2049	bigleaf maple	*Acer macrophyllum*	18	0	D	mostly dead, not viable	No	Remove	Building
2050	bigleaf maple	*Acer macrophyllum*	8	0	D	dead	No	Remove	Condition
2051	Oregon white oak	*Quercus garryana*	14	14	F	trunk decay 0-3', epicormics	No	Remove	Building
2052	Oregon white oak	*Quercus garryana*	16	14	F	small live crown, suppressed	No	Remove	Building
2053	Scouler's willow	*Salix scouleriana*	18	12	P	basal and trunk decay	No	Remove	Building
2054	red alder	*Alnus rubra*	8	8	P	poor structure, basal and trunk decay	No	Remove	Condition
2055	red alder	*Alnus rubra*	10	8	F	one-sided crown, not suitable for retention with adjacent removal	No	Remove	Condition
2056	Douglas-fir	*Pseudotsuga menziesii*	42	24	G	no major defects	Yes	Retain	n/a
2057	Oregon white oak	*Quercus garryana*	8,12	20	P	codominant stems, dead and broken branches, branch decay, ivy	No	Remove	Condition
2058	bigleaf maple	*Acer macrophyllum*	21	10	P	poor structure, severe ivy infestation	No	Remove	Condition
2059	bigleaf maple	*Acer macrophyllum*	14	18	P	poor rooting, drainage at base	No	Remove	Condition
2060	bigleaf maple	*Acer macrophyllum*	8	12	P	dead branches, severe ivy infestation	No	Remove	Condition

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2061	Oregon white oak	*Quercus garryana*	10,12	10	P	overtopped with ivy	No	Remove	Condition
2062	Douglas-fir	*Pseudotsuga menziesii*	34	22	F	old broken top, codom with 2063	Yes	Retain	n/a
2063	Douglas-fir	*Pseudotsuga menziesii*	36	24	G	forked leaders, some ivy	Yes	Retain	n/a
2064	Douglas-fir	*Pseudotsuga menziesii*	28	20	F	broken top, below dominant canopy	Yes	Retain	n/a
2065	madrone	*Arbutus menziesii*	10	9	F	small live crown, lower trunk wound, below Douglas-fir canopy	No	Remove	Condition
2066	madrone	*Arbutus menziesii*	12	10	F	dieback	No	Remove	Condition
2067	madrone	*Arbutus menziesii*	14	12	F	dieback	No	Remove	Condition
2068	madrone	*Arbutus menziesii*	13	12	P	trunk wound, forked top, crown decay	No	Remove	Condition
2069	madrone	*Arbutus menziesii*	10,16	20	P	severe dieback	No	Remove	Condition
2070	Douglas-fir	*Pseudotsuga menziesii*	24	18	F	forked top, one-sided crown	No	Remove	Building
2071	Douglas-fir	*Pseudotsuga menziesii*	18	18	F	basal wounds, resin flow, one-sided crown	No	Remove	Building
2072	bigleaf maple	*Acer macrophyllum*	6x8,16	22	F	7 codom stems, ivy into crown	No	Remove	Building
2073	Oregon white oak	*Quercus garryana*	24	20	F	forked leaders, some included bark, one-sided to S	No	Retain	n/a
2074	Douglas-fir	*Pseudotsuga menziesii*	38	18	F	poor structure, new leaders at old broken top, high live crown, ivy	No	Remove	Condition
2075	red alder	*Alnus rubra*	20	20	F	moderate vigor, some decay	No	Remove	Building
2076	madrone	*Arbutus menziesii*	16	20	F	32-degree self-correcting lean to S, basal decay with hollow	No	Remove	Building
2078	Douglas-fir	*Pseudotsuga menziesii*	28	17	F	basal swelling, insects	No	Remove	Grading
2079	Douglas-fir	*Pseudotsuga menziesii*	30	18	F	forked leaders, ivy on lower trunk	Yes	Remove	Grading
2080	Oregon white oak	*Quercus garryana*	36	28	F	moderate vigor, ivy	Yes	Remove	ROW
2081	Oregon white oak	*Quercus garryana*	22	26	G	codominant leaders, one-sided crown	Yes	Remove	ROW
2082	Oregon white oak	*Quercus garryana*	30	28	G	wound NE face 1-5'	Yes	Remove	ROW

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No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2083	Oregon white oak	*Quercus garryana*	14,20,24	24	G	moderate structure, ivy	Yes	Remove	ROW
2084	Oregon white oak	*Quercus garryana*	26	26	G	moderate structure, ivy	Yes	Remove	Grading
2085	Oregon white oak	*Quercus garryana*	15	26	F	natural but excessive lean to S, ivy	No	Remove	Building
2086	Oregon white oak	*Quercus garryana*	10	16	F	small live crown, poor lateral branch distribution	No	Remove	Building
2087	Oregon white oak	*Quercus garryana*	18	25	F	moderate vigor, some dieback, one-sided crown to SE, ivy	No	Remove	Building
2088	Oregon white oak	*Quercus garryana*	24	28	F	poor structure, history of major branch failure	No	Remove	Building
2089	Oregon white oak	*Quercus garryana*	14	26	F	excessive lean to E, few dead branches, ivy	No	Remove	Building
2090	Oregon white oak	*Quercus garryana*	14	16	G	one-sided crown to W, ivy up trunk	Yes	Remove	Building
2091	Oregon white oak	*Quercus garryana*	26	26	G	codominant leaders, appears stable	Yes	Remove	Building
2092	Oregon white oak	*Quercus garryana*	22	25	P	very poor structure, failing scaffold branch (only live branch)	No	Remove	Building
2093	Oregon white oak	*Quercus garryana*	24	18	F	moderate vigor, ivy	Yes	Retain	n/a
2094	Oregon white oak	*Quercus garryana*	15	24	F	natural lean to east, ivy	Yes	Retain	n/a
2095	Oregon white oak	*Quercus garryana*	12	14	F	poor lateral branch distribution, small live crown, ivy, only suitable for retention with 2094	No	Retain	n/a
2096	Oregon white oak	*Quercus garryana*	8	20	F	excessive lean to NW, small live crown, ivy	No	Retain	n/a
2097	Oregon white oak	*Quercus garryana*	12	18	F	one-sided crown to N, ivy	Yes	Retain	n/a
2098	Oregon white oak	*Quercus garryana*	10,18	20	F	codominant stems, ivy inhibits complete evaluation	Yes	Retain	n/a
2099	Oregon white oak	*Quercus garryana*	24	22	G	old wound on S face, some decay	Yes	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2100	Oregon white oak	*Quercus garryana*	20	22	G	natural lean to building lot, only suitable for retention with 2101	Yes	Retain	n/a
2101	Oregon white oak	*Quercus garryana*	26	22	G	ivy up trunk, only suitable for retention with 2100	Yes	Retain	n/a
2102	Oregon white oak	*Quercus garryana*	26	20	G	old wound N face of lower trunk, no major defects, needs pruning	Yes	Retain	n/a
2103	Oregon white oak	*Quercus garryana*	8	14	F	poor structure, suitable for retention with 2102, needs pruning	No	Retain	n/a
2104	Oregon white oak	*Quercus garryana*	13	16	F	one-sided crown due to fir competition, not suitable for retention with removal of tree 2105	No	Remove	Condition
2105	Douglas-fir	*Pseudotsuga menziesii*	42	20	F	hollow with basal decay NW side	No	Remove	Condition
2106	Oregon white oak	*Quercus garryana*	12	10	P	poor structure, suppressed	No	Remove	Building
2107	Oregon white oak	*Quercus garryana*	16	24	G	upright crown structure	Yes	Remove	Building
2108	Oregon white oak	*Quercus garryana*	2x12	20	F	codominant stems, one-sided crown to NNW, some ivy	Yes	Remove	Building
2109	Oregon white oak	*Quercus garryana*	6,12	15	F	upright crown, only suitable for retention with 2110	Yes	Remove	Building
2110	Oregon white oak	*Quercus garryana*	17	18	G	one-sided to NW, lower trunk wounds	Yes	Retain	n/a
2111	Scouler's willow	*Salix scouleriana*	12	10	P	dieback, decay, poor structure	No	Remove	Building
2112	Oregon white oak	*Quercus garryana*	16	20	F	moderate structure, only suitable for retention in group	Yes	Retain	n/a
2113	Oregon white oak	*Quercus garryana*	10	15	F	small live crown, one-sided to east, only suitable for retention in group	Yes	Retain	n/a
2114	Oregon white oak	*Quercus garryana*	15	16	F	numerous upright leaders, only suitable for retention in group	Yes	Retain	n/a

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2115	Oregon white oak	*Quercus garryana*	12	16	F	moderate structure, few dead branches, ivy, only suitable for retention in group	Yes	Retain	n/a
2116	Oregon white oak	*Quercus garryana*	16	24	F	natural lean to NE	Yes	Retain	n/a
2117	Douglas-fir	*Pseudotsuga menziesii*	40	34	G	no major defects, some ivy at base	Yes	Retain	n/a
2118	Oregon white oak	*Quercus garryana*	14	20	F	crowded by adjacent firs	No	Remove	Building
2119	Douglas-fir	*Pseudotsuga menziesii*	26	26	F	heavy sweep, root uplift	No	Remove	Building
2120	Douglas-fir	*Pseudotsuga menziesii*	37	22	G	no major defects, old buttress wound, root damage, ivy on lower trunk	Yes	Remove	ROW
2121	bigleaf maple	*Acer macrophyllum*	16	18	F	moderate structure, some ivy	No	Remove	Grading
2122	Oregon white oak	*Quercus garryana*	18	20	P	poor structure, small live crown	No	Remove	Building
2123	Oregon white oak	*Quercus garryana*	13	20	F	natural lead, one-sided crown to E, old trunk wound	Yes	Remove	Grading
2124	Oregon white oak	*Quercus garryana*	20	30	G	natural lean to S, one-sided crown, some ivy	Yes	Remove	Building
2125	Oregon white oak	*Quercus garryana*	16	30	G	natural lean to N, one-sided crown, ivy	Yes	Remove	Building
2126	Oregon white oak	*Quercus garryana*	16	20	G	one-sided to S, ivy	Yes	Remove	Building
2127	Oregon white oak	*Quercus garryana*	16	16	G	one-sided to N	Yes	Remove	Grading
2128	Douglas-fir	*Pseudotsuga menziesii*	32	24	G	dominant tree, ivy up lower trunk	Yes	Remove	Building
2129	Oregon white oak	*Quercus garryana*	7	10	F	suppressed, small live crown	No	Remove	Condition
2130	Oregon white oak	*Quercus garryana*	16	24	F	moderate structure, one-sided to W	Yes	Remove	Building
2131	Oregon white oak	*Quercus garryana*	10	10	P	poor structure, small high live crown	No	Remove	Building
2132	Oregon white oak	*Quercus garryana*	10	6	F	small live crown, only suitable for retention in group	Yes	Retain	n/a
2133	Oregon white oak	*Quercus garryana*	14	18	G	one-sided crown to S, only suitable for retention in group	Yes	Retain	n/a
2134	bigleaf maple	*Acer macrophyllum*	2x9	6	P	mostly dead, not viable	No	Remove	Condition

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2135	Oregon white oak	*Quercus garryana*	12	10	F	very upright small live crown, only suitable for retention in group	Yes	Retain	n/a
2136	Oregon white oak	*Quercus garryana*	26	26	G	some branch decay, only suitable for retention in group	Yes	Retain	n/a
2137	Oregon white oak	*Quercus garryana*	8	6	P	very small live crown	No	Remove	Building
2138	Douglas-fir	*Pseudotsuga menziesii*	42	26	G	codom with 2139	Yes	Remove	Building
2139	Douglas-fir	*Pseudotsuga menziesii*	42	26	G	codom with 2138	Yes	Remove	Building
2140	Douglas-fir	*Pseudotsuga menziesii*	15	16	F	intermediate crown class	No	Remove	Building
2142	Douglas-fir	*Pseudotsuga menziesii*	36	18	F	moderate structure	No	Remove	Building
2143	Douglas-fir	*Pseudotsuga menziesii*	28	18	F	broken top, ivy	No	Remove	Building
2145	Oregon white oak	*Quercus garryana*	10	10	F	small upright crown, mostly to NNW	No	Remove	Building
2146	bigleaf maple	*Acer macrophyllum*	24	20	F	hollow with basal decay	No	Remove	Building
2147	Oregon white oak	*Quercus garryana*	12,18	18	G	codominant stems, crown asymmetry to NNW	Yes	Remove	Building
2148	Oregon white oak	*Quercus garryana*	15	16	F	moderate vigor, high live crown	No	Remove	Building
2149	Douglas-fir	*Pseudotsuga menziesii*	34	20	G	dominant tree	Yes	Remove	Building
2150	Oregon white oak	*Quercus garryana*	14	18	G	few dead branches	Yes	Remove	Building
2151	Oregon white oak	*Quercus garryana*	15	14	G	forked leaders	Yes	Remove	Building
2152	Oregon ash	*Fraxinus latifolia*	21	12	P	dead top, decay	No	Remove	ROW
2153	Oregon ash	*Fraxinus latifolia*	26	12	P	advanced trunk decay, broken top	No	Remove	ROW
2154	Oregon white oak	*Quercus garryana*	16	18	F	moderate structure, crown decay	No	Remove	ROW
2155	Oregon white oak	*Quercus garryana*	12	10	F	moderate structure	No	Remove	Grading
2156	Oregon white oak	*Quercus garryana*	15	11	F	forked leaders	No	Remove	Grading
2157	Douglas-fir	*Pseudotsuga menziesii*	36	20	F	broken top, very high live crown	No	Remove	Building
2158	Oregon white oak	*Quercus garryana*	12	11	F	overtopped, old trunk wound	No	Remove	Building

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No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2159	Oregon white oak	*Quercus garryana*	2x10	11	F	old broken top, poor structure, old trunk wound	No	Remove	Building
2160	Oregon white oak	*Quercus garryana*	12	11	F	overtopped by adjacent trees	No	Remove	Building
2161	Oregon white oak	*Quercus garryana*	15	16	F	below dominant fir canopy	No	Remove	Building
2162	Douglas-fir	*Pseudotsuga menziesii*	22	18	G	no major defects	Yes	Remove	Building
2163	bigleaf maple	*Acer macrophyllum*	15	12	P	trunk decay, excessive lean	No	Remove	Building
2164	Oregon white oak	*Quercus garryana*	12	12	F	below dominant canopy, moderate structure	No	Remove	Building
2165	Douglas-fir	*Pseudotsuga menziesii*	34	23	P	decline, dead and broken branches, epicormics	No	Remove	Grading
2166	Oregon white oak	*Quercus garryana*	14	16	F	basal decay	No	Remove	ROW
2167	Oregon white oak	*Quercus garryana*	12	24	F	one-sided crown with lean to W	No	Remove	ROW
2168	Oregon white oak	*Quercus garryana*	19	24	G	few dead branches	Yes	Remove	ROW
2169	Oregon white oak	*Quercus garryana*	16	18	G	high live crown	Yes	Remove	ROW
2170	Douglas-fir	*Pseudotsuga menziesii*	28	24	P	dead and broken branches, poor structure	No	Remove	ROW
2171	Douglas-fir	*Pseudotsuga menziesii*	28	20	P	dead and broken branches, poor structure	No	Remove	ROW
2172	Oregon white oak	*Quercus garryana*	12,16	22	G	codominant stems, upright crown	Yes	Remove	ROW
2173	Oregon white oak	*Quercus garryana*	10	10	F	small live crown	No	Remove	Grading
2174	Oregon white oak	*Quercus garryana*	14	10	P	advanced trunk decay with conks	No	Remove	Grading
2175	Oregon white oak	*Quercus garryana*	20	22	F	moderate structure, old basal wound, some branch decay	Yes	Remove	Grading
2176	Oregon ash	*Fraxinus latifolia*	14	20	F	moderate structure, not suitable for retention with adjacent removal	No	Remove	Condition
2177	Oregon white oak	*Quercus garryana*	10	6	P	poor structure, very small live crown	No	Remove	Condition

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2178	Oregon white oak	*Quercus garryana*	12	10	P	trunk wound on S face with slim flux	No	Remove	Building
2179	Douglas-fir	*Pseudotsuga menziesii*	24	16	F	dominant tree, ivy up lower trunk	Yes	Remove	Grading
2180	bigleaf maple	*Acer macrophyllum*	17	18	G	basal wound, some decay	No	Remove	Grading
2181	Oregon white oak	*Quercus garryana*	11	10	F	small live crown, epicormics, not suitable for retention with adjacent removal	No	Remove	Condition
2182	Oregon ash	*Fraxinus latifolia*	18	16	F	moderate structure	No	Remove	ROW
2183	Oregon white oak	*Quercus garryana*	10	6	P	broken top, advanced decay at leader juncture	No	Remove	ROW
2184	Oregon white oak	*Quercus garryana*	10	10	F	small live crown	No	Remove	ROW
2185	Oregon white oak	*Quercus garryana*	15	16	F	one-sided crown, branch decay, old basal wound	No	Remove	ROW
2186	Oregon white oak	*Quercus garryana*	12	14	F	moderate structure, one-sided crown to E	No	Remove	ROW
2187	Oregon ash	*Fraxinus latifolia*	12	15	F	basal decay	No	Remove	ROW
2188	Oregon white oak	*Quercus garryana*	8,20	25	F	moderate structure, ivy up trunk	Yes	Remove	Grading
2189	bigleaf maple	*Acer macrophyllum*	14	12	F	moderate structure, ivy up trunk	No	Remove	Grading
2190	Oregon white oak	*Quercus garryana*	20	18	F	moderate structure	Yes	Remove	Grading
2191	Oregon white oak	*Quercus garryana*	10	8	P	very small live crown	No	Remove	Grading
2192	Oregon white oak	*Quercus garryana*	16	16	G	upright crown structure, some ivy	Yes	Remove	Grading
2193	Oregon white oak	*Quercus garryana*	10	14	F	below dominant canopy	Yes	Remove	Grading
2194	Oregon white oak	*Quercus garryana*	28	22	G	moderate structure	Yes	Remove	Building
2195	Oregon white oak	*Quercus garryana*	36	24	G	some basal decay	Yes	Remove	Building
2196	Oregon ash	*Fraxinus latifolia*	16	15	F	growing into oak canopy, not suitable for retention with adjacent removal	No	Remove	Condition
2197	Oregon white oak	*Quercus garryana*	18	14	F	upright crown, one-sided to E	Yes	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2198	grand fir	*Abies grandis*	24	14	G	trunk sweep at ~10'	Yes	Remove	Grading
2199	Douglas-fir	*Pseudotsuga menziesii*	24	12	F	old broken top, crook in trunk, ivy on lower trunk	No	Remove	ROW
2200	Douglas-fir	*Pseudotsuga menziesii*	24	14	G	codominant crown class	Yes	Remove	Building
2201	Oregon white oak	*Quercus garryana*	10	6	P	poor structure, trunk wound	No	Remove	Building
2202	bigleaf maple	*Acer macrophyllum*	10,12,2x14	20	F	moderate structure, hollow with trunk decay	No	Remove	Grading
2203	Douglas-fir	*Pseudotsuga menziesii*	18,26	16	F	large and numerous *P. pini* conks horizontally and laterally along trunk	No	Remove	ROW
2284	Douglas-fir	*Pseudotsuga menziesii*	14	13	F	small high live crown, ivy	No	Remove	ROW
2285	Oregon white oak	*Quercus garryana*	13	15	G	ivy and blackberry inhibited complete visual assessment	No	Remove	ROW
2286	Oregon white oak	*Quercus garryana*	16	16	G	moderate structure, ivy on lower trunk inhibited complete visual assessment	Yes	Remove	Grading
2287	Oregon white oak	*Quercus garryana*	28	28	G	some branch decay, ivy on lower trunk inhibited complete visual assessment	Yes	Retain	n/a
2288	Oregon white oak	*Quercus garryana*	28	32	G	somewhat one-sided to S	Yes	Remove	Building
2289	Oregon ash	*Fraxinus latifolia*	13	18	F	in crown of oak, not suitable for retention with adjacent removal	No	Remove	Condition
2290	Oregon white oak	*Quercus garryana*	24	20	G	moderate crown structure, ivy up trunk	Yes	Remove	Building
2291	Oregon white oak	*Quercus garryana*	27	26	F	one-sided to W, few dead and broken branches	Yes	Remove	Grading
2292	Oregon white oak	*Quercus garryana*	16	20	G	moderate structure	Yes	Remove	ROW
2293	Oregon white oak	*Quercus garryana*	23	20	F	branch dieback, epicormics	No	Remove	ROW
2294	Oregon white oak	*Quercus garryana*	20	14	F	hollow with advanced decay 30-40' just below main crown weight	No	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2295	Oregon white oak	*Quercus garryana*	18	12	P	very poor crown structure, extensive ivy on lower trunk	No	Remove	Building
2296	Douglas-fir	*Pseudotsuga menziesii*	18	14	F	competing with oaks	No	Remove	Building
2297	Oregon white oak	*Quercus garryana*	24	26	G	some branch decay	Yes	Remove	Building
2298	Oregon white oak	*Quercus garryana*	12	8	P	very poor structure, small live crown	No	Remove	Building
2299	sweet cherry	*Prunus avium*	15	12	F	invasive species	No	Remove	Building
2300	Oregon white oak	*Quercus garryana*	24	20	F	some branch decay, one-sided to S	Yes	Remove	Building
2301	bigleaf maple	*Acer macrophyllum*	10	10	F	small one-sided crown to S	No	Remove	Building
2302	madrone	*Arbutus menziesii*	24	24	F	basal decay on N and S sides, some branch decay	Yes	Remove	Building
2303	Oregon white oak	*Quercus garryana*	12	10	F	in crown of madrone	No	Remove	Building
2304	Oregon white oak	*Quercus garryana*	25	24	G	moderate crown structure	Yes	Remove	Building
2305	bigleaf maple	*Acer macrophyllum*	14	16	F	poor structure, hollow with decay	No	Remove	Building
2306	Oregon white oak	*Quercus garryana*	21	16	F	very upright crown, crown decay	No	Remove	Building
2307	bigleaf maple	*Acer macrophyllum*	10	8	P	overtopped by adjacent trees	No	Remove	Building
2308	bigleaf maple	*Acer macrophyllum*	12	16	P	poor structure, dead and broken branches, branch decay	No	Remove	Building
2309	bigleaf maple	*Acer macrophyllum*	12	16	P	broken top, decay	No	Remove	Building
2310	bigleaf maple	*Acer macrophyllum*	8	12	P	below dominant canopy, high live crown	No	Remove	Building
2311	Douglas-fir	*Pseudotsuga menziesii*	30	20	G	few dead branches, ivy on lower trunk, unable to see top	Yes	Remove	Building
2312	Douglas-fir	*Pseudotsuga menziesii*	10	0	D	dead	No	Remove	Condition
2313	Douglas-fir	*Pseudotsuga menziesii*	18	16	P	broken top, below dominant canopy, ivy on lower trunk	No	Remove	Condition
2314	Douglas-fir	*Pseudotsuga menziesii*	17	0	D	dead	No	Remove	Grading
2315	bigleaf maple	*Acer macrophyllum*	3x9	20	F	poor structure, ivy infestation	No	Remove	ROW

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2316	Douglas-fir	*Pseudotsuga menziesii*	42	24	F	suspect lower trunk decay, hollow sounding, bird/insect activity	No	Remove	ROW
2317	Douglas-fir	*Pseudotsuga menziesii*	26	15	P	decline, dead and broken branches	No	Remove	ROW
2318	Oregon white oak	*Quercus garryana*	26	24	G	good crown structure, ivy inhibited complete visual assessment	Yes	Remove	Grading
2319	Douglas-fir	*Pseudotsuga menziesii*	24	16	F	dead and broken branches, codominant crown class, some ivy	No	Remove	Building
2320	Douglas-fir	*Pseudotsuga menziesii*	10	8	P	suppressed	No	Remove	Building
2321	western redcedar	*Thuja plicata*	12	10	F	one-sided crown	No	Remove	Grading
2322	Douglas-fir	*Pseudotsuga menziesii*	28	20	G	dominant tree, unable to see top	Yes	Remove	Building
2323	bigleaf maple	*Acer macrophyllum*	16	22	F	moderate structure, some branch decay, ivy	No	Remove	Grading
2324	red alder	*Alnus rubra*	14	16	F	moderate structure, some ivy	No	Remove	Grading
2325	Oregon white oak	*Quercus garryana*	26	20	G	some branch decay, crown asymmetry	Yes	Remove	ROW
2326	Oregon white oak	*Quercus garryana*	25	30	G	small hollow with some decay at 30', also some branch decay	Yes	Remove	ROW
2327	Douglas-fir	*Pseudotsuga menziesii*	16	12	P	intermediate crown class, poor structure, competing with oaks	No	Remove	ROW
2328	Oregon white oak	*Quercus garryana*	12	8	F	small live crown in direction of lean to N	No	Remove	ROW
2329	Douglas-fir	*Pseudotsuga menziesii*	30	24	G	few dead branches, unable to see top	Yes	Remove	ROW
2330	Oregon ash	*Fraxinus latifolia*	12	12	P	poor structure, small live crown, excessive lean	No	Remove	Grading
2331	Oregon ash	*Fraxinus latifolia*	8,12	16	P	poor structure, excessive lean to SE, dead branches	No	Remove	Grading
2332	western redcedar	*Thuja plicata*	20	14	F	one-sided crown, small hollow near base	No	Remove	Grading
2333	western redcedar	*Thuja plicata*	15	10	F	one-sided crown, basal decay	No	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2334	western redcedar	*Thuja plicata*	10	8	P	dead top, trunk decay	No	Remove	Building
2335	Douglas-fir	*Pseudotsuga menziesii*	18	14	P	old broken top, very poor crown structure	No	Remove	Building
2336	Douglas-fir	*Pseudotsuga menziesii*	21	16	P	old broken top, very poor crown structure	No	Remove	Building
2337	Douglas-fir	*Pseudotsuga menziesii*	26	18	F	moderate structure, high live crown	No	Remove	ROW
2338	Douglas-fir	*Pseudotsuga menziesii*	24	18	F	basal swelling	No	Remove	Grading
2339	grand fir	*Abies grandis*	26	18	F	old broken top, high live crown	No	Remove	Building
2340	Douglas-fir	*Pseudotsuga menziesii*	24	18	F	moderate crown structure, dead and broken branches	No	Remove	Building
2341	grand fir	*Abies grandis*	16	12	P	overtopped by fir	No	Remove	ROW
2342	Oregon white oak	*Quercus garryana*	26	30	G	natural lean away from fir, one-sided crown to E	Yes	Remove	ROW
2343	Oregon ash	*Fraxinus latifolia*	11,15	25	P	poor structure, branch decay	No	Remove	ROW
2344	Oregon white oak	*Quercus garryana*	14	18	F	small one-sided crown to W	No	Remove	Grading
2345	Oregon white oak	*Quercus garryana*	12	12	P	old broken top, advanced decay in juncture of leader	No	Remove	Grading
2346	Douglas-fir	*Pseudotsuga menziesii*	20	20	F	moderate structure, one-sided crown	No	Remove	Grading
2347	Douglas-fir	*Pseudotsuga menziesii*	36	22	G	dominant tree, unable to see top	Yes	Remove	Grading
2348	Oregon white oak	*Quercus garryana*	2x8	18	F	poor structure, extensive ivy	No	Remove	Grading
2349	Oregon white oak	*Quercus garryana*	26	32	G	some crown decay	Yes	Remove	Building
2350	Oregon ash	*Fraxinus latifolia*	20	17	F	moderate structure	No	Remove	Grading
2351	Oregon white oak	*Quercus garryana*	26	18	G	one-sided crown to E	Yes	Remove	Grading
2352	Oregon ash	*Fraxinus latifolia*	10	14	F	dead branches, below dominant canopy	No	Remove	ROW
2353	Oregon white oak	*Quercus garryana*	22	24	G	mostly one-side to SE	Yes	Remove	ROW
2354	Oregon white oak	*Quercus garryana*	11	10	G	no major defects	Yes	Remove	ROW

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2355	Douglas-fir	*Pseudotsuga menziesii*	24	16	F	poor structure, history of lateral branch failure, dead and broken branches	No	Remove	Building
2356	Douglas-fir	*Pseudotsuga menziesii*	35	24	G	codominant crown class	Yes	Remove	Grading
2357	Oregon white oak	*Quercus garryana*	19	22	P	poor structure, dead and broken branches, branch decay	No	Remove	Building
2358	Oregon ash	*Fraxinus latifolia*	8	8	P	poor structure, extensive ivy	No	Remove	Building
2359	Oregon white oak	*Quercus garryana*	12	15	F	small live crown	No	Remove	ROW
2360	bigleaf maple	*Acer macrophyllum*	13	17	F	below dominant canopy, basal decay	No	Remove	ROW
2361	Oregon white oak	*Quercus garryana*	29	24	G	moderate structure	Yes	Remove	ROW
2362	bigleaf maple	*Acer macrophyllum*	10	12	P	high live crown, extensive ivy	No	Remove	Building
2363	Oregon white oak	*Quercus garryana*	24	22	G	good crown structure, some ivy at base	Yes	Remove	Building
2364	Oregon white oak	*Quercus garryana*	20	14	P	small live crown, extensive ivy into crown	No	Remove	Condition
2365	Douglas-fir	*Pseudotsuga menziesii*	18	10	F	intermediate crown class, competing with oaks, ivy	No	Remove	Condition
2366	Oregon white oak	*Quercus garryana*	18	12	F	high upright crown, some ivy	Yes	Remove	Building
2367	Douglas-fir	*Pseudotsuga menziesii*	24	18	F	moderate structure, competing with oaks	No	Remove	Building
2368	Oregon white oak	*Quercus garryana*	28	26	G	dead spur branch, ivy up lower trunk	Yes	Remove	Building
2369	Douglas-fir	*Pseudotsuga menziesii*	12	10	P	suppressed	No	Remove	Building
2370	bigleaf maple	*Acer macrophyllum*	10	11	F	below dominant canopy	No	Remove	Building
2371	bigleaf maple	*Acer macrophyllum*	10	10	P	poor basal structure, small live crown	No	Remove	Building
2372	bigleaf maple	*Acer macrophyllum*	6	14	P	dead and broken branches, small live crown, suppressed	No	Remove	Building
2373	bigleaf maple	*Acer macrophyllum*	10	12	P	poor structure, small live crown, dieback	No	Remove	Building
2374	bigleaf maple	*Acer macrophyllum*	12	15	F	moderate structure	No	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2375	bigleaf maple	*Acer macrophyllum*	18	18	F	moderate structure, dead and broken branches, some branch decay	No	Remove	Building
2376	bigleaf maple	*Acer macrophyllum*	10	16	P	very small one-sided crown, below dominant canopy	No	Remove	Building
2377	Oregon white oak	*Quercus garryana*	20,26	38	G	some crown asymmetry, some branch decay	Yes	Remove	Building
2378	bigleaf maple	*Acer macrophyllum*	8	16	P	very small one-sided live crown, below dominant canopy	No	Remove	Condition
2379	bigleaf maple	*Acer macrophyllum*	8	13	P	high live crown, below dominant canopy	No	Remove	Building
2380	Douglas-fir	*Pseudotsuga menziesii*	29	18	G	dominant tree, unable to see top, ivy on lower trunk	Yes	Retain	n/a
2381	bigleaf maple	*Acer macrophyllum*	12	20	F	moderate structure, ivy up trunk	No	Retain	n/a
2382	bigleaf maple	*Acer macrophyllum*	11	16	F	below dominant canopy	No	Retain	n/a
2383	Douglas-fir	*Pseudotsuga menziesii*	32	22	G	dominant tree, unable to see top, ivy at base	Yes	Retain	n/a
2384	bigleaf maple	*Acer macrophyllum*	10,14,18,22	30	P	poor structure, advanced basal and trunk decay, high risk to S	No	Remove	Condition
2385	bigleaf maple	*Acer macrophyllum*	6,8	15	P	extensive ivy, severe lean to N	No	Remove	Condition
2394	sweet cherry	*Prunus avium*	10	15	F	invasive species	No	Remove	Building
2395	bigleaf maple	*Acer macrophyllum*	8	15	P	growing on decay log	No	Remove	Building
2396	Oregon white oak	*Quercus garryana*	17	18	F	codominant crown class, moderate crown structure, fill at base	Yes	Remove	Building
2458	bigleaf maple	*Acer macrophyllum*	7	12	P	poor structure, small live crown	No	Remove	Grading
2459	Douglas-fir	*Pseudotsuga menziesii*	16	15	F	moderate trunk sweep, ivy	No	Remove	ROW
2461	Douglas-fir	*Pseudotsuga menziesii*	24	15	F	extensive ivy up trunk, codominant crown class	Yes	Remove	Grading

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No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2462	Oregon white oak	*Quercus garryana*	12	14	F	below dominant canopy	No	Remove	Building
2463	Douglas-fir	*Pseudotsuga menziesii*	30	20	G	codominant crown class	Yes	Remove	Building
2464	Douglas-fir	*Pseudotsuga menziesii*	26	14	G	codominant crown class	Yes	Remove	Building
2469	sweet cherry	*Prunus avium*	15	16	F	invasive species	No	Remove	Grading
2470	Oregon white oak	*Quercus garryana*	14	10	P	broken top, basal decay	No	Remove	ROW
2471	Douglas-fir	*Pseudotsuga menziesii*	26	15	G	codominant crown class, ivy	Yes	Remove	ROW
2472	Oregon white oak	*Quercus garryana*	10	6	P	suppressed by fir	No	Remove	ROW
2473	grand fir	*Abies grandis*	23	12	G	codominant crown class	Yes	Remove	ROW
2474	bigleaf maple	*Acer macrophyllum*	10	16	P	poor structure, below dominant canopy	No	Remove	ROW
2475	Douglas-fir	*Pseudotsuga menziesii*	30	20	G	codominant crown class	Yes	Remove	ROW
2476	Douglas-fir	*Pseudotsuga menziesii*	26	24	G	codominant crown class, ivy	Yes	Remove	ROW
2477	Douglas-fir	*Pseudotsuga menziesii*	22	18	F	codominant crown class	Yes	Remove	ROW
2478	Douglas-fir	*Pseudotsuga menziesii*	15	14	F	intermediate crown class, poor structure	No	Remove	ROW
2479	Douglas-fir	*Pseudotsuga menziesii*	32	24	F	codominant crown class, twig dieback, dead and broken branches	No	Remove	ROW
2480	Oregon white oak	*Quercus garryana*	18	20	P	very poor structure, decay	No	Remove	Grading
2481	Oregon ash	*Fraxinus latifolia*	18	13	F	moderate structure, few dead and broken branches	No	Remove	Grading
2482	Oregon white oak	*Quercus garryana*	36	28	G	moderate structure	Yes	Remove	Building
2483	Oregon ash	*Fraxinus latifolia*	20	20	P	failed, hung up in 2482, new leaders	No	Remove	Building
2484	Oregon white oak	*Quercus garryana*	27	30	G	some branch decay	Yes	Remove	ROW
2485	Oregon ash	*Fraxinus latifolia*	8	10	F	moderate structure	No	Remove	Building
2486	madrone	*Arbutus menziesii*	7	10	F	moderate structure	No	Remove	Building
2487	Oregon white oak	*Quercus garryana*	28	25	G	old basal wound	Yes	Remove	ROW
2488	Oregon white oak	*Quercus garryana*	14	10	F	moderate structure	Yes	Remove	Building
2489	Oregon white oak	*Quercus garryana*	12	10	F	moderate structure	Yes	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2490	Oregon white oak	*Quercus garryana*	12,18	20	F	poor structure, trunk decay	No	Remove	Building
2491	Oregon ash	*Fraxinus latifolia*	13	10	F	moderate structure	No	Remove	Building
2492	Oregon ash	*Fraxinus latifolia*	6	10	F	high live crown	No	Remove	Building
2493	Oregon white oak	*Quercus garryana*	19	20	F	poor structure, dead scaffold branch, decay	No	Remove	ROW
2494	Oregon ash	*Fraxinus latifolia*	2x6,9	10	P	dead and broken branches branch decay	No	Remove	Condition
2495	English holly	*Ilex aquifolium*	6	10	P	very poor structure, invasive species	No	Remove	Condition
2496	Oregon white oak	*Quercus garryana*	10	10	F	moderate structure, small live crown	No	Remove	Building
2497	Douglas-fir	*Pseudotsuga menziesii*	10	10	P	suppressed, extensive ivy	No	Remove	Condition
2498	Oregon white oak	*Quercus garryana*	20	18	G	some crown decay, dead branches	Yes	Remove	Building
2499	Oregon ash	*Fraxinus latifolia*	10	10	P	poor structure, extensive ivy	No	Remove	Building
2500	Oregon white oak	*Quercus garryana*	24	18	G	some branch and trunk decay, ivy	Yes	Remove	Building
2501	Oregon white oak	*Quercus garryana*	28	26	F	codom with 2498	Yes	Remove	Building
2502	Oregon white oak	*Quercus garryana*	18	16	F	moderate structure	Yes	Remove	Building
2503	Oregon ash	*Fraxinus latifolia*	10	12	P	very poor structure, ivy	No	Remove	Grading
2504	Oregon white oak	*Quercus garryana*	24	22	G	some branch decay	Yes	Remove	Grading
2505	Oregon white oak	*Quercus garryana*	12	14	F	moderate structure, small live crown	Yes	Remove	Building
2506	Oregon ash	*Fraxinus latifolia*	6	10	P	very poor structure, ivy	No	Remove	Building
2507	bigleaf maple	*Acer macrophyllum*	12	16	G	moderate structure, ivy	No	Remove	Building
2508	sweet cherry	*Prunus avium*	8	10	P	invasive species, extensive ivy	No	Remove	Grading
2509	Oregon white oak	*Quercus garryana*	10,12	16	G	very narrow one-sided crown to N	No	Remove	Building
2510	sweet cherry	*Prunus avium*	6	15	P	invasive species, poor structure	No	Remove	Building
2511	Oregon white oak	*Quercus garryana*	12	10	G	moderate structure, some branch decay	No	Remove	Building
2512	Oregon white oak	*Quercus garryana*	14	10	G	moderate structure, some branch decay	No	Remove	Building
2513	Douglas-fir	*Pseudotsuga menziesii*	14	8	P	poor structure	No	Remove	Building
2514	Oregon white oak	*Quercus garryana*	10	0	D	mostly dead, not viable	No	Remove	Building

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No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2515	Douglas-fir	*Pseudotsuga menziesii*	15	14	F	old broken top, high live crown	No	Remove	Building
2516	madrone	*Arbutus menziesii*	23	20	G	mostly one-sided to N	Yes	Remove	Building
2517	Oregon white oak	*Quercus garryana*	10	0	D	dead	No	Remove	Grading
2518	Douglas-fir	*Pseudotsuga menziesii*	24	16	F	extensive ivy up trunk	No	Remove	Condition
2519	Oregon ash	*Fraxinus latifolia*	8	10	P	poor structure, small live crown, ivy	No	Retain	n/a
2520	English hawthorn	*Crataegus monogyna*	6	10	P	invasive species, very poor structure	No	Remove	Condition
2521	Oregon white oak	*Quercus garryana*	13,20	16	F	3 codom stems, 1 dead, moderate structure	Yes	Remove	Building
2522	Oregon ash	*Fraxinus latifolia*	12	20	F	moderate structure	No	Retain	n/a
2523	Oregon white oak	*Quercus garryana*	20,24	20	F	moderate structure, some decay, ivy	Yes	Retain	n/a
2524	Oregon white oak	*Quercus garryana*	10,16	24	F	3 codom stems, 1 dead, very one-sided to S, moderate structure	Yes	Remove	Building
2525	Oregon ash	*Fraxinus latifolia*	20	20	F	moderate structure	No	Retain	n/a
2526	Douglas-fir	*Pseudotsuga menziesii*	29	24	F	moderate structure	Yes	Retain	n/a
2527	Oregon ash	*Fraxinus latifolia*	12	20	F	leans with crown weight to N	No	Retain	n/a
2528	Douglas-fir	*Pseudotsuga menziesii*	19	16	G	dominant tree	Yes	Retain	n/a
2529	Oregon ash	*Fraxinus latifolia*	15	16	F	moderate structure, some basal decay	No	Retain	n/a
2530	Douglas-fir	*Pseudotsuga menziesii*	20	16	F	codominant crown class, small *P. pini* conks	No	Remove	Building
2531	Oregon ash	*Fraxinus latifolia*	7	10	D	mostly dead, not viable	No	Retain	n/a
2532	madrone	*Arbutus menziesii*	8	12	F	moderate structure	Yes	Retain	n/a
2533	Douglas-fir	*Pseudotsuga menziesii*	24	18	F	codominant crown class	Yes	Remove	Building
2534	Oregon white oak	*Quercus garryana*	13	6	P	dead top	No	Retain	n/a
2536	Oregon ash	*Fraxinus latifolia*	14	16	F	moderate structure	No	Remove	Building
2537	Oregon white oak	*Quercus garryana*	16	18	G	old trunk wounds, one-sided to E	Yes	Remove	Building
2538	Oregon white oak	*Quercus garryana*	24	28	G	few dead branches	Yes	Remove	Building

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2539	Oregon ash	*Fraxinus latifolia*	2x10	16	P	decline, dead and broken branches	No	Remove	Building
2540	Oregon ash	*Fraxinus latifolia*	16	12	F	moderate structure, branch dieback, only suitable for retention in group	No	Remove	Building
2541	Oregon white oak	*Quercus garryana*	9	10	F	one-sided crown to NW, only suitable for retention in group	No	Remove	Building
2542	Oregon ash	*Fraxinus latifolia*	10	11	F	moderate structure	No	Retain	n/a
2543	Oregon ash	*Fraxinus latifolia*	12,16,18,24	15	P	severe decline, dead and broken branches, branch decay	No	Remove	Building
2544	Oregon ash	*Fraxinus latifolia*	10	8	P	poor structure, ivy infestation	No	Retain	n/a
2545	Douglas-fir	*Pseudotsuga menziesii*	8	9	P	suppressed	No	Retain	n/a
2546	Oregon white oak	*Quercus garryana*	26	24	G	ivy inhibited complete visual assessment	Yes	Retain	n/a
2547	Douglas-fir	*Pseudotsuga menziesii*	8	8	P	suppressed	No	Retain	n/a
2548	Oregon white oak	*Quercus garryana*	20	24	F	moderate structure, one-sided to N	Yes	Retain	n/a
2549	Oregon white oak	*Quercus garryana*	20	26	F	moderate structure, ivy	Yes	Retain	n/a
2550	Oregon white oak	*Quercus garryana*	24	26	F	moderate structure, one-sided to E, ivy	Yes	Retain	n/a
2551	English hawthorn	*Crataegus monogyna*	8	12	F	invasive species, poor structure	No	Remove	Condition
2552	Oregon ash	*Fraxinus latifolia*	2x12	18	F	moderate structure, some decay	No	Retain	n/a
2553	English hawthorn	*Crataegus monogyna*	2x8	8	F	invasive species, ivy	No	Retain	n/a
2554	Oregon ash	*Fraxinus latifolia*	2x16	20	F	moderate structure, dead branches	No	Retain	n/a
2555	Oregon ash	*Fraxinus latifolia*	6,8,12	18	F	moderate structure	No	Remove	Building
2556	Oregon white oak	*Quercus garryana*	18	20	G	ivy	Yes	Retain	n/a
2557	Oregon ash	*Fraxinus latifolia*	18	20	G	moderate structure	No	Retain	n/a
2558	Oregon ash	*Fraxinus latifolia*	8	10	F	poor structure	No	Retain	n/a
2559	Oregon ash	*Fraxinus latifolia*	15	20	G	few dead branches	No	Retain	n/a
2561	Douglas-fir	*Pseudotsuga menziesii*	9	14	P	suppressed	No	Retain	n/a
2562	Oregon ash	*Fraxinus latifolia*	2x8	10	F	poor structure	No	Retain	n/a

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2563	Oregon ash	*Fraxinus latifolia*	12	14	F	poor structure	No	Retain	n/a
2564	Oregon ash	*Fraxinus latifolia*	24	16	F	moderate structure, dead branches	No	Retain	n/a
2565	Douglas-fir	*Pseudotsuga menziesii*	24	24	F	ivy inhibited complete visual assessment	No	Retain	n/a
2566	Oregon white oak	*Quercus garryana*	24	22	F	moderate structure	Yes	Retain	n/a
2567	sweet cherry	*Prunus avium*	6	10	F	invasive species	No	Remove	Condition
2569	Oregon white oak	*Quercus garryana*	10,20	16	F	moderate structure, extensive ivy, codominant leaders, crown decay	No	Remove	Building
2570	Douglas-fir	*Pseudotsuga menziesii*	26	20	G	dominant tree, ivy up lower trunk	Yes	Remove	Grading
2571	Oregon white oak	*Quercus garryana*	9	6	P	very poor structure, mostly dead	No	Remove	Condition
2572	Oregon white oak	*Quercus garryana*	16	10	F	poor structure, ivy	No	Retain	n/a
2573	Oregon white oak	*Quercus garryana*	24	20	F	moderate structure, ivy	No	Retain	n/a
2574	Oregon white oak	*Quercus garryana*	9	10	P	mostly dead, ivy	No	Retain	n/a
2575	Oregon ash	*Fraxinus latifolia*	14,22,24	20	F	moderate structure, dead and broken branches, ivy	No	Retain	n/a
2576	Oregon white oak	*Quercus garryana*	30	20	F	moderate structure, ivy	Yes	Retain	n/a
2577a	Oregon ash	*Fraxinus latifolia*	16,20,22	18	P	very poor structure, decline	No	Retain	n/a
2577b	Oregon white oak	*Quercus garryana*	10,16	18	P	very poor structure, decline	No	Retain	n/a
2578	Oregon ash	*Fraxinus latifolia*	20	24	P	moderate structure, chlorotic foliage	No	Retain	n/a
2579	Oregon white oak	*Quercus garryana*	26	24	F	moderate structure, ivy	Yes	Retain	n/a
2580	Oregon ash	*Fraxinus latifolia*	10,16	18	F	moderate structure, some decay, ivy	No	Retain	n/a
2581	Oregon white oak	*Quercus garryana*	25	20	F	moderate structure	Yes	Remove	Building
2582	Oregon white oak	*Quercus garryana*	18	16	F	moderate structure, okay in group	Yes	Remove	Building
2583	Oregon white oak	*Quercus garryana*	20	16	F	moderate structure, okay in group	Yes	Remove	Building
2584	bigleaf maple	*Acer macrophyllum*	8	12	P	suppressed	No	Remove	ROW
2585	bigleaf maple	*Acer macrophyllum*	14	16	F	moderate structure	No	Remove	Building
2586	Douglas-fir	*Pseudotsuga menziesii*	9	10	P	suppressed	No	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2587	Douglas-fir	*Pseudotsuga menziesii*	36	28	G	codominant crown class, some resin on lower trunk	Yes	Remove	Grading
2588	Oregon ash	*Fraxinus latifolia*	8	8	P	poor structure, small live crown	No	Remove	Building
2662	Oregon white oak	*Quercus garryana*	18	15	F	moderate structure	Yes	Retain	n/a
2663	Douglas-fir	*Pseudotsuga menziesii*	10	10	P	suppressed	No	Remove	Grading
2664	Douglas-fir	*Pseudotsuga menziesii*	30	18	F	moderate structure, ivy	Yes	Retain	n/a
2665	Oregon ash	*Fraxinus latifolia*	18	16	F	poor structure, extensive ivy	No	Retain	n/a
2666	Oregon white oak	*Quercus garryana*	16	15	F	moderate crown structure, extensive ivy	No	Remove	Building
2667	Oregon white oak	*Quercus garryana*	15	15	F	moderate structure, dead branches, extensive ivy	No	Retain	n/a
2668	Oregon ash	*Fraxinus latifolia*	16	18	F	moderate structure, ivy up trunk	No	Remove	Grading
2669	Oregon ash	*Fraxinus latifolia*	14	10	P	very poor structure, decay	No	Remove	Building
2670	Oregon ash	*Fraxinus latifolia*	8	10	F	poor structure, small live crown, ivy	No	Remove	Building
2671	Oregon ash	*Fraxinus latifolia*	7,12	8	P	very poor structure, dead and broken branches, decay	No	Remove	Building
2672	Oregon ash	*Fraxinus latifolia*	16	15	P	excessive lean to S, hung up in adjacent crowns	No	Remove	Building
2673	Oregon white oak	*Quercus garryana*	13	16	P	overtopped by fir	No	Remove	ROW
2675	Oregon white oak	*Quercus garryana*	16	10	P	severe ivy, poor structure, crown decay	Yes	Retain	n/a
2676	Oregon ash	*Fraxinus latifolia*	20,24	20	P	advanced trunk decay, extensive ivy	No	Retain	n/a
2677	Oregon white oak	*Quercus garryana*	16	8	P	extensive ivy infestation	Yes	Retain	n/a
2678	Douglas-fir	*Pseudotsuga menziesii*	30	14	F	extensive ivy up lower trunk, codominant crown class	Yes	Retain	n/a
2679	Douglas-fir	*Pseudotsuga menziesii*	30	20	F	dominant tree, ivy up trunk	Yes	Retain	n/a
2680	Oregon white oak	*Quercus garryana*	30	22	G	some crown decay, ivy inhibited complete visual assessment	Yes	Retain	n/a

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2681	Oregon ash	*Fraxinus latifolia*	24	20	P	one-sided crown to E, ivy up trunk, increased risk potential	No	Remove	Condition
2682	Oregon ash	*Fraxinus latifolia*	20	20	F	poor crown structure, one-sided to E, ivy up trunk	No	Retain	n/a
2683	Douglas-fir	*Pseudotsuga menziesii*	16	12	P	suppressed	No	Retain	n/a
2684	Douglas-fir	*Pseudotsuga menziesii*	16	8	P	suppressed	No	Retain	n/a
2685	Oregon ash	*Fraxinus latifolia*	10,14	12	P	poor structure, dead branches, extensive ivy	No	Retain	n/a
2686	Oregon ash	*Fraxinus latifolia*	20	20	P	poor structure, dead branches, extensive ivy	No	Retain	n/a
2687	bigleaf maple	*Acer macrophyllum*	7,12	12	P	broken top, poor structure, severe ivy	No	Retain	n/a
2688	Oregon ash	*Fraxinus latifolia*	8	14	P	dead branches, small live crown, below dominant canopy	No	Retain	n/a
2689	Oregon ash	*Fraxinus latifolia*	30	24	F	dead and broken branches, moderate structure, severe ivy infestation	No	Retain	n/a
2690	Oregon white oak	*Quercus garryana*	40	34	G	some broken branches, branch decay, ivy inhibited complete assessment	Yes	Retain	n/a
2691	bigleaf maple	*Acer macrophyllum*	12	20	P	broken tops, very poor structure, severe ivy infestation	No	Remove	Building
2692	Oregon ash	*Fraxinus latifolia*	14	12	F	moderate structure, high live crown, some ivy	No	Remove	Building
2693	bigleaf maple	*Acer macrophyllum*	3x12	16	F	high live crown, trunk and branch decay	No	Remove	Building
2694	western redcedar	*Thuja plicata*	24	14	P	dead top, trunk decay with hollows	No	Remove	Building
2695	Douglas-fir	*Pseudotsuga menziesii*	24	16	P	poor structure, severe ivy infestation	No	Remove	Grading
2696	Oregon white oak	*Quercus garryana*	24	30	F	poor structure, rubs against 2698, ivy	No	Remove	Grading
2697	bigleaf maple	*Acer macrophyllum*	8,14,16	16	P	poor structure, severe ivy infestation	No	Remove	Grading

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
2698	Douglas-fir	*Pseudotsuga menziesii*	24	15	F	poor stem structure, forked top, rubs against 2696	No	Remove	Grading
2699	Oregon white oak	*Quercus garryana*	30	20	P	severe ivy up trunk into crown, branch dieback	No	Retain	n/a
2700	Oregon white oak	*Quercus garryana*	20	20	P	severe ivy up trunk into crown, crown decay	No	Remove	Grading
2701	bigleaf maple	*Acer macrophyllum*	2x8	10	P	poor structure, one dead leader	No	Retain	n/a
2702	bigleaf maple	*Acer macrophyllum*	8	10	F	moderate structure, some crown decay, ivy	No	Retain	n/a
2703	English hawthorn	*Crataegus monogyna*	18	15	P	invasive species	No	Off-site	n/a
2704	Douglas-fir	*Pseudotsuga menziesii*	12	12	F	one-sided crown	No	Off-site	n/a
2705	deciduous	unknown	20	10	P	very poor structure, over taken with ivy	No	Retain	n/a
2706	western redcedar	*Thuja plicata*	24	15	G	some crown asymmetry	Yes	Remove	Building
2707	sweet cherry	*Prunus avium*	12	14	F	invasive species	No	Remove	Building
2708	sweet cherry	*Prunus avium*	8	10	F	invasive species	No	Remove	Condition
2709	sweet cherry	*Prunus avium*	12	18	F	invasive species	No	Remove	Condition
2710	Oregon white oak	*Quercus garryana*	14	20	F	high live crown, fill at base	Yes	Retain	n/a
2711	Oregon white oak	*Quercus garryana*	14	28	F	very one-sided with crown weight to S	No	Retain	n/a
2712	Oregon white oak	*Quercus garryana*	20	22	G	one-sided crown to S, ivy	Yes	Remove	ROW
2713	Douglas-fir	*Pseudotsuga menziesii*	28	20	F	codominant crown class, some ivy, broken top, decay	No	Remove	Grading
2714	Douglas-fir	*Pseudotsuga menziesii*	24	15	G	codominant crown class, some ivy	No	Remove	Grading
2715	Douglas-fir	*Pseudotsuga menziesii*	18	10	P	broken top, decline, extensive ivy	No	Remove	Building
3430	Douglas-fir	*Pseudotsuga menziesii*	16	16	P	suppressed	No	Remove	Building
3431	Douglas-fir	*Pseudotsuga menziesii*	36	24	F	codominant, okay in group	No	Remove	Building
3432	Douglas-fir	*Pseudotsuga menziesii*	26	20	F	codominant, okay in group	No	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
3433	Douglas-fir	*Pseudotsuga menziesii*	20	20	F	codominant, okay in group	No	Remove	Building
3434	Douglas-fir	*Pseudotsuga menziesii*	18	20	P	suppressed	No	Remove	Building
3435	Oregon white oak	*Quercus garryana*	7	10	F	overtopped by firs	No	Remove	Building
3436	Oregon white oak	*Quercus garryana*	9	7	P	suppressed, advanced decay, mostly dead	No	Remove	Building
3437	Oregon ash	*Fraxinus latifolia*	12	12	F	small high live crown, ivy	No	Remove	Building
3438	Oregon ash	*Fraxinus latifolia*	8	10	F	small high live crown, ivy	No	Remove	Building
3439	bigleaf maple	*Acer macrophyllum*	10,20,24	22	F	extensive ivy inhibited complete visual assessment	No	Remove	Grading
3440	Oregon white oak	*Quercus garryana*	30	30	G	ivy inhibited complete visual assessment	Yes	Retain	n/a
3441	Oregon ash	*Fraxinus latifolia*	12	11	P	poor structure, advanced trunk decay	No	Remove	Condition
3442	Oregon ash	*Fraxinus latifolia*	7	10	F	small high live crown	No	Retain	n/a
3443	Oregon ash	*Fraxinus latifolia*	7	15	F	small high live crown	No	Retain	n/a
3444	yew	*Taxus brevifolia*	7	12	F	moderate structure	Yes	Retain	n/a
3445	sweet cherry	*Prunus avium*	10	12	P	poor structure, invasive species	No	Retain	n/a
3446	Douglas-fir	*Pseudotsuga menziesii*	30	24	G	dominant tree, ivy at base	Yes	Remove	Building
3447	black hawthorn	*Crataegus douglasii*	12	13	P	old broken top, multiple leaders, advanced decay, ivy	No	Remove	ROW
3448	Oregon white oak	*Quercus garryana*	20	20	F	moderate structure, codominant leaders	Yes	Remove	Grading
3449	Oregon white oak	*Quercus garryana*	17	18	G	20-degree lean to N, good foliage density	Yes	Remove	ROW
3450	Oregon white oak	*Quercus garryana*	9	14	G	one-sided crown to E	No	Remove	ROW
3451	bigleaf maple	*Acer macrophyllum*	13	14	G	one-sided crown to W	No	Remove	ROW
3452	Oregon white oak	*Quercus garryana*	15	16	G	ivy	Yes	Remove	ROW

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No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
3453	Oregon white oak	*Quercus garryana*	2x16	24	G	moderate structure, one-sided crown to SSW	Yes	Remove	Building
3454	Oregon white oak	*Quercus garryana*	15	14	F	one-sided crown with lean to S	No	Remove	Building
3504	Oregon white oak	*Quercus garryana*	9	10	F	below dominant canopy	No	Remove	Building
3505	Oregon white oak	*Quercus garryana*	10	8	F	moderate structure, below dominant canopy, old wound on NE face	No	Remove	Building
3506	Oregon white oak	*Quercus garryana*	12	15	F	codominant with 3506, moderate structure	Yes	Remove	Building
3507	Oregon white oak	*Quercus garryana*	16	20	F	codominant with 3505, moderate structure, old wound on N face	Yes	Remove	Building
3508	Oregon white oak	*Quercus garryana*	10	10	G	below dominant canopy	Yes	Remove	Building
3509	bigleaf maple	*Acer macrophyllum*	10	15	F	poor structure, basal decay	No	Remove	Building
3510	Oregon white oak	*Quercus garryana*	9	10	F	moderate structure, forked top	Yes	Remove	Grading
3511	pine	*Pinus* spp.	11	12	G	forked top, no major defects	No	Retain	n/a
3512	western redcedar	*Thuja plicata*	5,8	10	F	codom stems ~1' above ground level, E stem topped and with new leader	No	Retain	n/a
3513	bigleaf maple	*Acer macrophyllum*	2x8	14	P	poor structure	No	Retain	n/a
3514	western redcedar	*Thuja plicata*	7	8	F	below dominant canopy	No	Retain	n/a
3515	western redcedar	*Thuja plicata*	8	8	F	trunk sweep to south	No	Retain	n/a
3516	Oregon ash	*Fraxinus latifolia*	17	16	F	high live crown, severe ivy up trunk	No	Retain	n/a
3517	European white birch	*Betula pendula*	9	10	P	invasive species	No	Remove	Condition
3518	deciduous	unknown	4,8	10	P	mostly dead, dead and broken branches, severe ivy infestation	No	Remove	Condition
3520	bigleaf maple	*Acer macrophyllum*	10	14	F	moderate structure	No	Remove	Building
3521	Douglas-fir	*Pseudotsuga menziesii*	30	20	P	old broken top, new codom leaders, included bark, resin	No	Remove	Building

No.	Common Name	Species Name	DBH*	C-Rad^	Cond#	Comments	Sig?	Treatment	Reason
3522	Oregon white oak	*Quercus garryana*	16	20	F	moderate structure, some ivy	Yes	Remove	Building
3523	Oregon white oak	*Quercus garryana*	16	14	P	poor structure, extensive ivy	No	Remove	Condition
3524	Douglas-fir	*Pseudotsuga menziesii*	15	15	P	excessive lean into 2668, extensive ivy	No	Remove	Condition
3525	Oregon white oak	*Quercus garryana*	22	25	F	moderate structure, ivy up trunk	Yes	Retain	n/a
3526	Oregon white oak	*Quercus garryana*	20	25	F	moderate structure, ivy up trunk	Yes	Retain	n/a
3537	Oregon white oak	*Quercus garryana*	18	16	P	poor crown structure, some ivy	No	Remove	Building
3539	Oregon white oak	*Quercus garryana*	22	30	G	some branch decay	Yes	Remove	ROW
3677	Douglas-fir	*Pseudotsuga menziesii*	30	32	G	no major defects, some twig dieback, ivy up lower trunk	Yes	Remove	ROW
3767	Douglas-fir	*Pseudotsuga menziesii*	12	12	F	broken top	No	Retain	n/a
3775	Scouler's willow	*Salix scouleriana*	18	20	F	codominant stems, ivy	No	Remove	ROW
3776	Douglas-fir	*Pseudotsuga menziesii*	28	12	P	decline	No	Remove	Building
3777	Oregon white oak	*Quercus garryana*	15	14	F	moderate structure	No	Remove	Building
3778	Oregon ash	*Fraxinus latifolia*	10	12	F	small high live crown	No	Remove	Building
3779	Douglas-fir	*Pseudotsuga menziesii*	18	12	P	small live crown, epicormics	No	Remove	Building
3780	Douglas-fir	*Pseudotsuga menziesii*	15	10	F	one-sided crown, below dominant canopy, not suitable for retention with adjacent removal	No	Remove	Building

***DBH** is tree diameter measured at breast height, 4.5-feet above the ground level (inches); codominant trunks splitting below DBH are measured individually and separated by a comma, except codominant stems of equal size are noted as quantity x size.

^C-Rad is the average crown radius measured in feet.

#Cond is an arborist assigned rating to generally describe the condition of individual trees as follows- Dead; Poor; Fair; or Good condition.

Sig? asks whether or not individual trees are considered potentially significant, either Yes (likely significant) or No (not considered significant).

3J CONSULTING

CIVIL ENGINEERING | WATER RESOURCES | LAND USE PLANNING

PRELIMINARY STORM WATER REPORT

CHÊNE BLANC ESTATES

November 10, 2016

Prepared For:

18000 Midhill Drive, LLC
West Linn, OR

REGISTERED PROFESSIONAL ENGINEER
74498 PE
Kathleen E. Freeman
OREGON
Jan. 8, 2009
KATHLEEN E. FREEMAN
11/10/16
EXPIRES: 12/31/17

Prepared By:
3J Consulting, Inc.
5075 Griffith Drive, Suite 150
Beaverton, Oregon 97005
Project No: 15266
KEF

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I hereby certify that this Stormwater Management Report for the Chêne Blanc Estates has been prepared by me or under my supervision and meets minimum standards of the City of West Linn and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.

EXECUTIVE SUMMARY

The existing site is located on private property at 18000 Upper Midhill Drive in West Linn, Oregon (See Figure 1 & Figure 2). The property (including offsite improvements) is approximately 6.84 acres and currently contains no structures, brush and several groves of mature trees. The proposed development will consist of constructing 42 single family attached dwellings with new streets and sidewalks. The purpose of this storm water report is to describe the design of the stormwater management systems following the City of West Linn requirements.

Stormwater runoff from the proposed development will be conveyed to a detention pond for water quality treatment and detention. The pond has been sized to comply with the following requirements:

- Treat stormwater runoff using the City of Portland's requirement of 0.83 inches of precipitation for a 24-hour storm event.
- Capture and detain the 2, 5, 10 and 25-year, 24-hour post developed runoff rate to release at the 2, 5, 10 and 25-year, 24-hour existing runoff rate.

A geotechnical investigation was completed in August 2015 showing that infiltration rates on the site 1.2 in/hr at 5 feet below ground surface.

The purpose of this report is to describe the facilities being proposed and to show that the design follows the City of West Linn's Public Works Design Standards.

PROJECT DESCRIPTION

The existing site is located on private property at 18000 Upper Midhill Drive in West Linn, Oregon (See Figure 1 and 2).

The purpose of this report is to describe the facilities being proposed and show that the design follows the City of West Linn Public Works Design Standards in effect at the time of this report.

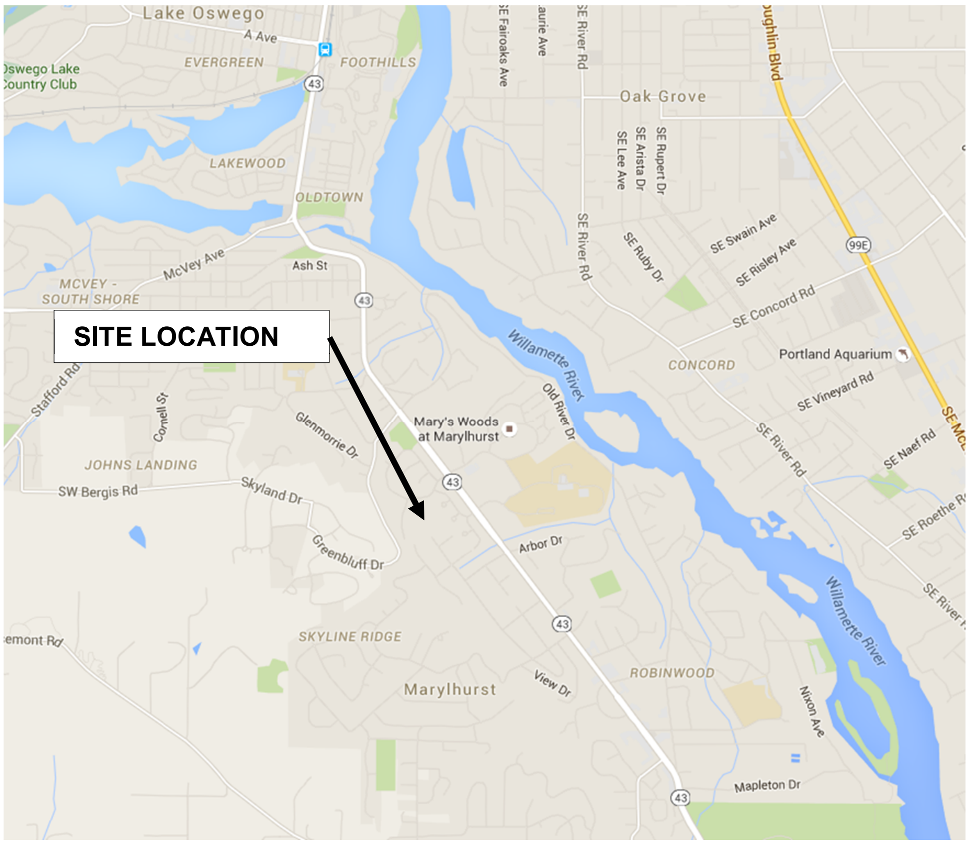


Figure 1 - Vicinity Map

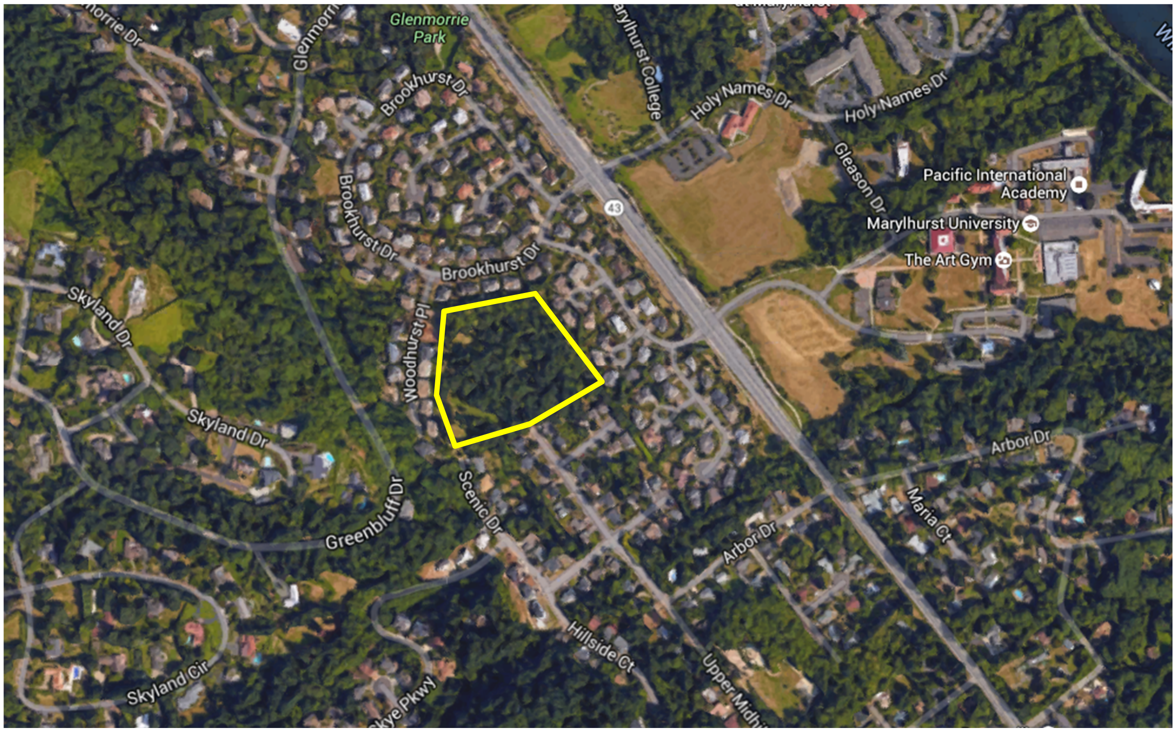


Figure 2 - Site Location

EXISTING CONDITIONS

Site

The property slopes toward east at grades ranging from 9% to 20%. Elevations range from a maximum of 350 feet on the southwest side of the property to a minimum of 238 feet on the southeast side. Currently no structures, brush and several groves of mature trees exist on the site

Flood Map

The flood plain map shows that the site resides in Zone X, where no base flood elevations have been determined (See Technical Appendix: Exhibits – FIRM Map Number 41005C0019D).

Site Geology

The soil type as classified by the United States Department of Agriculture Soil Survey of Clackamas County is identified in Table 1 (See Technical Appendix: Exhibits - Hydrologic Soil Group for Clackamas County Area, Oregon).

Soil Type	Hydrologic Group
Cascade Silt Loam	C

Table 1 – Soil Characteristics

A geotechnical investigation was completed in August 2015 showing that infiltration rates on the site are 1.2 in/hr at 5 feet below ground surface (See Technical Appendix: Geotechnical Report).

Existing Drainage

Existing Site

An existing drainage ditch is located on the north and east sides of the property. The ditch outfalls into a 12 inch storm line leaving the property and draining towards the southeast through College View Drive.

Basin Areas

Table 2 shows the current impervious and pervious areas for the project site (See Technical Appendix: Exhibits – Existing Site Conditions).

Existing Onsite Basin Area	Ft^2	Acres
Impervious Area	0	0.00
Pervious Area	265,716	6.10
Total Existing Basin Area	265,716	6.10
Existing Offsite Basin Area		
Impervious Area	0	0.00
Pervious Area	32,234	0.74
Total Existing Basin Area	32,234	0.74
Total Existing Project Site Area	297,950	6.84

Table 2 – Existing Basin Areas

Curve Number

The major factors for determining the CN values are hydrologic soil group, cover type, treatment, hydrologic condition, and antecedent runoff condition. The curve number represents runoff potential from the ground. Tables 2-2a and 2-2c in the TR-55 manual were used to determine the appropriate curve numbers (See Technical Appendix: Exhibits – Table 2-2a and 2-2c Runoff Curve Numbers).

The existing site consists of woods and brush with a corresponding curve number of 77. The post-developed pervious area was considered to be open space in fair condition (grass cover 50% to 75%) with a corresponding curve number of 79.

Time of Concentration

The time of concentration was calculated for the existing site using the TR-55 Method. The time of concentration of 18 minutes was calculated for the existing basin (See Technical Appendix: Calculations– Time of Concentration). The time of concentration for the post-developed conditions was assumed to be 5 minutes.

POST-DEVELOPED CONDITIONS

Post-Developed Site

Stormwater runoff from the site will be conveyed to a proposed water quality and detention pond in Tract B via catch basins and manholes. The outfall of the pond will be piped through a 20-foot storm easement that will be located in the southeastern corner of the site releasing into an existing 12-inch storm line.

Basin Areas

Table 3 shows the post-developed impervious and pervious areas (See Technical Appendix: Exhibits – Post-Developed Site Conditions). The project area will be approximately 30% impervious.

Post-Developed Basin Area	Ft^2	Acres
Impervious Area	90,169	2.07
Pervious Area	207,782	4.77
Total Post-Developed Basin Area	297,950	6.84

Table 3 – Post-Developed Basin Areas

HYDROLOGIC ANALYSIS DESIGN GUIDELINES

Design Guidelines

The site is located within the jurisdiction of the City of West Linn, which follows the City of Portland's Stormwater Management Manual for the design of stormwater facilities. Stormwater runoff from the proposed development will be conveyed to a wet detention pond for water quality treatment and detention. The pond has been sized to comply with the following requirements:

- Treat stormwater runoff for water quality storm event (0.83 inches);
- Capture and detain the 2, 5, 10 and 25-year, 24-hour post developed runoff rates to the existing 2, 5, 10 and 25-year, 24-hour existing runoff rates.

An infiltration rate of 1.2 in/hr with a factor of safety of 4 was used for the bottom surface area of the pond.

Hydrograph Method

Naturally occurring rainstorms dissipate over long periods of time. An effective way of estimating storm rainfall is by using the hydrograph method. The Santa Barbara Urban Hydrograph (SBUH) method was used to develop runoff rates. The computer software Hydraflow was used to compute runoff rates and volumes.

Design Storm

The rainfall distribution to be used for this area is the design storm of 24-hour duration based on the standard Type 1A rainfall distribution. Table 4 shows total precipitation depths for the various storm events, which were used as a multiplier for the Type 1A 24-hour rainfall distribution.

Recurrence Interval (years)	Current Total Precipitation Depth (inches)
Water Quality	0.83
2	2.50
5	3.00
10	3.40
25	3.90
100	4.50

Table 4 - Design Storms

Basin Runoff

Table 5 shows the runoff rates for the existing and post-developed conditions and the allowable release rates after construction (See Technical Appendix: Hydrographs – Hydrograph Report: Existing and Post-Developed).

Recurrence Interval (years)	Existing Runoff (cfs)	Post-Developed Runoff (cfs)	Allowable Release Rate (cfs)
WQ	N/A	0.05	0.03
2	0.66	1.81	0.66
5	1.12	2.56	1.12
10	1.53	3.19	1.53
25	2.07	4.00	2.07

Table 5 - Basin Runoff Rates

System Capacities

The stormwater conveyance system will be sized in the final design phase of the project.

WATER QUALITY/QUANTITY

Water Quality Guidelines

The stormwater facility design follows West Linn's design standards and the City of Portland's Stormwater Management Manual guidelines. The stormwater facility will be designed for flow control and pollution reduction. The City of Portland's performance approach was used to size an extended wet pond. The pond will detain the water quality volume for a minimum of 24 hours. The water quality volume (based on preliminary analysis) for the post-developed condition is 2,524 ft^3.

Water Quantity Guidelines

The pond has been designed to release flows at or below the required release rates as shown in Table 5.

Wet Detention Pond Volume

Table 6 shows the available storage capacity of the proposed pond. The table does not include the 0.5 feet of dead storage. The flow control structure and details will be provided in the final Stormwater Report.

Elevation (ft)	**Surface Area (ft^2)**	**Average Surface Area (ft^2)**	**Sectional Volume (ft^3)**	**Total Volume (ft^3)**
262	2,894			
		3,330	3,330	
263	3,766			**3,330**
		4,233	4,233	
264	4,701			**7,563**
		5,031	5,031	
265	5,360			**12,593**
		5,531	5,531	
266	5,702			**18,124**
		6,423	6,423	

267	7,145			**24,548**

Table 6 – Proposed Pond Volume

SUMMARY

The stormwater design for the proposed Chêne Blanc Estates will meet or exceed the City of West Linn's requirements. All sizing of water quality/quantity facilities followed the City of West Linn's Public Works Design Standards.

TECHNICAL APPENDIX

Exhibits

- FIRM Panel 19 of 1175
- Hydrologic Soil Group-Clackamas County Area, Oregon
- Table 2-2a Runoff Curve Numbers
- Existing Site Conditions
- Post-Developed Site Conditions

Drawings

- Sheet C100 "Existing Conditions Plan"
- Sheet C210 "Preliminary Site Plan"
- Sheets C230 "Phase 2 Grading & Erosion Control Plan"
- Sheet C300 "Composite Utility Plan"

Hydrographs

- Existing Runoff Hydrograph
- Post Developed Runoff Hydrograph

Calculations

- Time of Concentration

Geotechnical Report

- Preliminary Geotechnical Engineering Report & Landslide Hazard Study, GeoPacific Engineering, Inc., August 6, 2015

Operations and Maintenance

- To be included in Final Stormwater Report

REFERENCES

1. City of West Linn's Public Works Design Standards Issued in 2010

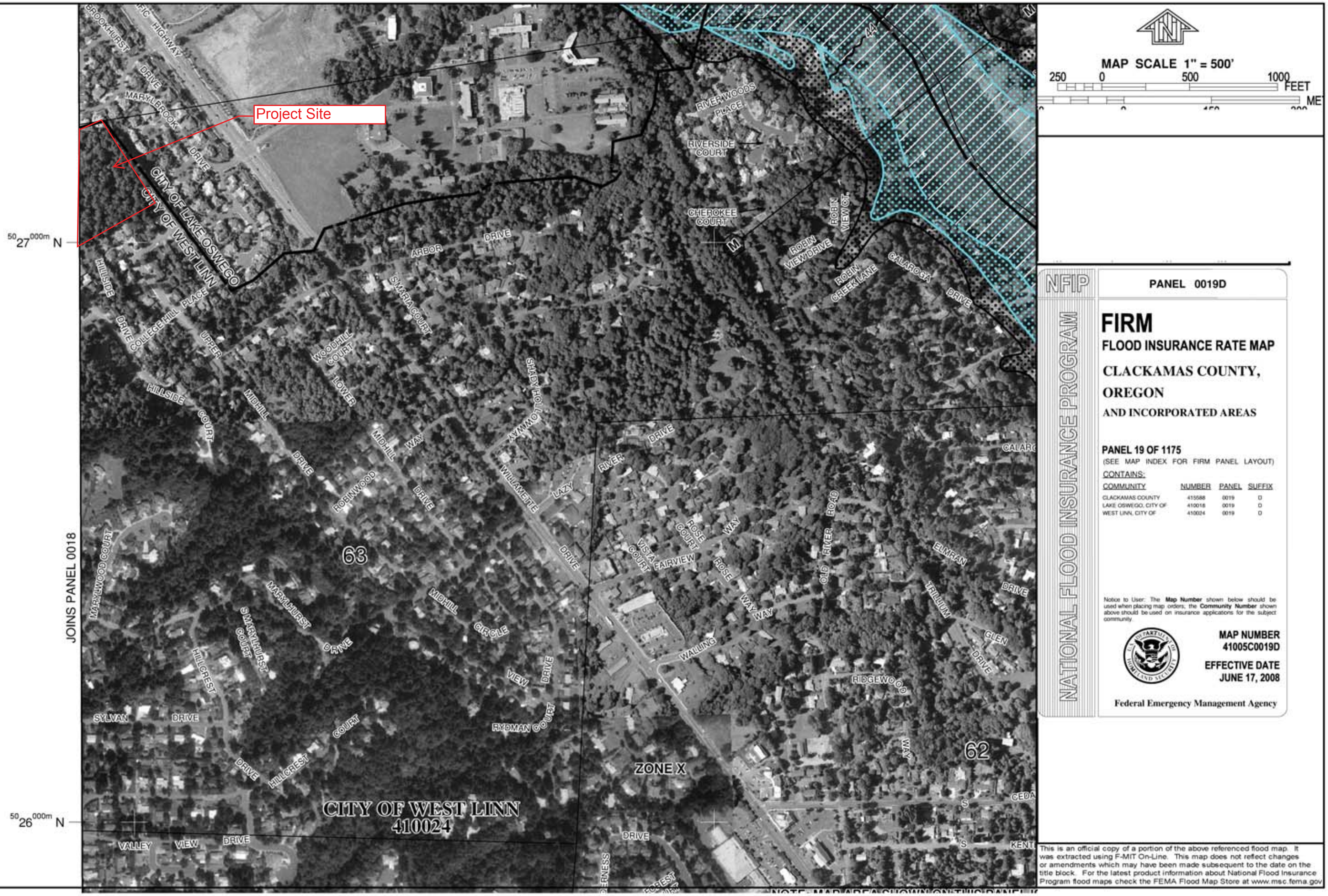
2. City of Portland's Stormwater Management Manual Issued in January 2014

3. Soil Survey of Clackamas County Area. National Resource Conservation Service

4. Urban Hydrology for Small Watersheds – TR-55 Issued in June 1986 – U.S. Department of Agriculture, Natural Resources Conservation Service, Conservation Engineering Division

5. http://westlinnoregon.gov/publicworks/stormwater-fact-sheet

EXHIBITS



NFIP

PANEL 0019D

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CLACKAMAS COUNTY, OREGON
AND INCORPORATED AREAS

PANEL 19 OF 1175
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLACKAMAS COUNTY	415588	0019	D
LAKE OSWEGO, CITY OF	410018	0019	D
WEST LINN, CITY OF	410024	0019	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

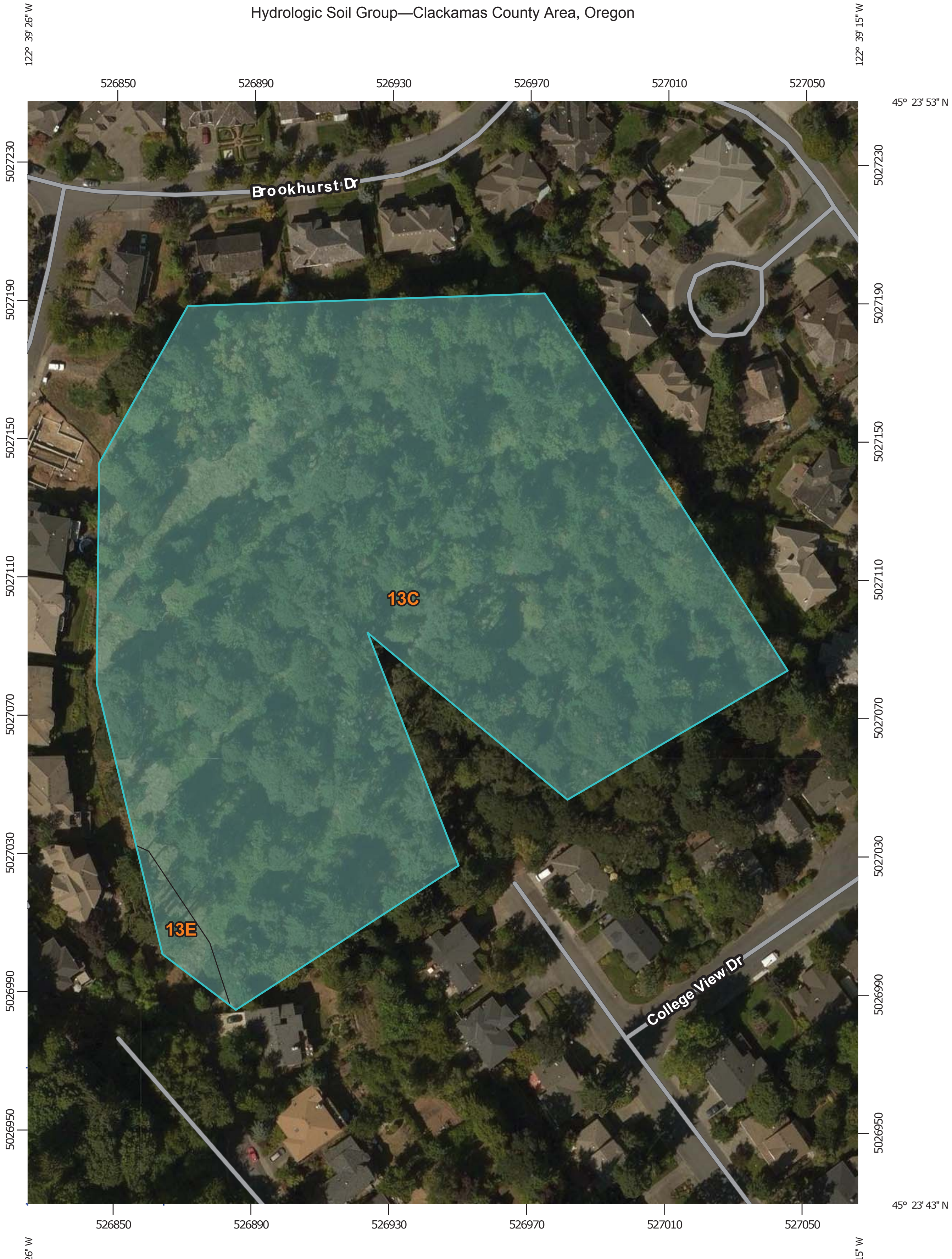
MAP NUMBER
41005C0019D

EFFECTIVE DATE
JUNE 17, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Hydrologic Soil Group—Clackamas County Area, Oregon



Map Scale: 1:1,550 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 20, 40, 80, 120

Feet: 0, 50, 100, 200, 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 9, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2014—Sep 5, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
13C	Cascade silt loam, 8 to 15 percent slopes	C	6.4	98.5%
13E	Cascade silt loam, 30 to 60 percent slopes	C	0.1	1.5%
Totals for Area of Interest			**6.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

1 Average runoff condition, and $I_a = 0.2S$.
2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
4 Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

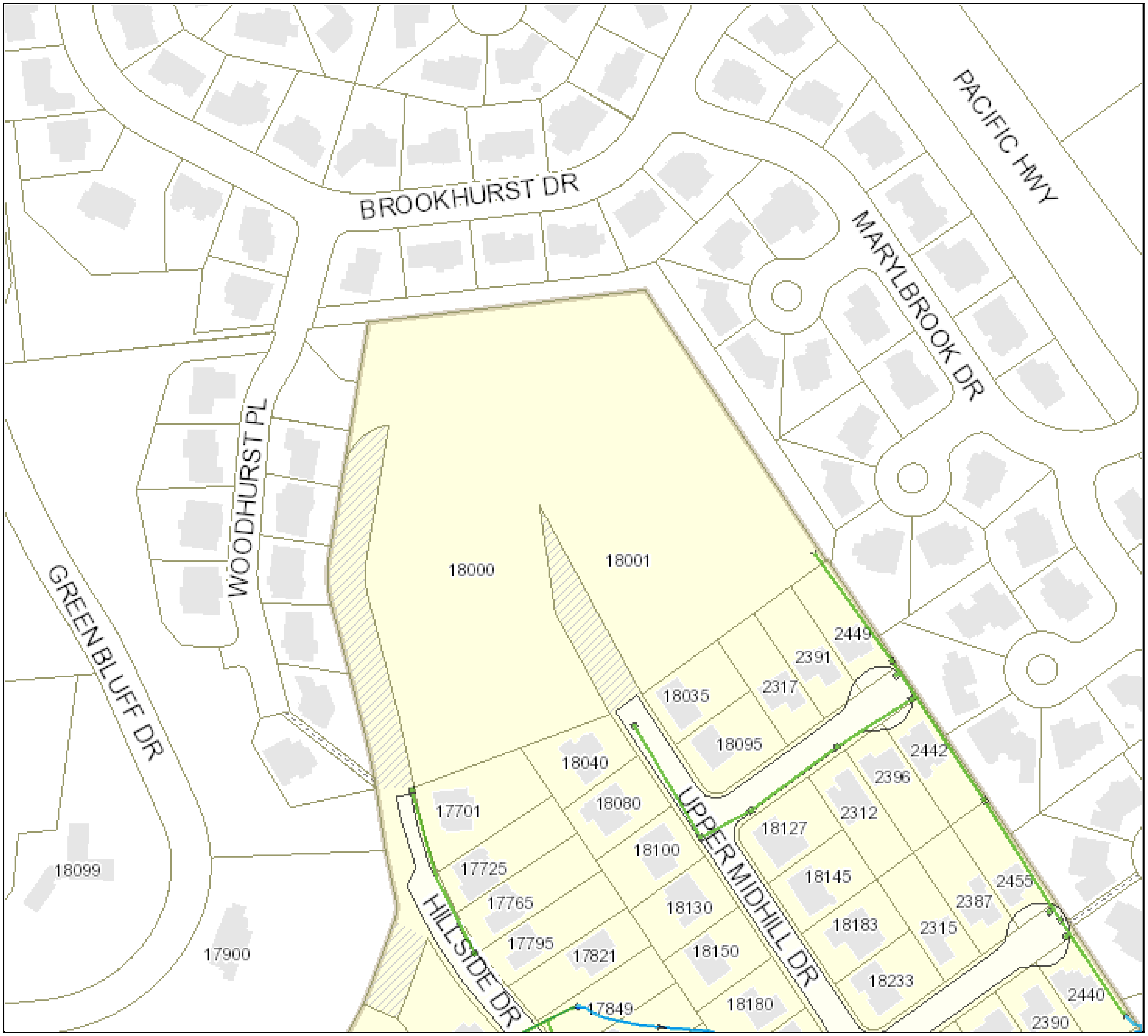
Table 2-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm). [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.
2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.
3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.
4 Actual curve number is less than 30; use CN = 30 for runoff computations.
5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.
6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

City of West Linn

FIGURE 3



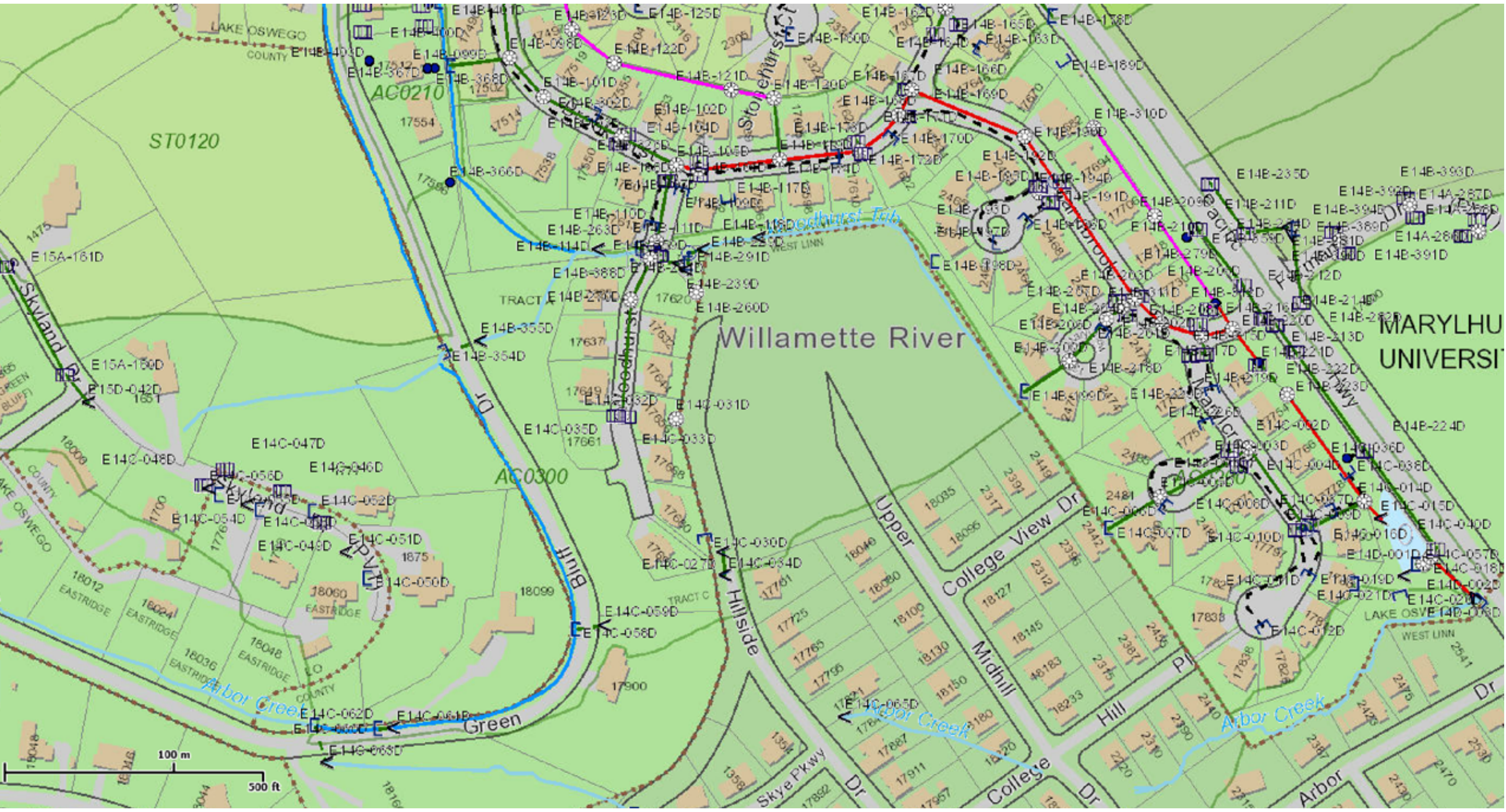
Scale 1:2,400 - 1 in = 200 ft
Scale is based on 8-1/2 x 11 paper size

Map created by: public
Date Created: 29-Sep-15 11:21 AM

WEST LINN GIS

City of Lake Oswego Storm

Figure 4



Tue Sep 29 2015 11:36:21 AM.

LEGEND

- - - -100- - - - EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

SURFACE RUN-OFF FLOW ARROW

EXISTING SITE AREA = 6.10 AC
IMPERVIOUS AREA = 0.00 AC
PERVIOUS AREA = 6.10 AC
PERVIOUS CURVE NUMBER = 77
TIME OF CONCENTRATION = 18 MIN

EXISTING OFFSITE AREA = 0.74 AC
IMPERVIOUS AREA = 0.00 AC
PERVIOUS AREA = 0.74 AC
PERVIOUS CURVE NUMBER = 77
TIME OF CONCENTRATION = 18 MIN

N

Scale: 1 inch = 80 feet

80 40 0 40 80

3J CONSULTING, INC

CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING

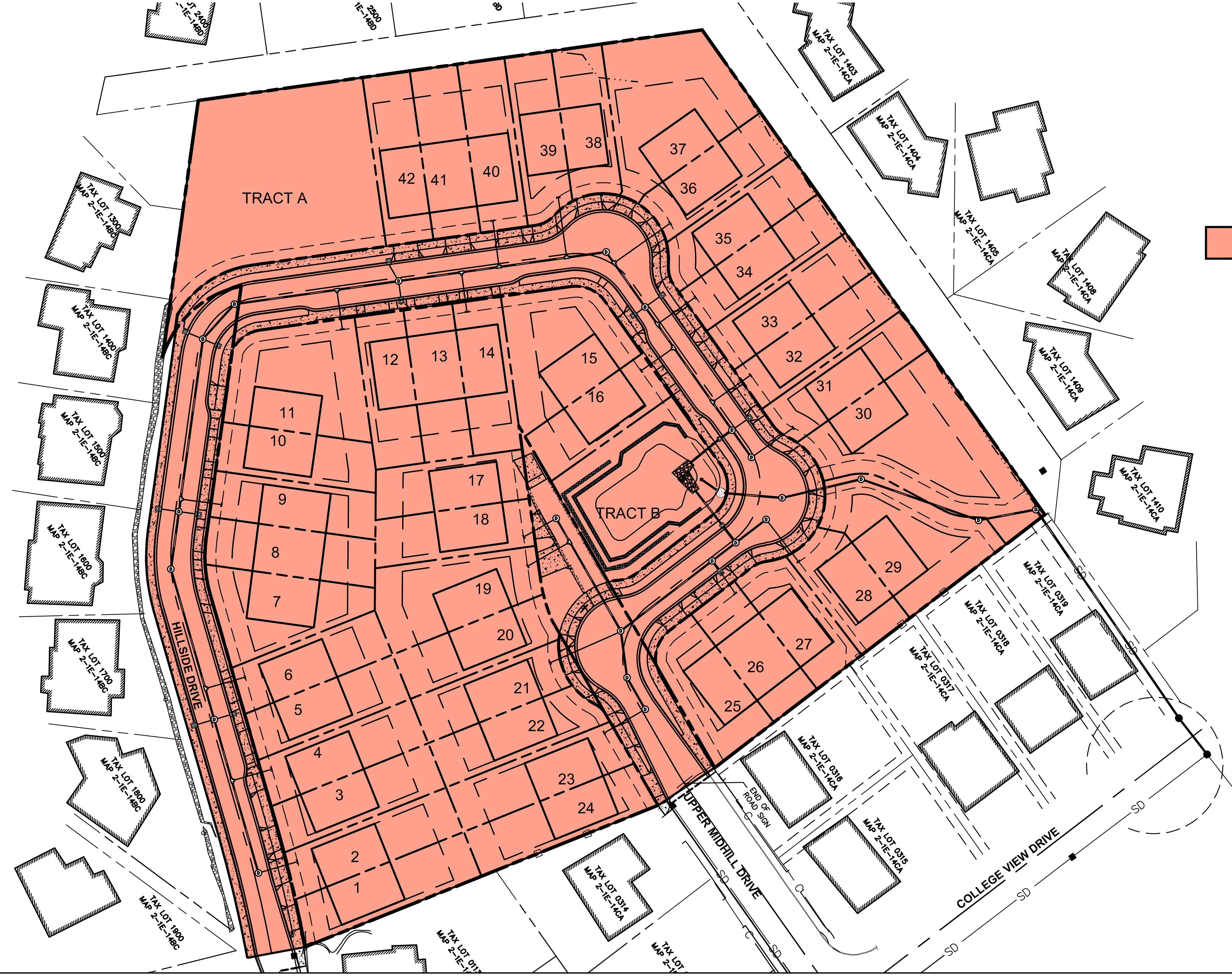
EXISTING SITE CONDITIONS
CHÊNE BLANC ESTATES

Stormwater Report

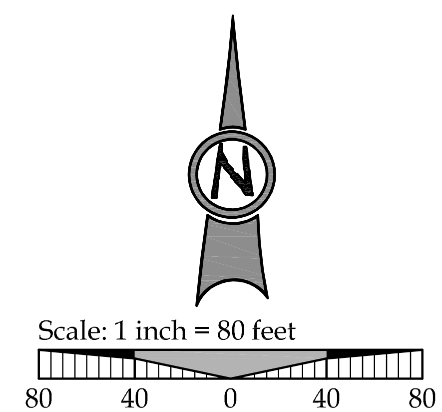
Exhibit 1

Date:11/10/16

By:KEF



POST-DEV PROJECT AREA = 6.848 AC
IMPERVIOUS AREA = 2.077 AC
PERVIOUS AREA = 4.771 AC
PERVIOUS CURVE NUMBER = 79
TIME OF CONCENTRATION = 5 MIN



3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING

POST-DEVELOPED SITE CONDITIONS
CHÊNE BLANC ESTATES

Stormwater Report

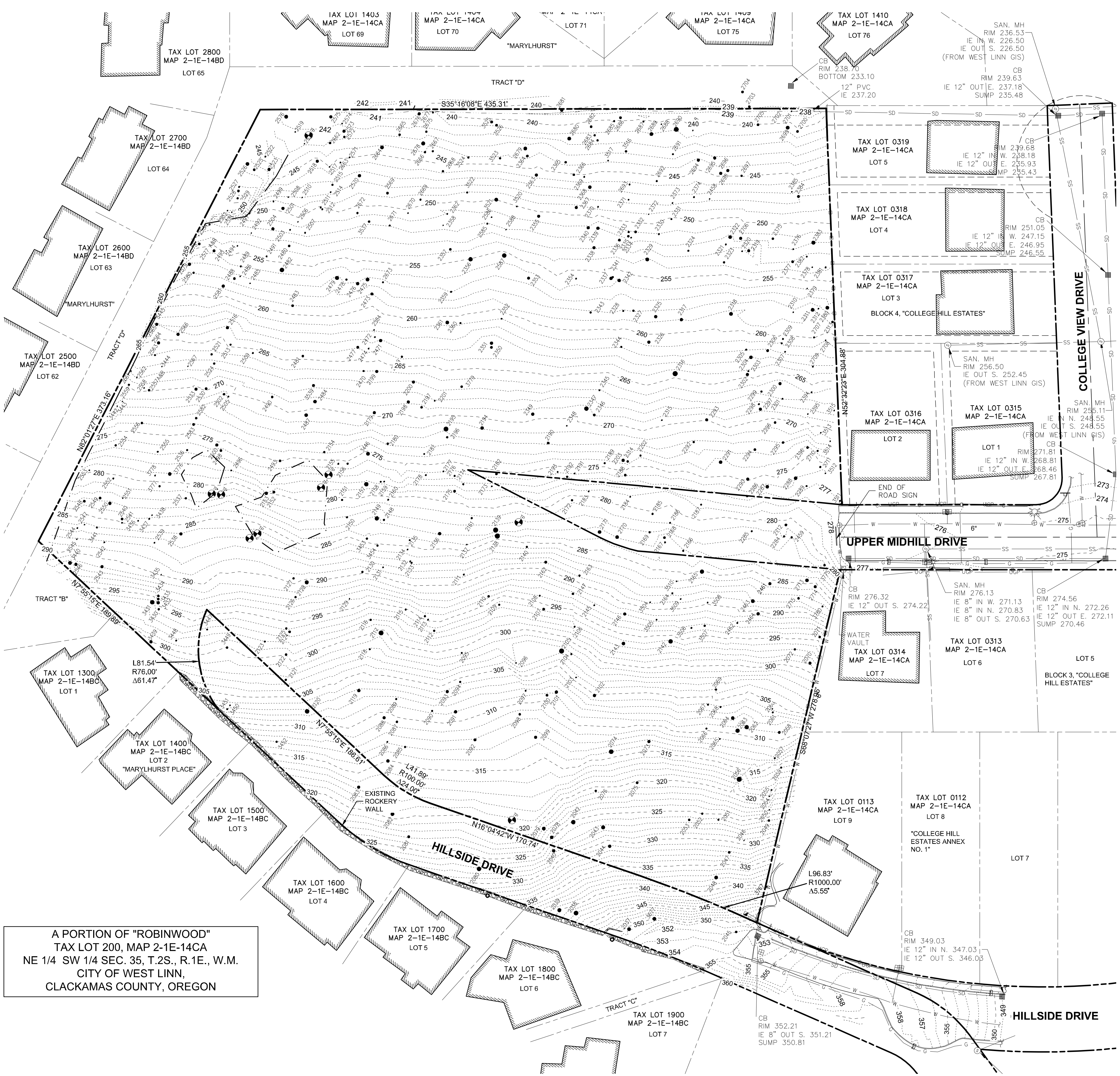
Exhibit 2

Date:11/10/16

By:KEF

DRAWINGS

NOT FOR CONSTRUCTION



A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EASEMENT LINE
- BUILDING
- CURB
- FENCE
- TELECOM. LINE
- GAS LINE
- UNDERGROUND POWER
- VEGETATION LIMITS LINE
- SANITARY SEWER
- STORM DRAIN
- WATER MAIN
- EXISTING MAPPED WETLAND
- EXISTING DRAINAGE SWALE
- TEST PIT
- FIRE HYDRANT
- WATER VALVE
- BLOW-OFF VALVE
- SIGN
- SANITARY MANHOLE
- SANITARY CLEANOUT
- STORM MANHOLE
- STORM CLEANOUT
- STORM INLET
- TELEPHONE PEDESTAL
- EXISTING TREE*

EXISTING CONDITIONS PLAN

THIS PLAN IS INTENDED FOR USE AS AN EXISTING CONDITIONS PLAN SHOWING THE CONDITIONS OF THE SITE PRIOR TO CONSTRUCTION. INFORMATION SHOWN ON THIS PLAN WAS DEVELOPED FROM THE TOPOGRAPHIC SURVEY, AERIAL PHOTOS, AND SITE OBSERVATIONS BY THE ENGINEER. NOT ALL SURFACE FEATURES OR UTILITIES MAY BE SHOWN. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION TO DETERMINE WORK SPECIFIC DETAILS. TOPOGRAPHIC INFORMATION PROVIDED BY COMPASS LAND SURVEYING, DATED JUNE 2015.

ZONE X (UN-SHADED) — THE SITE IS LOCATED WITHIN ZONE X (UN-SHADED) PER FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY-PANEL NUMBER 41005C 0019 D FEMA'S DEFINITION OF ZONE X (UN-SHADED) IS AN AREA OF MINIMAL FLOOD HAZARD, USUALLY DEPICTED ON FIRMS AS ABOVE THE 500-YEAR FLOOD LEVEL. ZONE X IS THE AREA DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD AND PROTECTED BY LEVEE FROM 100-YEAR FLOOD. IN COMMUNITIES THAT PARTICIPATE IN THE NFIP, FLOOD INSURANCE IS AVAILABLE TO ALL PROPERTY OWNERS AND RENTERS IN THESE ZONES.

SURVEYOR'S NOTE

1. UTILITY INFORMATION SHOWN ON THIS MAP IS BASED UPON OBSERVED FEATURES, RECORD DATA AND TONE MARKS PROVIDED BY PUBLIC UTILITY LOCATION SERVICES. NO WARRANTIES ARE MADE REGARDING THE ACCURACY OR COMPLETENESS OF THE UTILITY INFORMATION SHOWN. ADDITIONAL UTILITIES MAY EXIST. INTERESTED PARTIES ARE HEREBY ADVISED THAT UTILITY LOCATIONS SHOULD BE VERIFIED PRIOR TO DESIGN OR CONSTRUCTION OF ANY CRITICAL ITEMS.

2. VERTICAL DATUM: NAVD'88 UTILIZING GPS POSITIONING TIED TO THE ORGN WITH REAL TIME CORRECTORS REFERENCED TO DATUM NAD 83(2011) EPOCH 2010.00. THIS DATUM REALIZATION WAS VERIFIED THROUGH DIRECT OBSERVATION TO NGS CONTROL POINT Q723 HAVING A POINT IDENTIFICATION OF RD1491. THIS POINT IS DESCRIBED AS A STAINLESS STEEL ROD W/ SLEEVE NEAR THE INTERSECTION OF STATE HIGHWAY 224 AND LAKE ROAD. THE ELEVATION OF THIS POINT IS PUBLISHED AS 31.131 AND WAS ESTABLISHED BY NGS THROUGH DIFFERENTIAL LEVELING AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JUNE 1991 AND HAS A VERTICAL ORDER OF FIRST CLASS II.

3. BASIS OF BEARINGS: CENTERLINE OF UPPER MIDHILL DRIVE AS PER THE PLAT OF "COLLEGE HILL ESTATES"

4. TOPOGRAPHIC FEATURES SHOWN ON THIS MAP WERE LOCATED USING STANDARD PRECISION TOPOGRAPHIC MAPPING PROCEDURES. THIRD PARTY USERS OF DATA FROM THIS MAP PROVIDED VIA AUTOCAD DRAWING FILES OR DATA EXCHANGE FILES SHOULD NOT RELY ON ANY AUTOCAD GENERATED INFORMATION WHICH IS BEYOND THE LIMITS OF PRECISION OF THIS MAP. THIRD PARTIES USING DATA FROM THIS MAP IN AN AUTOCAD FORMAT SHOULD VERIFY ANY ELEMENTS REQUIRING PRECISE LOCATIONS PRIOR TO COMMENCEMENT OF ANY CRITICAL DESIGN OR CONSTRUCTION. CONTACT COMPASS LAND SURVEYORS FOR FURTHER INFORMATION. FURTHERMORE, COMPASS LAND SURVEYORS WILL NOT BE RESPONSIBLE NOR HELD LIABLE FOR ANY DESIGN OR CONSTRUCTION RELATED PROBLEMS THAT ARISE OUT OF THIRD PARTY USAGE OF THIS MAP (IN AUTOCAD OR OTHER FORMAT) IN ANY MANNER INCONSISTENT WITH THIS STATEMENT.

5. UNDERGROUND PIPE SIZES AND MATERIAL TYPES ARE BASED UPON RECORD DRAWINGS, INFORMATION PROVIDED BY UTILITY LOCATORS AND FIELD OBSERVATIONS AT MANHOLES AND CATCH BASIN RIMS AND SHOULD BE VERIFIED.

REESMAN PROPERTY EXISTING CONDITIONS MAP
TL 200 IN NE 1/4 OF SW 1/4 SEC. 14, T.2S, R.1E., W.M.
CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON

811
Know what's below. Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

EXISTING CONDITIONS PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
PRELIMINARY
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
EX. COND.

SHEET NUMBER
C100

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C100 EXISTING CONDITIONS PLAN.DWG

NOT FOR CONSTRUCTION

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

Scale: 1 inch = 40 feet

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- EASEMENT LINE
- EXISTING CONCRETE
- EXISTING CURB
- EXISTING FENCE LINE
- PROPOSED CURB FACE
- PROPOSED CURB BACK
- PROPOSED LIP OF GUTTER
- PROPOSED LOT LINE
- PROPOSED EASEMENT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- EXISTING ROCK WALL
- PROPOSED RETAINING WALL
- A – A' PROPOSED STREET SECTION - SEE SHEET C201
- PROPOSED ON-STREET PARKING

SITE NOTES

1. CONSTRUCT STANDARD CURB & GUTTER PER CITY OF WEST LINN STANDARD DETAIL WL-501 (TYPICAL CURBS).
2. CONSTRUCT 6 FT WIDE DETATCHED SIDEWALK PER CITY OF WEST LINN STANDARD DETAIL WL-508 (CONCRETE SIDEWALK CROSS SECTION).
3. CONSTRUCT 6 FT CURB TIGHT SIDEWALK PER CITY OF WEST LINN STANDARD DETAIL WL-508 (CONCRETE SIDEWALK CROSS SECTION).
4. INSTALL ASPHALT SECTION. SEE TYPICAL SECTIONS A-A' AND B-B' ON SHEET C201.
5. INSTALL ACCESS DRIVE. SEE TYPICAL SECTION C-C' ON SHEET C201.
6. INSTALL RETAINING WALL.
7. NOT USED.
8. ROADWAY TAPER PER AASHTO STANDARDS TO MEET EXISTING ROAD WIDTHS ON UPPER MIDHILL DRIVE. STA: 1+12 TO 2+28.
9. ROADWAY TAPER PER AASHTO STANDARDS TO MEET EXISTING ROAD WIDTHS ON HILLSIDE DRIVE. STA: 14+10 TO 14+91.
10. TRANSITION SIDEWALK TO CURB TIGHT. MATCH EXISTING CURB TIGHT SIDEWALK AS SHOWN.
11. PROVIDE CORNERING "EYE BROW" PER CLACKAMAS COUNTY ROADWAY STANDARD DRAWING C400.
12. INSTALL STREET SIGN "UPPER MIDHILL DRIVE" AND "HILLSIDE DRIVE".

811 Know what's below. Call before you dig.

#	REVISION SUMMARY	BY	DATE
	DESIGN REVIEW		11/10/2016

PRELIMINARY SITE PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE
PRELIMINARY
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

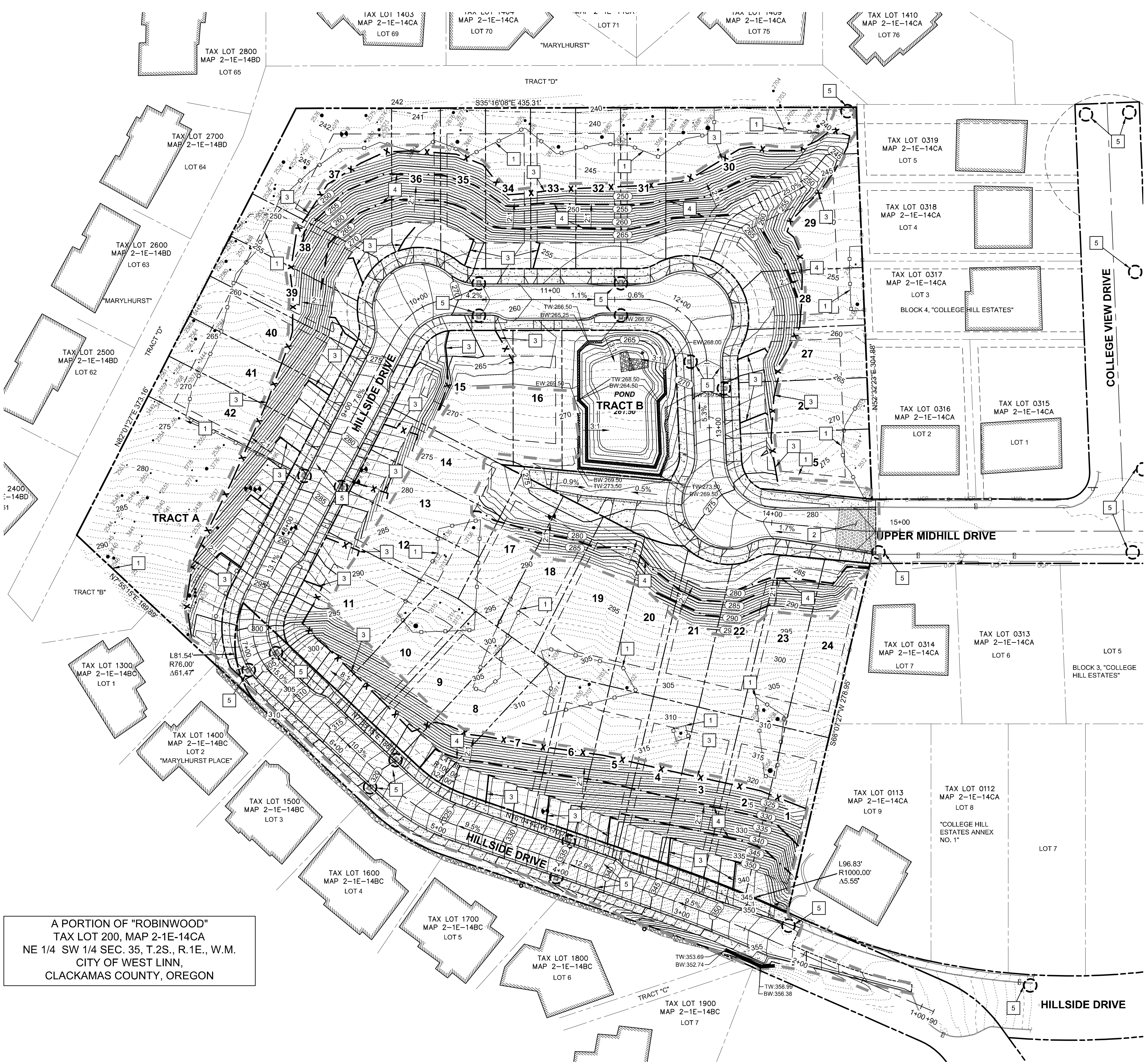
3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
SITE PLAN

SHEET NUMBER
C210

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C210 SITE PLAN.DWG

NOT FOR CONSTRUCTION



A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

Scale: 1 inch = 40 feet
40 20 0 20 40

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- 110 EXISTING MAJOR CONTOUR
- 108 EXISTING MINOR CONTOUR
- 110 PROPOSED MAJOR CONTOUR
- 108 PROPOSED MINOR CONTOUR
- EASEMENT LINE
- PROPOSED RETAINING WALL
- STRAW WATTLE
- X SILT FENCE
- LIMITS OF DISTURBANCE
- CONSTRUCTION ENTRANCE
- INLET PROTECTION
- SURFACE RUNOFF FLOW ARROW
- TW:XXX.XX TOP OF WALL SURFACE ELEVATION
- BW:XXX.XX BOTTOM OF WALL SURFACE ELEVATION

GRADING KEY NOTES

1. MAINTAIN TREE PROTECTION FENCING THROUGHOUT CONSTRUCTION.
2. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AT LOCATION SHOWN.
3. PLACE SILT FENCING AT LIMITS OF GRADING AND CONSTRUCTION WHERE SHOWN.
4. INSTALL STRAW WATTLE AT LOCATIONS SHOWN.
5. INSTALL INLET PROTECTION AT LOCATIONS SHOWN.
6. INSTALL RETAINING WALL FOR EXISTING GRADE TRANSITION, DESIGN BY OTHERS.

SITE GRADING INFORMATION

SITE STRIPPING*	10,037 CY
NEAT LINE CUT	5,860 CY
NEAT LINE FILL	35,460 CY
NEAT LINE NET BALANCE	29,600 CY (FILL)
MAXIMUM CUT DEPTH	12.2 FT
MAXIMUM FILL DEPTH	20.5 FT
MAXIMUM PROPOSED SLOPE	2H:1V
TOTAL AREA OF DISTURBANCE	4.15 ACRES

*STRIPPINGS:
ASSUMED REPLACEMENT / STOCKPILE ON SITE OUTSIDE BUILDING ENVELOPE
ASSUMED 18 INCHES REMOVAL OVER TOTAL AREA OF DISTURBANCE

GRADING GENERAL NOTES

1. REFER TO "*PRELIMINARY GEOTECHNICAL ENGINEERING REPORT AND LANDSLIDE HAZARD STUDY*" BY GEOPACIFIC ENGINEERING, DATED AUGUST 6, 2015. ALL SITE EARTHWORK PREPARATION AND EXECUTION SHALL CONFORM IN ALL RESPECTS TO THE RECOMMENDATIONS AND DESIGN REQUIREMENTS OF THIS DOCUMENT.
2. ALL PROPOSED GRADING SHOWN IS REFERENCED TO FINISHED GRADE.
3. ALL PROPOSED GRADING SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING CODE (CURRENT EDITION), INCLUDING APPENDIX J.

HILLSIDE DRIVE

811
Know what's below.
Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

PHASE 2 GRADING AND EROSION CONTROL
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
PRELIMINARY
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

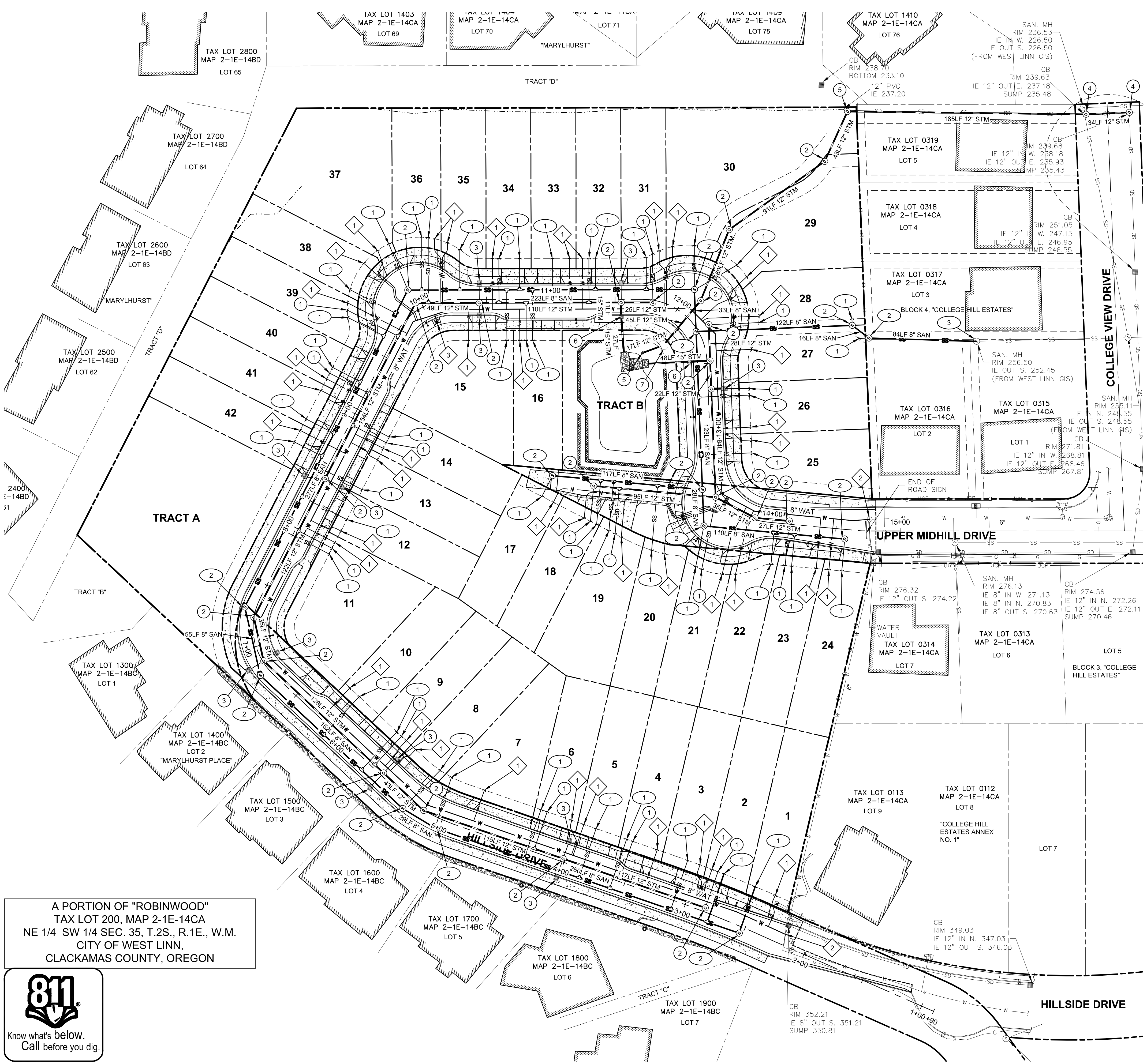
3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
PH2 GRADE & E.C.

SHEET NUMBER
C230

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C230 PHASE 2 GRADING AND EROSION CONTROL.DWG

NOT FOR CONSTRUCTION



A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

811 Know what's below. Call before you dig.

Scale: 1 inch = 40 feet

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- PROP. EASEMENT LINE
- PROP. BUILDING SETBACK LINE
- EXIST. DRAINAGE DITCH
- PROP. STORM MAIN
- PROP. STORM LATERAL / LEAD
- PROP. SANITARY MAIN
- PROP. SANITARY LATERAL
- PROP. WATER MAIN
- PROP. WATER SERVICE
- EXIST. SANITARY SEWER
- EXIST. STORM DRAIN
- EXIST. WATER MAIN
- PROP. TEE FITTING, STORM / SANITARY
- PROP. COMBINATION CURB INLET
- PROP. CG-48 MANHOLE
- PIPE CAP / STUB
- LINE CONTINUATION
- PROP. SEWER MANHOLE
- PROP. SEWER CLEANOUT
- PROP. STORM MANHOLE
- PROP. STORM CLEANOUT
- FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. BLOW-OFF VALVE
- EXIST. SANITARY MANHOLE
- EXIST. SANITARY CLEANOUT
- EXIST. STORM MANHOLE
- EXIST. STORM CLEANOUT
- EXIST. STORM INLET

WATER KEY NOTES

1. INSTALL SINGLE WATER METER FOR INDIVIDUAL LOT SERVICE. EXTEND 1" SERVICE LATERAL 3' BEYOND PUE.
2. INSTALL / CONNECT TO EXISTING.
3. INSTALL FIRE HYDRANT AT LOCATIONS SHOWN.

STORM KEY NOTES

1. PROVIDE NEW 4" PRIVATE STORM DRAIN LATERAL CONNECTION FOR INDIVIDUAL LOT SERVICE. EXTEND SERVICE LATERAL 3' BEYOND PUE.
2. CONSTRUCT STANDARD 48" STORM SEWER MANHOLE.
3. CONSTRUCT COMBINATION CURB INLET WITH 10" STORM LINE.
4. CONSTRUCT 48" STORM SEWER MANHOLE WITH GRATE LID.
5. CONSTRUCT 48" INLET MANHOLE
6. CONSTRUCT CG-48 CURB INLET MANHOLE.
7. CONSTRUCT FLOW CONTROL MANHOLE.

SANITARY SEWER KEY NOTES

1. PROVIDE NEW 4" SANITARY SEWER LATERAL FOR INDIVIDUAL LOT SERVICE. EXTEND SERVICE LATERAL 3' BEYOND PUE.
2. CONSTRUCT STANDARD 48" SANITARY SEWER MANHOLE
3. CORE DRILL NEW 8" CONNECTION ON EXISTING MANHOLE. CONNECT TO EXISTING MANHOLE.

DESIGN REVIEW | 11/10/2016
REVISION SUMMARY | BY | DATE

COMPOSITE UTILITY PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE PRELIMINARY OREGON JUNE 16, 2011 JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
COMP. UTIL.

SHEET NUMBER
C300

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C300 COMPOSITE UTILITY PLAN.DWG

HYDROGRAPHS

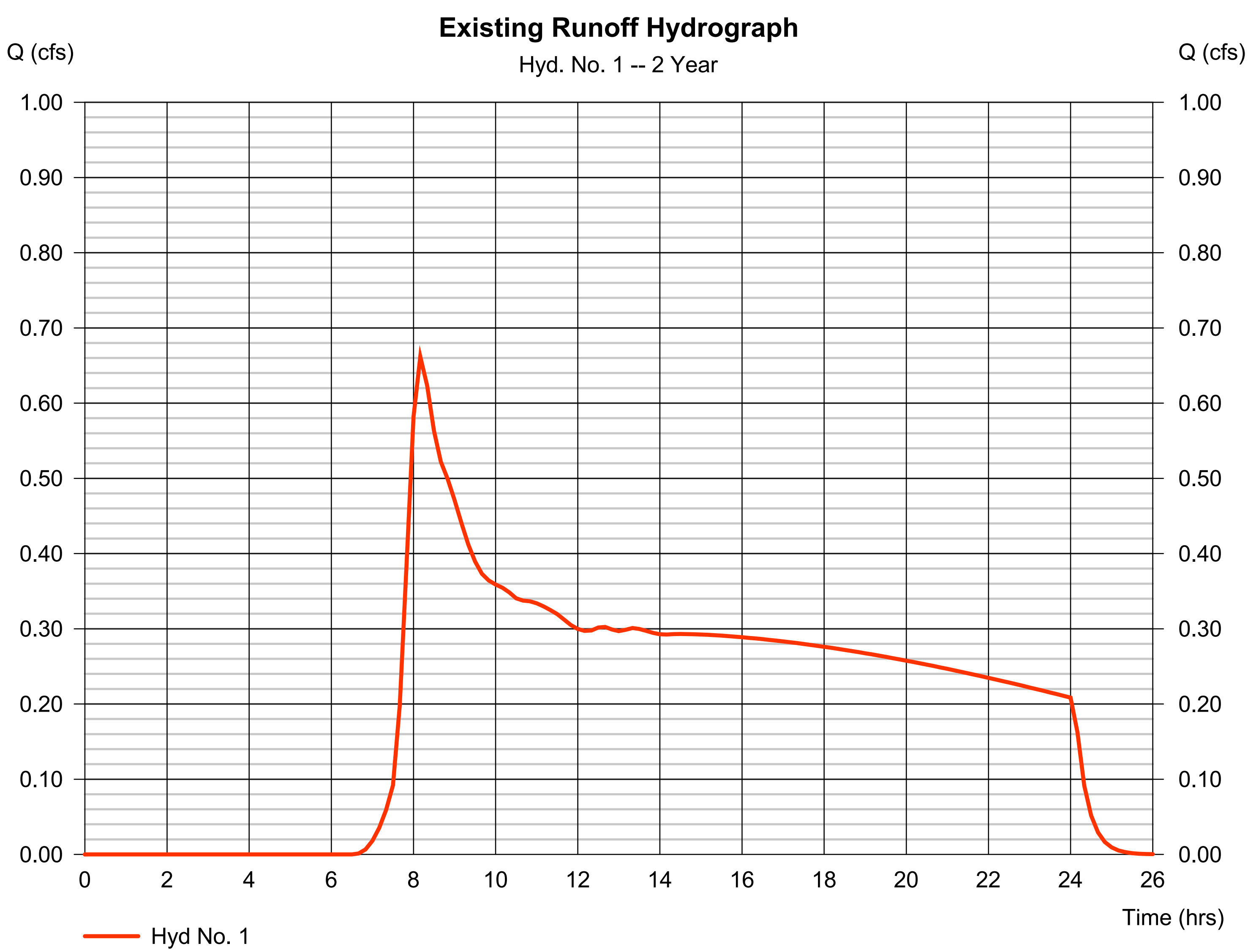
Hydrograph Report

Hyd. No. 1

Existing Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.662 cfs
Storm frequency	= 2 yrs	Time to peak	= 8.17 hrs
Time interval	= 10 min	Hyd. volume	= 18,382 cuft
Drainage area	= 6.840 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 2.50 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(6.100 x 77) + (0.740 x 77)] / 6.840



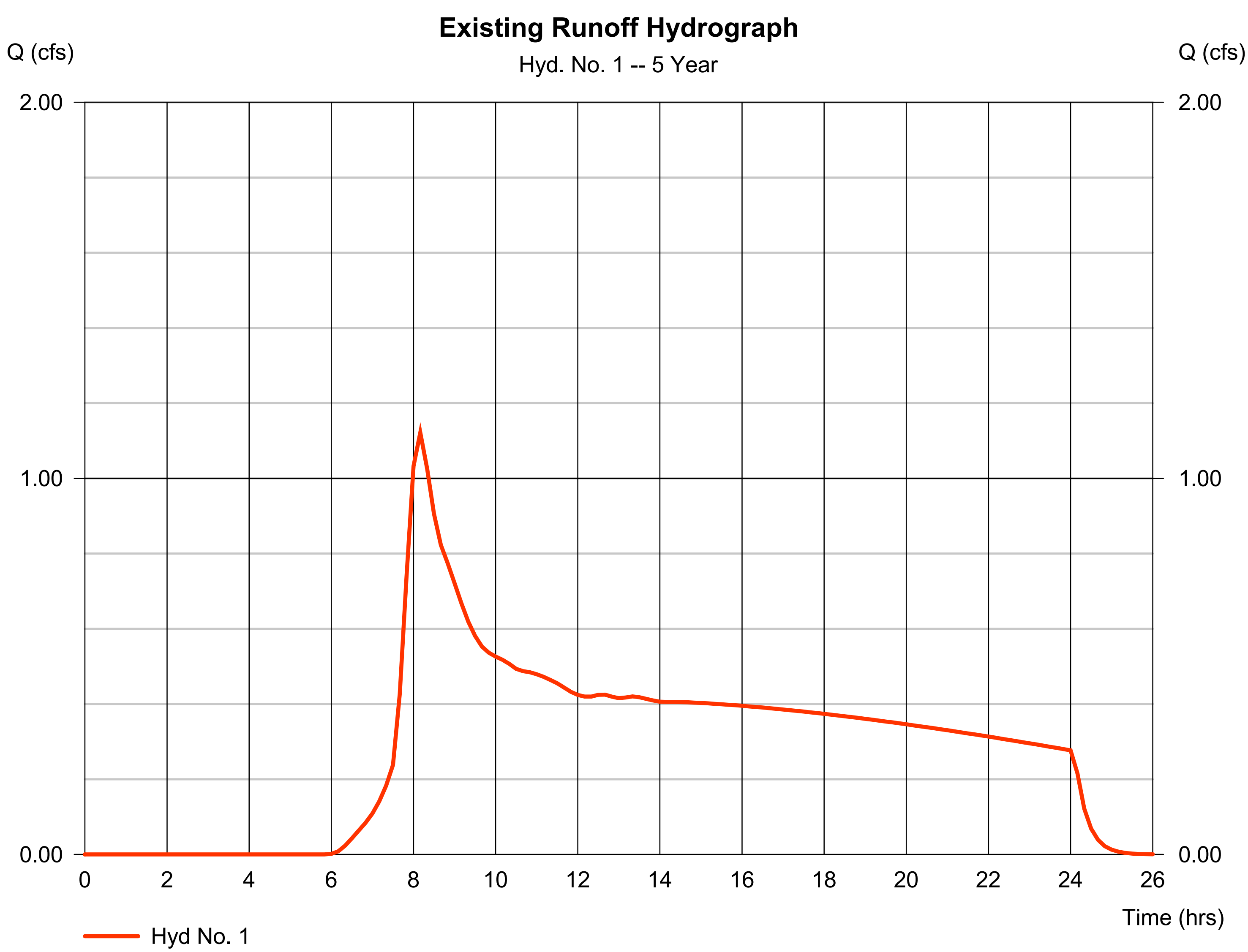
Hydrograph Report

Hyd. No. 1

Existing Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 1.122 cfs
Storm frequency	= 5 yrs	Time to peak	= 8.17 hrs
Time interval	= 10 min	Hyd. volume	= 26,593 cuft
Drainage area	= 6.840 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 3.00 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(6.100 x 77) + (0.740 x 77)] / 6.840



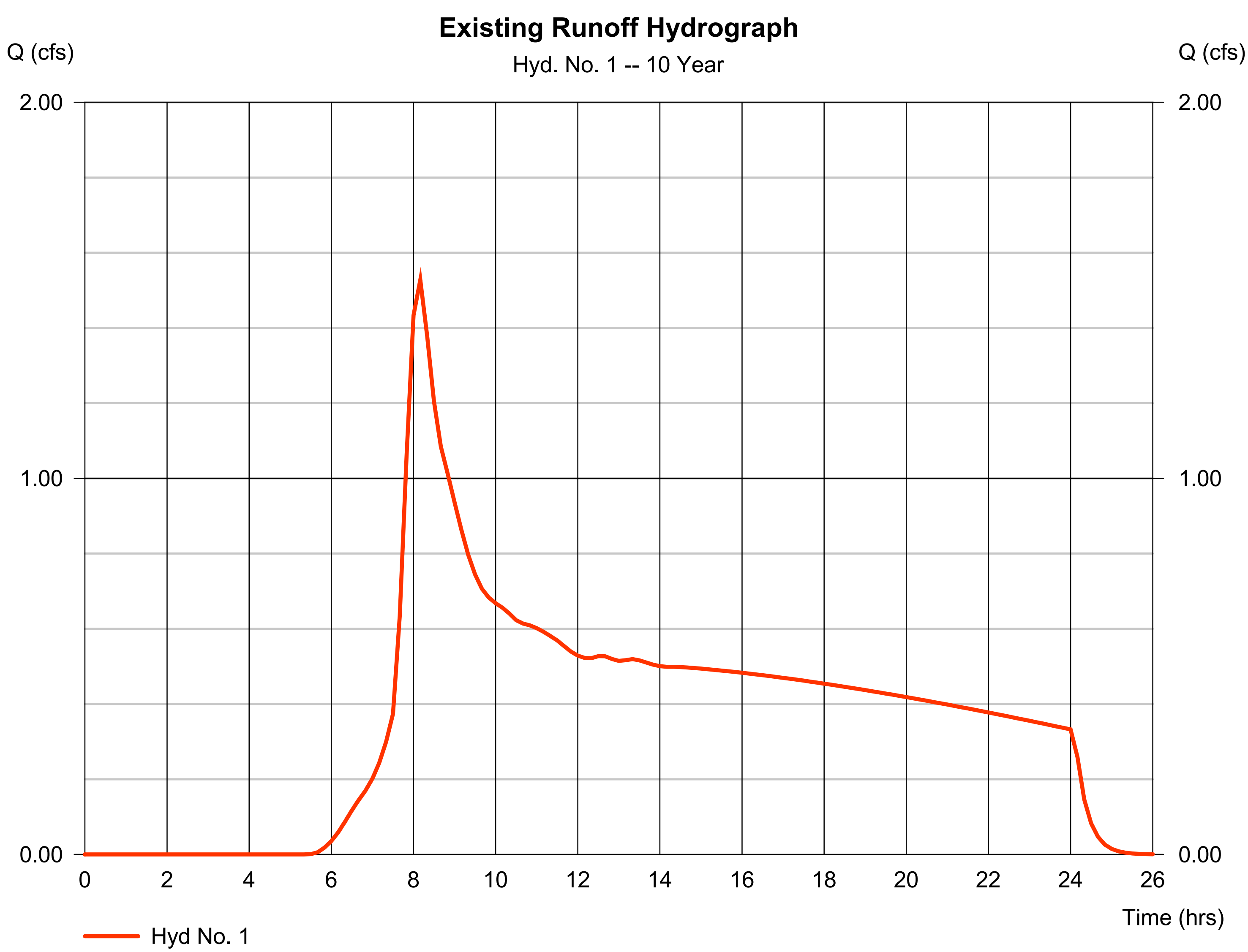
Hydrograph Report

Hyd. No. 1

Existing Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 1.528 cfs
Storm frequency	= 10 yrs	Time to peak	= 8.17 hrs
Time interval	= 10 min	Hyd. volume	= 33,685 cuft
Drainage area	= 6.840 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 3.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(6.100 x 77) + (0.740 x 77)] / 6.840



Hydrograph Report

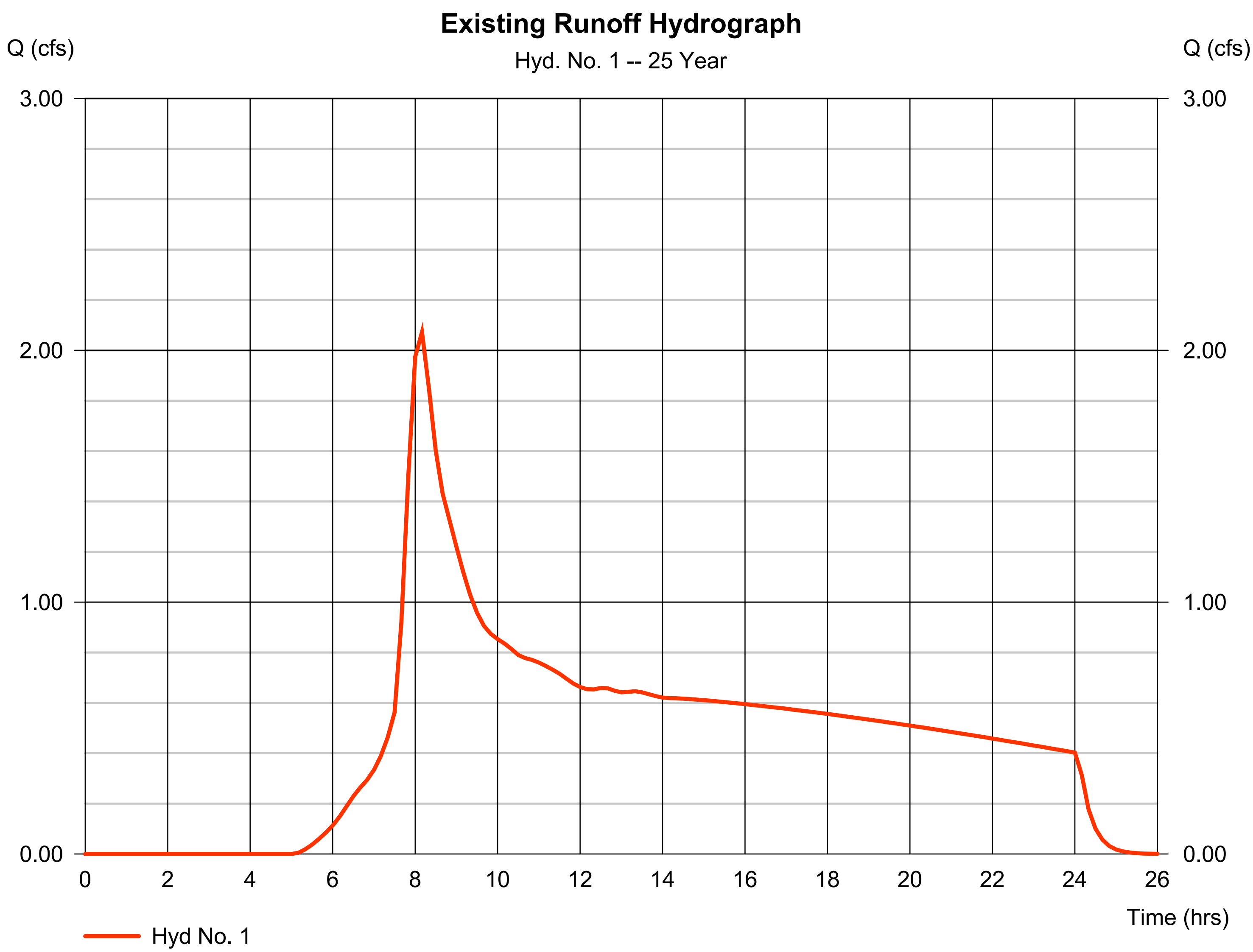
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 09 / 29 / 2015

Hyd. No. 1

Existing Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 2.072 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.17 hrs
Time interval	= 10 min	Hyd. volume	= 43,058 cuft
Drainage area	= 6.840 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 3.90 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(6.100 x 77) + (0.740 x 77)] / 6.840



Hydrograph Report

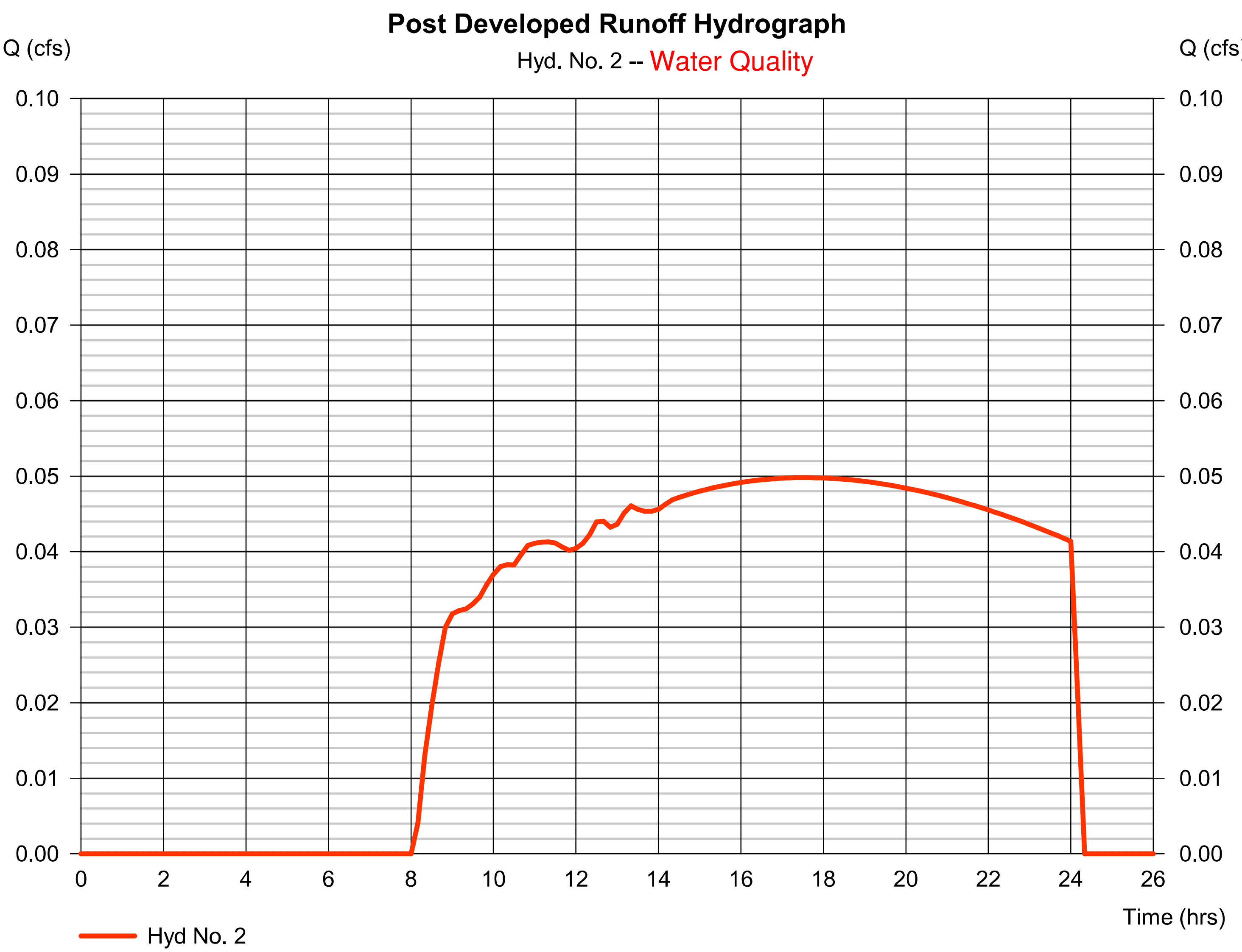
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 Tuesday, 11 / 8 / 2016

Hyd. No. 2

Post Developed Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.050 cfs
Storm frequency	= ~~1 yrs~~ Water Quality	Time to peak	= 17.50 hrs
Time interval	= 10 min	Hyd. volume	= 2,524 cuft
Drainage area	= 6.850 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 0.83 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(2.080 x 98) + (4.770 x 79)] / 6.850



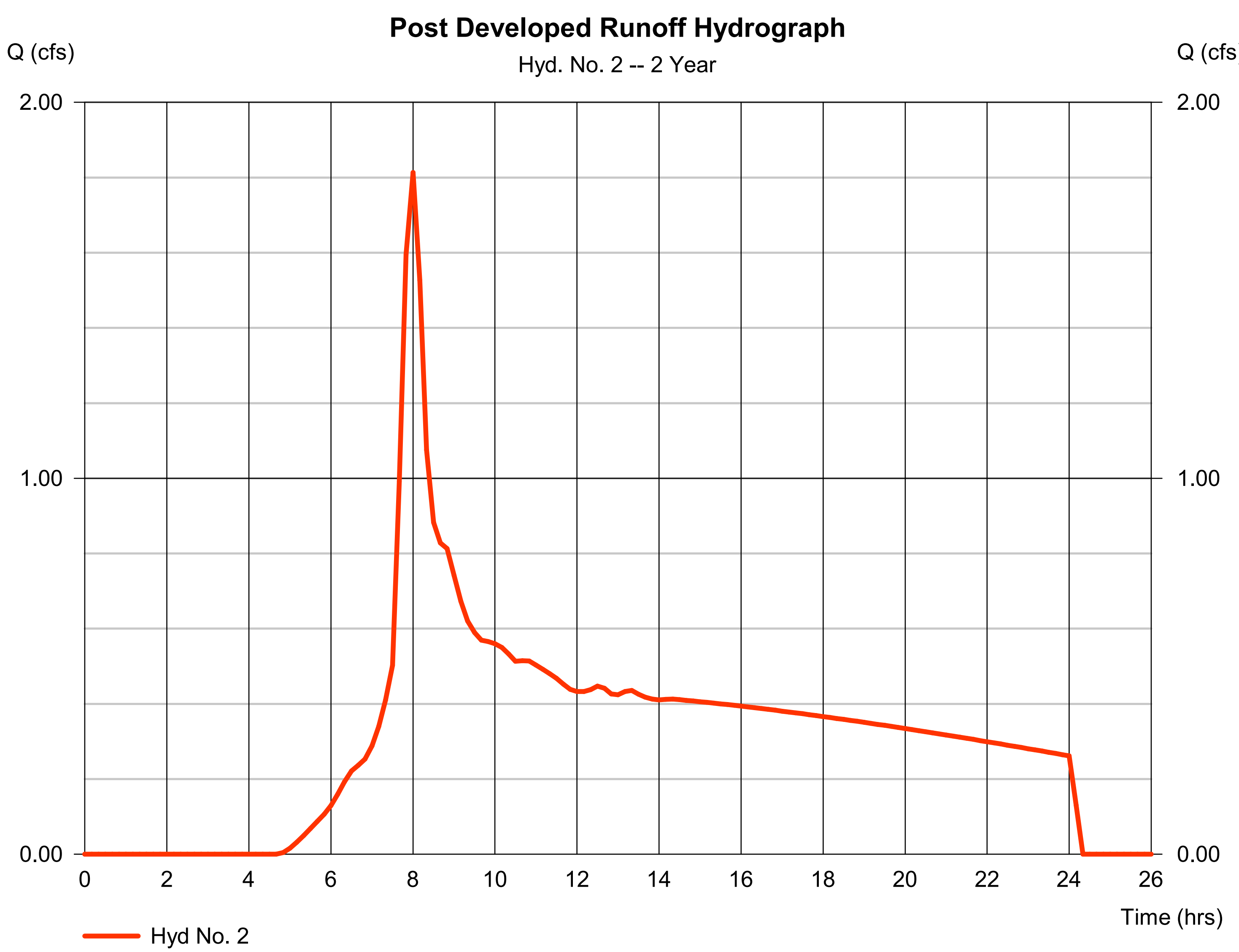
Hydrograph Report

Hyd. No. 2

Post Developed Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 1.813 cfs
Storm frequency	= 2 yrs	Time to peak	= 8.00 hrs
Time interval	= 10 min	Hyd. volume	= 29,303 cuft
Drainage area	= 6.850 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.50 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(2.080 x 98) + (4.770 x 79)] / 6.850



Hydrograph Report

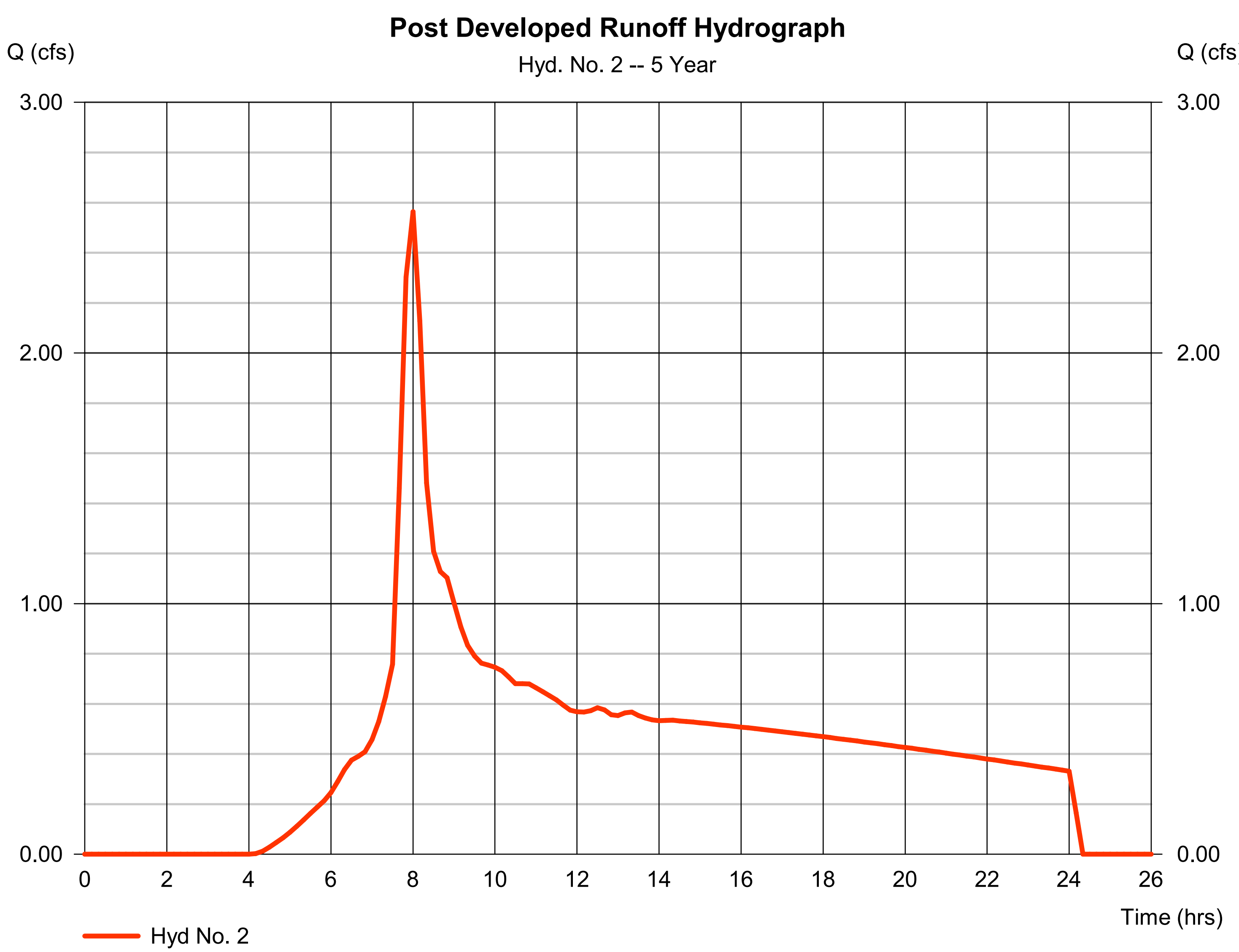
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 Tuesday, 11 / 8 / 2016

Hyd. No. 2

Post Developed Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 2.563 cfs
Storm frequency	= 5 yrs	Time to peak	= 8.00 hrs
Time interval	= 10 min	Hyd. volume	= 39,492 cuft
Drainage area	= 6.850 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(2.080 x 98) + (4.770 x 79)] / 6.850



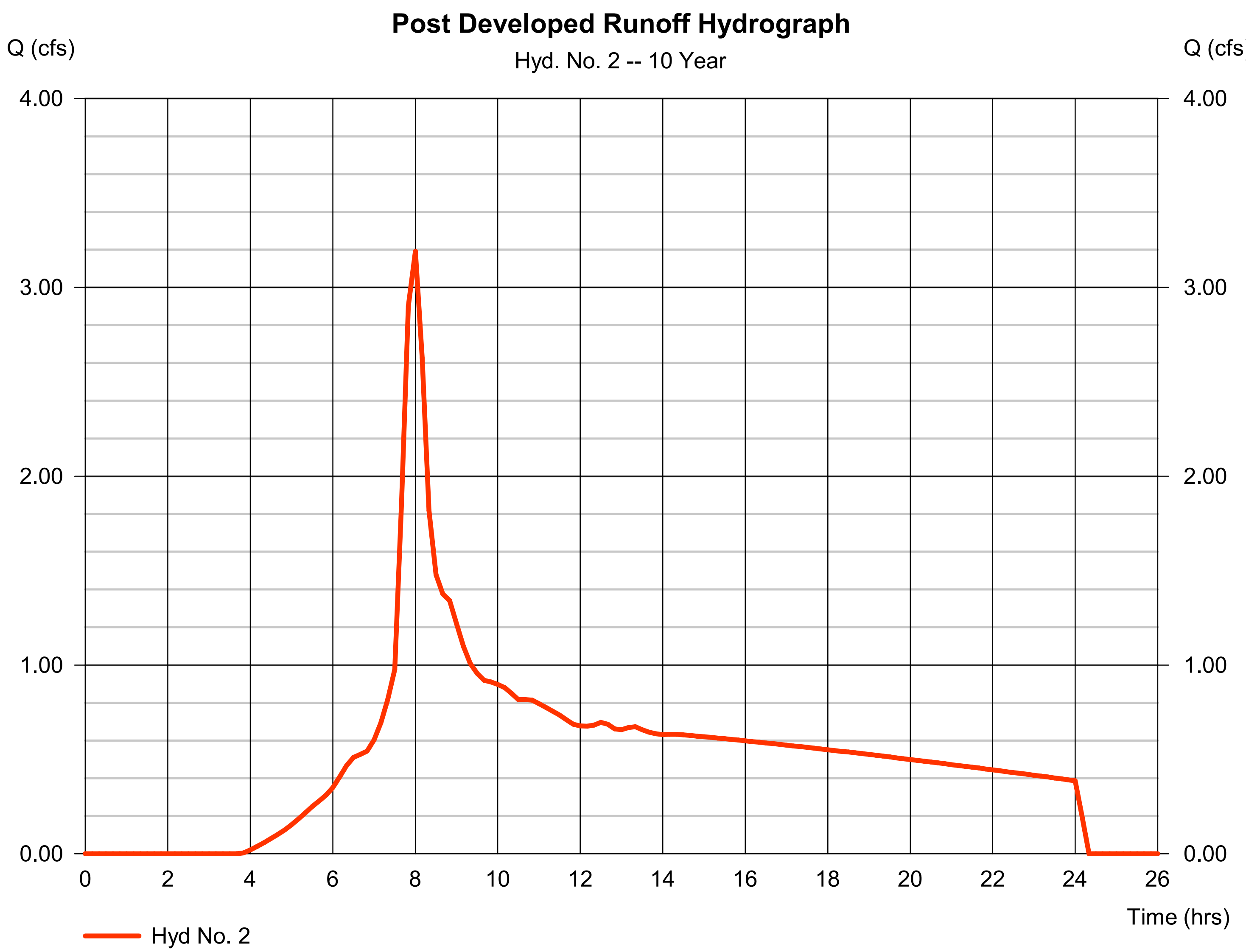
Hydrograph Report

Hyd. No. 2

Post Developed Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 3.191 cfs
Storm frequency	= 10 yrs	Time to peak	= 8.00 hrs
Time interval	= 10 min	Hyd. volume	= 47,979 cuft
Drainage area	= 6.850 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(2.080 x 98) + (4.770 x 79)] / 6.850



Hydrograph Report

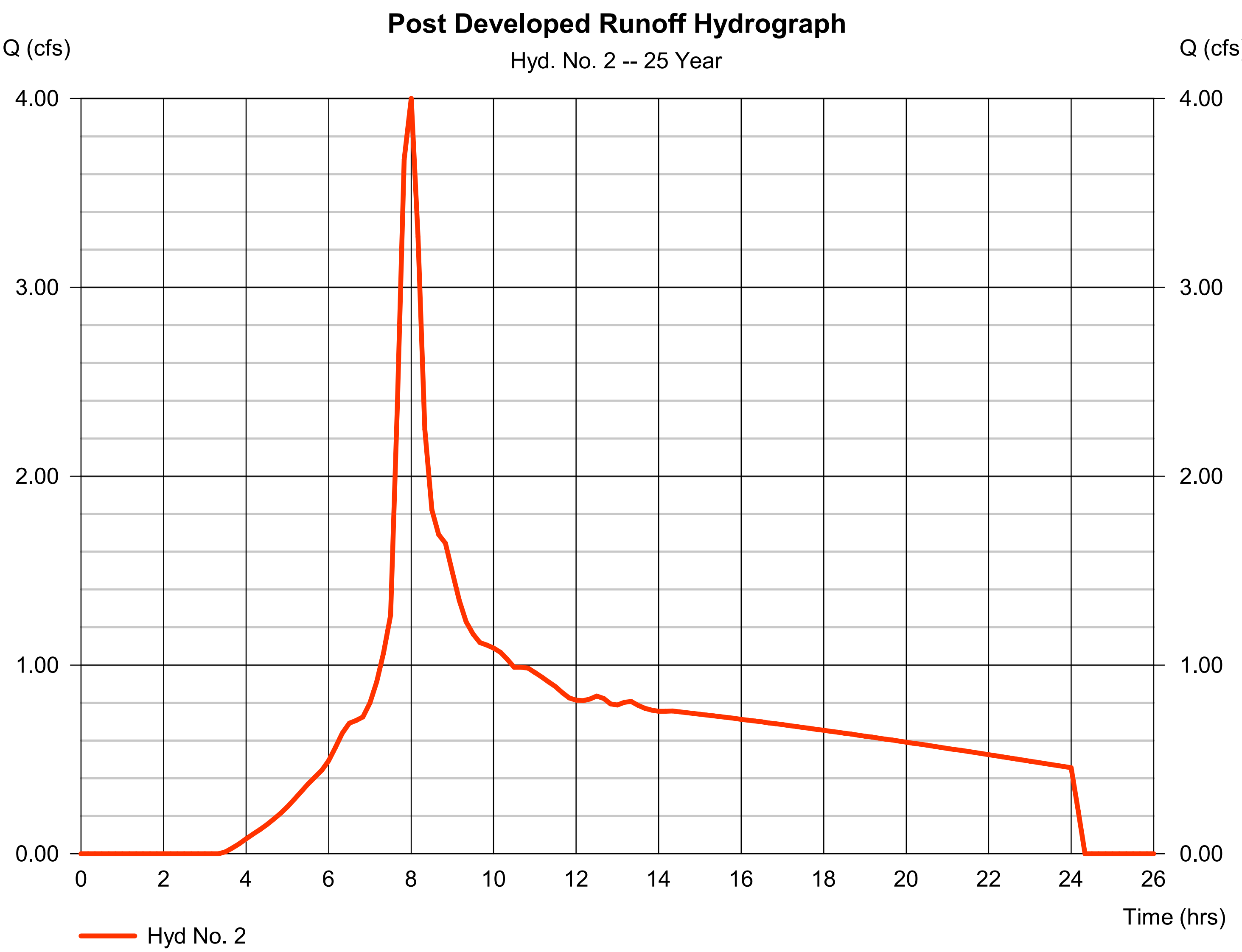
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 — Tuesday, 11 / 8 / 2016

Hyd. No. 2

Post Developed Runoff Hydrograph

Hydrograph type	= SBUH Runoff	Peak discharge	= 4.000 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.00 hrs
Time interval	= 10 min	Hyd. volume	= 58,897 cuft
Drainage area	= 6.850 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.90 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(2.080 x 98) + (4.770 x 79)] / 6.850



CALCULATIONS

Time of Concentration

PROJECT NO. 15266	**BY** kef	**DATE** 9/6/2015	
	Existing Pre Dev		
SHEET FLOW			
INPUT	**VALUE**	**VALUE**	**VALUE**
Surface Description	**Type 6 Grass (dense)**	**Type 6 Grass (dense)**	**Type 5 Grass (short prairie)**
Manning's "n"	**0.24**	**0.24**	**0.15**
Flow Length, L	**300** ft	ft	**0** ft
2-Yr 24 Hour Rainfall, P_2	**2.5** in	**2.5** in	**2.5** in
Land Slope, s	**0.1558** ft/ft	**0.02** ft/ft	**0.0025** ft/ft
OUTPUT			
Travel Time	0.29 hr	0.00 hr	0.00 hr
SHALLOW CONCENTRATED FLOW			
INPUT	**VALUE**	**VALUE**	**VALUE**
Surface Description	**Unpaved**	**Paved**	**Unpaved**
Flow Length, L	**346** ft	ft	**0** ft
Watercourse Slope*, s	**0.0987** ft/ft	**0.11** ft/ft	**0.027** ft/ft
OUTPUT			
Average Velocity, V	5.07 ft/s	6.74 ft/s	2.65 ft/s
Travel Time	0.019 hr	0.000 hr	0.000 hr
CHANNEL FLOW			
INPUT	**VALUE**	**VALUE**	**VALUE**
Cross Sectional Flow Area, a	**0.0** ft^2	**1.77** ft^2	**15.05** ft^2
Wetted Perimeter, P_w	**0.0** ft	**4.741** ft	**7.69** ft
Channel Slope, s	**0.0** ft/ft	**0.09** ft/ft	**0.00** ft/ft
Manning's "n"	**0.24**	**0.013**	**0.24**
Flow Length, L	**0** ft	ft	**0** ft
OUTPUT			
Average Velocity	0.03 ft/s	17.83 ft/s	0.53 ft/s
Hydraulic Radius, $r = a / P_w$	1.00 ft	0.37 ft	1.96 ft
Travel Time	0.00 hr	0.00 hr	0.00 hr
Watershed or Subarea T_c =	**0.30 hr**	**0.00 hr**	**0.00 hr**
Watershed or Subarea T_c =	**18 minutes**	**0 minutes**	**0 minutes**

GEOTECHNICAL REPORT

GeoPacific Engineering, Inc.

Real-World Geotechnical Solutions

Investigation • Design • Construction Support

Preliminary Geotechnical Engineering Report & Landslide Hazard Study

Reesman Property

Upper Midhill Drive - 2S1E14CA 00200

Portland, Oregon 97229

GeoPacific Engineering, Inc. Job No. 15-3849

August 6, 2015

14835 SW 72nd Avenue
Portland, Oregon 97224

Tel (503) 598-8445
Fax (503) 941-9281

TABLE OF CONTENTS

List of Appendices

List of Figures

August 6, 2015
Project No. 15-3849

Ryan Zygar
Upper Midhill Estates, LLC
931 SW King Avenue
Portland, Oregon 97205
Email: ryan@zygar.com

Cc: Andrew Tull, 3J Consulting Engineers, andrew.tull@3j-consulting.com

SUBJECT: PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
REESMAN PROPERTY
UPPER MIDHILL DRIVE - 2S1E14CA 00200
WEST LINN, OREGON

PROJECT INFORMATION

This report presents the results of a preliminary geotechnical engineering study conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our investigation was to evaluate subsurface conditions at the site and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-506, revised May 21, 2015, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*. This report is considered preliminary because no grading or development plans have yet been finalized. GeoPacific should be consulted to review the proposed grading and development plans and to provide specific recommendations for the proposed plans prior to construction.

Location:	Upper Midhill Drive 2S1E14CA 00200 West Linn, Oregon (see Figure 1)
Property Owner:	Ryan Zygar Upper Midhill Estates, LLC 931 SW King Avenue Portland, Oregon 97205
Developer:	Same as Property Owner
Jurisdictional Agency:	City of West Linn, Oregon
Prepared By:	GeoPacific Engineering, Inc 14835 SW 72nd Avenue Portland, Oregon 97224 Tel (503) 598-8445 Fax (503) 941-9281

SITE AND PROJECT DESCRIPTION

The subject site is an irregularly shaped parcel located at the northern terminus of Upper Midhill Drive in the City of West Linn, Clackamas County, Oregon. The property is approximately 6.1 acres in size. Topography in the northeast portion of the site slopes down to the northeast at an average grade of approximately 15 percent or less. Topography in the southwest portion of the site slopes down to the northeast at an average grade of approximately 25 percent or less. Small areas of the site, such as in the far southwest corner of the site, slope down to the east at grades of up to approximately 50 percent. The site is currently undeveloped and vegetation consists primarily of short grasses and dense to sparse trees.

Preliminary site plans indicate that the proposed development will consist of a 34 lot subdivision for single family home construction, new streets, driveways, stormwater management facilities, and associated underground utilities. A grading plan has not been provided for our review, but we anticipate maximum cuts and fills will be on the order of about 7 feet or less.

SITE GEOLOGY

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins. Valley-fill sediment in the adjacent basin achieves a maximum thickness of 1,500 feet and overlies Miocene Columbia River Basalt at depth (Madin, 1990; Yeats et al., 1996).

Geologic mapping indicates that the near-surface soils in the northeastern half of the site consist of Willamette Formation soils. The Willamette Formation is a quaternary age (last 1.6 million years) catastrophic flood deposit associated with repeated glacial outburst flooding of the Willamette Valley (Yeats et al., 1996). The last of these outburst floods occurred about 10,000 years ago. These deposits typically consist of horizontally layered, micaceous, silt to coarse sand forming poorly-defined to distinct beds less than 3 feet thick. Regional studies indicate that the Willamette Formation soils on the subject site decreases in thickness to the southwest and taper out completely in the central portion of the site.

Underlying the Willamette Formation soils in the northeast portion of the site and directly underlying the ground surface in the southwest portion of the stie is the Columbia River Basalt Formation (Madin, 1990). The Miocene aged (about 14.5 to 16.5 million years ago) Columbia River Basalts are a thick sequence of lava flows which form the crystalline basement of the Tualatin Valley. The basalts are composed of dense, finely crystalline rock that is commonly fractured along blocky and columnar vertical joints. Individual basalt flow units typically range from 25 to 125 feet thick and interflow zones are typically vesicular, scoriaceous, brecciated, and sometimes include sedimentary rocks.

LIDAR images reviewed for this study show ancient debris flows which moved downslope to the northeast. During our field reconnaissance, we observed signs of two debris on the site, indicated by the presence of corresponding scarps, benches, and slightly bulged terrain. Groundwater seepage was observed in test pit TP-11, indicating the presence of a seep or spring. The approximate extents of the two debris flows observed on the site are shown Figure 3.

REGIONAL SEISMIC SETTING

At least three major fault zones capable of generating damaging earthquakes are thought to exist in the vicinity of the subject site. These include the Portland Hills Fault Zone, the Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone.

Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that include the central Portland Hills Fault, the western Oatfield Fault, and the eastern East Bank Fault. These faults occur in a northwest-trending zone that varies in width between 3.5 and 5.0 miles. The combined three faults reportedly vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years) sediment (Madin, 1990). The Portland Hills Fault occurs along the Willamette River at the base of the Portland Hills, and is located approximately 1.5 miles northeast of the site. The Oatfield Fault occurs along the western side of the Portland Hills, and is located approximately 0.67 miles southwest of the site. The East Bank Fault occurs along the eastern margin of the Willamette River, and is located approximately 3.25 miles northeast of the site. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000).

According to the USGS Earthquake Hazards Program, the fault was originally mapped as a down-to-the-northeast normal fault, but has also been mapped as part of a regional-scale zone of right-lateral, oblique slip faults, and as a steep escarpment caused by asymmetrical folding above a south-west dipping, blind thrust fault. The Portland Hills fault offsets Miocene Columbia River Basalts, and Miocene to Pliocene sedimentary rocks of the Troutdale Formation. No fault scarps on surficial Quaternary deposits have been described along the fault trace, and the fault is mapped as buried by the Pleistocene aged Missoula flood deposits. No historical seismicity is correlated with the mapped portion of the Portland Hills Fault Zone, but in 1991 a M3.5 earthquake occurred on a NW-trending shear plane located 1.3 miles east of the fault (Yelin, 1992). Although there is no definitive evidence of recent activity, the Portland Hills Fault Zone is assumed to be potentially active (Geomatrix Consultants, 1995).

Gales Creek-Newberg-Mt. Angel Structural Zone

The Gales Creek-Newberg-Mt. Angel Structural Zone is a 50-mile-long zone of discontinuous, NW-trending faults that lies about 19 miles southwest of the subject site. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment (Yeats et al., 1996; Werner et al., 1992). A geologic reconnaissance and photogeologic analysis study conducted for the Scoggins Dam site in the Tualatin Basin revealed no evidence of deformed geomorphic surfaces along the structural zone (Unruh et al., 1994). No seismicity has been recorded on the Gales Creek Fault or Newberg Fault (the fault closest to the subject site); however, these faults are considered to be potentially active because they may connect with the seismically active Mount Angel Fault and the rupture plane of the 1993 M5.6 Scotts Mills earthquake (Werner et al. 1992; Geomatrix Consultants, 1995).

According to the USGS Earthquake Hazards Program, the Mount Angel fault is mapped as a high-angle, reverse-oblique fault, which offsets Miocene rocks of the Columbia River Basalts, and Miocene and Pliocene sedimentary rocks. The fault appears to have controlled emplacement of the Frenchman Spring Member of the Wanapum Basalts, and thus must have a history that predates the Miocene age of these rocks. No unequivocal evidence of deformation of Quaternary deposits has been described, but a thick sequence of sediments deposited by the Missoula floods covers much of the southern part of the fault trace.

Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year (Goldfinger et al., 1996). A growing body of geologic evidence suggests that prehistoric subduction zone earthquakes have occurred (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). This evidence includes: (1) buried tidal marshes recording episodic, sudden subsidence along the coast of northern California, Oregon, and Washington, (2) burial of subsided tidal marshes by tsunami wave deposits, (3) paleoliquefaction features, and (4) geodetic uplift patterns on the Oregon coast. Radiocarbon dates on buried tidal marshes indicate a recurrence interval for major subduction zone earthquakes of 250 to 650 years with the last event occurring 300 years ago (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). The inferred seismogenic portion of the plate interface lies approximately along the Oregon Coast at depths of between 20 and 40 kilometers below the surface.

FIELD EXPLORATION AND SUBSURFACE CONDITIONS

Our site-specific exploration for this report was conducted on June 10, 2015 and June 18, 2015. A total of 11 exploratory test pits (designated TP-1 through TP-11) were excavated to depths ranging from 10 to 17 feet at the locations shown on Figures 2 and 3. Test pit locations were determined in the field by pacing or taping distances from property corners and other site features discernible in aerial photographs. As such, the locations of the explorations should be considered approximate.

A representative of the GeoPacific engineering staff continuously monitored the field exploration program and logged the test pits. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System. Rock hardness was classified in accordance with the below table (Table 1), which was modified from the ODOT Rock Hardness Classification Chart.

Table 1 - Rock Hardness Classification Chart

ODOT Rock Hardness Rating	Field Criteria	Unconfined Compressive Strength	Typical Equipment Needed For Excavation
Extremely Soft (R0)	Indented by thumbnail	<100 psi	Small excavator
Very Soft (R1)	Scratched by thumbnail, crumbled by rock hammer	100-1,000 psi	Small excavator
Soft (R2)	Not scratched by thumbnail, indented by rock hammer	1,000-4,000 psi	Medium excavator (slow digging with small excavator)
Medium Hard (R3)	Scratched or fractured by rock hammer	4,000-8,000 psi	Medium to large excavator (slow to very slow digging), typically requires chipping with hydraulic hammer or mass excavation)
Hard (R4)	Scratched or fractured w/ difficulty	8,000-16,000 psi	Slow chipping with hydraulic hammer and/or blasting
Very Hard (R5)	Not scratched or fractured after many blows, hammer rebounds	>16,000 psi	Blasting

During our explorations, geotechnical conditions such as soil consistency, moisture and groundwater conditions were also noted. For additional information pertaining to subsurface conditions at specific location, refer to the attached test pit logs. It should be noted that subsurface conditions can vary between exploration locations, as discussed in the *Uncertainty and Limitations* section of this report. The following sections discuss the subsurface conditions encountered in our test pit explorations.

Soils

The underlying soils encountered in our explorations consisted of topsoil, undocumented fill, buried topsoil, residual soil, and the Columbia River Basalt Formation:

Topsoil Horizon: Directly underlying the ground surface in all test pits except test pit TP-4, we low to moderately organic SIL T(ML-OL) with fine to medium roots throughout. The topsoil layer was generally soft and extended to depths of 8 to 14 inches, with an average depth of approximately 12 inches. However, in test pit TP-6 the topsoil layer extended to a depth of 30 inches.

Undocumented Fill: Directly underlying the ground surface in test pit TP-4, we observed undocumented fill material. The fill material generally consisted of boulders in a matrix of clayey silt and extended to a depth of approximately 4.5 feet, overlying buried topsoil. We observed boulders up to 3 feet in diameter.

Buried Topsoil: Underlying the undocumented fill material in test pit TP-4, we observed a layer of buried topsoil material. The layer of buried topsoil consisted of moderately organic SILT (ML-OL) with significant amounts of organic debris, including branches and roots. The layer of buried topsoil extended to a depth of 6 feet in test pit TP-4.

Ancient Debris Flow Materials: Underlying the topsoil in test pits TP-5, TP-7, TP-9, TP-10, and TP-11, we observed material derived from an ancient debris flow of native residual soil. The debris flow materials generally consisted of clayey SILT (ML) to silty CLAY (CL). However, the debris flow materials encountered in test pits TP-7 and TP-10 contained some angular gravel to cobble size angular basalt fragments. Also, at the bottom of the debris flow materials in test pits TP-5, TP-9, and TP-10, and underlying the topsoil layer in test pit TP-11, the debris flow materials consisted of highly plastic CLAY (CH). The ancient debris flow materials were generally stiff to very stiff.

Laboratory tests indicated that this material has a plasticity index of 56 and liquid limit of 83, which indicates a very high plasticity. We subcontracted Northwest Testing, Inc. to perform expansion index testing on this soil. A representative sample taken at a depth of 7 feet in test pit TP-5 exhibited an expansion index of 110, indicating a very high potential for shrinkage and swelling with changes in moisture. The layer of highly expansive clay may be the ancient slide plane for the debris flow. Debris flow materials extended to depths of 8 feet in test pits TP-5 and TP-7, and to depths of 13, 3.5, and 8 feet in test pits TP-9, TP-10, and TP-11, respectively.

Willamette Formation: Underlying the topsoil layer in test pits TP-1 and TP-2, and underyling debris flow materials in test pits TP-10 and TP-11, we observed material belonging to the Willamette Formation. These soils generally consisted of silty to sandy GRAVEL and COBBLES, but varied from gravelly SILT (ML) to sandy GRAVEL (GP). Slight to moderately cemented sandstone was observed from 5 to 6 feet in test pit TP-10. Also, large boulders up to 2.5 feet in diameter were encountered in test pit TP-2

Willamette Formation soils extended to a depth of 3.5 feet in test pit TP-1, beyond the maximum depth of exploration in test pit TP-2 (12 feet), beyond the maximum depth of exploration in test pit TP-10 (14 feet), and beyond the maximum depth of exploration in test pit TP-11 (10 feet).

Residual Soil: Underlying the Willamette Formation soils in test pit TP-1, the topsoil layer in test pit TP-3, TP-6, and TP-8, the buried topsoil layer in test pit TP-4, and debris flow materials in test pit TP-5, TP-7, and TP-9 we observed residual soil derived from the in-place weathering of the underlying Columbia River Basalt Formation without any lateral movement. The residual soil generally consisted of silty CLAY (CL) to clayey SILT (ML) and was characterized by a stiff to very stiff consistency. However, highly plastic CLAY (CH) was observed below a depth of 16 feet in test pit TP-8, and below 13 feet in test pit TP-9. Residual soil extended beyond the maximum depths of our explorations in test pits TP-1, TP-3, TP-4, TP-6, TP-7, TP-8, and TP-9. Residual soils extended to a depth of 11 feet in test pit TP-5, below which depth the residual soil transitioned to less weathered basalt bedrock as discussed below.

Columbia River Basalt: Underlying the residual soil in test pit TP-5, we observed gray basalt belonging to the Columbia River Basalt Formation. The basalt encountered in test pit TP-5 was extremely soft (R0) to very soft (R1) with trace reddish-brown silty clay to clayey silt. Extremely soft to very soft basalt (R0-R1) extended beyond the maximum depth of exploration in test pit TP-5 (12 feet).

Soil Moisture and Groundwater

On June 10 and 18, 2015 the soil moisture conditions observed in test pits were damp to very moist. However, groundwater seepage was encountered in test pit TP-11 from 1 to 4 feet beneath the ground surface. The seepage rate in test pit TP-11 was visually estimated at less than 1 gallon per minute. Very slow groundwater seepage was also encountered in test pit TP-5 during infiltration testing at a depth of 5 feet. Experience has shown that temporary storm related perched groundwater within the near surface soils often occur over fine-grained native deposits such as those beneath the site during the wet season. It is anticipated that groundwater conditions will vary depending on the season, local subsurface conditions, changes in site utilization, and other factors. According to the *Estimated Depth to Groundwater in the Portland, Oregon Area, (United States Geological Survey, Snyder, 2014 website)*, groundwater is present at an approximate depth of 100 feet below the ground surface, with a moderate level of uncertainty.

INFILTRATION TESTING

On June 10, 2015, a representative of GeoPacific Engineering, Inc. (GeoPacific) performed one pushed-pipe, falling head infiltration test at a depth of 11 feet in test pit TP-1 and one open hole, falling head infiltration test at a depth of 5 feet in test pit TP-2. The tests were conducted in native soils at the bottom of the test pits. During the tests, water levels were measured over regular intervals until three successive measurements showing a consistent infiltration rate were achieved. Descriptions of the soils encountered in the test locations are presented on the following table. Approximate test locations are shown in Figure 2. Table 2 presents a summary of our infiltration test measurement results.

Table 2 - Results of Infiltration Testing

Location	Depth (ft)	Soil Description	Infiltration Rate (in/hr)
TP-1	11	Silty CLAY (CL) – Residual Soil	Groundwater Seepage Observed
TP-2	5	Silty GRAVEL and COBBLES (GM) – Willamette Formation	1.2

Very slow groundwater seepage was observed in the infiltration test in TP-2 at a depth of 5 feet, indicating that subsurface infiltration of stormwater into the residual soils in the vicinity of test pit TP-5 is not feasible. The test results indicate that infiltration rates in the native Willamette Formation soils are low. The measured rates in test pit TP-2 reflect bother vertical and horizontal flow pathways.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Our site investigation indicates that the proposed construction is geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. In our opinion, there are three main geotechnical issues for project completion. The first main geotechnical issue is the presence of ancient debris flow materials on the site. Two ancient debris flows were identified on the site during our geologic reconnaissance and subsurface investigation. The ancient debris flow materials appear to be relatively shallow (generally less than 8 feet, but up to 13 feet deep in test pit TP-9). We recommend that site grading be planned in such a way as to reduce slope instability hazards by unloading the ancient debris flows or by completely removing them.

The second main geotechnical issue for project development is the presence of undocumented fill material and buried topsoil. Undocumented fill material was encountered to a depth of 4.5 feet in test pit TP-4 and consisted of loose boulders up to 2.5 feet in diameter. Buried topsoil extended to a depth of 6 feet in test pit TP-4.

The third main geotechnical issue is the presence of expansive clay on the site. Highly plastic, potentially expansive clay was observed in test pits TP-5, TP-8, TP-9, TP-10, and TP-11. Expansion index testing of clay material from test pit TP-5 indicates the highly plastic clay on the site has a high potential for expansion and shrinkage. This material should be removed from within 5 feet vertically beneath foundations and replaced with compacted, engineered fill as indicated in this report. The highly plastic clay material should also be removed 5 feet horizontally beyond the building envelopes. Other areas of potentially expansive clay may exist on the site outside our explorations. The proposed on site public streets are comprised of flexible pavements that are not significantly impacted by expansive soils, therefore no soil removal is recommended within the streets.

Other alternatives may be considered for addressing the presence of potentially expansive soils on the site, depending on the final grading plan. Alternatives may include placing at least 5 feet of engineered fill over the layer of potentially expansive soil or treating the potentially expansive soil with lime and recompacting it. It may also be possible to remove the potentially expansive soils from beneath foundations and use it as a pond liner in the stormwater quality facility. Additional measures may include installation of footing perimeter drains, elimination of deep-rooted plants and irrigation systems adjacent to structures, and placement of additional reinforcing steel in footings and floor slabs. GeoPacific should be contacted for further recommendations if deeper or more prevalent pockets of expansive soils are encountered near final grades during site grading.

The following report sections provide recommendations for site development and construction in accordance with the current applicable codes and local standards of practice. These recommendations are considered preliminary because no grading or development plans have yet been finalized. GeoPacific should be consulted to review the proposed grading and development plans and to provide specific recommendations for the proposed plans prior to construction.

General Slope Stability and Mass Grading

Based on the results of our geotechnical investigation, the site is generally underlain by stiff to hard residual soil and medium dense to dense Willamette Formation soils, with basalt bedrock at relatively shallow depths. However, we identified two ancient debris flows on the site, consisting of native residual soils which moved downslope. The approximate extents of the ancient debris flows observed on the site are shown on Figure 3. As observed in test pit TP-10 and TP-11, and shown on the attached geologic cross sectional drawing (Figure 4), the ancient debris flow materials moved downslope over the Willamette Formation soils in the central portion of the site.

We recommend that mass grading of the site be planned in such a way as to improve slope stability in the vicinity of the ancient debris flows. In our opinion, this can be done by either completely removing the ancient debris flow material, or by unloading the top of the debris flow and buttressing the toe of the debris flow with engineered fill. GeoPacific should be consulted to review the proposed grading plan for the site prior to construction. Provided that the recommendations of this report are incorporated into the design and construction phases of the project, it is our opinion that potential for slope instability resulting in damage to the proposed development is considered to be low, and no further evaluation of the slope instability hazard will be necessary.

It should be noted that this evaluation is based on limited observation of surficial features, the backhoe test pits performed, and review of available geologic literature. Also, the presence of hillside springs has a potential to negatively affect slope stability if not address properly. Discussions pertaining to this issue follow in the *Subsurface Drainage* section of this report.

Site Preparation Recommendations

Areas of proposed buildings, streets, and areas to receive fill should be cleared of vegetation and any organic and inorganic debris. Inorganic debris should be removed from the site. Organic materials from clearing should either be removed from the site or placed as landscape fill (in areas not planned for structures, driving lanes, or parking areas).

Organic-rich topsoil should then be stripped from construction areas of the site or where engineered fill is to be placed. In general, the estimated necessary depth of removal in undisturbed areas for moderately organic soils is 10 to 12 inches. However, the topsoil layer extended to a depth of 30 inches in test pit TP-6 and it should be noted that the necessary depth of topsoil removal in treed areas of the site may be up to 12 to 18 inches. Large trees are present at the site and deeper stripping to remove large roots or other organics may be necessary in localized areas. The final depth of soil removal will be determined on the basis of a site inspection after the stripping/excavation has been performed. Stripped topsoil should be stockpiled only in designated areas and stripping operations should be observed and documented by the geotechnical engineer (or representative).

Any remaining disturbed native soils, undocumented fills, buried topsoil, potentially expansive clay soils, and subsurface structures (tile drains, basements, driveway and landscaping fill, old utility lines, septic leach fields, etc.) should be removed and the excavations backfilled with engineered fill. Undocumented fill material was encountered to a depth of 4.5 feet in test pit TP-4. Buried topsoil was encountered underlying the undocumented fill material in test pit TP-4 to a total depth of 6 feet beneath the ground surface. Highly plastic, potentially expansive clay soils were encountered in test pits TP-5, TP-8, TP-9, TP-10, and TP-11. Highly plastic clay soils may be reused as an impermeable clay liner for the stormwater management facility, if desired.

GeoPacific should be consulted during site preparation to determine whether or not the existing undocumented fill material may be used as engineered fill. Based on the results of our exploration, we anticipate that the fill material encountered in TP-4 will not be suitable for reuse as engineered fill due to the significant amount of large boulders it contains. Reuse of the existing undocumented fill as engineered fill may require sorting operations.

Once stripping of a particular area is approved, the area must be ripped or tilled to a depth of 12 inches, moisture conditioned, root-picked, and compacted in-place prior to the placement of engineered fill or crushed aggregate base for pavement. Exposed subgrade soils should be evaluated by the geotechnical engineer. For large areas, this evaluation is normally performed by proof-rolling the exposed subgrade with a fully loaded scraper or dump truck. For smaller areas where access is restricted, the subgrade should be evaluated by probing the soil with a steel probe. Soft/loose soils identified during subgrade preparation should be compacted to a firm and unyielding condition, over-excavated and replaced with engineered fill (as described below), or stabilized with rock prior to placement of engineered fill. The depth of overexcavation, if required, should be evaluated by the geotechnical engineer at the time of construction.

Subsurface Drainage

Proposed cuts, particularly those above existing wetlands, are likely to expose seasonal or year round groundwater seeps. Some cuts will be supported by engineered retaining walls and additional drainage measures can be implemented in the wall design. Sloping cuts may require additional drainage measures such as shallow cutoff trench drains. The necessity and location of cutoff trench drains will depend on conditions encountered during site grading. GeoPacific should observe cut slope excavations and make specific recommendations for subsurface drains based on actual conditions exposed.

Engineered Fill

In general, we anticipate that nonexpansive soils from planned cuts and utility trench excavations will be suitable for use as engineered fill provided they are adequately moisture conditioned prior to compacting. All grading for the proposed construction should be performed as engineered grading in accordance with the applicable building code at time of construction with the exceptions and additions noted herein. Areas proposed for fill placement should be prepared as described in the site preparation section. Surface soils should then be scarified and recompacted prior to placement of structural fill. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Imported fill material must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 90 percent of the maximum dry density determined by ASTM D1557 (Modified Proctor) or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. All engineered fill should be observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd^3, whichever requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency. Site earthwork will be impacted by soil moisture and shallow groundwater conditions.

Keyways, Benching, and Subdrains for Fill Slopes

Engineered fill placed on existing sloped areas inclining steeper than an approximately twenty percent grade should be constructed on a keyway and benches in accordance with the typical designs shown in the attached Fill Slope Detail (Figure 5). Keyways should have a minimum depth of three feet, and a minimum width of eight feet. Additional removal of weakened or soft soils may be required depending on the conditions observed during construction. Benches and keyways should be roughly horizontal in the down slope direction, but may slope up to a 10 percent grade along a topographic contour. Keyways sloping more than a 20 percent grade along a topographic contour should be benched or configured as approved by the geotechnical engineer or his designated representative. Cut slopes should be no steeper than 2H:1V.

If groundwater seepage is observed during excavation, keyways should include a subdrain consisting of a minimum 4-inch-diameter, ADS Heavy Duty Grade (or equivalent), perforated plastic pipe enveloped in a minimum of 4 cubic feet per lineal foot of 2"- ½", open-graded gravel drain rock wrapped with geotextile filter fabric (Mirafi 140N or equivalent). Figure 4 shows a typical keyway subdrain. A minimum 0.5 percent gradient should be maintained throughout all subdrain pipes and outlets. GeoPacific should inspect keyways, subdrains and benching prior to fill placement. Subdrains may be eliminated at the discretion of the geotechnical engineer.

Excavating Conditions and Utility Trench Backfill

We anticipate that on-site soils can be excavated using conventional heavy equipment. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926), or be shored. The existing native soils classify as Type B Soil and temporary excavation side slope inclinations as steep as 1H:1V may be assumed for planning purposes. This cut slope inclination is applicable to excavations above the water table only.

Shallow, perched groundwater may be encountered during the wet weather season and should be anticipated in excavations and utility trenches. Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

PVC pipe should be installed in accordance with the procedures specified in ASTM D2321 and the City of Portland standards. We recommend that structural trench backfill be compacted to at least 90 percent of the maximum dry density obtained by Modified Proctor (ASTM D1557) or equivalent. Initial backfill lift thicknesses for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, at least one density test is taken for every 4 vertical feet of backfill on each 200-lineal-foot section of trench.

New Pavement Sections for Proposed Streets

We understand that the proposed development will consist of paved roadways that will be surfaced with asphalt pavement. Table 3 presents the recommended section thicknesses for the proposed pavement areas that are to be completed as part of the project, under dry weather construction conditions. In our opinion, this pavement section is suitable to support the anticipated levels of traffic.

Table 3 - Recommended Minimum Dry-Weather Pavement Section for Light-Duty Roadways

Material Layer	Section Thickness (in)	Compaction Standard
Asphaltic Concrete (AC)	3	91%/ 92% of Rice Density AASHTO T-209
Crushed Aggregate Base ¾"-0 (leveling course)	2	95% of Modified Proctor AASHTO T-180
Crushed Aggregate Base 1½"-0	8	95% of Modified Proctor AASHTO T-180
Competent Subgrade	12	Approved native or 90% of Modified Proctor AASHTO T-180

Any pockets of organic debris or loose fill encountered during subgrade preparation should be removed and replaced with engineered fill (see *Site Preparation* Section). In order to verify subgrade strength, we recommend proof-rolling directly on subgrade with a loaded dump truck during dry weather and on top of base course in wet weather. Soft areas that pump, rut, or weave should be stabilized prior to paving.

If pavement areas are to be constructed during wet weather, the subgrade and construction plan should be reviewed by the project geotechnical engineer at the time of construction so that condition specific recommendations can be provided. The moisture sensitive subgrade soils make the site a difficult wet weather construction project. General recommendations for wet weather pavement sections are provided below.

During placement of pavement section materials, density testing should be performed to verify compliance with project specifications. Generally, one subgrade, one base course, and one asphalt compaction test is performed for every 100 to 200 linear feet of paving.

Wet Weather Construction Pavement Section

This section presents our recommendations for wet weather pavement sections, which are for construction of on-site driving lanes and parking areas. These wet weather pavement section recommendations are intended for use in situations where it is not feasible to compact the subgrade soils to Clackamas County requirements, due to wet subgrade soil conditions, and/or construction during wet weather.

Based on our site review, we recommend a wet weather section with a minimum subgrade deepening of 6 inches to accommodate a working subbase of additional 1½"-0 crushed rock. Geotextile fabric, Mirafi 500x or equivalent, should be placed on subgrade soils prior to placement of base rock.

In some instances it may be preferable to use Special Treated Base (STB) in combination with overexcavation and increasing the thickness of the rock section. GeoPacific should be consulted for additional recommendations regarding use of STB in wet weather pavement sections if it is desired to pursue this alternative. Cement treatment of the subgrade may also be considered instead of overexcavation. For planning purposes, we anticipate that treatment of the on-site soils would involve mixing cement powder to approximately 6 percent cement content and a mixing depth on the order of 12 inches.

With implementation of the above recommendations, it is our opinion that the resulting pavement sections will provide equivalent or greater structural strength than the dry weather pavement section currently planned. However, it should be noted that construction in wet weather is challenging, and the performance of pavement subgrade depend on a number of factors including the weather conditions, the contractor's methods, and the amount of traffic the areas are subjected to. There is a potential that soft spots may develop even with implementation of the wet weather provisions recommended in this letter. If soft spots in the subgrade are identified during roadway excavation, or develop prior to paving, the soft spots should be over-excavated and backfilled with additional crushed rock.

During subgrade excavation, care should be taken to avoid disturbing the subgrade soils. Removals should be performed using an excavator with a smooth-bladed bucket. Truck traffic should be limited until an adequate working surface has been established. We suggest that the crushed rock be spread using bulldozer equipment rather than dump trucks, to reduce the amount of traffic and potential disturbance of subgrade soils.

Care should be taken to avoid over-compaction of the base course materials, which could create pumping, unstable subgrade soil conditions. Heavy and/or vibratory compaction efforts should be applied with caution. Following placement and compaction of the crushed rock to project specifications (95% of AASHTO T-180), a finish proof-roll should be performed before paving.
The above recommendations are subject to field verification. GeoPacific should be on-site during construction to verify subgrade strength and to take density tests on the engineered fill, base rock and asphaltic pavement materials.

Spread Foundations

The proposed residential structures may be supported on shallow foundations bearing on competent undisturbed, native soils and/or engineered fill, appropriately designed and constructed as recommended in this report. Foundation design, construction, and setback requirements should conform to the applicable building code at the time of construction. For maximization of bearing strength and protection against frost heave, spread footings should be embedded at a minimum depth of 18 inches below exterior grade. Minimum footing widths should be determined by the project engineer/architect in accordance with applicable design codes.

The anticipated allowable soil bearing pressure is 2,000 lbs/ft^2 for footings bearing on competent, native soil and/or engineered fill. A maximum chimney and column load of 30 kips is preliminarily recommended for the site. The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For heavier loads, the geotechnical engineer should be consulted. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.45, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. We anticipate that the majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any loose soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require over-excavation of footings and backfill with compacted, crushed aggregate.

Footing and Roof Drains

If the proposed structures will have a raised floor, and no concrete slab-on-grade floors are used, perimeter footing drains would not be required based on soil conditions encountered at the site and experience with standard local construction practices. Where it is desired to reduce the potential for moist crawl spaces, footing drains may be installed. If concrete slab-on-grade floors are used, perimeter footing drains should be installed as recommended below.

Where used, perimeter footing drains should consist of 3 or 4-inch diameter, perforated plastic pipe embedded in a minimum of 1 ft^3 per lineal foot of clean, free-draining drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. Water collected from the footing drains should be directed to the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. The footing drains should include clean-outs to allow periodic maintenance and inspection. In our opinion, footing drains may outlet at the curb, or on the back sides of lots where sufficient fall is not available to allow drainage to the street.

Construction should include typical measures for controlling subsurface water beneath the homes, including positive crawlspace drainage to an adequate low-point drain exiting the foundation, visqueen covering the exposed ground in the crawlspace, and crawlspace ventilation (foundation vents). The homebuyers should be informed and educated that some slow flowing water in the crawlspaces is considered normal and not necessarily detrimental to the home given these other design elements incorporated into its construction. Appropriate design professionals should be consulted regarding crawlspace ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Down spouts and roof drains should collect roof water in a system separate from the footing drains in order to reduce the potential for clogging. Roof drain water should be directed to an appropriate discharge point well away from structural foundations. Grades should be sloped downward and away from buildings to reduce the potential for ponded water near structures.

Stormwater Management Facilities

We understand that plans for project development may include stormwater management facilities, such as stormwater quality ponds in the northeast or southeast corners of the site. We also understand that it is desired to incorporate subsurface disposal of stormwater through infiltration. Groundwater seepage was observed during the infiltration test at a depth of 5 feet in test pit TP-1, indicating that subsurface infiltration is not feasible in the residual soils in the vicinity of test pit TP-1. Infiltration rates in native silty GRAVEL and COBBLES (GM) encountered in test pit TP-2 are on the order of 1.2 inches per hour.

We typically suggest a factor of safety ranging from 2 to 4 depending on many factors including the type and location of the facility, regulatory stipulations, and the ability to safely convey potential overflow to an appropriate discharge point.

Systems should be constructed as specified by the designer and/or in accordance with jurisdictional design manuals. Stormwater exceeding storage capacities will need to be directed to a suitable surface discharge location. Stormwater management systems may need to include overflow outlets, surface water control measures and/or be connected to the street stormdrain system, if available.

Seismic Design

Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2012 International Residential Code (IRC) for One- and Two-Family Dwellings, with applicable Oregon Structural Specialty Code (OSSC) revisions (*current 2014*). We recommend Site Class D be used for design per the OSSC, Table 1613.5.2 and as defined in ASCE 7, Chapter 20, Table 20.3-1. Design values determined for the site using the USGS (United States Geological Survey) *2014 Seismic Design Maps Summary Report* are summarized in Table 4.

Table 4 - Recommended Earthquake Ground Motion Parameters (2015 USGS)

Parameter	Value
Location (Lat, Long), decimal	45.397, -122.656
Probabilistic Ground Motion Values, 2% Probability of Exceedance in 50 yrs	
Short Period, S_s	0.974 g
1.0 Sec Period, S_1	0.417 g
Soil Factors for Site Class D:	
F_a	1.110
F_v	1.583
Residential Site Value = 2/3 x F_a x S_s	0.721 g
Residential Seismic Design Category	D

Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to earthquake shaking. Soil liquefaction is generally limited to loose, granular soils located below the water table. After development, the on-site soils will consist predominantly of engineered fill, stiff to hard residual soil, medium dense to dense Willamette Formation soils, and hard rock, and are not considered susceptible to liquefaction. Therefore, it is our opinion that special design or construction measures are not required to mitigate the effects of liquefaction.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and his/her consultants for use in design of this project only. The conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Within the limitations of scope, schedule and budget, GeoPacific executed these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, express or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

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REGISTERED PROFESSIONAL ENGINEER
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MAY 22, 2015
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Expires: 12/31/15

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FIGURES

GeoPacific Engineering, Inc.
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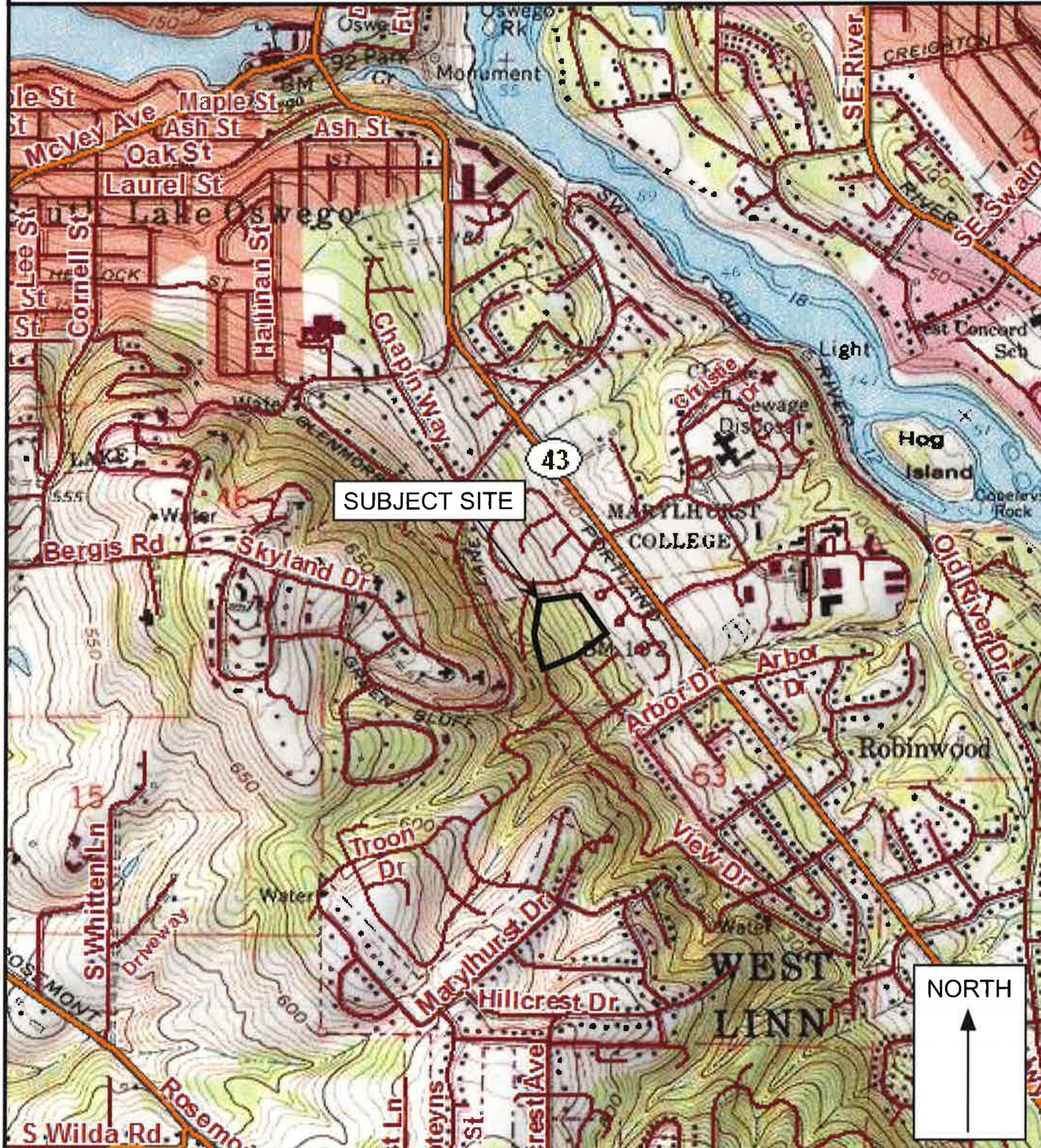
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

VICINITY MAP



Legend

Approximate Scale 1 in = 1,400 ft

Date: 08/05/15
Drawn by: BGA

Base maps: National Geographic TOPO!, Tele Atlas, Oregon, 1990.

Project: Reesman Property West Linn, Oregon	Project No. 15-3849	FIGURE 1

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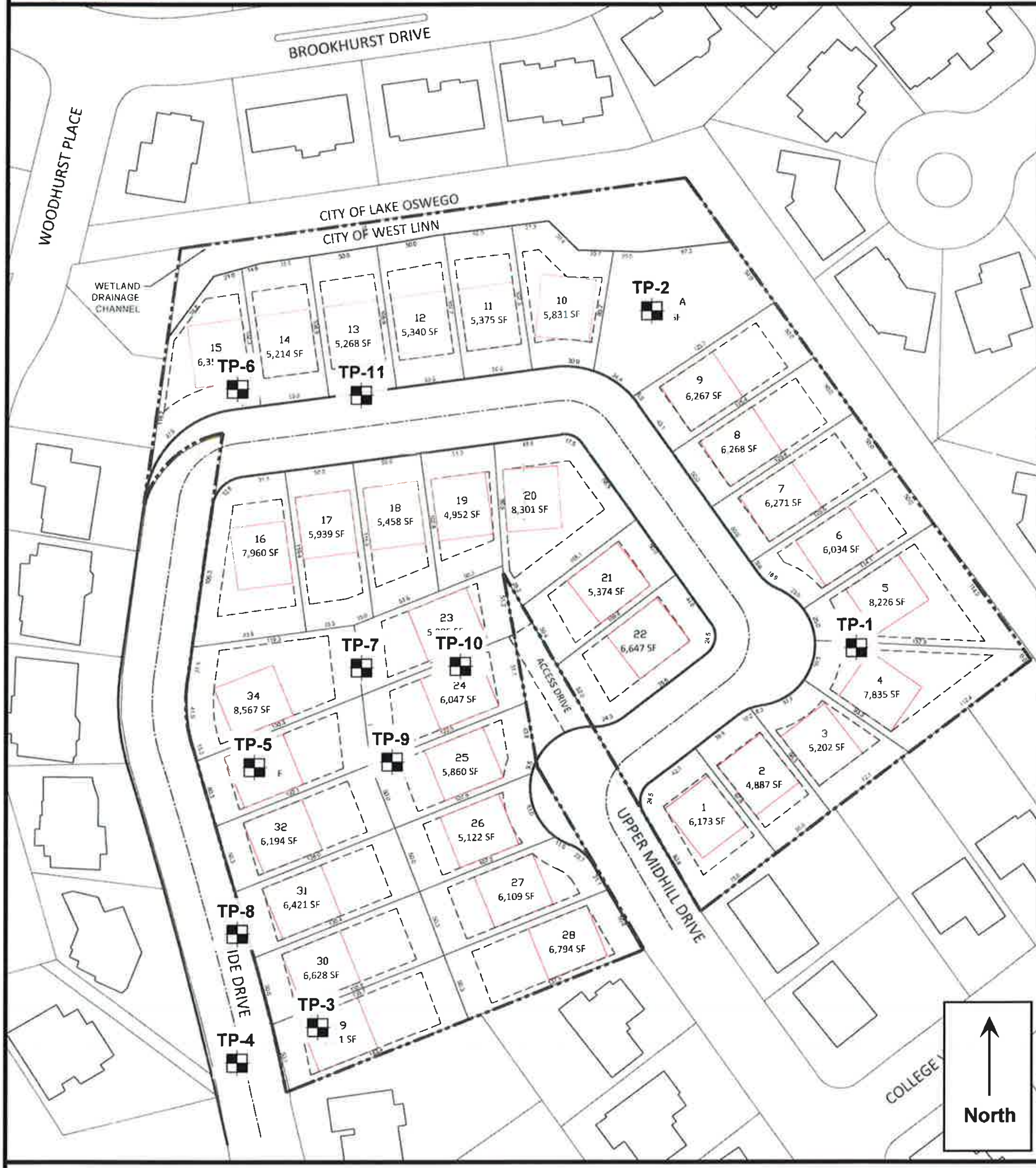
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

SITE PLAN AND EXPLORATION LOCATIONS



Legend

TP-1 Test Pit Designation and Approximate Location

0 200'
APPROXIMATE SCALE 1"=200'

Date: 07/01/15
Drawn by: BGA

Project: Reesman Property West Linn, Oregon	Project No. 15-3849	FIGURE 2

GeoPacific Engineering, Inc.

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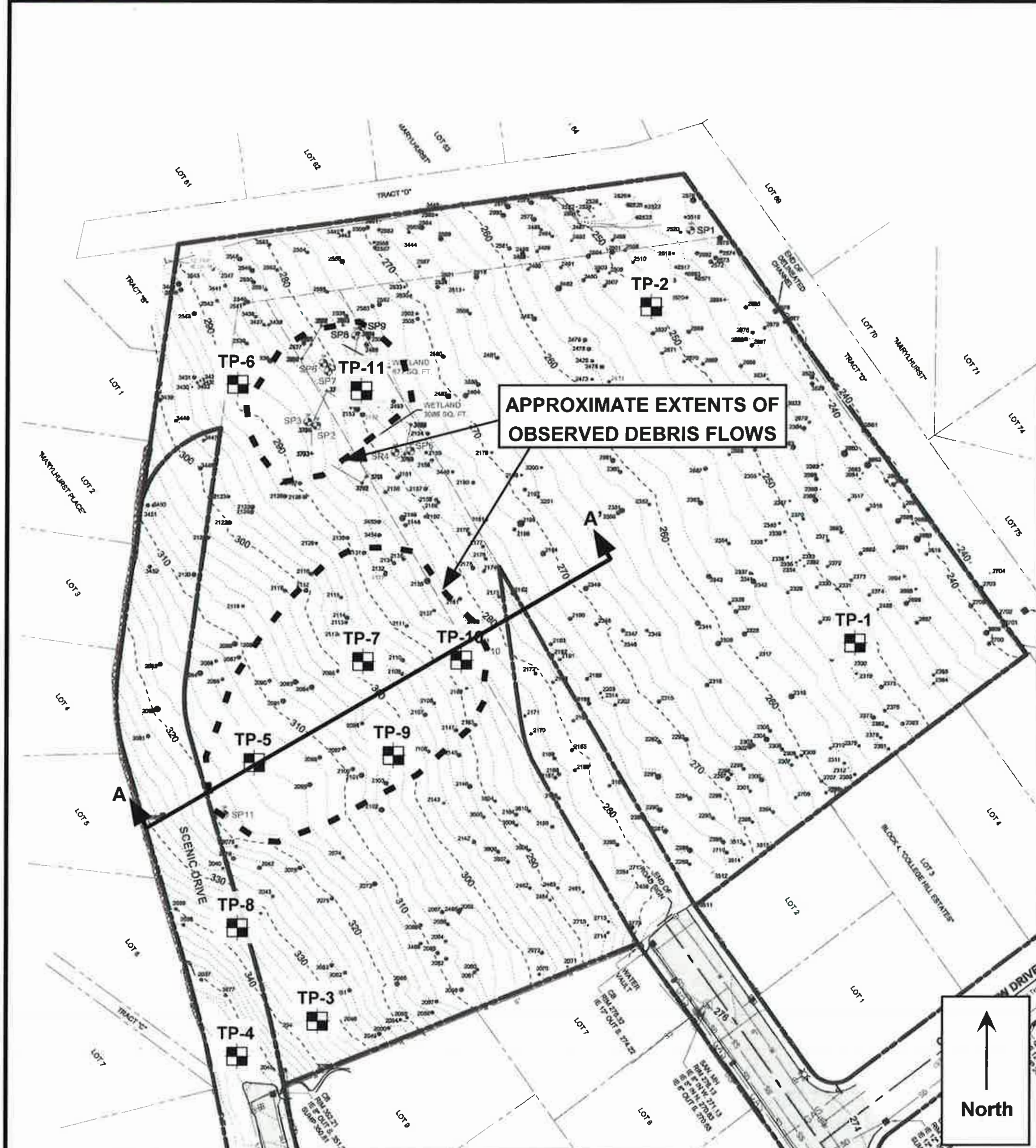
SITE TOPOGRAPHIC MAP AND EXPLORATION LOCATIONS



Legend

TP-1
Test Pit Designation and Approximate Location

0 100'
APPROXIMATE SCALE 1"=100'

Date: 07/30/15
Drawn by: BGA

Project: Reesman Property West Linn, Oregon	Project No. 15-3849	FIGURE 3

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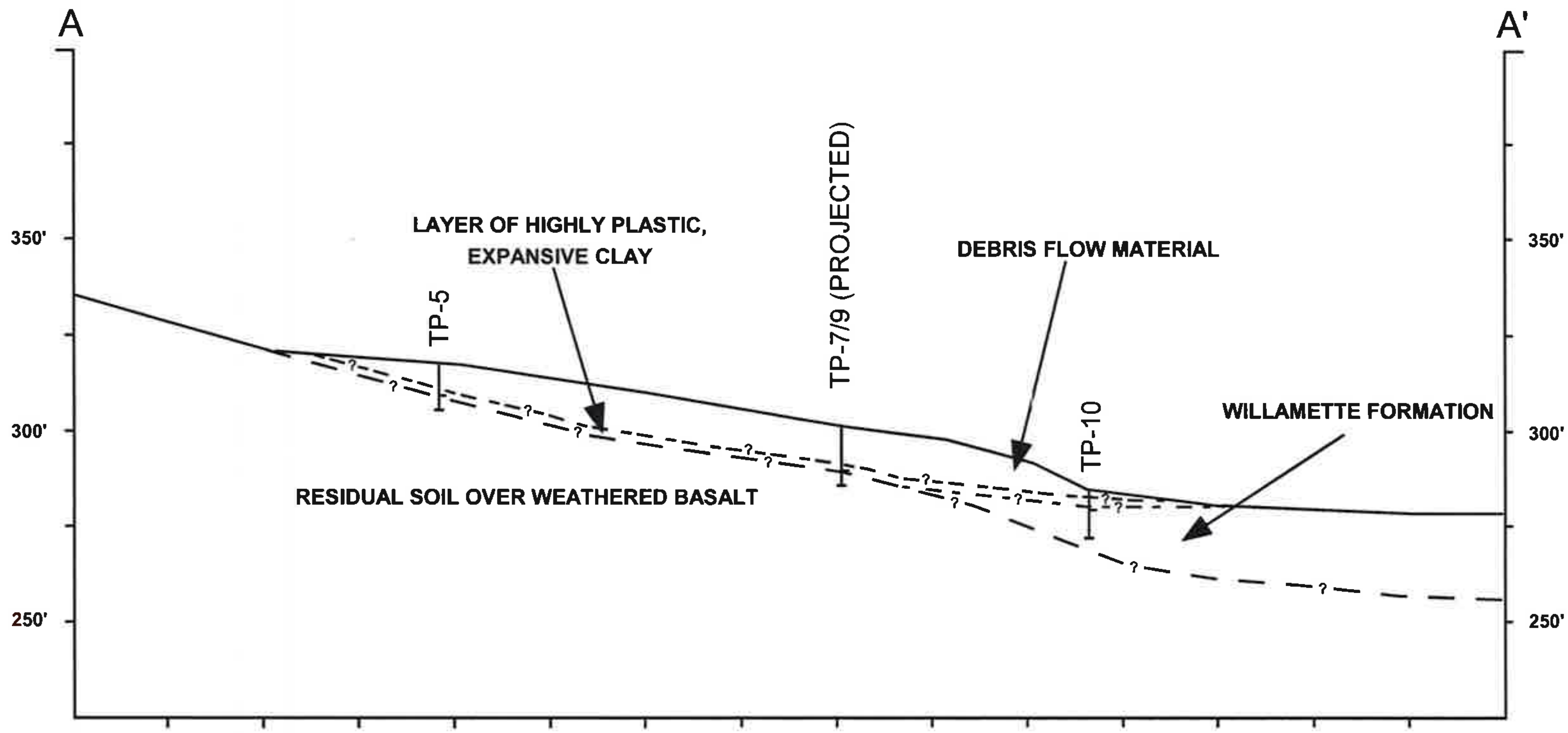
Geologic Cross Section



Legend

EXPLORATORY TEST PIT

0 50'
APPROXIMATE SCALE 1"=50'

Date: 08/03/15
Drawn by: BGA

Project: Reesman Property West Linn, Oregon	Project No. 15-3849	FIGURE 4

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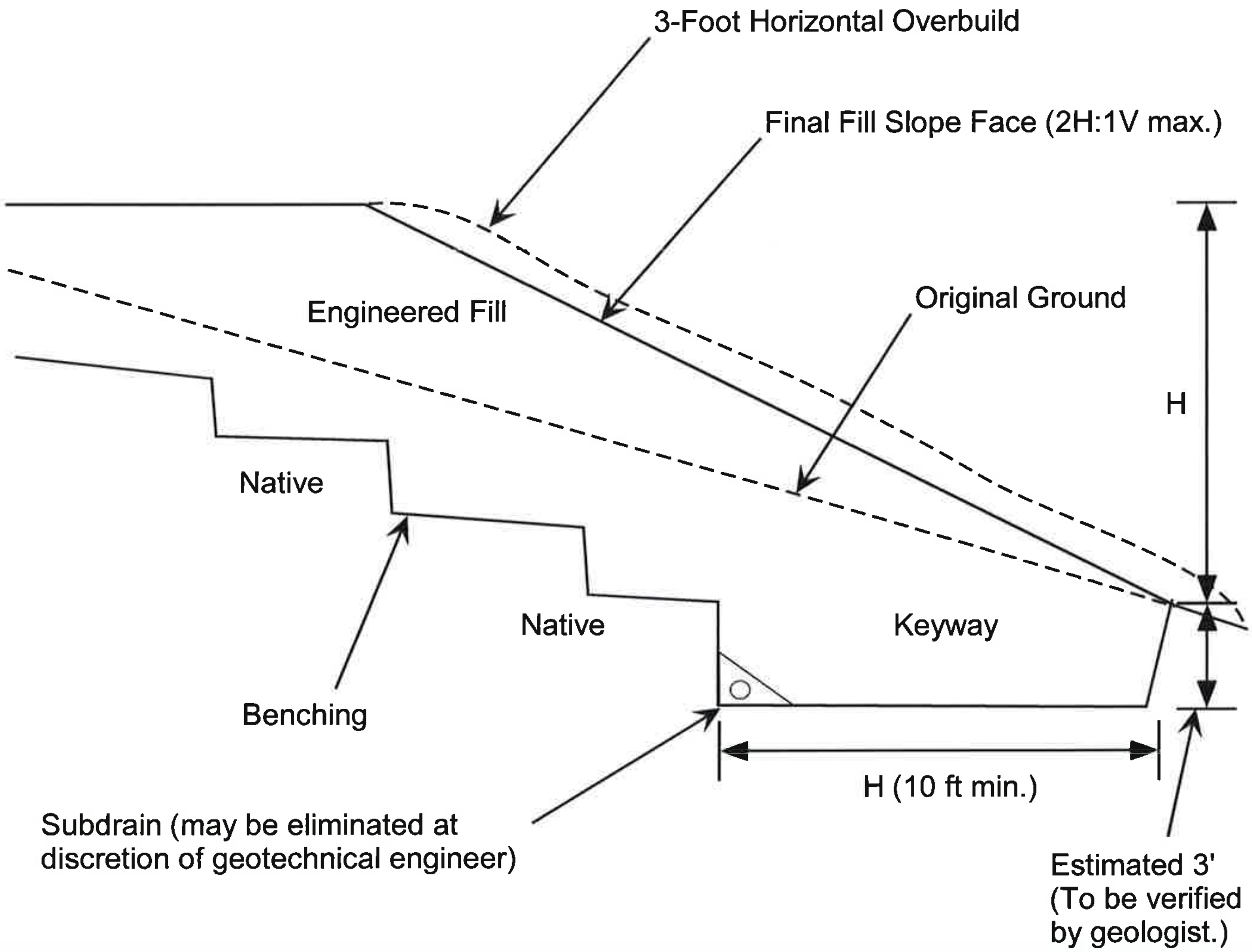
FILL SLOPE DETAIL

TYPICAL KEYWAY, BENCHING & FILL SLOPE DETAIL



Recommended subdrain is minimum 3-inch-diameter ADS Heavy Duty grade (or equivalent), perforated plastic pipe enveloped in a minimum of 3 cubic feet per lineal foot of 2" to 1/2" open-graded gravel drain rock wrapped with geotextile filter fabric (Mirafi 140N or equivalent).

Project: Reesman Property West Linn, Oregon	Project No. 15-3849	FIGURE 5

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Real-World Geotechnical Solutions
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EXPLORATION LOGS

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TEST PIT LOG

Project: Reesman Property, West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP- 1**

Depth (ft)	Pocket Penetrometer (tons/ft^2)	Sample Type	In-Situ Dry Density (lb/ft^3)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1						Soft, low organic SILT (ML), brown, with fine to medium roots throughout, dry to damp (Topsoil)
1–2.3		Bag Sample (100 to 1,000 g) at ~2				Medium stiff, gravelly SILT (ML), brown, with some cobbles up to 6 inches in diameter, gravel and cobbles are rounded, damp (Willamette Formation)
2.3–3.5						Medium dense, silty GRAVEL (GM), brown, with occasional cobbles, damp (Willamette Formation)
3.5–11		Bag Samples (100 to 1,000 g) at ~5, ~7, ~10.5				Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), dark gray, moist (Residual Soil) Grades to light gray below 4.5 feet Grades to with black and yellow mineral deposits Grades to light brown and clayey
11–17						Test pit terminated at 11 feet Notes: No seepage or static groundwater encountered Infiltration test performed at 11 feet

LEGEND: Bag Sample (100 to 1,000 g); Bucket Sample (5 Gal. Bucket); Shelby Tube Sample; Seepage; Water Bearing Zone; Water Level at Abandonment

Date Excavated: 06/10/15
Logged By: BGA
Surface Elevation:

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Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Reesman Property, West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1						14" soft, low organic SILT (OL-ML), dark gray, with fine to medium roots throughout, dry to damp (Topsoil)
1–2						Medium dense, silty GRAVEL and COBBLES (GM), brown, with occasional boulders, damp to moist (Willamette Formation)
5		100 to 1,000 g				
9		100 to 1,000 g				Grades to sandy and with trace silt
11						Grades to with large boulders up to 2.5 feet in diameter and very dense
12						Test pit terminated at 12 feet
13–17						Notes: No seepage or static groundwater encountered Infiltration test performed at 5 feet

LEGEND

100 to 1,000 g — Bag Sample
5 Gal. Bucket — Bucket Sample
Shelby Tube Sample
Seepage
Water Bearing Zone
Water Level at Abandonment

Date Excavated: 06/10/15
Logged By: BGA
Surface Elevation:

GeoPacific Engineering, Inc.
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TEST PIT LOG

Project: Reesman Property, West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-3**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	**Material Description**
						12" moderately organic SILT (ML-OL), brown, with fine to medium roots throughout, moist (Topsoil)
1						Very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, trace black staining, damp to moist (Residual Soil)
	3.0					
2						
	3.0					
3	3.5					
4	3.0					
5						
6						
7						
8						
9						
10						Grades to hard and with increased black staining
11						
12						Test pit terminated at 11 feet
13						Note: No seepage or groundwater encountered
14						
15						
16						
17						

LEGEND

100 to 1,000 g — Bag Sample
5 Gal. Bucket — Bucket Sample
Shelby Tube Sample
Seepage
Water Bearing Zone
Water Level at Abandonment

Date Excavated: 06/10/15
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: Reesman Property, West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-4**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–4.5						Loose BOULDERS in a matrix of reddish brown clayey silt, boulders up to 2.5 feet in diameter, damp (Undocumented Fill)
4.5–6						Soft, moderately organic SILT (ML-OL), dark brown, with significant amounts of organic debris (branches and roots), moist (Buried Topsoil)
6–11.5						Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), reddish brown, moist (Residual Soil) Increased plasticity below 9.5 feet

Test pit terminated at 11.5 feet

Notes: No seepage or static groundwater encountered

LEGEND

Bag Sample (100 to 1,000 g) | Bucket Sample (5 Gal. Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 06/10/15
Logged By: BGA
Surface Elevation:

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Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Reesman Property
West Linn, Oregon

Project No. 15-3849

Test Pit No. **TP-5**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–0.5						Soft, moderately organic SILT (OL-ML), dark gray, with fine roots throughout, moist (Topsoil)
1.5	3.0					Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), dark gray, moist (Ancient Debris Flow Material)
2.5	4.0					
3.5	4.0					
4						Grades to light brown
6						Stiff, highly plastic CLAY (CH), light brown, very moist (Ancient Debris Flow Materials - Possible Slide Plane?)
7.5		Bag Sample (100 to 1,000 g)				
8						Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), dark gray, moist (Residual Soil)
8.5		Bag Sample (100 to 1,000 g)				
10.5						Extremely soft to very soft (R0-R1), highly weathered BASALT, trace reddish-brown matrix of silty clay to clayey silt, light gray, black staining, damp to moist (Columbia River Basalt)
12						Test pit terminated at 12 feet
						Notes: No seepage or static groundwater encountered

LEGEND

Bag Sample (100 to 1,000 g) · Bucket Sample (5 Gal. Bucket) · Shelby Tube Sample · Seepage · Water Bearing Zone · Water Level at Abandonment

Date Excavated: 06/10/15
Logged By: BGA
Surface Elevation:

GeoPacific Engineering, Inc.

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TEST PIT LOG

Project: Reesman Property, West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-6**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–2.5						Highly organic SILT (OL-ML), dark brown, roots throughout, loose, 2 inch thick root mat, damp to moist (Topsoil) Grades to moderately organic, dark gray, and with fine to large roots throughout
3	2.5					Below 30 inches, very stiff, clayey SILT (ML) to silty CLAY (CL), reddish brown, micaceous, trace roots throughout, black staining, damp (Residual Soil)
3.5	4.5					
4	>4.5					
7						Grades to hard
11.5						Test pit terminated at 11.5 feet Note: Very slow groundwater seepage observed at 11 feet Seepage visually estimated at less than 1 gallon per minute

LEGEND

100 to 1,000 g — Bag Sample; 5 Gal. Bucket — Bucket Sample; Shelby Tube Sample; Seepage; Water Bearing Zone; Water Level at Abandonment

Date Excavated: 06/10/15
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: Reesman Property West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-7**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1						Highly organic SILT (OL-ML), dark brown, roots throughout, loose, moist (Topsoil)
1–8	2.5 4.5 >4.5					Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), reddish brown, with occasional gravel and cobble size basalt fragments, disturbed texture, moist (Ancient Debris Flow Material)
8–12						Very stiff, clayey SILT (ML) to silty CLAY (CL), light brown, with black staining, undisturbed texture, moist (Residual Soil)
12–17						Test pit terminated at 12 feet Notes: No seepage or static groundwater encountered

LEGEND

Bag Sample (100 to 1,000 g) | Bucket Sample (5 Gal. Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 06/10/15
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: Reesman Property, West Linn, Oregon | Project No. 15-3849 | Test Pit No. **TP-8**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1.3						16" soft, moderately organic SILT (OL-ML), dark gray, with fine roots throughout, dry (Topsoil)
1.5	3.0					Very stiff, clayey SILT (ML) to silty CLAY (CL), brown, with orange mottling, with occasional gravel size weathered basalt clasts, damp (Residual Soil)
2.5	4.0					
3						Remnant roots observed
3.5	4.0					
4						Grades to brown, moist, basalt clasts are angular
5.5						Grades to reddish brown and very moist
10						Grades to less altered, with more intact rock
13						Grades to with decreased shear strength, increased moisture, less altered, dominant clayey matrix
16–17						Stiff, highly plastic CLAY (CH), reddish brown, with orange and gray mottling, very moist (Residual Soil)

Test pit terminated at 17 feet

Notes: No seepage or static groundwater encountered

LEGEND: Bag Sample (100 to 1,000 g) · Bucket Sample (5 Gal. Bucket) · Shelby Tube Sample · Seepage · Water Bearing Zone · Water Level at Abandonment

Date Excavated: 06/18/15

Logged By: BGA

Surface Elevation:

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TEST PIT LOG

Project: Reesman Property, West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-9**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1.5						Decayed stump and tree roots with soft, moderately organic CLAY (CL-OL), brown, with orange mottling, with roots throughout, dry to damp (Topsoil)
1.5–10						Very stiff, clayey SILT (ML) to silty CLAY (CL), brown, with orange mottling, damp (Ancient Debris Flow Material) Grades to with orange and gray mottling
10–13						Stiff, highly plastic CLAY (CH), reddish brown with gray pockets, with some small roots, with occasional fine gravel size rounded basalt clasts, very moist (Ancient Debris Flow Materials - Possible Slide Plane?)
13–16						Stiff, highly plastic CLAY (CH), layered gray and brown, with some small roots, very moist (Residual Soil)
16–17						Test pit terminated at 16 feet Notes: No seepage or static groundwater encountered

LEGEND

Bag Sample (100 to 1,000 g) | Bucket Sample (5 Gal. Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 06/18/15
Logged By: BGA
Surface Elevation:

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Portland, Oregon 97224
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TEST PIT LOG

Project: Reesman Property West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-10**

Depth (ft)	Pocket Penetrometer (tons/ft^2)	Sample Type	In-Situ Dry Density (lb/ft^3)	Moisture Content (%)	Water Bearing Zone	Material Description
0–0.7						8" soft, low organic CLAY (OL-CL), dark brown, with fine to medium roots throughout, dry to damp (Topsoil)
0.7–3						Very stiff, clayey SILT (ML) to silty CLAY (CL), brown, with orange mottling, with occasional angular gravel to cobble size weathered basalt clasts up to 8 inches in diameter, damp (Ancient Debris Flow Material)
3–3.8						Stiff, highly plastic CLAY (CH), brown, with some roots, very moist (Ancient Debris Flow Materials - Possible Slide Plane?)
3.8–4.8						Medium dense to dense, COBBLES and BOULDERS, brown, boulders up to 2.5 feet in diameter, moist (Willamette Formation)
4.8–6						Hard, slight to moderately cemented sandstone, fine to medium grain size (Willamette Formation)
6–8						Dense COBBLES in a silt matrix, lightly cemented, subrounded, damp to moist (Willamette Formation) 2.5-foot diameter boulder encountered at 7.5 feet
8–14						Dense, silty SAND (SM), light brown, with gravel, cobbles, and boulders, not cemented, subrounded, dry to damp (Willamette Formation)

Test pit terminated at 14 feet

Notes: No seepage or static groundwater encountered

LEGEND: Bag Sample (100 to 1,000 g); Bucket Sample (5 Gal. Bucket); Shelby Tube Sample; Seepage; Water Bearing Zone; Water Level at Abandonment

Date Excavated: 06/18/15
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: Reesman Property, West Linn, Oregon	Project No. 15-3849	Test Pit No. **TP-11**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1						Very soft, highly organic CLAY (OL-CL), dark gray, with fine to medium roots throughout, dry to damp (Topsoil)
1–4	1.5 1.5 1.0				Seepage	Soft, silty CLAY (CH), blue gray, highly plastic, wet (Ancient Debris Flow Material)
4–8						Very stiff, clayey SILT (ML) to silty CLAY (CL), brown, with orange mottling, damp (Ancient Debris Flow Materials - Possible Slide Plane?)
8–10						Dense COBBLES in a silt matrix, lightly cemented, subrounded, damp to moist (Willamette Formation)
10–17						Test pit terminated at 10 feet Notes: Groundwater seepage encountered from 1 to 4 feet Seepage rate visually estimated at less than 1 gallon per minute

LEGEND

Bag Sample | Bucket Sample | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 06/18/15
Logged By: BGA
Surface Elevation:

LABORATORY TEST RESULTS

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc
9120 SW Pioneer Court, Suite B • Wilsonville, Oregon 97070 503/682-1880 FAX: 503/682-2753

TECHNICAL REPORT

Report To:	Mr. Ben Anderson GeoPacific Engineering, Inc. 14835 SW 72nd Avenue Portland, Oregon 97224	**Date:** **Lab No.:**	6/24/15 15-138
Project:	Laboratory Testing – Reesman Property (OR 15-3849)	**Project No.:**	2684.1.1

Report of: Expansion index of soil

Sample Identification

As requested, NTI completed expansion index testing on a sample delivered to our laboratory on June 19, 2015 by a GeoPacific Engineering, Inc. representative. All testing was performed in general accordance with the methods indicated. Our laboratory's test results are summarized on the following table.

Laboratory Test Results

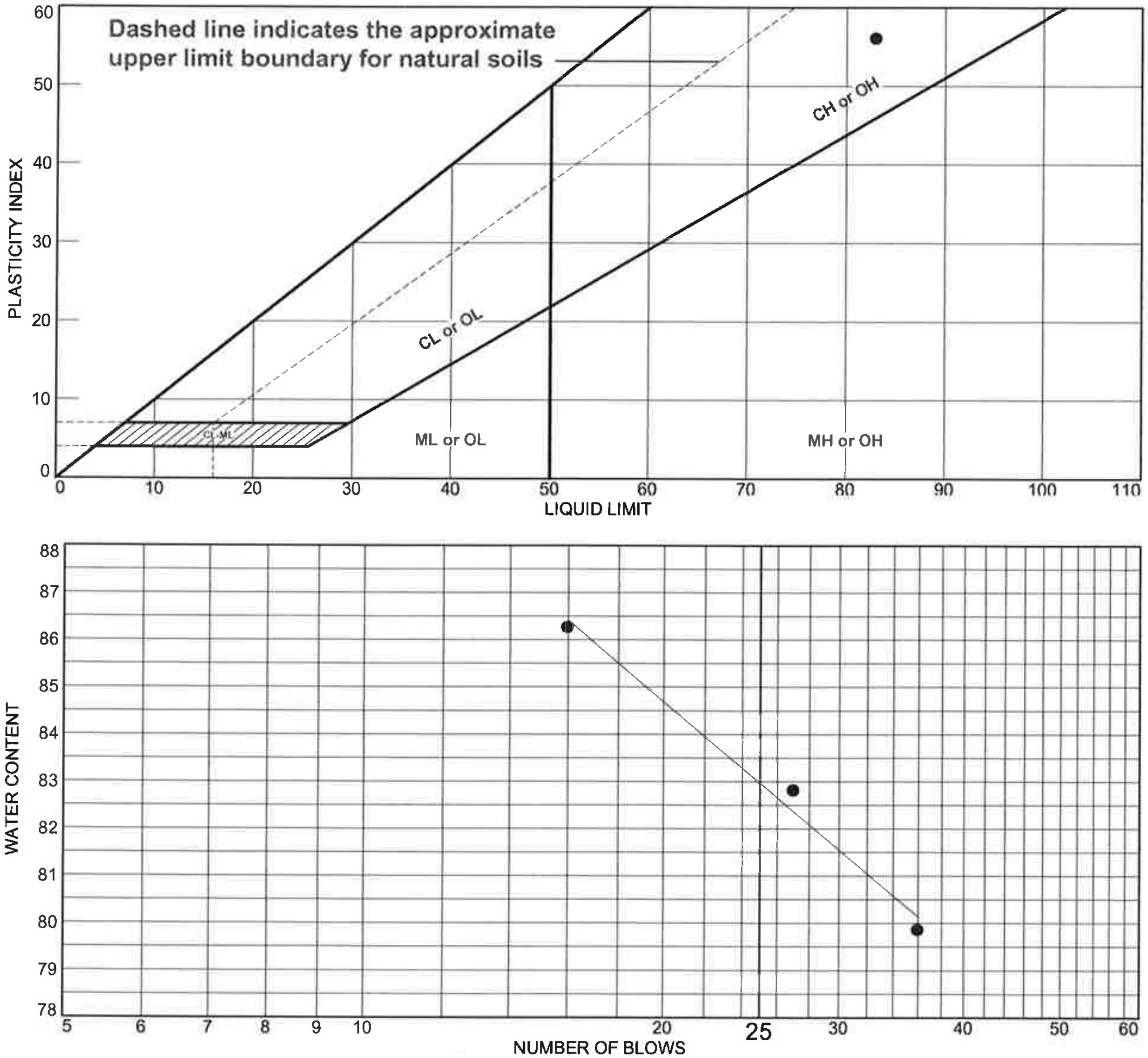
Expansion Index of Soils (ASTM D 4829)	
Test	**Test Results TP-5 @ 7 ft.**
Initial Moisture Content, (%)	16.9
Initial Dry Unit Weight, (pcf)	88.7
Initial Height of Specimen, (inches)	1.00
Initial Degree of Saturation, (%)	50.7
Final Moisture Content, (%)	31.6
Expansion Index, *EI*	110

Copies: Addressee

 BKA

 REVIEWED BY: Bridgett Adame

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Fat Clay	83	27	56			

Project No. 15-3849 **Client:** Upper Midhill Estates, LLC

Project: Reesman Property

Sample Number: TP-5 **Depth:** 7'

Remarks:
●S15-107

GEOPACIFIC ENGINEERING, INC.

Figure

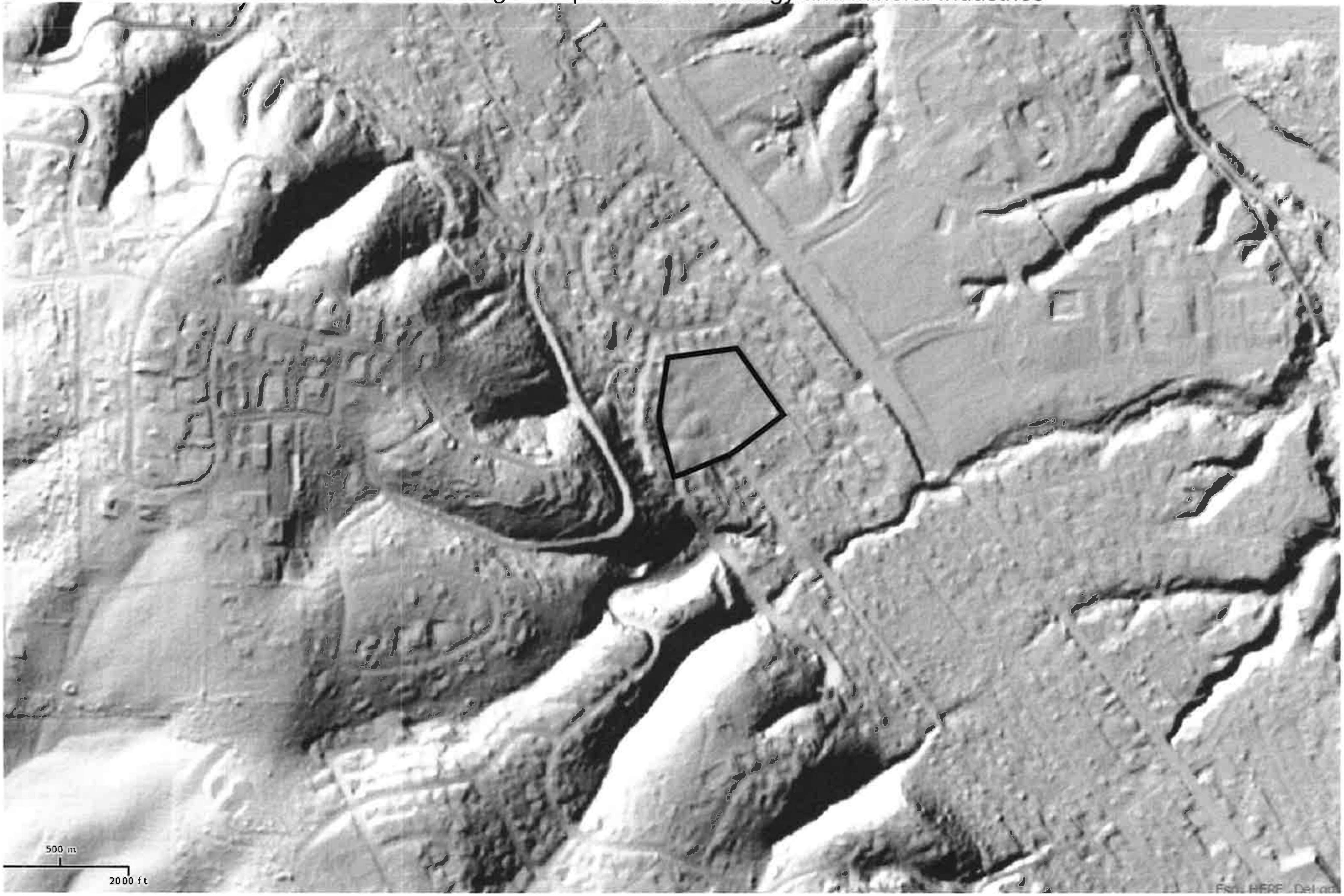
Tested By: SJC **Checked By:** MTB

SITE RESEARCH

14835 SW 72nd Avenue
Portland, Oregon 97224

Tel (503) 598-8445
Fax (503) 941-9281

LIDAR IMAGERY Obtained from Oregon Department of Geology and Mineral Industries



USGS Design Maps Detailed Report

ASCE 7-10 Standard (45.39686°N, 122.65579°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_S = 0.974 g
From Figure 22-2 [2]	S_1 = 0.417 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index *PI* > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 0.974 g, F_a = 1.110

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.417 g, F_v = 1.583

Equation (11.4-1): $S_{MS} = F_aS_S = 1.110 \times 0.974 = 1.082$ g

Equation (11.4-2): $S_{M1} = F_vS_1 = 1.583 \times 0.417 = 0.660$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

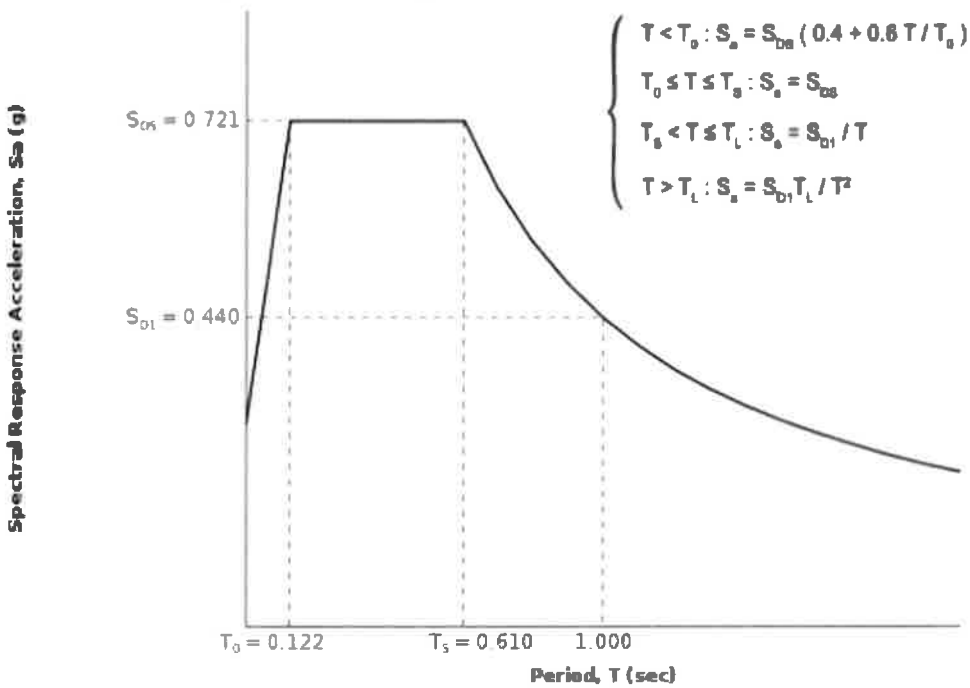
Equation (11.4-3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 1.082 = 0.721$ g

Equation (11.4-4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 0.660 = 0.440$ g

Section 11.4.5 — Design Response Spectrum

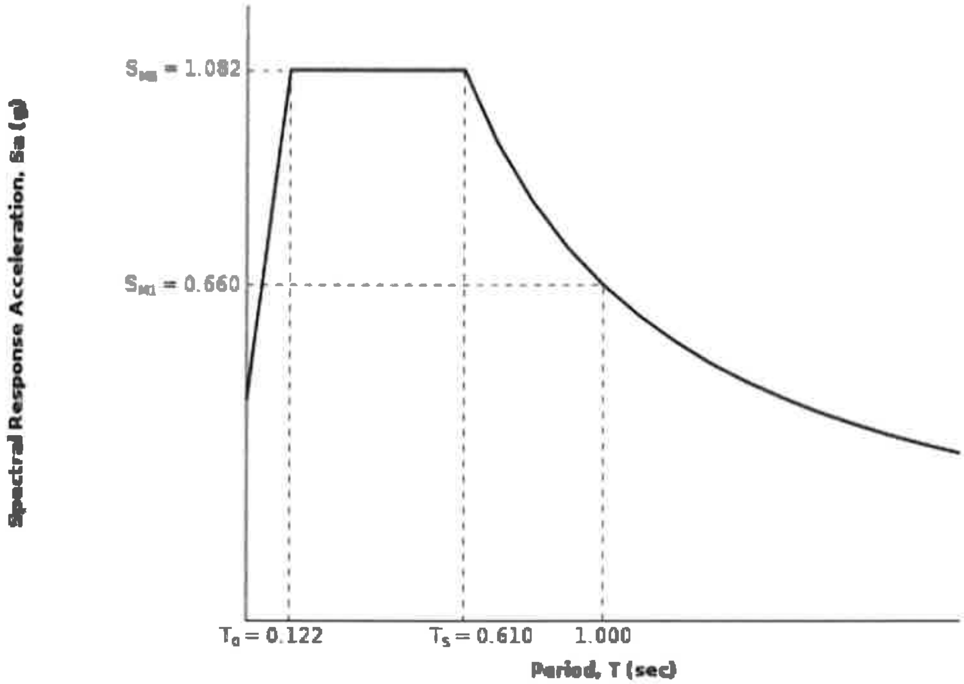
From Figure 22-12 [3] T_L = 16 seconds

Figure 11.4-1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4]	PGA = 0.421
Equation (11.8–1):	$PGA_M = F_{PGA}PGA = 1.079 \times 0.421 = 0.454$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.421 g, F_{PGA} = 1.079

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5]	C_{RS} = 0.907
From Figure 22-18 [6]	C_{R1} = 0.873

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.721 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.440 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

GeoPacific Engineering, Inc.

Real-World Geotechnical Solutions
Investigation • Design • Construction Support

PHOTOGRAPHIC LOG

14835 SW 72nd Avenue
Portland, Oregon 97224

Tel (503) 598-8445
Fax (503) 941-9281

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REESMAN PROPERTY
GEOTECHNICAL SITE INVESTIGATION
PHOTOGRAPHIC LOG

Fill Material Consisting of Boulders in Test Pit TP-4

REESMAN PROPERTY
GEOTECHNICAL SITE INVESTIGATION
PHOTOGRAPHIC LOG

Subcontractor Excavating Test Pit TP-5, View to the South

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REESMAN PROPERTY
GEOTECHNICAL SITE INVESTIGATION
PHOTOGRAPHIC LOG

Relatively Level Bench at Top of Debris Flow, View to the North

OPERATIONS AND MAINTENANCE

To be included in Final Stormwater Report

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report or include a hard copy of the completed form with a CD/DVD that includes a single PDF file of the report cover form and report (minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF attachment of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail instructions on how to access the file from your ftp or other file sharing website. Fees can be paid by check or credit card. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

☒ Applicant ☒ Owner Name, Firm and Address:
David Chiddix
18000 Midhill Drive LLC
1235 North Dutton Ave, Suite E
Santa Rosa CA 95401

Business phone # **360.798.4838 (Ryan Zygar-Rep)**
Mobile phone # (optional)
E-mail: **ryan@zygar.com**

☒ Authorized Legal Agent, Name and Address:
Schott and Associates
PO Box 589
Aurora, OR 97002

Business phone # **503.678.6007**
Mobile phone #
E-mail: **caric@schottandassociates.com**

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: David Chiddix Signature: DocuSigned by: [signature] EAD2708C72DC41D...

Date: 8/12/2015 | 9:28 AM PDT Special instructions regarding site access:

Project and Site Information (using decimal degree format for lat/long.,enter centroid of site or start & end points of linear project)

Project Name: **Reesman Property**	Latitude: **45.2347** Longitude: **122.3921**
Proposed Use:	Tax Map # **14 2S 1E**
Project Street Address (or other descriptive location): **18000/18001 Upper Midhill Drive**	Township **2S** Range **1E** Section **14** QQ **CA** Tax Lot(s) **200**
City: **West Linn** County: **Clackamas**	Waterway: River Mile: NWI Quad(s):

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Schott and Associates Attn Cari Cramer
PO Box 589
Aurora, OR 97002

Phone # **503.678.6007**
Mobile phone #
E-mail: caric@schottandassociates.com

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.

Consultant Signature: Cari Cramer Date: 8/31/15

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No | Study Area size: **6.12AC** | Total Wetland Acreage: **0.09**

Check Box Below if Applicable: **Fees:$406.00**

☐ R-F permit application submitted
☐ Mitigation bank site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Industrial Land Certification Program Site
☐ Reissuance of a recently expired delineation
Previous DSL # Expiration date _____

☒ Fee payment submitted **$ 406.00**
☐ Fee ($100) for resubmittal of rejected report
☐ No fee for request for reissuance of an expired report

Other Information:

	Y	N	
Has previous delineation/application been made on parcel?	☐	☐	If known, previous DSL #
Does LWI, if any, show wetland or waters on parcel?	☐	☒	

For Office Use Only

DSL Reviewer: ____________ Fee Paid Date: ____ / ____ / ____ DSL WD # ____________

Date Delineation Received: ___ / ___ / ___ DSL Project # ____________ DSL Site # ____________

Scanned: ☐ Final Scan: ☐ DSL WN # ____________ DSL App. # ____________

Form Updated 01/03/2013

SCHOTT & ASSOCIATES
Ecologists & Wetlands Specialists

21018 NE Hwy 99E • P.O. Box 589 • Aurora, OR 97002 • (503) 678-6007 • FAX: (503) 678-6011

JURISDICTIONAL WETLAND DELINEATION FOR

Reeseman Property
Located in
West Linn, Oregon

Prepared for:

David Chiddix
18000 Midhill Drive LLC
1235 North Dutton Ave, Suite E
Santa Rosa, CA 95401

Prepared by:

Schott and Associates

Date:

July 2015

Project #: 2373

TABLE OF CONTENTS

LIST OF FIGURES

(A) Landscape Setting and Land Use

The approximate 6.12 acre subject property is located north of the dead end of Upper Midhill Drive, Clackamas County, West Linn, Oregon (T2S, R1E, Sec. 14CA, TL 200). The subject property is bordered by residential homes on all sides.

The property is gently east sloping and consisted of a large grove of Oregon white oak (*Quercus garryana*) mixed with Oregon ash (*Fraxinus latifolia*) with scattered Douglas fir trees (*Pseudotsuga menziesii*) and bigleaf maple (*Acer macrophyllum*). The understory was mainly facultative grasses with areas that contained large patches of Himalayan blackberry (*Rubus armeniacus*) or English ivy (*Hedera helix*). Also observed were scattered English hawthorn (*Crataegus monogyna*), vine maple (*Acer circinatum*) and clusters of snowberry (*Symphoricarpos albus*).

A drainage ditch borders the northern property boundary and a portion of the eastern property boundary. This area is thickly vegetated with English ivy. The ditch is connected to a water quality pond, which serves the development west of the site.

(B) Site Alterations

There were two culverts installed, one at the northwest corner of the property and one at the southeast corner of the property. A shallow ditch was dug along the northern property boundary as well as the east property boundary that dissipates approximately a third of the way down on the east side. The northern culvert exits a stormwater pond located just offsite to the west. The ditch appears to have been dug for the purpose of draining water away from the water quality facility.

(C) Precipitation Data and Analysis

The site was visited on June 10, 2015. Precipitation was recorded at 0.00 inches by the West Linn weather station that day (accuweather.com). Total precipitation recorded in the two weeks prior to the site visit was 0.00 inches. Precipitation for the month of May was 1.32 inches at 53% of average and just below WETS range. Precipitation for April was also below average at 56% of average. February and March were within normal range at 112% and 116% of average respectively according to the N Willamette Exp Stn WETS table. Between October 1st, 2014 and May 31, 2015 a total of 35.47 inches of precipitation was recorded. This is 95% percent of the water year average.

Table 1. Precipitation Summary and WETS Averages

Month	2014-2015 Precipitation	WETS Average	WETS Range	Percent of Average
February	5.69	5.07	3.26-6.11	112
March	4.96	4.28	3.26-4.98	116
April	1.77	3.14	2.10-3.75	56

May	1.32	2.50	1.59-3.02	53
Water Year	35.47	37.52		95

(D) Site Specific Methods

Prior to visiting, site information was gathered, including recent and historical aerial photographs provided by Google Earth, the soil survey (NRCS web soil survey), the Local Wetland Inventory and National Wetland Inventory. The USGS topography map was also reviewed prior to site visits.

This was the third visit to the site by Schott & Associates. The first visit was about 10 years ago when Centex homes was considering acquiring the property. The second site visit was one years ago, when another developer was considering acquiring the site. The entire site was walked on both of the previous site visits. Prior to starting the delineation Schott and Associates initially walked the subject property to assess the presence or absence of onsite wetlands and waters , and to see if the conditions had changed since the previous site visits. The site was visited and sample plots established in May 2014. The site was visited again and wetland delineation field work was conducted on June 10, 2015. The *1987 Manual* and *Regional Supplement to the Corps of Engineers Delineation Manual: Western Mountains, Valleys, and Coast Region* were used to determine presence or absence of State of Oregon wetland boundaries and the Federal jurisdictional wetlands.

Sample plots were placed where geomorphic location or vegetation indicated the possibility of wetlands. For each sample plot, data on vegetation, hydrology and soils was collected, recorded in the field and later transferred to data forms (Appendix B). Where a wetland was present paired plots were located in the adjacent upland to document the transition.

(E) Description of All Wetlands and Other Non-Wetland Waters

Based on soil, vegetation and hydrology data taken in the field two small PEM/sloped wetlands of 877sf and 3,086sf were delineated. Both wetlands were close together and located at the northwest end of the property, south of a drainage. Herbaceous vegetation in both the wetlands was dominated by velvet grass (*Holcus lanatus*) (sp2,4,6,8) and also consisted of some soft rush (*Juncus effusus*) (sp2), meadow foxtail (*Alopecurus pratensis*) (sp6), tall fescue (*Schedonorus arundinaceus*) (sp2), bentgrass (*Agrostis sp.*) (sp4,8), camas (*Camassia quamash*) (sp6) and a geranium species (sp4,6). Oregon ash and Himalayan blackberry (sp2,4,8) were also observed within the wetland sample plots. Soils met the Redox Dark Surface (F6) or Depleted Dark Surface (F7) hydric soil indicators throughout the wetland. Secondary hydrology indicators were present in all but one plot which had a sulfide odor (sp6). In May of 2014 hydrology was observed in sample plots 2, 4 and 6 ranging from 6” from the top to surface saturation.

The adjacent upland was also dominated by velvet grass in the herbaceous layer. Also observed was a geranium species, meadow foxtail, bentgrass and Himalayan blackberry. The overstory was mainly Oregon ash (sp5). Soils and hydrology criteria were not met.

A sample plot was taken at the very lowest part of the property in the northeast corner (sp1). The herbaceous layer was almost entirely English ivy. The overstory consisted of Oregon white oak, English hawthorn and bigleaf maple with some snowberry and vine maple observed in the understory. Soils were a 10YR 3/3 and no hydrology was observed.

Two more sample plots were taken in flat areas on terraces. The overstory consisted of Douglas fir (sp10) and Himalayan blackberry (sp10,11) with an herbaceous layer made up of facultative grasses. Soils were a 10YR 3/3 (sp11) or 10YR 3/2 0-10" and 10YR 3/2 with redox at 10-18" (sp 10). No hydrology was observed.

A ditch was located on the property starting in the northwest corner of the property. The ditch parallels the entire north property line, sometimes running just offsite, and a small portion of the east property boundary before the defined channel ends. Water entered the ditch thru a culvert in the northwest corner of the property. The culvert drained a water quality facility. Water was observed in the ditch May 5, 2014 and June 10, 2015. An additional site visit was made July 17, 2015 and the ditch was observed to be dry. Within the defined drainage channel it was mostly bare. Ivy mainly bordered it on each side and rooted within the drainage in sections of the ditch. Water flows in the ditch whenever water enters the water quality facility, and dries up soon after the water stops entering the water quality facility.

(F) Deviation from LWI or NWI

There is a West Linn Local Wetland Inventory (LWI) but no wetlands or waterways are mapped on it. There are no wetlands or waterways mapped for the subject property on the NWI. The onsite wetlands are very small and both the drainage and wetlands are under a canopy blocking out visibility. The drainage is also manmade. This is likely why they are not documented.

(G) Mapping Method

The wetland and sample plots were flagged by Schott and Associates and surveyed by Compass Land surveyors, Professional Land Surveyors (PLS).

(H) Additional Information

None.

(I) Results and Conclusions

Based on soil, vegetation and hydrology data taken in the field, two small PEM wetlands totaling 0.09 acres were delineated on site. Vegetation was dominated by facultative grasses, mainly velvet grass. Soils were found to be hydric and hydrology was observed by way of secondary indicators except one sample plot that had a sulfur odor. Soils were observed to be saturated in May of 2014.

A defined ditch was observed on the site starting at the northwest corner, paralleling the northern property boundary and a portion of the eastern property boundary. Water was observed entering the drainage through a culvert from a water quality facility on two occasions and was observed to by dry on a third. The ditch was dug to carry water away from the water quality facility. It does not connect to another water body, and there is not a wetland at the lower end of the ditch.

The soil survey map for Clackamas County mapped Cascade silt loam on the property. Cascade silt loam is not considered hydric.

The West Linn LWI and NWI did not show any wetlands or waters on the subject property.

The topographic map showed a gently east sloping site.

(J) Disclaimer

This report documents the investigation, best professional judgment and the conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State lands in accordance with OAR 141-090-0005 through 141-090-005.

Appendix A: Maps

FIGURE 1. LOCATION MAP

Figure 1: Location Map
Reeseman Property
S&A 2373

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

FIGURE 2. TAX MAP

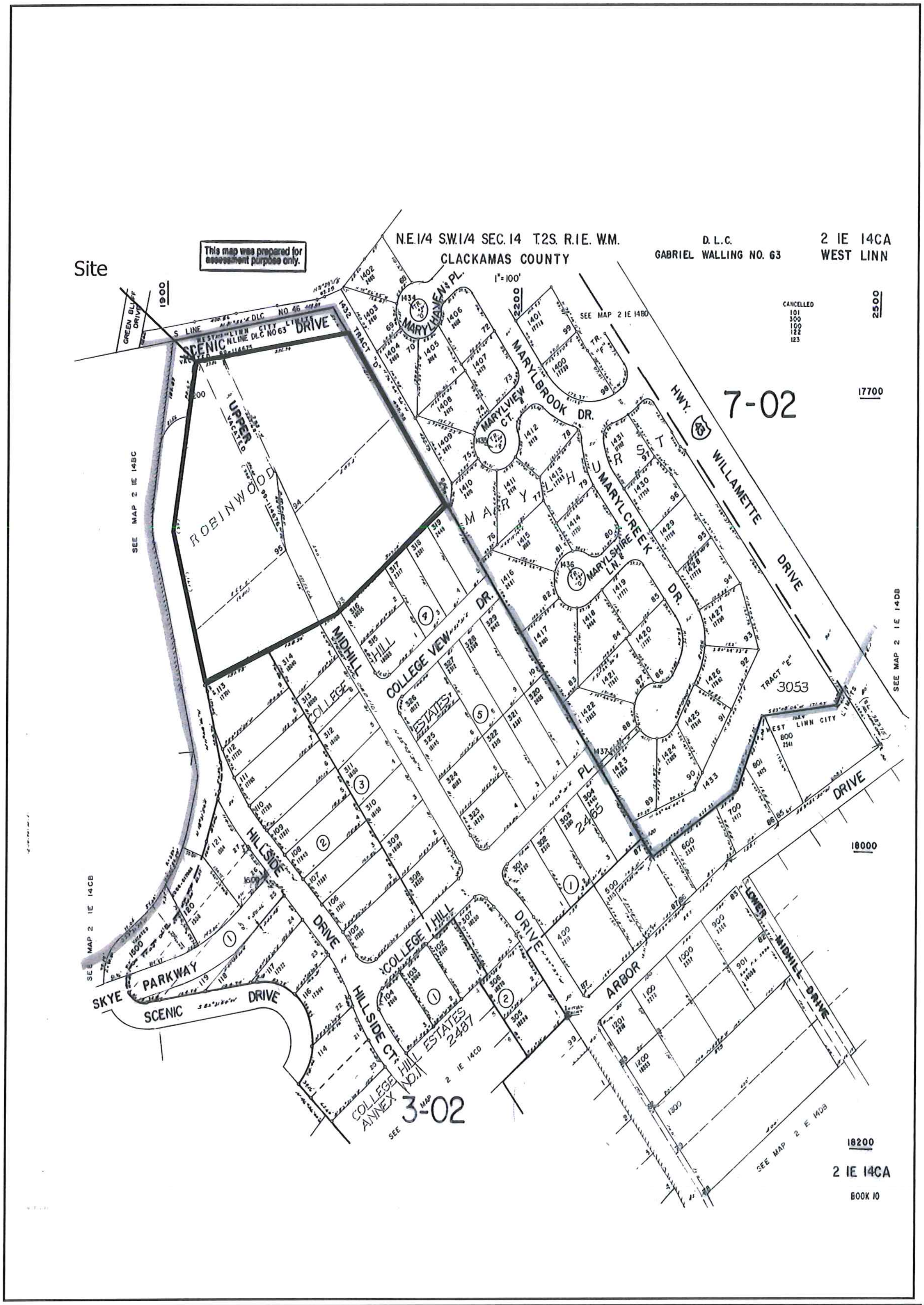


Figure 2: Tax Map (2 1E 14CA TL 200) Reeseman Property S&A 2373	Schott & Associates P.O. Box 589 Aurora, OR. 97002 503.678.6007

FIGURE 3. LWI MAP

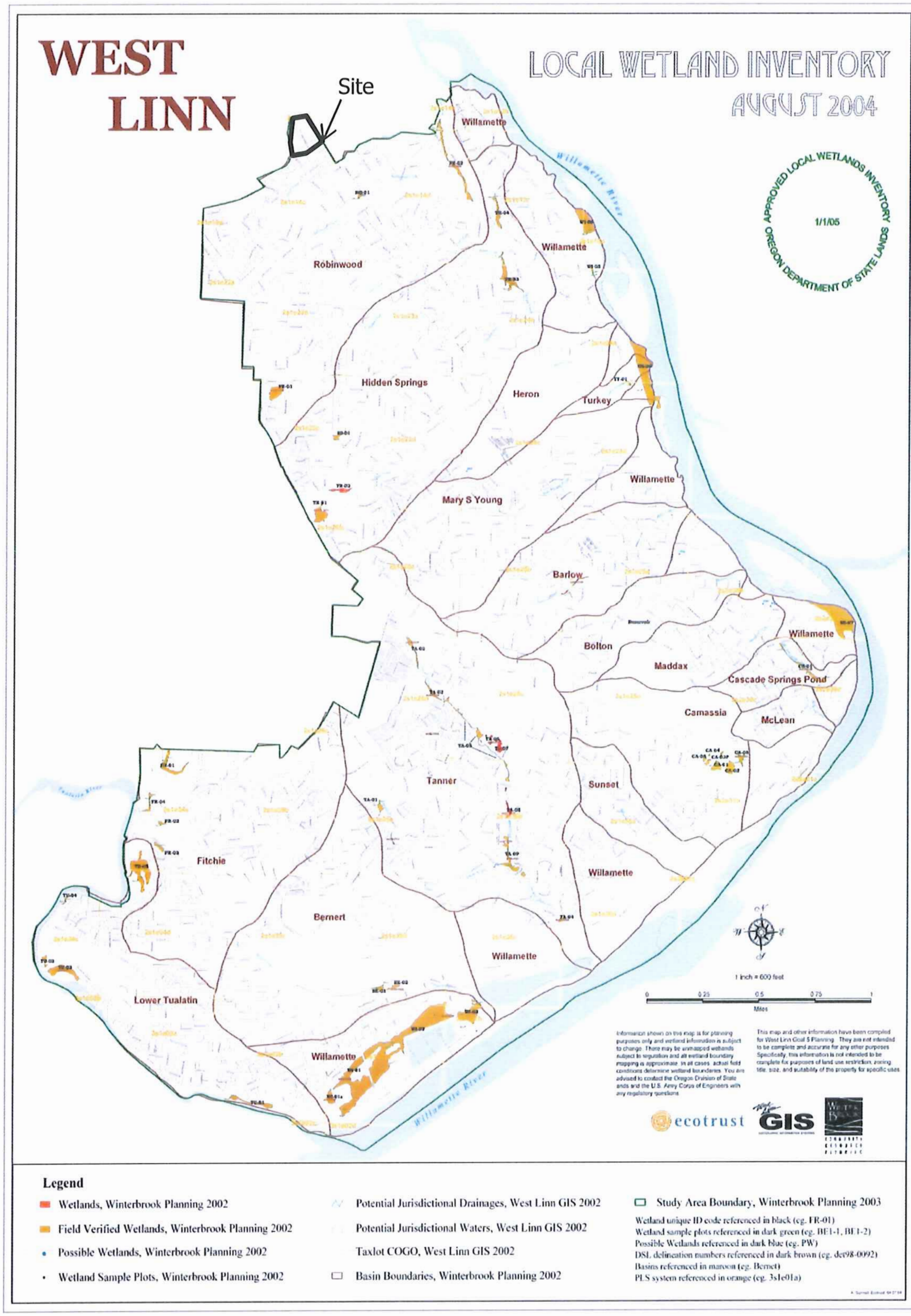


Figure 3: West Linn LWI Reeseman Property S&A 2373	Schott & Associates P.O. Box 589 Aurora, OR. 97002 503.678.6007

FIGURE 4. SOIL SURVEY MAP

Soil Map—Clackamas County Area, Oregon
(Reeseman Property)

Map Unit Legend

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
13C	Cascade silt loam, 8 to 15 percent slopes	7.5	98.2%
13E	Cascade silt loam, 30 to 60 percent slopes	0.1	1.8%
Totals for Area of Interest		**7.7**	**100.0%**

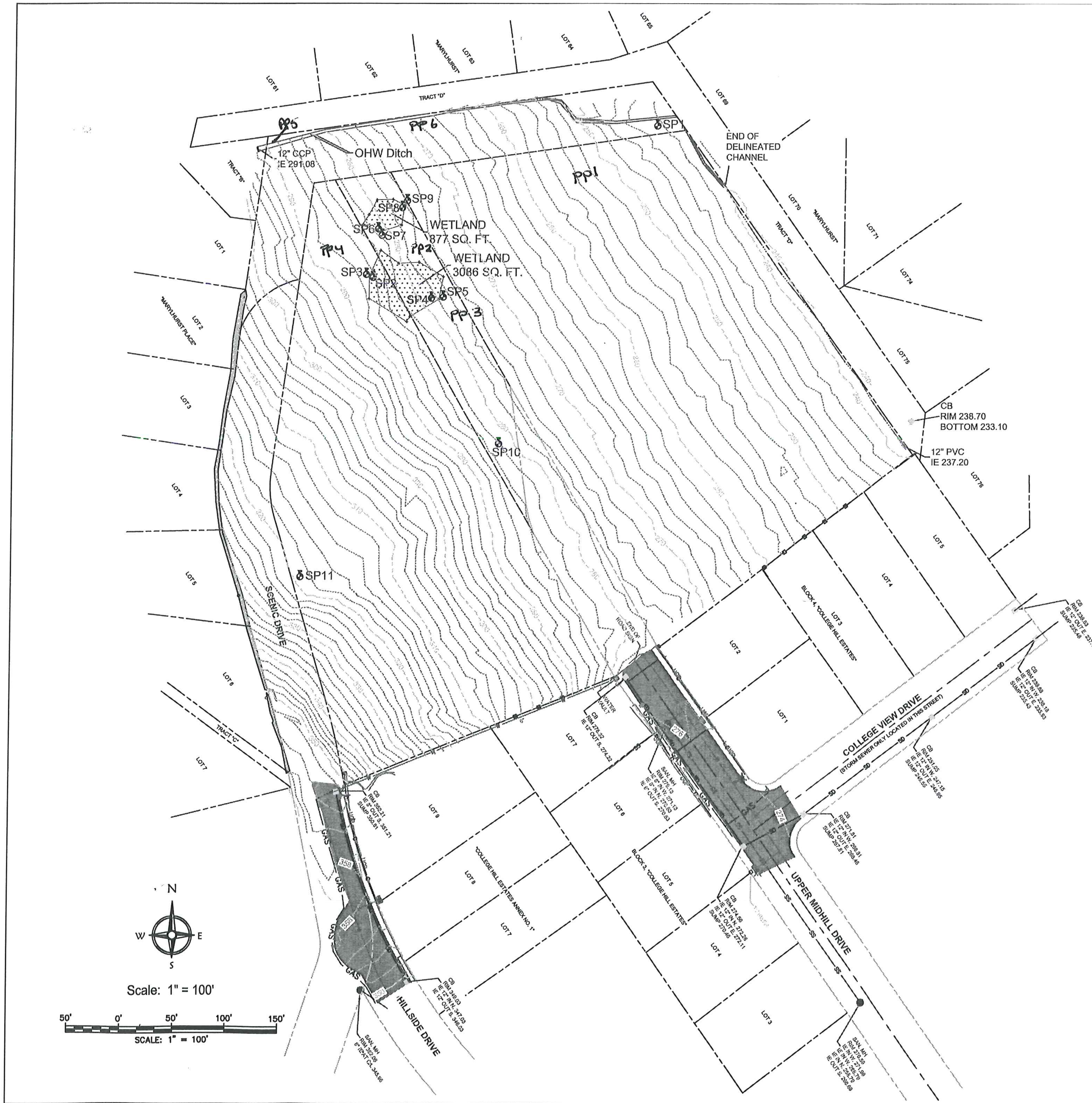
Figure 4: Soils map Reeseman Property S&A 2373	Schott & Associates P.O. Box 589 Aurora, OR. 97002 503.678.6007

FIGURE 5. AERIAL PHOTOGRAPH

Figure 5: Aerial Photograph
Reeseman Property
S&A 2373

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

FIGURE 6. WETLAND MAP



Notes:

1. UTILITY INFORMATION SHOWN ON THIS MAP IS BASED UPON OBSERVED FEATURES, RECORD DATA AND TONE MARKS PROVIDED BY PUBLIC UTILITY LOCATION SERVICES. NO WARRANTIES ARE MADE REGARDING THE ACCURACY OR COMPLETENESS OF THE UTILITY INFORMATION SHOWN. ADDITIONAL UTILITIES MAY EXIST. INTERESTED PARTIES ARE HEREBY ADVISED THAT UTILITY LOCATIONS SHOULD BE VERIFIED PRIOR TO DESIGN OR CONSTRUCTION OF ANY CRITICAL ITEMS.

2. VERTICAL DATUM: NAVD'88 UTILIZING GPS POSITIONING TIED TO THE ORGN WITH REAL TIME CORRECTORS REFERENCED TO DATUM NAD 83(2011) EPOCH 2010.00. THIS DATUM REALIZATION WAS VERIFIED THROUGH DIRECT OBSERVATION TO NGS CONTROL POINT Q723 HAVING A POINT IDENTIFICATION OF RD1491. THIS POINT IS DESCRIBED AS A STAINLESS STEEL ROD W/ SLEEVE NEAR THE INTERSECTION OF STATE HIGHWAY 224 AND LAKE ROAD. THE ELEVATION OF THIS POINT IS PUBLISHED AS 31.131 AND WAS ESTABLISHED BY NGS THROUGH DIFFERENTIAL LEVELING AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JUNE 1991 AND HAS A VERTICAL ORDER OF FIRST CLASS II.

3. BASIS OF BEARINGS: CENTERLINE OF UPPER MIDHILL DRIVE AS PER THE PLAT OF "COLLEGE HILL ESTATES"

4. CONTOUR INTERVAL IS TWO FEET.

5. TOPOGRAPHIC FEATURES SHOWN ON THIS MAP WERE LOCATED USING STANDARD PRECISION TOPOGRAPHIC MAPPING PROCEDURES. THIRD PARTY USERS OF DATA FROM THIS MAP PROVIDED VIA AUTOCAD DRAWING FILES OR DATA EXCHANGE FILES SHOULD NOT RELY ON ANY AUTOCAD GENERATED INFORMATION WHICH IS BEYOND THE LIMITS OF PRECISION OF THIS MAP. THIRD PARTIES USING DATA FROM THIS MAP IN AN AUTOCAD FORMAT SHOULD VERIFY ANY ELEMENTS REQUIRING PRECISE LOCATIONS PRIOR TO COMMENCEMENT OF ANY CRITICAL DESIGN OR CONSTRUCTION. CONTACT COMPASS LAND SURVEYORS FOR FURTHER INFORMATION. FURTHERMORE, COMPASS LAND SURVEYORS WILL NOT BE RESPONSIBLE NOR HELD LIABLE FOR ANY DESIGN OR CONSTRUCTION RELATED PROBLEMS THAT ARISE OUT OF THIRD PARTY USAGE OF THIS MAP (IN AUTOCAD OR OTHER FORMAT) IN ANY MANNER INCONSISTENT WITH THIS STATEMENT.

6. UNDERGROUND PIPE SIZES AND MATERIAL TYPES ARE BASED UPON RECORD DRAWINGS, INFORMATION PROVIDED BY UTILITY LOCATORS AND FIELD OBSERVATIONS AT MANHOLES AND CATCH BASIN RIMS AND SHOULD BE VERIFIED.

7. WETLAND BOUNDARIES AND SAMPLE PLOTS LOCATED BY SCHOTT AND ASSOCIATES, AND SURVEYED BY COMPASS LAND SURVEYORS.

8. SEE SHEET 2 FOR TREE LIST.

Legend:

EDGE OF PAVEMENT
OVERHEAD POWER LINE
RIGHT OF WAY LINE
PROJECT BOUNDARY
ADJACENT PROPERTY LINE
CURB
GAS LINE
SANITARY SEWER LINE
STORM DRAIN LINE
TELECOMMUNICATION LINE
WATER LINE
UNDERGROUND POWER LINE
OVERHEAD POWER LINE
CONCRETE
ASPHALT

DL DRIP LINE (RADIUS)
MAILBOX
PHONE PEDESTAL
LIGHT POLE
WATER VALVE
WATER METER
TRAFFIC SIGN
SP SAMPLE PLOT
PP Photo Point

REESMAN PROPERTY EXISTING CONDITIONS MAP
TL 200 IN NE 1/4 OF SW 1/4 SEC. 14, T.2S., R.1E., W.M.
CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON

1 / 2

COMPASS Land Surveyors
4107 SE International Way, Suite 705
Milwaukie, Oregon 97222 503-653-9093

DRAWN	MMM	CHECK	DD
SCALE	1" = 50'	DATE	JUNE, 2015
PLAN	7379 Topo.dwg		

DATE	NO.	REVISION

Appendix B: Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 1
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Bottom of hillslope Local relief (concave, convex, none): none Slope (%): 1%
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No	
Hydrophytic Vegetation Present?		x	**Is the Sampled Area within a Wetland?** Yes ___ No x
Hydric Soil Present?		x	
Wetland Hydrology Present?		x	

Remarks: northeast corner of site in low area

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1. Crataegus monogyna	40	X	FAC
2. Acer macrophyllum	20	X	FACU
3. Quercus garryana	20	X	FACU
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5')			
1. Acer circinatum	2		FAC
2. Symphoricarpos albus	5	X	FACU
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size: 5')			
1. Hedera helix	80	X	FACU
2.			
	80	= Total Cover	

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No x

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR3/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____________
Depth (inches): ____________

Hydric Soil Present? Yes ___ No x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ______
Water Table Present? Yes ___ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ______

Wetland Hydrology Present? Yes ___ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 2
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 2
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ___		
Hydric Soil Present? Yes x No ___		Is the Sampled Area within a Wetland? Yes x No ___
Wetland Hydrology Present? Yes x No ___		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	5	X	FACU
2. Fraxinus latifolia saplings	20	X	FACW
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Holcus lanatus	70	X	FAC
2. Juncus effusus	25	X	FACW
3. Gallium aparine	5	X	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] 5 - Wetland Non-Vascular Plants[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks: RUAR problematic and only 5% so not used. Dominance test met either way.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 5/1	80	10YR 4/6	20	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes x No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- x Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___

Water Table Present? Yes ___ No x Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? Yes x No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: On May 5, 2014 the hydrology was checked at this sample point and it was saturated 6" to the surface with water in the hole at 12"

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 3
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 3
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	x	
Hydric Soil Present?		x
Wetland Hydrology Present?		x

Is the Sampled Area within a Wetland? Yes ___ No x

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 5)			
1. Fraxinus latifolia saplings	5	x	FACW
2.			
3.			
4.			
5.			
= Total Cover	5		
Herb Stratum (Plot size: 5)			
1. Juncus effusus	10		FACW
2. Holcus lanatus	85	X	FAC
3. Dactylis glomerata	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤ 3.0[1]
- [ ] 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] 5 - Wetland Non-Vascular Plants[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR 3/3	90	10YR 4/2	5	c	m	Clay	Rock mixed in
			10YR 3/6	5	c	m		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____________
Depth (inches): ____________

Hydric Soil Present? Yes ____ No x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	x	Depth (inches):
Water Table Present?	Yes		No	x	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	x	Depth (inches):

Wetland Hydrology Present? Yes ____ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property   City/County: West Linn/Clackamas   Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar   State: OR   Sampling Point: 4
Investigator(s): CC, JT   Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace   Local relief (concave, convex, none): concave   Slope (%): 2
Subregion (LRR): A   Lat: 45.2347   Long: 122.3921   Datum:
Soil Map Unit Name: Cascade silt loam   NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ___	Is the Sampled Area within a Wetland?	Yes x No ___
Hydric Soil Present?	Yes x	No ___		
Wetland Hydrology Present?	Yes x	No ___		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	5	X	FACU
2.			
3.			
4.			
5.			
= Total Cover	5		
Herb Stratum (Plot size: 5')			
1. Holcus lanatus	70	X	FAC
2. Geranium sp	5		FACU
3. Galium aparine	2		FACU
4. Vicia Americana	10		FAC
5. Agrostis sp	15		FAC
6. Typha latifolia	T		FACW
7.			
8.			
9.			
10.			
11.			
= Total Cover	102		
Woody Vine Stratum (Plot size:)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks: RUAR is problematic and only 5% so not using

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 4/1	85	10YR 4/4	15	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
_x_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes _x_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
_x_ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
_x_ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No _x_ Depth (inches): ______
Water Table Present? Yes ___ No _x_ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No _x_ Depth (inches): ______

Wetland Hydrology Present? Yes _x_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: May 5, 2014 Hydrology was observed in this sample plot as saturation at 2" from the top

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 5
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 3
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology Significantly disturbed? Are "Normal Circumstances" present? Yes x No
Are Vegetation , Soil , or Hydrology Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X		
Hydric Soil Present? Yes ___ No X	Is the Sampled Area within a Wetland? Yes ___ No X	
Wetland Hydrology Present? Yes ___ No x		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus garryana	40	X	FACU
2.			
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	15	X	FACU
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Festuca arundinacea	5		FAC
2. Geranium sp	20	x	FACU
3. Galium aparine	5		FACU
4. Alopecurus pratensis	20	x	FAC
5. Agrostis sp	25	x	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	75	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 25(10%litter)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No x

Remarks:

SOIL

Sampling Point 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-18	10YR 3/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		x	
Water Table Present?		x	
Saturation Present? (includes capillary fringe)		x	

Wetland Hydrology Present? Yes ___ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 6
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 2
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology Significantly disturbed? Are "Normal Circumstances" present? Yes x No
Are Vegetation , Soil , or Hydrology Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No		Is the Sampled Area within a Wetland? Yes X No
Hydric Soil Present? Yes x No		
Wetland Hydrology Present? Yes x No		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 5')			
1. Festuca arundinacea	5		FAC
2. Geranium sp	15		FACU
3. Holcus lanatus	25	X	FAC
4. Camassia quamash	15		FACW
5. Alopecurus pratensis	40	x	FAC
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size:)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No

Remarks:

SOIL

Sampling Point 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1	95	10YR 4/6	5	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
x Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
x Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
x Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	x	Depth (inches):
Water Table Present?	Yes		No	x	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	x	Depth (inches):

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: May 5, 2014 this sample plot was observed to have hydrology –surface saturation

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 7
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 3
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology Significantly disturbed? Are "Normal Circumstances" present? Yes x No
Are Vegetation , Soil , or Hydrology Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No	
Hydrophytic Vegetation Present?		x	
Hydric Soil Present?		x	Is the Sampled Area within a Wetland? Yes ___ No x
Wetland Hydrology Present?		x	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	15	x	FACU
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Agrostis sp	10		FAC
2. Holcus lanatus	50	X	FAC
3. Dactylis glomerata	20	x	FACU
4. Geranium sp	2		FACU
5. Galium aparine	3		FACU
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 15 litter

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No x

Remarks:

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR 3/4	95	7.5YR 4/6	5	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___

Water Table Present? Yes ___ No x Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? Yes ___ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 8
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 2
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ___		
Hydric Soil Present? Yes x No ___	Is the Sampled Area within a Wetland?	Yes x No ___
Wetland Hydrology Present? Yes x No ___		

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	T		FACU
2. Fraxinus latifolia saplings	5	X	FACW
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Holcus lanatus	50	X	FAC
2. Agrostis sp	35	X	FAC
3. Galium aparine	10		FACU
4. Dactylis glomerata	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					CL	
6-18	10YR3/2	90	10YR3/4	10	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_x_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes _x_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
_x_ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
_x_ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No _x_ Depth (inches): ___
Water Table Present? Yes ___ No _x_ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No _x_ Depth (inches): ___

Wetland Hydrology Present? Yes _x_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: dry time of year, low end of wetland, secondary indicators, BPJ, other criteria met

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 9
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 3
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?		x
Wetland Hydrology Present?		x

Is the Sampled Area within a Wetland? Yes ___ No x

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Quercus garryana	20	X	FACU
2.			
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	20	x	FACU
2. Fraxinus latifolia	5		FACW
3. Symphoricarpos albus	5		FACU
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2. Agrostis sp	10	X	FAC
3. Galium aparine	10	x	FACU
4. Dactylis glomerata	5	x	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25	= Total Cover	
Woody Vine Stratum (Plot size: 5)			
1. Rubus ursinus	10	X	FACU
2.			
	10	= Total Cover	

% Bare Ground in Herb Stratum 60

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 17 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No x

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					CL	
10-18	10YR3/2	90					CL	1/8" blk concretions Not redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes ___ No x Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? Yes ___ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 10
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 3
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?		x
Wetland Hydrology Present?		x

Is the Sampled Area within a Wetland? Yes ___ No x

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	30	X	FACU
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	20	x	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2. Poa pratensis	10		FAC
3. Holcus lanatus	80	x	FAC
4. Geranium sp	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 5)			
1. Rubus ursinus	10	X	FACU
2.			
	10	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No x

Remarks:

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					CL	
10-18	10YR3/2	93	10YR3/4	7	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ___ No x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	x	Depth (inches):
Water Table Present?	Yes		No	x	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	x	Depth (inches):

Wetland Hydrology Present? Yes ___ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Reeseman Property City/County: West Linn/Clackamas Sampling Date: 6/10/15
Applicant/Owner: Upper Midhill Estates/Ryan Zygar State: OR Sampling Point: 11
Investigator(s): CC, JT Section, Township, Range: 14 2S 1E
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 3
Subregion (LRR): A Lat: 45.2347 Long: 122.3921 Datum:
Soil Map Unit Name: Cascade silt loam NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology Significantly disturbed? Are "Normal Circumstances" present? Yes x No
Are Vegetation , Soil , or Hydrology Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No	
Hydrophytic Vegetation Present?	x		
Hydric Soil Present?		x	Is the Sampled Area within a Wetland? Yes ___ No x
Wetland Hydrology Present?		x	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	10	x	FACU
2.			
3.			
4.			
5.			
= Total Cover	10		
Herb Stratum (Plot size: 5)			
1. Festuca arundinacea	40	x	FAC
2. Holcus lanatus	15		FAC
3. Alopecurus pratensis	20	x	FAC
4. Vicia sp	20	x	FAC
5. Galium aparine	5		FACU
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size:)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] 5 - Wetland Non-Vascular Plants[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No

Remarks:

SOIL

Sampling Point: 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR3/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ___ **No** x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	x	Depth (inches):
Water Table Present?	Yes		No	x	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	x	Depth (inches):

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C: Ground Level Photographs

Photo Point 1 facing east, northeast

Photo point 2 facing northeast

Appendix C: Ground Level Photographs Reeseman Property S&A 2373	Schott & Associates P.O. Box 589 Aurora, OR. 97002 503.678.6007

Photo Point 2 facing northwest

Photo Point 3 facing north, northwest

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 4 facing northeast

Photo Point 4 facing southeast

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 5 at entrance to culvert in nw corner of property

Photo Point 6 showing drainage channel

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Appendix D: References

Environmental Laboratory, 1987. *Corps of Engineers Wetlands Delineation Manual,* Technical Report Y-87-1, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.

Environmental Laboratory, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0),* Wetlands Regulatory Assistance Program ERDC/EL TR-10-3 U.S. Army Engineer Research and Development Center. Vicksburg, MS.

Federal Interagency Committee for Wetland Delineation, 1989. *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication. 138 pp.

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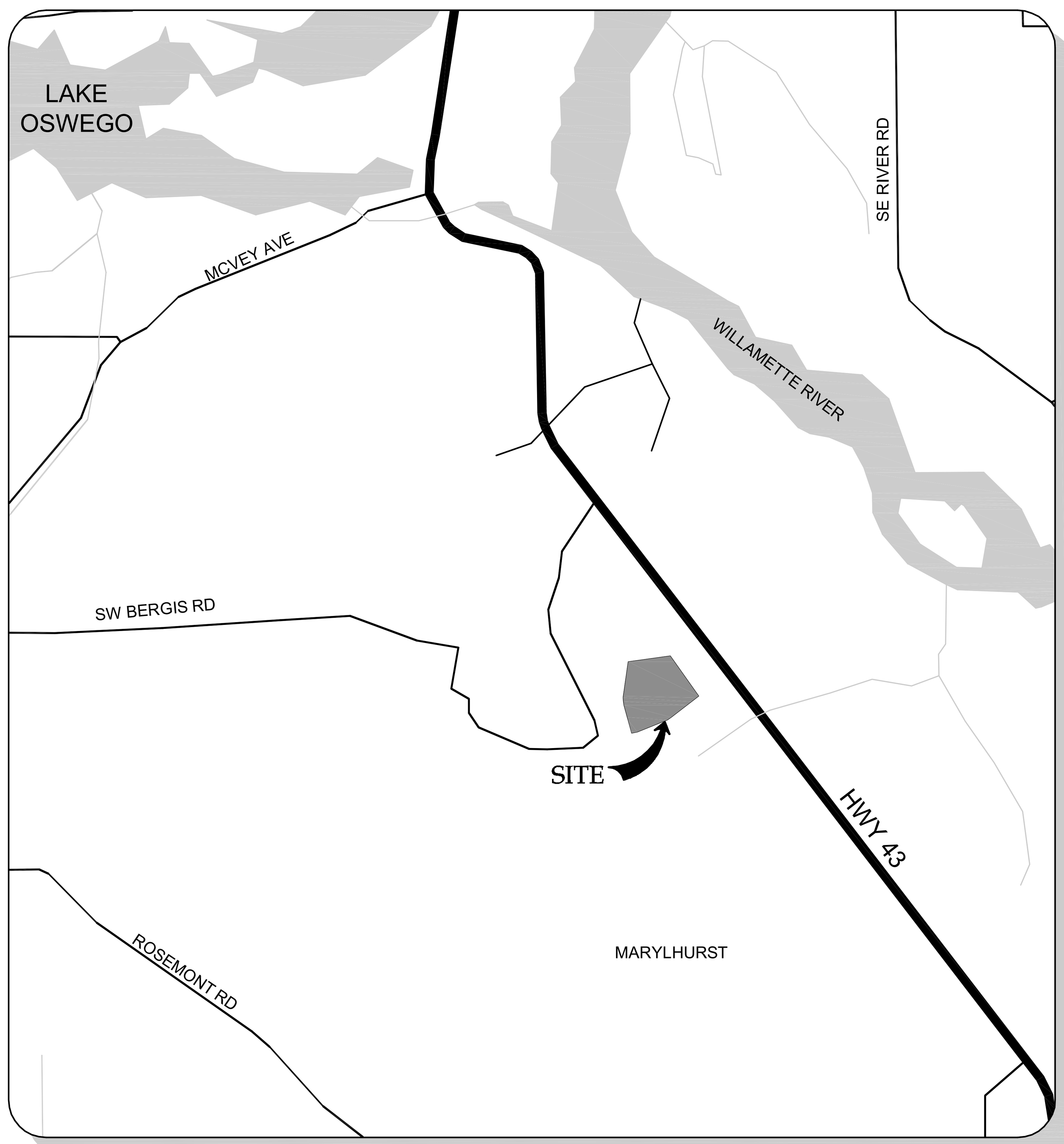
NOT FOR CONSTRUCTION

TAX LOT 200 LOCATED IN THE
NE 1/4 OF SW 1/4 SEC. 14, T.2S, R.1E., W.M.
CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON

LAND USE DOCUMENTS
FOR
CHÊNE BLANC ESTATES
PREPARED FOR
1800 UPPER MIDHILL DRIVE, LLC



VICINITY MAP
NOT TO SCALE

SITE MAP

SHEET INDEX	
Sheet Number	Sheet Title
C000	COVER SHEET
C100	EXISTING CONDITIONS PLAN
C105	PHASE 1 DEMOLITION & EROSION CONTROL
C110	TREE PRESERVATION PLAN
C111	TREE PRESERVATION DETAILS I
C112	TREE PRESERVATION DETAILS II
C113	TREE PRESERVATION DETAILS III
C114	TREE PRESERVATION DETAILS IV
C130	SLOPE ANALYSIS PLAN
C200	PRELIMINARY PLAT
C201	TYPICAL SECTIONS
C210	PRELIMINARY SITE PLAN
C220	ROADWAY PROFILES
C230	PHASE 2 GRADING AND EROSION CONTROL
C280	PHOTOMETRICS PLAN
C300	COMPOSITE UTILITY PLAN
L1	LANDSCAPE PLAN

SITE INFORMATION

SITE ADDRESS
18000 UPPER MIDHILL DRIVE
WEST LINN OREGON

TAX LOT(S)
2S1E14CA 00200

JURSIDICTION
CITY OF WEST LINN

FLOOD HAZARD
MAP NUMBER: 41005C0019D
ZONE X (UNSHADED)

ZONING
R-4.5

GROSS SITE AREA
6.10 AC.

UTILITIES & SERVICES

WATER, STORM, SEWER
CITY OF WEST LINN
CONTACT: KHOI LE
PHONE: (503) 722-5517
EMAIL: kle@westlinnoregon.gov

CABLE
CENTURY LINK - REGIONAL ENGINEER
CONTACT: KENNETH SCIULLI
PHONE: (503) 242-0304
EMAIL: kenneth.sciulli@centurylink.com

GAS
NORTHWEST NATURAL - ENGINERING
CONTACT: BRIAN KELLEY
PHONE: (503) 220-2427
EMAIL: brian.kelley@nwnatural.com

CABLE
CENTURY LINK - REGIONAL MANAGER
CONTACT: JEREMY MORRIS
PHONE: (503) 293-4567
EMAIL: jeremy.morris@centurylink.com

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PGE
CONTACT: CHRIS JEWETT
PHONE: (503) 672-5481
EMAIL: chris.jewett@pgn.com

CABLE
COMCAST
CONTACT: KENNETH WILLS
PHONE: (503) 793-9981
EMAIL: kenneth_wills@cable.comcast.com

FIRE, POLICE, SCHOOLS, ROADS, PARKS
CITY OF WEST LINN

PROJECT TEAM

OWNER / APPLICANT
UPPER MIDHILL ESTATES, LLC
C/O: RYAN ZYGAR
981 SW KING AVENUE
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PHONE: (360) 798-4838
EMAIL: ryan@zygar.com

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COMPASS SURVEYING
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CIVIL ENGINEER
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EMAIL: jimbrie@geopacificeng.com

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

DESIGN REVIEW		11/10/2016
#	REVISION SUMMARY	BY / DATE

COVER SHEET
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

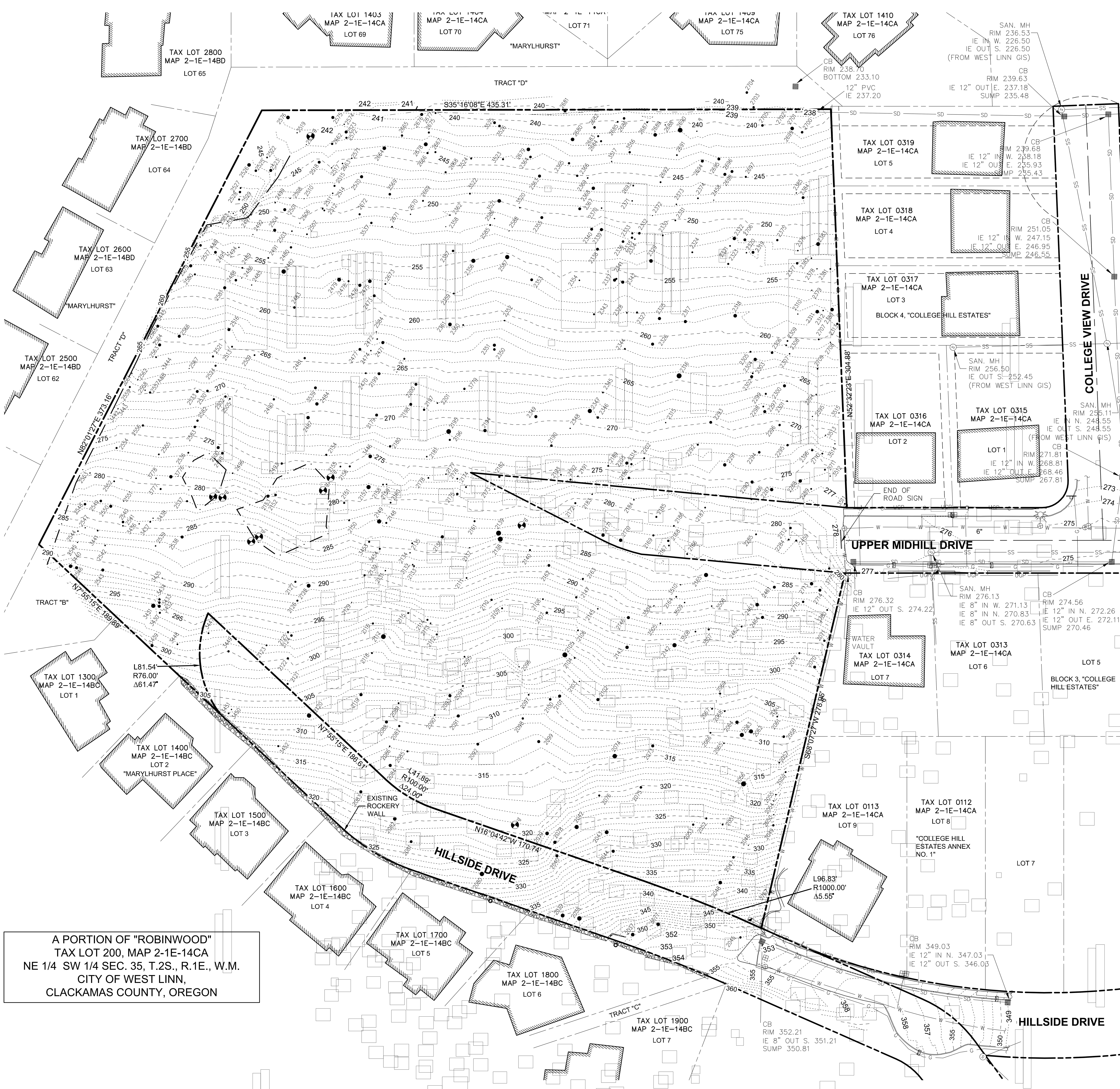
3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
COVER SHEET

SHEET NUMBER
C000

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C000 COVER SHEET.DWG

NOT FOR CONSTRUCTION



LEGEND

PROJECT BOUNDARY LINE	TEST PIT
RIGHT OF WAY LINE	FIRE HYDRANT
ROADWAY CENTER LINE	WATER VALVE
ADJACENT PROPERTY BOUNDARY	BLOW-OFF VALVE
EXISTING MAJOR CONTOUR	SIGN
EXISTING MINOR CONTOUR	SANITARY MANHOLE
EASEMENT LINE	SANITARY CLEANOUT
BUILDING	STORM MANHOLE
CURB	STORM CLEANOUT
FENCE	STORM INLET
TELECOM. LINE	TELEPHONE PEDESTAL
GAS LINE	EXISTING TREE*
UNDERGROUND POWER	
VEGETATION LIMITS LINE	
SANITARY SEWER	
STORM DRAIN	
WATER MAIN	
EXISTING MAPPED WETLAND	
EXISTING DRAINAGE SWALE	

EXISTING CONDITIONS PLAN

THIS PLAN IS INTENDED FOR USE AS AN EXISTING CONDITIONS PLAN SHOWING THE CONDITIONS OF THE SITE PRIOR TO CONSTRUCTION. INFORMATION SHOWN ON THIS PLAN WAS DEVELOPED FROM THE TOPOGRAPHIC SURVEY, AERIAL PHOTOS, AND SITE OBSERVATIONS BY THE ENGINEER. NOT ALL SURFACE FEATURES OR UTILITIES MAY BE SHOWN. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION TO DETERMINE WORK SPECIFIC DETAILS. TOPOGRAPHIC INFORMATION PROVIDED BY COMPASS LAND SURVEYING, DATED JUNE 2015.

ZONE X (UN-SHADED)

THE SITE IS LOCATED WITHIN ZONE X (UN-SHADED) PER FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY-PANEL NUMBER 41005C 0019 D FEMA'S DEFINITION OF ZONE X (UN-SHADED) IS AN AREA OF MINIMAL FLOOD HAZARD, USUALLY DEPICTED ON FIRMS AS ABOVE THE 500-YEAR FLOOD LEVEL. ZONE X IS THE AREA DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD AND PROTECTED BY LEVEE FROM 100-YEAR FLOOD. IN COMMUNITIES THAT PARTICIPATE IN THE NFIP, FLOOD INSURANCE IS AVAILABLE TO ALL PROPERTY OWNERS AND RENTERS IN THESE ZONES.

SURVEYOR'S NOTE

1. UTILITY INFORMATION SHOWN ON THIS MAP IS BASED UPON OBSERVED FEATURES, RECORD DATA AND TONE MARKS PROVIDED BY PUBLIC UTILITY LOCATION SERVICES. NO WARRANTIES ARE MADE REGARDING THE ACCURACY OR COMPLETENESS OF THE UTILITY INFORMATION SHOWN. ADDITIONAL UTILITIES MAY EXIST. INTERESTED PARTIES ARE HEREBY ADVISED THAT UTILITY LOCATIONS SHOULD BE VERIFIED PRIOR TO DESIGN OR CONSTRUCTION OF ANY CRITICAL ITEMS.

2. VERTICAL DATUM: NAVD'88 UTILIZING GPS POSITIONING TIED TO THE ORGN WITH REAL TIME CORRECTORS REFERENCED TO DATUM NAD 83(2011) EPOCH 2010.00. THIS DATUM REALIZATION WAS VERIFIED THROUGH DIRECT OBSERVATION TO NGS CONTROL POINT Q723 HAVING A POINT IDENTIFICATION OF RD1491. THIS POINT IS DESCRIBED AS A STAINLESS STEEL ROD W/ SLEEVE NEAR THE INTERSECTION OF STATE HIGHWAY 224 AND LAKE ROAD. THE ELEVATION OF THIS POINT IS PUBLISHED AS 31.131 AND WAS ESTABLISHED BY NGS THROUGH DIFFERENTIAL LEVELING AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JUNE 1991 AND HAS A VERTICAL ORDER OF FIRST CLASS II.

3. BASIS OF BEARINGS: CENTERLINE OF UPPER MIDHILL DRIVE AS PER THE PLAT OF "COLLEGE HILL ESTATES"

4. TOPOGRAPHIC FEATURES SHOWN ON THIS MAP WERE LOCATED USING STANDARD PRECISION TOPOGRAPHIC MAPPING PROCEDURES. THIRD PARTY USERS OF DATA FROM THIS MAP PROVIDED VIA AUTOCAD DRAWING FILES OR DATA EXCHANGE FILES SHOULD NOT RELY ON ANY AUTOCAD GENERATED INFORMATION WHICH IS BEYOND THE LIMITS OF PRECISION OF THIS MAP. THIRD PARTIES USING DATA FROM THIS MAP IN AN AUTOCAD FORMAT SHOULD VERIFY ANY ELEMENTS REQUIRING PRECISE LOCATIONS PRIOR TO COMMENCEMENT OF ANY CRITICAL DESIGN OR CONSTRUCTION. CONTACT COMPASS LAND SURVEYORS FOR FURTHER INFORMATION. FURTHERMORE, COMPASS LAND SURVEYORS WILL NOT BE RESPONSIBLE NOR HELD LIABLE FOR ANY DESIGN OR CONSTRUCTION RELATED PROBLEMS THAT ARISE OUT OF THIRD PARTY USAGE OF THIS MAP (IN AUTOCAD OR OTHER FORMAT) IN ANY MANNER INCONSISTENT WITH THIS STATEMENT.

5. UNDERGROUND PIPE SIZES AND MATERIAL TYPES ARE BASED UPON RECORD DRAWINGS, INFORMATION PROVIDED BY UTILITY LOCATORS AND FIELD OBSERVATIONS AT MANHOLES AND CATCH BASIN RIMS AND SHOULD BE VERIFIED.

REESMAN PROPERTY EXISTING CONDITIONS MAP
TL 200 IN NE 1/4 OF SW 1/4 SEC. 14, T.2S, R.1E., W.M.
CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON

811 Know what's below. Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

EXISTING CONDITIONS PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE
OREGON JUNE 16, 2011 JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

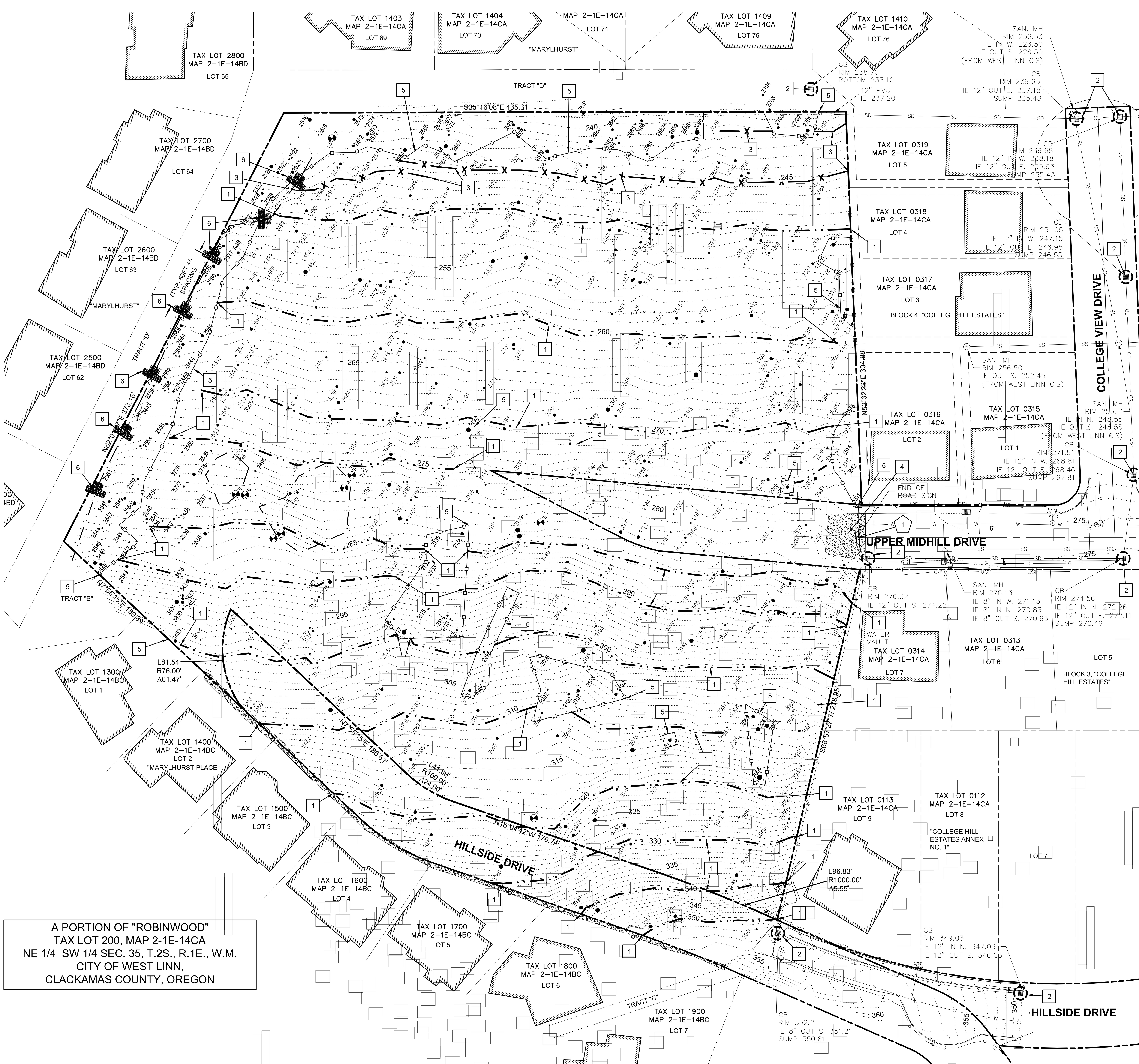
3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
EX. COND.

SHEET NUMBER
C100

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C100 EXISTING CONDITIONS PLAN.DWG

NOT FOR CONSTRUCTION



A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

LEGEND

	PROJECT BOUNDARY LINE
	RIGHT OF WAY LINE
	PROPOSED PROPERTY LINE
	ROADWAY CENTER LINE
	ADJACENT PROPERTY BOUNDARY
110	EXISTING MAJOR CONTOUR
108	EXISTING MINOR CONTOUR
	EASEMENT LINE
	STRAW WATTLE
X	SILT FENCE
	TREE PROTECTION FENCING
	EXISTING MAPPED WETLAND
	EXISTING DRAINAGE SWALE
	CONSTRUCTION ENTRANCE
	INLET PROTECTION
	EROSION CONTROL: BIO BAG
	SURFACE RUNOFF FLOW ARROW
2346	TREE LOCATION AND TAG NUMBER
TP	TEST PIT

SEE SHEETS C110-C114 FOR TREE PRESERVATION AND REMOVAL INFORMATION

DEMOLITION KEY NOTES

1. REMOVE SIGN AND POST AND DISPOSE OF OFF-SITE.

EROSION CONTROL KEY NOTES

1. INSTALL STRAW WATTLE AS NEEDED FOR CONSTRUCTION PHASING. MAINTAIN EXISTING VEGETATION AS LONG AS POSSIBLE.
2. INSTALL INLET PROTECTION.
3. PLACE SILT FENCING AT LIMITS OF GRADING AND CONSTRUCTION WHERE SHOWN.
4. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE.
5. INSTALL TREE PROTECTION FENCING AT LIMITS SHOWN.
6. INSTALL EROSION CONTROL BIO BAG(S) AT LOCATION(S) SHOWN.

811
Know what's below. Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

PHASE 1 DEMOLITION & EROSION CONTROL
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE
OREGON JUNE 16, 2011 JESSE T. EMERSON
EXPIRES: 12/31/17

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3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
PH1 DEMO & E.C.

SHEET NUMBER
C105

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C105 PHASE 1 DEMOLITION & EROSION CONTROL.DWG

NOT FOR CONSTRUCTION

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- 110 EXISTING MAJOR CONTOUR
- 108 EXISTING MINOR CONTOUR
- PROPOSED TREE PROTECTIVE FENCING
- TYPE III DELINEATION LINE
- SIGNIFICANT TREE CANOPY TO REMAIN (DRIPLINE + 10 FT)
- SIGNIFICANT TREE CANOPY TO BE REMOVED (DRIPLINE + 10 FT)
- TREE TO BE REMOVED

GENERAL TREE INVENTORY STATISTICS

TOTAL PROPERTY AREA:	265,860 +/- SF (6.10 AC)
TOTAL TREE INVENTORY:	502
TOTAL TREES RETAINED:	131
TOTAL TREES REMOVED:	371
TOTAL TREE CALIPER INCHES:	8,906
TOTAL CALIPER INCHES RETAINED:	2,363
TOTAL CALIPER INCHES REMOVED:	6,543

SIGNIFICANT TREE STATISTICS

SIGNIFICANT TREE INVENTORY:	169
SIGNIFICANT TREES RETAINED:	49
SIGNIFICANT TREES REMOVED:	120
SIGNIFICANT TREE CALIPER INCHES:	3,891
SIGNIFICANT CALIPER INCHES RETAINED:	1,094
SIGNIFICANT CALIPER INCHES REMOVED:	2,797
EXISTING SIGNIFICANT TREE CANOPY COVERAGE:	238,212 SF
SIGNIFICANT TREE CANOPY REMOVED DUE TO R.O.W. IMPROVEMENTS:	165,132 SF
TREE PRESERVATION AREA REQUIRED *(20% OF EXISTING CANOPY)*:	47,642 SF
TREE PRESERVATION AREA PROVIDED *(33% OF EXISTING CANOPY)*:	70,368 SF
SIGNIFICANT NON-TYPE I OR II AREA RETAINED (DRIPLINE +10'):	0 SF
TOTAL SIGNIFICANT NON-TYPE I OR II AREA (DRIPLINE +10'):	7,045 SF
TOTAL PERCENT NON-TYPE I OR II AREA RETAINED (DRIPLINE +10'):	0%

811
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TREE PRESERVATION PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
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3J JOB ID #	15266
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DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
TREE PRES. PLAN

SHEET NUMBER
C110

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C110 TREE PRESERVATION PLAN.DWG

NOT FOR CONSTRUCTION

TREE INVENTORY

SURVEY POINT NUMBER	TREE SPECIES	NOMINAL CALIPER SIZE	SIGNIFICANT DESIGNATION	PROPOSED ACTION	REMOVE DUE TO CONDITION
2037	DOUGLAS-FIR	30	SIGNIFICANT	REMOVE	ROW
2038	DOUGLAS-FIR	38	SIGNIFICANT	REMOVE	ROW
2039	DOUGLAS-FIR	32	SIGNIFICANT	REMOVE	ROW
2040	DOUGLAS-FIR	26	NON-SIGNIFICANT	REMOVE	ROW
2042	DOUGLAS-FIR	36	NON-SIGNIFICANT	REMOVE	BUILDING
2043	DOUGLAS-FIR	32	NON-SIGNIFICANT	REMOVE	BUILDING
2044	DOUGLAS-FIR	26	NON-SIGNIFICANT	REMOVE	GRADING
2045	PORT-ORFORD-CEDAR	18	NON-SIGNIFICANT	REMOVE	ROW
2046	DOUGLAS-FIR	6	NON-SIGNIFICANT	REMOVE	ROW
2047	BIG LEAF MAPLE	20	NON-SIGNIFICANT	REMOVE	BUILDING
2048	OREGON WHITE OAK	29	NON-SIGNIFICANT	REMOVE	BUILDING
2049	BIG LEAF MAPLE	18	NON-SIGNIFICANT	REMOVE	BUILDING
2050	BIG LEAF MAPLE	8	NON-SIGNIFICANT	REMOVE	CONDITION
2051	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	BUILDING
2052	OREGON WHITE OAK	16	NON-SIGNIFICANT	REMOVE	BUILDING
2053	SCOULER'S WILLOW	18	NON-SIGNIFICANT	REMOVE	BUILDING
2054	RED ALDER	8	NON-SIGNIFICANT	REMOVE	CONDITION
2055	RED ALDER	10	NON-SIGNIFICANT	REMOVE	CONDITION
2056	DOUGLAS-FIR	42	SIGNIFICANT	RETAIN	N/A
2057	OREGON WHITE OAK	8, 12	NON-SIGNIFICANT	REMOVE	CONDITION
2058	BIG LEAF MAPLE	21	NON-SIGNIFICANT	REMOVE	CONDITION
2059	BIG LEAF MAPLE	14	NON-SIGNIFICANT	REMOVE	CONDITION
2060	BIG LEAF MAPLE	8	NON-SIGNIFICANT	REMOVE	CONDITION
2061	OREGON WHITE OAK	10, 12	NON-SIGNIFICANT	REMOVE	CONDITION
2062	DOUGLAS-FIR	34	SIGNIFICANT	RETAIN	N/A
2063	DOUGLAS-FIR	36	SIGNIFICANT	RETAIN	N/A
2064	DOUGLAS-FIR	28	SIGNIFICANT	RETAIN	N/A
2065	MADRONE	10	NON-SIGNIFICANT	REMOVE	CONDITION
2066	MADRONE	12	NON-SIGNIFICANT	REMOVE	CONDITION
2067	MADRONE	14	NON-SIGNIFICANT	REMOVE	CONDITION
2068	MADRONE	13	NON-SIGNIFICANT	REMOVE	CONDITION
2069	MADRONE	10, 16	NON-SIGNIFICANT	REMOVE	CONDITION
2070	DOUGLAS-FIR	24	NON-SIGNIFICANT	REMOVE	BUILDING
2071	DOUGLAS-FIR	18	NON-SIGNIFICANT	REMOVE	BUILDING
2072	BIG LEAF MAPLE	6x8, 16	NON-SIGNIFICANT	REMOVE	BUILDING
2073	OREGON WHITE OAK	24	NON-SIGNIFICANT	RETAIN	N/A
2074	DOUGLAS-FIR	38	NON-SIGNIFICANT	REMOVE	CONDITION
2075	RED ALDER	20	NON-SIGNIFICANT	REMOVE	BUILDING
2076	MADRONE	16	NON-SIGNIFICANT	REMOVE	BUILDING
2078	DOUGLAS-FIR	28	NON-SIGNIFICANT	REMOVE	GRADING
2079	DOUGLAS-FIR	30	SIGNIFICANT	REMOVE	GRADING
2080	OREGON WHITE OAK	36	SIGNIFICANT	REMOVE	ROW
2081	OREGON WHITE OAK	22	SIGNIFICANT	REMOVE	ROW
2082	OREGON WHITE OAK	30	SIGNIFICANT	REMOVE	ROW
2083	OREGON WHITE OAK	14, 20 24	SIGNIFICANT	REMOVE	ROW
2084	OREGON WHITE OAK	26	SIGNIFICANT	REMOVE	GRADING
2085	OREGON WHITE OAK	15	NON-SIGNIFICANT	REMOVE	BUILDING
2086	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	BUILDING
2087	OREGON WHITE OAK	18	NON-SIGNIFICANT	REMOVE	BUILDING
2088	OREGON WHITE OAK	24	NON-SIGNIFICANT	REMOVE	BUILDING
2089	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	BUILDING
2090	OREGON WHITE OAK	14	SIGNIFICANT	REMOVE	BUILDING
2091	OREGON WHITE OAK	26	SIGNIFICANT	REMOVE	BUILDING
2092	OREGON WHITE OAK	22	NON-SIGNIFICANT	REMOVE	BUILDING
2093	OREGON WHITE OAK	24	NON-SIGNIFICANT	REMOVE	BUILDING
2094	OREGON WHITE OAK	15	NON-SIGNIFICANT	REMOVE	BUILDING
2095	OREGON WHITE OAK	12	NON-SIGNIFICANT	RETAIN	N/A
2096	OREGON WHITE OAK	8	NON-SIGNIFICANT	RETAIN	N/A
2097	OREGON WHITE OAK	12	SIGNIFICANT	RETAIN	N/A
2098	OREGON WHITE OAK	10, 18	SIGNIFICANT	REMOVE	BUILDING
2099	OREGON WHITE OAK	24	SIGNIFICANT	REMOVE	BUILDING
2100	OREGON WHITE OAK	20	SIGNIFICANT	RETAIN	N/A
2101	OREGON WHITE OAK	26	SIGNIFICANT	RETAIN	N/A
2102	OREGON WHITE OAK	26	SIGNIFICANT	RETAIN	N/A
2103	OREGON WHITE OAK	8	NON-SIGNIFICANT	RETAIN	N/A
2104	OREGON WHITE OAK	13	NON-SIGNIFICANT	REMOVE	CONDITION
2105	DOUGLAS-FIR	42	NON-SIGNIFICANT	REMOVE	CONDITION
2106	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2107	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	BUILDING
2108	OREGON WHITE OAK	2x12	SIGNIFICANT	REMOVE	BUILDING
2109	OREGON WHITE OAK	6, 12	SIGNIFICANT	REMOVE	BUILDING
2110	OREGON WHITE OAK	17	SIGNIFICANT	REMOVE	BUILDING
2111	SCOULER'S WILLOW	12	NON-SIGNIFICANT	REMOVE	BUILDING
2112	OREGON WHITE OAK	16	SIGNIFICANT	RETAIN	N/A
2113	OREGON WHITE OAK	10	SIGNIFICANT	RETAIN	N/A
2114	OREGON WHITE OAK	15	SIGNIFICANT	RETAIN	N/A
2115	OREGON WHITE OAK	12	SIGNIFICANT	RETAIN	N/A
2116	OREGON WHITE OAK	16	SIGNIFICANT	RETAIN	N/A
2117	DOUGLAS-FIR	40	SIGNIFICANT	RETAIN	N/A
2118	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	BUILDING
2119	DOUGLAS-FIR	26	NON-SIGNIFICANT	REMOVE	BUILDING
2120	DOUGLAS-FIR	37	SIGNIFICANT	REMOVE	ROW
2121	BIG LEAF MAPLE	16	NON-SIGNIFICANT	REMOVE	GRADING
2122	OREGON WHITE OAK	18	NON-SIGNIFICANT	REMOVE	BUILDING
2123	OREGON WHITE OAK	13	SIGNIFICANT	REMOVE	GRADING
2124	OREGON WHITE OAK	20	SIGNIFICANT	REMOVE	BUILDING
2125	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	BUILDING
2126	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	BUILDING
2127	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	GRADING
2128	DOUGLAS-FIR	32	SIGNIFICANT	REMOVE	BUILDING
2129	OREGON WHITE OAK	7	NON-SIGNIFICANT	REMOVE	CONDITION
2130	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	BUILDING
2131	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	BUILDING
2132	OREGON WHITE OAK	10	SIGNIFICANT	RETAIN	N/A
2133	OREGON WHITE OAK	14	SIGNIFICANT	RETAIN	N/A
2134	BIG LEAF MAPLE	2x9	NON-SIGNIFICANT	REMOVE	CONDITION
2135	OREGON WHITE OAK	12	SIGNIFICANT	RETAIN	N/A
2136	OREGON WHITE OAK	26	SIGNIFICANT	RETAIN	N/A
2137	OREGON WHITE OAK	8	NON-SIGNIFICANT	REMOVE	BUILDING
2138	DOUGLAS-FIR	42	SIGNIFICANT	REMOVE	BUILDING
2139	DOUGLAS-FIR	42	SIGNIFICANT	REMOVE	BUILDING
2140	DOUGLAS-FIR	15	NON-SIGNIFICANT	REMOVE	BUILDING
2142	DOUGLAS-FIR	36	NON-SIGNIFICANT	REMOVE	BUILDING
2143	DOUGLAS-FIR	28	NON-SIGNIFICANT	REMOVE	BUILDING
2145	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	BUILDING
2146	BIG LEAF MAPLE	24	NON-SIGNIFICANT	REMOVE	BUILDING
2147	OREGON WHITE OAK	12, 18	SIGNIFICANT	REMOVE	BUILDING
2148	OREGON WHITE OAK	15	NON-SIGNIFICANT	REMOVE	BUILDING
2149	DOUGLAS-FIR	34	SIGNIFICANT	REMOVE	BUILDING
2150	OREGON WHITE OAK	14	SIGNIFICANT	REMOVE	BUILDING
2151	OREGON WHITE OAK	15	SIGNIFICANT	REMOVE	BUILDING
2152	OREGON ASH	21	NON-SIGNIFICANT	REMOVE	ROW
2153	OREGON ASH	26	NON-SIGNIFICANT	REMOVE	ROW
2154	OREGON WHITE OAK	16	NON-SIGNIFICANT	REMOVE	ROW
2155	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	GRADING
2156	OREGON WHITE OAK	15	NON-SIGNIFICANT	REMOVE	GRADING
2157	DOUGLAS-FIR	36	NON-SIGNIFICANT	REMOVE	BUILDING
2158	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2159	OREGON WHITE OAK	2x10	NON-SIGNIFICANT	REMOVE	BUILDING
2160	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2161	OREGON WHITE OAK	15	NON-SIGNIFICANT	REMOVE	BUILDING
2162	DOUGLAS-FIR	22	SIGNIFICANT	REMOVE	BUILDING
2163	BIG LEAF MAPLE	15	NON-SIGNIFICANT	REMOVE	BUILDING
2164	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2165	DOUGLAS-FIR	34	NON-SIGNIFICANT	REMOVE	GRADING
2166	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	ROW
2167	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	ROW
2168	OREGON WHITE OAK	19	SIGNIFICANT	REMOVE	ROW
2169	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	ROW
2170	DOUGLAS-FIR	28	NON-SIGNIFICANT	REMOVE	ROW
2171	DOUGLAS-FIR	28	NON-SIGNIFICANT	REMOVE	ROW
2172	OREGON WHITE OAK	12, 16	SIGNIFICANT	REMOVE	ROW
2173	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	GRADING
2174	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	GRADING
2175	OREGON WHITE OAK	20	SIGNIFICANT	REMOVE	GRADING

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

TREE PRESERVATION DETAILS I

CHÊNE BLANC ESTATES

LAND USE DOCUMENTS

1800 UPPER MIDHILL DRIVE, LLC

WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE OREGON JUNE 16, 2011 JESSE T. EMERSON EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID # | 15266
LAND USE # | TBD
TAX LOT # | 2S1E14CA 00200
DESIGNED BY | JTE, CKW, JCP
CHECKED BY | JTE

SHEET TITLE
TREE DETAILS I

SHEET NUMBER
C111

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C110 TREE PRESERVATION PLAN.DWG

NOT FOR CONSTRUCTION

TREE INVENTORY

SURVEY POINT NUMBER	TREE SPECIES	NOMINAL CALIPER SIZE	SIGNIFICANT DESIGNATION	PROPOSED ACTION	REMOVE DUE TO CONDITION
2176	OREGON ASH	14	NON-SIGNIFICANT	REMOVE	CONDITION
2177	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	CONDITION
2178	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2179	DOUGLAS-FIR	24	SIGNIFICANT	REMOVE	GRADING
2180	BIG LEAF MAPLE	17	NON-SIGNIFICANT	REMOVE	GRADING
2181	OREGON WHITE OAK	11	NON-SIGNIFICANT	REMOVE	CONDITION
2182	OREGON ASH	18	NON-SIGNIFICANT	REMOVE	ROW
2183	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	ROW
2184	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	ROW
2185	OREGON WHITE OAK	15	NON-SIGNIFICANT	REMOVE	ROW
2186	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	ROW
2187	OREGON ASH	12	NON-SIGNIFICANT	REMOVE	ROW
2188	OREGON WHITE OAK	8, 20	SIGNIFICANT	REMOVE	GRADING
2189	BIG LEAF MAPLE	14	NON-SIGNIFICANT	REMOVE	GRADING
2190	OREGON WHITE OAK	20	SIGNIFICANT	RETAIN	N/A
2191	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	GRADING
2192	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	GRADING
2193	OREGON WHITE OAK	10	SIGNIFICANT	REMOVE	GRADING
2194	OREGON WHITE OAK	28	SIGNIFICANT	REMOVE	BUILDING
2195	OREGON WHITE OAK	36	SIGNIFICANT	REMOVE	BUILDING
2196	OREGON ASH	16	NON-SIGNIFICANT	REMOVE	CONDITION
2197	OREGON WHITE OAK	18	SIGNIFICANT	REMOVE	BUILDING
2198	GRAND FIR	24	SIGNIFICANT	REMOVE	GRADING
2199	DOUGLAS-FIR	24	NON-SIGNIFICANT	REMOVE	ROW
2200	DOUGLAS-FIR	24	SIGNIFICANT	REMOVE	BUILDING
2201	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	BUILDING
2202	BIG LEAF MAPLE	10, 12, 2x14	NON-SIGNIFICANT	REMOVE	GRADING
2203	DOUGLAS-FIR	18, 26	NON-SIGNIFICANT	REMOVE	ROW
2284	DOUGLAS-FIR	14	NON-SIGNIFICANT	REMOVE	ROW
2285	OREGON WHITE OAK	13	NON-SIGNIFICANT	REMOVE	ROW
2286	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	GRADING
2287	OREGON WHITE OAK	28	SIGNIFICANT	REMOVE	BUILDING
2288	OREGON WHITE OAK	28	SIGNIFICANT	REMOVE	BUILDING
2289	OREGON ASH	13	NON-SIGNIFICANT	REMOVE	CONDITION
2290	OREGON WHITE OAK	24	SIGNIFICANT	REMOVE	BUILDING
2291	OREGON WHITE OAK	27	SIGNIFICANT	REMOVE	GRADING
2292	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	ROW
2293	OREGON WHITE OAK	23	NON-SIGNIFICANT	REMOVE	ROW
2294	OREGON WHITE OAK	20	NON-SIGNIFICANT	REMOVE	BUILDING
2295	OREGON WHITE OAK	18	NON-SIGNIFICANT	REMOVE	BUILDING
2296	DOUGLAS-FIR	18	NON-SIGNIFICANT	REMOVE	BUILDING
2297	OREGON WHITE OAK	24	SIGNIFICANT	REMOVE	BUILDING
2298	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2299	SWEET CHERRY	15	NON-SIGNIFICANT	REMOVE	BUILDING
2300	OREGON WHITE OAK	24	SIGNIFICANT	REMOVE	BUILDING
2301	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
2302	MADRONE	24	SIGNIFICANT	REMOVE	BUILDING
2303	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2304	OREGON WHITE OAK	25	SIGNIFICANT	REMOVE	BUILDING
2305	BIG LEAF MAPLE	14	NON-SIGNIFICANT	REMOVE	BUILDING
2306	OREGON WHITE OAK	21	NON-SIGNIFICANT	REMOVE	BUILDING
2307	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
2308	BIG LEAF MAPLE	12	NON-SIGNIFICANT	REMOVE	BUILDING
2309	BIG LEAF MAPLE	12	NON-SIGNIFICANT	REMOVE	BUILDING
2310	BIG LEAF MAPLE	8	NON-SIGNIFICANT	REMOVE	BUILDING
2311	DOUGLAS-FIR	30	SIGNIFICANT	REMOVE	BUILDING
2312	DOUGLAS-FIR	10	NON-SIGNIFICANT	REMOVE	CONDITION
2313	DOUGLAS-FIR	18	NON-SIGNIFICANT	REMOVE	CONDITION
2314	DOUGLAS-FIR	18	NON-SIGNIFICANT	REMOVE	GRADING
2314	DOUGLAS-FIR	17	NON-SIGNIFICANT	REMOVE	GRADING
2315	BIG LEAF MAPLE	3x9	NON-SIGNIFICANT	REMOVE	ROW
2316	DOUGLAS-FIR	42	NON-SIGNIFICANT	REMOVE	ROW
2317	DOUGLAS-FIR	26	NON-SIGNIFICANT	REMOVE	ROW
2318	OREGON WHITE OAK	26	SIGNIFICANT	REMOVE	GRADING
2319	DOUGLAS-FIR	24	NON-SIGNIFICANT	REMOVE	BUILDING
2320	DOUGLAS-FIR	10	NON-SIGNIFICANT	REMOVE	BUILDING
2321	WESTERN RED CEDAR	12	NON-SIGNIFICANT	REMOVE	GRADING
2322	DOUGLAS-FIR	28	SIGNIFICANT	REMOVE	BUILDING
2323	BIG LEAF MAPLE	16	NON-SIGNIFICANT	REMOVE	GRADING
2324	RED ALDER	14	NON-SIGNIFICANT	REMOVE	GRADING
2325	OREGON WHITE OAK	26	SIGNIFICANT	REMOVE	ROW
2326	OREGON WHITE OAK	25	SIGNIFICANT	REMOVE	ROW
2327	DOUGLAS-FIR	16	NON-SIGNIFICANT	REMOVE	ROW
2328	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	ROW
2329	DOUGLAS-FIR	30	SIGNIFICANT	REMOVE	ROW
2330	OREGON ASH	12	NON-SIGNIFICANT	REMOVE	GRADING
2331	OREGON ASH	8, 12	NON-SIGNIFICANT	REMOVE	GRADING
2332	WESTERN RED CEDAR	20	NON-SIGNIFICANT	REMOVE	GRADING
2333	WESTERN RED CEDAR	15	NON-SIGNIFICANT	REMOVE	BUILDING
2334	WESTERN RED CEDAR	10	NON-SIGNIFICANT	REMOVE	BUILDING
2335	DOUGLAS-FIR	18	NON-SIGNIFICANT	REMOVE	BUILDING
2336	DOUGLAS-FIR	21	NON-SIGNIFICANT	REMOVE	BUILDING
2337	DOUGLAS-FIR	26	NON-SIGNIFICANT	REMOVE	ROW
2338	DOUGLAS-FIR	24	NON-SIGNIFICANT	REMOVE	GRADING
2339	GRAND FIR	26	NON-SIGNIFICANT	REMOVE	BUILDING
2340	DOUGLAS-FIR	24	NON-SIGNIFICANT	REMOVE	BUILDNG
2341	GRAND FIR	16	NON-SIGNIFICANT	REMOVE	ROW
2342	OREGON WHITE OAK	26	SIGNIFICANT	REMOVE	ROW
2343	OREGON ASH	11, 15	NON-SIGNIFICANT	REMOVE	ROW
2344	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	GRADING
2345	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	GRADING
2346	DOUGLAS-FIR	20	NON-SIGNIFICANT	REMOVE	GRADING
2347	DOUGLAS-FIR	36	SIGNIFICANT	REMOVE	GRADING
2348	OREGON WHITE OAK	2x8	NON-SIGNIFICANT	REMOVE	GRADING
2349	OREGON WHITE OAK	26	SIGNIFICANT	REMOVE	BUILDING
2350	OREGON ASH	20	NON-SIGNIFICANT	REMOVE	GRADING
2351	OREGON WHITE OAK	26	SIGNIFICANT	REMOVE	GRADING
2352	OREGON ASH	10	NON-SIGNIFICANT	REMOVE	ROW
2353	OREGON WHITE OAK	22	SIGNIFICANT	REMOVE	ROW
2354	OREGON WHITE OAK	11	SIGNIFICANT	REMOVE	ROW
2355	DOUGLAS-FIR	24	NON-SIGNIFICANT	REMOVE	BUILDING
2356	DOUGLAS-FIR	35	SIGNIFICANT	REMOVE	GRADING
2357	OREGON WHITE OAK	19	NON-SIGNIFICANT	REMOVE	BUILDING
2358	OREGON ASH	8	NON-SIGNIFICANT	REMOVE	BUILDING
2359	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	ROW
2360	BIG LEAF MAPLE	13	NON-SIGNIFICANT	REMOVE	ROW
2361	OREGON WHITE OAK	29	SIGNIFICANT	REMOVE	ROW
2362	DEC	10	NON-SIGNIFICANT	REMOVE	BUILDING
2363	OREGON WHITE OAK	24	SIGNIFICANT	REMOVE	BUILDING
2364	OREGON WHITE OAK	20	NON-SIGNIFICANT	REMOVE	CONDITION
2365	DOUGLAS-FIR	18	NON-SIGNIFICANT	REMOVE	CONDITION
2366	OREGON WHITE OAK	18	SIGNIFICANT	REMOVE	BUILDING
2367	DOUGLAS-FIR	24	NON-SIGNIFICANT	REMOVE	BUILDING
2368	OREGON WHITE OAK	28	SIGNIFICANT	REMOVE	BUILDING
2369	DOUGLAS-FIR	12	NON-SIGNIFICANT	REMOVE	BUILDING
2370	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
2371	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
2372	BIG LEAF MAPLE	6	NON-SIGNIFICANT	REMOVE	BUILDING
2373	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
2374	BIG LEAF MAPLE	12	NON-SIGNIFICANT	REMOVE	BUILDING
2375	BIG LEAF MAPLE	18	NON-SIGNIFICANT	REMOVE	BUILDING
2376	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
2377	OREGON WHITE OAK	20, 26	SIGNIFICANT	REMOVE	BUILDING
2378	BIG LEAF MAPLE	8	NON-SIGNIFICANT	REMOVE	CONDITION
2379	BIG LEAF MAPLE	8	NON-SIGNIFICANT	REMOVE	BUILDING
2380	DOUGLAS FIR	29	SIGNIFICANT	RETAIN	N/A
2381	BIG LEAF MAPLE	12	NON-SIGNIFICANT	RETAIN	N/A
2382	BIG LEAF MAPLE	11	NON-SIGNIFICANT	REMOVE	BUILDING
2383	DOUGLAS FIR	32	SIGNIFICANT	REMOVE	BUILDING
2384	BIG LEAF MAPLE	10, 14, 18, 22	NON-SIGNIFICANT	REMOVE	CONDITION
2385	BIG LEAF MAPLE	6, 8	NON-SIGNIFICANT	REMOVE	BUILDING
2394	SWEET CHERRY	10	NON-SIGNIFICANT	REMOVE	BUILDING
2395	BIG LEAF MAPLE	8	NON-SIGNIFICANT	REMOVE	BUILDING
2396	OREGON WHITE OAK	17	SIGNIFICANT	REMOVE	GRADING
2458	BIG LEAF MAPLE	7	NON-SIGNIFICANT	REMOVE	ROW
2459	DOUGLAS FIR	16	NON-SIGNIFICANT	REMOVE	GRADING

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DESIGN REVIEW 11/10/2016

REVISION SUMMARY BY DATE

TREE PRESERVATION DETAILS II
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID # | 15266
LAND USE # | TBD
TAX LOT # | 2S1E14CA 00200
DESIGNED BY | JTE, CKW, JCP
CHECKED BY | JTE

SHEET TITLE
TREE DETAILS II

SHEET NUMBER
C112

NOT FOR CONSTRUCTION

TREE INVENTORY

SURVEY POINT NUMBER	TREE SPECIES	NOMINAL CALIPER SIZE	SIGNIFICANT DESIGNATION	PROPOSED ACTION	REMOVE DUE TO CONDITION
2461	DOUGLAS FIR	24	SIGNIFICANT	REMOVE	GRADING
2462	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2463	DOUGLAS FIR	30	SIGNIFICANT	REMOVE	BUILDING
2464	DOUGLAS FIR	26	SIGNIFICANT	REMOVE	BUILDING
2469	SWEET CHERRY	15	NON-SIGNIFICANT	REMOVE	GRADING
2470	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	ROW
2471	DOUGLAS FIR	26	SIGNIFICANT	REMOVE	ROW
2472	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	ROW
2473	GRAND FIR	23	SIGNIFICANT	REMOVE	ROW
2474	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	ROW
2475	DOUGLAS FIR	30	SIGNIFICANT	REMOVE	ROW
2476	DOUGLAS FIR	26	SIGNIFICANT	REMOVE	ROW
2477	DOUGLAS FIR	22	SIGNIFICANT	REMOVE	ROW
2478	DOUGLAS FIR	15	NON-SIGNIFICANT	REMOVE	ROW
2479	DOUGLAS FIR	32	NON-SIGNIFICANT	REMOVE	GRADING
2480	OREGON WHITE OAK	18	NON-SIGNIFICANT	REMOVE	GRADING
2481	OREGON ASH	18	NON-SIGNIFICANT	REMOVE	GRADING
2482	OREGON WHITE OAK	36	SIGNIFICANT	REMOVE	BUILDING
2483	OREGON ASH	20	NON-SIGNIFICANT	REMOVE	BUILDING
2484	OREGON WHITE OAK	27	SIGNIFICANT	REMOVE	ROW
2485	OREGON ASH	8	NON-SIGNIFICANT	REMOVE	BUILDING
2486	MADRONE	7	NON-SIGNIFICANT	REMOVE	BUILDING
2487	OREGON WHITE OAK	28	SIGNIFICANT	REMOVE	ROW
2488	OREGON WHITE OAK	14	SIGNIFICANT	RETAIN	BUILDING
2489	OREGON WHITE OAK	12	SIGNIFICANT	RETAIN	BUILDING
2490	OREGON WHITE OAK	12, 18	NON-SIGNIFICANT	REMOVE	BUILDING
2491	OREGON ASH	13	NON-SIGNIFICANT	REMOVE	BUILDING
2492	OREGON ASH	6	NON-SIGNIFICANT	REMOVE	BUILDING
2493	OREGON WHITE OAK	19	NON-SIGNIFICANT	REMOVE	ROW
2494	OREGON ASH	2x6, 9	NON-SIGNIFICANT	REMOVE	CONDITION
2495	ENGLISH HOLLY	6	NON-SIGNIFICANT	REMOVE	CONDITION
2496	OREGON WHITE OAK	10	NON-SIGNIFICANT	RETAIN	N/A
2497	DOUGLAS FIR	10	NON-SIGNIFICANT	REMOVE	CONDITION
2498	OREGON WHITE OAK	20	SIGNIFICANT	RETAIN	N/A
2499	OREGON ASH	10	NON-SIGNIFICANT	REMOVE	BUILDING
2500	OREGON WHITE OAK	24	SIGNIFICANT	RETAIN	N/A
2501	OREGON WHITE OAK	28	SIGNIFICANT	REMOVE	BUILDING
2502	OREGON WHITE OAK	18	SIGNIFICANT	REMOVE	BUILDING
2503	OREGON ASH	10	NON-SIGNIFICANT	REMOVE	GRADING
2504	OREGON WHITE OAK	24	SIGNIFICANT	REMOVE	GRADING
2505	OREGON WHITE OAK	12	SIGNIFICANT	REMOVE	BUILDING
2506	OREGON ASH	6	NON-SIGNIFICANT	REMOVE	BUILDING
2507	BIG LEAF MAPLE	12	NON-SIGNIFICANT	REMOVE	BUILDING
2508	SWEET CHERRY	8	NON-SIGNIFICANT	REMOVE	GRADING
2509	OREGON WHITE OAK	10, 12	NON-SIGNIFICANT	REMOVE	BUILDING
2510	SWEET CHERRY	6	NON-SIGNIFICANT	REMOVE	BUILDING
2511	OREGON WHITE OAK	12	NON-SIGNIFICANT	REMOVE	BUILDING
2512	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	BUILDING
2513	DOUGLAS FIR	14	NON-SIGNIFICANT	REMOVE	BUILDING
2514	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	BUILDING
2515	DOUGLAS FIR	15	NON-SIGNIFICANT	REMOVE	BUILDING
2516	MADRONE	23	SIGNIFICANT	REMOVE	BUILDING
2517	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	GRADING
2518	DOUGLAS FIR	24	NON-SIGNIFICANT	REMOVE	CONDITION
2519	OREGON ASH	8	NON-SIGNIFICANT	RETAIN	N/A
2520	ENGLISH HAWTHORN	6	NON-SIGNIFICANT	REMOVE	CONDITION
2521	OREGON WHITE OAK	13, 20	SIGNIFICANT	REMOVE	BUILDING
2522	OREGON ASH	12	NON-SIGNIFICANT	RETAIN	N/A
2523	OREGON WHITE OAK	20, 24	SIGNIFICANT	RETAIN	N/A
2524	OREGON WHITE OAK	10, 16	SIGNIFICANT	REMOVE	BUILDING
2525	OREGON ASH	20	NON-SIGNIFICANT	RETAIN	N/A
2526	DOUGLAS FIR	29	SIGNIFICANT	RETAIN	N/A
2527	OREGON ASH	12	NON-SIGNIFICANT	RETAIN	N/A
2528	DOUGLAS FIR	19	SIGNIFICANT	RETAIN	N/A
2529	OREGON ASH	15	NON-SIGNIFICANT	RETAIN	N/A
2530	DOUGLAS FIR	20	NON-SIGNIFICANT	REMOVE	BUILDING
2531	OREGON ASH	7	NON-SIGNIFICANT	RETAIN	N/A
2532	MADRONE	8	SIGNIFICANT	RETAIN	N/A
2533	DOUGLAS FIR	24	SIGNIFICANT	REMOVE	BUILDING
2534	OREGON WHITE OAK	13	NON-SIGNIFICANT	RETAIN	N/A
2536	OREGON ASH	14	NON-SIGNIFICANT	RETAIN	N/A
2537	OREGON WHITE OAK	16	SIGNIFICANT	RETAIN	N/A
2538	OREGON WHITE OAK	24	SIGNIFICANT	RETAIN	N/A
2539	OREGON ASH	2x10	NON-SIGNIFICANT	RETAIN	N/A
2540	OREGON ASH	16	NON-SIGNIFICANT	RETAIN	N/A
2541	OREGON WHITE OAK	9	NON-SIGNIFICANT	RETAIN	N/A
2542	OREGON ASH	10	NON-SIGNIFICANT	RETAIN	N/A
2543	OREGON ASH	12, 16, 18, 24	NON-SIGNIFICANT	RETAIN	N/A
2544	OREGON ASH	10	NON-SIGNIFICANT	RETAIN	N/A
2545	DOUGLAS FIR	8	NON-SIGNIFICANT	RETAIN	N/A
2546	OREGON WHITE OAK	26	SIGNIFICANT	RETAIN	N/A
2547	DOUGLAS FIR	8	NON-SIGNIFICANT	RETAIN	N/A
2548	OREGON WHITE OAK	20	SIGNIFICANT	RETAIN	N/A
2549	OREGON WHITE OAK	20	SIGNIFICANT	RETAIN	N/A
2550	OREGON WHITE OAK	24	SIGNIFICANT	RETAIN	N/A
2551	ENGLISH HAWTHORN	8	NON-SIGNIFICANT	REMOVE	CONDITION
2552	OREGON ASH	2x12	NON-SIGNIFICANT	RETAIN	N/A
2553	OREGON WHITE OAK	2x8	NON-SIGNIFICANT	RETAIN	N/A
2554	OREGON ASH	2x16	NON-SIGNIFICANT	RETAIN	N/A
2555	OREGON ASH	6, 8, 12	NON-SIGNIFICANT	RETAIN	N/A
2556	OREGON WHITE OAK	18	SIGNIFICANT	RETAIN	N/A
2557 A&B	OREGON ASH	18	NON-SIGNIFICANT	RETAIN	N/A
2558	OREGON ASH	8	NON-SIGNIFICANT	RETAIN	N/A
2559	OREGON ASH	15	NON-SIGNIFICANT	RETAIN	N/A
2561	DOUGLAS FIR	9	NON-SIGNIFICANT	RETAIN	N/A
2562	OREGON ASH	2x8	NON-SIGNIFICANT	RETAIN	N/A
2563	OREGON ASH	12	NON-SIGNIFICANT	RETAIN	N/A
2564	OREGON ASH	24	NON-SIGNIFICANT	RETAIN	N/A
2565	DOUGLAS FIR	24	NON-SIGNIFICANT	RETAIN	N/A
2566	OREGON WHITE OAK	24	SIGNIFICANT	RETAIN	N/A
2567	SWEET CHERRY	6	NON-SIGNIFICANT	REMOVE	CONDITION
2569	OREGON WHITE OAK	10, 20	NON-SIGNIFICANT	REMOVE	BUILDING
2570	DOUGLAS FIR	26	SIGNIFICANT	REMOVE	GRADING
2571	OREGON WHITE OAK	9	NON-SIGNIFICANT	REMOVE	CONDITION
2572	OREGON WHITE OAK	16	NON-SIGNIFICANT	RETAIN	N/A
2573	OREGON WHITE OAK	24	NON-SIGNIFICANT	RETAIN	N/A
2574	OREGON WHITE OAK	9	NON-SIGNIFICANT	RETAIN	N/A
2575	OREGON ASH	14, 22, 24	NON-SIGNIFICANT	RETAIN	N/A
2576	OREGON WHITE OAK	30	SIGNIFICANT	RETAIN	N/A
2577a	OREGON ASH	16, 20, 22	NON-SIGNIFICANT	RETAIN	N/A
2577b	OREGON WHITE OAK	10, 16	NON-SIGNIFICANT	RETAIN	N/A
2578	OREGON ASH	20	NON-SIGNIFICANT	RETAIN	N/A
2579	OREGON WHITE OAK	26	SIGNIFICANT	RETAIN	N/A
2580	OREGON ASH	10, 16	NON-SIGNIFICANT	RETAIN	N/A
2581	OREGON WHITE OAK	25	SIGNIFICANT	REMOVE	BUILDING
2582	OREGON WHITE OAK	18	SIGNIFICANT	REMOVE	BUILDING
2583	OREGON WHITE OAK	20	SIGNIFICANT	REMOVE	BUILDING
2584	BIG LEAF MAPLE	8	NON-SIGNIFICANT	REMOVE	ROW
2585	BIG LEAF MAPLE	14	NON-SIGNIFICANT	REMOVE	BUILDING
2586	DOUGLAS FIR	9	NON-SIGNIFICANT	REMOVE	BUILDING
2587	DOUGLAS FIR	36	SIGNIFICANT	REMOVE	GRADING
2588	OREGON ASH	8	NON-SIGNIFICANT	REMOVE	BUILDING
2662	OREGON WHITE OAK	18	SIGNIFICANT	RETAIN	N/A
2663	DOUGLAS FIR	10	NON-SIGNIFICANT	REMOVE	GRADING
2664	DOUGLAS FIR	30	SIGNIFICANT	RETAIN	N/A
2665	OREGON ASH	18	NON-SIGNIFICANT	RETAIN	N/A
2666	OREGON WHITE OAK	16	NON-SIGNIFICANT	REMOVE	BUILDING
2667	OREGON WHITE OAK	15	NON-SIGNIFICANT	RETAIN	N/A
2668	OREGON ASH	16	NON-SIGNIFICANT	REMOVE	GRADING
2669	OREGON ASH	14	NON-SIGNIFICANT	REMOVE	BUILDING
2670	OREGON ASH	8	NON-SIGNIFICANT	REMOVE	BUILDING
2671	OREGON ASH	7, 12	NON-SIGNIFICANT	REMOVE	BUILDING
2672	OREGON ASH	16	NON-SIGNIFICANT	REMOVE	BUILDING

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C110 TREE PRESERVATION PLAN.DWG

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

TREE PRESERVATION DETAILS III

CHÊNE BLANC ESTATES

LAND USE DOCUMENTS

1800 UPPER MIDHILL DRIVE, LLC

WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE OREGON JUNE 16, 2011 JESSE T. EMERSON

EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID # | 15266
LAND USE # | TBD
TAX LOT # | 2S1E14CA 00200
DESIGNED BY | JTE, CKW, JCP
CHECKED BY | JTE

SHEET TITLE
TREE DETAILS III

SHEET NUMBER
C113

NOT FOR CONSTRUCTION

TREE INVENTORY

SURVEY POINT NUMBER	TREE SPECIES	NOMINAL CALIPER SIZE	SIGNIFICANT DESIGNATION	PROPOSED ACTION	REMOVE DUE TO CONDITION
2673	OREGON WHITE OAK	13	NON-SIGNIFICANT	REMOVE	ROW
2675	OREGON WHITE OAK	16	SIGNIFICANT	RETAIN	N/A
2676	OREGON ASH	20, 24	NON-SIGNIFICANT	RETAIN	N/A
2677	OREGON WHITE OAK	16	SIGNIFICANT	RETAIN	N/A
2678	DOUGLAS FIR	30	SIGNIFICANT	RETAIN	N/A
2679	DOUGLAS FIR	30	SIGNIFICANT	RETAIN	N/A
2680	OREGON WHITE OAK	30	SIGNIFICANT	RETAIN	N/A
2681	OREGON ASH	24	NON-SIGNIFICANT	REMOVE	CONDITION
2682	OREGON ASH	20	NON-SIGNIFICANT	RETAIN	N/A
2683	DOUGLAS FIR	16	NON-SIGNIFICANT	RETAIN	N/A
2684	DOUGLAS FIR	16	NON-SIGNIFICANT	RETAIN	N/A
2685	OREGON ASH	10, 14	NON-SIGNIFICANT	RETAIN	N/A
2686	OREGON ASH	20	NON-SIGNIFICANT	RETAIN	N/A
2687	BIG LEAF MAPLE	7, 12	NON-SIGNIFICANT	RETAIN	N/A
2688	OREGON ASH	8	NON-SIGNIFICANT	RETAIN	N/A
2689	OREGON ASH	30	NON-SIGNIFICANT	RETAIN	N/A
2690	OREGON WHITE OAK	40	SIGNIFICANT	RETAIN	N/A
2691	BIG LEAF MAPLE	12	NON-SIGNIFICANT	REMOVE	BUILDING
2692	OREGON ASH	14	NON-SIGNIFICANT	REMOVE	BUILDING
2693	BIG LEAF MAPLE	3x12	NON-SIGNIFICANT	REMOVE	BUILDING
2694	WESTERN RED CEDAR	24	NON-SIGNIFICANT	REMOVE	BUILDING
2695	DOUGLAS FIR	24	NON-SIGNIFICANT	REMOVE	GRADING
2696	OREGON WHITE OAK	24	NON-SIGNIFICANT	REMOVE	GRADING
2697	BIG LEAF MAPLE	8, 14, 16	NON-SIGNIFICANT	REMOVE	GRADING
2698	DOUGLAS FIR	24	NON-SIGNIFICANT	REMOVE	GRADING
2699	OREGON WHITE OAK	30	NON-SIGNIFICANT	RETAIN	N/A
2700	OREGON WHITE OAK	20	NON-SIGNIFICANT	REMOVE	GRADING
2701	BIG LEAF MAPLE	2x8	NON-SIGNIFICANT	RETAIN	N/A
2702	BIG LEAF MAPLE	8	NON-SIGNIFICANT	RETAIN	N/A
2703	ENGLISH HAWTHORN	18	NON-SIGNIFICANT	RETAIN	N/A
2704	DOUGLAS FIR	12	NON-SIGNIFICANT	OFF-SITE	N/A
2705	DECIDUOUS	20	NON-SIGNIFICANT	OFF-SITE	N/A
2706	WESTERN RED CEDAR	24	SIGNIFICANT	REMOVE	BUILDING
2707	SWEET CHERRY	12	NON-SIGNIFICANT	REMOVE	BUILDING
2708	SWEET CHERRY	8	NON-SIGNIFICANT	REMOVE	CONDITION
2709	SWEET CHERRY	12	NON-SIGNIFICANT	REMOVE	CONDITION
2710	OREGON WHITE OAK	14	SIGNIFICANT	REMOVE	BUILDING
2711	OREGON WHITE OAK	14	NON-SIGNIFICANT	REMOVE	BUILDING
2712	OREGON WHITE OAK	20	SIGNIFICANT	REMOVE	ROW
2713	DOUGLAS FIR	28	NON-SIGNIFICANT	REMOVE	GRADING
2714	DOUGLAS FIR	24	NON-SIGNIFICANT	REMOVE	GRADING
2715	DOUGLAS FIR	18	NON-SIGNIFICANT	REMOVE	BUILDING
3430	DOUGLAS FIR	16	NON-SIGNIFICANT	RETAIN	N/A
3431	DOUGLAS FIR	36	NON-SIGNIFICANT	RETAIN	N/A
3432	DOUGLAS FIR	26	NON-SIGNIFICANT	RETAIN	N/A
3433	DOUGLAS FIR	20	NON-SIGNIFICANT	RETAIN	N/A
3434	DOUGLAS FIR	18	NON-SIGNIFICANT	RETAIN	N/A
3435	OREGON WHITE OAK	7	NON-SIGNIFICANT	RETAIN	N/A
3436	OREGON WHITE OAK	9	NON-SIGNIFICANT	RETAIN	N/A
3437	OREGON ASH	12	NON-SIGNIFICANT	RETAIN	N/A
3438	OREGON ASH	8	NON-SIGNIFICANT	RETAIN	N/A
3439	BIG LEAF MAPLE	10, 20, 24	NON-SIGNIFICANT	RETAIN	N/A
3440	OREGON WHITE OAK	30	SIGNIFICANT	RETAIN	N/A
3441	OREGON ASH	12	NON-SIGNIFICANT	RETAIN	N/A
3442	OREGON ASH	7	NON-SIGNIFICANT	RETAIN	N/A
3443	OREGON ASH	7	NON-SIGNIFICANT	RETAIN	N/A
3444	YEW	7	SIGNIFICANT	RETAIN	N/A
3445	SWEET CHERRY	10	NON-SIGNIFICANT	RETAIN	N/A
3446	DOUGLAS FIR	30	SIGNIFICANT	REMOVE	BUILDING
3447	BLACK HAWTHORN	12	NON-SIGNIFICANT	REMOVE	ROW
3448	OREGON WHITE OAK	20	SIGNIFICANT	REMOVE	GRADING
3449	OREGON WHITE OAK	17	SIGNIFICANT	REMOVE	ROW
3450	OREGON WHITE OAK	9	NON-SIGNIFICANT	REMOVE	ROW
3451	BIG LEAF MAPLE	13	NON-SIGNIFICANT	REMOVE	ROW
3452	OREGON WHITE OAK	15	SIGNIFICANT	REMOVE	ROW
3453	OREGON WHITE OAK	2x16	SIGNIFICANT	REMOVE	BUILDING
3454	OREGON WHITE OAK	15	NON-SIGNIFICANT	REMOVE	BUILDING
3504	OREGON WHITE OAK	9	NON-SIGNIFICANT	REMOVE	BUILDING
3505	OREGON WHITE OAK	10	NON-SIGNIFICANT	REMOVE	BUILDING
3506	OREGON WHITE OAK	12	SIGNIFICANT	REMOVE	BUILDING
3507	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	BUILDING
3508	OREGON WHITE OAK	10	SIGNIFICANT	REMOVE	BUILDING
3509	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
3510	OREGON WHITE OAK	9	SIGNIFICANT	REMOVE	GRADING
3511	PINE	11	NON-SIGNIFICANT	RETAIN	N/A
3512	WESTERN RED CEDAR	5, 8	NON-SIGNIFICANT	RETAIN	N/A
3513	BIG LEAF MAPLE	2x8	NON-SIGNIFICANT	REMOVE	BUILDING
3514	WESTERN RED CEDAR	7	NON-SIGNIFICANT	RETAIN	N/A
3515	WESTERN RED CEDAR	8	NON-SIGNIFICANT	RETAIN	N/A
3516	OREGON ASH	17	NON-SIGNIFICANT	RETAIN	N/A
3517	EUROPEAN WHITE BIRCH	9	NON-SIGNIFICANT	REMOVE	CONDITION
3518	DECIDUOUS	4, 8	NON-SIGNIFICANT	REMOVE	CONDITION
3520	BIG LEAF MAPLE	10	NON-SIGNIFICANT	REMOVE	BUILDING
3521	DOUGLAS FIR	30	NON-SIGNIFICANT	REMOVE	BUILDING
3522	OREGON WHITE OAK	16	SIGNIFICANT	REMOVE	BUILDING
3523	OREGON WHITE OAK	16	NON-SIGNIFICANT	REMOVE	CONDITION
3524	DOUGLAS FIR	15	NON-SIGNIFICANT	REMOVE	CONDITION
3525	OREGON WHITE OAK	22	SIGNIFICANT	RETAIN	N/A
3526	OREGON WHITE OAK	20	SIGNIFICANT	RETAIN	N/A
3537	OREGON WHITE OAK	18	NON-SIGNIFICANT	REMOVE	BUILDING
3539	OREGON WHITE OAK	22	SIGNIFICANT	REMOVE	ROW
3677	DOUGLAS FIR	30	SIGNIFICANT	REMOVE	ROW
3775	SCOULER'S WILLOW	18	NON-SIGNIFICANT	REMOVE	ROW
3776	DOUGLAS FIR	28	NON-SIGNIFICANT	RETAIN	N/A
3777	OREGON WHITE OAK	15	NON-SIGNIFICANT	RETAIN	N/A
3778	OREGON ASH	10	NON-SIGNIFICANT	RETAIN	N/A
3779	DOUGLAS FIR	18	NON-SIGNIFICANT	REMOVE	BUILDING
3780	DOUGLAS FIR	15	NON-SIGNIFICANT	REMOVE	BUILDING

DESIGN REVIEW 11/10/2016

REVISION SUMMARY | BY | DATE

TREE PRESERVATION DETAILS IV

CHÊNE BLANC ESTATES

LAND USE DOCUMENTS

1800 UPPER MIDHILL DRIVE, LLC

WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE OREGON JUNE 16, 2011 JESSE T. EMERSON

EXPIRES: 12/31/17

3J CONSULTING, INC

CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING

5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
TREE DETAILS IV

SHEET NUMBER
C114

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C110 TREE PRESERVATION PLAN.DWG

NOT FOR CONSTRUCTION

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- EASEMENT LINE
- GROUND SLOPE DIRECTION
- 1000 — EXISTING TREE & TAG NUMBER (SEE C110 - C114) FOR FURTHER INFORMATION
- 250 — EXISTING MAJOR CONTOUR (5FT)
- EXISTING MINOR CONTOUR (1FT)

SLOPE STATISTICS

MINIMUM SLOPE	MAXIMUM SLOPE	AREA (SF)	COLOR
0%	15%	128,584	
15%	25%	115,769	
25%	35%	17,018	
35%	35% OR GREATER	3,668	

811
Know what's below.
Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

SLOPE ANALYSIS PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

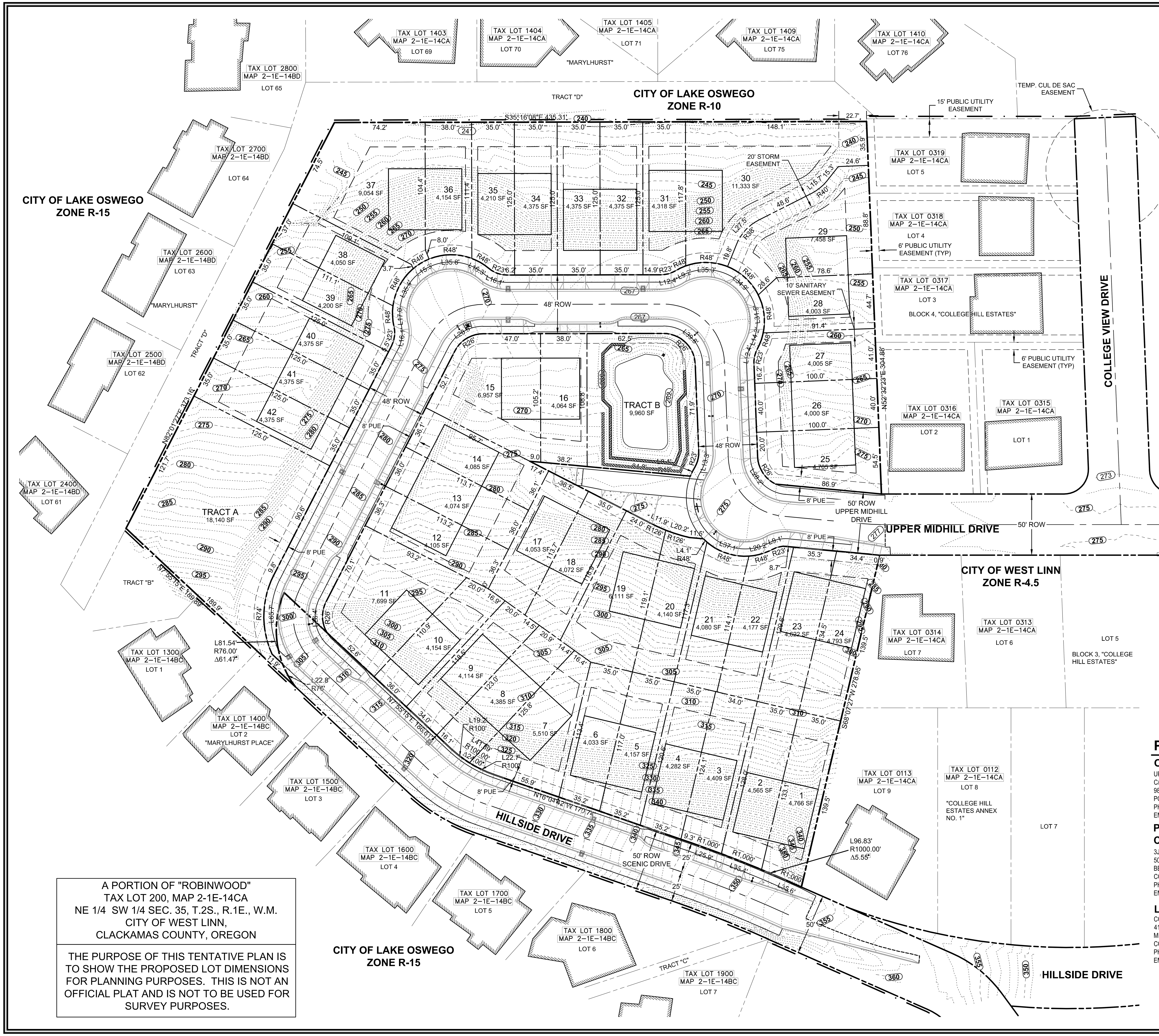
3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
SLOPE ANALYSIS

SHEET NUMBER
C130

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C130 SLOPE ANALYSIS PLAN.DWG



A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

THE PURPOSE OF THIS TENTATIVE PLAN IS TO SHOW THE PROPOSED LOT DIMENSIONS FOR PLANNING PURPOSES. THIS IS NOT AN OFFICIAL PLAT AND IS NOT TO BE USED FOR SURVEY PURPOSES.

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- EASEMENT LINE
- PROPOSED LOT LINE
- PROPOSED EASEMENT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED SETBACK LINE
- CITY BOUNDARY LINE
- 207 — 1 FOOT CONTOUR
- 210 — 5 FOOT CONTOUR

SITE STATISTICS

SITE ADDRESS	18000 UPPER MIDHILL DRIVE, WEST LINN, OREGON
TAX LOT	2S1E14CA 00200
JURISDICTION	CITY OF WEST LINN
GROSS SITE AREA	265,860 +/- SF (6.10 AC)
PROPERTY ZONING	R-4.5
FLOOD HAZARD MAP NUMBER	41005C0019D
	ZONE X (UNSHADED)

SUBDIVISION STATISTICS

RIGHT OF WAY DEDICATION	34,637 SF (0.80 AC)
MINIMUM ALLOWABLE EFFECTIVE LOT SIZE	4,000 SF
MINIMUM LOT DENSITY	6.67 LOTS / ACRE
MAXIMUM LOT DENSITY	9.61 LOTS / ACRE
PROPOSED LOT DENSITY	6.89 LOTS / ACRE
MAXIMUM BUILDING HEIGHT	35 FEET

SETBACKS

SETBACK LOCATION	STANDARD:
FRONT	20'
SIDE (NON ATTACHED)	5'
REAR	20'
STREET SIDE	15'

SURVEYOR'S NOTE

1. VERTICAL DATUM: NAVD'88 UTILIZING GPS POSITIONING TIED TO THE ORGN WITH REAL TIME CORRECTORS REFERENCED TO DATUM NAD 83(2011) EPOCH 2010.00. THIS DATUM REALIZATION WAS VERIFIED THROUGH DIRECT OBSERVATION TO NGS CONTROL POINT Q723 HAVING A POINT IDENTIFICATION OF RD1491. THIS POINT IS DESCRIBED AS A STAINLESS STEEL ROD W/ SLEEVE NEAR THE INTERSECTION OF STATE HIGHWAY 224 AND LAKE ROAD. THE ELEVATION OF THIS POINT IS PUBLISHED AS 31.131 AND WAS ESTABLISHED BY NGS THROUGH DIFFERENTIAL LEVELING AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JUNE 1991 AND HAS A VERTICAL ORDER OF FIRST CLASS II.

2. BASIS OF BEARINGS: CENTERLINE OF UPPER MIDHILL DRIVE AS PER THE PLAT OF "COLLEGE HILL ESTATES"

PROJECT TEAM

OWNER / APPLICANT

UPPER MIDHILL ESTATES, LLC
C/O: RYAN ZYGAR
981 SW KING AVENUE
PORTLAND, OR 97205
PHONE: (360) 798-4838
EMAIL: ryan@zygar.com

PLANNING CONSULTANT

3J CONSULTING, INC
5075 SW GRIFFITH DRIVE, SUITE 150
BEAVERTON, OR 97005
CONTACT: ANDREW TULL
PHONE: 503-946-9365
EMAIL: andrew.tull@3j-consulting.com

LAND SURVEYOR

COMPASS SURVEYING
4107 SE INTERNATIONAL WAY, SUITE 705
MILWAUKIE, OR 97222
CONTACT: DON DEVLAEMINCK, PLS
PHONE: 503-653-9093
EMAIL: dond@compass-engineering.com

GEOTECHNICAL CONSULTANT

GEOPACIFIC ENGINEERING, INC.
14835 SW 72ND AVENUE
PORTLAND, OR 97224
CONTACT: JIM IMBRIE
PHONE: (503) 625-4455
EMAIL: jimbrie@geopacificeng.com

CIVIL ENGINEER

3J CONSULTING, INC.
5075 SW GRIFFITH DRIVE, SUITE 150
BEAVERTON, OR 97005
CONTACTS:
JESSE EMERSON, PE
PHONE: (503) 946-9365 x202
EMAIL: jesse.emerson@3j-consulting.com
AARON MURPHY, PE
PHONE: (503) 946-9365 x 218
EMAIL: aaron.murphy@3j-consulting.com

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

TENTATIVE PLAN
CHÊNE BLANC ESTATES LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

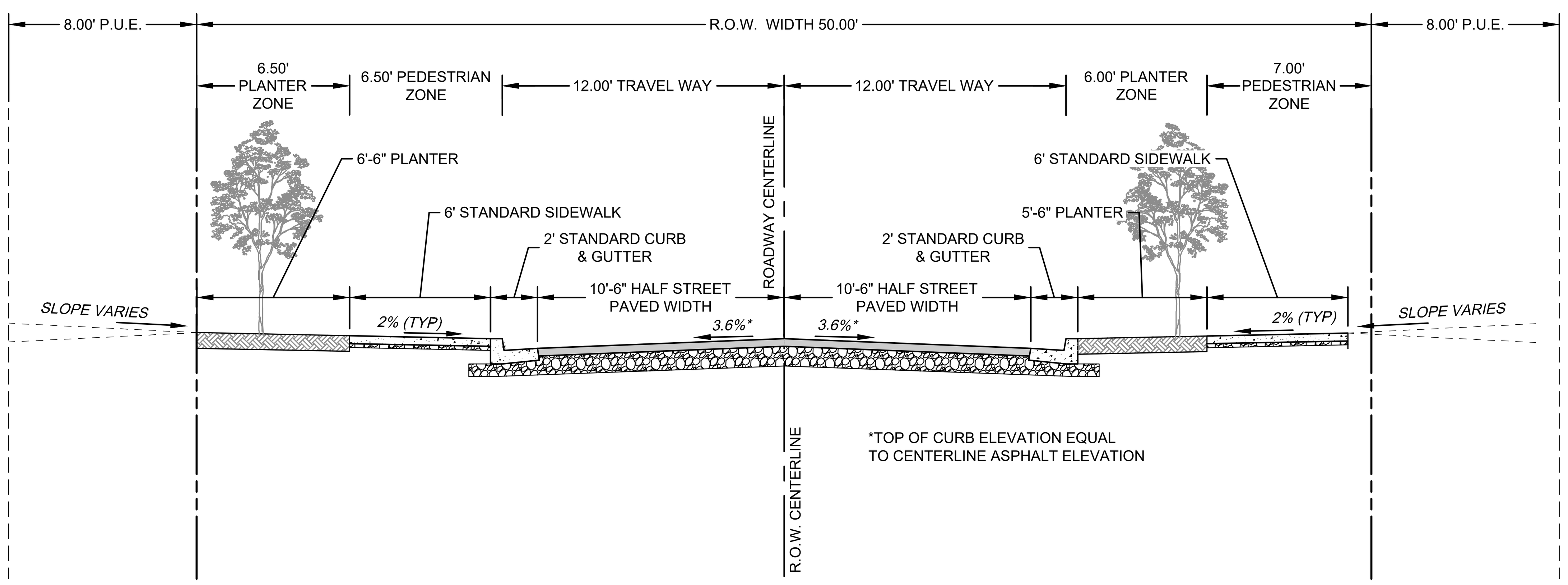
3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
TENT. PLAN

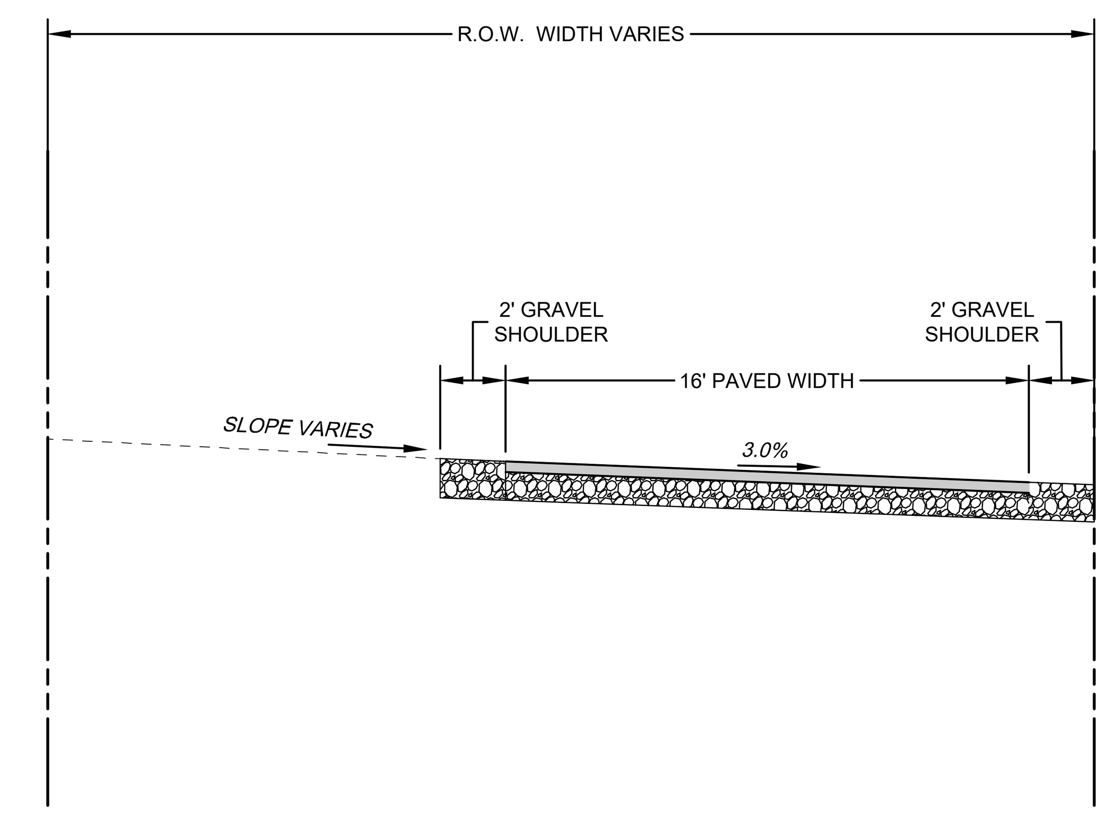
SHEET NUMBER
C200

NOT FOR CONSTRUCTION



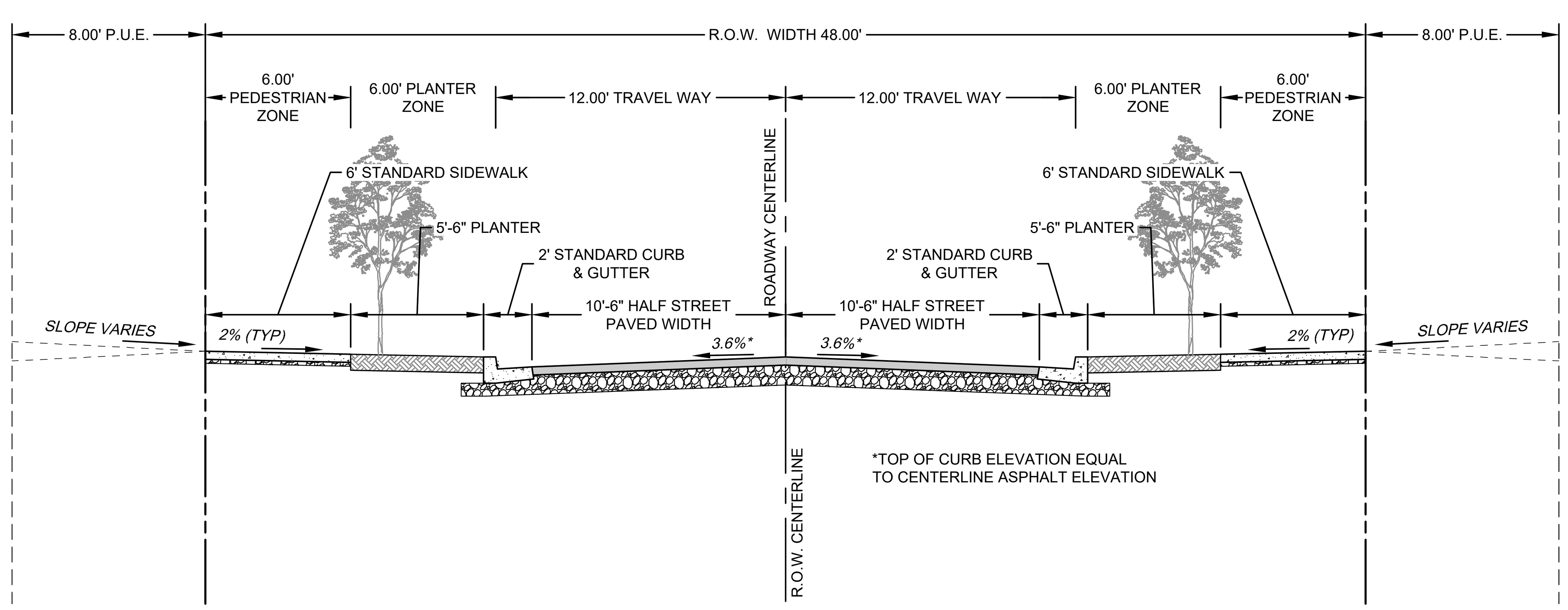
SECTION A-A: LOCAL ROAD W/ CURB TIGHT SIDEWALK (LEFT)

N.T.S.



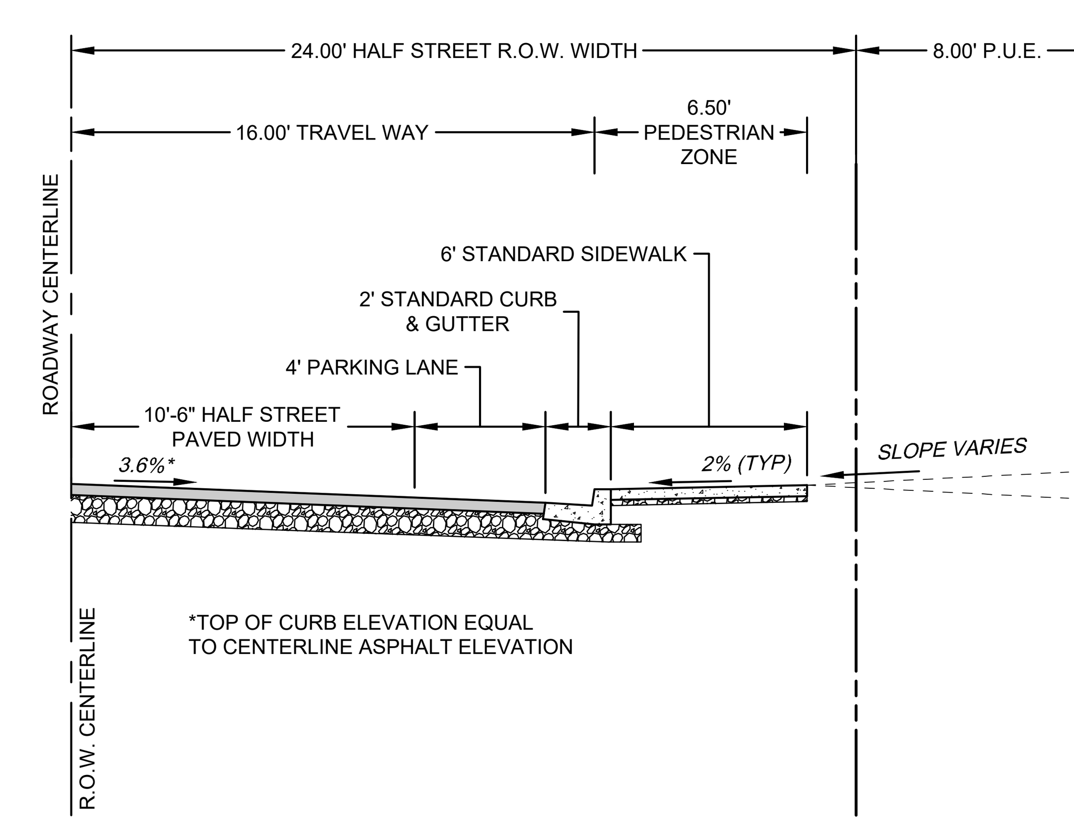
SECTION C-C: COMMON LOT ACCESS DRIVE SECTION

N.T.S.



SECTION B-B: LOCAL ROAD W/ DETACHED SIDEWALK

N.T.S.



SECTION D-D: LOCAL ROAD W/ ON-STREET PARKING

N.T.S.

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C201 TYPICAL SECTIONS.DWG

DESIGN REVIEW 11/10/2016

REVISION SUMMARY	BY	DATE

TYPICAL SECTIONS

CHÊNE BLANC ESTATES

LAND USE DOCUMENTS

1800 UPPER MIDHILL DRIVE, LLC

WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE OREGON JUNE 16, 2011 JESSE T. EMERSON EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
TYPICAL SECTIONS

SHEET NUMBER
C201

NOT FOR CONSTRUCTION

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- EASEMENT LINE
- EXISTING CONCRETE
- EXISTING CURB
- EXISTING FENCE LINE
- PROPOSED CURB FACE
- PROPOSED CURB BACK
- PROPOSED LIP OF GUTTER
- PROPOSED LOT LINE
- PROPOSED EASEMENT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- EXISTING ROCK WALL
- PROPOSED RETAINING WALL
- A A' PROPOSED STREET SECTION - SEE SHEET C201
- PROPOSED ON-STREET PARKING

SITE NOTES

1. CONSTRUCT STANDARD CURB & GUTTER PER CITY OF WEST LINN STANDARD DETAIL WL-501 (TYPICAL CURBS).
2. CONSTRUCT 6 FT WIDE DETATCHED SIDEWALK PER CITY OF WEST LINN STANDARD DETAIL WL-508 (CONCRETE SIDEWALK CROSS SECTION).
3. CONSTRUCT 6 FT CURB TIGHT SIDEWALK PER CITY OF WEST LINN STANDARD DETAIL WL-508 (CONCRETE SIDEWALK CROSS SECTION).
4. INSTALL ASPHALT SECTION. SEE TYPICAL SECTIONS A-A' AND B-B' ON SHEET C201.
5. INSTALL ACCESS DRIVE. SEE TYPICAL SECTION C-C' ON SHEET C201.
6. INSTALL RETAINING WALL.
7. NOT USED.
8. ROADWAY TAPER PER AASHTO STANDARDS TO MEET EXISTING ROAD WIDTHS ON UPPER MIDHILL DRIVE. STA: 1+12 TO 2+28.
9. ROADWAY TAPER PER AASHTO STANDARDS TO MEET EXISTING ROAD WIDTHS ON HILLSIDE DRIVE. STA: 14+10 TO 14+91.
10. TRANSITION SIDEWALK TO CURB TIGHT. MATCH EXISTING CURB TIGHT SIDEWALK AS SHOWN.
11. PROVIDE CORNERING "EYE BROW" PER CLACKAMAS COUNTY ROADWAY STANDARD DRAWING C400.
12. INSTALL STREET SIGN "UPPER MIDHILL DRIVE" AND "HILLSIDE DRIVE".

811 Know what's below. Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

PRELIMINARY SITE PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE
OREGON JUNE 16, 2011 JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

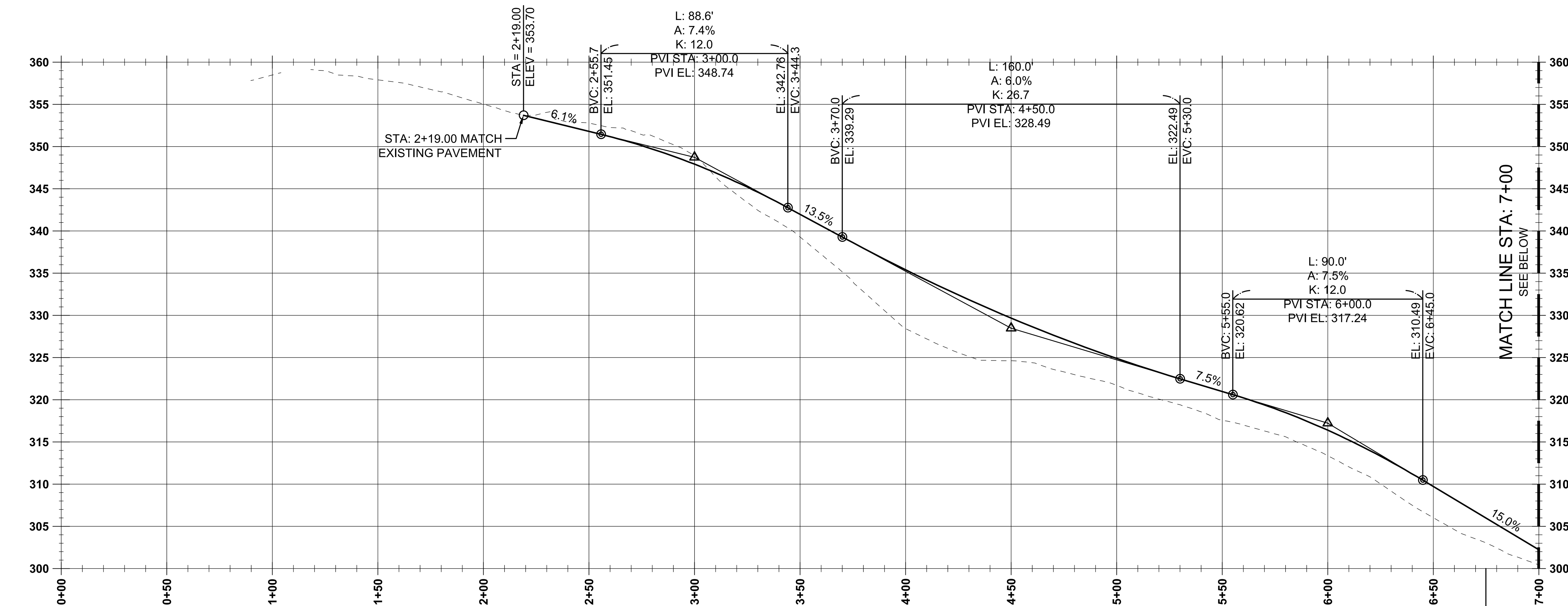
3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
SITE PLAN

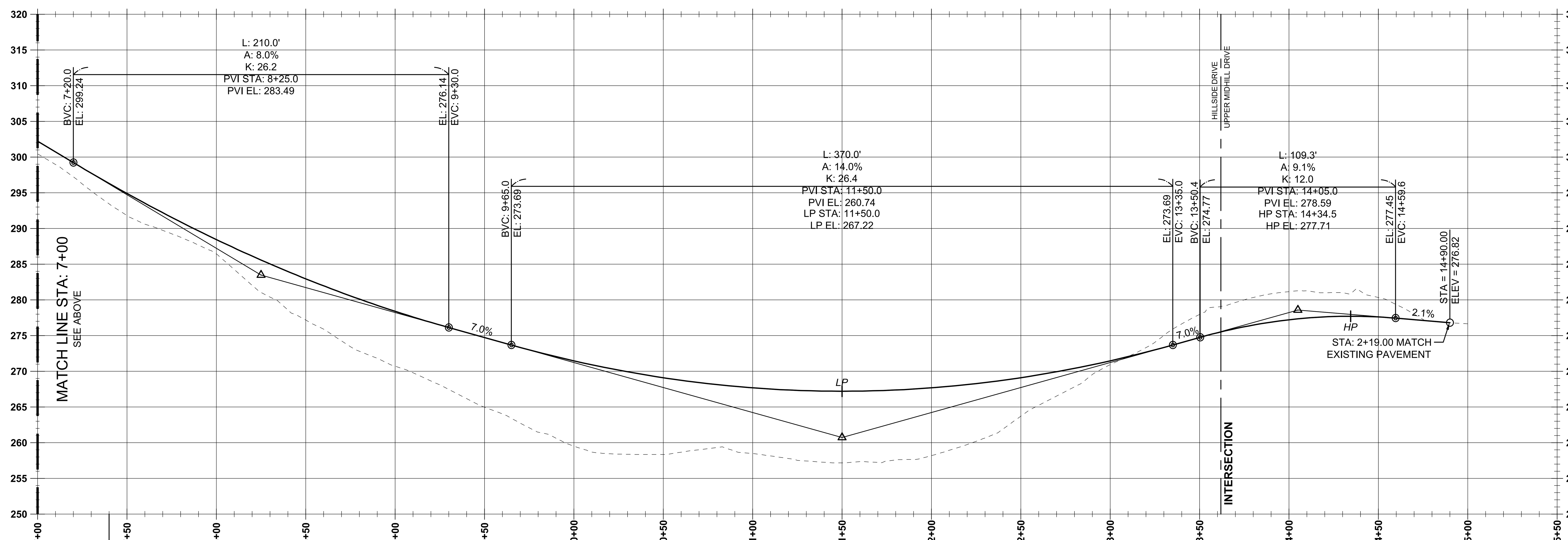
SHEET NUMBER
C210

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C210 SITE PLAN.DWG

NOT FOR CONSTRUCTION



HILLSIDE DRIVE PROFILE
STA: 0+00.00 TO 7+00.00
SCALE: 1" = 40' HORIZONTAL - 1" = 10' VERTICAL



HILLSIDE DRIVE & UPPER MIDHILL DRIVE PROFILE
STA: 7+00.00 TO 15+50.00
SCALE: 1" = 40' HORIZONTAL - 1" = 10' VERTICAL

STREET DESIGN REQUIREMENTS	
DESIGN SPEED	25 MPH
HORIZONTAL CURVES RADIUS (MIN. @ CL.)	165'
STOPPING SIGHT DISTANCE (MIN. K VALUE)	
CREST	12
SAG	26
VERTICAL GRADES (MAX)	15%
VERTICAL GRADE CHANGE (MAX)	1%
INTERIOR CURB RADIUS (MIN)	25'

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C220 ROADWAY PROFILES.DWG

#	REVISION SUMMARY	BY	DATE
	DESIGN REVIEW		11/10/2016

ROADWAY PROFILES
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER
70657PE
OREGON
JUNE 16, 2011
JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
ROADWAY PROF.

SHEET NUMBER
C220

NOT FOR CONSTRUCTION

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

Scale: 1 inch = 40 feet

40 20 0 20 40

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- 110 EXISTING MAJOR CONTOUR
- 108 EXISTING MINOR CONTOUR
- 110 PROPOSED MAJOR CONTOUR
- 108 PROPOSED MINOR CONTOUR
- EASEMENT LINE
- PROPOSED RETAINING WALL
- STRAW WATTLE
- X SILT FENCE
- LIMITS OF DISTURBANCE
- CONSTRUCTION ENTRANCE
- INLET PROTECTION
- SURFACE RUNOFF FLOW ARROW
- TW:XXX.XX TOP OF WALL SURFACE ELEVATION
- BW:XXX.XX BOTTOM OF WALL SURFACE ELEVATION

GRADING KEY NOTES

1. MAINTAIN TREE PROTECTION FENCING THROUGHOUT CONSTRUCTION.
2. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AT LOCATION SHOWN.
3. PLACE SILT FENCING AT LIMITS OF GRADING AND CONSTRUCTION WHERE SHOWN.
4. INSTALL STRAW WATTLE AT LOCATIONS SHOWN.
5. INSTALL INLET PROTECTION AT LOCATIONS SHOWN.
6. INSTALL RETAINING WALL FOR EXISTING GRADE TRANSITION, DESIGN BY OTHERS.

SITE GRADING INFORMATION

SITE STRIPPING*	10,037 CY
NEAT LINE CUT	5,860 CY
NEAT LINE FILL	35,460 CY
NEAT LINE NET BALANCE	29,600 CY (FILL)
MAXIMUM CUT DEPTH	12.2 FT
MAXIMUM FILL DEPTH	20.5 FT
MAXIMUM PROPOSED SLOPE	2H:1V
TOTAL AREA OF DISTURBANCE	4.15 ACRES

*STRIPPINGS:
ASSUMED REPLACEMENT / STOCKPILE ON SITE OUTSIDE BUILDING ENVELOPE
ASSUMED 18 INCHES REMOVAL OVER TOTAL AREA OF DISTURBANCE

GRADING GENERAL NOTES

1. REFER TO "*PRELIMINARY GEOTECHNICAL ENGINEERING REPORT AND LANDSLIDE HAZARD STUDY*" BY GEOPACIFIC ENGINEERING, DATED AUGUST 6, 2015. ALL SITE EARTHWORK PREPARATION AND EXECUTION SHALL CONFORM IN ALL RESPECTS TO THE RECOMMENDATIONS AND DESIGN REQUIREMENTS OF THIS DOCUMENT.
2. ALL PROPOSED GRADING SHOWN IS REFERENCED TO FINISHED GRADE.
3. ALL PROPOSED GRADING SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING CODE (CURRENT EDITION), INCLUDING APPENDIX J.

811 Know what's below. Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

PHASE 2 GRADING AND EROSION CONTROL
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE
OREGON JUNE 16, 2011 JESSE T. EMERSON
EXPIRES: 12/31/17

3J CONSULTING, INC
CIVIL ENGINEERING
WATER RESOURCES
LAND USE PLANNING
5075 SW GRIFFITH DRIVE, SUITE 150, BEAVERTON, OR 97005
PHONE & FAX: (503) 946-9365

3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
PH2 GRADE & E.C.

SHEET NUMBER
C230

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C230 PHASE 2 GRADING AND EROSION CONTROL.DWG

Scale: 1 inch = 40 feet

40 20 0 20 40

LEGEND

- 0.5 FOOT CANDLE ISO-ILLUMINATION CONTOUR
- 0.1 FOOT CANDLE ISO-ILLUMINATION CONTOUR
- 0.7 - ILLUMINATION ANALYSIS POINT (FC)
- FC - FOOT CANDLE UNIT
- PROPOSED LUMINAIRE

SCENIC DRIVE	PROPOSED	REQUIRED*
EXISTING LIGHT(S) INCLUDED	0 EA	
NEW LIGHTS PROPOSED	11 EA	
MAX. ILLUMINATION	1.1 FC	
MIN. ILLUMINATION	0.1 FC	
AVERAGE ILLUMINATION	0.5 FC	0.40 FC (MIN)
UNIFORMITY (AVG/MIN)	5.0	6.00 (MAX)

*PER CITY OF WEST LINN PUBLIC WORKS DESIGN STANDARDS

LUMINAIRE

CREE LEDWAY IP66 STREET LIGHT - TYPE 2 MEDIUM
STR-LWY-2M-HT-02-E-UL-BZ-700-40K-R-UTL-SPX

POST AND ARM

30 FT BRONZE POLE / 25 FT MOUNTING HEIGHT
6' BRONZE MAST ARM

SITE NOTES

1. INSTALL NEW BRONZE POLE, 6-FT MAST ARM, AND LED BETA FIXTURE.

A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
CLACKAMAS COUNTY, OREGON

811 Know what's below. Call before you dig.

DESIGN REVIEW 11/10/2016

#	REVISION SUMMARY	BY	DATE

PHOTOMETRICS PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE
OREGON JUNE 16, 2011 JESSE T. EMERSON
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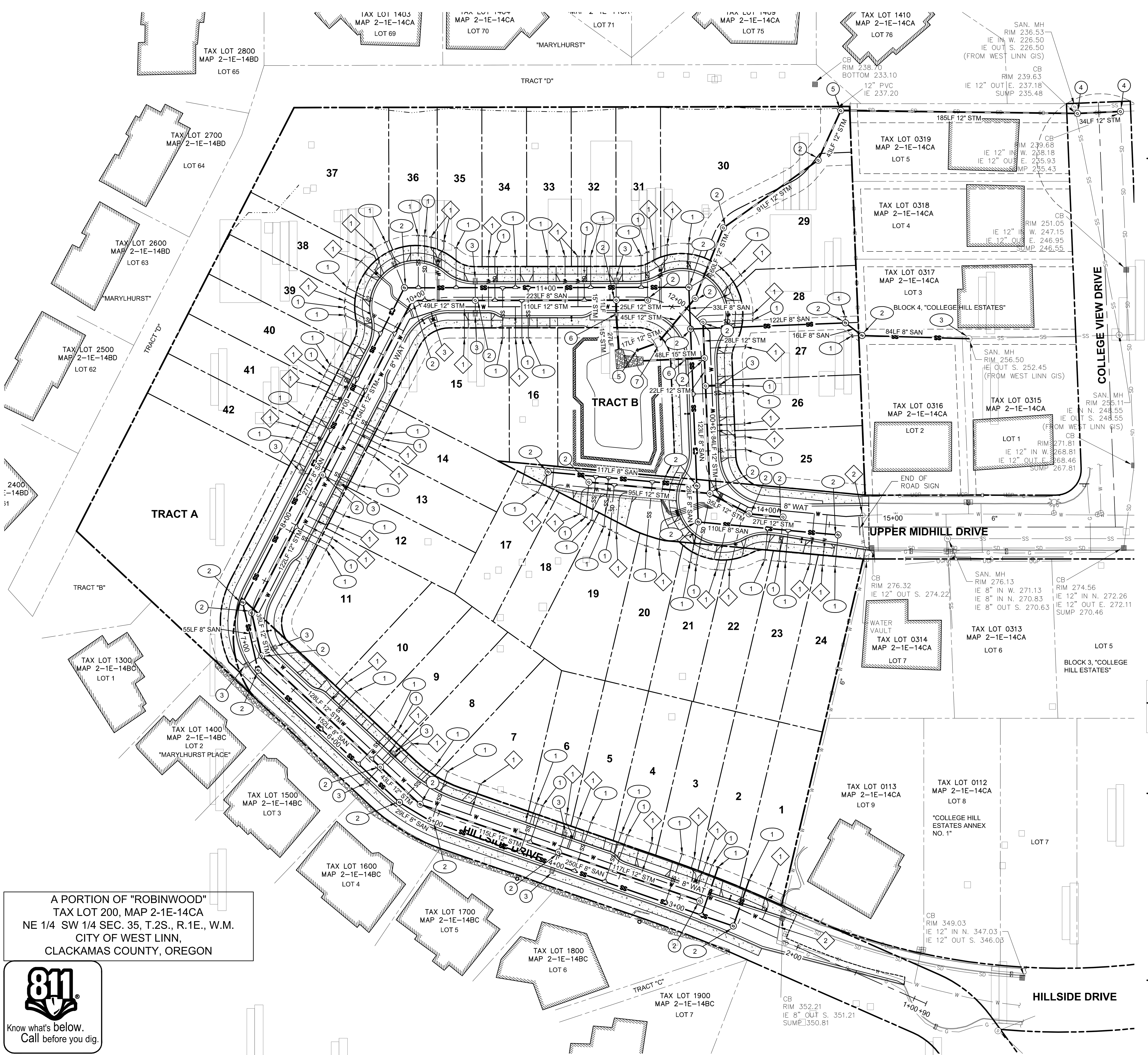
SHEET TITLE
PHOTOMETRICS

SHEET NUMBER
C280

P:\15266-UPPER MIDHILL ESTATES (REESMAN)\CAD\DD\C280 PHOTOMETRICS PLAN.DWG

NOT FOR CONSTRUCTION



A PORTION OF "ROBINWOOD"
TAX LOT 200, MAP 2-1E-14CA
NE 1/4 SW 1/4 SEC. 35, T.2S., R.1E., W.M.
CITY OF WEST LINN,
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LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPOSED PROPERTY LINE
- ROADWAY CENTER LINE
- ADJACENT PROPERTY BOUNDARY
- PROP. EASEMENT LINE
- PROP. BUILDING SETBACK LINE
- EXIST. DRAINAGE DITCH
- PROP. STORM MAIN
- SD PROP. STORM LATERAL / LEAD
- SS PROP. SANITARY MAIN
- SS PROP. SANITARY LATERAL
- W PROP. WATER MAIN
- W PROP. WATER SERVICE
- SS EXIST. SANITARY SEWER
- SD EXIST. STORM DRAIN
- W EXIST. WATER MAIN
- PROP. TEE FITTING, STORM / SANITARY
- PROP. COMBINATION CURB INLET
- PROP. CG-48 MANHOLE
- PIPE CAP / STUB
- LINE CONTINUATION
- PROP. SEWER MANHOLE
- PROP. SEWER CLEANOUT
- PROP. STORM MANHOLE
- PROP. STORM CLEANOUT
- FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. BLOW-OFF VALVE
- EXIST. SANITARY MANHOLE
- EXIST. SANITARY CLEANOUT
- EXIST. STORM MANHOLE
- EXIST. STORM CLEANOUT
- EXIST. STORM INLET

WATER KEY NOTES

1. INSTALL SINGLE WATER METER FOR INDIVIDUAL LOT SERVICE. EXTEND 1" SERVICE LATERAL 3' BEYOND PUE.
2. INSTALL / CONNECT TO EXISTING.
3. INSTALL FIRE HYDRANT AT LOCATIONS SHOWN.

STORM KEY NOTES

1. PROVIDE NEW 4" PRIVATE STORM DRAIN LATERAL CONNECTION FOR INDIVIDUAL LOT SERVICE. EXTEND SERVICE LATERAL 3' BEYOND PUE.
2. CONSTRUCT STANDARD 48" STORM SEWER MANHOLE.
3. CONSTRUCT COMBINATION CURB INLET WITH 10" STORM LINE.
4. CONSTRUCT 48" STORM SEWER MANHOLE WITH GRATE LID.
5. CONSTRUCT 48" INLET MANHOLE
6. CONSTRUCT CG-48 CURB INLET MANHOLE.
7. CONSTRUCT FLOW CONTROL MANHOLE.

SANITARY SEWER KEY NOTES

1. PROVIDE NEW 4" SANITARY SEWER LATERAL FOR INDIVIDUAL LOT SERVICE. EXTEND SERVICE LATERAL 3' BEYOND PUE.
2. CONSTRUCT STANDARD 48" SANITARY SEWER MANHOLE
3. CORE DRILL NEW 8" CONNECTION ON EXISTING MANHOLE. CONNECT TO EXISTING MANHOLE.

DESIGN REVIEW 11/10/2016

REVISION SUMMARY	BY	DATE

COMPOSITE UTILITY PLAN
CHÊNE BLANC ESTATES
LAND USE DOCUMENTS
1800 UPPER MIDHILL DRIVE, LLC
WEST LINN, OR

REGISTERED PROFESSIONAL ENGINEER 70657PE OREGON JUNE 16, 2011 JESSE T. EMERSON
EXPIRES: 12/31/17

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3J JOB ID #	15266
LAND USE #	TBD
TAX LOT #	2S1E14CA 00200
DESIGNED BY	JTE, CKW, JCP
CHECKED BY	JTE

SHEET TITLE
COMP. UTIL.

SHEET NUMBER
C300

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