CITY OF SHERWOOD
July 23, 2020
Staff Report

RIVERSIDE AT CEDAR CREEK
28-LOT SUBDIVISION
LU 2020-005 SUB

To: Hearings Officer

From: Eric Rutledge, Associate Planner

Pre-App Meeting:	November 7, 2019
App. Submitted:	April 21, 2020
App. Complete:	June 25, 2020
Hearing Date:	July 30, 2020
120-Day Deadline:	October 23, 2020

PROPOSAL: The applicant is proposing a 28-lot single-family detached residential subdivision on a 10.47-acre site. The subject site is located in the City of Sherwood within the Brookman Road Concept Plan area and is zoned Medium Density Residential Low (MDRL). The proposed lot sizes range from 4,722 SF to 8,135 SF with an average lot size of 5,914 SF. The applicant is proposing to preserve approximately 203,158 SF (4.66 acres) of open space including the Cedar Creek vegetated corridor, wetlands, and floodplain. A new community trail will be constructed along the north side of the creek and provide a pedestrian connection to SW Brookman Road. Street improvements will include a through connection and complete street improvements to SW Wapato Lake Drive (local street) and 1/4 street improvements to SW Trillium Lane (local street).

I. BACKGROUND

A. **Applicant:** Riverside Homes, Niki Munson
17933 NW Evergreen Place, Suite 300
Beaverton, OR 97006

Owner: Linda and Richard Scott
17433 SW Brookman Road
Sherwood, OR 97140

B. **Location:** 17433 SW Brookman Road (TL 3S1060000104). The property is located at the northeast corner of SW Brookman Road and SW Oberst Road.

C. **Zoning:** The property is zoned Medium Density Residential Low (MDRL) which allows single-family, two-family, manufactured housing and other related residential uses with a density of 5.6 to 6.8 dwelling units per acre.

D. **Review Type:** Type III Subdivision. Subdivision applications that propose between 11 – 50 lots are processed as a Type III application per SZCDC § 16.72.010(A)(3)(c). The Type III Hearing Authority is the Hearings Officer and the Appeal Authority is the Planning Commission.

E. **Review Criteria:** SZCDC § 16.12 - Residential Land Use Districts; Chapter 16.58 - Clear Vision and Fence Standards; Chapter 16.72 - Procedures for Processing Development Permits; Chapter 16.92 – Landscaping; Chapter 16.94 - Off-Street Parking and Loading; Chapter 16.96 - On-Site Circulation; Chapter 16.98 - On-Site Storage; Chapter 16.104 - General Provisions; Chapter 16.106 - Transportation Facilities; Chapter 16.108 - Improvement Plan Review; Chapter 16.110 - Sanitary Sewers; Chapter 16.112 - Water Supply; Chapter 16.114 - Storm Water; Chapter 16.116 - Fire Protection; Chapter 16.118 - Public and Private Utilities; Chapter 16.120 – Subdivisions; Chapter 16.128 - Land Division Design Standards; Chapter 16.134 - Floodplain (FP) Overlay; Chapter 16.142 - Parks, Trees and Open Space; Chapter 16.144 - Wetland, Habitat and Natural Areas; Chapter 16.156 - Energy Conservation

F. **Public Notice:** Notice of the application was provided in accordance with SZCDC § 16.72.020 for a Type III application as follows: notice was distributed in five locations throughout the City and posted on the site on July 9, 2020, notice was mailed to property owners within 1,000 feet on July 9, 2020, and notice was published in local newspaper (Tigard Times) on July 16 and July 23, 2020.

G. **History and Background:** The subject site is part of the Brookman Addition Concept Plan area which is located adjacent to the southern boundary of the City of Sherwood north of Brookman Rd. The Brookman Addition was brought into the Sherwood Urban Growth Boundary in 2002 via Metro Ordinance 02-0969B to provide for needed residential land. In June 2009 the City approved the concept plan and associated implementing Comprehensive Plan and Map Amendments via Ordinance 09-004. In 2017, the subject property and seven (7) other parcels totaling 92.30 acres were annexed into the City of Sherwood via Ordinance 2017-002.

H. **Existing Site Characteristics:** The site currently contains a single-family home and several outbuildings. A packed dirt driveway provides access

into the site from SW Brookman Road. Cedar Creek intersects the southeast corner of the site and is surrounded by forested riparian vegetation and wetlands. The northwest corner of the site contains the existing home and a maintained open grassy area. The site is generally flat within the grassy area but begins to slope down from northwest to southeast as it approaches Cedar Creek.

I. **Surrounding Land Uses:** SW Brookman Road runs along the site's southern boundary and forms the edge of the Urban Growth Boundary. The land south of Brookman Road is in unincorporated Washington County and typically consists of rural land uses and single-family homes on large lots. The property immediately south of the subject property is zoned Agricultural & Forest 20. The adjacent parcels to the north, east, and west have been annexed into the City of Sherwood and hold the same zoning classification as the subject site (MDRL). To the north and west, the proposed Middlebrook Subdivision (SUB 18-02) was recently approved by the City for 145 new residential lots. To the east, the Reserve at Cedar Creek (SUB 19-02) development was also recently approved by the City for 59 new residential lots (see Exhibit A15 – Sheet P11).

J. **Regional Planning:** The City of Sherwood is within the Metropolitan Service District (Metro) which provides a variety regional services including but not limited to solid waste disposal facilities, cultural and entertainment facilities, park and open space facilities, and regional land use and transportation planning. The City of Sherwood is also located in the Clean Water Services (CWS) jurisdictional boundary which provides stormwater and wastewater services. The subject site has not been annexed into Metro or CWS service boundaries and is required as a condition of approval.

RECOMMENDED CONDITION OF APPROVAL B20: Prior to final plat approval, the parcel shall annex into the Metro Service District.

Note: A Condition of Approval requiring annexation to CWS is provided under the applicable section below.

II. AFFECTED AGENCY AND PUBLIC COMMENTS

A. Notice of the application was sent to affected agencies via email on June 29, 2020. The following responses were received:
   1. City of Sherwood Engineering Department provided comments dated July 23, 2020 (Exhibit B1). The comments address traffic and transportation, public utilities, and other engineering requirements. The comments and Conditions of Approval are incorporated throughout the report under each applicable code section.
   2. Washington County Land Use and Transportation provided comments dated July 16, 2020 (Exhibit B2). The comments address transportation requirements for SW Brookman Road which is under County jurisdiction. The applicant is required to close the existing access on the roadway, install street pavement tapers to provide a transition to the adjacent street widths, and construct the community trail and other improvements to County standards.
   3. Oregon Department of Transportation (ODOT) Region 1 provided comments dated July 16, 2020 (Exhibit B3). The comments address impacts to the intersection of OR 99W & SW Brookman Rd which is located in the Region 1 boundary. The City's Transportation System Plan identifies signalization of the intersection as a future project in order to address capacity deficiencies. ODOT recommends the applicant contribute a proportionate share contribution towards the signalization.
   4. ODOT Region 2 provided comments on the application (Exhibit B4) as the intersection of OR 99W & SW Brookman Rd. is also located within the Region 2 boundary. The comments address safety and operational issues at the intersection and support the recommendation for a proportionate share contribution towards the signalization project. The same comments were issued for the Reserve at Cedar Creek subdivision (SUB 19-02) and since the conditions have not changed, they are also applicable to the current land use application.
   5. Tualatin Valley Fire and Rescue provided comments during the completeneness review process which are dated April 24, 2020 (Exhibit B5). The comments are in regard to fire hydrants, water supply, and fire apparatus access. The applicant has revised the plans in response to the comments and final compliance with the fire letter is required as a condition of approval.
   6. Clean Water Services provided a memorandum dated July 17, 2020 (Exhibit B6). The memorandum provides Conditions of Approvals related to stormwater, erosion control, and protection of sensitive habitat areas. The subject site is not currently within the CWS jurisdictional boundary and annexation is required.

7. Oregon Department of State Lands (DSL) provided preliminary comments via email dated July 2, 2020 (Exhibit B7). The comments indicate a Wetland Land use Notification should be submitted from the City of Sherwood and that a wetland delineation report will likely be required. The City submitted a Wetland Land Use Notification to DSL on July 20, 2020 and is awaiting full review comments. The applicant has completed an environmental assessment for the site (Exhibit A7) that includes a wetland delineation. DSL concurrence with the wetland report provided by the applicant is required as condition of approval.
8. Pride Disposal Company – Pride Disposal provided comments dated July 13, 2020 (Exhibit B8). Pride has reviewed the site plan and can service the development as proposed. Each resident will be responsible for placing their totes curbside on collection day.
9. Portland General Electric (PGE) provided comments via email dated July 6, 2020 (Exhibit B9). Currently, a one phase service is provided along SW Brookman Rd. but the system will be upgraded to three phases with development of the Middlebrook Subdivision. The comments indicate the developer is required to extend the three-phase system east of SW Oberst Ln.
10. ODOT Outdoor Advertising Sign Program provided comments via email dated July 6, 2020 (Exhibit B10). The comments state if there are any signs that are on private property that will be visible from the state highway, the requirements of ORS 377 will apply. The requirements do not apply to standard street and traffic control signs.
11. The Tualatin River National Wildlife Refuge Complex provided comments via email dated July 1, 2020 (Exhibit B11). The comments state that long-term protection of Cedar Creek is an important goal that the refuge would like to discuss with the City.
12. The following agencies acknowledged the application without comment or expressing any issues or concerns: Sherwood Police Department and Bonneville Power Administration.

B. Public Comments
1. As of the date of this report, no written public comments were received on the application. City staff received one phone call regarding the application from Leslie Kolb. Ms. Kolb notified staff that street access into the Middlebrook Subdivision was originally intended to align with SW Oberst Place and create a 4-way intersection. However, due to a large tree being in the sight distance of the proposed intersection, the street was moved towards the west to alleviate the issue. Ms. Kolb stated that the subject tree is located on the site currently under review and asked if the street would be re-aligned to SW Oberst Place as a result of the proposed development. Although Ms. Kolb does not object

to the proposal, she expressed concern that without any changes, SW Oberst Place will need to be moved to the west at some point in the future to align with SW White Oak Terrace.

III. APPLICABLE CODE PROVISIONS

*** *indicates text has been omitted because it is not applicable*

DIVISION III ADMINISTRATIVE PROCEDURES

Chapter 16.72 PROCEDURES FOR PROCESSING DEVELOPMENT PERMITS
16.72.010 – Generally

A. Classifications

Except for Final Development Plans for Planned Unit Developments, which are reviewed per Section 16.40.030, all quasi-judicial development permit applications and legislative land use actions shall be classified as one of the following:

3. Type III

The following quasi-judicial actions shall be subject to a Type III review process:

c. Subdivisions between 11—50 lots.

ANALYSIS: The application is proposing a 28-lot subdivision and is subject to a Type III quasi-judicial review process. The application has been processed according to the Type III noticing and review procedures as required under SZCDC § 16.72.

FINDING: This criterion is met.

DIVISION II LAND USE & DEVELOPMENT
Chapter 16.12 RESIDENTIAL LAND USE DISTRICTS
16.12.010 - Purpose and Density Requirements

C. Medium Density Residential (MDRL)

The MDRL zoning district provides for single-family and two-family housing, manufactured housing and other related uses with a density of 5.6 to 8 dwelling units per acre. Minor land partitions shall be exempt from the minimum density requirements.

ANALYSIS: The application is proposing a 28-lot single-family detached residential subdivision at a density of approximately 6.01 dwelling units per acre. SZCDC § 16.10 defines density as the “number of dwelling units per net buildable acre”. Net buildable acre means an area measuring 43,560 SF after excluding present and future rights-of-way and environmentally constrained areas. Exhibit A14 provides a breakdown of the

gross site area and net buildable acres for the subdivision which is summarized and corrected below.

The applicant is proposing a total of 32,069 SF of open space in pocket parks and trails throughout the subdivision, which is identified as "Public Parks or Trails" on the Net Developable Area Exhibit (Exhibit A14). This area was removed from the gross site area in calculating the net buildable area, however, SZCDC § 16.142.030(D) states that open space areas shall remain in the net buildable area for purposes of calculating residential density. The calculations also assume a gross site area of 10.37 acres; however, the application form and tax map indicate the property is 10.47 acres. Therefore, the density is calculated as shown below:

Gross site area	10.47 acres (456,073 SF)
Area removed*	5.80 acres (252,703 SF)
Net buildable site	4.66 acres (203,370 SF)

**Public ROW and environmentally constrained areas*

Flood plain	*3.59 acres (156,182 SF)*
Vegetated Corridor outside FP	*0.73 acres (31,958 SF)*
Public Streets	*1.18 acres (51,293)*
Stormwater facility	*0.30 acres (13,270 SF)*
Total	*5.80 acres (252,703)*

28 lots / 4.66 acres = 6.01 units per acre

Density standards for the MDRL zone is 5.6 to 6.8 dwelling units per acre.

FINDING: The proposed density is 6.01 units per acre meets the standard of the MDRL zone. This standard is met.

16.12.020 - Allowed Residential Land Uses

A. Residential Land Uses

The table below identifies the land uses that are allowed in the Residential Districts. The specific land use categories are described and defined in Chapter 16.10.

Uses (Residential)	MDRL
Single-Family Attached or Detached Dwellings	P

Whereas P = Permitted

ANALYSIS: The application proposes a 28-lot subdivision for the construction of single-family detached dwellings.

FINDING: This criterion is met.

16.12.030 - Residential Land Use Development Standards

A. Generally

No lot area, setback, yard, landscaped area, open space, off-street parking or loading area, or other site dimension or requirement, existing on, or after, the effective date of this Code shall be reduced below the minimum required by this Code. Nor shall the conveyance of any portion of a lot, for other than a public use or right-of-way, leave a lot or structure on the remainder of said lot with less than minimum Code dimensions, area, setbacks or other requirements, except as permitted by Chapter 16.84. (Variance and Adjustments)

B. Development Standards

Except as modified under Chapter 16.68 (Infill Development), Section 16.144.030 (Wetland, Habitat and Natural Areas) Chapter 16.44 (Townhomes), or as otherwise provided, required minimum lot areas, dimensions and setbacks shall be provided in the following table.

C. Development Standards per Residential Zone

Development Standards by Residential District	MDRL	10% Reduction Requested under §16.144.030.B.1
Minimum Lot area (in square feet) Single-Family Detached	5,000	4,500
Minimum Lot width at front property line	25 feet	-
Minimum Lot width at building line; Single-Family	50 feet	45 feet
Lot Depth	80 feet	-
Maximum Height (in feet)	30 or 2 stories	-
Front yard	14 feet	-
Face of garage	20 feet	-
Interior side yard; Single-Family Detached	5 feet	-
Corner lot street side; Single Family or Two	15 feet	-
Rear yard:	20 feet	-

ANALYSIS: The property is zoned MDRL and is subject to the dimensional standards shown in the table above. The applicant is requesting a 10% reduction to the minimum lot area and minimum lot width at building line standards as allowed under SZCDC § 16.144.030. As shown on the preliminary plat and discussed in this report, all lots meet

or are conditioned to meet the development standards of the district. Lots 25 and 28 are irregular shaped lots and warrant additional discussion which is provided below.

Lots 25 and 28 general discussion - the proposed street and lot layout of the subdivision is influenced by Cedar Creek to the south/east and the required alignment of SW Wapato Lake Drive as it transects the property to align with the Middlebrook Subdivision in the northeast. As proposed the subdivision conforms the natural features and topography of the site while providing the required connection of SW Wapato Lake. This has resulted in irregular shaped lots (Lots 25 and 28) where the buildable land on the south side of the street is reduced by the presence of natural features.

The applicant is proposing to provide access to Lots 25 and 28 via private tracts (Tracts C & D) in order to provide street frontage along the northeast property lines and orient the front yards and homes towards this property line. The applicant's narrative states the lots are required to be oriented with their front towards the northeast in order to obtain the required lot depth of 80 ft. Under this orientation, the southwest property lines would serve as the rear lines, and the two lot lines roughly parallel to the street would serve as side lot lines. Based on staff analysis, Lot 25 does not require Tract D or a front orientation towards the northeast property line in order to meet the depth requirement. In support of removing the tract, SZCDC § 16.128.030(D) requires side lot lines to run at right angles to the street upon which the lot faces as far as practicable. It is practicable for Lot 25 to meet this standard without the use of Tract D and is the preferred orientation based on the land division standards. Lot 28 is further constrained by the alignment of SW Wapato Lake Drive and warrants the use of a private tract in order to obtain adequate lot depth.

Lot 25 details – Lot depth is defined as "*The average horizontal distance between the front and rear lot lines measured in the direction of the side lot lines."* When applied to the Lot 25 the two side lot lines measure 71 ft. and 108 ft. for an average of 89.5 ft. Therefore Lot 25 can meet lot size and dimensional requirements without utilizing a private tract as shown below:

Lot Dimensional Standards	MDRL Zone	Lot 25 with front lot line abutting SW Wapato Lake Drive
Minimum Lot area	5,000 SF	7,953 SF
Minimum Lot width at front property line	25 feet	98 ft.
Minimum Lot width at building line;	50 feet	~ 100 ft.
Lot Depth	80 feet	82 ft. (avg length of two side lot lines)

Lot 28 details – the development constraints are greater in regard to Lot 28 because of the proximity of SW Wapato Lake Drive to the riparian corner at the northeast corner of the site. The buildable land remaining for Lot 28 is oriented from southwest to northeast and does not allow a lot depth of 80 ft. unless the front lot is oriented to face Tract C and the northeast lot line. When oriented in this direction the lot meets the dimensional standards as shown below:

Lot Dimensional Standards	MDRL Zone	Lot 28 with the northeast lot line serving as front lot line
Minimum Lot area	5,000 SF	6,102
Minimum Lot width at front property line	25 feet	32 ft.
Minimum Lot width at building line;	50 feet	50 ft.
Lot Depth	80 feet	~110 ft.

Under this orientation the side of the house will face the public street. Side facades generally have less architectural detail than front facades and staff recommends a condition of approval to improve the appearance of the wall facing the public street. The condition will address the adverse impact that a blank or plain side wall would create when viewed from the surrounding public realm and street.

Although two irregular shaped lots will be created as part of the subdivision, the design allows the development to meet habitat protection requirements and utilize the creek as an open space resource for the overall community. Each lot meets the dimensional standard as described above and as shown on the preliminary plat. While providing private tracts to a lot for the sole purpose of changing the lot orientation is generally not advised, the unique site constraints warrant this approach for Lot 28.

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B1: Prior to final plat approval, remove Tract D from the plat and adjust the lot shape and dimensions accordingly.

RECOMMENDED CONDITION OF APPROVAL F1: Prior to issuance of building permits for Lot 25, a plot plan shall be submitted that identifies the lot line abutting the public street as the front lot line. The plot plan shall show the front, rear, and side setbacks meet the requirements of the MDRL zone, unless a variance is approved that allows otherwise.

RECOMMENDED CONDITION OF APPROVAL F2: Prior to issuance of building permits for Lot 28, submit elevation plans that demonstrate the public street facing

façade meets or exceeds the level of architectural detail provided in the “Enhanced Elevation” drawing shown in Exhibit C1. The actual architectural features provided may differ from the elevation shown in the exhibit but shall be provided at the quantity shown in the plans.

RECOMMENDED CONDITION OF APPROVAL F3: Prior to issuance of building permits, submit plot plans and building plans showing the structures meet the development standards requirements of the MDRL zone.

16.12.040 - Community Design
For standards relating to off-street parking and loading, energy conservation, historic resources, environmental resources, landscaping, access and egress, signs, parks and open space, on-site storage, and site design, *see* Divisions V, VIII, IX.

FINDING: The application meets or is conditioned to meet all applicable community design standards as described in this report. This criterion is met.

16.12.050 - Flood Plain
Except as otherwise provided, Section 16.134.020 shall apply.

FINDING: A portion of the subject site is located within a base flood zone as defined in SZCDC § 16.134.020. SZCDC § 16.134.020 applies to this application and is addressed below.

16.58.010 Clear Vision Areas

- **A. A clear vision area shall be maintained on the corners of all property at the intersection of two (2) streets, intersection of a street with a railroad, or intersection of a street with an alley or private driveway.**
- **B. A clear vision area shall consist of a triangular area, two (2) sides of which are lot lines measured from the corner intersection of the street lot lines for a distance specified in this regulation; or, where the lot lines have rounded corners, the lot lines extended in a straight line to a point of intersection, and so measured, and the third side of which is a line across the corner of the lot joining the non-intersecting ends of the other two (2) sides.**
- **C. A clear vision area shall contain no planting, sight obscuring fence, wall, structure, or temporary or permanent obstruction exceeding two and one-half (2½) feet in height, measured from the top of the curb, or where no curb exists, from the established street center line grade, except that trees exceeding this height may be located in this area, provided all branches and foliage are removed to the height of**

seven (7) feet above the ground on the sidewalk side and ten (10) feet on the street side.
The following requirements shall govern clear vision areas:

1. **In all zones, the minimum distance shall be twenty (20) feet.**
2. **In all zones, the minimum distance from corner curb to any driveway shall be twenty-five (25) feet.**
3. **Where no setbacks are required, buildings may be constructed within the clear vision area.**

ANALYSIS: The plans submitted by the applicant do not show clear vision areas as required by this section. Clear vision areas are required at the following locations:

- Intersection of SW Wapato Lake Drive and SW Trillium Lane

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B2: Prior to Final Approval of Plat, show clear vision easements on all corner lots fronting public streets. The clear vision easement shall be to the City of Sherwood and conform with SZCDC § 16.58.010.

RECOMMENDED CONDITION OF APPROVAL B3: Prior to final plat approval, revise the Preliminary Street Tree & Open Space Planting Plan (Exhibit A15 – Sheet L1) to provide landscaping in accordance with the clear vision requirements of SZCDC § 16.58.010(C).

Chapter 16.60 - YARD REQUIREMENTS
16.60.010 - Through Lots
On a through lot the front yard requirements of the zone in which such a lot is located shall apply to the street frontage where the lot receives vehicle access; except where access is from an alley, the front yard requirements shall apply to the street opposite the alley.

ANALYSIS: No through lots are proposed as part of the subdivision.

FINDING: This standard does not apply.

16.60.020 - Corner Lots
On a corner lot, or a reversed corner lot of a block oblong in shape, the short street side may be used as the front of the lot provided:

A. The front yard setback shall not be less than twenty-five (25) feet; except where otherwise allowed by the applicable zoning district and subject to vision clearance requirements.

B. The side yard requirements on the long street side shall conform to the front yard requirement of the zone in which the building is located.

ANALYSIS: As shown in the preliminary plat, no corner lots are proposed. A pocket park is proposed at the only intersection that will be created as part of the subdivision (SW Wapato Lake Drive and SW Trillium Lane).

FINDING: This standard is not applicable.

16.60.030 - Yards

A. Except for landscaping, every part of a required yard (also referred to as minimum setback) shall be open and unobstructed from its lowest point to the sky, except that architectural features such as awnings, fire escapes, open stairways, chimneys, or accessory structures permitted in accordance with Chapter 16.50 (Accessory Structures) may be permitted when so placed as not to obstruct light and ventilation.

B. Where a side or rear yard is not required, and a primary structure is not erected directly on the property line, a primary structure must be set back at least three (3) feet.

ANALYSIS: Yard requirements are reviewed and approved as part of the building permits for each lot.

FINDING: This standard will be met.

16.60.040 - Lot Sizes and Dimensions

A. If a lot or parcel, or the aggregate of contiguous lots or parcels, recorded or platted prior to the effective date of this Code, has an area or dimension which does not meet the requirements of this Code, the lot or aggregate lots may be put to a use permitted outright, subject to the other requirements of the zone in which the property is located.

B. Exceptions

1. Residential uses are limited to a single-family dwelling, or to the number of dwelling units consistent with the density requirements of the zone. However, a dwelling cannot be built on a lot with less area than thirty-two hundred (3,200) square feet, except as provided in Chapter 16.68.

2. Yard requirements of the underlying zone may be modified for infill developments as provided in Chapter 16.68 (Infill Development).

ANALYSIS: The proposal is for a new residential subdivision on a 10.47-acre site. Exceptions to the lot sizes are not requested under this section.

FINDING: These standards do not apply.

DIVISION VII LAND DIVISION, SUBDIVISIONS, PARTITIONS…

Chapter 16.120 - SUBDIVISIONS
16.120.010 - Purpose
Subdivision regulations are intended to promote the public health, safety and general welfare; lessen traffic congestion; provide adequate light and air; prevent overcrowding of land; and facilitate adequate water supply, sewage and drainage.

16.120.020 - General Subdivision Provisions

A. Approval of a subdivision occurs through a two-step process: the preliminary plat and the final plat.

1. The preliminary plat shall be approved by the Approval Authority before the final plat can be submitted for approval consideration; and

2. The final plat shall reflect all conditions of approval of the preliminary plat.

ANALYSIS: The applicant has submitted a preliminary plat application which is the subject of this review. The final plat will be reviewed as a separate land use application and shall reflect all of the conditions as required by this decision.

FINDING: This criterion will be met.

B. All subdivision proposals shall conform to all state regulations set forth in ORS Chapter 92, Subdivisions and Partitions.

ANALYSIS: State regulations set forth in ORS Chapter 92 are implemented through the City Municipal Code. The application meets or is conditioned to meet all applicable sections of the code as described in this report.

FINDING: This criterion is met.

C. Future re-division
When subdividing tracts into large lots, the Approval Authority shall require that the lots be of such size and shape as to facilitate future

re-division in accordance with the requirements of the zoning district and this Division.

ANALYSIS: The proposal is for a 28-lot residential subdivision with an average lot size of approximately 5,914 SF. No new large lots will be created with the exception of Tract B Open Space which will be dedicated to the City. The proposal represents full land division of the parent parcel and future re-division is not feasible under the current zoning.

FINDING: This criterion is met.

D. Future Partitioning

When subdividing tracts into large lots which may be resubdivided, the City shall require that the lots be of a size and shape, and apply additional building site restrictions, to allow for the subsequent division of any parcel into lots of smaller size and the creation and extension of future streets.

ANALYSIS: As described above, the proposal represents full land division of the parent parcel and future partitioning is not feasible under the current zoning.

FINDING: This criterion is met.

E. Lot averaging

Lot size may be averaged to allow lots less than the minimum lot size allowed in the underlying zoning district subject to the following regulations:

1. **The average lot area for all lots is not less than allowed by the underlying zoning district.**
2. **No lot created under this provision shall be less than 90 % of the minimum lot size allowed in the underlying zoning district.**
3. **The maximum lot size cannot be greater than 10 % of the minimum lot size.**

ANALYSIS: The applicant is proposing to reduce the minimum lot size by utilizing the exception standards allowed under SZCDC § 16.144.030(B)(1). Lot averaging utilizing the standards above is not requested.

FINDING: This standard does not apply.

F. Required Setbacks

All required building setback lines as established by this Code, shall be shown in the preliminary subdivision plat.

ANALYSIS: The applicant has submitted a Conceptual Building Setback Plan (Exhibit A15 – Sheet P4) that shows the proposed building setback for each home. Setbacks for the MDRL zone are provided in SZCDC § 16.12.030(C). The front, side, and rear lot lines are defined in SZCDC § 16.10. The setbacks conform to the requirements of the code with the exceptions of Lots 8, 12, 25 as described below:

Lot 8 – the rear setback shown is less than 20 ft. from the rear property line.

Lot 12 – the north property line is shown as the rear property line on this triangular shaped lot. However, SZCDC § 16.10.020, defines a rear lot line for triangular shaped lots as “a line ten feet in length within the lot, parallel to and at a maximum distance from the front lot line”. The rear building setback line shall be revised based on this definition.

Lot 25 – as required by Condition of Approval F1, the public street will serve as the front lot line for the parcel with the front yard abutting SW Wapato Lake Drive. The setbacks shown on the Conceptual Building Setback Plan assume a different orientation and do not meet the standards as shown. The revised setbacks will be reviewed by the City as required by Condition of Approval F1 above.

FINDING: This criterion is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B4: Prior to issuance of building permits for Lot 8, a 20 ft. wide rear yard setback shall be shown on the plot plan.

RECOMMENDED CONDITION OF APPROVAL B5: Prior to issuance of building permits for Lot 12, a rear yard setback shall be shown on the plot plan in conformance with the requirements for “irregular and triangular lots” as described in SZCDC § 16.10.020.

G. Property Sales
No property shall be disposed of, transferred, or sold until required subdivision approvals are obtained, pursuant to this Code.

ANALYSIS: The applicant’s narrative acknowledges that individual lots may not be disposed of, transferred, or sold until the final plat application is approved and the final subdivision plat is recorded.

FINDING: This criterion is met.

16.120.030 - Approval Procedure-Preliminary Plat

A. Approval Authority

1. **The approving authority for preliminary and final plats of subdivisions shall be in accordance with Section 16.72.010 of this Code.**
    a. **A subdivision application for 4-10 lots will follow a Type II review process.**
    b. **A subdivision application for 11-50 lots will follow a Type III review process.**
    c. **A subdivision application for over 50 lots will follow a Type IV review process.**
2. **Approval of subdivisions is required in accordance with this Code before a plat for any such subdivision may be filed or recorded with County. Appeals to a decision may be filed pursuant to Chapter 16.76.**

ANALYSIS: The proposal is for a 28-lot subdivision and is being processed as a Type III application as required above. The applicant's narrative acknowledges approval from the City is required prior to recording the plat with Washington County.

FINDING: These criteria are met.

B. Phased Development

1. **The Approval Authority may approve a time schedule for developing a subdivision in phases, but in no case shall the actual construction time period for any phase be greater than two years without reapplying for a preliminary plat.**
2. **The criteria for approving a phased subdivision review proposal are:**
    a. **The public facilities shall be scheduled to be constructed in conjunction with or prior to each phase to ensure provision of public facilities prior to building occupancy;**
    b. **The development and occupancy of any phase shall not be dependent on the use of temporary public facilities:**
        (1) **For purposes of this subsection, a temporary public facility is an interim facility not constructed to the applicable City or district standard; and**
        (2) **The phased development shall not result in requiring the City or other property owners to construct public facilities that were required as a part of the approval of the preliminary plat.**
3. **The application for phased development approval shall be reviewed concurrently with the preliminary plat application**

and the decision may be appealed in the same manner as the preliminary plat.

ANALYSIS: The applicant is not proposing to develop the site in phases.

FINDING: This criterion does not apply.

16.120.040 - Approval Criteria: Preliminary Plat
No preliminary plat shall be approved unless:

A. Streets and roads conform to plats approved for adjoining properties as to widths, alignments, grades, and other standards, unless the City determines that the public interest is served by modifying streets or road patterns.

ANALYSIS: The surrounding properties to north, west, and east have received preliminary plat approval for new residential subdivisions including SUB 18-02 Middlebrook and SUB 19-02 Reserve at Cedar Creek (Exhibit A15 – Sheet P11). As shown on the plans, the proposed subdivision will extend SW Trillium Ln. and SW Wapato Lake Dr. and conform to the previously approved preliminary plats in regard to width, alignment, grade, and other standards. The proposed streets also conform generally to Brookman Addition Concept Plan in regards to alignment and location within the area.

FINDING: This criterion is met.

B. Streets and roads held for private use are clearly indicated on the plat and all reservations or restrictions relating to such private roads and streets are set forth thereon.

ANALYSIS: The applicant is proposing two private streets, Tracts C & D, which will serve Lots 28 and 25, respectively. As required by Condition of Approval B1 above, Tract D will be removed from the plat. The intended reservations and restrictions for Tract C have not been addressed.

FINDING: This criterion is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B4: Prior to final plat approval, provide a Covenants, Conditions, & Restrictions (CC&R) document that describes the reservations, restrictions, and maintenance responsibilities for Tract C. The final CC&Rs shall be recorded with the final plat.

C. The plat complies with applicable zoning district standards and design standards in Division II, and all provisions of Divisions IV, VI,

VIII and IX. The subdivision complies with Chapter 16.128 (Land Division Design Standards).

ANALYSIS: As described in this report, the proposal complies or is conditioned to comply with all applicable standards and provisions of the Sherwood Zoning and Community Development Code including Division II Land Use & Development, Division IV Planning Procedures, Division VI Public Infrastructure, and Division VIII Environmental Resources. The property does not contain historic resources and is not subject to Division IX Historic Resources.

FINDING: This criterion is met.

D. Adequate water, sanitary sewer, and other public facilities exist to support the use of land proposed in the plat.

ANALYSIS: As described in the City of Sherwood Engineering comments (Exhibit B1) and in the findings for Division VI Public Infrastructure below, there is adequate water, sanitary sewer, and other public facilities to support the use of land proposed in the plat.

FINDING: This criterion is met.

E. Development of additional, contiguous property under the same ownership can be accomplished in accordance with this Code.

ANALYSIS: The proposal represents full platting of the subject site and development of additional contiguous property is not feasible.

FINDING: This criterion does not apply.

F. Adjoining land can either be developed independently or is provided access that will allow development in accordance with this Code.

ANALYSIS: The proposal conforms to the approved development pattern and street layout of the adjoining land to the north and west. The proposed subdivision will include an extension of SW Trillium Lane and SW Wapato Lake Drive that will allow previously approved subdivisions (SUB 18-02 and SUB 19-02) to develop in accordance with their preliminary plats. The Cedar Creek corridor occupies the south and east portions of the site and precludes any options for access or a continuation of development from the subject site.

FINDING: This criterion is met.

G. Tree and woodland inventories have been submitted and approved as per Section 16.142.060.

ANALYSIS: The applicant has submitted a Preliminary Tree Preservation and Removal Plan (Exhibit A15 – Sheet P3) which is supported by an arborist report from Morgan Holen & Associated (Exhibit A8). As described in SZCDC § 16.142.070 below, the proposal complies or is conditioned to comply with the applicable tree protection standards.

Note –Section 16.142.060 relates to street trees and is a typo. The correct section that relates to tree and woodland inventories is Section 16.142.070.

FINDING: This criterion is met.

H. The plat clearly shows the proposed lot numbers, setbacks, dedications and easements.

ANALYSIS: The Preliminary Plat (Exhibit A15 – Sheet P1) shows the proposed lot numbers, setbacks, dedications, and easements.

FINDING: This criterion is met.

I. A minimum of five percent (5%) open space has been provided per Section 16.44.010.B.8 (Townhome-Standards) or Section 16.142.030 (Parks, Open Spaces and Trees-Single-Family Residential Subdivisions), if applicable.

ANALYSIS: The minimum 5% open space requirement for single-family residential subdivisions has been met, as addressed in SZCDC § 16.142.030 below.

FINDING: This standard is met.

16.120.050 - Final Subdivision Plat

A. Procedure

1. Unless otherwise noted below, final subdivision approval includes meeting all conditions from the land use approval, review and approval by County, and the signature of the City's designee on the mylar.

2. The subdivider shall submit the final plat, and all supplementary information required by the Planning Department or pursuant to this Code.

3. Upon approval of the final plat drawing, the applicant may submit the mylar for final signature.

4. All requirements for signature of the mylar shall be completed within two (2) years of approval of the final plat.

B. Extensions

If the final plat is not approved within two (2) years, the preliminary plat approval shall expire and a new plat must be submitted. However, the City may, upon written request by the applicant, grant a single extension up to one (1) year upon a written finding that the facts upon which approval was based have not changed to an extent sufficient to warrant refiling of the preliminary plat and that no other development approval would be affected. For preliminary plat approvals granted between January 1, 2007 and December 31, 2009, the approval shall be extended until December 31, 2013.

C. Approval Criteria: Final Plat

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ANALYSIS: The subject application is for preliminary plat approval. Final plat approval is required within 2-years of the Notice of Decision.

FINDING: These criteria are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL A4: The preliminary plat approval is valid for two years from the date of the Notice of Decision. The final plat shall be approved by the City within two years of Notice of Decision, unless an extension is granted by the City prior to the two-year deadline.

16.120.060 - Improvement Agreement

A. Subdivision Agreement

The subdivider shall either install required improvements and repair existing streets and other public facilities damaged in the development of the subdivision pursuant to the Division VI, or execute and file with the City an agreement specifying the period within which all required improvements and repairs shall be completed, and providing that if such work is not completed within the period specified, the City may complete the same and recover the full cost and expense thereof from the subdivider. Such agreement may also provide for the construction of the improvements in stages.

B. Performance Security

The subdivider is required to provide monetary assurance of full and faithful performance in the form of a bond, cash, or other security acceptable to the City in an amount equal to one hundred twenty-five percent (125%) of the estimated cost of the improvements.

16.120.070 - Bond

A. Performance guarantee required. As required by Section 16.120.060, the subdivider shall file with the agreement an assurance of performance supported by one of the following:

1. A surety bond executed by a surety company authorized to transact business in the state of Oregon which remains in force until the surety company is notified by the City in writing that it may be terminated or cash.

2. Determination of sum. The assurance of performance shall be for a sum determined by the City Engineer as required to cover the cost of the improvements and repairs, including related engineering and incidental expenses.

3. Itemized improvement estimate. The subdivider shall furnish to the City Engineer an itemized improvement estimate, certified by a registered civil engineer, to assist the City Engineer in calculating the amount of the performance assurance.

4. When subdivider fails to perform. In the event the subdivider fails to carry out all provisions of the agreement and the City has un-reimbursed costs or expenses resulting from such failure, the City shall call on the bond, cash deposit for reimbursement.

5. Termination of performance guarantee. The subdivider shall not cause termination of nor allow expiration of said guarantee without having first secured written authorization from the City.

ANALYSIS: The proposal includes new public improvements and the applicant is required to enter into an Improvement Agreement with the City as described above.

FINDING: These criteria are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL C1: Prior to Issuance of an Engineering Compliance Agreement, final engineering plan approval by the Engineering Department is required, performance and payment bonds and insurance riders must be submitted to the City.

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Chapter 16.128 - LAND DIVISION DESIGN STANDARDS
16.128.010 - Blocks

A. Connectivity

1. Block Size

The length, width, and shape of blocks shall be designed to provide adequate building sites for the uses proposed, and for convenient access, circulation, traffic control and safety.

ANALYSIS: A partial street block was approved as part of the Middlebrook Subdivision (SUB 18-02), bounded SW White Oak Terrace to the west, SW Trillium Lane to the north, and SW Wapato Lake Drive to the south (see Exhibit A15 – Sheet P11). The remaining block to the east is being platted as part of this subdivision proposal.

The proposed layout will complete the block by extending SW Trillium Lane and SW Wapato Lake Drive towards the east until they connect at the northeast corner of the site. A new north-south street connection is not proposed due to the location of Cedar Creek on the site. The lots within the interior of the block are capable of supporting single-family homes as shown on the Conceptual Building Setback Plan (Exhibit A15 – Sheet P4).

SW Wapato Lake Drive and the lots on the south side of the street are adjacent to the Cedar Creek corridor and are located to conform to the alignment of the creek. All lots proposed on the south side of SW Wapato Lake Drive are also capable of supporting a single-family home, as shown on the Conceptual Building Setback Plan (Exhibit A15 – Sheet P4). Lots 25 and 28 are irregular shaped lots but are capable of providing supporting a building on the site. Conditions have been placed on the lots to ensure proper orientation and design of the homes.

FINDING: This standard is met.

2. Block Length

Block length standards shall be in accordance with Section 16.108.040. Generally, blocks shall not exceed five-hundred thirty (530) feet in length, except blocks adjacent to principal arterial, which shall not exceed one thousand eight hundred (1,800) feet. The extension of streets and the formation of blocks shall conform to the Local Street Network map contained in the Transportation System Plan.

ANALYSIS: As described above, the proposal will complete the eastern portion of a new triangular shaped block bounded by SW White Oak Terrace to the west, SW Trillium Lane to the north, and SW Wapato Lake Drive to the south and east. The applicant's narrative indicates that when the block length is measured by taking the

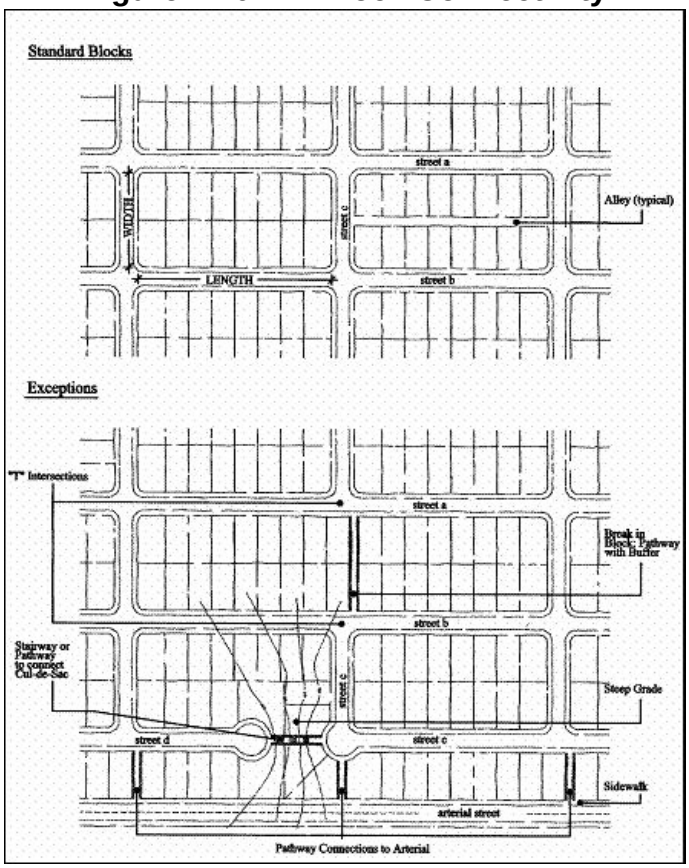
east-west and then north-south distance of SW Wapato Lake Drive, the block length and width are 506 ft. and 239 ft., respectively. However, this measurement does not account for the approved street and lots to the west which are part of the same block and were approved as part of the Middlebrook Subdivision. When accounting for the western portion of the block, the proposed east-west street length is approximately 850 ft. along SW Trillium Lane.

SZCDC § 16.106.020(E) allows modifications to the standards for certain transportation facilities including street and block length. A design modification to the street length standard has been granted under SZCDC § 16.106.020(E) and is addressed below.

FINDING: This standard is met as described in SZCDC § 16.106.020(E).

3. Pedestrian and Bicycle Connectivity. Paved bike and pedestrian accessways shall be provided on public easements or right-of-way consistent with Figure 7.401.

Figure 7.401 — Block Connectivity



ANALYSIS: The applicant is proposing a continuous pedestrian and bicycle system including streets, sidewalks, and trails as shown in Exhibit A15 – Sheet P7. New sidewalks are proposed along all public streets and a new community trail is proposed

along the north side of Cedar Creek. In accordance with the figure above, a north-south pedestrian pathway is proposed between SW Trillium Lane and SW Wapato Lake Drive in order to reduce the length of the pedestrian block where a full street connection is not feasible. The pedestrian pathway will run north-south between lots 6-7 and 14-15 and align with mid-block pedestrian pathway approved as part of the Middlebrook Subdivision (between lots 123-124 and 134-135).

FINDING: This standard is met.

B. Utilities Easements for sewers, drainage, water mains, electric lines, or other utilities shall be dedicated or provided for by deed. Easements shall be a minimum of ten (10) feet in width and centered on rear or side lot lines; except for tie-back easements, which shall be six (6) feet wide by twenty (20) feet long on side lot lines at the change of direction.

ANALYSIS: The development proposal will require an extension of public main line utilities throughout the site including sanitary sewer, storm sewer, water, and franchise utilities. The applicant's narrative indicates utility mains can be located within the dedicated rights-of-way adjacent to individual lots. An 8 ft. wide public utility easement (PUE) is also proposed along the frontage of each lot to accommodate franchise utilities. The PUE easement is shown but not labeled on the preliminary plat (Exhibit A15 – Sheet P1).

The Brookman Sewer Trunk Line is proposed to align with the new Community Trail that is proposed along the north side of Cedar Creek. The trunk line is being constructed by the developer of Middlebrook Subdivision and is being reviewed and approved separate from this application, however, an easement over the subject property is required to accommodate the line. A condition of approval is included in the public facilities chapter below.

FINDING: This standard is met as required by Condition of Approval G10.

C. Drainages
Where a subdivision is traversed by a watercourse, drainage way, channel or street, drainage easements or rights-of-way shall be provided conforming substantially to the alignment and size of the drainage.

ANALYSIS: The subdivision is traversed by Cedar Creek and its associated riparian areas and floodplain which are a significant water drainage way. The applicant has provided a Conceptual Open Space Plan (Exhibit A15 – Sheet P5) which proposes to locate the Cedar Creek floodplain, CWS Vegetated Corridor, and associated wetlands

in Tract B. With the exception of the community trail and pocket park at the northeast corner, the City of Sherwood will accept ownership and maintenance of Tract B. A stormwater drainage easement to Clean Water Services is required to ensure access for public utilities. Condition of Approval related to dedications and easement are included in the open space section below.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B5: Prior to final plat approval, provide a draft statutory warranty deed to the City that dedicates Tract B Open Space to the City of Sherwood. The final tract shall not include the pocket park at the northeast corner of the site. The final deed shall be recorded with the final plat.

16.128.020 - Pedestrian and Bicycle Ways
Pedestrian or bicycle ways may be required to connect cul-de-sacs, divide through an unusually long or oddly shaped block, or to otherwise provide adequate circulation.

ANALYSIS: As described above, the applicant is proposing a mid-block pedestrian pathway to connect SW Trillium Lane to SW Wapato Lane and provide adequate circulation for a block that exceeds standard length.

FINDING: This standard is met.

16.128.030 - Lots

A. Size and Shape

Lot size, width, shape, and orientation shall be appropriate for the location and topography of the subdivision or partition, and shall comply with applicable zoning district requirements, with the following exception:

1. Lots in areas not served by public sewer or water supply shall conform to any special County Health Department standards.

ANALYSIS: The lots proposed within the subdivision have been designed to conform the adjacent natural features and topography of the site and reduce impacts to sensitive areas. Although this approach has led to irregular shaped lots (Lots 25 and 28), it also allows the development to meet habitat protection requirements and utilize the creek as a resource for the overall community. As described in this report, all of the proposed lots meet or are conditioned to meet the lot size and shape requirements.

The specific lot size and width requirements are located in SZCDC § 16.12.030(C) and are addressed below. A 10% reduction is requested to the lot size regarding lot area as

well as the lot width at the building line utilizing the exception standards of SZCDC § 16.144.030.

FINDING: This standard is met as discussed in this report.

B. Access
All lots in a subdivision shall abut a public street, except as allowed for infill development under Chapter 16.68.

ANALYSIS: As shown in the Preliminary Plat all lots in the subdivision abut a public street.

FINDING: This standard is met.

C. Double Frontage
Double frontage and reversed frontage lots are prohibited except where essential to provide separation of residential development from railroads, traffic arteries, adjacent nonresidential uses, or to overcome specific topographical or orientation problems. A five (5) foot wide or greater easement for planting and screening may be required.

ANALYSIS: As shown in the Preliminary Plat no double frontage or reverse frontage lots are proposed.

FINDING: This standard is met.

D. Side Lot Lines Side lot lines shall, as far as practicable, run at right angles to the street upon which the lots face, except that on curved streets side lot lines shall be radial to the curve of the street.

ANALYSIS: As shown in the Preliminary Plat side lot lines run at right angles to the street with the exception of Lots 25 and 28. As discussed above, staff is recommending Condition of Approval B1 to remove the Tract D from Lot 25 and utilize the public street line as the front lot line. The condition is supported the findings in this section.

Lot 25 meets all the dimensional standards of the MDRL zone with front lot line along SW Wapato Lake Drive. Under this orientation, the side lot lines run at right angles to the public street as required by this standard. Under the applicant's proposal, the southeast property line would be deemed a "side lot line" but it would not run at a right angle to a street. Staff finds that it is practicable for Lot 25 to meet the side lot line standards without the use of Tract D.

Lot 28 does not meet the depth requirements with the side lot lines running at right angles to a public street. The applicant has proposed an alternative orientation that provides adequate lot depth while providing side lot lines at right angles to the street to the extent practicable.

FINDING: The standard is met by Condition of Approval B1. If Condition of Approval B1 is not applied, Lot 25 does not meet the standard above.

E. Grading

Grading of building sites shall conform to the following standards, except when topography of physical conditions warrants special exceptions:

1. **Cut slopes shall not exceed one (1) and one-half (1 1/2) feet horizontally to one (1) foot vertically.**
2. **Fill slopes shall not exceed two (2) feet horizontally to one (1) foot vertically.**

ANALYSIS: The Preliminary Grading and Erosion Control Plan (Exhibit A15 – Sheet P6) shows the proposed grade of the site and individual lots which do not exceed these standards. Final grade of the site and individual building lots will be reviewed through site grading and building permits.

FINDING: This standard is met.

DIVISION V COMMUNITY DESIGN

Chapter 16.92 – LANDSCAPING

16.92.010-Landscaping Plan Required

All proposed developments for which a site plan is required pursuant to Section 16.90.020 shall submit a landscaping plan that meets the standards of this Chapter. All areas not occupied by structures, paved roadways, walkways, or patios shall be landscaped or maintained according to an approved site plan.

ANALYSIS: The proposal is for a residential subdivision, which does not require Site Plan review pursuant to SZCDC § 16.90.020. The sections of this chapter which pertain to Site Plan review are omitted. The sections applicable to subdivisions (e.g. open space landscaping) are addressed below.

FINDING: This criterion is met.

16.92.020 Landscaping Materials

A. Type of Landscaping

Required landscaped areas shall include an appropriate combination of native evergreen or deciduous trees and shrubs, evergreen ground cover, and perennial plantings. Trees to be planted in or adjacent to public rights-of-way shall meet the requirements of this Chapter. Plants may be selected from the City's "Suggested Plant Lists for Required Landscaping Manual" or suitable for the Pacific Northwest climate and verified by a landscape architect or certified landscape professional.

1. Ground Cover Plants

a. All of the landscape that is not planted with trees and shrubs must be planted in ground cover plants, which may include grasses. Mulch is not a substitute for ground cover, but is allowed in addition to the ground cover plants.

b. Ground cover plants other than grasses must be at least the four-inch pot size and spaced at distances appropriate for the plant species. Ground cover plants must be planted at a density that will cover the entire area within three (3) years from the time of planting.

2. Shrubs

a. All shrubs must be of sufficient size and number to be at full growth within three (3) years of planting.

b. Shrubs must be at least the one-gallon container size at the time of planting.

3. Trees

a. Trees at the time of planting must be fully branched and must be a minimum of two (2) caliper inches and at least six (6) feet in height.

b. Existing trees may be used to meet the standards of this chapter, as described in Section 16.92.020.C.2.

B. Plant Material Selection and Preparation

1. Required landscaping materials shall be established and maintained in a healthy condition and of a size sufficient to meet the intent of the approved landscaping plan. Specifications shall be submitted showing that adequate preparation of the topsoil and subsoil will be undertaken.

2. Landscape materials should be selected and sited to produce a hardy and drought-resistant landscape area. Selection of the plants should include consideration of soil type, and depth, the amount of maintenance required, spacing, exposure to sun and wind, the slope and contours of the site, and compatibility with existing native vegetation preserved on the site.

ANALYSIS: The applicant has submitted a Preliminary Street Tree and Open Space Planting Plan (Exhibit A15 – Sheet L1) that shows new landscaping will be provided in the following areas:

- Perimeter of the community trail easement
- Tract A
- The northern portion of Tract B

Exhibit A15 – Sheet L2 provides the size and species of the proposed plantings in accordance with the standards above. A detailed planting plan showing the location and quantity of plantings within the landscaped areas has not been provided.

Additional plantings will be provided in the Vegetated Corridor as required by CWS standards which are outside the purview of this section.

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B6: Prior to Final Plat Approval, submit revised plans that provide the location and quantity of landscaped open space areas in accordance with SZCDC § 16.92.020. This condition does not apply to landscaping required by CWS standards.

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6. Landscaping at Points of Access
When a private access-way intersects a public right-of-way or when a property abuts the intersection of two (2) or more public rights-of-way, landscaping shall be planted and maintained so that minimum sight distances shall be preserved pursuant to Section 16.58.010.

ANALYSIS: Landscaping shall be maintained within the clear vision areas in accordance with SZCDC § 16.58.010, which is required by Condition of Approval B3.

FINDING: This standard is not met but can be satisfied by Condition of Approval B3.

7. Exceptions
a. For properties with an environmentally sensitive area and/or trees or woodlands that merit protection per Chapters 16.142 (Parks, Trees and Open Space) and 16.144 (Wetland, Habitat and Natural Areas) the landscaping standards may be reduced, modified or

"shifted" on-site where necessary in order to retain existing vegetation that would otherwise be removed to meet the above referenced landscaping requirements.

b. The maximum reduction in required landscaping buffer permitted through this exception process shall be no more than fifty (50) percent. The resulting landscaping buffer after reduction may not be less than five (5) feet in width unless otherwise permitted by the underlying zone. Exceptions to the required landscaping may only be permitted when reviewed as part of a land use action application and do not require a separate variance permit.

ANALYSIS: An exception or reduction to the landscaping standards is not required or requested.

FINDING: This standard is not applicable.

C. Screening of Mechanical Equipment, Outdoor Storage, Service and Delivery Areas

All mechanical equipment, outdoor storage and manufacturing, and service and delivery areas, shall be screened from view from all public streets and any adjacent residential zones. If unfeasible to fully screen due to policies and standards, the applicant shall make efforts to minimize the visual impact of the mechanical equipment.

ANALYSIS: The proposal is for a residential subdivision and new mechanical, outdoor storage, and service and delivery areas are not proposed at this time. Screening of mechanical equipment for the new homes will be reviewed at time of building permits.

FINDING: This standard is met.

D. Visual Corridors

Except as allowed by subsection 6. above, new developments shall be required to establish landscaped visual corridors along Highway 99W and other arterial and collector streets, consistent with the Natural Resources and Recreation Plan Map, Appendix C of the Community Development Plan, Part II, and the provisions of Chapter 16.142 (Parks, Trees, and Open Space). Properties within the Old Town Overlay are exempt from this standard.

ANALYSIS: The subject site has frontage along SW Brookman Road which is classified as an arterial street in the City's Transportation System Plan. The development is

required to establish a 15 ft. wide landscaped visual corridor in accordance with SZCDC § 16.142.040.

FINDING: This criterion is addressed below under SZCDC § 16.142.040.

16.92.040 Installation and Maintenance Standards

A. Installation

All required landscaping must be in-ground, except when in raised planters that are used to meet minimum Clean Water Services storm water management requirements. Plant materials must be installed to current nursery industry standards. Plant materials must be properly supported to ensure survival. Support devices such as guy wires or stakes must not interfere with vehicular or pedestrian movement.

B. Maintenance and Mitigation of Landscaped Areas

1. Maintenance of existing non-invasive native vegetation is encouraged within a development and required for portions of the property not being developed.

2. All landscaping shall be maintained in a manner consistent with the intent of the approved landscaping plan.

3. Any required landscaping trees removed must be replanted consistent with the approved landscaping plan and comply with § 16.142, (Parks, Trees and Open Space).

ANALYSIS: The applicant has provided installation and maintenance standards for the open space landscaping in accordance with the standards above (Exhibit A15 – Sheets L1 – L2).

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL G1: Prior to Acceptance of the Public Improvements, landscaping for the open space areas shall be installed to nursey standards and in accordance with the approved landscaping plans.

C. Irrigation

The intent of this standard is to ensure that plants will survive the critical establishment period when they are most vulnerable due to lack of watering. All landscaped areas must provide an irrigation system, as stated in Option 1, 2, or 3.

1. Option 1: A permanent built-in irrigation system with an automatic controller installed.

2. Option 2: An irrigation system designed and certified by a licensed landscape architect or other qualified professional as

part of the landscape plan, which provides sufficient water to ensure that the plants become established. The system does not have to be permanent if the plants chosen can survive independently once established.

3. **Option 3: Irrigation by hand. If the applicant chooses this option, an inspection will be required one (1) year after final inspection to ensure that the landscaping has become established.**

ANALYSIS: The Preliminary Planting Legend (Exhibit A15 – Sheet L2) indicates that an automatic underground sprinkler system will be designed and installed by the contractor.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL G2: Prior to Acceptance of the Public Improvements, all common landscaped areas must have an irrigation system in accordance with SZCDC § 16.92.040(C).

Chapter 16.94 OFF-STREET PARKING AND LOADING
16.94.010 General Requirements

A. Off-Street Parking Required

No site shall be used for the parking of vehicles until plans are approved providing for off-street parking and loading space as required by this Code. Any change in uses or structures that reduces the current off-street parking and loading spaces provided on site, or that increases the need for off-street parking or loading requirements shall be unlawful and a violation of this Code, unless additional off-street parking or loading areas are provided in accordance with Section 16.94.020, or unless a variance from the minimum or maximum parking standards is approved in accordance with Chapter 16.84 Variances.

ANALYSIS: The proposal is for a 28-lot single family detached residential subdivision. SZCDC § 16.94.020 requires one (1) off street parking space per dwelling unit for single family and two-family residences on a lot. The applicant is proposing a minimum of one off-street parking space located on the private driveway of each lot. The applicant's narrative indicates an additional two off-street parking spaces will be provided in the garage of each residence; however, garage space cannot be counted towards meeting the off-street parking minimum per SZCDC § 16.94.010(E)(1). The proposal meets the applicable sections of this chapter, as described below.

FINDING: This criterion is met.

B. Deferral of Improvements

Off-street parking and loading spaces shall be completed prior to the issuance of occupancy permits, unless the City determines that weather conditions, lack of available surfacing materials, or other circumstances beyond the control of the applicant make completion impossible. In such circumstances, security equal to one hundred twenty five (125) percent of the cost of the parking and loading area is provided the City. "Security" may consist of a performance bond payable to the City, cash, certified check, or other assurance of completion approved by the City. If the installation of the parking or loading area is not completed within one (1) year, the security may be used by the City to complete the installation.

ANALYSIS: The application is for land use approval and does not include issuance of building permits. Off-street parking will be provided at time of home construction on individual lots.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL H1: Prior to occupancy of structures, one off-street parking space per dwelling unit shall be provided.

***

D. Prohibited Uses

Required parking, loading and maneuvering areas shall not be used for long-term storage or sale of vehicles or other materials, and shall not be rented, leased or assigned to any person or organization not using or occupying the building or use served.

ANALYSIS: The applicant's narrative states that no prohibited uses are proposed for the off-street parking area.

FINDING: This criterion is met.

E. Location

1. Residential off-street parking spaces:

a. Shall be located on the same lot or development as the residential use.

b. Shall not include garages or enclosed buildings with the exception of a parking structure in multifamily developments where three (3) or more spaces are not

individually enclosed. (Example: Underground or multi-level parking structures).

2. **For other uses, required off-street parking spaces may include adjacent on-street parking spaces, nearby public parking and shared parking located within five hundred (500) feet of the use. The distance from the parking, area to the use shall be measured from the nearest parking space to a building entrance, following a sidewalk or other pedestrian route. The right to use private off-site parking must be evidenced by a recorded deed, lease, easement, or similar written notarized letter or instrument.**
3. **Vehicle parking is allowed only on improved parking shoulders that meet City standards for public streets, within garages, carports and other structures, or on driveways or parking lots that have been developed in conformance with this code. Specific locations and types of spaces (car pool, compact, etc.) for parking shall be indicated on submitted plans and located to the side or rear of buildings where feasible.**
    a. **All new development with forty (40) employees or more shall include preferential spaces for carpool/vanpool designation. Carpool and vanpool parking spaces shall be located closer to the main employee entrance than all other parking spaces with the exception of ADA parking spaces. Carpool/vanpool spaces shall be clearly marked as reserved for carpool/vanpool only.**
    b. **Existing development may redevelop portions of designated parking areas for multi-modal facilities (transit shelters, park and ride, and bicycle parking), subject to meeting all other applicable standards, including minimum space standards.**

ANALYSIS: Residential off-street parking spaces are required to be on the same lot as the residential use and cannot include garages or structures unless part of a multi-family development. The applicant is proposing a minimum of one off-street parking space to be located in the driveway of each lot.

FINDING: These standards are met.

F. Marking

All parking, loading or maneuvering areas shall be clearly marked and painted. All interior drives and access aisles shall be clearly

marked and signed to show the direction of flow and maintain vehicular and pedestrian safety.

ANALYSIS: The off-street parking spaces will be located on the private driveway of each lot and marking is not required.

FINDING: This standard does not apply.

G. Surface and Drainage

1. All parking and loading areas shall be improved with a permanent hard surface such as asphalt, concrete or a durable pervious surface. Use of pervious paving material is encouraged and preferred where appropriate considering soils, location, anticipated vehicle usage and other pertinent factors.

2. Parking and loading areas shall include storm water drainage facilities approved by the City Engineer or Building Official.

ANALYSIS: Private driveways will be installed during construction of each residential lot. The applicant's narrative indicates the driveways will be sloped away from the garage in order to drain into the street which will then be conveyed and treated by the proposed stormwater management system for the development.

FINDING: This standard is met.

H. Repairs

Parking and loading areas shall be kept clean and in good repair. Breaks in paved surfaces shall be repaired. Broken or splintered wheel stops shall be replaced. Painted parking space boundaries and directional symbols shall be maintained in a readable condition.

ANALYSIS: Once constructed, driveways and parking space maintenance will be the responsibility of individual property owners.

FINDING: This standard is met.

I. Parking and Loading Plan

An off-street parking and loading plan, drawn to scale, shall accompany requests for building permits or site plan approvals, except for single and two-family dwellings, and manufactured homes on residential lots. The plan shall show but not be limited to:

1. Delineation of individual parking and loading spaces and dimensions.

2. **Circulation areas necessary to serve parking and loading spaces.**
3. **Location of accesses to streets, alleys and properties to be served, and any curb cuts.**
4. **Landscaping as required by Chapter 16.92.**
5. **Grading and drainage facilities.**
6. **Signing and bumper guard specifications.**
7. **Bicycle parking facilities as specified in Section 16.94.020.C.**
8. **Parking lots more than one (1) acre in size shall provide street-like features including curbs, sidewalks, and street trees or planting strips.**

ANALYSIS: The proposal is for a single family residential subdivision and a parking plan is not required.

FINDING: This section is not applicable.

J. Parking Districts

The City may establish a parking district (i.e., permits or signage) in residential areas in order to protect residential areas from spillover parking generated by adjacent commercial, employment or mixed-use areas, or other uses that generate a high demand for parking. The district request shall be made to the City Manager, who will forward a recommendation to the City Council for a decision. Structured parking and on-street parking are exempt from the parking space maximums in Section 16.94.020.A.

ANALYSIS: The proposal is for a single family residential subdivision. The surrounding property in all directions is zoned for residential uses and a parking district is not proposed or required at this time. If parking becomes an issue in the future, the City may implement a parking district plan at that time.

FINDING: This section is not applicable.

16.94.020 Off-Street Parking Standards

A. Generally

Where square feet are specified, the area measured shall be the gross building floor area primary to the functioning of the proposed use. Where employees are specified, persons counted shall be those working on the premises, including proprietors, during the largest shift at peak season. Fractional space requirements shall be counted as a whole space. The Review Authority may determine alternate off-street parking and loading requirements for a use not specifically

listed in this Section based upon the requirements of comparable uses.

Table 1: Minimum and Maximum Parking Standards
(Metro spaces are based on 1 per 1,000 sq ft of gross leasable area)

Use	Minimum Parking Standard	Maximum Permitted Parking Zone A[1]	Maximum Permitted Parking Zone B[2]
Single, two-family and manufactured home on lot [3]	1 per dwelling unit	None	None

[3] If the street on which the house has direct access does not permit on-street parking or is less than twenty-eight (28) feet wide, two (2) off-street parking spaces are required per single-family residential unit. (includes single-family detached or attached, two-family dwelling or a manufactured home on an individual lot) If the abutting street is twenty-eight (28) feet or wider, one (1) standard (9 ft. × 20 ft.) parking space is required.

ANALYSIS: The proposal is for a 28-lot single family residential subdivision. One (1) off-street parking space is required per lot. The applicant is proposing one off-street parking space per lot which will be located in the private driveway serving each residence. Condition of Approval H1 above requires parking spaces to be installed prior to occupancy of each residence. The width of the proposed local streets is 28 ft. wide with on-street parking allowed. An additional off-street parking is not required per footnote 3.

FINDING: This standard is met.

B. Dimensional and General Configuration Standards

1. Dimensions For the purpose of this Chapter, a "parking space" means a stall nine (9) feet in width and twenty (20) feet in length. Up to twenty five (25) percent of required parking spaces may have a minimum dimension of eight (8) feet in width and eighteen (18) feet in length so long as they are signed as compact car stalls.

ANALYSIS: The minimum garage setback is 20 ft. in the MDRL zone and will allow for a minimum driveway length of 20 ft. on each lot. As required by SZCDC § 16.96.020 below, the minimum driveway width for single-family residential driveways is 10 ft. Therefore, each private driveway will be a minimum of 20 ft. in length by 10 ft. wide.

FINDING: This standard is met.

***

Chapter 16.96 - ONSITE CIRCULATION
16.92.010 – On-Site Pedestrian and Bicycle Circulation

A. Purpose

On-site facilities shall be provided that accommodate safe and convenient pedestrian access within new subdivisions, multi-family developments, planned unit developments, shopping centers and commercial districts, and connecting to adjacent residential areas and neighborhood activity centers within one-half mile of the development. Neighborhood activity centers include but are not limited to existing or planned schools, parks, shopping areas, transit stops or employment centers. All new development, (except single-family detached housing), shall provide a continuous system of private pathways/sidewalks.

ANALYSIS: The proposal is for a subdivision and this section applies. As shown in the Circulation and Future Development Plan (Exhibit A15 – Sheet P11), the subdivision will provide continuous pathway system that provides safe and convenient to neighborhood activity centers, namely the proposed park system. The pedestrian circulation system has also been designed to connect to the pathway system on adjacent developments including the Middlebrook (SUB 18-02) and Reserve at Cedar Creek (SUB 19-02) subdivisions.

FINDING: This criterion is met.

B. Maintenance

No building permit or other City permit shall be issued until plans for ingress, egress and circulation have been approved by the City. Any change increasing any ingress, egress or circulation requirements, shall be a violation of this Code unless additional facilities are provided in accordance with this Chapter.

ANALYSIS: Pedestrian circulation plans are being reviewed and approved as part of this application. Changes to the proposed circulation shall be in accordance with chapter.

FINDING: This criterion is met.

C. Joint Access

Two (2) or more uses, structures, or parcels of land may utilize the same ingress and egress when the combined ingress and egress of

all uses, structures, or parcels of land satisfied the other requirements of this Code, provided that satisfactory legal evidence is presented to the City in the form of deeds, easements, leases, or contracts to clearly establish the joint use.

ANALYSIS: Joint access to the individually platted lots is not proposed.

FINDING: This standard does not apply.

D. Connection to Streets

1. Except for joint access per this Section, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways with paved sidewalk.

2. Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or elevators to the public sidewalk or curb of the public street which provides required ingress and egress.

ANALYSIS: As shown in the Preliminary Plat, each lot will have access to a public street. While Lot 28 will face a short private drive, the orientation does not preclude the placement of a private pathway from the ground floor entrance to the public sidewalk. The applicant's narrative indicates a private pathway extend from the ground floor entrance of each residence to the public sidewalk and will be installed with home construction.

FINDING: This standard is met.

E. Maintenance of Required Improvements

Required ingress, egress and circulation improvements shall be kept clean and in good repair.

ANALYSIS: The applicant's narrative indicates that after construction, ingress and egress improvements will be maintained by the individual homeowner adjacent to the improvement or by another legal entity such as a homeowner's association.

FINDING: This criterion is met.

F. Access to Major Roadways

Points of ingress or egress to and from Highway 99W and arterials designated on the Transportation Plan Map, attached as Appendix C of the Community Development Plan, Part II, shall be limited as follows:

1. **Single and two-family uses and manufactured homes on individual residential lots developed after the effective date of this Code shall not be granted permanent driveway ingress or egress from Highway 99W and arterial roadways. If alternative public access is not available at the time of development, provisions shall be made for temporary access which shall be discontinued upon the availability of alternative access.**
2. **Other private ingress or egress from Highway 99W and arterial roadways shall be minimized. Where alternatives to Highway 99W or arterials exist or are proposed, any new or altered uses developed after the effective date of this Code shall be required to use the alternative ingress and egress.**
3. **All site plans for new development submitted to the City for approval after the effective date of this Code shall show ingress and egress from existing or planned local or collector streets, consistent with the Transportation Plan Map and Section VI of the Community Development Plan.**

G. Service Drives

Service drives shall be provided pursuant to Section 16.94.030.

ANALYSIS: The site has frontage on SW Brookman Road which is classified as an arterial street in the City's Transportation System Plan. As shown on the Preliminary Plat, all vehicle access to individual lots will be provided via local streets. Vehicle access is not proposed from an arterial. Service drives are also not proposed.

FINDING: These standards are met.

16.96.020 Minimum - Residential standards

Minimum standards for private, on-site circulation improvements in residential developments:

A. Driveways

1. **Single-Family: One (1) driveway improved with hard surface pavement with a minimum width of ten (10) feet, not to exceed a grade of 14%. Permeable surfaces and planting strips between driveway ramps are encouraged in order to reduce stormwater runoff.**

ANALYSIS: The applicant's narrative indicates each lot is planned to have a paved hard surface driveway which will be greater than 10 ft. in width and less than 14% grade.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL H2: Prior to the issuance of building permits, the final design of each driveway shall be reviewed and approved by the City of Sherwood.

****

16.96.040 - On-Site Vehicle Circulation

A. Maintenance

No building permit or other City permit shall be issued until plans for ingress, egress and circulation have been approved by the City. Any change increasing any ingress, egress or circulation requirements, shall be a violation of this Code unless additional facilities are provided in accordance with this Chapter.

ANALYSIS: The proposed subdivision will be accessed from two new public streets, SW Wapato Lake Drive and SW Trillium Lane. The local access is being reviewed and approved as part of this application and will be reviewed in more detail through a public improvement plan review by the City's engineering department.

FINDING: This criterion is met.

B. Joint Access [See also Chapter 16.108]

Two (2) or more uses, structures, or parcels of land are strongly encouraged to utilize jointly the same ingress and egress when the combined ingress and egress of all uses, structures, or parcels of land satisfy the other requirements of this Code, provided that satisfactory legal evidence is presented to the City in the form of deeds, easements, leases, or contracts to clearly establish the joint use. In some cases, the City may require a joint access to improve safety, vision clearance, site distance, and comply with access spacing standards for the applicable street classification.

ANALYSIS: Joint access to private lots is not proposed. Each lot will have a single access point from a public or private street.

FINDING: This standard is met.

C. Connection to Streets

1. Except for joint access per this Section, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways.

2. Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or

elevators to the public sidewalk or curb of the public street which provides required ingress and egress.

ANALYSIS: As shown on the Preliminary Plat, all proposed lots will have direct vehicle access to a public street with the exception of Lots 25 and 28. As discussed in this report, Lot 25 can meet the dimensional standards without utilizing a private drive. The condition to remove Tract D from the plat is further supported by the requirements of this section.

Lot 28 is proposing to provide ingress and egress to the parcel via a private drive (Tract C) in order to meet the lot depth requirement of 80 ft. The tract will only be serving Lot 28 and will serve as the direct access to the public street.

FINDING: These standards are met.

D. Maintenance of Required Improvements
Required ingress, egress and circulation improvements shall be kept clean and in good repair.

E. Service Drives
Service drives shall be provided pursuant to Section 16.94.030.

ANALYSIS: As described above, the applicant's narrative indicates that after construction, ingress and egress improvements will be maintained by the individual homeowner adjacent to the improvement or by another legal entity such as a homeowners association. No service drives are proposed.

FINDING: These criteria are met.

DIVISION VIII ENVIRONMENTAL RESOURCES

Chapter 16.134 - FLOODPLAIN (FP) OVERLAY
16.134.010 - Generally
Special resource zones are established to provide for preservation, protection, and management of unique natural and environmental resources in the City that are deemed to require additional standards beyond those contained elsewhere in this Code. Special resource zones may be implemented as underlying or overlay zones depending on patterns of property ownership and the nature of the resource. A property or properties may be within more than one resource zone. In addition, the City may identify special resource areas and apply a PUD overlay zone in advance of any development in order to further protect said resources. The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled, "The Flood Insurance Study for Washington County, Oregon and Incorporated Areas," (flood

insurance study) dated October 19, 2018, with accompanying Flood Insurance Maps are hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study is on file with the Sherwood City Engineer at Sherwood City Hall.

16.134.020 - Purpose

The purpose of this ordinance is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by complying with the provisions of this chapter.

- **A. The FP zoning district is an overlay district that controls and regulates flood hazard areas in order to protect the public health, safety and general welfare; to reduce potential flood damage losses; and to protect floodways and natural drainageways from encroachment by uses which may adversely affect water quality and water flow and subsequent upstream or downstream flood levels. The FP zone shall be applied to all areas within the base flood, and shall supplement the regulations of the underlying zoning district.**
- **B. FP zoning districts are areas within the base flood as identified by the Federal Emergency Management Agency (FEMA) in a Flood Insurance Study (FIS) and in Flood Insurance Rate Maps (FIRM) published for the City and surrounding areas, or as otherwise identified in accordance with Section 16.134.020C. These FEMA documents are adopted by reference as part of this Code, and are on file at the City.**
- **C. When base flood elevation data is not available from the FIS or FIRM, the City shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, state, or other source, and standards developed by the FEMA, in order to administer the provisions of this Code.**
- **D. In areas where a regulatory floodway has not been designated, and where the Flood Insurance Study indicates that it is possible to calculate a floodway, no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.**

ANALYSIS: Cedar Creek and its associated floodplain intersects the southeast corner of the site. A portion of the property is located within the base flood zone or “Special Flood Hazard Areas” as shown in the FIRM map for the area dated (Exhibit C2). The applicant’s narrative indicates the base flood elevation of Cedar Creek site is

approximately 178.7 ft. above mean sea level as it enters the southwest corner of the while the lowest elevation on the site is approximately 170 ft at the northeast corner.

FINDING: A portion of the subject site is located within the base flood zone and this chapter applies.

6.134.030 - Greenways

The FP zoning districts overlaying the Rock Creek and Cedar Creek floodplains are designated greenways in accordance with Chapter 5 of the Community Development Plan. All development in these two floodplains shall be governed by the policies in Division V, Chapter 16.142 of this Code, in addition to the requirements of this Section and the Clean Water Services Design and Construction Standards R&O 07-20, or its replacement.

ANALYSIS: The Cedar Creek floodplain is identified as a major natural resource in Chapter 5 of the City's Community Development Plan. The Preliminary Grading and Erosion Control Plan (Exhibit A15 – Sheet P6) shows the 100-year floodplain as being located entirely within proposed Tract B. Tract B will be dedicated to the City as an open space tract as described in Condition of Approval B5. The development also complies or is conditioned to comply with the applicable sections of SZCDC § 16.142 as described below. Clean Water Services has provided comments and conditions on the application which are included as Exhibit C6.

FINDING: The application complies or is conditioned to comply with the applicable greenway requirements. This criterion is met.

16.134.040 - Development Review and Floodplain Administrator Duties

- **A. The City Engineer is the designated local Floodplain Administrator and is responsible for maintaining local floodplain management records for the City.**
- **B. Provided land is not required to be dedicated as per Section 16.134.030, a conditional use permit (CUP) is required before any use, construction, fill, or alteration of a floodplain, floodway, or watercourse, or any other development begins within any FP zone, except as provided in Section 16.134.050.**
- **C. Application for a CUP for development in a floodplain shall conform to the requirements of Chapter 16.82 and may include, but is not limited to, plans and scale drawings showing the nature, location, dimensions, and elevations of the area in question, existing or proposed structures, fill, storage of materials, and drainage facilities.**
- **D. The following specific information is required in a floodplain CUP application and shall be certified and verified by a registered civil engineer or architect. The City shall maintain such certifications as**

part of the public record. All certifications shall be based on the as-built elevations of lowest building floors.

1. **Elevations in relation to the current FIRM and FIS of the lowest floor (including basement) of all structures;**
2. **Elevations in relation to the current FIRM and FIS to which any structure has been flood proofed.**
3. **That the flood proofing methods for any structure meet the requirements of this section, Floodplain Structures.**
4. **Description of the extent to which any watercourse will be altered or relocated as a result of the proposed development.**
5. **A base flood survey and impact study made by a registered civil engineer.**
6. **Proof all necessary notifications have been sent to, and permits have been obtained from, those federal, state, or other local government agencies for which prior approval of the proposed development is required.**
7. **Any other information required by this section, by any applicable federal regulations, or as otherwise determined by the City to be necessary for the full and proper review of the application.**

E. The floodplain administrator shall review all development permits to determine if the proposed development is located in the floodway. If located in the floodway, assure that the encroachment provisions of Section 16.134.070.F are met.

F. Where base flood elevation data is provided through the Flood Insurance Study, FIRM or required under Section 16.134.020.C the local Floodplain Administrator shall:

1. **Obtain and record the actual elevation (in relation to mean sea level) of the lowest floor (including basement) of all new and substantially improved structures, and**
2. **If the structure has been floodproofed in accordance with Sections 16.134.090.A.3 and D.1.a, then obtain the elevation (in relation to mean sea level) to which the structure was floodproofed, and**
3. **Maintain all elevation and floodproofing certificates required under Section 16.134.040.D, and**
4. **Maintain for public inspection all records pertaining to the provisions of this ordinance.**

G. Where elevation data is not available as per subsection D of this section, or from other sources as per Section 16.134.020.C, a floodplain CUP shall be reviewed using other relevant data, as determined by the City, such as historical information, high water marks, and other evidence of past flooding. The City may require

utility structures and habitable building floor elevations, and building flood proofing, to be at least two feet above the probable base flood elevation, in such circumstances where more definitive flood data is not available.

H. The floodplain administrator shall:

1. Notify adjacent communities, the Department of Land Conservation and Development and other appropriate state and federal agencies, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration as required in Section 16.134.100.C.

2. Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

I. The floodplain administrator shall make interpretations where needed, as to exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation. Such appeals shall be granted consistent with the standards of Section 60.6 of the Rules and Regulations of the National Flood Insurance Program (44 CFR 59-76).

J. Variances to any standard within the floodplain overlay shall comply with the provisions of the Code of Federal Regulations (CFR) section 44 CFR 60.6(a)(1)—(7).

16.134.050 - Permitted Uses

In the FP zone the following uses are permitted outright, and do not require a CUP, provided that floodway flow, or floodplain capacity, will not be impeded, as determined by the City, and when greenway dedication is not required as per Section 16.134.030.

A. Agricultural uses, provided that associated structures are not allowed, except for temporary building and boundary fences that do not impede the movement of floodwaters and flood-carried materials.

B. Open space, park and recreational uses, and minor associated structures, if otherwise allowed in the underlying zoning district that do not impede the movement of floodwaters and flood-carried materials.

C. Public streets and appurtenant structures, and above and underground utilities, subject to the provisions of Sections 16.134.080 and 16.134.090.

D. Other accessory uses allowed in the underlying zoning district that do not involve structures, and will not, in the City's determination, materially alter the stability or storm drainage absorption capability of the floodplain.

16.134.060 - Conditional Uses

In the FP zone the following uses are permitted as conditional uses, subject to the provisions of this Section and Chapter 16.82, when greenway dedication is not required as per this Section.

Greenways:

A. Any permitted or conditional use allowed in the underlying zoning district, when located in the flood fringe only, as specifically defined by this Code.

16.134.070 - Prohibited Uses

In the FP zone the following uses are expressly prohibited:

A. The storage or processing of materials that are buoyant, flammable, contaminants, explosive, or otherwise potentially injurious to human, animal or plant life.

B. Public and private sewerage treatment systems, including drainfields, septic tanks and individual package treatment plants.

C. Any use or activity not permitted in the underlying zoning district.

D. Any use or activity that, in the City's determination, will materially alter the stability or storm drainage absorption capability of the floodplain.

E. Any use or activity that, in the City's determination, could create an immediate or potential hazard to the public health, safety and welfare, if located in the floodplain.

F. Any use, activity, or encroachment located in the floodway, including fill, new construction, improvements to existing developments, or other development, except as otherwise allowed by Section 16.134.050 and unless certification by a registered professional engineer or architect is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the use, activity, or encroachment will not result in any increase to flood levels during the occurrence of the base flood discharge.

a. If paragraph F of this section is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard provisions of Sections 16.134.080 and .090, or ASCE 24, whichever is more stringent.

G. The storage of recreational vehicles. This is the most restrictive provision wherein.

ANALYSIS: The base flood elevation data for the site is shown on a FIRM map provided as (Exhibit C2). The base flood area is also shown on the applicant's plans and no permanent impacts to the Cedar Creek floodplain are proposed. A new Community Trail will be located just north of the 100-year floodplain. In order to confirm the location of the base flood, an elevation certificate is required.

The Brookman Sewer Trunk Line is proposed to align in the general area of the Community Trail that is proposed along the north side of Cedar Creek. The trunk line is being constructed by the developer of Middlebrook Subdivision and is being reviewed and approved separate from this application. No prohibited uses are proposed within the floodplain and no development is proposed that requires a CU permit.

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL E1: Prior to Final Approval of Engineering Plans, a Flood Plain Certificate for the site flood plain elevation shall be submitted to the City for its records.

RECOMMENDED CONDITION OF APPROVAL H3: Prior to Grant of Occupancy, for each residential structure constructed within the subdivision and abutting the Flood Plain corridor, a completed FEMA Elevation Certificate Form shall be submitted to the City for its records.

RECOMMENDED CONDITION OF APPROVAL E2: Prior to Final Approval of Engineering Plans, a finalized NPDES 1200-C Permit issued by CWS shall be submitted to the City for its records.

RECOMMENDED CONDITION OF APPROVAL G3: Prior to Final Acceptance of Constructed Public Improvements, all conditions of the CWS Service Provider Letter (CWS File No. 20-000663) shall have been constructed and received final inspection approval by the City, in conformance with the conditions and requirements of the SPL.

16.134.080 - Floodplain Development

A. Floodplain Alterations

1. Floodplain Survey

The floodplain, including the floodway and flood fringe areas, shall be surveyed by a registered land surveyor or civil engineer, and approved by the City, based on the findings of the flood insurance study and other available data. Such delineation shall be based on the current FIRM and FIS data and be field-located from recognized valid benchmarks.

2. Grading Plan

Alteration of the existing topography of floodplain areas may be made upon approval of a grading plan by the City. The plan shall include both existing and proposed topography and a plan for alternate drainage. Contour intervals for existing and proposed topography shall be included and shall be not more than one foot for ground slopes up to five percent (5%) and for areas immediately adjacent to a stream or drainage way, two feet for ground slopes between five and ten percent (5% to 10%), and five feet for greater slopes.

3. Fill and Diked Lands

a. Proposed floodplain fill or diked lands may be developed if a site plan for the area to be altered within the floodplain is prepared and certified by a registered civil engineer and approved by the Commission pursuant to the applicable provisions of this Code.

b. Vehicular access shall be provided from a street above the elevation of the base flood to any proposed fill or dike area if the area supports structures for human occupancy. Unoccupied fill or dike areas shall be provided with emergency vehicle access.

4. Alteration Site Plan

a. The certified site plan prepared by a registered civil engineer or architect for an altered floodplain area shall show that:

(1) Proposed improvements will not alter the flow of surface water during flooding such as to cause a compounding of flood hazards or changes in the direction or velocity of floodwater flow.

(2) No structure, fill, storage, impervious surface or other uses alone, or in combination with existing or future uses, will materially reduce the capacity of the floodplain or increase in flood heights.

(3) Proposed floodplain fill or diked areas will benefit the public health, safety and welfare and incorporate adequate erosion and storm drainage controls, such as pumps, dams and gates.

(4) No serious environmental degradation shall occur to the natural features and existing ecological balance of upstream and downstream areas.

(5) On-going maintenance of altered areas is provided so that flood-carrying capacity will not be diminished by future erosion, settling, or other factors.

b. Applicants must obtain a conditional letter of map revision (CLOMR) from FEMA before any encroachment, including fill, new construction, substantial improvement, or other development, in the regulatory floodway is permitted. Applicants are responsible for preparing technical data to support the CLOMR application and paying any processing or application fees to FEMA.

ANALYSIS: As described above, no development is proposed within the floodplain. Condition of Approval E1 requires certification of the base flood zone prior to approval of the final engineering plans.

FINDING: This section is not applicable.

5. Subdivisions and Partitions

All proposed subdivisions or partitions including land within an FP zone must establish the boundaries of the base flood by survey and dedicate said land as per Section 16.134.030. The balance of the land and development must:

a. Be designed to include adequate drainage to reduce exposure to flood damage, and have public sewer, gas, electrical and other utility systems so located and constructed to minimize potential flood damage, as determined by the City.

b. Provide for each parcel or lot intended for structures, a building site which is at or above the base flood elevation, and meets all setback standards of the underlying zoning district.

c. Where base flood elevation data is not provided, or is not available from an authoritative source, it shall be generated by the applicant for subdivision proposals and other proposed developments which contain at least fifty (50) lots or five acres, whichever is less.

ANALYSIS: The base flood has been identified using recent FEMA maps and is identified on the plans. The actual location of the base flood will be verified by an Elevation Certificate required by Condition of Approval E1 above. The land within the base flood zone is entirely within Tract B and will be dedicated to the City in accordance with the requirement above.

The applicant's narrative and Preliminary Storm Drainage Report (Exhibit A10) demonstrate the development has been designed to include adequate drainage and

reduce exposure to flood damage. The proposed utilities are located outside of the floodplain and will be constructed to minimize flood damage. The final location and design of utilities will occur with review of the final engineering plans.

As shown in the Conceptual Building Setback Plan (Exhibit A15 – Sheet P4) all lots are located out of the base flood and can accommodate a single-family residential structure. Condition of Approval H3 is recommended in the section below to ensure the homes on Lots 21 – 28 (adjacent to Cedar Creek) comply with the floodplain requirements.

FINDING: The standards are met.

16.134.090 - Floodplain Structures
Structures in the FP zone permitted in accordance with this section, shall be subject to the following conditions, in addition to the standards of the underlying zoning district:

A. Generally

1. All structures, including utility equipment, and manufactured housing dwellings, shall be anchored to prevent lateral movement, floatation, or collapse during flood conditions, and shall be constructed of flood-resistant materials, to standards approved by the City, State Structural and Plumbing Specialty Codes and applicable building codes.

2. The lowest floor elevation of a structure designed for human occupancy must be at least one and one-half feet above the base flood elevation and the building site must comply with the provisions of Section 16.134.080.A.

3. The lower portions of all structures shall be flood proofed according to the provisions of the State Structural and Plumbing Specialty Code to an elevation of at least one and one-half feet above the base flood elevation.

4. The finished ground elevation of any under floor crawl space shall be above the grade elevation of an adjacent street, or natural or approved drainage way unless specifically approved by the City. A positive means of drainage from the low point of such crawl space shall be provided.

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

ANALYSIS: As discussed in this report, no permanent structures are proposed within the 100-year floodplain. The applicant's narrative indicates that all construction will be situated to be at least one and one half feet above base flood elevation. A Condition of

Approval is recommended below to ensure the new residential structures adjacent to Cedar Creek comply with these requirements.

FINDING: These standards are met as conditioned below.

B. Utilities

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

2. Electrical service equipment, or other utility structures, shall be constructed at or above the base flood elevation. All openings in utility structures shall be sealed and locked.

3. Water supply and sanitary sewer systems (not prohibited under section 16.134.070.B shall be approved by the Washington County Health Department, and shall be designed to minimize or eliminate the infiltration of floodwaters into the systems, or any discharge from systems into floodwaters.

a. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding consistent with Washington County Health Authority and Oregon Department of Environmental Quality.

ANALYSIS: As shown in the Preliminary Composite Utility Plan (Exhibit A15 – Sheet P10), no utilities are proposed within the floodplain. An 8 ft. wide PUE for franchise utilities is proposed within the front setback of each lot which are located outside the floodplain. The applicant's narrative indicates all construction on the proposed lots will be at least one and one half feet above the base flood elevation.

FINDING: These standards are met by Condition of Approval B22.

C. Residential Structures

1. All residential structures shall have the lowest floor, including basement, elevated to at least one and one-half feet above the base flood elevation.

2. Fully enclosed areas below the lowest floor that are subject to flooding are not permitted unless they are designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a

registered engineer or architect, or must meet or exceed the following minimum criteria:

a. A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

b. The bottom of all openings shall be no higher than one foot above grade.

c. Openings may be equipped with screens, louvers, or other coverings or devices, provided they permit the automatic entry and exit of floodwaters.

3. Shall be constructed with materials resistant to flood damage.

ANALYSIS: The applicant's narrative states that all residential structures will be located at least one and one half feet above the base flood elevation. Condition of Approval H3 requires an Elevation Certificate to by submitted for each structure prior to occupancy. These standards will be met and confirmed with construction and occupancy of each home.

FINDING: These standards are met by Condition of Approval H3.

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Chapter 16.136 - PROCEDURES*

Chapter 16.142 Parks, Trees and Open Space

16.142.010 - Purpose

This Chapter is intended to assure the provision of a system of public and private recreation and open space areas and facilities consistent with this Code and applicable portions of Chapter 5 of the Community Development Plan Part 2. The standards of this section do not supersede the open space requirements of a Planned Unit Development, found in Chapter 16.40 - Planned Unit Development (PUD).

16.142.030 - Single-Family or Duplex Residential Subdivisions

A. A minimum of five percent (5%) of the net buildable site (after exclusion of public right-of-way and environmentally constrained areas) shall be maintained as "open space". Open space must include usable areas such as public parks, swimming and wading pools, grass areas for picnics and recreational play, walking paths, and other like space. The following may not be used to calculate open space:

1. **Required yards or setbacks.**
2. **Required visual corridors.**
3. **Required sensitive areas and buffers.**
4. **Any area required to meet a standard found elsewhere in this code.**

ANALYSIS: The proposal is for a single-family residential subdivision and 5% of the net buildable site is required as open space. The gross site area is 456,073 SF (10.47 acres). Exhibit A14 provided by the applicant calculates the net developable area to be 166,919 SF and the open space provided to be 31,219 SF of open space, equating to 18.7%. However, the calculations removed 32,069 SF of "Parks and Trails" (open space) from the gross site area. Since the percentage of open space is calculated as a fraction of the gross site area, open space should be included in the net buildable site prior to calculating the percentage. Utilizing the information provided in the Exhibit A14 with the above-mentioned correction, staff finds the net buildable site and open space areas to be the following:

Gross site area	10.47 acres (456,073 SF)
Area removed*	5.80 acres (252,703 SF)
Net buildable site	4.57 acres (203,370 SF)

**Public ROW and environmentally constrained areas*

Flood plain	*3.59 acres (156,182 SF)*
Vegetated Corridor outside FP	*0.73 acres (31,958 SF)*
Public Streets	*1.18 acres (51,293)*
Stormwater facility	*0.30 acres (13,270 SF)*
Total	*5.80 acres (252,703 SF)*

31,129 SF / 203,370 SF = 15.3% Open Space

The 15.7% open space will be a connected system of pocket parks, trails, and vegetated areas that connect the southwest corner of the site to the northeast corner of the site along the north side of Cedar Creek. The applicant's narrative indicates the open space system will primarily be improved with a network of walking paths creating approximately 0.25 lineal miles of pathways outside of the required concrete sidewalks and mid-block easement. The proposed size and type of open space meets the requirements of this section.

FINDING: The applicant is proposing approximately 15.7% open space which includes 0.25 lineal miles of off-street walking trails. This standard is met.

B. Enhanced streetscapes such as "boulevard treatments" in excess of the minimum public street requirements may count toward a maximum of 10,000 square feet of the open space requirement.

1. Example: if a 52-foot-wide right-of-way [ROW] is required for a 1,000 foot-long street and a 62-foot wide ROW with 5-foot additional plantings/meandering pathway is provided on each side of the street, the additional 10-foot-wide area x 1,000 linear feet, or 10,000 square feet, counts toward the open space requirement.

ANALYSIS: Enhanced streetscapes are not proposed.

FINDING: This standard does not apply.

C. The open space shall be conveyed in accordance with one of the following methods:

1. By dedication to the City as public open space (if acceptable to the City). Open space proposed for dedication to the City must be acceptable to the City Manager or the Manager's designee with regard to the size, shape, location, improvement, environmental condition, and budgetary and maintenance abilities;

2. By leasing or conveying title (including beneficial ownership) to a corporation, homeowners' association or other legal entity, with the City retaining the development rights to the open space. The terms of such lease or other instrument of conveyance must include provisions (e.g., maintenance, property tax payment, etc.) suitable to the City.

ANALYSIS: The applicant’s narrative indicates the open space will be conveyed to a future homeowner’s association, unless requested otherwise by the City or appropriate jurisdictional district. The proposed Tract B includes a pocket park at the northeast corner, the community trail, 100-year floodplain and vegetated corridor, and non-protected vegetated areas associated with the riparian corridor. The City will accept ownership of Tract B with the exception of the pocket park at the northeast corner of the tract which addressed under Condition of Approval B5. The pocket park shall be located in a separate tract and dedicated to the future HOA. An easement is also required over the community trail with maintenance responsibilities assigned to the HOA. The following summarizes the dedication and maintenance responsibilities that are required for the open space

Tract	Use	Dedication (Ownership)	Maintenance Responsibility & Method
Tract A	Open Space - pocket park	HOA	HOA via dedication deed and CC&Rs
Tract B – pocket park	Open Space - pocket park at northeast corner	HOA	HOA via dedication deed and CC&Rs
Tract B – trail	Open Space - trail	City of Sherwood	HOA via easement on plat and CC&Rs
Tract B – all areas outside of trail easement and pocket park	Open Space – sensitive and natural habitat, riparian vegetation	City of Sherwood	City of Sherwood via dedication deed

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B7: Prior to final plat approval, submit a draft deed to the City dedicating Tract A Open Space to the future HOA. The deed shall be recorded with the final plat.

RECOMMENDED CONDITION OF APPROVAL B8: Prior to final plat approval, submit draft CC&Rs to the City that describe how Tract A will be maintained by the future HOA. The final CC&Rs shall be recorded with the final plat.

RECOMMENDED CONDITION OF APPROVAL B9: Prior to final plat approval, provide a separate tract for the pocket park at the northeast corner of Tract B. Submit a draft deed that dedicates the new tract to the HOA. The deed shall be recorded with the final plat.

RECOMMENDED CONDITION OF APPROVAL B10: Prior to final plat approval, submit draft CC&Rs to the City that describe how the pocket park (to be located in a new tract) will be maintained by the future HOA. The final CC&Rs shall be recorded with the final plat.

RECOMMENDED CONDITION OF APPROVAL B11: Prior to final plat approval, submit draft CC&Rs to the City that describe how the community trail will be maintained by the future HOA. The final CC&Rs shall be recorded with the final plat.

D. The density of a single-family residential subdivision shall be calculated based on the net buildable site prior to exclusion of open space per this Section.

1. **Example: a 40,000 square foot net buildable site would be required to maintain 2,000 square feet (5%) of open space but would calculate density based on 40,000 square feet.**

ANALYSIS: As described in the analysis and findings for SZCDC § 16.12.010(C) above, the density was calculated prior to removing the “Parks and Trails”, or open space, from the net buildable site.

FINDING: This criterion is met.

E. If a proposed residential subdivision contains or is adjacent to a site identified as "parks" on the Acquisition Map of the Parks Master Plan (2006) or has been identified for acquisition by the Sherwood Parks and Recreation Board, establishment of open space shall occur in the designated areas if the subdivision contains the park site, or immediately adjacent to the parks site if the subdivision is adjacent to it.

ANALYSIS: The Cedar Creek corridor is identified as a potential acquisition site on the Acquisition Map of the 2006 Parks Master Plan. As required by this section, the applicant is dedicating Tract B to the City of Sherwood for open space purposes. Condition of Approval B5 above requires dedication of Tract B Open Space to the City of Sherwood.

FINDING: This criterion is met by Condition of Approval B5.

F. If the proposed residential subdivision does not contain or is not adjacent to a site identified on the Parks Master Plan map or otherwise identified for acquisition by the Parks and Recreation Board, the applicant may elect to convey off-site park/open space.

ANALYSIS: Tract B Open Space will be conveyed to the City as described above.

FINDING: This criterion does not apply.

G. This standard does not apply to a residential partition provided that a development may not use phasing or series partitions to avoid the minimum open space requirement. A partition of land that was part of an approved partition within the previous five (5) years shall be required to provide the minimum five percent (5%) open space in accordance with subsection (A) above.

ANALYSIS: A residential partition is not proposed.

FINDING: This standard does not apply.

H. The value of the open space conveyed under Subsection (A) above may be eligible for Parks System Development Charges (SDCs) credits based on the methodology identified in the most current *Parks and Recreation System Development Charges Methodology Report.*

ANALYSIS: The value of open space conveyed under Subsection (A) may be eligible for Park SDC credits as determined by the City Engineer.

FINDING: This criterion is met.

16.142.040 - Visual Corridors

A. Corridors Required

New developments located outside of the Old Town Overlay with frontage on Highway 99W, or arterial or collector streets designated on Figure 8-1 of the Transportation System Plan shall be required to establish a landscaped visual corridor according to the following standards:

	Category	Width
1.	**Highway 99W**	**25 feet**
2.	**Arterial**	**15 feet**
3.	**Collector**	**10 feet**

In residential developments where fences are typically desired adjoining the above described major street the corridor may be placed in the road right-of-way between the property line and the sidewalk. In all other developments, the visual corridor shall be on private property adjacent to the right-of-way.

ANALYSIS: The subject site has frontage along SW Brookman Rd. which is identified as an arterial street in the City's TSP. A 15 ft. wide landscaped visual corridor is required along this site frontage.

As shown in the Preliminary Plat, the applicant is proposing to a 15 ft. wide landscaped visual corridor in Tracts F & G. Where the arterial street abuts the required CWS Vegetated Corridor (located within Tract B), the open space is a minimum of 15 ft. in width and will remain as a natural / vegetated area meeting the intent of the vegetated corridor standard.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B12: Prior to final plat approval, provide draft deeds to the City that dedicate Tracts F & G to the future HOA. The final deed shall be recorded with the final plat.

RECOMMENDED CONDITION OF APPROVAL B13: Prior to final plat approval, provide draft CC&Rs that specify the HOA is responsible for the perpetual maintenance of Tracts F & G. The final CC&Rs shall be recorded with the final plat.

B. Landscape Materials

The required visual corridor areas shall be planted as specified by the review authority to provide a continuous visual and/or acoustical buffer between major streets and developed uses. Except as provided for above, fences and walls shall not be substituted for landscaping within the visual corridor. Uniformly planted, drought resistant street trees and ground cover, as specified in Section 16.142.060, shall be planted in the corridor by the developer. The improvements shall be included in the compliance agreement. In no case shall trees be removed from the required visual corridor.

ANALYSIS: Half street improvements to the arterial street (SW Brookman Rd.) are not required as part of this proposal and the space dedicated for right-of-way will remain undeveloped at this time. Tracts F & G contain existing mature trees and will be surrounded by natural areas until the street improvements. Given these conditions it is not practicable or desirable to have the developer install new landscaping in the visual corridor at this time. Once street improvements are made in front of the subject site, the HOA will be responsible for establishing and maintaining the visual corridor in conformance with these standards.

FINDING: This criterion is met.

C. Establishment and Maintenance

Designated visual corridors shall be established as a portion of landscaping requirements pursuant to Chapter 16.92. To assure continuous maintenance of the visual corridors, the review authority may require that the development rights to the corridor areas be dedicated to the City or that restrictive covenants be recorded prior to the issuance of a building permit.

ANALYSIS: As required by Condition of Approval B13, the HOA will be responsible for establishment and maintenance of the visual corridor.

FINDING: This criterion is met.

D. Required Yard

Visual corridors may be established in required yards, except that where the required visual corridor width exceeds the required yard width, the visual corridor requirement shall take precedence. In no case shall buildings be sited within the required visual corridor, with the exception of front porches on townhomes, as permitted in Section 16.44.010(E)(4)(c).

ANALYSIS: The visual corridor is not proposed to be in any required yards. Additionally, no buildings are proposed within the required visual corridors.

FINDING: This standard is met.

16.142.050 - Park Reservation

Areas designated on the Natural Resources and Recreation Plan Map, in Chapter 5 of the Community Development Plan, which have not been dedicated pursuant to Section 16.142.030 or 16.134.020, may be required to be reserved upon the recommendation of the City Parks Board, for purchase by the City within a period of time not to exceed three (3) years.

ANALYSIS: The subject site is not shown on the Natural Resources and Recreation Plan map as it was adopted prior to the Brookman Addition Concept Plan. However, the adjacent subdivisions have provided parks in accordance with the Brookman Addition Concept Plan as described in the findings and notice of decision for each subdivision. The proposed subdivision will preserve the Cedar Creek corridor as open space in accordance with the Brookman Addition Concept Plan.

FINDING: This criterion is met.

16.142.060: STREET TREES

A. Installation of Street Trees on New or Redeveloped Property.

Trees are required to be planted to the following specifications along public streets abutting or within any new development or re-development. Planting of such trees shall be a condition of development approval. The City shall be subject to the same standards for any developments involving City-owned property, or when constructing or reconstructing City streets. After installing street trees, the property owner shall be responsible for maintaining the street trees on the owner's property or within the right-of-way adjacent to the owner's property.

1. **Location: Trees shall be planted within the planter strip along a newly created or improved streets. In the event that a planter strip is not required or available, the trees shall be planted on private property within the front yard setback area or within public street right-of-way between front property lines and street curb lines or as required by the City.**
2. **Size: Trees shall have a minimum trunk diameter of two (2) caliper inches, which is measured six inches above the soil line, and a minimum height of six (6) feet when planted.**
3. **Types: Developments shall include a variety of street trees. The trees planted shall be chosen from those listed in 16.142.080 of this Code.**
4. **Required Street Trees and Spacing:**
   a. **The minimum spacing is based on the maximum canopy spread identified in the recommended street tree list in section 16.142.080 with the intent of providing a continuous canopy without openings between the trees. For example, if a tree has a canopy of forty (40) feet, the spacing between trees is forty (40) feet. If the tree is not on the list, the mature canopy width must be provided to the planning department by a certified arborist.**
   b. **All new developments shall provide adequate tree planting along all public streets. The number and spacing of trees shall be determined based on the type of tree and the spacing standards described in a. above and considering driveways, street light locations and utility connections. Unless exempt per c. below, trees shall not be spaced more than forty (40) feet apart in any development.**
   c. **A new development may exceed the forty-foot spacing requirement under section b. above, under the following circumstances:**
      (1) **Installing the tree would interfere with existing utility lines and no substitute tree is appropriate for the site; or**
      (2) **There is not adequate space in which to plant a street tree due to driveway or street light locations, vision clearance or utility connections, provided the driveways, street light or utilities could not be reasonably located elsewhere so as to accommodate adequate room for street trees; and**

(3) The street trees are spaced as close as possible given the site limitations in (1) and (2) above.

(4) The location of street trees in an ODOT or Washington County right-of-way may require approval, respectively, by ODOT or Washington County and are subject to the relevant state or county standards.

(5) For arterial and collector streets, the City may require planted medians in lieu of paved twelve-foot wide center turning lanes, planted with trees to the specifications of this subsection.

ANALYSIS: The applicant is proposing American Linden trees along the SW Trillium Lane and Pyramidal hornbeam trees for SW Wapato Lake Drive. The Preliminary Street Tree Plan (Exhibit A15 – Sheets L1 – L2) show the trees will be located in the sidewalk planter strip and be installed at the size requirements.

The City's Recommended Street List indicates the canopy spread of both trees is 40 ft. The scaled Preliminary Tree Plan (Exhibit A15 – Sheet L1) shows that no street trees will be spaced greater than 40 ft. unless adjacent to open space where existing mature trees provide canopy cover. The final location of street trees will be determined with the final plat and final engineering plan review.

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B14: Prior to final plat approval, a detailed street tree plan that complies with the size and spacing standards of SZCDC § 16.142.060 shall be submitted to the City.

16.142.070 Trees on Property Subject to Certain Land Use Applications

A. Generally

The purpose of this Section is to establish processes and standards which will minimize cutting or destruction of trees and woodlands within the City. This Section is intended to help protect the scenic beauty of the City; to retain a livable environment through the beneficial effect of trees on air pollution, heat and glare, sound, water quality, and surface water and erosion control; to encourage the retention and planting of tree species native to the Willamette Valley and Western Oregon; to provide an attractive visual contrast to the urban environment, and to sustain a wide variety and distribution of viable trees and woodlands in the community over time.

B. Applicability

All applications including a Type II - IV land use review, shall be required to preserve trees or woodlands, as defined by this Section to the maximum extent feasible within the context of the proposed land use plan and relative to other codes, policies, and standards of the City Comprehensive Plan.

FINDING: The application is for a Type III subdivision and this chapter applies. As described in the analysis and findings below, the development preserves trees and woodlands in accordance with this chapter.

FINDING: This criterion is met.

C. Inventory

1. To assist the City in making its determinations on the retention of trees and woodlands, land use applications including Type II - IV development shall include a tree and woodland inventory and report. The report shall be prepared by a qualified professional and must contain the following information:

a. Tree size (in DBH and canopy area)

b. Tree species

c. The condition of the tree with notes as applicable explaining the assessment

d. The location of the tree on the site

e. The location of the tree relative to the planned improvements

f. Assessment of whether the tree must be removed to accommodate the development

g. Recommendations on measures that must be taken to preserve trees during the construction that are not proposed to be removed.

2. In addition to the general requirements of this Section, the tree and woodland inventory's mapping and report shall also include, but is not limited to, the specific information outlined in the appropriate land use application materials packet.

3. Definitions for the inventory purposes of this Section

a. A tree is a living woody plant having a trunk diameter as specified below at Diameter at Breast Height (DBH). Trees planted for commercial agricultural purposes, and/or those subject to farm forest deferral, such as nut and fruit orchards and Christmas tree farms, are excluded from this definition and from regulation under this Section, as are any living woody plants under six (6)

inches at DBH. All trees six (6) inches or greater shall be inventoried.

b. A woodland is a biological community dominated by trees covering a land area of 20,000 square feet or greater at a density of at least fifty (50) trees per every 20,000 square feet with at least fifty percent (50%) of those trees of any species having a six (6) inches or greater at DBH. Woodlands planted for commercial agricultural purposes and/or subject to farm forest deferral, such as nut and fruit orchards and Christmas tree farms, are excluded from this definition, and from regulation under this Section.

c. A large stature tree is over 20 feet tall and wide with a minimum trunk diameter of 30 inches at DBH.

FINDING: This applicant has submitted a Preliminary Tree Preservation and Removal Plan (Exhibit A15 – Sheet P3) and an Arborist Report (Exhibit A8) that maps and describes trees as required by this section. Details of the preservation and removal plan are discussed below.

FINDING: These criteria are met.

D. Retention requirements

1. Trees may be considered for removal to accommodate the development including buildings, parking, walkways, grading etc., provided the development satisfies of D.2 or D.3, below.

FINDING: This applicant's narrative states that the trees proposed for removal are necessary to accommodate improvements including buildings, streets, sidewalks, trails, water quality facilities, and grading / retaining walls. The development satisfies section D2 as discussed below.

FINDING: This standard is met.

2. Required Tree Canopy - Residential Developments (Single Family Attached, Single Family Detached and Two - Family) Each net development site shall provide a variety of trees to achieve a minimum total tree canopy of 40 percent. The canopy percentage is based on the expected mature canopy of each tree by using the equation πr^2 to calculate the expected square footage of canopy for each tree. The expected mature

canopy is counted for each tree regardless of an overlap of multiple tree canopies.
The canopy requirement can be achieved by retaining existing trees or planting new trees. Required street trees can be used toward the total on site canopy required to meet this standard. The expected mature canopy spread of the new trees will be counted toward the needed canopy cover. A certified arborist or other qualified professional shall provide the estimated tree canopy of the proposed trees to the planning department for review.

Residential (single family & two family developments)	
Canopy Requirement	**40%**
Counted Toward the Canopy Requirement	
Street trees included in canopy requirement	**Yes**
Landscaping requirements included in canopy requirement	**N/A**
Existing trees onsite	**Yes x2**
Planting new trees onsite	**Yes**

Mature Canopy in Square Feet Equation πr^2 or (3.14159*radius^2) (This is the calculation to measure the square footage of a circle.)

The Mature Canopy is given in diameter. In gardening and horticulture reference books, therefore to get the radius you must divide the diameter in half.

Canopy Calculation Example: Pin Oak
Mature canopy = 35'
(3.14159* 17.52) = 962 square feet

ANALYSIS: The net developable site and tree canopy calculations are described in the applicant's narrative and shown in Exhibit A14. With staff corrections, the net developable site is approximately 171,301 SF. The applicant is proposing to preserve a total of 5,634 SF of tree canopy outside of the environmentally constrained areas. Existing tree canopies are multiplied by two when determining tree canopy area, which results in a total preservation credit of 11,268 SF. As shown in Exhibit A15 Sheets L1 –

L2, 48 new trees will be planted within the right-of-way and public parks for an added tree canopy of 62,409 SF. Therefore, the proposed tree canopy is approximately 73,677 SF. The proposal meets the 40% canopy requirements as shown below:

Gross site area	10.47 acres (456,073 SF)
Area removed from gross site area*	6.53 acres (284,772 SF)
Net developable site	3.83 acres (171,301 SF)

**Public ROW, other public uses, environmentally constrained areas*

Flood plain	*3.59 acres (156,182 SF)*
Vegetated Corridor outside FP	*0.73 acres (31,958 SF)*
Public Streets	*1.18 acres (51,293)*
Public parks or trails	*0.74 acres (32,069 SF)*
Stormwater facility	*0.30 acres (13,270 SF)*
Total	*6.53 acres (284,772 SF)*

(171,301 SF)(0.40) = 68,520 SF minimum canopy coverage requirement
11,268 SF canopy credit + 166,919 SF new canopy added = 73,677 SF total canopy

The applicant is proposing 73,677 SF of tree canopy cover, which exceeds the minimum required by 5,157 SF. The canopy provided equates to 43.01% of the net developable site and meets the requirement.

FINDING: This standard is met.

4. The City may determine that, regardless of D.1 through D.3, that certain trees or woodlands may be required to be retained. The basis for such a decision shall include; specific findings that retention of said trees or woodlands furthers the purposes and goals of this Section, is feasible and practical both within the context of the proposed land use plan and relative to other policies and standards of the City Comprehensive Plan, and are:

a. Within a Significant Natural Area, 100-year floodplain, City greenway, jurisdictional wetland or other existing or future public park or natural area designated by the City Comprehensive Plan, or

b. A landscape or natural feature as per applicable policies of the City Comprehensive Plan, or are necessary to keep other identified trees or woodlands on or near the site from being damaged or destroyed due to windfall, erosion, disease or other natural processes, or

c. Necessary for soil stability and the control of erosion, for managing and preserving surface or groundwater quantities or quality, or for the maintenance of a natural drainageway, as per Clean Water Services stormwater management plans and standards of the City Comprehensive Plan, or

d. Necessary in required buffers between otherwise incompatible land uses, or from natural areas, wetlands and greenways, or

e. Otherwise merit retention because of unusual size, size of the tree stand, historic association or species type, habitat or wildlife preservation considerations, or some combination thereof, as determined by the City.

ANALYSIS: The development proposal preserves trees on the site including open space areas to the extent practicable, as discussed in detail in the applicant's narrative and arborist report. No additional trees beyond those identified in the Preliminary Tree Preservation Plan are required to be retained.

FINDING: These criteria are met.

5. Tree retention requirements for properties located within the Old Town Overlay or projects subject to the infill standards of Chapter 16.68 are only subject to retention requirements identified in D.4. above.

ANALYSIS: The subject site is not located in the Old Town Overlay or subject to the final standards.

FINDING: This section is not applicable.

6. The Notice of Decision issued for the land use applications subject to this Section shall indicate which trees and woodlands will be retained as per subsection D of this Section, which may be removed or shall be retained as per subsection D of this Section and any limitations or conditions attached thereto.

ANALYSIS: The Notice of Decision will include the Exhibit A15 – Sheet P3 Tree Preservation Plan and any modifications to the plan as may be required by the Hearing Authority.

FINDING: This criterion will be met.

7. All trees, woodlands, and vegetation located on any private property accepted for dedication to the City for public parks and open space, greenways, Significant Natural Areas, wetlands, floodplains, or for storm water management or for other purposes, as a condition of a land use approval, shall be retained outright, irrespective of size, species, condition or other factors. Removal of any such trees, woodlands, and vegetation prior to actual dedication of the property to the City shall be cause for reconsideration of the land use plan approval.

ANALYSIS: Tracts B will be dedicated to the City for purposes of open space and will include a Community Trail. Trees will be removed as required to accommodate site grading and construction of retention walls and trails. As discussed above, the development proposal preserves trees to the maximum extent practicable. This standard is met.

FINDING: This section is not applicable.

E. Tree Preservation Incentive

Retention of existing native trees on site which are in good health can be used to achieve the required mature canopy requirement of the development. The expected mature canopy can be calculated twice for existing trees. For example, if one existing tree with an expected mature canopy of 10 feet (78.5 square feet) is retained it will count as twice the existing canopy (157 square feet).

ANALYSIS: The applicant is proposing to preserve a total of 5,634 SF of tree canopy outside of the environmentally constrained areas. The tree canopy incentive outlined in this section was applied to the calculations under SZCDC § 16.142.070(D)(2) above.

FINDING: This criterion is met.

F. Additional Preservation Incentives

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G. Tree Protection During Development

The applicant shall prepare and submit a final Tree and Woodland Plan prior to issuance of any construction permits, illustrating how identified trees and woodlands will be retained, removed or protected as per the Notice of Decision. Such plan shall specify how trees and woodlands will be protected from damage or destruction

by construction activities, including protective fencing, selective pruning and root treatments, excavation techniques, temporary drainage systems, and like methods. At a minimum, trees to be protected shall have the area within the drip line of the tree protected from grading, stockpiling, and all other construction related activity unless specifically reviewed and recommended by a certified arborist or other qualified professional. Any work within the dripline of the tree shall be supervised by the project arborist or other qualified professional onsite during construction.

ANALYSIS: The applicant has submitted an Arborist Report (Exhibit A8) that outlines detailed Tree Protection Standards. A final Tree Preservation Plan is recommended as a condition of approval below.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL E3: Prior to Engineering Approval of the Public Improvement Plans, the applicant shall submit a final Tree Preservation and Removal Plan that reflect any changes required in the Notice of Decision.

RECOMMENDED CONDITION OF APPROVAL A10: Tree protection during development is required in accordance with the Tree Protection Standards described in the Arborist Report (Exhibit A8 – pages 5-7)

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Chapter 16.144 - WETLAND, HABITAT AND NATURAL AREAS*

16.144.010 - Generally
Unless otherwise permitted, residential, commercial, industrial, and institutional uses in the City shall comply with the following wetland, habitat and natural area standards if applicable to the site as identified on the City's Wetland Inventory, the Comprehensive Plan Natural Resource Inventory, the Regionally Significant Fish and Wildlife Habitat Area map adopted by Metro, and by reference into this Code and the Comprehensive Plan. Where the applicability of a standard overlaps, the more stringent regulation shall apply.

ANALYSIS: A summary of the wetland, habitat, and natural areas found on the site is provided below. The proposal complies or is conditioned to comply with the applicable environmental regulations for each resource as described in the findings for chapter and as provided in the individual jurisdictional agency comments and conditions.

City's Wetland Inventory – the subject site was annexed to the City in 2017 and is not included in the Wetland Inventory. The applicant's CWS Site Assessment (Exhibit A5 – page 2) indicates Cedar Creek is categorized as a Freshwater Forested/Shrub wetland and identifies 8 unique wetlands on the site. Applicable wetland standards are addressed below.

Comprehensive Plan Natural Resource Inventory – The Cedar Creek floodplain is identified as a major natural resource in Chapter 5 of the City's Community Development Plan and is identified for preservation in the Brookman Addition Concept Plan. As described below and throughout this report, the Cedar Creek floodplain will be dedicated to the City and protected as a natural resource.

Regionally Significant Fish and Wildlife Habitat Area – the subject site contains Class A Upland Habitat and Class I Riparian Habitat based on data provided on Metro Maps (Exhibit C3). The applicable standards for habitat protection have been met as described below.

FINDING: This chapter applies and compliance with specific requirements is addressed below.

16.144.020 - Standards

A. The applicant shall identify and describe the significance and functional value of wetlands on the site and protect those wetlands from adverse effects of the development. A facility complies with this standard if it complies with the criteria of subsections A.1.a and A.1.b, below:

1. The facility will not reduce the area of wetlands on the site, and development will be separated from such wetlands by an area determined by the Clean Water Services Design and Construction Standards R&O 00-7 or its replacement provided Section 16.140.090 does not require more than the requested setback.

a. A natural condition such as topography, soil, vegetation or other feature isolates the area of development from the wetland.

b. Impact mitigation measures will be designed, implemented, and monitored to provide effective protection against harm to the wetland from sedimentation, erosion, loss of surface or ground water supply, or physical trespass.

c. A lesser setback complies with federal and state permits, or standards that will apply to state and federal permits, if required.

2. **If existing wetlands are proposed to be eliminated by the facility, the applicant shall demonstrate that the project can, and will develop or enhance an area of wetland on the site or in the same drainage basin that is at least equal to the area and functional value of wetlands eliminated.**

ANALYSIS: The applicant's CWS Site Assessment (Exhibit A7) identifies eight (8) wetlands on the site. Wetland A is associated with an unnamed tributary to the west of Cedar Creek and the remaining seven wetlands are directly associated with the Cedar Creek floodplain. No wetlands are proposed to be eliminated by the development and a Vegetated Corridor is proposed around all sensitive habitat as defined by CWS. A community trail is also proposed along the north side of the creek to provide a recreational buffer between the sensitive habitat and areas of development. The applicant is required to comply with all state and federal wetland permit requirements, as indicated in the CWS memorandum issued for the proposal (Exhibit B6).

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL A11: The developer shall comply with conditions described in the CWS Memorandum dated July 17, 2020 and all applicable CWS Design and Construction Standards (R&O 19-5).

RECOMMENDED CONDITION OF APPROVAL E4: Prior to Final Engineering Plan Approval, obtain and submit to Engineer a concurrence letter from DSL for the wetlands on the site or submit documentation from DSL that concurrence is not required.

B. **The applicant shall provide appropriate plans and text that identify and describe the significance and functional value of natural features on the site (if identified in the Community Development Plan, Part 2) and protect those features from impacts of the development or mitigate adverse effects that will occur. A facility complies with this standard if:**
   1. **The site does not contain an endangered or threatened plant or animal species or a critical habitat for such species identified by Federal or State government (and does not contain significant natural features identified in the Community Development Plan, Part 2, Natural Resources and Recreation Plan).**
   2. **The facility will comply with applicable requirements of the zone.**
   3. **The applicant will excavate and store topsoil separate from subsurface soil, and shall replace the topsoil over disturbed**

areas of the site not covered by buildings or pavement or provide other appropriate medium for re-vegetation of those areas, such as yard debris compost.

4. **The applicant will retain significant vegetation in areas that will not be covered by buildings or pavement or disturbed by excavation for the facility; will replant areas disturbed by the development and not covered by buildings or pavement with native species vegetation unless other vegetation is needed to buffer the facility; will protect disturbed areas and adjoining habitat from potential erosion until replanted vegetation is established; and will provide a plan or plans identifying each area and its proposed use.**
5. **Development associated with the facility will be set back from the edge of a significant natural area by an area determined by the Clean Water Services Design and Construction standards R&O 00-7 or its replacement, provided Section 16.140.090A does not require more than the requested setback. Lack of adverse effect can be demonstrated by showing the same sort of evidence as in subsection A.1 above.**

ANALYSIS: The Cedar Creek floodplain is identified as a major natural resource in Chapter 5 of the City's Community Development Plan. The applicant's narrative and CWS Site Assessment provide a detailed description of the natural features located on the site as required by this section.

As described throughout this report, areas of the site with significant vegetation as described above are planned to be retained within Tract B of the preliminary plat. The assessment did not identify endangered or threatened plant or animal species, or critical habitat for the species on the site. Areas of significant vegetation to the south of the Community Trail will be retained. A buffer will be provided as determined by CWS Design and Construction Standards around all sensitive habitat.

The applicant's narrative indicates topsoil removed during the initial construction phases will be stored on site in a manner that protects it from erosion while grading operations are underway. The topsoil will be placed in a location where it will not suffocate root systems of trees that may remain. The topsoil will be restored after construction to provide a suitable base for seeding and planting of areas of the site not covered by buildings or pavement.

FINDING: These criteria are met.

C. When the Regionally Significant Fish and Wildlife Habitat map indicates there are resources on the site or within 50 feet of the site, the applicant shall provide plans that show the location of resources on the property. If resources are determined to be located on the property, the plans shall show the value of environmentally sensitive areas using the methodologies described in Sections 1 and 2 below. The Metro Regionally Significant Fish and Wildlife Habitat map shall be the basis for determining the location and value of environmentally sensitive habitat areas. In order to specify the exact locations on site, the following methodology shall be used to determine the appropriate boundaries and habitat values:

1. Verifying boundaries of inventoried riparian habitat. Locating habitat and determining its riparian habitat class is a four-step process:

a. Located the Water Feature that is the basis for identifying riparian habitat.

1. Locate the top of bank of all streams, rivers, and open water within 200 feet of the property.

2. Locate all flood areas within 100 feet of the property.

3. Locate all wetlands within 150 feet of the property based on the Local Wetland Inventory map and on the Metro 2002 Wetland Inventory map (available from the Metro Data Resource Center, 600 NE Grand Ave., Portland, OR 97232). Identified wetlands shall be further delineated consistent with methods currently accepted by the Oregon Division of State Lands and the US Army Corps of Engineers.

b. Identify the vegetative cover status of all areas on the property that are within 200 feet of the top of bank of streams, rivers, and open water, are wetlands or are within 150 feet of wetlands, and are flood areas or are within 100 feet of flood areas. Vegetative cover status shall be as identified on the Metro Vegetative Cover map. In the event of a discrepancy between the Metro Vegetative Cover map and the existing site conditions, document the actual vegetative cover based on the following definitions along with a 2002 aerial photograph of the property;

1. Low structure vegetation or open soils — Areas that are part of a contiguous area one acre or larger of grass, meadow, crop-lands, or areas of

open soils located within 300 feet of a surface stream (low structure vegetation areas may include areas of shrub vegetation less than one acre in size if they are contiguous with areas of grass, meadow, crop-lands, orchards, Christmas tree farms, holly farms, or areas of open soils located within 300 feet of a surface stream and together form an area of one acre in size or larger).

2. Woody vegetation — Areas that are part of a contiguous area one acre or larger of shrub or open or scattered forest canopy (less than 60% crown-closure) located within 300 feet of a surface stream.

3. Forest canopy — Areas that are part of a contiguous grove of trees of one acre or larger in area with approximately 60% or greater crown closure, irrespective of whether the entire grove is within 200 feet of the relevant water feature.

c. Determine whether the degree that the land slopes upward from all streams, rivers, and open water within 200 feet of the property is greater than or less than 25% (using the Clean Water Services Vegetated Corridor methodology); and

d. Identify the riparian habitat classes applicable to all areas on the property using Table 8-1 below:

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2. Verifying boundaries of inventoried upland habitat. Upland habitat was identified based on the existence of contiguous patches of forest canopy, with limited canopy openings. The "forest canopy" designation is made based on analysis of aerial photographs, as part of determining the vegetative cover status of land within the region. Upland habitat shall be as identified on the HCA map. The perimeter of an area delineated as "forest canopy" on the Metro Vegetative Cover map may be adjusted to more precisely indicate the drip line of the trees within the canopied area.

ANALYSIS: The subject site contains Class A Upland Habitat and Class I Riparian Habitat based on data provided on Metro Maps (Exhibit C3). The CWS Site Assessment identifies the location environmentally sensitive areas and describes their value in sufficient detail to meet the verification standards above. The applicant is opting to

protect riparian habitat above and beyond that required by CWS standards in order to obtain an exception to the lot size standards as discussed below.

FINDING: These criteria have been met.

16.144.030 - Exceptions to Standards
In order to protect environmentally sensitive areas that are not also governed by floodplain, wetland and Clean Water Services vegetated corridor regulations, the City allows flexibility of the specific standards in exchange for the specified amount of protection inventoried environmentally sensitive areas as defined in this code.

A Process

The flexibility of standards is only applicable when reviewed and approved as part of a land use application and shall require no additional fee or permit provided criteria is addressed. In the absence of a land use application, review may be processed as a Type 1 administrative interpretation.

ANALYSIS: The applicant is proposing to protect additional sensitive habitat beyond the required floodplain, wetland, and Clean Water Services protection requirements. As shown in Exhibit C3, the site contains Regionally Significant Fish and Wildlife Habitat that can be protected to meet the exception standards allowed by this chapter. Areas within Tract B that do not require protection elsewhere in the code can be counted towards the surplus habitat provision whereby:

Area of additional protection = Tract B Open Space – sensitive areas requiring protection*

Tract B	203,158 SF
Sensitive Areas Requiring Protection*	191,611 SF

**Sensitive areas requiring protection:*	
CWS Sensitive Areas (SA)	*38,964 SF*
CWS Vegetated Corridor (VC)	*141,230 SF*
Floodplain outside of the SA and VC	*1,486 SF*
5% open space of net buildable site	*9,949 SF*
Total	*191,611 SF*

203,158 SF – 191,611 SF* = 11,547 SF

FINDINGS: An additional 11,547 SF of regionally significant fish and wildlife habitat will be protected in Tract B.

B. Standards modified

1. Lot size — Not withstanding density transfers permitted through Chapter 16.40, when a development contains inventoried regionally significant fish and wildlife habitats as defined in Section 16.144.020 above, lot sizes may be reduced up to ten percent (10%) below the minimum lot size of the zone when an equal amount of inventoried resource above and beyond that already required to be protected is held in a public or private open space tract or otherwise protected from further development.

ANALYSIS: The minimum lot size in the MDRL zone is 5,000 ft. The applicant is proposing to reduce the lot size by up to 10% to allow a new minimum of 4,500 SF for five (5) of the 28 lots. The applicant is also proposing to reduce the minimum lot width at building line from 50 ft. to 45 ft. for 21 of the 27 lots.

Of the (5) lots that will be reduced below 5,000 SF, a total of reduction of 850 SF spread between all of the lots is requested. The exception to the lot width at building line standard does not reduce the overall lot area and therefore is not included in the calculations. The reduction to the lot width at building line allows narrower lots in order provide a layout that meets the lot area and density requirements while protecting the regionally significant habitat.

The exception can be granted if an equal amount of Regionally Significant Fish and Wildlife Habitat is protected beyond that already required by the code. As described above the development project will protect an additional 11,547 SF of Regionally Significant Fish and Wildlife Habitat in Tract B, which far exceeds the 850 SF required.

FINDING: This standard is met.

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Chapter 16.156 - Energy Conservation
16.156.020 Standards

A. Building Orientation - The maximum number of buildings feasible shall receive sunlight sufficient for using solar energy systems for space, water or industrial process heating or cooling. Buildings and vegetation shall be sited with respect to each other and the topography of the site so that unobstructed sunlight reaches the south wall of the greatest possible number of buildings between the hours of 9:00 AM and 3:00 PM, Pacific Standard Time on December 21st.

B. Wind - The cooling effects of prevailing summer breezes and shading vegetation shall be accounted for in site design. The extent solar access to adjacent sites is not impaired vegetation shall be used to moderate prevailing winter wind on the site.

ANALYSIS: Street alignment within the subdivision are generally in an east-west orientation with each lot having a south facing front or rear façade. The Preliminary Plat (Exhibit A15 – Sheet P1) includes a graphic depicting the summer and winter sun location relative to the orientation of each lot. Most building will have a south facing façade that takes advantage of the winter sunlight. The open space provided throughout the subdivision and in Tract B will also provide a wind break in the winter and a cooler breeze in the summer.

FINDING: These standards are met.

DIVISION VI PUBLIC INFRASTRUCTURE

Chapter 16.104 - GENERAL PROVISIONS (PUBLIC INFRASTRUCTURE)
16.104.010 - Purpose
To ensure the health, safety, and the economic stability of the community, and to establish a quality system of public improvements, the City shall require any buildings or other development for which public facilities and public rights-of-way are not fully provided or improved to current City standards, to install said improvements. Except as otherwise provided or authorized, private improvements serving substantially the same function as equivalent public facilities shall generally be provided and improved to the standards established by this Code and other City regulations.

Green Street elements such as bioswales and porous pavement are encouraged where appropriate and feasible. Where a specific design standard supporting a green street concept is not included in the Engineering Design and Standard Details Manual (Engineering Design Manual), the design will be considered by the Engineering Department, provided additional documentation is provided to the Engineering Department that documents the design is appropriate, has a design life equal to a traditional paved street, and the maintenance costs to the City are comparable to traditional streets.

16.104.020 - Future Improvements
The location of future public improvements including water, sanitary sewer, storm water, streets, bicycle and pedestrian paths, and other public facilities and rights-of-way, as depicted in the Transportation System Plan (TSP) Chapters 4, 5, 6 and 7 of the Community Development Plan are intended as general locations only. The precise alignment and location of a public improvement shall be

established during the land use process and shall be depicted on public improvement plans submitted and approved pursuant to § 16.108 and other applicable sections of this Code.

16.104.030 - Improvement Procedures

Except as otherwise provided, all public improvements shall conform to City standards and specifications found in the Engineering Design Manual and installed in accordance with Chapter 16.108. The Council may establish additional specifications to supplement the standards of this Code and other applicable ordinances. Except for public projects constructed consistent with an existing facility plan, a public improvements shall not be undertaken until land use approval has been granted, a public improvement plan review fee has been paid, all improvement plans have been approved by the City, and an improvement permit has been issued.

Chapter 16.106 - TRANSPORTATION FACILITIES

16.106.010 - Generally

A. Creation

Public streets shall be created in accordance with provisions of this Chapter. Except as otherwise provided, all street improvements and rights-of-way shall conform to standards for the City's functional street classification, as shown on the Transportation System Plan (TSP) Map (Figure 17) and other applicable City standards. The following table depicts the guidelines for the street characteristics.

Type of Street	ROW Width	Number of Lanes	Minimum Land Width	On Street Parking Width	Bike Lane Width	Sidewalk Width	Landscape Strip (exclusive of curb)	Median Width
Local	52’	2	14’	8’ on one side only	None	6’	5’ with 1’ buffer	None
Arterial	60-102’	2-5	12’	Limited	6’	6-8’	5’	14’ if required

ANALYSIS: The following streets will be created or modified as part of the development:

- SW Brookman Road *County Arterial*
- SW Trillium Lane *City local residential*
- SW Wapato Lake Drive *City local residential*

The proposed streets comply with the applicable standards of the City code and TSP. Full findings for this chapter are provided in the City of Sherwood Engineering Comments dated July 23, 2020 and Washington County Land Use & Transportation Comments dated July 16, 2020.

FINDING: These criteria are met as described in the sections below.

B. Street Naming

ANALYSIS: The names of all streets proposed have been previously approved under the Middlebrook Subdivision approval in accordance with the standards in this section.

FINDING: These criteria are not applicable.

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16.106.020 - Required Improvements

A. Generally

Except as otherwise provided, all developments containing or abutting an existing or proposed street, that is either unimproved or substandard in right-of-way width or improvement, shall dedicate the necessary right-of-way prior to the issuance of building permits and/or complete acceptable improvements prior to issuance of occupancy permits. Right-of-way requirements are based on functional classification of the street network as established in the Transportation System Plan, Figure 17.

ANALYSIS:
SW Brookman Rd. – the south property line abuts SW Brookman Rd. which is classified as a County arterial. A right-of-way dedication of 33 ft. and an 8 ft. PUE dedication is required along the entire site frontage. The new right-of-way width in front of the subject site will be 53 ft. to centerline. As described in the engineering comments, construction of complete half street improvements along the site frontage with Brookman Rd. is not proportional to the scope of the development. The applicant is proposing to connect the Community Trail to new sidewalk to the west of the site that will be constructed as part of the Middlebrook Subdivision.

SW Wapato Lake Drive – the development will complete the through connection of SW Wapato Lake Drive that is required in order to connect to the surrounding Middlebrook

Subdivision. The applicant is required to dedicate right-of-way and construct improvements to local street standards. The alignment of the street conforms to the alignment shown in the Middlebrook Subdivision Preliminary Street Plan (Exhibit C4) and will provide access to Lots 12 – 28 as shown in the Preliminary Plat. The right-of-way width will be 52 ft. and the improvements will match the design approved as part of the Middlebrook Subdivision.

SW Trillium Lane – the northern property line abuts SW Trillium Lane which will provide access to Lots 1 – 11 of the proposed subdivision. The applicant is required to dedicate right-of-way and construct improvements to local street standards. The developer of the Middlebrook Subdivision will be constructing the northern 3/4 portion of the street and the applicant is required to complete the southern 1/4 portion of the street. The final right-of-way width will be 52 ft. and the improvements will match the design approved as part of the Middlebrook Subdivision street cross section.

FINDING: These criteria is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL A12: WACO Transportation Development Tax (TDT) credit eligible offsets will be based on requirements and limitations established by WACO Ordinance Mo. 691A, as modified by Ordinances 729, 741, 746-A, 751 and 793-A, and as described in WACO's *Countywide Transportation Development Tax Procedures Manual*, dated July 2019. City Transportation SDC credit eligible off-sets will be based on requirements and limitations established by City of Sherwood Municipal Code Chapter 15.16 – System Development Charges and Chapter 15.20 – Park and Recreation System Development Charges on New Development.

RECOMMENDED CONDITION OF APPROVAL B16: Prior to Final Approval of Plat, applicant shall show a 33-foot wide right-of-way dedication to WACO along the SW Brookman Road frontage.

RECOMMENDED CONDITION OF APPROVAL E5: Prior to Final Approval of Engineering Plans, the applicant shall pay a fee in-lieu-of construction for deferred City required frontage improvements along SW Brookman Road. The fee in-lieu-of construction amount will be set at 125% of the estimated City required deferred frontage improvements construction cost, as approved by the City Engineer. The deferred City required frontage improvements are identified as being;

1. Asphalt Pavement section conforming to the City Engineering Design and Standard Details Manual, Section 210.2.2 for asphalt thickness requirements for arterial road sections.

2. Standard Base Rock section conforming to the City Engineering Design and Standard Details Manual, Section 210.2.1 for leveling course rock and base rock thickness requirements for arterial roads.
3. Concrete curb and cutter
4. Concrete sidewalk/multi-use path
5. Street planter strip plantings
6. Street lighting system (including lights, foundations and conduits)
7. Street trees
8. Street signage and striping conforming to the City Engineering Design and Standard Details Manual, Section 340.
9. Irrigation system (including piping, valves, controllers, sprinkler heads)
10. Stormwater drainage collection, conveyance, and treatment systems for public roadway.
11. Undergrounding of existing overhead utilities.

Funds are to be deposited into City managed WACO TDT funds account and dedicated strictly to a future WACO SW Brookman Road capital improvement project.

RECOMMENDED CONDITION OF APPROVAL E6: Prior to Final Approval of Engineering Plans, applicant shall pay fee in-lieu-of construction amounts as follows:

a. SW Sunset Boulevard/SW Woodhaven Drive - $7,897.92 for proportionate share cost of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Woodhaven Drive & SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards Washington County (WACO) TDT and/or City Transportation SDC fee assessments on the developments single family residential units.
b. SW Sunset Boulevard/SW Timbrel Lane - $5,882.85 for proportionate share cost of traffic mini-roundabout improvements. Funds to be deposited into City funds account and dedicated strictly for a suture SW Timbrel Lane & SW Sunset Boulevard traffic roundabout improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards WACO TDT and/or 54% credit eligible towards City Transportation SDC fee assessments on the developments single family residential units.
c. SW Ladd Hill Road-SW Main Street/SW Sunset Boulevard - $7,812.50 for proportionate share cost of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Ladd Hill Road-SW Main Street & SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards WACO TDT and/or City Transportation SDC fee assessments on the developments single family residential units.

d. SW Baker Road/SW Murdock Road/SW Sunset Boulevard - $26,627.22 for proportionate share cost of addition of future intersection turn lanes improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Baker Road-SW Murdock Road/SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 75% credit eligible towards WACO TDT and/or 100% credit eligible towards City Transportation SDC fee assessments on the developments single family residential units.

e. SW Brookman Road/Hwy 99W - $21,131.32 for proportionate share cost of addition of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Brookman Road & Hwy 99W signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards Washington County (WACO) TDT fee assessments on the developments single family residential units.

RECOMMENDED CONDITION OF APPROVAL H4: Prior to Final Grant of Occupancy, all TDT and SDC credit requests on credit eligible public improvements must be submitted in accordance with WACO Ordinance Mo. 691A, as modified by Ordinances 729, 741, 746-A, 751 and 793-A, and City of Sherwood Municipal Code Chapter 15.16 – System Development Charges and Chapter 15.20 – Park and Recreation System Development Charges on New Development, and conform and comply with the standards and requirements stated therein.

RECOMMENDED CONDITION OF APPROVAL E7: Prior to Final Approval of Engineering Plans, the street lighting design shall include a photometric analysis report for review and approval by City Engineering. City lighting standards require Westbrook fixtures on all internal streets to the subdivision.

RECOMMENDED CONDITION OF APPROVAL G4: Prior to Final Acceptance of Constructed Public Improvements, connection of the development area to the public transportation improvements being constructed by the adjacent Middlebrook Subdivision, will not be permitted until such time as the public transportation improvements being constructed by the Middlebrook Subdivision have been constructed, have received final inspection approval, and have been accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the Riverside at Cedar Creek site development public transportation infrastructure improvements and the adjacent Middlebrook Subdivision public transportation infrastructure improvements shall be maintained.

RECOMMENDED CONDITION OF APPROVAL G5: Prior to Final Acceptance of Constructed Public Improvements, all conditions and requirements listing in a letter submitted by WACO, dated July 16, 2020 shall be complied with.

RECOMMENDED CONDITION OF APPROVAL E8: Prior to Final Approval of Engineering Plans, applicant shall submit a separate design modification request for each non-conforming public infrastructure design element, to the City Engineer for review and approval.

RECOMMENDED CONDITION OF APPROVAL D1: Prior to issuance of site grading from the City of Sherwood, the applicant shall obtain a Washington County facility permit for construction of the following public improvements on SW Brookman Rd:

A. Submit the following to Washington County Public Assurance Staff (503-846-3843):

1. Completed "Design Option" form (original signed copy).

2. $10,000.00 Administration Deposit.

   NOTE: The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field inspections, as-built approval, and project administration. The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is falls below County approved level, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.

3. Copy of the City's Notice of Decision (NOD) and the County's letter dated July 16, 2020.
4. Engineering plans and Geotech/Pavement report via ProjectDox for construction of the following public improvements to County standards:
   a. Closure of all existing access from the subject tax lot to SW Brookman Road.

   b. Pavement widening taper to match Middlebrook Subdivision to the west and the Reserve @ Cedar Creek to the east per the County Engineer.

c. All work within the ROW of SW Brookman Road, including the Community Trail to County Standards.

RECOMMENDED CONDITION OF APPROVAL B16: Prior to final plat approval, the following shall be shown on the plat and recorded with Washington County Survey Division:

1. Dedication of additional 33 feet right-of-way to provide 53 feet from the centerline of SW Brookman Road, including an 8 foot PUE.

RECOMMENDED CONDITION OF APPROVAL H5: Prior to occupancy permits, the following requirements shall be met:

A. The road improvements required in condition I.A.4. above shall be completed and approved by Washington County.

B. Pay a proportional share of the fee in-lieu of constructing 5 lanes (half-width) on SW Brookman Road to the County. The engineer's estimate shall include the following items:
   1. Asphalt (known standards for materials, width and thickness),
   2. Standard base rock (known standards for materials and thickness),
   3. Sidewalks (known standards for material, thickness and width),
   4. Curb and gutter,
   5. Striping,
   6. Street trees,
   7. Street lighting (including lights and conduits),
   8. Planter strip plantings,
   9. Irrigation system,
   10. Stormwater drainage collection, conveyance, and treatment,
   11. Floodplain and Natural Resources alterations.

B. Existing Streets

Except as otherwise provided, when a development abuts an existing street, the improvements requirement shall apply to that portion of the street right-of-way located between the centerline of the right-of-way and the property line of the lot proposed for development. In no event shall a required street improvement for an existing street exceed a pavement width of thirty (30) feet.

ANALYSIS: The subject property has frontage on Brookman Rd. which is an existing arterial street. The developer is required to dedicate right-of-way to obtain a 53-foot width to centerline. Half street improvements are not required at this time and therefore the 30 ft. half street pavement width will not be exceeded.

FINDING: This standard is met.

C. Proposed Streets

1. Except as otherwise provided, when a development includes or abuts a proposed street, in no event shall the required street improvement exceed a pavement width of forty (40) feet.

2. Half Streets: When a half street is created, a minimum of 22 feet of driving surface shall be provided by the developer.

ANALYSIS: SW Trillium Lane and SW Wapato Lake Drive are proposed streets within the subdivision. As shown in the Typical Street Cross Section drawings (Exhibit A15 – Sheet P8), no pavement widths will exceed 40 ft.

FINDING: This standard is met.

D. Extent of Improvements

1. Streets required pursuant to this Chapter shall be dedicated and improved consistent with Chapter 6 of the Community Development Plan, the TSP and applicable City specifications included in the City of Sherwood Construction Standards. Streets shall include curbs, sidewalks, catch basins, street lights, and street trees. Improvements shall also include any bikeways designated on the Transportation System Plan map. Applicant may be required to dedicate land for required public improvements only when the exaction is directly related to and roughly proportional to the impact of the development, pursuant to Section 16.106.090.

2. If the applicant is required to provide street improvements, the City Engineer may accept a future improvements guarantee in lieu of street improvements if one or more of the following conditions exist, as determined by the City:

a. A partial improvement is not feasible due to the inability to achieve proper design standards;

b. A partial improvement may create a potential safety hazard to motorists or pedestrians.

c. Due to the nature of existing development on adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide a significant improvement to street safety or capacity;

d. The improvement would be in conflict with an adopted capital improvement plan;

e. The improvement is associated with an approved land partition on property zoned residential use and the proposed land partition does not create any new streets; or

f. Additional planning work is required to define the appropriate design standards for the street and the application is for a project that would contribute only a minor portion of the anticipated future traffic on the street.

ANALYSIS: Per, the Engineers' Comments, frontage improvements along SW Brookman Road are required to City standards. However, to meet WACO standards for a 5-lane arterial, significant grading of the existing road section would need to take place. The cost of reconstructing SW Brookman Road to meet WACO design standards would be very expensive and not proportional to the impacts of a 28-lot subdivision. Given the significant grade differences required to meet WACO design standards, City required frontage improvements along SW Brookman Road are being deferred until such time that SW Brookman Road is improved as a WACO capital improvement project.

Given the improvement deferment, a fee in-lieu-of construction for the City required frontage improvements will be required. The in-lieu fee amount will be based on the estimated cost of the deferred items with a 125% multiplying factor to account for difference in the value of the improvements over time, as approved by the City Engineer.

Full findings are provided in the Engineers Comments' July 23, 2020 and the Washington County Land Use & Transportation Comments dated July 16, 2020.

FINDING: These criteria are met as conditioned above.

E. Transportation Facilities Modifications

1. A modification to a standard contained within this Chapter and Section 16.58.010 and the standard cross sections contained in Chapter 8 of the adopted TSP may be granted in accordance with the procedures and criteria set out in this section.

2. A modification request concerns a deviation from the general design standards for public facilities, in this Chapter, Section 16.58.010, or Chapter 8 in the adopted Transportation System Plan. The standards that may be modified include but are not limited to:

a. Reduced sight distances.
b. Vertical alignment.
c. Horizontal alignment.
d. Geometric design (length, width, bulb radius, etc.).
e. Design speed.
f. Crossroads.
g. Access policy.
h. A proposed alternative design which provides a plan superior to these standards.
i. Low impact development.
j. Access Management Plans

3. Modification Procedure

a. A modification shall be proposed with the application for land use approval.
b. A modification is processed as a Type II application. Modification requests shall be processed in conjunction with the underlying development proposal.
c. When a modification is requested to provide a green street element that is not included in the Engineering Design Manual, the modification process will apply, but the modification fee will be waived.

4. Criteria for Modification: Modifications may be granted when criterion 4a and any one of criteria 4b through 4e are met:

a. Consideration shall be given to public safety, durability, cost of maintenance, function, appearance, and other appropriate factors to advance the goals of the adopted Sherwood Comprehensive Plan and Transportation System Plan as a whole. Any modification shall be the minimum necessary to alleviate the hardship or disproportional impact.
b. Topography, right-of-way, existing construction or physical conditions, or other geographic conditions impose an unusual hardship on the applicant, and an equivalent alternative which can accomplish the same design purpose is available.
c. A minor change to a specification or standard is required to address a specific design or construction problem which, if not enacted, will result in an unusual hardship. Self- imposed hardships shall not be used as a reason to grant a modification request.
d. An alternative design is proposed which will provide a plan equal to or superior to the existing street standards.

e. Application of the standards of this chapter to the development would be grossly disproportional to the impacts created.

ANALYSIS: The subdivision will complete a new block that is bordered by SW White Oak Terrace to the west, SW Trillum Lane to the north, and SW Wapato Lake Drive to the south/east. The proposed block will be approximately 850 ft. in length and exceed the 530 ft. limit required by SZCDC § 16.106.030(B)(3). Therefore, a design modification meeting the criteria of this section is required. Based on the information provided in the application, staff finds that a modification to the meets the criteria for an exception to the block length.

Subsection (4a) criteria:
A direct north-south street connection is not proposed with the subdivision due to the location and extent of Cedar Creek on the property. The creek corridor contains floodplain, wetlands, and other sensitive habitat that warrant protection. Development of this area, including streets, would require mitigation of the environmental impacts and ongoing maintenance of a street or bridge over a sensitive area. The exception to the block length standard will allow protection of the natural resources on the site and provide enhanced recreational amenities for the development which is in alignment with the City's Comprehensive Plan.

Subsection (4b) criteria:
The site faces an unusual hardship that warrants a modification to the block length standards based on the physical conditions (stream corridor) and the location of surrounding right-of-way. A north-south street connection between SW Brookman Rd. and SW Wapato Lake Drive on the subject site would result in significant impacts to the designated environmental resources. Any right-of-way in this location would likely only be used for as an access point to and from SW Brookman Rd., as sensitive areas would restrict creation of new lots on either side of a street.

A north-south street connection between SW Trillium Lane and SW Wapato Lake Drive is also not practicable due to the surrounding development pattern and overall site constraints imposed by the creek. The block to the north of the subject site is formed by two north-south running streets – SW Oberst Ct. to the east and SW Wapato Lake Drive to the west. SW Oberst court is located just east of the subject site and creates a "T" intersection with SW Trillium Lane. While a southern extension of this street would create a shorter block for the proposed subdivision, the land has already been platted as part of the Middlebrook Subdivision. Installation of a new north-south street between SW Trillium Lane and SW Wapato Lake Drive would create an additional mid-block "T" intersection along SW Trillium Lane and result in fourth such intersection within a single block. This approach to streets is prohibited under SZCDC § 16.106.040 which addresses street staggering and "T" intersections.

As an alternative to a full vehicular street connection, the development will provide a 15 ft. wide pedestrian easement between Lots 6/7 and 14/15. This alternative will shorten the block length for bicyclists and pedestrians and accomplish the design goals of providing walkable street lengths within residential subdivisions.

FINDING: The criteria for a modification to the block length standard has been met.

16.106.030 - Location

A. Generally

The location, width and grade of streets shall be considered in their relation to existing and planned streets, topographical conditions, and proposed land uses. The proposed street system shall provide adequate, convenient and safe traffic and pedestrian circulation, and intersection angles, grades, tangents, and curves shall be adequate for expected traffic volumes. Street alignments shall be consistent with solar access requirements as per Chapter 16.156, and topographical considerations.

ANALYSIS: The proposed development and associated street improvements have been designed and located to provide access to each of the planned lots to City standards; to meet arterial standards; and to extend existing street stubs through the site in a logical manner. The existing streets (SW Brookman Road, SW Wapato Lake Drive, SW Trillium Road) dictate to a large degree the circulation system within the site, including intersection angles, grades, tangents, and curves, and therefore lot orientation. Adequate, convenient and safe pedestrian circulation is provided through public sidewalks and publicly accessible trails within the development. Street alignments are consistent with the solar access requirements of Chapter 16.156 as discussed above.

FINDING: This criterion is met.

B. Street Connectivity and Future Street Systems

1. Future Street Systems. The arrangement of public streets shall provide for the continuation and establishment of future street systems as shown on the Local Street Connectivity Map contained in the adopted Transportation System Plan (Figure 16).

ANALYSIS: The Local Street Connectivity Map (Figure 18) of the City of Sherwood Transportation System Plan shows conceptual street connections, including those along SW Brookman Road. Footnotes for Figure 18 identify that the alignments shown are approximate and may vary, and it is considered that the street connection of SW White

Oak Terrace within the approved Middlebrook Subdivision effectively serves as the connection indicated in Figure 18 near the subject site, given arterial access spacing restrictions on SW Brookman Road. Further, an additional north-south connection through the site is not practicable due to the location of significant natural resources bisecting the site.

FINDING: This criterion is met.

2. Connectivity Map Required. New residential, commercial, and mixed use development involving the construction of new streets shall be submitted with a site plan that implements, responds to and expands on the Local Street Connectivity map contained in the TSP.

a. A project is deemed to be consistent with the Local Street Connectivity map when it provides a street connection in the general vicinity of the connection(s) shown on the map, or where such connection is not practicable due to topography or other physical constraints; it shall provide an alternate connection approved by the decision-maker.

b. Where a developer does not control all of the land that is necessary to complete a planned street connection, the development shall provide for as much of the designated connection as practicable and not prevent the street from continuing in the future.

c. Where a development is disproportionately impacted by a required street connection, or it provides more than its proportionate share of street improvements along property line (i.e., by building more than 3/4 width street), the developer shall be entitled to System Development charge credits, as determined by the City Engineer.

d. Driveways that are more than 24 feet in width shall align with existing streets or planned streets as shown in the Local Street Connectivity Map in the adopted Transportation System Plan (Figure 17), except where prevented by topography, rail lines, freeways, pre-existing development, or leases, easements, or covenants.

ANALYSIS: Access to SW Brookman Road is located in the general vicinity as indicated on Figure 18 through SW White Oak Terrace (Middlebrook Subdivision), and existing streets will be extended through (SW Wapato Lake Drive) and/or across the

frontage of the site (SW Trillium Road). No additional street connectivity to any adjacent property is required.

FINDING: This criterion is met.

3. Block Length. For new streets except arterials, block length shall not exceed 530 feet. The length of blocks adjacent to arterials shall not exceed 1,800 feet.

ANALYSIS: The new triangular shaped block created by the subdivision will be approximately 850 ft. in length and exceed the limit above. As discussed above, a design modification to the block length standard is warranted based on the site constraints.

FINDING: This standard is met as described in the analysis and findings for SZCDC § 16.106.020(E) above.

4. Where streets must cross water features identified in Title 3 of the Urban Growth Management Functional Plan (UGMFP), provide crossings at an average spacing of 800 to 1,200 feet, unless habitat quality or length of crossing prevents a full street connection.

ANALYSIS: This project does not involve a street crossing of Cedar Creek, the significant natural water resource on the site.

FINDING: This standard does not apply.

5. Where full street connections over water features identified in Title 3 of the UGMFP cannot be constructed in centers, main streets and station communities (including direct connections from adjacent neighborhoods), or spacing of full street crossings exceeds 1,200 feet, provide bicycle and pedestrian crossings at an average spacing of 530 feet, unless exceptional habitat quality or length of crossing prevents a connection.

ANALYSIS: A vehicular block cannot be formed to the south to connect SW Wapato Lake Drive to SW Brookman Road due to the location of Cedar Creek and its associated floodplain, however a pedestrian and bicycle connection has been provided between the two separate portions of the site via an existing driveway crossing at the south eastern corner of the site.

FINDING: This standard is met.

6. **Pedestrian and Bicycle Connectivity. Paved bike and pedestrian accessways consistent with cross section standards in Figure 8-6 of the TSP shall be provided on public easements or right- of-way when full street connections are not possible, with spacing between connections of no more than 300 feet. Multi-use paths shall be built according to the Pedestrian and Bike Master Plans in the adopted TSP.**

ANALYSIS: The applicant is proposing a 15 ft. wide pedestrian easement between lots 6/7 and 14/15. The pathway will provide bike and pedestrian connectivity as a full north-south street connection is not feasible. The pathway is located at the approximate mid-point of the block and is less than 300 ft. from the western and eastern ends of the platted block that is currently under review. An additional accessway towards the west end of the block is not feasible because it has already been platted as part of the Middlebrook Subdivision.

FINDING: This standard is met.

7. **Exceptions. Streets, bike, and pedestrian connections need not be constructed when any of the following conditions exists:**
   a. **Physical or topographic conditions make a street or accessway connection impracticable. Such conditions include but are not limited to freeways, railroads, steep slopes, wetlands or other bodies of water where a connection could not reasonably be provided.**
   b. **Buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment; or**
   c. **Where streets or accessways would violate provisions of leases, easements, covenants, restrictions or other agreements existing as of May 1, 1995, which preclude a required street or accessway connection.**

ANALYSIS: Street connections cannot be created between the northern portion of the site and SW Brookman Road, due to the location of Cedar Creek and its associated flood plains bifurcating the site into northern and southern sections. Street connections are made to the east of the site through the Middlebrook Subdivision. In lieu of providing street connections between the northern portions of the development and SW Brookman Road, an extensive network of pedestrian paths in pedestrian access

easements are provided throughout the site, with both north-south and east-west connections provided.

FINDING: This criterion is met.

C. Underground Utilities
All public and private underground utilities, including sanitary sewers and storm water drains, shall be constructed prior to the surfacing of streets. Stubs for service connections shall be long enough to avoid disturbing the street improvements when service connections are made.

ANALYSIS: Public and private utilities are proposed to be located underground with the construction of streets and accessways through the site.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL A13: Per SZCDC § 16.118, all new utilities shall be placed underground unless covered by exceptions noted under Section 16.118.040, and as approved by the City Engineer.

D. Additional Setbacks
Generally additional setbacks apply when the width of a street right-of-way abutting a development is less than the standard width under the functional classifications in Section VI of the Community Development Plan. Additional setbacks are intended to provide unobstructed area for future street right-of-way dedication and improvements, in conformance with Section VI. Additional setbacks shall be measured at right angles from the centerline of the street.

	Classification	**Additional Setback**
1.	**Principle Arterial (99W)**	**61 feet**
2.	**Arterial**	**37 feet**
3.	**Collector**	**32 feet**
4.	**Neighborhood Route**	**32 feet**
5.	**Local**	**26 feet**

ANALYSIS: Dedication of 33 ft. of right-of-way to Washington County along the site frontage with SW Brookman Road is shown on the submitted plan set, creating a right-of-way meeting or exceeding the required standard. All other streets will be improved to their full standards by the developer and do not require additional setbacks or dedications.

FINDING: This standard is met.

16.106.040 - Design
Standard cross sections showing street design and pavement dimensions are located in the City of Sherwood's Engineering Design Manual.

A. Reserve Strips
Reserve strips or street plugs controlling access or extensions to streets are not allowed unless necessary for the protection of the public welfare or of substantial property rights. All reserve strips shall be dedicated to the appropriate jurisdiction that maintains the street.

ANALYSIS: No reserve strips or street plugs are proposed.

FINDING: This standard does not apply.

B. Alignment
All proposed streets shall, as far as practicable, be in alignment with existing streets. In no case shall the staggering of streets create a "T" intersection or a dangerous condition. Street offsets of less than one hundred (100) feet are not allowed.

ANALYSIS: As shown on the submitted plan set, there are no specific public street intersections created which would create offsets. Both street intersections created by the plat are located as required to align with the approved Middlebrook Subdivision.

A new north-south street connection between SW Wapato Lake Drive and SW Trillium Lane would create “T” intersections which are not supported by this section. A mid-block pedestrian easement has been provided to improve bike and pedestrian circulation.

FINDING: This standard is met.

C. Future Extension
Where necessary to access or permit future subdivision or development of adjoining land, streets must extend to the boundary of the proposed development and provide the required roadway

width. Dead-end streets less than 100' in length must comply with the Engineering Design Manual.
A durable sign must be installed at the applicant's expense. The sign is required to notify the public of the intent to construct future streets. The sign must read as follows: "This road will be extended with future development. For more information contact the City of Sherwood Engineering Department."

ANALYSIS: The site is not located such that additional or future access to adjoining properties is required. To the west, the development proposes to extend the approved stub of SW Wapato Lake Drive from the Middlebrook Subdivision; to the north, the approved 3/4 section of SW Trillium Road will be expanded to its full section; to the east no connections are provided or required to the Reserve at Cedar Creek development due to the location of significant natural resources, with the exception of a pedestrian trail to link to a proposed trail within that development; and to the south of the site is the SW Brookman Road right-of-way, which will dedicated to meet County arterial width standards.

FINDING: This standard is met.

D. Intersection Angles
Streets shall intersect as near to ninety (90) degree angles as practical, except where topography requires a lesser angle. In all cases, the applicant shall comply with the Engineering Design Manual.

ANALYSIS: At the west end of the site, SW Wapato Lake Drive will be extended from an existing street stub, and will therefore meet this requirement. At the north east corner, SW Wapato Lake Drive will intersect with SW Trillium Road as aligned with the northern portion of SW Wapato Lake Drive. Due to the location of significant natural resources and efficient use of the site, the angle of this intersection will be less than 90 degrees. Additional right-of-way and corner radius have been provided to ease right in turns from east bound SW Trillium Road. The final intersection angles will be reviewed through with the final engineering plans and be required to meet City standards.

FINDING: This standard is met.

E. Cul-de-sacs
1. All cul-de-sacs shall be used only when exceptional topographical constraints, existing development patterns, or compliance with other standards in this code preclude a street extension and circulation. A cul-de-sac shall not be more than

two hundred (200) feet in length and shall not provide access to more than 25 dwelling units.

2. **All cul-de-sacs shall terminate with a turnaround in accordance with the specifications in the Engineering Design Manual. The radius of circular turnarounds may be larger when they contain a landscaped island, parking bay in their center, Tualatin Valley Fire and Rescue submits a written request, or an industrial use requires a larger turnaround for truck access.**
3. **Public easements, tracts, or right-of-way shall provide paved pedestrian and bicycle access ways at least 6 feet wide where a cul-de-sac or dead-end street is planned, to connect the ends of the streets together, connect to other streets, or connect to other existing or planned developments in accordance with the standards of this Chapter, the TSP, the Engineering Design Manual or other provisions identified in this Code for the preservation of trees.**

ANALYSIS: No cul-de-sacs will be created as part of the subdivision.

FINDING: This standard is met.

F. Grades and Curves
Grades shall be evaluated by the City Engineer and comply with the Engineering Design Manual.

ANALYSIS: All street grades within the development have been designed in accordance with the applicable City standards. The City's engineering department will review the grades and curves of the site during approval of the final engineering plans.

FINDING: This standard will be met.

G. Streets Adjacent to Railroads
Streets adjacent to railroads shall run approximately parallel to the railroad and be separated by a distance suitable to allow landscaping and buffering between the street and railroad. Due consideration shall be given at cross streets for the minimum distance required for future grade separations and to provide sufficient depth to allow screening of the railroad.

ANALYSIS: No streets associated with the development are adjacent to a railroad.

FINDING: This standard does not apply.

H. Buffering of Major Streets

Where a development abuts Highway 99W, or an existing or proposed principal arterial, arterial or collector street, or neighborhood route, adequate protection for residential properties must be provided, through and local traffic be separated, and traffic conflicts minimized. In addition, visual corridors pursuant to Section 16.142.040, and all applicable access provisions of Chapter 16.96, are to be met. Buffering may be achieved by: parallel access streets, lots of extra depth abutting the major street with frontage along another street, or other treatment suitable to meet the objectives of this Code.

ANALYSIS: The subject site abuts SW Brookman Road, a county Arterial street. All lots within the development are buffered from SW Brookman Road by the 15-foot landscaped visual corridor required SZCDC § 16.142.040, and/or approximately 180 feet of resource area located within Tract B.

FINDING: This standard is met.

I. Median Islands

As illustrated in the adopted Transportation System Plan, Chapter 8, median islands may be required on arterial or collector streets for the purpose of controlling access, providing pedestrian safety or for aesthetic purposes.

ANALYSIS: Frontage improvements along SW Brookman Road are not proposed to include a median, and County staff have not indicated that a median island would be required as part of this development.

FINDING: This standard does not apply.

J. Transit Facilities

Development along an existing or proposed transit route, as illustrated in Figure 7-2 in the TSP, is required to provide areas and facilities for bus turnouts, shelters, and other transit-related facilities to Tri-Met specifications. Transit facilities shall also meet the following requirements:

1. **Locate buildings within 20 feet of or provide a pedestrian plaza at major transit stops.**
2. **Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site.**
3. **Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards).**

4. **Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider.**
5. **Provide lighting at a transit stop (if not already existing to transit agency standards).**

ANALYSIS: The City's TSP identifies SW Brookman Road as a potential corridor for future transit enhancements. However, the street is not currently served by transit. In addition, the site frontage on SW Brookman Rd. is constrained by sensitive habitat. As such it is not a preferred location for transit enhancement improvements. The applicant is providing a pedestrian pathway to SW Brookman Rd. which can provide access to future transit improvements on the street. Transit enhancements are not practicable at this time and are not required.

FINDING: This standard is met.

K. Traffic Controls

1. **Pursuant to Section 16.106.080, or as otherwise required by the City Engineer, an application must include a traffic impact analysis to determine the number and types of traffic controls necessary to accommodate anticipated traffic flow.**
2. **For all other proposed developments including commercial, industrial or institutional uses with over an estimated 400 ADT, or as otherwise required by the City Engineer, the application must include a traffic impact analysis to determine the number and types of traffic controls necessary to accommodate anticipated traffic flow.**

ANALYSIS: A Transportation Impact Analysis (TIA) has been submitted with this application, prepared by Lancaster Mobley, and dated April 8, 2020. SZCDC § 16.106.080 requires analysis of all intersections where fifty (50) or more peak hour vehicle trips can be expected to result from the development. The 12 intersections (10 existing and 2 future) included in the TIA are identical to the Middlebrook and Reserve at Cedar Creek Subdivision studies for consistency; however, none of the studied intersections are projected to experience 50 or more peak hour vehicle trips resulting from this development.

The TIA summarized the following with regard to intersection impacts:

- All study intersections are projected to operate acceptably per their respectively jurisdictional standards by year 2024 with buildout of the proposed subdivision. No operational mitigation is necessary as part of the proposed Cedar Creek Subdivision.

- The Reserve at Cedar Creek Transportation Impact Analysis (TIA) – Sherwood, Oregon, dated September 19th, 2019, identified four intersections as currently exceeding acceptable jurisdictional standards. Based on the projected site trip impacts to these intersections, a total proportionate share fee to mitigate impacts of $48,207.49 was calculated.

FINDING: This standard is met.

L. Traffic Calming

1. The following roadway design features, including internal circulation drives, may be required by the City in new construction in areas where traffic calming needs are anticipated:

a. Curb extensions (bulb-outs).

b. Traffic diverters/circles.

c. Alternative paving and painting patterns.

d. Raised crosswalks, speed humps, and pedestrian refuges.

e. Other methods demonstrated as effective through peer reviewed Engineering studies.

2. With approval of the City Engineer, traffic calming measures such as speed humps and additional stop signs can be applied to mitigate traffic operations and/or safety problems on existing streets. They should not be applied with new street construction unless approved by the City Engineer and Tualatin Valley Fire & Rescue.

ANALYSIS: No specific or new traffic calming measures have been identified as required or proposed for this development.

FINDING: This standard is met.

M. Vehicular Access Management

All developments shall have legal access to a public road. Access onto public streets shall be permitted upon demonstration of compliance with the provisions of adopted street standards in the Engineering Design Manual.

1. Measurement: See the following access diagram where R/W = Right-of-Way; and P.I. = Point-of-Intersection where P.I. shall be located based upon a 90 degree angle of intersection between ultimate right-of-way lines.

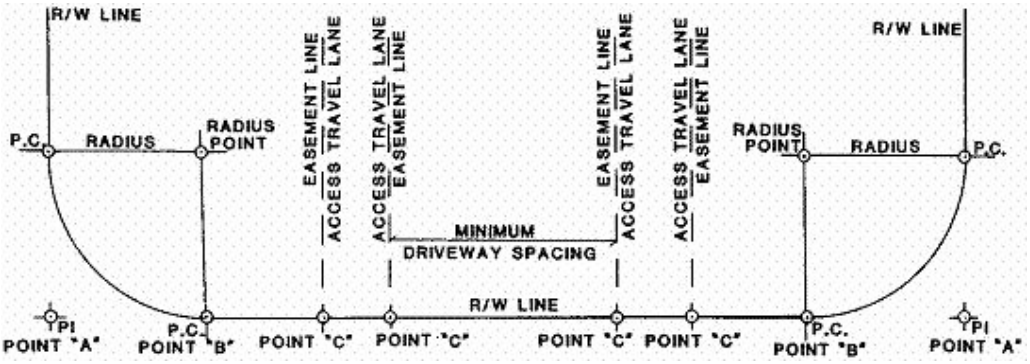
a. Minimum right-of-way radius at intersections shall conform to City standards.

b. **All minimum distances stated in the following sections shall be governed by sight distance requirements according to the Engineering Design Manual.**

c. **All minimum distances stated in the following sections shall be measured to the nearest easement line of the access or edge of travel lane of the access on both sides of the road.**

d. **All minimum distances between accesses shall be measured from existing or approved accesses on both sides of the road.**

e. **Minimum spacing between driveways shall be measured from Point "C" to Point "C" as shown below:**



2. **Roadway Access**

No use will be permitted to have direct access to a street or road except as specified below. Access spacing shall be measured from existing or approved accesses on either side of a street or road. The lowest functional classification street available to the legal lot, including alleys within a public easement, shall take precedence for new access points.

c. **Collectors:**

All commercial, industrial and institutional uses with one-hundred-fifty (150) feet or more of frontage will be permitted direct access to a Collector. Uses with less than one-hundred-fifty (150) feet of frontage shall not be permitted direct access to Collectors unless no other alternative exists.

Where joint access is available it shall be used, provided that such use is consistent with Section 16.96.040, Joint Access. No use will be permitted direct access to a Collector within one- hundred (100) feet of any present Point "A." Minimum spacing between driveways (Point "C" to Point "C") shall be one-hundred (100) feet. In all instances, access points near an intersection with a Collector or Arterial shall be located beyond the

influence of standing queues of the intersection in accordance with AASHTO standards. This requirement may result in access spacing greater than one hundred (100) feet.

3. Exceptions to Access Criteria for City-Owned Streets

a. Alternate points of access may be allowed if an access management plan which maintains the classified function and integrity of the applicable facility is submitted to and approved by the City Engineer as the access management plan must be included as part of the land use submittal or an application for modification as described in § 16.106.020 E. (Transportation Facilities Modifications).

b. Access in the Old Town (OT) Overlay Zone
Access points in the OT Overlay Zone shown in an adopted plan such as the Transportation System Plan, are not subject to the access spacing standards and do not need a variance. However, the applicant shall submit a partial access management plan for approval by the City Engineer. The approved plan shall be implemented as a condition of development approval.

ANALYSIS: The submitted plans for the application demonstrate that the vehicular access management standards above are met. Both street access points, including the east and west ends of the extension of SW Wapato Lake Drive, meet the required City access spacing standards, and are located generally as shown on plans submitted and approved with the Middlebrook Subdivision. The development will access SW Brookman Road via SW White Oak Terrace, which was also proposed and approved through the Middlebrook Subdivision. The site does not access Highway 99W and is not located in the Old Town Overlay District.

FINDING: These criteria are met.

N. Private Streets

1. The construction of a private street serving a single-family residential development is prohibited unless it provides principal access to two or fewer residential lots or parcels (i.e. flag lots).

2. Provisions shall be made to assure private responsibility for future access and maintenance through recorded easements. Unless otherwise specifically authorized, a private street shall comply with the same standards as a public street identified in the Community Development Code and the Transportation System Plan.

3. **A private street shall be distinguished from public streets and reservations or restrictions relating to the private street shall be described in land division documents and deed records.**

4. **A private street shall also be signed differently from public streets and include the words "Private Street".**

ANALYSIS: Findings and conditions for private streets are addressed under SZCDC § 16.118.050 below.

FINDING: These criteria are met per Condition of Approval B23 & G17.

16.106.060 - Sidewalks

A. Required Improvements

1. **Except as otherwise provided, sidewalks shall be installed on both sides of a public street and in any special pedestrian way within new development.**
2. **For Highway 99W, arterials, or in special industrial districts, the City Manager or designee may approve a development without sidewalks if alternative pedestrian routes are available.**
3. **In the case of approved cul-de-sacs serving less than fifteen (15) dwelling units, sidewalks on one side only may be approved by the City Manager or designee.**

ANALYSIS: As shown on the submitted plan set, sidewalks meeting city local street standards will be provided along both sides of the extension of SW Wapato Lake Drive, and along the site frontage with SW Trillium Road. Street improvements are not proposed along subject site's frontage of SW Brookman Road, however, the planned right-of-way dedication will provide adequate area for a sidewalks at the time of improvements.

FINDING: This standard is met.

B. Design Standards

1. **Arterial and Collector Streets**
   Arterial and collector streets shall have minimum six (6) or eight (8) foot wide sidewalks/multi-use paths, located as required by this Code. Residential areas shall have a minimum of a six (6) foot wide sidewalk and commercial industrial areas shall have a minimum of an eight (8) foot wide sidewalk.
2. **Local Streets**
   Local streets shall have minimum five (5) foot wide sidewalks, located as required by this Code.

3. Handicapped Ramps
Sidewalk handicapped ramps shall be provided at all intersections.

ANALYSIS: SW Brookman Road is classified as a County Arterial and the planned right-of-way dedication will provide adequate area for a sidewalk within the proposed street section. Local streets are provided with a six-foot wide sidewalk as shown in the plans. The applicant's narrative states handicapped ramps will be provided as required by code.

FINDING: These criteria are met.

C. Pedestrian and Bicycle Paths
Provide bike and pedestrian connections on public easements or right-of-way when full street connections are not possible, with spacing between connections of no more than 330 feet except where prevented by topography, barriers such as railroads or highways, or environmental constraints such as rivers and streams.

ANALYSIS: The applicant is proposing a 15 ft. wide pedestrian easement between lots 6/7 and 14/15. The pathway will provide bike and pedestrian connectivity as a full north-south street connection is not feasible. The pathway is located at the approximate mid-point of the block and is less than 300 ft. from the western and eastern ends of the platted block that is currently under review. An additional accessway towards the west end of the block is not feasible because it has already been platted as part of the Middlebrook Subdivision.

FINDING: This standard is met.

16.106.070 - Bike Lanes
If shown in Figure 13 of the Transportation System Plan, bicycle lanes shall be installed in public rights-of-way, in accordance with City specifications. Bike lanes shall be installed on both sides of designated roads, should be separated from the road by a twelve-inch stripe or other means approved by Engineering Staff, and should be a minimum of five (5) feet wide.

ANALYSIS: Figure 13 of the City of Sherwood Transportation System Plan (TSP), identifies that bicycle lanes are required along SW Brookman Road. SW Brookman Road is under the jurisdiction of Washington County. The planned right-of-way dedication will provide adequate area for a bike lane within the proposed street section.

FINDING: This standard is met.

16.106.080 - Traffic Impact Analysis (TIA)

A. Purpose

The purpose of this section is to implement Sections 660-012-0045(2)(b) and -0045(2)(e) of the State Transportation Planning Rule (TPR), which require the City to adopt performance standards and a process to apply conditions to land use proposals in order to minimize impacts on and protect transportation facilities. This section establishes requirements for when a traffic impact analysis (TIA) must be prepared and submitted; the analysis methods and content involved in a TIA; criteria used to review the TIA; and authority to attach conditions of approval to minimize the impacts of the proposal on transportation facilities.

This section refers to the TSP for performance standards for transportation facilities as well as for projects that may need to be constructed as mitigation measures for a proposal's projected impacts. This section also relies on the City's Engineering Design Manual to provide street design standards and construction specifications for improvements and projects that may be constructed as part of the proposal and mitigation measures approved for the proposal.

B. Applicability

A traffic impact analysis (TIA) shall be required to be submitted to the City with a land use application at the request of the City Engineer or if the proposal is expected to involve one (1) or more of the following:

1. **An amendment to the Sherwood Comprehensive Plan or zoning map.**
2. **A new direct property approach road to Highway 99W is proposed.**
3. **The proposed development generates fifty (50) or more PM peak-hour trips on Highway 99W, or one hundred (100) PM peak-hour trips on the local transportation system.**
4. **An increase in use of any adjacent street or direct property approach road to Highway 99W by ten (10) vehicles or more per day that exceed the twenty thousand-pound gross vehicle weight.**
5. **The location of an existing or proposed access driveway does not meet minimum spacing or sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles are likely to queue or hesitate at an approach or access connection, thereby creating a safety hazard.**

6. A change in internal traffic patterns that may cause safety problems, such as back up onto the highway or traffic crashes in the approach area.

C. Requirements

The following are typical requirements that may be modified in coordination with Engineering Staff based on the specific application.

1. Pre-application Conference. The applicant shall meet with the City Engineer prior to submitting an application that requires a TIA. This meeting will be coordinated with Washington County and ODOT when an approach road to a County road or Highway 99W serves the property, so that the TIA will meet the requirements of all relevant agencies.

2. Preparation. The TIA shall be prepared by an Oregon Registered Professional Engineer qualified to perform traffic Engineering analysis and will be paid for by the applicant.

3. Typical Average Daily Trips and Peak Hour Trips. The latest edition of the Trip Generation Manual, published by the Institute of Transportation Engineers (ITE), shall be used to gauge PM peak hour vehicle trips, unless a specific trip generation study that is approved by the City Engineer indicates an alternative trip generation rate is appropriate.

4. Intersection-level Analysis. Intersection-level analysis shall occur at every intersection where the analysis shows that fifty (50) or more peak hour vehicle trips can be expected to result from the development.

5. Transportation Planning Rule Compliance. The requirements of OAR 660-012-0060 shall apply to those land use actions that significantly affect the transportation system, as defined by the Transportation Planning Rule.

D. Study Area

The following facilities shall be included in the study area for all TIAs:

1. All site-access points and intersections (signalized and unsignalized) adjacent to the proposed development site. If the site fronts an arterial or collector street, the analysis shall address all intersections and driveways along the site frontage and within the access spacing distances extending out from the boundary of the site frontage.

2. Roads and streets through and adjacent to the site.

3. All intersections needed for signal progression analysis.

4. In addition to these requirements, the City Engineer may require analysis of any additional intersections or roadway

links that may be adversely affected as a result of the proposed development.

E. Analysis Periods

To adequately assess the impacts of a proposed land use action, the following study periods, or horizon years, should be addressed in the transportation impact analysis where applicable:

1. **Existing Year.**
2. **Background Conditions in Project Completion Year. The conditions in the year in which the proposed land use action will be completed and occupied, but without the expected traffic from the proposed land use action. This analysis should account for all City-approved developments that are expected to be fully built out in the proposed land use action horizon year, as well as all planned transportation system improvements.**
3. **Full Buildout Conditions in Project Completion Year. The background condition plus traffic from the proposed land use action assuming full build-out and occupancy.**
4. **Phased Years of Completion. If the project involves construction or occupancy in phases, the applicant shall assess the expected roadway and intersection conditions resulting from major development phases. Phased years of analysis will be determined in coordination with City staff.**
5. **Twenty-Year or TSP Horizon Year. For planned unit developments, comprehensive plan amendments or zoning map amendments, the applicant shall assess the expected future roadway, intersection, and land use conditions as compared to approved comprehensive planning documents.**

F. Approval Criteria

When a TIA is required, a proposal is subject to the following criteria, in addition to all criteria otherwise applicable to the underlying land use proposal:

1. **The analysis complies with the requirements of 16.106.080.C;**
2. **The analysis demonstrates that adequate transportation facilities exist to serve the proposed development or identifies mitigation measures that resolve identified traffic safety problems in a manner that is satisfactory to the City Engineer and, when County or State highway facilities are affected, to Washington County and ODOT;**
3. **For affected non-highway facilities, the TIA demonstrates that mobility and other applicable performance standards established in the adopted City TSP have been met; and**

4. **Proposed public improvements are designed and will be constructed to the street standards specified in Section 16.106.010 and the Engineering Design Manual, and to the access standards in Section 16.106.040.**
5. **Proposed public improvements and mitigation measures will provide safe connections across adjacent right-of-way (e.g., protected crossings) when pedestrian or bicycle facilities are present or planned on the far side of the right-of-way.**

ANALYSIS: A Transportation Impact Analysis (TIA) has been submitted with this application, prepared by Lancaster Mobley, and dated April 8, 2020. The TIA addresses the requirements of SZCDC § 16.106.080 as well as applicable Washington County and ODOT review requirements. The study methodology, assumptions and scope were determined based on a review of existing travel patterns, the City of Sherwood's Development Code, and TIA prepared as part of the recently approved Middlebrook Residential Subdivision and the Reserve at Cedar Creek application. The study intersections and requirements are the same as was required for the Middlebrook Residential Subdivision, and the Reserve at Cedar Creek application.

FINDING: This criterion is met.

G. Conditions of Approval

The City may deny, approve, or approve a development proposal with conditions needed to meet operations and safety standards and provide the necessary right-of-way and improvements to ensure consistency with the future planned transportation system. Improvements required as a condition of development approval, when not voluntarily provided by the applicant, shall be roughly proportional to the impact of the development on transportation facilities, pursuant to Section 16.106.090. Findings in the development approval shall indicate how the required improvements are directly related to and are roughly proportional to the impact of development.

16.106.090 - Rough Proportionality

A. Purpose

The purpose of this section is to ensure that required transportation facility improvements are roughly proportional to the potential impacts of the proposed development. The rough proportionality requirements of this section apply to both frontage and non-frontage improvements. A proportionality analysis will be conducted by the City Engineer for any proposed development that triggers transportation facility improvements pursuant to this chapter. The

City Engineer will take into consideration any benefits that are estimated to accrue to the development property as a result of any required transportation facility improvements. A proportionality determination can be appealed pursuant to Chapter 16.76. The following general provisions apply whenever a proportionality analysis is conducted.

B. Mitigation of impacts due to increased demand for transportation facilities associated with the proposed development shall be provided in rough proportion to the transportation impacts of the proposed development. When applicable, anticipated impacts will be determined by the TIA in accordance with Section 16.106.080. When no TIA is required, anticipated impacts will be determined by the City Engineer.

C. The following shall be considered when determining proportional improvements:

1. **Condition and capacity of existing facilities within the impact area in relation to City standards. The impact area is generally defined as the area within a one-half-mile radius of the proposed development. If a TIA is required, the impact area is the TIA study area.**
2. **Existing vehicle, bicycle, pedestrian, and transit use within the impact area.**
3. **The effect of increased demand on transportation facilities and other approved, but not yet constructed, development projects within the impact area that is associated with the proposed development.**
4. **Applicable TSP goals, policies, and plans.**
5. **Whether any route affected by increased transportation demand within the impact area is listed in any City program including school trip safety; neighborhood traffic management; capital improvement; system development improvement, or others.**
6. **Accident history within the impact area.**
7. **Potential increased safety risks to transportation facility users, including pedestrians and cyclists.**
8. **Potential benefit the development property will receive as a result of the construction of any required transportation facility improvements.**
9. **Other considerations as may be identified in the review process pursuant to Chapter 16.72.**

ANALYSIS: Full findings related to the required Conditions of Approval and rough proportionately are provided in the Engineers Comments' (Exhibit B1) and the Washington County Land Use & Transportation Comments (Exhibit B2).

FINDING: These criteria are met.

Chapter 16.108 – IMPROVEMENT PLAN REVIEW
16.108.010 – Preparation and Submission
An improvement plan shall be prepared and stamped by a Registered Civil Engineer certifying compliance with City specifications. Two (2) sets of the plan shall be submitted to the City for review. An improvements plan shall be accompanied by a review fee as per this Section.

- **A. Review Fee**
  Plan review fees are calculated as a percentage of the estimated total cost of improvements and are set by the "Schedule of Development and Business Fees" adopted by Resolution of the Council. This schedule is included herein for the purposes of information, but is deemed to be separate from and independent of this Code.
- **B. Engineering Agreement**
  A copy of an agreement or contract between the applicant and Registered Civil Engineer for:
  1. **Surveying sufficient to prepare construction plans.**
  2. **Preparation of construction plans and specifications.**
  3. **Construction staking, and adequate inspection.**
  4. **Construction notes sufficient to develop accurate as-built plans.**
  5. **Drawing of accurate as-built plans and submission of reproducible mylars for finals to the City.**
  6. **Certificate stating that construction was completed in accordance with required plans and specifications.**

ANALYSIS: The development will require new public and an Engineering Public Improvement Plan is required.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL E9: Prior to Approval of the Engineering Public Improvement Plans, an Engineering Compliance Agreement shall be obtained from the City of Sherwood Engineering Department.

16.108.040 - Acceptance of Improvements

- **A. Final Inspection**

At such time as all public improvements, except those specifically approved for later installation, have been completed, the applicant shall notify the City of the readiness for final inspection.

B. Notification of Acceptance

The City shall give written notice of acceptance of the improvements upon finding that the applicant has met the requirements of this Chapter and the specifications of all approved plans.

C. Maintenance Bond

Prior to City acceptance of public improvements, the applicant shall provide the City a maintenance bond computed at ten percent (10%) of the full value of the improvements, for the purpose of correcting any defective work or maintenance that becomes apparent or arises within two (2) years after final acceptance of the public improvements.

ANALYSIS: The City will complete the final inspection of public improvements upon notification by the applicant. A maintenance bond is required at ten percent (10%) of the full value of the improvements.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL G6: Prior to acceptance of the public improvements, the applicant shall provide a maintenance bond at 10% of the full value of the improvements, for the purpose of correcting any defective work or maintenance that becomes apparent or arises within two (2) years after final acceptance of the public improvements.

Chapter 16.110 – SANITARY SEWERS

16.110.010 - Required Improvements

Sanitary sewers shall be installed to serve all new developments and shall connect to existing sanitary sewer mains. Provided, however, that when impractical to immediately connect to a trunk sewer system, the use of septic tanks may be approved, if sealed sewer laterals are installed for future connection and the temporary system meets all other applicable City, Clean Water Services, Washington County and State sewage disposal standards.

16.110.020 - Design Standards

A. Capacity

Sanitary sewers shall be constructed, located, sized, and installed at standards consistent with this Code, the Sanitary Sewer Service Plan Map in the Sanitary Sewer Master Plan, and other applicable Clean Water Services and City standards, in order to adequately serve the proposed development and allow for future extensions.

B. Over-Sizing

1. **When sewer facilities will, without further construction, directly serve property outside a proposed development, gradual reimbursement may be used to equitably distribute the cost of that over-sized system.**
2. **Reimbursement shall be in an amount estimated by the City to be a proportionate share of the cost for each connection made to the sewer by property owners outside of the development, for a period of ten (10) years from the time of installation of the sewers. The boundary of the reimbursement area and the method of determining proportionate shares shall be determined by the City. Reimbursement shall only be made as additional connections are made and shall be collected as a surcharge in addition to normal connection charges.**

16.110.030 - Service Availability

Approval of construction plans for new facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing sewer systems shall include certification by the City that existing or proposed sewer facilities are adequate to serve the development.

ANALYSIS: Per the City Engineer's comments, the submitted plans show the proposed public sanitary sewer main system connecting to the existing sanitary sewer main system constructed as part of the adjacent Middlebrook subdivision. The construction of the Middlebrook public sanitary sewer must be completed, inspected, approved and accepted by the City before the proposed development may connect to the existing public system. Until such time as the City gives final acceptance of the public sanitary sewer being constructed with the Middlebrook Subdivision, the proposed Riverside Subdivision shall maintain a 10-foot physical separation between the two systems.

A regional sanitary sewer trunk line extension (Brookman Sanitary Sewer Trunk Line Extension Project) is currently being designed by Clean Water Services (CWS). The alignment of the proposed trunk line is shown on the submitted plans under the Community Trail of Tract B.

To allow for further extension of the Brookman Sanitary Sewer Trunk Extension Project the applicant will be conditioned to dedicate a 20-foot wide public sanitary sewer easement across the entirety of the applicants property in alignment with the proposed Brookman Sanitary Sewer Trunk Extension Project as defined by CWS.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL E10: Prior to Final Approval of Engineering Plans applicant shall provide a letter from CWS indicating that the alignment of the future Brookman Sanitary Sewer Trunk Extension is in conformance with approved CWS design.

RECOMMENDED CONDITION OF APPROVAL G7: Prior to Final Acceptance of Constructed Public Improvements, connection to that portion of the adjacent Middlebrook Subdivision system, will not be permitted until such time as that sanitary sewer main line has been constructed, received final inspection approval, and accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the Riverside at Cedar Creek site development public sanitary infrastructure improvements and the adjacent Middlebrook Subdivision public sanitary infrastructure improvements shall be maintained.

RECOMMENDED CONDITION OF APPROVAL G8: Prior to Final Acceptance of Constructed Public Improvements, all private sanitary laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.

RECOMMENDED CONDITION OF APPROVAL G9: Prior to Final Acceptance of Constructed Public Improvements, any public sanitary sewer to be located on private property shall have a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvement meeting Sherwood Engineering standards.

RECOMMENDED CONDITION OF APPROVAL G10: Prior to Final Acceptance of Constructed Public Improvements, a 20-foot wide public sanitary sewer easement across the entirety of the applicants property in alignment with the proposed Brookman Sanitary Sewer Trunk Line Extension project as specified by CWS, shall be dedicated to the City.

Chapter 16.112– WATER SUPPLY
16.112.010 Required Improvements
Water lines and fire hydrants conforming to City and Fire District standards shall be installed to serve all building sites in a proposed development. All waterlines shall be connected to existing water mains or shall construct new mains appropriately sized and located in accordance with the Water System Master Plan.

16.112.020 - Design Standards

A. Capacity

Water lines providing potable water supply shall be sized, constructed, located and installed at standards consistent with this Code, the Water System Master Plan, the City's Design and Construction Manual, and with other applicable City standards and specifications, in order to adequately serve the proposed development and allow for future extensions.

B. Fire Protection

All new development shall comply with the fire protection requirements of Chapter 16.116, the applicable portions of Chapter 7 of the Community Development Plan, and the Fire District.

C. Over-Sizing

1. When water mains will, without further construction, directly serve property outside a proposed development, gradual reimbursement may be used to equitably distribute the cost of that over-sized system.

2. Reimbursement shall be in an amount estimated by the City to be the proportionate share of the cost of each connection made to the water mains by property owners outside the development, for a period of ten (10) years from the time of installation of the mains. The boundary of the reimbursement area and the method of determining proportionate shares shall be determined by the City. Reimbursement shall only be made as additional connections are made and shall be collected as a surcharge in addition to normal connection charges.

3. When over-sizing is required in accordance with the Water System Master Plan, it shall be installed per the Water System Master Plan. Compensation for over-sizing may be provided through direct reimbursement, from the City, after mainlines have been accepted. Reimbursement of this nature would be utilized when the cost of over-sizing is for system wide improvements.

16.112.030 - Service Availability

Approval of construction plans for new water facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing water systems shall include certification by the City that existing or proposed water systems are adequate to serve the development.

FINDING: Per the Engineers' Comments, the proposed development submittal indicates the extension of the public water system previously construction by the Middlebrook Subdivision. The project will extend an 8-inch public water main along SW Wapato

Lake Drive, and provide a looped system between SW Wapato Lake Drive and SW Trillium Lane

The City of Sherwood Water System Master Plan shows the need for construction of 12-inch waterline within Brookman Road. The public water line will extend the proposed water main constructed with the Middlebrook Subdivision, across the entire SW Brookman Road frontage of the Reserve at Cedar Creek subdivision. Because the line is sized larger than the residential standard of 8-inches, the construction cost of this line will be eligible for water system SDC credits on that portion greater than 8-inches.

RECOMMENDED CONDITION OF APPROVAL E11: Prior to Final Approval of Engineering Plans, the Engineering Department shall provide review and approval of related public water improvement plans and reports. Public water system plans shall meet City standards. All public water pipe shall have joint restraints.

RECOMMENDED CONDITION OF APPROVAL E12: Prior to Final Approval of Engineering Plans, the applicant shall obtain any necessary Right-of-Way Permits and/or Utility Facilities Permits from WACO for constructing public improvements within the SW Brookman Road right-of-way.

RECOMMENDED CONDITION OF APPROVAL E13: Prior to Final Approval of Engineering Plans, applicant shall obtain and provide letter from Sherwood Public Works Department, that existing public water system has the capacity and pressure to provide appropriate public water and fire service to the proposed development.

RECOMMENDED CONDITION OF APPROVAL G11: Prior to Final Acceptance of Constructed Public Improvements, connection to that portion of the public water system being constructed by the adjacent Middlebrook Subdivision, will not be permitted until such time as that portion of the public water system is constructed, has received final inspection approval, and is accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the proposed site development public water system and the Middlebrook Subdivision public water systems, shall be maintained.

RECOMMENDED CONDITION OF APPROVAL E12: Prior to Final Acceptance of Constructed Public Improvements, the installation of the 12-inch waterline running down SW Brookman Road, shall extend the entire length of the property frontage right-of-way line. The oversizing cost of construction (greater than 8”) shall be eligible for water system SDC credits.

RECOMMENDED CONDITION OF APPROVAL H6: Prior to Issuance of Occupancy of any residential lot structures, all service laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.

Chapter 16.114 – STORM WATER

16.114.010 - Required Improvements

Storm water facilities, including appropriate source control and conveyance facilities, shall be installed in new developments and shall connect to the existing downstream drainage systems consistent with the Comprehensive Plan and the requirements of the Clean Water Services water quality regulations contained in their Design and Construction Standards R&O 04-9, or its replacement.

(Note: Section 16.114.015, Street Systems Improvement Fees (SIF) was repealed by Ordinance 91-922 § 19) to be removed from the SZCDC and permanently located in the Municipal Code).

16.114.020 - Design Standards

A. Capacity

Storm water drainage systems shall be sized, constructed, located, and installed at standards consistent with this Code, the Storm Drainage Master Plan Map, attached as Exhibit E, Chapter 7 of the Community Development Plan, other applicable City standards, the Clean Water Services Design and Construction standards R&O 04-9 or its replacement, and hydrologic data and improvement plans submitted by the developer.

B. On-Site Source Control

Storm water detention and groundwater recharge improvements, including but not limited to such facilities as dry wells, detention ponds, and roof top ponds shall be constructed according to Clean Water Services Design and Construction Standards.

C. Conveyance System

The size, capacity and location of storm water sewers and other storm water conveyance improvements shall be adequate to serve the development and accommodate upstream and downstream flow. If an upstream area discharges through the property proposed for development, the drainage system shall provide capacity to the receive storm water discharge from the upstream area. If downstream drainage systems are not sufficient to receive an increase in storm water caused by new development, provisions shall be made by the developer to increase the downstream capacity or to provide detention such that the new development will not increase the storm water caused by the new development.

16.114.030 - Service Availability
Approval of construction plans for new storm water drainage facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing storm water drainage systems shall include certification by the City that existing or proposed drainage facilities are adequate to serve the development.

ANALYSIS: Per the City Engineers' comments, A preliminary stormwater drainage report prepared by PDG, dated February 8, 2020 has been submitted. Within the preliminary drainage report the following important items are noted:

1) Cedar Creek runs through the site commencing at a culvert crossing of Brookman Road located approximately 250-feet west of the east property line, then meandering north and east to the east property line.
2) There are no identified downstream conveyance system deficiencies within 1/4 mile of the site, hence no on-site detention is required.
3) The proposed system storm water drainage system is required to meet current CWS regulations for hydromodification.
4) A single regional storm water treatment facility is proposed for the subdivision.
5) The total lot area is approximately 10.47 acre. The total disturbed area is more than half the total area (estimated at > 5 acres), therefore a NPDES 1200C permit is required.

The applicant has also submitted a Service Provider Letter issued by CWS (File No. 20-000663), dated May 11, 2020. The SPL lists 24 specific conditions which are to be completed and adhered to as part of the proposed development. CWS also responded to the land use notice for the project and submitted a memorandum with general comments and conditions. The subject site is located outside of CWS jurisdictional boundaries and annexation to the service district is required.

FINDING: These criteria is met as conditioned below

RECOMMENDED CONDITION OF APPROVAL B17: Prior to Final Plat Approval, the stormwater treatment facilities (Tract E) shall be shown as being located in individual tracts of land dedicated to the City of Sherwood.

RECOMMENDED CONDITION OF APPROVAL B18: Prior to Final Plat Approval, an easement over the vegetated corridors tracts of land granting access to CWS shall be recorded with the plat.

RECOMMENDED CONDITION OF APPROVAL E14: Prior to Final Engineering Plan Approval, submitted site development plans shall provide for compliance with all 24 requirements and conditions stated in the CWS issued Service Provider Letter (File No. 20-000663).

RECOMMENDED CONDITION OF APPROVAL E15: Prior to Final Engineering Plan Approval, submitted site development stormwater improvement plans shall provide for City access to stormwater outfall/outlet structures for maintenance purposes.

RECOMMENDED CONDITION OF APPROVAL E16: Prior to Final Engineering Plan Approval, a Final Stormwater Drainage Report shall be provided to City Engineering for review and approval.

RECOMMENDED CONDITION OF APPROVAL E17: Prior to Final Engineering Plan Approval, a Stormwater Connection Permit shall be obtained from CWS.

RECOMMENDED CONDITION OF APPROVAL E18: Prior to Final Engineering Plan Approval, applicant shall obtain an NPDES 1200C permit from CWS and submit it to the City Engineering Department for their records.

RECOMMENDED CONDITION OF APPROVAL G13: Prior to Final Acceptance of Constructed Public Improvements, the proposed development shall provide stormwater improvements as needed to serve new street and lot improvements meeting CWS and City of Sherwood standards.

RECOMMENDED CONDITION OF APPROVAL G14: Prior to Final Acceptance of Constructed Public Improvements, any public stormwater system that is located on private property shall have a recorded public stormwater easement encompassing the related public stormwater sewer improvement meeting Sherwood Engineering standards.

RECOMMENDED CONDITION OF APPROVAL H7: Prior to Grant of Occupancy for any building, the proposed development shall provide storm sewer improvements as needed to serve new street improvements and service all parcels within the subject development meeting CWS and City standards.

RECOMMENDED CONDITION OF APPROVAL G15: Prior to Final Acceptance of Constructed Public Improvements, all private stormwater laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.

RECOMMENDED CONDITION OF APPROVAL G16: Prior to Final Acceptance of Public Improvements, all vegetated corridors shall be dedicated to the City in recorded tracts of land.

RECOMMENDED CONDITION OF APPROVAL D2: Prior to site grading, comply will all requirements of the CWS Memorandum dated July 17, 2020, including obtaining a Storm Water Connection Authorization Permit.

RECOMMENDED CONDITION OF APPROVAL B19: Prior to final plat approval, comply will all requirements of the CWS Memorandum dated July 17, 2020, including obtaining a Storm Water Connection Authorization Permit.

RECOMMENDED CONDITION OF APPROVAL B21: Prior to final plat approval, the parcel shall annex into the Clean Water Services district boundary.

Chapter 16.116 - FIRE PROTECTION
16.116.010 Required Improvements
When land is developed so that any commercial or industrial structure is further than two hundred and fifty (250) feet or any residential structure is further than five hundred (500) feet from an adequate water supply for fire protection, as determined by the Fire District, the developer shall provide fire protection facilities necessary to provide adequate water supply and fire safety.

A. Capacity
All fire protection facilities shall be approved by and meet the specifications of the Fire District, and shall be sized, constructed, located, and installed consistent with this Code, Chapter 7 of the Community Development Plan, and other applicable City standards, in order to adequately protect life and property in the proposed development.

B. Fire Flow
Standards published by the Insurance Services Office, entitled "Guide for Determination of Required Fire Flows" shall determine the capacity of facilities required to furnish an adequate fire flow. Fire protection facilities shall be adequate to convey quantities of water, as determined by ISO standards, to any outlet in the system, at no less than twenty (20) pounds per square inch residual pressure. Water supply for fire protection purposes shall be restricted to that

available from the City water system. The location of hydrants shall be taken into account in determining whether an adequate water supply exists.

C. Access to Facilities

Whenever any hydrant or other appurtenance for use by the Fire District is required by this Chapter, adequate ingress and egress shall be provided. Access shall be in the form of an improved, permanently maintained roadway or open paved area, or any combination thereof, designed, constructed, and at all times maintained, to be clear and unobstructed. Widths, height clearances, ingress and egress shall be adequate for District firefighting equipment. The Fire District, may further prohibit vehicular parking along private accessways in order to keep them clear and unobstructed, and cause notice to that effect to be posted.

D. Hydrants

Hydrants located along private, accessways shall either have curbs painted yellow or otherwise marked prohibiting parking for a distance of at least fifteen (15) feet in either direction, or where curbs do not exist, markings shall be painted on the pavement, or signs erected, or both, given notice that parking is prohibited for at least fifteen (15) feet in either direction.

16.116.030 - Miscellaneous Requirements

A. Timing of Installation

When fire protection facilities are required, such facilities shall be installed and made serviceable prior to or at the time any combustible construction begins on the land unless, in the opinion of the Fire District, the nature or circumstances of said construction makes immediate installation impractical.

B. Maintenance of Facilities

All on-site fire protection facilities, shall be maintained in good working order. The Fire District may conduct periodic tests and inspection of fire protection and may order the necessary repairs or changes be made within ten (10) days.

C. Modification of Facilities

On-site fire protection facilities, may be altered or repaired with the consent of the Fire District; provided that such alteration or repairs shall be carried out in conformity with the provisions of this Chapter.

ANALYSIS: The proposal is for a residential subdivision and the applicant is required to install fire protection facilities that meet the standards of Tualatin Valley Fire & Rescue (TVF&R). TVF&R provided comments during the completeneness review process which

are dated April 24, 2020 (Exhibit B5). The comments list the applicable fire code standards and highlight specific requirements including:

- The construction Type VB requires a minimum flow of 1,000 GPM
- Documentation of a fire flow test is required
- The proposed hydrant locations do not meet spacing standards and an additional hydrant is required near Lots 18 or 19

The applicant has provided revised plans that show a new hydrant is proposed along the north side of Wapato Lake Drive near hydrant 16. A condition of approval is recommended below which requires compliance with the Fire Marshall's letter.

FINDING: These criteria are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL F6: Prior to issuance of building permits, provide documentation of a fire flow test that meets flow requirements for the development type.

RECOMMENDED CONDITION OF APPROVAL F7: Prior to issuance of building permits, submit documentation from TVF&R that indicates the requirements of the Fire Marshall's letter dated April 24, 2020 and other applicable requirements of the fire code have been satisfied.

Chapter 16.118 - PUBLIC AND PRIVATE UTILITIES
16.118.010 Purpose
Public telecommunication conduits as well as conduits for franchise utilities including, but not limited to, electric power, telephone, natural gas, lighting, and cable television shall be installed to serve all newly created lots and developments in Sherwood.

16.118.020 Standard

A. Installation of utilities shall be provided in public utility easements and shall be sized, constructed, located and installed consistent with this Code, Chapter 7 of the Community Development Code, and applicable utility company and City standards.

B. Public utility easements shall be a minimum of eight (8) feet in width unless a reduced width is specifically exempted by the City Engineer. An eight-foot wide public utility easement (PUE) shall be provided on private property along all public street frontages. This standard does not apply to developments within the Old Town Overlay.

C. Where necessary, in the judgment of the City Manager or his designee, to provide for orderly development of adjacent properties,

public and franchise utilities shall be extended through the site to the edge of adjacent property(ies).

D. Franchise utility conduits shall be installed per the utility design and specification standards of the utility agency.

E. Public Telecommunication conduits and appurtenances shall be installed per the City of Sherwood telecommunication design standards.

F. Exceptions: Installation shall not be required if the development does not require any other street improvements. In those instances, the developer shall pay a fee in lieu that will finance installation when street or utility improvements in that location occur.

ANALYSIS: A minimum 8-foot wide public utility easement shall be provided on private property along all public street frontages.

FINDING: This standard is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B22: Prior to Final Approval of Plat, applicant shall show a minimum 8-foot wide public utility easement (PUE) on private property along all public street frontages.

16.118.030 - Underground Facilities

Except as otherwise provided, all utility facilities, including but not limited to, electric power, telephone, natural gas, lighting, cable television, and telecommunication cable, shall be placed underground, unless specifically authorized for above ground installation, because the points of connection to existing utilities make underground installation impractical, or for other reasons deemed acceptable by the City.

ANALYSIS: Sherwood Broadband utilities are required to be installed along the subject properties frontage per requirements set forth in City Ordinance 2005-017 and City Resolution 2005-074.

FINDING: These standards are met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL H8: Prior to Grant of Occupancy for the building, Sherwood Broadband utilities (vaults and conduit) shall be installed along the subject properties frontage per requirements set forth in City Ordinance 2005-017 and City Resolution 2005-074.

16.118.040 - Exceptions

Surface-mounted transformers, surface-mounted connection boxes and meter cabinets, temporary utility service facilities during construction, high capacity electric and communication feeder lines, and utility transmission lines operating at fifty thousand (50,000) volts or more may be located above ground. The City reserves the right to approve location of all surface-mounted transformers.

16.118.050 - Private Streets

The construction of new private streets, serving single-family residential developments shall be prohibited unless it provides principal access to two or fewer residential lots or parcels i.e. flag lots. Provisions shall be made to assure private responsibility for future access and maintenance through recorded easements. Unless otherwise specifically authorized, a private street shall comply with the same standards as a public street identified in the Community Development Code and the Transportation System Plan. A private street shall be distinguished from public streets and reservations or restrictions relating to the private street shall be described in land division documents and deed records. A private street shall also be signed differently from public streets and include the words "Private Street".

ANALYSIS: The application proposes two private streets, identified as Tracts C and D. As discussed above, staff recommends removal of the Tract D from the plat as it is not necessary to provide adequate lot depth.

FINDING: These criteria is met as conditioned below.

RECOMMENDED CONDITION OF APPROVAL B23: Prior to Final Approval of Plat, all proposed private streets shall comply with all the standards stated in SZCDC § 16.118.050 (Private Streets).

RECOMMENDED CONDITION OF APPROVAL G17: Prior to Final Acceptance of Constructed Public Improvements, all private street shall comply with all the standards stated in SZCDC § 16.118.050 (Private Streets).

IV. CONDITIONS OF APPROVAL

Based upon review of the applicant's submittal information, review of the code, agency comments and consideration of the applicant's submittal, staff finds that the proposed site plan does not fully comply with the standards but can be conditioned to comply. **Therefore, staff recommends approval of LU 2020-005 SUB Riverside at Cedar Creek subject to the following conditions of approval:**

A. GENERAL CONDITIONS

1. Compliance with the Conditions of Approval is the responsibility of the developer or its successor in interest.
2. Development and construction on the site shall conform substantially to the preliminary plat plans submitted by Pioneer Design Group, dated June 2020, except as modified in the conditions below, (and shall conform specifically to final construction plans reviewed and approved by the City Engineer, the Building Official, Clean Water Services, and Tualatin Valley Fire and Rescue, and Washington County). All plans shall comply with the applicable building, planning, engineering and fire protection codes of the City of Sherwood.
3. This approval is valid for a period of two (2) years from the date of the decision notice. Extensions may be granted by the City as afforded by the Sherwood Zoning and Community Development Code.
4. The preliminary plat approval is valid for two years from the date of the Notice of Decision. The final plat shall be approved by the City within two years of Notice of Decision, unless an extension is granted by the City prior to the two-year deadline. Placement of construction trailers or temporary storage containers on the subject property shall require a Temporary Use Permit per Section 16.86 of the SZCDC.
5. This approval does not negate the need to obtain permits, as appropriate from other local, state or federal agencies, even if not specifically required by this decision.
6. All fences within the subdivision shall meet the requirements in Sherwood Zoning and Community Development Code Chapter 16.58.020.
7. Decks, fences, sheds, building additions and other site improvements shall not be located within any easement unless otherwise determined by the City of Sherwood.
8. Restrict and maintain on-site landscaping, utilities, and any other obstructions in the sight distance triangles to provide adequate sight distance at access locations.
9. Prior to Building Permit application submittal, obtain address(es) for the site or parcels.
10. Tree protection during development is required in accordance with the Tree Protection Standards described in the Arborist Report (Exhibit A8 – pages 5-7)

11. The developer shall comply with conditions described in the CWS Memorandum dated July 17, 2020 and all applicable CWS Design and Construction Standards (R&O 19-5).
12. WACO Transportation Development Tax (TDT) credit eligible offsets will be based on requirements and limitations established by WACO Ordinance Mo. 691A, as modified by Ordinances 729, 741, 746-A, 751 and 793-A, and as described in WACO's *Countywide Transportation Development Tax Procedures Manual*, dated July 2019. City Transportation SDC credit eligible off-sets will be based on requirements and limitations established by City of Sherwood Municipal Code Chapter 15.16 – System Development Charges and Chapter 15.20 – Park and Recreation System Development Charges on New Development.
13. Per SZCDC § 16.118, all new utilities shall be placed underground unless covered by exceptions noted under Section 16.118.040, and as approved by the City Engineer.

B. PRIOR TO FINAL SUBDIVISION PLAT APPROVAL

1. Prior to final plat approval, remove Tract D from the plat and adjust the lot shape and dimensions accordingly.
2. Prior to Final Approval of Plat, show clear vision easements on all corner lots fronting public streets. The clear vision easement shall be to the City of Sherwood and conform with SZCDC § 16.58.010.
3. Prior to final plat approval, revise the Preliminary Street Tree & Open Space Planting Plan (Exhibit A15 – Sheet L1) to provide landscaping in accordance with the clear vision requirements of SZCDC § 16.58.010(C).
4. Prior to final plat approval, provide a Covenants, Conditions, & Restrictions (CC&R) document that describes the reservations, restrictions, and maintenance responsibilities for Tract C. The final CC&Rs shall be recorded with the final plat.
5. Prior to final plat approval, provide a draft statutory warranty deed to the City that dedicates Tract B Open Space to the City of Sherwood. The final tract shall not include the pocket park at the northeast corner of the site. The final deed shall be recorded with the final plat.
6. Prior to Final Plat Approval, submit revised plans that provide the location and quantity of landscaped open space areas in accordance with SZCDC § 16.92.020. This condition does not apply to landscaping required by CWS standards.
7. Prior to final plat approval, submit a draft deed to the City dedicating Tract A Open Space to the future HOA. The deed shall be recorded with the final plat.
8. Prior to final plat approval, submit draft CC&Rs to the City that describe how Tract A will be maintained by the future HOA. The final CC&Rs shall be recorded with the final plat.

9. Prior to final plat approval, provide a separate tract for the pocket park at the northeast corner of Tract B. Submit a draft deed that dedicates the new tract to the HOA. The deed shall be recorded with the final plat.
10. Prior to final plat approval, submit draft CC&Rs to the City that describe how the pocket park (to be located in a new tract) will be maintained by the future HOA. The final CC&Rs shall be recorded with the final plat.
11. Prior to final plat approval, submit draft CC&Rs to the City that describe how the community trail will be maintained by the future HOA. The final CC&Rs shall be recorded with the final plat.
12. Prior to final plat approval, provide draft deeds to the City that dedicate Tracts F & G to the future HOA. The final deed shall be recorded with the final plat.
13. Prior to final plat approval, provide draft CC&Rs that specify the HOA is responsible for the perpetual maintenance of Tracts F & G. The final CC&Rs shall be recorded with the final plat.
14. Prior to final plat approval, a detailed street tree plan that complies with the size and spacing standards of SZCDC § 16.142.060 shall be submitted to the City.
15. Prior to Final Approval of Plat, applicant shall show a 33-foot wide right-of-way dedication to WACO along the SW Brookman Road frontage.
16. Prior to final plat approval, the following shall be shown on the plat and recorded with Washington County Survey Division:
    - Dedication of additional 33 feet right-of-way to provide 53 feet from the centerline of SW Brookman Road, including an 8 foot PUE.
17. Prior to Final Plat Approval, the stormwater treatment facilities (Tract E) shall be shown as being located in individual tracts of land dedicated to the City of Sherwood.
18. Prior to Final Plat Approval, an easement over the vegetated corridors tracts of land granting access to CWS shall be recorded with the plat.
19. Prior to final plat approval, comply will all requirements of the CWS Memorandum dated July 17, 2020, including obtaining a Storm Water Connection Authorization Permit.
20. Prior to final plat approval, the parcel shall annex into the Metro Service District.
21. Prior to final plat approval, the parcel shall annex into the Clean Water Services district boundary.
22. Prior to Final Approval of Plat, applicant shall show a minimum 8-foot wide public utility easement (PUE) on private property along all public street frontages.
23. Prior to Final Approval of Plat, all proposed private streets shall comply with all the standards stated in SZCDC § 16.118.050 (Private Streets).

C. PRIOR TO ISSUANCE OF A CITY OF SHERWOOD ENGINEERING COMPLIANCE AGREEMENT

1. Prior to Issuance of an Engineering Compliance Agreement, final engineering plan approval by the Engineering Department is required, performance and payment bonds and insurance riders must be submitted to the City.

D. PRIOR TO ISSUANCE OF A SITE GRADING PERMIT

1. Prior to issuance of site grading from the City of Sherwood, the applicant shall obtain a Washington County facility permit for construction of the following public improvements on SW Brookman Rd:
   A. Submit the following to Washington County Public Assurance Staff (503-846-3843):
      1. Completed "Design Option" form (original signed copy).
      2. $10,000.00 Administration Deposit.

         NOTE: The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field inspections, as-built approval, and project administration. The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is falls below County approved level, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.
      3. Copy of the City's Notice of Decision (NOD) and the County's letter dated July 16, 2020.
      4. Engineering plans and Geotech/Pavement report via ProjectDox for construction of the following public improvements to County standards:
         a. Closure of all existing access from the subject tax lot to SW Brookman Road.
         b. Pavement widening taper to match Middlebrook Subdivision to the west and the Reserve @ Cedar Creek to the east per the County Engineer.
         c. All work within the ROW of SW Brookman Road, including the Community Trail to County Standards.

   2. Prior to site grading, comply will all requirements of the CWS Memorandum dated July 17, 2020, including obtaining a Storm Water Connection Authorization Permit.

E. PRIOR TO APPROVAL OF THE ENGINEERING PUBLIC IMPROVEMENT PLANS

1. Prior to Final Approval of Engineering Plans, a Flood Plain Certificate for the site flood plain elevation shall be submitted to the City for its records.
2. Prior to Final Approval of Engineering Plans, a finalized NPDES 1200-C Permit issued by CWS shall be submitted to the City for its records.
3. Prior to Engineering Approval of the Public Improvement Plans, the applicant shall submit a final Tree Preservation and Removal Plan that reflect any changes required in the Notice of Decision.
4. Prior to Final Engineering Plan Approval, obtain and submit to Engineer a concurrence letter from DSL for the wetlands on the site or submit documentation from DSL that concurrence is not required.
5. Prior to Final Approval of Engineering Plans, the applicant shall pay a fee in-lieu-of construction for deferred City required frontage improvements along SW Brookman Road. The fee in-lieu-of construction amount will be set at 125% of the estimated City required deferred frontage improvements construction cost, as approved by the City Engineer. The deferred City required frontage improvements are identified as being;
    1. Asphalt Pavement section conforming to the City Engineering Design and Standard Details Manual, Section 210.2.2 for asphalt thickness requirements for arterial road sections.
    2. Standard Base Rock section conforming to the City Engineering Design and Standard Details Manual, Section 210.2.1 for leveling course rock and base rock thickness requirements for arterial roads.
    3. Concrete curb and cutter
    4. Concrete sidewalk/multi-use path
    5. Street planter strip plantings
    6. Street lighting system (including lights, foundations and conduits)
    7. Street trees
    8. Street signage and striping conforming to the City Engineering Design and Standard Details Manual, Section 340.
    9. Irrigation system (including piping, valves, controllers, sprinkler heads)
    10. Stormwater drainage collection, conveyance, and treatment systems for public roadway.
    11. Undergrounding of existing overhead utilities.

    Funds are to be deposited into City managed WACO TDT funds account and dedicated strictly to a future WACO SW Brookman Road capital improvement project.
6. Prior to Final Approval of Engineering Plans, applicant shall pay fee in-lieu-of construction amounts as follows:

f. SW Sunset Boulevard/SW Woodhaven Drive - $7,897.92 for proportionate share cost of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Woodhaven Drive & SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards Washington County (WACO) TDT and/or City Transportation SDC fee assessments on the developments single family residential units.

g. SW Sunset Boulevard/SW Timbrel Lane - $5,882.85 for proportionate share cost of traffic mini-roundabout improvements. Funds to be deposited into City funds account and dedicated strictly for a suture SW Timbrel Lane & SW Sunset Boulevard traffic roundabout improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards WACO TDT and/or 54% credit eligible towards City Transportation SDC fee assessments on the developments single family residential units.

h. SW Ladd Hill Road-SW Main Street/SW Sunset Boulevard - $7,812.50 for proportionate share cost of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Ladd Hill Road-SW Main Street & SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards WACO TDT and/or City Transportation SDC fee assessments on the developments single family residential units.

i. SW Baker Road/SW Murdock Road/SW Sunset Boulevard - $26,627.22 for proportionate share cost of addition of future intersection turn lanes improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Baker Road-SW Murdock Road/SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 75% credit eligible towards WACO TDT and/or 100% credit eligible towards City Transportation SDC fee assessments on the developments single family residential units.

j. SW Brookman Road/Hwy 99W - $21,131.32 for proportionate share cost of addition of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Brookman Road & Hwy 99W signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards Washington County (WACO) TDT fee assessments on the developments single family residential units.

7. Prior to Final Approval of Engineering Plans, the street lighting design shall include a photometric analysis report for review and approval by City Engineering. City lighting standards require Westbrook fixtures on all internal streets to the subdivision.
8. Prior to Final Approval of Engineering Plans, applicant shall submit a separate design modification request for each non-conforming public infrastructure design element, to the City Engineer for review and approval.

9. Prior to Approval of the Engineering Public Improvement Plans, an Engineering Compliance Agreement shall be obtained from the City of Sherwood Engineering Department.
10. Prior to Final Approval of Engineering Plans applicant shall provide a letter from CWS indicating that the alignment of the future Brookman Sanitary Sewer Trunk Extension is in conformance with approved CWS design.
11. Prior to Final Approval of Engineering Plans, the Engineering Department shall provide review and approval of related public water improvement plans and reports. Public water system plans shall meet City standards. All public water pipe shall have joint restraints.
12. Prior to Final Approval of Engineering Plans, the applicant shall obtain any necessary Right-of-Way Permits and/or Utility Facilities Permits from WACO for constructing public improvements within the SW Brookman Road right-of-way.
13. Prior to Final Approval of Engineering Plans, applicant shall obtain and provide letter from Sherwood Public Works Department, that existing public water system has the capacity and pressure to provide appropriate public water and fire service to the proposed development.
14. Prior to Final Engineering Plan Approval, submitted site development plans shall provide for compliance with all 24 requirements and conditions stated in the CWS issued Service Provider Letter (File No. 20-000663).
15. Prior to Final Engineering Plan Approval, submitted site development stormwater improvement plans shall provide for City access to stormwater outfall/outlet structures for maintenance purposes.
16. Prior to Final Engineering Plan Approval, a Final Stormwater Drainage Report shall be provided to City Engineering for review and approval.
17. Prior to Final Engineering Plan Approval, a Stormwater Connection Permit shall be obtained from CWS.
18. Prior to Final Engineering Plan Approval, applicant shall obtain an NPDES 1200C permit from CWS and submit it to the City Engineering Department for their records.

F. PRIOR TO ISSUANE OF BUILDING PERMITS

1. Prior to issuance of building permits for Lot 25, a plot plan shall be submitted that identifies the lot line abutting the public street as the front lot line. The plot plan shall show the front, rear, and side setbacks meet the requirements of the MDRL zone, unless a variance is approved that allows otherwise.
2. Prior to issuance of building permits for Lot 28, submit elevation plans that demonstrate the public street facing façade meets or exceeds the level of architectural detail provided in the “Enhanced Elevation” drawing shown in Exhibit C1. The actual architectural features provided may differ from the elevation shown in the exhibit but shall be provided at the quantity shown in the plans.

3. Prior to issuance of building permits, submit plot plans and building plans showing the structures meet the development standards requirements of the MDRL zone.
4. Prior to issuance of building permits for Lot 8, a 20 ft. wide rear yard setback shall be shown on the plot plan.
5. Prior to issuance of building permits for Lot 12, a rear yard setback shall be shown on the plot plan in conformance with the requirements for “irregular and triangular lots” as described in SZCDC § 16.10.020.
6. Prior to issuance of building permits, provide documentation of a fire flow test that meets flow requirements for the development type.
7. Prior to issuance of building permits, submit documentation from TVF&R that indicates the requirements of the Fire Marshall’s letter dated April 24, 2020 and other applicable requirements of the fire code have been satisfied.

G. PRIOR TO ACCEPTANCE OF CONSTRUCTED PUBLIC IMPROVEMENTS

1. Prior to Acceptance of the Public Improvements, landscaping for the open space areas shall be installed to nursey standards and in accordance with the approved landscaping plans.
2. Prior to Acceptance of the Public Improvements, all common landscaped areas must have an irrigation system in accordance with SZCDC § 16.92.040(C).
3. Prior to Final Acceptance of Constructed Public Improvements, all conditions of the CWS Service Provider Letter (CWS File No. 20-000663) shall have been constructed and received final inspection approval by the City, in conformance with the conditions and requirements of the SPL.
4. Prior to Final Acceptance of Constructed Public Improvements, connection of the development area to the public transportation improvements being constructed by the adjacent Middlebrook Subdivision, will not be permitted until such time as the public transportation improvements being constructed by the Middlebrook Subdivision have been constructed, have received final inspection approval, and have been accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the Riverside at Cedar Creek site development public transportation infrastructure improvements and the adjacent Middlebrook Subdivision public transportation infrastructure improvements shall be maintained.
5. Prior to Final Acceptance of Constructed Public Improvements, all conditions and requirements listing in a letter submitted by WACO, dated July 16, 2020 shall be complied with.
6. Prior to acceptance of the public improvements, the applicant shall provide a maintenance bond at 10% of the full value of the improvements, for the purpose of correcting any defective work or maintenance that becomes apparent or arises within two (2) years after final acceptance of the public improvements.

7. Prior to Final Acceptance of Constructed Public Improvements, connection to that portion of the adjacent Middlebrook Subdivision system, will not be permitted until such time as that sanitary sewer main line has been constructed, received final inspection approval, and accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the Riverside at Cedar Creek site development public sanitary infrastructure improvements and the adjacent Middlebrook Subdivision public sanitary infrastructure improvements shall be maintained.
8. Prior to Final Acceptance of Constructed Public Improvements, all private sanitary laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.
9. Prior to Final Acceptance of Constructed Public Improvements, any public sanitary sewer to be located on private property shall have a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvement meeting Sherwood Engineering standards
10. Prior to Final Acceptance of Constructed Public Improvements, a 20-foot wide public sanitary sewer easement across the entirety of the applicants property in alignment with the proposed Brookman Sanitary Sewer Trunk Line Extension project as specified by CWS, shall be dedicated to the City.
11. Prior to Final Acceptance of Constructed Public Improvements, connection to that portion of the public water system being constructed by the adjacent Middlebrook Subdivision, will not be permitted until such time as that portion of the public water system is constructed, has received final inspection approval, and is accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the proposed site development public water system and the Middlebrook Subdivision public water systems, shall be maintained.
12. Prior to Final Acceptance of Constructed Public Improvements, the installation of the 12-inch waterline running down SW Brookman Road, shall extend the entire length of the property frontage right-of-way line. The oversizing cost of construction (greater than 8") shall be eligible for water system SDC credits.
13. Prior to Final Acceptance of Constructed Public Improvements, the proposed development shall provide stormwater improvements as needed to serve new street and lot improvements meeting CWS and City of Sherwood standards.
14. Prior to Final Acceptance of Constructed Public Improvements, any public stormwater system that is located on private property shall have a recorded public stormwater easement encompassing the related public stormwater sewer improvement meeting Sherwood Engineering standards.
15. Prior to Final Acceptance of Constructed Public Improvements, all private stormwater laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.
16. Prior to Final Acceptance of Public Improvements, all vegetated corridors shall be dedicated to the City in recorded tracts of land.

17. Prior to Final Acceptance of Constructed Public Improvements, all private street shall comply with all the standards stated in SZCDC § 16.118.050 (Private Streets).

H. PRIOR TO OCCUPANCY OF STRUCTURES

1. Prior to occupancy of structures, one off-street parking space per dwelling unit shall be provided.
2. Prior to the issuance of building permits, the final design of each driveway shall be reviewed and approved by the City of Sherwood.
3. Prior to Grant of Occupancy, for each residential structure constructed within the subdivision and abutting the Flood Plain corridor, a completed FEMA Elevation Certificate Form shall be submitted to the City for its records.
4. Prior to Final Grant of Occupancy, all TDT and SDC credit requests on credit eligible public improvements must be submitted in accordance with WACO Ordinance Mo. 691A, as modified by Ordinances 729, 741, 746-A, 751 and 793-A, and City of Sherwood Municipal Code Chapter 15.16 – System Development Charges and Chapter 15.20 – Park and Recreation System Development Charges on New Development, and conform and comply with the standards and requirements stated therein.
5. Prior to occupancy permits, the following requirements shall be met:
   A. The road improvements required in condition I.A.4. above shall be completed and approved by Washington County.
   B. Pay a proportional share of the fee in-lieu of constructing 5 lanes (half-width) on SW Brookman Road to the County. The engineer's estimate shall include the following items:
      - Asphalt (known standards for materials, width and thickness),
      - Standard base rock (known standards for materials and thickness),
      - Sidewalks (known standards for material, thickness and width),
      - Curb and gutter,
      - Striping,
      - Street trees,
      - Street lighting (including lights and conduits),
      - Planter strip plantings,
      - Irrigation system
      - Stormwater drainage collection, conveyance, and treatment,
      - Floodplain and Natural Resources alterations.
6. Prior to Issuance of Occupancy of any residential lot structures, all service laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.
7. Prior to Grant of Occupancy for any building, the proposed development shall provide storm sewer improvements as needed to serve new street improvements and service all parcels within the subject.

8. Prior to Grant of Occupancy for the building, Sherwood Broadband utilities (vaults and conduit) shall be installed along the subject properties frontage per requirements set forth in City Ordinance 2005-017 and City Resolution 2005-074.

V. EXHIBITS

A. Applicant Submittal (complete application materials available in the project file at City Hall)

1. Application Form
2. Compliance Narrative
3. Pre-application Notes
4. Neighborhood Meeting Materials
5. CWS Service Provider Letter
6. Biologists Supplemental Memo
7. Biologists Site Assessment
8. Arborist Memo and Revised Report
9. Geotechnical Report
10. Preliminary Storm Drainage Report
11. Transportation Impact Analysis
12. Plat Name Reservation
13. Title Report
14. Net Developable Area Exhibit
15. Plan Set

B. Agency Comments

1. City of Sherwood Engineering
2. Washington County Land Use & Transportation
3. Oregon Department of Transportation Region 1
4. Oregon Department of Transportation Region 2
5. Tualatin Valley Fire & Rescue
6. Clean Water Services Memorandum
7. Oregon Department of State Lands
8. Pride Disposal
9. Portland General Electric
10. Oregon Department of Transportation Sign Program
11. Tualatin River National Wildlife Refuge

C. Additional Information

1. Enhanced Street Side Building Elevation
2. FEMA FIRM Map
3. Metro Maps with Regionally Significant Habitat
4. Middlebrook Preliminary Street Plan

Exhibit A1

City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

Case No. _____
Fee _____
Receipt # _____
Date _____
TYPE _____

City of Sherwood
Application for Land Use Action

Type of Land Use Action Requested: (check all that apply)

- ☐ Annexation
- ☐ Plan Amendment (Proposed Zone _____)
- ☐ Planned Unit Development
- ☐ Site Plan (square footage of building and parking area)
- ☐ Variance (list standards to be varied in description)
- ☐ Conditional Use
- ☐ Partition (# of lots _____)
- ☒ Subdivision (# of lots 28 Lots)
- ☐ Other: _____

By submitting this form the Owner, or Owner's authorized agent/ representative, acknowledges and agrees that City of Sherwood employees, and appointed or elected City Officials, have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related specifically to the project site.

Note: See City of Sherwood current Fee Schedule, which includes the "Publication/Distribution of Notice" fee, at **www.sherwoodoregon.gov.** Click on Government/Finance/Fee Schedule.

Owner/Applicant Information:

Applicant: Riverside Homes, Attn: Niki Munson — Phone: 503-645-0986
Applicant Address: 17933 NW Evergreen Place, Ste 300, Bvrtn. — Email: NMunson@riversidehome.com
Owner: Richard L. & Linda R. Scott — Phone: _____
Owner Address: 17433 SW Brookman Road, Sherwood — Email: _____
Contact for Additional Information: Matt Sprague 503-643-8286, Pioneer Design Group

Property Information:

Street Location: 17433 SW Brookman Road, Sherwood, OR 97140
Tax Lot and Map No: Tax Lot 104, Map 3S1 06
Existing Structures/Use: One Home
Existing Plan/Zone Designation: MDRL - Medium Density Residential Low
Size of Property(ies) 10.47 Acres

Proposed Action:

Purpose and Description of Proposed Action:

28-Lot Single Family Residential Subdivision

Proposed Use: Subdivision

Proposed No. of Phases (one year each): _____

Continued on Reverse

LAND USE APPLICATION FORM

Authorizing Signatures:

I am the owner/authorized agent of the owner empowered to submit this application and affirm that the information submitted with this application is correct to the best of my knowledge.

I further acknowledge that I have read the applicable standards for review of the land use action I am requesting and understand that I must demonstrate to the City review authorities compliance with these standards prior to approval of my request.

Applicant's Signature — Date: 5/21/20

Owner's Signature — Date: 5-20-2020

Owner's Signature — Date: 5/20/2020

The following materials must be submitted with your application or it will not be accepted at the counter. Once taken at the counter, the City has up to 30 days to review the materials submitted to determine if we have everything we need to complete the review. Applicant can verify submittal includes specific materials necessary for the application per checklist.

■ **3 Copies of Application Form*** completely filled out and signed by the property owner (or person with authority to make decisions on the property.

■ **Copy of Deed** to verify ownership, easements, etc.

■ **At least 3 folded** sets of plans*

■ **At least 3 copies** of narrative addressing application criteria*

■ **Fee** (along with calculations utilized to determine fee if applicable)

■ **Neighborhood Meeting Verification** including affidavit, sign-in sheet and meeting summary (required for Type III, IV and V projects)

* **Note** that the required numbers of copies identified on the checklist are required for completeness; however, upon initial submittal applicants are encouraged to submit only 3 copies for completeness review. Prior to completeness, the required number of copies identified on the checklist and one full electronic copy will be required to be submitted.

LAND USE APPLICATION
CITY OF SHERWOOD, OREGON

RIVERSIDE AT CEDAR CREEK

A 28-Lot Subdivision of Tax Lot 104, Tax Map 3S1 06,

Revised June 15, 2020

OWNER TAX LOT 104:
Richard and Linda Scott
17433 SW Brookman Road
Sherwood, OR 97140

APPLICANT:
Riverside Homes
17933 NW Evergreen Place
Beaverton, OR 97006

APPLICANT'S REPRESENTATIVE:
Pioneer Design Group
9020 Washington Square Road, Suite 170
Portland, OR 97223
Contact: Matthew L. Sprague
Phone: 503-643-8286
Email: msprague@pd-grp.com

PIONEER DESIGN GROUP

9020 SW Washington Square Rd
Suite 170
Portland, Oregon 97223
p 503.643.8286
f 844.715.4743
www.pd-grp.com

FACT SHEET

Project Name:	**Riverside at Cedar Creek**
Proposed Action:	A 28-Lot Single Family Residential Subdivision
Tax Map/Lot:	3S1 06 104
Site Size:	10.47 Acres
Addresses:	17433 SW Brookman Road, Sherwood, OR 97140
Location:	On the north side of SW Brookman Road, approximately 50 feet east of its intersection with SW Oberst Road
Zoning:	MDRL – Medium Density Residential Low

Owner Tax Lot 104:
Richard and Linda Scott
17433 SW Brookman Road
Sherwood, OR 97140

Applicant:
Riverside Homes
17933 NW Evergreen Place
Beaverton, OR 97006
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GENERAL INFORMATION

The applicant requests preliminary approval of a 28-Lot Single-Family Detached Residential Subdivision "Riverside at Cedar Creek". The subject site, specifically identified as Tax Lot 104 of Tax Map 3S106, is 10.47 acres in size. An existing residence and associated out buildings are located in the northwest quadrant of the site, with a driveway culvert crossing of the Cedar Creek drainage to access the dwelling from SW Brookman Road to the south.

The site is within the Brookman Road Concept Plan area, which was adopted by the Sherwood City Council in 2009, and is zoned Medium Density Residential Low (MDRL) by the City of Sherwood. The MDRL Zone allows for single family detached residential lots as a permitted use, with a 5,000 square foot minimum lot size.

The northern part of the site will support the 28 lots, which will be accessed from the northeast and west via public streets within the proposed Middlebrook Subdivision (SUB 18-02). The City of Sherwood Planning Commission held a hearing for SUB 18-02 on July 9, 2019 and approved the application with conditions based on the findings of fact and conditions contained in the record including testimony received, staff report and Exhibits A-J. The decision approving SUB 18-02 was rendered on July 15, 2019, with the appeal period ending July 29, 2019.

VICINITY & SITE INFORMATION

Site Location: On the north side of SW Brookman Road, approximately 50 feet east of its intersection with SW Oberst Road.

Existing Uses: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The site is a large acreage parcel with a residential subdivision to the north, Hazelnut orchard to the south, and Cedar Creek riparian corridor to the east. The site includes a single-family home and several outbuildings and structures. A packed dirt driveway extends into the site from SW Brookman Road at the southwest corner. The driveway splits into two dirt roads: one extends to the residence and the other extends into the open grass area near the outbuildings in the northwest site corner. The southern and eastern areas of the site are forested with a riparian forested community along Cedar Creek, which flows through the southwestern corner of the site. There are multiple wetland areas within the Cedar Creek floodplain.

Topography: The site topography slopes from the northwest site corner southeast towards the Cedar Creek riparian corridor. The topography at the northwest corner is generally flat within the maintained grass areas but begins to slope 14-30% down through the riparian corridor approaching Cedar Creek. There is a high point in the southeast site corner, where topography slopes northwest approaching Cedar Creek with 21-28% slopes.

Vegetation: The site is bare ground and mowed grass in the northwest half of the site surrounding the residence and outbuildings. The remainder of the site is a mix of riparian and wetland communities. The riparian areas include mature Douglas fir (*Pseudotsuga menziesii*), Douglas Hawthorn (*Crataegus douglasii*), Oregon ash (*Fraxinus latifolia*), and Big Leaf Maple (*Acer macrophyllum*) with a canopy cover of up to 90 percent throughout. Understory plants include mainly native species such as Western Beaked Hazelnut (*Corylus cornuta*), Vine Maple (*Acer*

circinatum), Snowberry (*Symphoricarpos albus*), Serviceberry (*Amelanchier alnifolia*), Osoberry (*Oemleria cerasiformis*) and Swordfern (*Polystichum munitum*).

Surrounding Land Uses: SW Brookman Road runs along the site's southern boundary, and forms the edge of the Urban Growth Boundary. South of SW Brookman Road, a mixture of County resource and rural residential zoning districts prevail, typically consisting of rural uses and single-family dwellings on large lots. To the east and west of the site, land is located within the Brookman Road Concept Plan area, and will ultimately be developed to similar residential densities as the subject property. To the north and west, the proposed Middlebrook Subdivision was recently approved by the City for 145 new residential units, as previously described. To the east, the Reserve at Cedar Creek development is currently under review, and proposes 59 single family residential dwellings.

Transportation: Transportation facilities for automobile, transit, pedestrians, and bicyclists continue to develop in the local area. The site is within the TriMet service district boundaries; however, the closest bus routes are #93 and 94 (Tigard/Sherwood, Pacific Highway/Sherwood) on SW Main Street, located approximately 1.2 miles to the north west of the site by road. It is noted that this is a greenfield development, and it is expected that access to transit facilities will increase over time, with new bus routes or stops, and the addition of community trails allowing greater pedestrian access to SW Brookman Road.

PROJECT DESCRIPTION

The proposed project is a residential subdivision creating 28 Lots for single-family detached homes. A tract of approximately 203,158 square feet (4.66 acres) (Tract B) containing Cedar Creek and its associated flood plain and vegetated corridor is to be preserved as open space that will be privately owned, unless it is dedicated to Clean Water Services or another appropriate jurisdiction. The smallest lot in the subdivision is 4,722 square feet (Lot 27), while the largest lot is approximately 8,135 square feet (Lot 23). The average lot size is approximately 5,914 square feet, however the applicant is requesting the ability to reduce minimum lot areas to 4,500 square feet as necessary and lot widths at the building line to 45 feet, while maintaining the 5,000 square foot average lot size.

The design for the site includes the improvement of SW Brookman Road to a County arterial standard with a ½ street improvement along the site frontage; the through connection of the proposed SW Wapato Lake Drive within the Middlebrook Subdivision from the west to the northeast. In addition, two short private streets will each serve 1 Lot (Tracts C and D), and will be constructed to City private street standards. SW Brookman Road is to be improved to the County A2 standard for a 5-lane arterial, with a requested right-of-way width of width of 53 feet to centerline. The paved surface will include a 37-foot half street, 10-foot-wide sidewalks behind planter strips, curb and gutter, street trees, and illumination.

The local street within the development (SW Wapato Lake Drive) proposed to meet the City local street standards, with 52 feet of right-of-way and a 28-foot paved surface, curb and gutter, 6-foot-wide sidewalks, planter strips, street trees, and illumination.

The applicant proposes a single water quality facility, designed and constructed as a detention pond, and located on the north side of Cedar Creek (Tract E). Drainage from the site will be

directed to this facility via catch basins, manholes and pipes and then released into the adjoining Cedar Creek drainageway. SW Wapato Lake Drive will serve to provide access to the facility.

The Cedar Creek channel flows from a culvert under SW Brookman Road at the southeastern edge of site in an "S" shape: curving northeast, northwest, then east and extending offsite along the southeastern property boundary. The constructed channel conveys flow from wetland A in the southwest corner to Cedar Creek about 20-feet north of the Brookman Road culvert. Additionally, seasonal inundation from Cedar Creek backs up into the constructed channel.

The riparian forested community bordering both sides of Cedar Creek extends approximately 100-feet on both sides. The stream channel is 6 to 8 feet wide at the Ordinary High Water (OHW) line and is bordered by wetland areas intermingled with riparian areas. The vegetative community is forested wetland and riparian habitat comprised of species already identified above.

III. Applicable Review Criteria

CITY OF SHERWOOD COMMUNITY DEVELOPMENT CODE

Title 16 -ZONING AND COMMUNITY DEVELOPMENT CODE

Division II. - LAND USE AND DEVELOPMENT

Chapter 16.12 - RESIDENTIAL LAND USE DISTRICTS

The residential districts are intended to promote the livability, stability and improvement of the City's neighborhoods.

16.12.010 - Purpose and Density Requirements

C. Medium Density Residential (MDRL)

The MDRL zoning district provides for single-family and two-family housing, manufactured housing and other related uses with a density of 5.6 to 8 dwelling units per acre. Minor land partitions shall be exempt from the minimum density requirements.

RESPONSE: The entire development site is zoned Medium Density Residential Low (MDRL) within the Brookman Road Concept Plan. The proposed subdivision, "Riverside at Cedar Creek", includes a total of 28 Lots for single-family detached residential units. While the gross site area equals approximately 10.37 acres (451,691 square feet), when removing approximately 6.54 acres (284,772 square feet) of streets, public use areas, and environmentally constrained areas, the net development area of the site is 3.83 acres (166,919 square feet). Minimum and Maximum densities based on the net site area are calculated as follows:

Minimum Density = 3.83 acres x 5.6 units/acre = 21.45 = 21 units.
Maximum Density = 3.83 acres x 8 units/acre = 30.64 = 33 units.

Accordingly, the proposed 28 Lot subdivision falls within the minimum and maximum density requirements for the site.

16.12.020 - Allowed Residential Land Uses

A. Residential Land Uses

The table below identifies the land uses that are allowed in the Residential Districts. The specific land use categories are described and defined in Chapter 16.10.

USES	MDRL
RESIDENTIAL	
Single-Family Attached or Detached Dwellings	P

RESPONSE: The application proposes the creation of 28 Lots for the construction of detached single-family residential dwelling units. Detached single-family dwellings are a permitted use in the MDRL district. Therefore, this criterion is met.

B. Any use not otherwise listed that can be shown to be consistent or associated with the permitted uses or conditionally permitted uses identified in the residential zones or contribute to the achievement of the objectives of the residential zones will be allowed or conditionally permitted using the procedure under Chapter 16.88 (Interpretation of Similar Uses).

C. Any use that is not permitted or conditionally permitted under this zone that cannot be found to be consistent with the allowed or conditional uses identified as in B. is prohibited in the residential zone using the procedure under Chapter 16.88 (Interpretation of Similar Uses).

RESPONSE: The application includes only the above listed permitted uses. Therefore, these criteria do not apply.

16.12.030 - Residential Land Use Development Standards

A. Generally

No lot area, setback, yard, landscaped area, open space, off-street parking or loading area, or other site dimension or requirement, existing on, or after, the effective date of this Code shall be reduced below the minimum required by this Code. Nor shall the conveyance of any portion of a lot, for other than a public use or right-of-way, leave a lot or structure on the remainder of said lot with less than minimum Code dimensions, area, setbacks or other requirements, except as permitted by Chapter 16.84. (Variance and Adjustments)

B. Development Standards

Except as modified under Chapter 16.68 (Infill Development), Section 16.144.030 (Wetland, Habitat and Natural Areas) Chapter 16.44 (Townhomes), or as otherwise provided, required minimum lot areas, dimensions and setbacks shall be provided in the following table.

C. Development Standards per Residential Zone

RESPONSE: The following development standards are applicable to single-family detached dwelling units in the MDRL zone:

DEVELOPMENT STANDARD BY RESIDENTIAL ZONE	MDRL
Minimum Lot areas: (in square ft.)	
Single-Family Detached	5,000
Minimum Lot width at front property line: (in feet)	25
Minimum Lot width at building line[1] (in feet)	
Single-Family	50
Lot Depth	80
Maximum Height [2] (in feet)	30 or 2 stories
Setbacks (in feet)	
Front yard [4]	14
Face of garage	20
Interior side yard	
Single-family detached	5
Corner lot street side	
Single-family or Two family	15
Rear Yard	20

RESPONSE: As proposed, each of the lots meets the required dimensional standards listed above with the exception of minimum lot size, including both lot area and minimum lot width at the building line. In accordance with Section 16.144.030.B.1., the applicant is requesting an exception to these dimensional standards, to the maximum permitted 10% reduction. Accordingly, the minimum lot size allowed is 4,500 square feet, with a minimum lot width at the building line of 45 feet. Please see the response to Section 16.144.030.B.1. for findings related to the exception criteria.

The Preliminary Plat submitted with the application demonstrates that each lot is capable of supporting a detached single-family dwelling unit meeting all minimum setback requirements, at the time of building permit review. Therefore, these criteria are met.

16.12.040 - Community Design

For standards relating to off-street parking and loading, energy conservation, historic resources, environmental resources, landscaping, access and egress, signs, parks and open space, on-site storage, and site design, see Divisions V, VIII, IX.

RESPONSE: This written narrative demonstrates that the proposed 28-Lot subdivision meets the applicable community design standards of Division V. – Community Design, and Division VIII. – Environmental Resources. There are no identified historic resources on the site, therefore Division IX.- Historic Resources does not apply to this application.

16.12.050 - Flood Plain

Except as otherwise provided, Section 16.134.020 shall apply.

RESPONSE: The site is bisected by Cedar Creek, which runs from west to east across the site, and its associated 100-year flood plain. Therefore, Section 16.134.020 is applicable to this application, and addressed later in this written narrative.

Division IV. - PLANNING PROCEDURES

Chapter 16.84 - VARIANCES

16.84.020 – Applicability

A. Exceptions and Modifications versus Variances

A code standard or approval criterion may be modified without approval of a variance if the applicable code section expressly allows exceptions or modifications. If the code provision does not expressly provide for exceptions or modifications then a variance is required to modify that code section and the provisions of Chapter 16.84 apply.

RESPONSE: As described above, the applicant is requesting an exception to minimum lot size, including both lot area and minimum lot width at the building line, to the maximum permitted 10% reduction. As stated above, a code standard or approval criterion may be modified without approval of a variance if the applicable code section expressly allows exceptions or modifications. Section 16.144.030 expressly allows such exceptions without the need for a variance, where it states that *"The flexibility of standards is only applicable when reviewed and approved as part of a land use application and shall require no additional fee or permit provided criteria is addressed."* The applicable standards are addressed as part of this land use application in response to Section 16.144.030, and therefore no further permit or fee is required

Division V. - COMMUNITY DESIGN

Chapter 16.92 - LANDSCAPING

16.92.030 - Site Area Landscaping and Perimeter Screening Standards

D. Visual Corridors

Except as allowed by subsection 6. above, new developments shall be required to establish landscaped visual corridors along Highway 99W and other arterial and collector streets, consistent with the Natural Resources and Recreation Plan Map, Appendix C of the Community Development Plan, Part II, and the provisions of Chapter 16.142 (Parks, Trees, and Open Space). Properties within the Old Town Overlay are exempt from this standard.

16.142.040 - Visual Corridors

A. Corridors Required

New developments located outside of the Old Town Overlay with frontage on Highway 99W, or arterial or collector streets designated on Figure 8-1 of the Transportation System Plan shall be required to establish a landscaped visual corridor according to the following standards:

Highway 99W: 25 feet
Arterial: 15 feet
Collector: 10 feet

In residential developments where fences are typically desired adjoining the above described major street the corridor may be placed in the road right-of-way between the property line and the sidewalk. In all other developments, the visual corridor shall be on private property adjacent to the right-of-way.

RESPONSE: SW Brookman Road is classified as an Arterial street; therefore a 15-foot wide landscaped visual corridor is required. As shown on the preliminary plat, a 15-foot wide visual corridor is provided along the SW Brookman Road frontage, except where the delineated resources associated with Cedar Creek extend to the Right-of-Way of SW Brookman Road, and the visual corridor is already located within an open space tract exceeding 15 feet in width. This visual corridor is identified as Tracts F and G on the Preliminary Plat. Therefore, this criterion is met.

B. Landscape Materials

The required visual corridor areas shall be planted as specified by the review authority to provide a continuous visual and/or

acoustical buffer between major streets and developed uses. Except as provided for above, fences and walls shall not be substituted for landscaping within the visual corridor. Uniformly planted, drought resistant street trees and ground cover, as specified in Section 16.142.060, shall be planted in the corridor by the developer. The improvements shall be included in the compliance agreement. In no case shall trees be removed from the required visual corridor.

RESPONSE: As illustrated on the Preliminary Street Tree and Open Space Planting Plan (Sheets L1 and L2), street trees meeting City requirements and extensive ground cover landscaping are provided within the visual corridor areas, including in areas where roadside LIDA facilities are provided in the corridor. Therefore, this criterion is met.

C. Establishment and Maintenance

Designated visual corridors shall be established as a portion of landscaping requirements pursuant to Chapter 16.92. To assure continuous maintenance of the visual corridors, the review authority may require that the development rights to the corridor areas be dedicated to the City or that restrictive covenants be recorded prior to the issuance of a building permit.

RESPONSE: The Applicant is aware and understands that the City may require dedication of the development rights or restrictive covenants to be recorded for the visual corridor area. This criterion can be met, as determined appropriate by the City through the land use review.

D. Required Yard

Visual corridors may be established in required yards, except that where the required visual corridor width exceeds the required yard width, the visual corridor requirement shall take precedence. In no case shall buildings be sited within the required visual corridor, with the exception of front porches on townhomes, as permitted in Section 16.44.010(E)(4)(c).

RESPONSE: The visual corridor area is not in a required yard, and no buildings are proposed to be sited in the corridor. Therefore, this criterion is met.

Chapter 16.94 - OFF-STREET PARKING AND LOADING

16.94.010 - General Requirements

A. Off-Street Parking Required

No site shall be used for the parking of vehicles until plans are approved providing for off-street parking and loading space as

required by this Code. Any change in uses or structures that reduces the current off-street parking and loading spaces provided on site, or that increases the need for off-street parking or loading requirements shall be unlawful and a violation of this Code, unless additional off-street parking or loading areas are provided in accordance with Section 16.94.020, or unless a variance from the minimum or maximum parking standards is approved in accordance with Chapter 16.84 Variances.

RESPONSE: No parking in violation of this Section will occur prior to the development of the site. All parking on-site will comply with the requirements for site development permits for the site, and ultimately with the residential parking requirements as detailed below.

B. Deferral of Improvements

Off-street parking and loading spaces shall be completed prior to the issuance of occupancy permits, unless the City determines that weather conditions, lack of available surfacing materials, or other circumstances beyond the control of the applicant make completion impossible. In such circumstances, security equal to one hundred twenty five (125) percent of the cost of the parking and loading area is provided the City. "Security" may consist of a performance bond payable to the City, cash, certified check, or other assurance of completion approved by the City. If the installation of the parking or loading area is not completed within one (1) year, the security may be used by the City to complete the installation.

RESPONSE: Off-street residential parking will be available within garages and driveways, as described below. These spaces will be available prior to or concurrent with the issuance of occupancy permits for each individual dwelling. This criterion is met.

C. Options for Reducing the Required Parking Spaces

1. Two (2) or more uses or, structures on multiple parcels of land may utilize jointly the same parking and loading spaces when the peak hours of operation do not substantially overlap, provided that satisfactory evidence is presented to the City, in the form of deeds, leases, or contracts, clearly establishing the joint use.

a. Within commercial, institutional and public, or industrial zones, shared parking may be provided on lots that are within five hundred (500) feet of the property line of the use to be served.

b. Shared parking is allowed if the application can show that the combined peak use is available by a parking study that demonstrates:

(1) There is a sufficient number of parking spaces to accommodate the requirements of the individual businesses; or
(2) That the peak hours of operation of such establishments do not overlap, and
(3) That an exclusive permanent easement over a delineated area has been granted for parking space use.

RESPONSE: The applicant is not requesting shared parking or a reduction in required parking spaces. This criterion is not applicable.

2. Mixed use projects are developments where a variety of uses occupies a development project or complex. For example, an eating establishment, professional office building and movie theater are all components of a mixed use site. It does not include a secondary use within a primary use such as an administrative office associated with a retail establishment. In mixed-use projects, the required minimum vehicle parking shall be determined using the following formula:

a. Primary use: i.e. that with the largest proportion of total floor area within the development at one hundred (100) percent of the minimum vehicle parking required for that use.

b. Secondary Use: i.e. that with the second largest percentage of total floor area within the development, at ninety (90) percent of the vehicle parking required for that use.

c. Subsequent use or uses, at eighty (80) percent of the vehicle parking required for that use.

RESPONSE: The application is not for a mixed-use development. This criterion is not applicable.

D. Prohibited Uses

Required parking, loading and maneuvering areas shall not be used for long-term storage or sale of vehicles or other materials, and shall not be rented, leased or assigned to any person or organization not using or occupying the building or use served.

RESPONSE: Off-street parking within the development will be reserved for typical residential uses. Compliance with this standard over time will be the responsibility of individual homeowners. This criterion will be met.

E. Location

1. Residential off-street parking spaces:

a. Shall be located on the same lot or development as the residential use.

b. Shall not include garages or enclosed buildings with the exception of a parking structure in multifamily developments where three (3) or more spaces are not individually enclosed. (Example: Underground or multi-level parking structures).

RESPONSE: In addition to private garage spaces, of which each home is anticipated to contain a minimum of 2 spaces, each dwelling will provide a minimum of one off-street parking space within a driveway, as required per Table 1 below. This criterion is met.

2. For other uses, required off-street parking spaces may include adjacent on-street parking spaces, nearby public parking and shared parking located within five hundred (500) feet of the use. The distance from the parking, area to the use shall be measured from the nearest parking space to a building entrance, following a sidewalk or other pedestrian route. The right to use private off-site parking must be evidenced by a recorded deed, lease, easement, or similar written notarized letter or instrument.

RESPONSE: The application is for a residential development. This criterion is not applicable.

3. Vehicle parking is allowed only on improved parking shoulders that meet City standards for public streets, within garages, carports and other structures, or on driveways or parking lots that have been developed in conformance with this code. Specific locations and types of spaces (car pool, compact, etc.) for parking shall be indicated on submitted plans and located to the side or rear of buildings where feasible.

a. All new development with forty (40) employees or more shall include preferential spaces for carpool/vanpool designation. Carpool and vanpool parking spaces shall be located closer to the main employee entrance than all other parking spaces with the exception of ADA parking spaces. Carpool/vanpool spaces shall be clearly marked as reserved for carpool/vanpool only.

b. Existing development may redevelop portions of designated parking areas for multi-modal facilities (transit shelters, park and ride, and bicycle parking), subject to meeting all other applicable standards, including minimum space standards.

RESPONSE: As described above, the applicant proposes off-street parking for each individual lot/dwelling within private garage spaces and driveways, consistent with the requirements of this Section, as they apply to single-family detached residential development. This criterion is met.

F. Marking

All parking, loading or maneuvering areas shall be clearly marked and painted. All interior drives and access aisles shall be clearly marked and signed to show the direction of flow and maintain vehicular and pedestrian safety.

RESPONSE: All off-street parking within the development is for single-family detached residential dwellings, and therefore no off-street marking is proposed or required. Any surface markings within the site will be restricted to that required as part of the proposed public street improvements. This criterion is met.

G. Surface and Drainage

1. All parking and loading areas shall be improved with a permanent hard surface such as asphalt, concrete or a durable pervious surface. Use of pervious paving material is encouraged and preferred where appropriate considering soils, location, anticipated vehicle usage and other pertinent factors.

2. Parking and loading areas shall include storm water drainage facilities approved by the City Engineer or Building Official.

RESPONSE: Each residential dwelling will include a garage with a concrete floor with a typical slope of approximately 2% towards the opening. Driveways will be paved to slope towards the street, away from the garage entrance where it will be collected and diverted into the proposed stormwater management systems within the development, as reviewed and approved by Clean Water Services and the City Engineer or Building Official. This criterion is met.

H. Repairs

Parking and loading areas shall be kept clean and in good repair. Breaks in paved surfaces shall be repaired. Broken or splintered wheel stops shall be replaced. Painted parking space boundaries and directional symbols shall be maintained in a readable condition.

RESPONSE: Following construction and final occupancy of each dwelling, maintenance of off-street parking areas will become the responsibility of each individual homeowner. This criterion will be met.

I. Parking and Loading Plan

An off-street parking and loading plan, drawn to scale, shall accompany requests for building permits or site plan approvals, except for single and two-family dwellings, and manufactured homes on residential lots. The plan shall show but not be limited to:

1. *Delineation of individual parking and loading spaces and dimensions.*
2. *Circulation areas necessary to serve parking and loading spaces.*
3. *Location of accesses to streets, alleys and properties to be served, and any curb cuts.*
4. *Landscaping as required by Chapter 16.92.*
5. *Grading and drainage facilities.*
6. *Signing and bumper guard specifications.*
7. *Bicycle parking facilities as specified in Section 16.94.020.C.*
8. *Parking lots more than one (1) acre in size shall provide street-like features including curbs, sidewalks, and street trees or planting strips.*

RESPONSE: The subject application is for a subdivision for single family detached residential development. Accordingly, a parking and loading plan is not required, as identified above. These criteria are not applicable.

J. Parking Districts

The City may establish a parking district (i.e., permits or signage) in residential areas in order to protect residential areas from spillover parking generated by adjacent commercial, employment or mixed-use areas, or other uses that generate a high demand for parking. The district request shall be made to the City Manager, who will forward a recommendation to the City Council for a decision.

RESPONSE: The applicant is not aware of any such request establish a parking district within or surrounding the development.

K. Structured parking and on-street parking are exempt from the parking space maximums in Section 16.94.020.A.
(Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; 2000-2001, § 3; Ord. 2000-2001, § 3; Ord. 86-851, § 3)

RESPONSE: Single-family detached residential dwellings are excluded from the minimum and maximum parking standards, as shown in Table 1. No structured parking is proposed.

16.94.020 - Off-Street Parking Standards

A. Generally

Where square feet are specified, the area measured shall be the gross building floor area primary to the functioning of the proposed use. Where employees are specified, persons counted shall be those working on the premises, including proprietors, during the largest shift at peak season. Fractional space requirements shall be counted as a whole space. The Review Authority may determine alternate off - street parking and loading requirements for a use not specifically listed in this Section based upon the requirements of comparable uses.

Table 1: Minimum and Maximum Parking Standards
(Metro spaces are based on 1 per 1,000 sq ft of gross leasable area)

	Minimum Parking Standard	*Maximum Permitted Parking Zone A [1]*	*Maximum Permitted Parking Zone B [2]*
Single, two-family and manufactured home on lot [3]	*1 per dwelling unit*	*None*	*None*

[3] If the street on which the house has direct access does not permit on-street parking or is less than twenty-eight (28) feet wide, two (2) off-street parking spaces are required per single-family residential unit. (includes single-family detached or attached, two-family dwelling or a manufactured home on an individual lot) If the abutting street is twenty-eight (28) feet or wider, one (1) standard (9 ft. × 20 ft.) parking space is required.

RESPONSE: As described previously, in addition to private garage spaces, of which each home is anticipated to contain a minimum of 2 spaces, each dwelling will provide a minimum of one off-street parking space within a driveway, as required per Table 1 above. Single-family detached residential dwellings are excluded from the minimum and maximum parking standards, as shown in Table 1. This criterion is met.

B. Dimensional and General Configuration Standards

1. *Dimensions For the purpose of this Chapter, a "parking space" means a stall nine (9) feet in width and twenty (20) feet in length. Up to twenty five (25) percent of required parking spaces may have a minimum dimension of eight (8) feet in width and eighteen (18) feet in length so long as they are signed as compact car stalls.*

2. *Layout*

   Parking space configuration, stall and access aisle size shall be of sufficient width for all vehicle turning and maneuvering. Groups of more than four (4) parking spaces shall be served by a driveway so as to minimize backing movements or other maneuvering within a street, other than an alley. All parking areas shall meet the minimum standards shown in the following table and diagram.

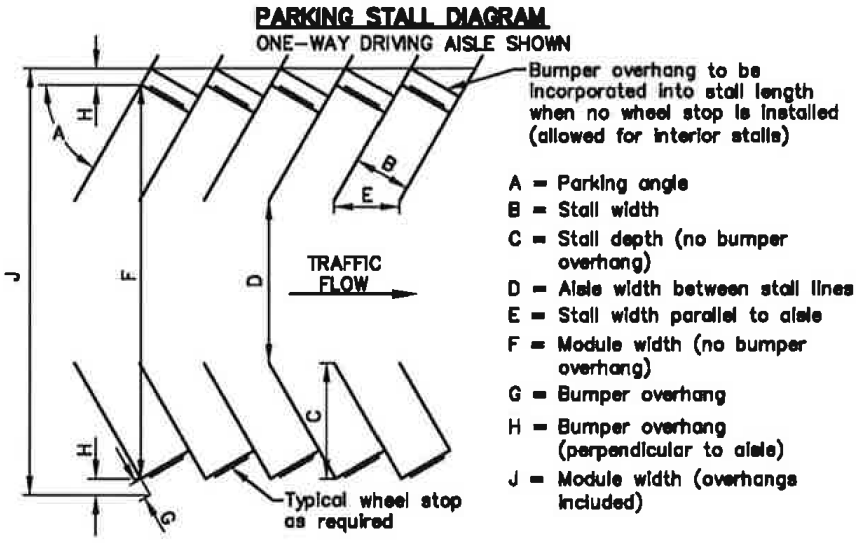


Table 2: Minimum Parking Dimension Requirements
One-Way Driving Aisle (Dimensions in Feet)

A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*
45°	*8.0*	*16.5*	*13.0*	*11.3*	*46.0*	*3.0*	*2.5*	*51.0*
	9.0	*18.5*	*12.0*	*12.7*	*49.0*	*3.0*	*2.5*	*54.0*
60°	*8.0*	*17.0*	*18.0*	*9.2*	*52.0*	*3.0*	*2.5*	*57.0*
	9.0	*19.5*	*16.0*	*10.4*	*55.0*	*3.0*	*2.5*	*60.0*
75°	*8.0*	*16.5*	*26.0*	*8.3*	*59.0*	*3.0*	*3.0*	*65.0*
	9.0	*19.0*	*23.0*	*9.3*	*61.0*	*3.0*	*3.0*	*67.0*

90º	*8.0*	*18.0*	*26.0*	*8.0*	*56.0*	*3.0*	*3.0*	*62.0*
	9.0	*20.0*	*24.0*	*9.0*	*58.0*	*3.0*	*3.0*	*64.0*

Table 3: Two-Way Driving Aisle
(Dimensions in Feet)

A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*
45º	*8.0*	*16.5*	*24.0*	*11.3*	*57.0*	*3.0*	*2.5*	*62.0*
	9.0	*18.5*	*24.0*	*12.7*	*61.0*	*3.0*	*2.5*	*66.0*
60º	*8.0*	*17.0*	*24.0*	*9.2*	*58.0*	*3.0*	*2.5*	*63.0*
	9.0	*19.5*	*24.0*	*10.4*	*63.0*	*3.0*	*2.5*	*68.0*
75º	*8.0*	*16.5*	*26.0*	*8.3*	*59.0*	*3.0*	*3.0*	*65.0*
	9.0	*19.0*	*24.0*	*9.3*	*62.0*	*3.0*	*3.0*	*68.0*
90º	*8.0*	*18.0*	*26.0*	*8.0*	*56.0*	*3.0*	*3.0*	*62.0*
	9.0	*20.0*	*24.0*	*9.0*	*58.0*	*3.0*	*3.0*	*64.0*

3. *Wheel Stops*

    a. *Parking spaces along the boundaries of a parking lot or adjacent to interior landscaped areas or sidewalks shall be provided with a wheel stop at least four (4) inches high, located three (3) feet back from the front of the parking stall as shown in the above diagram.*

    b. *Wheel stops adjacent to landscaping, bio-swales or water quality facilities shall be designed to allow storm water runoff.*

    c. *The paved portion of the parking stall length may be reduced by three (3) feet if replaced with three (3) feet of low lying landscape or hardscape in lieu of a wheel stop; however, a curb is still required. In other words, the traditional three-foot vehicle overhang from a wheel stop may be low-lying landscaping rather than an impervious surface.*

4. *Service Drives*

    Service drives shall be clearly and permanently marked and defined through use of rails, fences, walls, or other barriers or markers, and shall have minimum vision clearance area formed by the intersection of the driveway center line, the street right-of-way line, and a straight line joining said lines through points fifteen (15) feet from their intersection.

5. *Credit for On-Street Parking*

   a. *On-Street Parking Credit. The amount of off-street parking required shall be reduced by one (1) off-street parking space for every on-street parking space adjacent to the development. On-street parking shall follow the established configuration of existing on-street parking, except that angled parking may be allowed for some streets, where permitted by City standards.*

   b. *The following constitutes an on-street parking space:*

      (1) Parallel parking, each twenty-four (24) feet of uninterrupted curb;
      (2) Forty-five (45)/sixty (60) degree diagonal, each with ten (10) feet of curb;
      (3) Ninety (90) degree (perpendicular) parking, each with eight (8) feet of curb;
      (4) Curb space must be connected to the lot which contains the use;
      (5) Parking spaces that would not obstruct a required clear vision area, nor any other parking that violates any law or street standard; and;
      (6) On-street parking spaces credited for a specific use may not be used exclusively by that use, but shall be available for general public use at all times. No signs or actions limiting general public use of on-street spaces is permitted.

RESPONSE: The subject application is for a subdivision for single family detached residential development., and does not contain any shared, marked, or public off-street parking areas. These criteria are not applicable.

6. *Reduction in Required Parking Spaces*

   Developments utilizing Engineered storm water bio-swales or those adjacent to environmentally constrained or sensitive areas may reduce the amount of required parking spaces by ten (10) percent when twenty-five (25) through forty-nine (49) parking spaces are required, fifteen (15) percent when fifty (50) and seventy-four (74) parking spaces are required and twenty (20) percent when more than seventy-five (75) parking spaces are required, provided the area that would have been used for parking is maintained as a habitat area or is generally adjacent to an environmentally sensitive or constrained area.

7. *Parking Location and Shared Parking*

   Owners of off-street parking facilities may post a sign indicating that all parking on the site is available only for residents, customers and/or employees, as applicable.

RESPONSE: The applicant is not requesting shared parking or a reduction in required parking spaces. This criterion is not applicable.

C. *Bicycle Parking Facilities*

1. *General Provisions*

   a. *Applicability. Bicycle parking spaces shall be provided for new development, changes of use, and major renovations, defined as construction valued at twenty-five (25) percent or more of the assessed value of the existing structure.*

   b. *Types of Spaces. Bicycle parking facilities shall be provided in terms of short-term bicycle parking and long-term bicycle parking. Short-term bicycle parking is intended to encourage customers and other visitors to use bicycles by providing a convenient and readily accessible place to park bicycles. Long-term bicycle parking provides employees, students, residents, commuters, and others who generally stay at a site for at least several hours a weather-protected place to park bicycles.*

   c. *Minimum Number of Spaces. The required total minimum number of bicycle parking spaces for each use category is shown in Table 4, Minimum Required Bicycle Parking Spaces.*

   d. *Minimum Number of Long-term Spaces. If a development is required to provide eight (8) or more required bicycle parking spaces in Table 4, at least twenty-five (25) percent shall be provided as long-term bicycle with a minimum of one (1) long-term bicycle parking space.*

   e. *Multiple Uses. When there are two or more primary uses on a site, the required bicycle parking for the site is the sum of the required bicycle parking for the individual primary uses.*

2. *Location and Design.*

   a. *General Provisions*

(1) *Each space must be at least two (2) feet by six (6) feet in area, be accessible without moving another bicycle, and provide enough space between the rack and any obstructions to use the space properly.*
(2) *There must be an aisle at least five (5) feet wide behind all required bicycle parking to allow room for bicycle maneuvering. Where the bicycle parking is adjacent to a sidewalk, the maneuvering area may extend into the right-of-way.*
(3) *Lighting. Bicycle parking shall be at least as well lit as vehicle parking for security.*
(4) *Reserved Areas. Areas set aside for bicycle parking shall be clearly marked and reserved for bicycle parking only.*
(5) *Bicycle parking in the Old Town Overlay District can be located on the sidewalk within the right-of-way. A standard inverted "U shaped" or staple design is appropriate. Alternative, creative designs are strongly encouraged.*
(6) *Hazards. Bicycle parking shall not impede or create a hazard to pedestrians. Parking areas shall be located so as to not conflict with vision clearance standards.*

b. *Short-term Bicycle Parking*

(1) *Provide lockers or racks that meet the standards of this section.*
(2) *Locate inside or outside the building within thirty (30) feet of the main entrance to the building or at least as close as the nearest vehicle parking space, whichever is closer.*

c. *Long-term Bicycle Parking*

(1) *Provide racks, storage rooms, or lockers in areas that are secure or monitored (e.g., visible to employees or customers or monitored by security guards).*
(2) *Locate the outside bicycle parking spaces within one hundred (100) feet of the entrance that will be accessed by the intended users.*
(3) *All of the spaces shall be covered.*

d. *Covered Parking (Weather Protection)*

(1) *When required, covered bicycle parking shall be provided in one (1) of the following ways: inside*

buildings, under roof overhangs or awnings, in bicycle lockers, or within or under other structures.

(2) Where required covered bicycle parking is not within a building or locker, the cover must be permanent and designed to protect the bicycle from rainfall and provide seven-foot minimum overhead clearance.

(3) Where required bicycle parking is provided in lockers, the lockers shall be securely anchored.

Table 4: Minimum Required Bicycle Parking Spaces

Use Categories	*Minimum Required Spaces*
Residential Categories	
Household living	*Multi-dwelling — 2 or 1 per 10 auto spaces.* *All other residential structure types — None*

(Ord. No. 2018-007, § 2, 10-2-2018; Ord. No. 2015-003, § 2, 3-17-2015; Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. 2006-021; 2005-009 § 8; Ord. 2000-2001 § 3; Ord. 86-851 § 3)

RESPONSE: The subject application is for a subdivision for single family detached residential development., and as such is not required to provide specified bicycle parking pursuant to Table 4. These criteria are not applicable. However, it is noted that each dwelling will include an attached garage, which typically provides the opportunity for residential bicycle parking.

16.94.030 - Off-Street Loading Standards

A. Minimum Standards

1. A driveway designed for continuous forward flow of passenger vehicles for the purpose of loading and unloading passengers shall be located on the site of any school, or other public meeting place, which is designed to accommodate more than twenty five (25) persons at one time.

2. The minimum loading area for non-residential uses shall not be less than ten (10) feet in width by twenty-five (25) feet in length and shall have an unobstructed height of fourteen (14) feet.

3. Multiple uses on the same parcel or adjacent parcels may utilize the same loading area if it is shown in the development application that the uses will not have substantially overlapping delivery times.

4. *The following additional minimum loading space is required for buildings in excess of twenty thousand (20,000) square feet of gross floor area:*

    a. *Twenty thousand (20,000) to fifty (50,000) sq. ft. - five hundred (500) sq. ft.*

    b. *Fifty (50,000) sq. ft. or more - seven hundred fifty (750) sq. ft.*

B. *Separation of Areas*

Any area to be used for the maneuvering of delivery vehicles and the unloading or loading of materials shall be separated from designated off-street parking areas and designed to prevent the encroachment of delivery vehicles onto off-street parking areas or public streets. Off-street parking areas used to fulfill the requirements of this Chapter shall not be used for loading and unloading operations.

C. *Exceptions and Adjustments.*

The review authority, through Site Plan Review, may approve loading areas within a street right-of-way in the Old Town Overlay District when all of the following conditions are met:

1. *Short in duration (i.e., less than one (1) hour);*

2. *Infrequent (less than three (3) operations occur daily between 5:00 a.m. and 12:00 a.m. or all operations occur between 12:00 a.m. and 5:00 a.m. at a location that is not adjacent to a residential zone);*

3. *Does not unreasonably obstruct traffic; [or] Does not obstruct traffic during peak traffic hours;*

4. *Does not obstruct a primary emergency response route; and*

5. *Is acceptable to the applicable roadway authority.*
(Ord. No. 2014-012, § 3, 7-17-2014; Ord. No. 2012-008, § 2, 7-17-2012; Ord. No. 2010-015, § 2, 10-5-2010; Ord. No. 2009-005, § 2, 6-2-2009; Ord. 86-851, § 3)

RESPONSE: The subject application is for a subdivision for single family detached residential development. The site does not include a *school or other public meeting place, non-residential uses, or buildings in excess of twenty thousand (20,000) square feet of gross floor area*. However, it is noted that each dwelling will include an attached garage, which typically provides the opportunity for residential bicycle parking.

Chapter 16.96 - ON-SITE CIRCULATION

16.96.010 - On-Site Pedestrian and Bicycle Circulation

A. Purpose

On-site facilities shall be provided that accommodate safe and convenient pedestrian access within new subdivisions, multi-family developments, planned unit developments, shopping centers and commercial districts, and connecting to adjacent residential areas and neighborhood activity centers within one-half mile of the development.

Neighborhood activity centers include but are not limited to existing or planned schools, parks, shopping areas, transit stops or employment centers. All new development, (except single-family detached housing), shall provide a continuous system of private pathways/ sidewalks.

RESPONSE: As shown on the Preliminary Plat, Preliminary Street Tree and Open Space Planting Plan (Sheet L1), and the submitted plan set, designated pedestrian pathways are provided adjacent to the natural resource areas and throughout the subdivision, including a Community Trail connecting the Middlebrook Subdivision to the west and north and the Reserve at Cedar Creek Subdivision to the east, and SW Brookman Road. Sidewalks meeting city standards will be built adjacent to both sides of the extension of SW Wapato Lake Drive. Therefore, this criterion is met.

B. Maintenance

No building permit or other City permit shall be issued until plans for ingress, egress and circulation have been approved by the City. Any change increasing any ingress, egress or circulation requirements, shall be a violation of this Code unless additional facilities are provided in accordance with this Chapter.

RESPONSE: The Applicant understands that no building permits or other City permits will be issued until the plans for ingress, egress, and circulation have been approved by the City. This criterion can be met.

C. Joint Access

Two (2) or more uses, structures, or parcels of land may utilize the same ingress and egress when the combined ingress and egress of all uses, structures, or parcels of land satisfied the other requirements of this Code, provided that satisfactory legal evidence is presented to the City in the form of deeds, easements, leases, or contracts to clearly establish the joint use.

RESPONSE: Joint access is not required or proposed as part of this development. Therefore, this criterion is not applicable.

D. Connection to Streets

1. Except for joint access per this Section, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways with paved sidewalk.

RESPONSE: With the exception of Lots 25 and 28, individual ingress and egress connections for all proposed lots are available directly to public streets within the development, as shown on the Preliminary Plat. Lots 25 and 28, which each have significant public street frontage, will access the extension of SW Wapato Lake Drive over individual private street tracts, meeting the intent of this section. Therefore, this criterion is met.

2. Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or elevators to the public sidewalk or curb of the public street which provides required ingress and egress.

RESPONSE: Private sidewalks will extend from the primary ground floor entrance of each dwelling to the nearest public street sidewalk. These private sidewalks will be planned and installed as part of the individual home construction on each lot. Therefore, this criterion will be met.

E. Maintenance of Required Improvements

Required ingress, egress and circulation improvements shall be kept clean and in good repair.

RESPONSE: Following construction, required ingress, egress and circulation improvements will be maintained and kept clean and in good repair by the individual homeowner adjacent to such improvement, or other legal entity legally responsible for maintenance and upkeep of said improvements such as a Home Owners Association. This criterion will be met.

F. Access to Major Roadways

Points of ingress or egress to and from Highway 99W and arterials designated on the Transportation Plan Map, attached as Appendix C of the Community Development Plan, Part II, shall be limited as follows:

1. Single and two-family uses and manufactured homes on individual residential lots developed after the effective date of this Code shall not be granted permanent driveway ingress or egress from Highway 99W and arterial roadways. If alternative public access is not available at the time of development, provisions shall be made for temporary access which shall be discontinued upon the availability of alternative access.

2. Other private ingress or egress from Highway 99W and arterial roadways shall be minimized. Where alternatives to

Highway 99W or arterials exist or are proposed, any new or altered uses developed after the effective date of this Code shall be required to use the alternative ingress and egress.

3. *All site plans for new development submitted to the City for approval after the effective date of this Code shall show ingress and egress from existing or planned local or collector streets, consistent with the Transportation Plan Map and Section VI of the Community Development Plan.*

RESPONSE: SW Brookman Road is classified as an Arterial street on the Washington County Transportation System Plan and the City of Sherwood Transportation System Plan. As such, single-family uses are not permitted permanent driveway ingress or egress from SW Brookman Road. This application includes ingress and egress to the single-family lots from the proposed extension of SW Wapato Lake Drive, a local public street. Therefore, this criterion is met.

G. Service Drives

Service drives shall be provided pursuant to Section 16.94.030.

RESPONSE: The subject application does not include service drives. Therefore, this criterion is not applicable.

16.96.020 - Minimum Residential standards

Minimum standards for private, on-site circulation improvements in residential developments:

A. Driveways

1. *Single-Family: One (1) driveway improved with hard surface pavement with a minimum width of ten (10) feet, not to exceed a grade of 14%. Permeable surfaces and planting strips between driveway ramps are encouraged in order to reduce stormwater runoff.*

RESPONSE: Each lot within the subdivision is planned to have a single driveway, each of which will be improved with hard surface pavement. Each of the driveways will be greater than 10 feet in width to provide off-street parking for each lot, and will be constructed with a grade of less than 14%. The criterion will be met.

B. Sidewalks, Pathways and Curbs

1. *Single, Two-Family, and Manufactured Home on Individual Residential Lot: No on-site sidewalks and curbs are required when not part of a proposed partition or subdivision.*

RESPONSE: As illustrated on the Preliminary Street Tree and Open Space Planting Plan (Sheet L1), a curb, sidewalk and planter strip are planned to be installed along the street frontage of each lot in the subdivision, where they abut a public street. This criterion will be met.

16.96.030 - Minimum Non-Residential Standards

RESPONSE: The application does not include commercial or industrial uses. The Section does not apply.

16.96.040 - On-Site Vehicle Circulation

A. Maintenance

No building permit or other City permit shall be issued until plans for ingress, egress and circulation have been approved by the City. Any change increasing any ingress, egress or circulation requirements, shall be a violation of this Code unless additional facilities are provided in accordance with this Chapter.

RESPONSE: The Applicant is aware that no building permit or other City permit will be issued until the plans for ingress, egress, and circulation have been approved by the City. This criterion can be met.

B. Joint Access [See also Chapter 16.108]

Two (2) or more uses, structures, or parcels of land are strongly encouraged to utilize jointly the same ingress and egress when the combined ingress and egress of all uses, structures, or parcels of land satisfy the other requirements of this Code, provided that satisfactory legal evidence is presented to the City in the form of deeds, easements, leases, or contracts to clearly establish the joint use. In some cases, the City may require a joint access to improve safety, vision clearance, site distance, and comply with access spacing standards for the applicable street classification.

RESPONSE: Joint access is not required or proposed as part of this development. Therefore, this criterion is not applicable.

C. Connection to Streets

1. Except for joint access per this Section, all ingress and egress to a use or parcel shall connect directly to a public street, excepting alleyways.

RESPONSE: With the exception of Lots 25 and 28, individual ingress and egress connections for all proposed lots are available directly to public streets within the development, as shown on the Preliminary Plat. Lots 25 and 28, which each have significant public street frontage, will access the

extension of SW Wapato Lake Drive over individual private street tracts, meeting the intent of this section. Therefore, this criterion is met.

2. *Required private sidewalks shall extend from the ground floor entrances or the ground floor landing of stairs, ramps or elevators to the public sidewalk or curb of the public street which provides required ingress and egress.*

RESPONSE: Private sidewalks will extend from the primary ground floor entrance of each dwelling to the nearest public street sidewalk. These private sidewalks will be planned and installed as part of the individual home construction on each lot. Therefore, this criterion will be met.

D. Maintenance of Required Improvements

Required ingress, egress and circulation improvements shall be kept clean and in good repair.

RESPONSE: Following construction, required ingress, egress and circulation improvements will be maintained and kept clean and in good repair by the individual homeowner adjacent to such improvement, or other legal entity legally responsible for maintenance and upkeep of said improvements such as a Home Owners Association. This criterion will be met.

E. Service Drives

Service drives shall be provided pursuant to Section 16.94.030.

RESPONSE: This proposed development does not include service drives. This criterion is not applicable to this application.

Division VI. - PUBLIC INFRASTRUCTURE

Chapter 16.106 - TRANSPORTATION FACILITIES

16.106.010 - Generally

A. Creation

Public streets shall be created in accordance with provisions of this Chapter. Except as otherwise provided, all street improvements and rights-of-way shall conform to standards for the City's functional street classification, as shown on the Transportation System Plan (TSP) Map (Figure 15) and other applicable City standards. The following table depicts the guidelines for the street characteristics.

Type of Street	Right of Way Width	Number of Lanes	Minimum Lane Width	On Street Parking Width	Bike Lane Width	Sidewalk Width	Landscape Strip (exclusive of Curb)	Median Width
Arterial	**60-102**	**2-5**	**12'**	**Limited**	**6 feet**	**6-8'**	**5'**	**14' if required**
Local (<1000 vpd)	**52'**	**2**	**14'**	**8' on one side only**	**None**	**6'**	**5' with 1' buffer**	**None**

RESPONSE: SW Brookman Road is under the jurisdiction of Washington County. The proposed improvements to SW Brookman Road have been designed to Washington County arterial standards. The new local streets are designed according to City standards, as described above. Therefore, these criteria are met.

B. Street Naming

1. *All streets created by subdivision or partition will be named prior to submission of the final plat.*

2. *Any street created by a public dedication shall be named prior to or upon acceptance of the deed of dedication.*

3. *An action to name an unnamed street in the City may be initiated by the Council or by a person filing a petition as described in this Section.*

4. *All streets named shall conform to the general requirements as outlined in this Section.*

5. *At the request of the owner(s), the City may approve a private street name and address. Private streets are subject to the same street name standards as are public streets. All private street signs will be provided at the owner(s) expense.*

RESPONSE: The street within the proposed plat will be an extension of an already approved named street, being SW Wapato Lake Drive, and this name is shown on the proposed plat. These criteria are met.

C. Street Name Standards

1. *All streets named or renamed shall comply with the following criteria:*

   a. *Major streets and highways shall maintain a common name or number for the entire alignment.*
   b. *Whenever practicable, names as specified in this Section shall be utilized or retained.*

c. *Hyphenated or exceptionally long names shall be avoided.*
d. *Similar names such as Farview and Fairview or Salzman and Saltzman shall be avoided.*
e. *Consideration shall be given to the continuation of the name of a street in another jurisdiction when it is extended into the City.*

2. *The following classifications (suffixes) shall be utilized in the assignment of all street names:*

a. *Boulevards: North/south arterials providing through traffic movement across the community.*
b. *Roads: East/west arterials providing through traffic movement across the community.*
c. *Avenues: Continuous, north/south collectors or extensions thereof.*
d. *Streets: Continuous, east-west collectors or extensions thereof.*
e. *Drives: Curvilinear collectors (less than 180 degrees) at least 1,000 feet in length or more.*
f. *Lanes: Short east/west local streets under 1,000 feet in length.*
g. *Terraces: short north/south local streets under 1,000 feet in length.*
h. *Court: All east/west cul-de-sacs.*
i. *Place: All north/south cul-de-sacs.*
j. *Ways: All looped local streets (exceeding 180 degrees).*
k. *Parkway: A broad landscaped collector or arterial.*

3. *Except as provided for by this section, no street shall be given a name that is the same as, similar to, or pronounced the same as any other street in the City unless that street is an extension of an already named street.*

4. *All proposed street names shall be approved, prior to use, by the City.*

D. Preferred Street Names

Whenever practicable, historical names will be considered in the naming or renaming of public roads. Historical factors to be considered shall include, but not be limited to the following:

a. *Original holders of Donation Land Claims in Sherwood.*
b. *Early homesteaders or settlers of Sherwood.*
c. *Heirs of original settlers or long-time (50 or more years) residents of Sherwood.*
d. *Explorers of or having to do with Sherwood.*
e. *Indian tribes of Washington County.*

f. *Early leaders and pioneers of eminence.*
g. *Names related to Sherwood's flora and fauna.*
h. *Names associated with the Robin Hood legend.*

RESPONSE: The street within the proposed plat will be an extension of an already approved named street, being SW Wapato Lake Drive, and this name is shown on the proposed plat. These criteria are met. Therefore, these criteria are met.

16.106.020 - Required Improvements

A. Generally

Except as otherwise provided, all developments containing or abutting an existing or proposed street, that is either unimproved or substandard in right-of-way width or improvement, shall dedicate the necessary right-of-way prior to the issuance of building permits and/or complete acceptable improvements prior to issuance of occupancy permits. Right-of-way requirements are based on functional classification of the street network as established in the Transportation System Plan, Figure 15.

RESPONSE: SW Brookman Road is under the jurisdiction of Washington County. The proposed improvements to SW Brookman Road have been designed to Washington County arterial standards, including dedication of 33-feet of additional right-of-way along the site frontage to provide 53 feet of right-of-way to centerline. The new local street is designed according to City standards, and will be extended consistent with the applicable local street standards. Therefore, these criteria are met.

B. Existing Streets

Except as otherwise provided, when a development abuts an existing street, the improvements requirement shall apply to that portion of the street right-of-way located between the centerline of the right-of-way and the property line of the lot proposed for development. In no event shall a required street improvement for an existing street exceed a pavement width of thirty (30) feet.

RESPONSE: SW Brookman Road is under the jurisdiction of Washington County. The proposed improvements to SW Brookman Road have been designed to Washington County arterial standards, including dedication of 33-feet of additional right-of-way along the site frontage to provide 53 feet of right-of-way to centerline. Existing pavement along the site frontage is approximately 9 feet to centerline, and the street will be widened an additional 28 feet to create 37 feet of paving to centerline. The new local street extension is designed according to City standards, with a 52-foot total right-of-way width and 28 feet of paved surface. Therefore, these criteria are met.

C. Proposed Streets

1. *Except as otherwise provided, when a development includes or abuts a proposed street, in no event shall the required street improvement exceed a pavement width of forty (40) feet.*

2. *Half Streets: When a half street is created, a minimum of 22 feet of driving surface shall be provided by the developer.*

RESPONSE: The local street extension of SW Wapato Lake Drive is planned to be constructed to City standards with a total pavement width of 28 feet, which is less than 40 feet, but more than the minimum required 22 feet of driving surface. Therefore, these criteria are met.

D. Extent of Improvements

1. *Streets required pursuant to this Chapter shall be dedicated and improved consistent with Chapter 6 of the Community Development Plan, the TSP and applicable City specifications included in the City of Sherwood Construction Standards. Streets shall include curbs, sidewalks, catch basins, street lights, and street trees. Improvements shall also include any bikeways designated on the Transportation System Plan map. Applicant may be required to dedicate land for required public improvements only when the exaction is directly related to and roughly proportional to the impact of the development, pursuant to Section 16.106.090.*

RESPONSE: Proposed right-of-way dedication and street improvements are shown within the submitted plan set, in particular Sheets P7, P8 and P9, and include curbs, sidewalks behind planter strips, drainage, street lights, and street trees. Frontage improvements to SW Brookman Road are shown and will be provided in accordance with Washington County standards. Therefore, these criteria are met.

2. *If the applicant is required to provide street improvements, the City Engineer may accept a future improvements guarantee in lieu of street improvements if one or more of the following conditions exist, as determined by the City:*

    a. *A partial improvement is not feasible due to the inability to achieve proper design standards;*
    b. *A partial improvement may create a potential safety hazard to motorists or pedestrians.*
    c. *Due to the nature of existing development on adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide a significant improvement to street safety or capacity;*
    d. *The improvement would be in conflict with an adopted capital improvement plan;*

e. *The improvement is associated with an approved land partition on property zoned residential use and the proposed land partition does not create any new streets; or*
f. *Additional planning work is required to define the appropriate design standards for the street and the application is for a project that would contribute only a minor portion of the anticipated future traffic on the street.*

RESPONSE: Washington County Land Use & Transportation Engineering and Construction Services staff have not indicated at this time that a fee in-lieu of frontage improvements may be required along SW Brookman Road. However, the applicant will provide fee-in-lieu or physical improvements as required. Therefore, this criterion can be met.

E. Transportation Facilities Modifications

1. A modification to a standard contained within this Chapter and Section 16.58.010 and the standard cross sections contained in Chapter 8 of the adopted TSP may be granted in accordance with the procedures and criteria set out in this section.

RESPONSE: The applicant is not requesting a modification to a standard within this Chapter, Section 16.58.010, or the standard cross sections contained in Chapter 8 of the adopted TSP. This section is not applicable to this application.

16.106.030 - Location

A. Generally

The location, width and grade of streets shall be considered in their relation to existing and planned streets, topographical conditions, and proposed land uses. The proposed street system shall provide adequate, convenient and safe traffic and pedestrian circulation, and intersection angles, grades, tangents, and curves shall be adequate for expected traffic volumes. Street alignments shall be consistent with solar access requirements as per Chapter 16.156, and topographical considerations.

RESPONSE: The proposed development and associated street improvements have been designed and located to provide City standard access to each of the planned lots; to meet arterial standards; and to extend existing street stubs through the site in a logical manner. The existing streets (SW Brookman Road, SW Wapato Lake Drive, SW Trillium Road) dictate to a large degree the circulation system within the site, including intersection angles, grades, tangents, and curves, and therefore lot orientation. Adequate, convenient and safe pedestrian circulation is provided through public sidewalks and publicly accessible trails within the development. Street alignments are consistent with the solar access requirements of Chapter 16.156 as discussed below. The criterion is met.

B. Street Connectivity and Future Street Systems

1. Future Street Systems. The arrangement of public streets shall provide for the continuation and establishment of future street systems as shown on the Local Street Connectivity Map contained in the adopted Transportation System Plan (Figure 16).

RESPONSE: The Local Street Connectivity Map (Figure 18) of the City of Sherwood Transportation System Plan shows conceptual street connections, including those along SW Brookman Road. Footnotes for Figure 18 identify that the alignments shown are approximate and may vary, and it is considered that the street connection of SW White Oak Terrace within the approved Middlebrook Subdivision effectively serves as the connection indicated in Figure 18, particularly given arterial access spacing restrictions on SW Brookman Road. Further, an additional north-south connection through the site is not practicable due to the location of significant natural resources bisecting the site. Therefore, this criterion is met.

2. Connectivity Map Required. New residential, commercial, and mixed-use development involving the construction of new streets shall be submitted with a site plan that implements, responds to and expands on the Local Street Connectivity map contained in the TSP.

a. A project is deemed to be consistent with the Local Street Connectivity map when it provides a street connection in the general vicinity of the connection(s) shown on the map, or where such connection is not practicable due to topography or other physical constraints; it shall provide an alternate connection approved by the decision-maker.

b. Where a developer does not control all of the land that is necessary to complete a planned street connection, the development shall provide for as much of the designated connection as practicable and not prevent the street from continuing in the future.

c. Where a development is disproportionately impacted by a required street connection, or it provides more than its proportionate share of street improvements along property line (i.e., by building more than 3/4 width street), the developer shall be entitled to System Development charge credits, as determined by the City Engineer.

d. Driveways that are more than 24 feet in width shall align with existing streets or planned streets as shown in the Local Street Connectivity Map in the adopted Transportation System Plan (Figure 17), except where prevented by topography, rail lines, freeways, pre-existing development, or leases, easements, or covenants.

RESPONSE: The submitted plan set demonstrates compliance with the Local Street Connectivity Map (Figure 18) of the City of Sherwood Transportation System Plan. Access to SW Brookman Road is located generally as indicated on Figure 18 through SW White Oak Terrace (Middlebrook Subdivision), and existing streets will be extended through (SW Wapato Lake Drive) and/or across the frontage of the site (SW Trillium Road). These criteria are met.

3. *Block Length. For new streets except arterials, block length shall not exceed 530 feet. The length of blocks adjacent to arterials shall not exceed 1,800 feet.*

RESPONSE: One new interior block is created as part of this development, being SW Wapato Lake Drive between SW Trillium Lane in the north and SW White Oak Terrace in the west. As measured along the nearside right-of-way line, the proposed block length is approximately 745 feet. However, it is noted that due to the location of significant natural resources on the property, the block face generally forms the continuous hypotenuse of a triangular block as created and anticipated as part of the Middlebrook Subdivision approval. If measuring block length along the predominantly east-west versus north-south sections, block lengths measure approximately 506 feet and 239 feet respectively, in compliance with the requirements of this section. There are no blocks a created along SW Brookman Road due to the location of significant natural resources and arterial access spacing restrictions. This criterion is met.

4. *Where streets must cross water features identified in Title 3 of the Urban Growth Management Functional Plan (UGMFP), provide crossings at an average spacing of 800 to 1,200 feet, unless habitat quality or length of crossing prevents a full street connection.*

RESPONSE: This project does not involve a street crossing of Cedar Creek, the significant natural water resource on the site. This criterion does not apply.

5. *Where full street connections over water features identified in Title 3 of the UGMFP cannot be constructed in centers, main streets and station communities (including direct connections from adjacent neighborhoods), or spacing of full street crossings exceeds 1,200 feet, provide bicycle and pedestrian crossings at an average spacing of 530 feet, unless exceptional habitat quality or length of crossing prevents a connection.*

RESPONSE: A vehicular block cannot be formed to the south to connect SW Wapato Lake Drive to SW Brookman Road due to the location of Cedar Creek and its associated Flood Plain, however a pedestrian and bicycle connection has been provided between the two separate portions of the site via an existing driveway crossing at the south eastern corner of the site. Therefore, this criterion has been met.

6. *Pedestrian and Bicycle Connectivity. Paved bike and pedestrian accessways consistent with cross section standards in Figure 8-6 of the TSP shall be provided on public easements or right- of-way when full street connections are not possible, with spacing between connections of no more than 300 feet. Multi-use paths shall be built according to the Pedestrian and Bike Master Plans in the adopted TSP.*

RESPONSE: An extensive network of pedestrian paths in pedestrian access easements are provided throughout the site, with design and construction to meet the requirements above. Both north-south and east-west connections are provided. This criterion is met.

7. *Exceptions. Streets, bike, and pedestrian connections need not be constructed when any of the following conditions exists:*

   a. *Physical or topographic conditions make a street or accessway connection impracticable. Such conditions include but are not limited to freeways, railroads, steep slopes, wetlands or other bodies of water where a connection could not reasonably be provided.*
   b. *Buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment; or*
   c. *Where streets or accessways would violate provisions of leases, easements, covenants, restrictions or other agreements existing as of May 1, 1995, which preclude a required street or accessway connection.*

RESPONSE: Street connections cannot be created between the northern portion of the site and SW Brookman Road, due to the location of Cedar Creek and its associated flood plains bifurcating the site into northern and southern sections. Street connections are made to the east of the site through the Middlebrook Subdivision. In lieu of providing street connections between the northern portions of the development and SW Brookman Road, an extensive network of pedestrian paths in pedestrian access easements are provided throughout the site, with both north-south and east-west connections provided. Therefore, these criteria are met.

C. Underground Utilities

All public and private underground utilities, including sanitary sewers and storm water drains, shall be constructed prior to the surfacing of streets. Stubs for service connections shall be long enough to avoid disturbing the street improvements when service connections are made.

RESPONSE: Public and private utilities are proposed to be located underground with the construction of streets and accessways through the site. This requirement is satisfied.

D. Additional Setbacks

Generally additional setbacks apply when the width of a street right-of-way abutting a development is less than the standard width under the functional classifications in Section VI of the Community Development Plan. Additional setbacks are intended to provide unobstructed area for future street right-of-way dedication and improvements, in conformance with Section VI. Additional setbacks shall be measured at right angles from the centerline of the street.

	Classification	Additional Setback
2.	**Arterial**	**37 feet**
5.	**Local**	**26 feet**

RESPONSE: Dedication of 33 feet of right-of-way to Washington County arterial standards along SW Brookman Road is shown on the submitted plan set, creating a right-of-way meeting or exceeding the required standard. There are no other existing abutting streets, with the exception of the stub of SW Wapato Lake Drive to the west and the ¾ section of SW Trillium Road along the northern property frontage, both from the Middlebrook subdivision, and which will both be improved with the required 52 feet of right-of-way for a full local street section. Therefore, this criterion is met.

16.106.040 - Design

Standard cross sections showing street design and pavement dimensions are located in the City of Sherwood's Engineering Design Manual.

A. Reserve Strips

Reserve strips or street plugs controlling access or extensions to streets are not allowed unless necessary for the protection of the public welfare or of substantial property rights. All reserve strips shall be dedicated to the appropriate jurisdiction that maintains the street.

RESPONSE: No reserve strips or street plugs are proposed as part of this application. Therefore, this criterion is met.

B. Alignment

All proposed streets shall, as far as practicable, be in alignment with existing streets. In no case shall the staggering of streets create a "T" intersection or a dangerous condition. Street offsets of less than one hundred (100) feet are not allowed.

RESPONSE: As shown on the submitted plan set, there are no specific public street intersections created which would create offsets, therefore this criterion is met. Both street intersections created are located as proposed through the approved Middlebrook Subdivision.

C. Future Extension

Where necessary to access or permit future subdivision or development of adjoining land, streets must extend to the boundary of the proposed development and provide the required roadway width. Dead-end streets less than 100' in length must comply with the Engineering Design Manual.

A durable sign must be installed at the applicant's expense. The sign is required to notify the public of the intent to construct future streets. The sign must read as follows: "This road will be extended with future development. For more information contact the City of Sherwood Engineering Department."

RESPONSE: The site is not located such that additional or future access to adjoining properties is required. To the west, the development proposes to extend the approved stub of SW Wapato Lake Drive from the Middlebrook Subdivision; to the north, the approved ¾ section of SW Trillium Road will be expanded to its full section; to the east no connections are provided or required to the Reserve at Cedar Creek development due to the location of significant natural resources, with the exception of a pedestrian trail to link to a proposed trail within that development; and to the south of the site is the SW Brookman Road right-of-way, which will be improved to a County arterial standard. This criterion is satisfied.

D. Intersection Angles

Streets shall intersect as near to ninety (90) degree angles as practical, except where topography requires a lesser angle. In all cases, the applicant shall comply with the Engineering Design Manual.

RESPONSE: At the west end of the site, SW Wapato Lake Drive will be extended from an existing street stub, and will therefore meet this requirement. At the north east corner, SW Wapato Lake Drive will intersect with SW Trillium Road as aligned with the northern portion of SW Wapato Lake Drive. Due to the location of significant natural resources and efficient use of the site, the angle of this intersection will be less than 90 degrees, intersection SW Trillium Road as close to 90 degrees as practicable. Additional right-of-way and corner radius are provided to ease right in turns from east bound SW Trillium Road. Therefore, these criteria are met.

E. Cul-de-sacs

1. *All cul-de-sacs shall be used only when exceptional topographical constraints, existing development patterns, or compliance with other standards in this code preclude a*

street extension and circulation. A cul-de-sac shall not be more than two hundred (200) feet in length and shall not provide access to more than 25 dwelling units.

2. *All cul-de-sacs shall terminate with a turnaround in accordance with the specifications in the Engineering Design Manual. The radius of circular turnarounds may be larger when they contain a landscaped island, parking bay in their center, Tualatin Valley Fire and Rescue submits a written request, or an industrial use requires a larger turnaround for truck access.*

3. *Public easements, tracts, or right-of-way shall provide paved pedestrian and bicycle access ways at least 6 feet wide where a cul-de-sac or dead-end street is planned, to connect the ends of the streets together, connect to other streets, or connect to other existing or planned developments in accordance with the standards of this Chapter, the TSP, the Engineering Design Manual or other provisions identified in this Code for the preservation of trees.*

RESPONSE: No cul-de-sacs are proposed with this development. Therefore, this criterion is not applicable

F. Grades and Curves

Grades shall be evaluated by the City Engineer and comply with the Engineering Design Manual.

RESPONSE: All street grades within the development have been designed in accordance with the applicable City standards. This criterion is met.

G. Streets Adjacent to Railroads

Streets adjacent to railroads shall run approximately parallel to the railroad and be separated by a distance suitable to allow landscaping and buffering between the street and railroad. Due consideration shall be given at cross streets for the minimum distance required for future grade separations and to provide sufficient depth to allow screening of the railroad.

RESPONSE: The site does not abut a railroad, and therefore no streets are located adjacent to the railroad. Accordingly, this criterion does not apply.

H. Buffering of Major Streets

Where a development abuts Highway 99W, or an existing or proposed principal arterial, arterial or collector street, or neighborhood route,

adequate protection for residential properties must be provided, through and local traffic be separated, and traffic conflicts minimized. In addition, visual corridors pursuant to Section 16.142.040, and all applicable access provisions of Chapter 16.96, are to be met. Buffering may be achieved by: parallel access streets, lots of extra depth abutting the major street with frontage along another street, or other treatment suitable to meet the objectives of this Code.

RESPONSE: The subject site abuts SW Brookman Road, a county Arterial street. All lots within the development are buffered from SW Brookman Road by the 15-foot landscaped visual corridor required along SW Brookman Road by Section 16.142.040, and/or approximately 180 feet of resource area located within Tract B. As such, this criterion is met.

I. Median Islands

As illustrated in the adopted Transportation System Plan, Chapter 8, median islands may be required on arterial or collector streets for the purpose of controlling access, providing pedestrian safety or for aesthetic purposes.

RESPONSE: Frontage improvements along SW Brookman Road are not proposed to include a median, and County staff have not indicated that a median island would be required as part of this development. Accordingly, this criterion is not applicable at this time.

J. Transit Facilities

Development along an existing or proposed transit route, as illustrated in Figure 7-2 in the TSP, is required to provide areas and facilities for bus turnouts, shelters, and other transit-related facilities to Tri-Met specifications. Transit facilities shall also meet the following requirements:

1. *Locate buildings within 20 feet of or provide a pedestrian plaza at major transit stops.*

2. *Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site.*

3. *Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards).*

4. *Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider.*

5. *Provide lighting at a transit stop (if not already existing to transit agency standards).*

RESPONSE: It is noted that the Transit System and Potential Enhancements plan (Figure 14) of the City of Sherwood Transportation System Plan (TSP) identifies SW Brookman Road as a route for *"Potential Local Enhancements."* However, SW Brookman Road is not identified as an existing or proposed transit route within either the City of Sherwood TSP or the Washington County TSP. Figure 14 does contain a note which states, *"Transit projects in this TSP include enhancement to local and regional transit service to be identified through a refinement plan. While specific transit service enhancement locations have not been identified, for the purposes of providing information for other planning efforts, this map indicates corridors that could be selected for future enhancements through further planning studies. This information is subject to change pending future planning efforts."* It is further noted that the Washington County TSP designates SW Brookman Road and surrounds as a *"TSP Refinement Area"*. Therefore, SW Brookman Road is not considered an existing or proposed transit route, and therefore these criteria do not apply.

K. Traffic Controls

1. *Pursuant to Section 16.106.080, or as otherwise required by the City Engineer, an application must include a traffic impact analysis to determine the number and types of traffic controls necessary to accommodate anticipated traffic flow.*

2. *For all other proposed developments including commercial, industrial or institutional uses with over an estimated 400 ADT, or as otherwise required by the City Engineer, the application must include a traffic impact analysis to determine the number and types of traffic controls necessary to accommodate anticipated traffic flow.*

RESPONSE: A Transportation Impact Analysis (TIA) has been submitted with this application, prepared by Lancaster Mobley, and dated April 8, 2020. The City of Sherwood Municipal Code Section 16.106.080 requires analysis of all intersections where fifty (50) or more peak hour vehicle trips can be expected to result from the development. The 12 intersections (10 existing and 2 future) included in the TIA are identical to the Middlebrook and Reserve at Cedar Creek Subdivision studies for consistency; however, none of the studied intersections are projected to experience 50 or more peak hour vehicle trips resulting from this development.

The TIA summarized the following with regard to intersection impacts:

All study intersections are projected to operate acceptably per their respectively jurisdictional standards by year 2024 with buildout of the proposed subdivision. No operational mitigation is necessary as part of the proposed Cedar Creek Subdivision.

The Reserve at Cedar Creek Transportation Impact Analysis (TIA) – Sherwood, Oregon, dated September 19th, 2019, identified four intersections as currently exceeding acceptable jurisdictional standards. Based on the projected site trip impacts to these intersections, a total proportionate share fee to mitigate impacts of $48,207.49 was calculated.

L. Traffic Calming

1. The following roadway design features, including internal circulation drives, may be required by the City in new construction in areas where traffic calming needs are anticipated:

a. *Curb extensions (bulb-outs).*
b. *Traffic diverters/circles.*
c. *Alternative paving and painting patterns.*
d. *Raised crosswalks, speed humps, and pedestrian refuges.*
e. *Other methods demonstrated as effective through peer reviewed Engineering studies.*

2. With approval of the City Engineer, traffic calming measures such as speed humps and additional stop signs can be applied to mitigate traffic operations and/or safety problems on existing streets. They should not be applied with new street construction unless approved by the City Engineer and Tualatin Valley Fire & Rescue.

RESPONSE: No specific or new traffic calming measures have been identified as required or proposed for this development. Therefore, these criteria do not apply.

M. Vehicular Access Management

All developments shall have legal access to a public road. Access onto public streets shall be permitted upon demonstration of compliance with the provisions of adopted street standards in the Engineering Design Manual.

1. Measurement: See the following access diagram where R/W = Right-of-Way; and P.I. = Point-of Intersection where P.I. shall be located based upon a 90-degree angle of intersection between ultimate right-of-way lines.

a. Minimum right-of-way radius at intersections shall conform to City standards.
b. All minimum distances stated in the following sections shall be governed by sight distance requirements according to the Engineering Design Manual.
c. All minimum distances stated in the following sections shall be measured to the nearest easement line of the access or edge of travel lane of the access on both sides of the road.

d. All minimum distances between accesses shall be measured from existing or approved accesses on both sides of the road.

e. Minimum spacing between driveways shall be measured from Point "C" to Point "C" as shown below:

2. Roadway Access

No use will be permitted to have direct access to a street or road except as specified below. Access spacing shall be measured from existing or approved accesses on either side of a street or road. The lowest functional classification street available to the legal lot, including alleys within a public easement, shall take precedence for new access points.

a. Local Streets:

Minimum right-of-way radius is fifteen (15) feet. Access will not be permitted within ten (10) feet of Point "B," if no radius exists, access will not be permitted within twenty-five (25) feet of Point "A." Access points near an intersection with a Neighborhood Route, Collector or Arterial shall be located beyond the influence of standing queues of the intersection in accordance with AASHTO standards. This requirement may result in access spacing greater than ten (10) feet.

b. Neighborhood Routes:

Minimum spacing between driveways (Point "C" to Point "C") shall be fifty (50) feet with the exception of single family residential lots in a recorded subdivision. Such lots shall not be subject to a minimum spacing requirement between driveways (Point "C" to Point "C"). In all instances, access points near an intersection with a Neighborhood Route, Collector or Arterial shall be located beyond the influence of standing queues of the intersection in accordance with AASHTO standards. This requirement may result in access spacing greater than fifty (50) feet.

c. Collectors:

All commercial, industrial and institutional uses with one-hundred-fifty (150) feet or more of frontage will be permitted direct access to a Collector. Uses with

less than one-hundred-fifty (150) feet of frontage shall not be permitted direct access to Collectors unless no other alternative exists.

Where joint access is available it shall be used, provided that such use is consistent with Section 16.96.040, Joint Access. No use will be permitted direct access to a Collector within one- hundred (100) feet of any present Point "A." Minimum spacing between driveways (Point "C" to Point "C") shall be one-hundred (100) feet. In all instances, access points near an intersection with a Collector or Arterial shall be located beyond the influence of standing queues of the intersection in accordance with AASHTO standards. This requirement may result in access spacing greater than one hundred (100) feet.

d. Arterials and Highway 99W - Points of ingress or egress to and from Highway 99W and arterials designated on the Transportation Plan Map, attached as Figure 1 of the Community Development Plan, Part II, shall be limited as follows:

(1) Single and two-family uses and manufactured homes on individual residential lots developed after the effective date of this Code shall not be granted permanent driveway ingress or egress from Highway 99W or arterials. If alternative public access is not available at the time of development, provisions shall be made for temporary access which shall be discontinued upon the availability of alternative access.

(2) Other private ingress or egress from Highway 99W and arterial roadways shall be minimized. Where alternatives to Highway 99W or arterials exist or are proposed, any new or altered uses developed after the effective date of this Code shall be required to use the alternative ingress and egress. Alternatives include shared or crossover access agreement between properties, consolidated access points, or frontage or backage roads. When alternatives do not exist, access shall comply with the following standards:

(a) *Access to Highway 99W shall be consistent with ODOT standards and policies per OAR 734, Division 51, as follows: Direct access to an arterial or principal arterial will be permitted provided that Point 'A' of such access is more than six hundred (600) feet from any intersection Point 'A' or other access to that arterial (Point 'C').*

(3) The access to Highway 99W will be considered temporary until an alternative access to public right-of-ways is created. When the alternative access is available the temporary access to Highway 99W shall be closed.

(4) All site plans for new development submitted to the City for approval after the effective date of this Code shall show ingress and egress from existing or planned local, neighborhood route or collector streets, including frontage or backage roads, consistent with the Transportation Plan Map and Chapter 6 of the Community Development Plan.

3. Exceptions to Access Criteria for City-Owned Streets

a. *Alternate points of access may be allowed if an access management plan which maintains the classified function and integrity of the applicable facility is submitted to and approved by the City Engineer as the access management plan must be included as part of the land use submittal or an application for modification as described in § 16.106.020 E. (Transportation Facilities Modifications).*

b. *Access in the Old Town (OT) Overlay Zone*

Access points in the OT Overlay Zone shown in an adopted plan such as the Transportation System Plan, are not subject to the access spacing standards and do not need a variance. However, the applicant shall submit a partial access management plan for approval by the City Engineer. The approved plan shall be implemented as a condition of development approval.

RESPONSE: The submitted plans for the application demonstrate that the vehicular access management standards above are met. Both street access points, including the east and west ends of the extension of SW Wapato Lake Drive, meet the required City access spacing standards, and

are located generally as shown on plans submitted and approved with the Middlebrook Subdivision. The development will access SW Brookman Road via SW White Oak Terrace, which was also proposed and approved through the Middlebrook Subdivision. The site does not access Highway 99W and is not located in the Old Town Overlay District. Therefore, the applicable criteria are met.

N. Private Streets

1. *The construction of a private street serving a single-family residential development is prohibited unless it provides principal access to two or fewer residential lots or parcels (i.e. flag lots).*

2. *Provisions shall be made to assure private responsibility for future access and maintenance through recorded easements. Unless otherwise specifically authorized, a private street shall comply with the same standards as a public street identified in the Community Development Code and the Transportation System Plan.*

3. *A private street shall be distinguished from public streets and reservations or restrictions relating to the private street shall be described in land division documents and deed records.*

4. *A private street shall also be signed differently from public streets and include the words "Private Street".*

RESPONSE: The application includes two private streets, located in each of Tracts C and D. Each private street will serve one single-family dwelling, and will be maintained, identified and recorded as required above. Therefore, these criteria are met.

16.106.060 - Sidewalks

A. Required Improvements

1. *Except as otherwise provided, sidewalks shall be installed on both sides of a public street and in any special pedestrian way within new development.*

2. *For Highway 99W, arterials, or in special industrial districts, the City Manager or designee may approve a development without sidewalks if alternative pedestrian routes are available.*

3. *In the case of approved cul-de-sacs serving less than fifteen (15) dwelling units, sidewalks on one side only may be approved by the City Manager or designee.*

RESPONSE: As shown on the submitted plan set, sidewalks meeting city local street standards will be provided along both sides of the extension of SW Wapato Lake Drive, and along the site frontage with SW Trillium Road. A 10-foot wide sidewalk will be provided along the subject site's frontage of SW Brookman Road. Sidewalks are also proposed within all pedestrian access easements. Accordingly, these criteria are met.

B. Design Standards

1. *Arterial and Collector Streets*

Arterial and collector streets shall have minimum eight (8) foot wide sidewalks/multi- use path, located as required by this Code.

2. *Local Streets*

Local streets shall have minimum five (5) foot wide sidewalks, located as required by this Code.

3. *Handicapped Ramps*

Sidewalk handicapped ramps shall be provided at all intersections.

RESPONSE: SW Brookman Road is classified as a County Arterial street. A 10-foot wide paved sidewalk is proposed along the subject site's frontage on SW Brookman Road, with six-foot wide sidewalks provided along all local streets per City standards. Handicapped ramps will be provided as required by code. These criteria, as applicable, are met.

C. Pedestrian and Bicycle Paths

Provide bike and pedestrian connections on public easements or right-of-way when full street connections are not possible, with spacing between connections of no more than 330 feet except where prevented by topography, barriers such as railroads or highways, or environmental constraints such as rivers and streams.

RESPONSE: As shown on the submitted plan set, bicycle and pedestrian connections are provided along the northern edge of the resource area, with connections to the east to the Reserve at Cedar Creek development; to the south across the existing driveway crossing to SW Brookman Road; and to the north and west to the proposed SW Wapato Lake Drive extension. Further, a pedestrian and bicycle easement are provided to connect SW Trillium Lane and SW Wapato Lake Drive, located between Lots 6 and 7, and 14 and 15. Accordingly, it is considered that the applicant has made every effort to provide pedestrian and bicycle connections wherever possible. Therefore, the criterion is met.

16.106.070 - Bike Lanes

If shown in Figure 13 of the Transportation System Plan, bicycle lanes shall be installed in public rights-of-way, in accordance with City specifications.

Bike lanes shall be installed on both sides of designated roads, should be separated from the road by a twelve-inch stripe or other means approved by Engineering Staff, and should be a minimum of five (5) feet wide.

RESPONSE: Figure 13 of the City of Sherwood Transportation System Plan (TSP), identifies that bicycle lanes are required along SW Brookman Road. SW Brookman Road is under the jurisdiction of Washington County. The planned right-of-way dedication and improvements are in accordance with Washington County arterial standards, and will and provide adequate area for a bike lane within the proposed street section. Accordingly, this criterion is met.

16.106.080 - Traffic Impact Analysis (TIA)

A. Purpose

The purpose of this section is to implement Sections 660012-0045(2)(b) and -0045(2)(e) of the State Transportation Planning Rule (TPR), which require the City to adopt performance standards and a process to apply conditions to land use proposals in order to minimize impacts on and protect transportation facilities. This section establishes requirements for when a traffic impact analysis (TIA) must be prepared and submitted; the analysis methods and content involved in a TIA; criteria used to review the TIA; and authority to attach conditions of approval to minimize the impacts of the proposal on transportation facilities.

This section refers to the TSP for performance standards for transportation facilities as well as for projects that may need to be constructed as mitigation measures for a proposal's projected impacts. This section also relies on the City's Engineering Design Manual to provide street design standards and construction specifications for improvements and projects that may be constructed as part of the proposal and mitigation measures approved for the proposal.

B. Applicability

A traffic impact analysis (TIA) shall be required to be submitted to the City with a land use application at the request of the City Engineer or if the proposal is expected to involve one (1) or more of the following:

1. *An amendment to the Sherwood Comprehensive Plan or zoning map.*
2. *A new direct property approach road to Highway 99W is proposed.*
3. *The proposed development generates fifty (50) or more PM peak-hour trips on Highway 99W, or one hundred (100) PM peak-hour trips on the local transportation system.*

4. *An increase in use of any adjacent street or direct property approach road to Highway 99W by ten (10) vehicles or more per day that exceed the twenty thousand-pound gross vehicle weight.*

5. *The location of an existing or proposed access driveway does not meet minimum spacing or sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles are likely to queue or hesitate at an approach or access connection, thereby creating a safety hazard.*

6. *A change in internal traffic patterns that may cause safety problems, such as back up onto the highway or traffic crashes in the approach area.*

RESPONSE: A Transportation Impact Analysis (TIA) has been submitted with this application, prepared by Lancaster Mobley, and dated April 8, 2020. The TIA addresses the requirements of City of Sherwood Municipal Code Section 16.106.080 as well as applicable Washington County and ODOT review requirements. The study methodology, assumptions and scope were determined based on a review of existing travel patterns, the City of Sherwood's Development Code, and TIA prepared as part of the recently approved Middlebrook Residential Subdivision and the Reserve at Cedar Creek application. The study intersections and requirements are the same as was required for the Middlebrook Residential Subdivision, and the Reserve at Cedar Creek application. This requirement is met.

G. Conditions of Approval

The City may deny, approve, or approve a development proposal with conditions needed to meet operations and safety standards and provide the necessary right-of-way and improvements to ensure consistency with the future planned transportation system. Improvements required as a condition of development approval, when not voluntarily provided by the applicant, shall be roughly proportional to the impact of the development on transportation facilities, pursuant to Section 16.106.090. Findings in the development approval shall indicate how the required improvements are directly related to and are roughly proportional to the impact of development.

RESPONSE: The Applicant understands that the City may deny, approve, or approve a development proposal with conditions. Any such conditions the City wishes to impose are required to be based upon an essential nexus and roughly proportional to an identified development impact on transportation facilities.

16.106.090 - Rough Proportionality

A. Purpose

The purpose of this section is to ensure that required transportation facility improvements are roughly proportional to the potential impacts of the proposed development. The rough proportionality requirements of this section apply to both frontage and non-frontage improvements. A proportionality analysis will be conducted by the City Engineer for any proposed development that triggers transportation facility improvements pursuant to this chapter. The City Engineer will take into consideration any benefits that are estimated to accrue to the development property as a result of any required transportation facility improvements. A proportionality determination can be appealed pursuant to Chapter 16.76. The following general provisions apply whenever a proportionality analysis is conducted.

B. Mitigation of impacts due to increased demand for transportation facilities associated with the proposed development shall be provided in rough proportion to the transportation impacts of the proposed development. When applicable, anticipated impacts will be determined by the TIA in accordance with Section 16.106.080. When no TIA is required, anticipated impacts will be determined by the City Engineer.

C. The following shall be considered when determining proportional improvements:

1. Condition and capacity of existing facilities within the impact area in relation to City standards. The impact area is generally defined as the area within a one-half-mile radius of the proposed development. If a TIA is required, the impact area is the TIA study area.

2. Existing vehicle, bicycle, pedestrian, and transit use within the impact area.

3. The effect of increased demand on transportation facilities and other approved, but not yet constructed, development projects within the impact area that is associated with the proposed development.

4. Applicable TSP goals, policies, and plans.

5. Whether any route affected by increased transportation demand within the impact area is listed in any City program

including school trip safety; neighborhood traffic management; capital improvement; system development improvement, or others.

6. *Accident history within the impact area.*

7. *Potential increased safety risks to transportation facility users, including pedestrians and cyclists.*

8. *Potential benefit the development property will receive as a result of the construction of any required transportation facility improvements.*

9. *Other considerations as may be identified in the review process pursuant to Chapter 16.72.*

RESPONSE: It is understood that the City will make appropriate proportionality findings in line with the above requirements for conditions of approval applied in the City's decision for this application.

Chapter 16.110 - SANITARY SEWERS

16.110.010 - Required Improvements

Sanitary sewers shall be installed to serve all new developments and shall connect to existing sanitary sewer mains. Provided, however, that when impractical to immediately connect to a trunk sewer system, the use of septic tanks may be approved, if sealed sewer laterals are installed for future connection and the temporary system meets all other applicable City, Clean Water Services, Washington County and State sewage disposal standards.

RESPONSE: The project will include necessary public sanitary sewer infrastructure as shown on the preliminary utility plans. The applicant is aware that Clean Water Services is currently working to design and construct a trunk sewer main that will serve the Brookman Addition Concept Plan area, including this project area and the neighboring Middlebrook Subdivision. Improvements will be designed and constructed in accordance with applicable City, Clean Water Services, and State standards. These criteria are met.

16.110.020 - Design Standards

A. Capacity

Sanitary sewers shall be constructed, located, sized, and installed at standards consistent with this Code, the Sanitary Sewer Service Plan Map in the Sanitary Sewer Master Plan, and other applicable Clean Water Services and City standards, in order to adequately serve the proposed development and allow for future extensions.

B. Over-Sizing

1. *When sewer facilities will, without further construction, directly serve property outside a proposed development, gradual reimbursement may be used to equitably distribute the cost of that over-sized system.*

2. *Reimbursement shall be in an amount estimated by the City to be a proportionate share of the cost for each connection made to the sewer by property owners outside of the development, for a period of ten (10) years from the time of installation of the sewers. The boundary of the reimbursement area and the method of determining proportionate shares shall be determined by the City. Reimbursement shall only be made as additional connections are made and shall be collected as a surcharge in addition to normal connection charges.*

RESPONSE: Clean Water Services is currently working to design and construct a trunk sewer main that will serve the Brookman Addition Concept Plan area, including this project area and the neighboring Middlebrook and Reserve at Cedar Creek Subdivisions. On site sanitary sewer infrastructure will be sized properly and oversized as necessary to serve potential future growth. The applicant will work with the City and Clean Water Services to identify the appropriate design solutions, and to determine appropriate reimbursement/SDC credits for any over-sized sanitary sewer system infrastructure where applicable. These criteria are met.

16.110.030 - Service Availability

Approval of construction plans for new facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing sewer systems shall include certification by the City that existing or proposed sewer facilities are adequate to serve the development.

RESPONSE: The applicant acknowledges that certification by the City as described above is required prior to approval of construction plans and issuance of building permits. The criterion will be met.

Chapter 16.112 - WATER SUPPLY

16.112.010 - Required Improvements

Water lines and fire hydrants conforming to City and Fire District standards shall be installed to serve all building sites in a proposed development. All waterlines shall be connected to existing water mains or shall construct new mains appropriately sized and located in accordance with the Water System Master Plan.

RESPONSE: The applicant will extend and loop water service through the site including water lines, hydrants, and connections, as shown on the submitted Preliminary Composite Utility Plan (Sheet P10). These improvements are shown to be extended from the proposed Middlebrook subdivision, and have been appropriately sized and designed to meet all applicable standards. Therefore, the criterion is met.

16.112.020 - Design Standards

A. Capacity

Water lines providing potable water supply shall be sized, constructed, located and installed at standards consistent with this Code, the Water System Master Plan, the City's Design and Construction Manual, and with other applicable City standards and specifications, in order to adequately serve the proposed development and allow for future extensions.

B. Fire Protection

All new development shall comply with the fire protection requirements of Chapter 16.116, the applicable portions of Chapter 7 of the Community Development Plan, and the Fire District.

C. Over-Sizing

1. *When water mains will, without further construction, directly serve property outside a proposed development, gradual reimbursement may be used to equitably distribute the cost of that over-sized system.*

2. *Reimbursement shall be in an amount estimated by the City to be the proportionate share of the cost of each connection made to the water mains by property owners outside the development, for a period of ten (10) years from the time of installation of the mains. The boundary of the reimbursement area and the method of determining proportionate shares shall be determined by the City. Reimbursement shall only be made as additional connections are made and shall be collected as a surcharge in addition to normal connection charges.*

3. *When over-sizing is required in accordance with the Water System Master Plan, it shall be installed per the Water System Master Plan. Compensation for over-sizing may be provided through direct reimbursement, from the City, after mainlines have been accepted. Reimbursement of this nature*

would be utilized when the cost of over-sizing is for system wide improvements.

RESPONSE: All components of the proposed water system will be sized properly and oversized where necessary to serve potential future growth within the area, including extension of a public water line within the SW Brookman Road RoW frontage. The Applicant will work with the City to determine reimbursement/SDC credits as applicable for any oversized water supply infrastructure. The criteria are met.

16.112.030 - Service Availability

Approval of construction plans for new water facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing water systems shall include certification by the City that existing or proposed water systems are adequate to serve the development.

RESPONSE: The applicant acknowledges that certification by the City as described above is required prior to approval of construction plans and issuance of building permits. Therefore, this criterion will be met.

Chapter 16.114 - STORMWATER

16.114.010 - Required Improvements

Storm water facilities, including appropriate source control and conveyance facilities, shall be installed in new developments and shall connect to the existing downstream drainage systems consistent with the Comprehensive Plan and the requirements of the Clean Water Services water quality regulations contained in their Design and Construction Standards R&O 04-9, or its replacement.

RESPONSE: All components of the proposed stormwater facility, as shown on the preliminary plan set and identified as Tract E, have been appropriately sized and designed in accordance with all applicable City, State, DEQ and CWS standards. See also the Preliminary Storm Drainage Report submitted with this application. Therefore, this criterion is met.

16.114.020 - Design Standards

A. Capacity

Storm water drainage systems shall be sized, constructed, located, and installed at standards consistent with this Code, the Storm Drainage Master Plan Map, attached as Exhibit E, Chapter 7 of the Community Development Plan, other applicable City standards, the Clean Water Services Design and Construction standards R&O 04-9 or its replacement, and hydrologic data and improvement plans submitted by the developer.

B. On-Site Source Control

Storm water detention and groundwater recharge improvements, including but not limited to such facilities as dry wells, detention ponds, and roof top ponds shall be constructed according to Clean Water Services Design and Construction Standards.

C. Conveyance System

The size, capacity and location of storm water sewers and other storm water conveyance improvements shall be adequate to serve the development and accommodate upstream and downstream flow. If an upstream area discharges through the property proposed for development, the drainage system shall provide capacity to the receive storm water discharge from the upstream area. If downstream drainage systems are not sufficient to receive an increase in storm water caused by new development, provisions shall be made by the developer to increase the downstream capacity or to provide detention such that the new development will not increase the storm water caused by the new development.

RESPONSE: The proposed stormwater drainage system has been sized and designed in accordance with applicable City, State, DEQ and CWS standards. As shown in the attached Preliminary Storm Drainage Report, stormwater treatment will be provided on-site within Tract E using water quality swales, prior to being released to the adjacent Cedar Creek. Therefore, these criteria will be met.

16.114.030 - Service Availability

Approval of construction plans for new storm water drainage facilities pursuant to Chapter 16.106, and the issuance of building permits for new development to be served by existing storm water drainage systems shall include certification by the City that existing or proposed drainage facilities are adequate to serve the development.

RESPONSE: The applicant acknowledges that certification by the City as described above is required prior to approval of construction plans and issuance of building permits. As illustrated by the submitted plans and Preliminary Storm Drainage Report, these criteria will be met.

Chapter 16.116 - FIRE PROTECTION

16.116.010 - Required Improvements

When land is developed so that any commercial or industrial structure is further than two hundred and fifty (250) feet or any residential structure is further than five hundred (500) feet from an adequate water supply for fire

protection, as determined by the Fire District, the developer shall provide fire protection facilities necessary to provide adequate water supply and fire safety.

RESPONSE: Proposed fire protection facilities are included on the Preliminary Composite Utility Plan (Sheet P10). These improvements are appropriately sized and designed in accordance with applicable Oregon Fire Code, City of Sherwood building standards, and Tualatin Valley Fire and Rescue standards. Therefore, this criterion is met.

16.116.020 - Standards

A. Capacity

All fire protection facilities shall be approved by and meet the specifications of the Fire District, and shall be sized, constructed, located, and installed consistent with this Code, Chapter 7 of the Community Development Plan, and other applicable City standards, in order to adequately protect life and property in the proposed development.

B. Fire Flow

Standards published by the Insurance Services Office, entitled "Guide for Determination of Required Fire Flows" shall determine the capacity of facilities required to furnish an adequate fire flow. Fire protection facilities shall be adequate to convey quantities of water, as determined by ISO standards, to any outlet in the system, at no less than twenty (20) pounds per square inch residual pressure. Water supply for fire protection purposes shall be restricted to that available from the City water system. The location of hydrants shall be taken into account in determining whether an adequate water supply exists.

C. Access to Facilities

Whenever any hydrant or other appurtenance for use by the Fire District is required by this Chapter, adequate ingress and egress shall be provided. Access shall be in the form of an improved, permanently maintained roadway or open paved area, or any combination thereof, designed, constructed, and at all times maintained, to be clear and unobstructed. Widths, height clearances, ingress and egress shall be adequate for District firefighting equipment. The Fire District, may further prohibit vehicular parking along private accessways in order to keep them clear and unobstructed, and cause notice to that effect to be posted.

D. Hydrants

Hydrants located along private, accessways shall either have curbs painted yellow or otherwise marked prohibiting parking for a

distance of at least fifteen (15) feet in either direction, or where curbs do not exist, markings shall be painted on the pavement, or signs erected, or both, given notice that parking is prohibited for at least fifteen (15) feet in either direction.

RESPONSE: As described above, proposed fire protection facilities will be sized properly, constructed, located, and installed consistent with applicable Oregon Fire Code, City of Sherwood building standards, and Tualatin Valley Fire and Rescue standards. Therefore, this criterion is met.

16.116.030 - Miscellaneous Requirements

A. Timing of Installation

When fire protection facilities are required, such facilities shall be installed and made serviceable prior to or at the time any combustible construction begins on the land unless, in the opinion of the Fire District, the nature or circumstances of said construction makes immediate installation impractical.

B. Maintenance of Facilities

All on-site fire protection facilities, shall be maintained in good working order. The Fire District may conduct periodic tests and inspection of fire protection and may order the necessary repairs or changes be made within ten (10) days.

C. Modification of Facilities

On-site fire protection facilities, may be altered or repaired with the consent of the Fire District; provided that such alteration or repairs shall be carried out in conformity with the provisions of this Chapter.

RESPONSE: The applicant acknowledges the above in that Tualatin Valley Fire and Rescue may require installation of proposed fire protection facilities prior to or at the time of construction, may conduct inspections of fire protection facilities, and may consent to modification of fire protection facilities. These criteria are considered to be met.

Chapter 16.118 - PUBLIC AND PRIVATE UTILITIES

16.118.010 - Purpose

Public telecommunication conduits as well as conduits for franchise utilities including, but not limited to, electric power, telephone, natural gas, lighting, and cable television shall be installed to serve all newly created lots and developments in Sherwood.

16.118.020 - Standard

A. Installation of utilities shall be provided in public utility easements and shall be sized, constructed, located and installed consistent with this Code, Chapter 7 of the Community Development Code, and applicable utility company and City standards.

B. Public utility easements shall be a minimum of eight (8) feet in width unless a reduced width is specifically exempted by the City Engineer. An eight-foot wide public utility easement (PUE) shall be provided on private property along all public street frontages. This standard does not apply to developments within the Old Town Overlay.

C. Where necessary, in the judgment of the City Manager or his designee, to provide for orderly development of adjacent properties, public and franchise utilities shall be extended through the site to the edge of adjacent property(ies).

D. Franchise utility conduits shall be installed per the utility design and specification standards of the utility agency.

E. Public Telecommunication conduits and appurtenances shall be installed per the City of Sherwood telecommunication design standards.

F. Exceptions: Installation shall not be required if the development does not require any other street improvements. In those instances, the developer shall pay a fee in lieu that will finance installation when street or utility improvements in that location occur.

RESPONSE: As illustrated on the submitted Preliminary Plat, all proposed lots are encumbered by an 8-foot wide public utility easement along the adjacent street frontage, where these lots abut a local public street. These easements provide sufficient area for franchise utility installation, and meet the requirements specified above. Therefore, this criterion can be met.

16.118.030 - Underground Facilities

Except as otherwise provided, all utility facilities, including but not limited to, electric power, telephone, natural gas, lighting, cable television, and telecommunication cable, shall be placed underground, unless specifically authorized for above ground installation, because the points of connection to existing utilities make underground installation impractical, or for other reasons deemed acceptable by the City.

16.118.040 - Exceptions

Surface-mounted transformers, surface-mounted connection boxes and meter cabinets, temporary utility service facilities during construction, high

capacity electric and communication feeder lines, and utility transmission lines operating at fifty thousand (50,000) volts or more may be located above ground. The City reserves the right to approve location of all surface-mounted transformers.

RESPONSE: All new utility facilities are planned to be placed underground. It is noted that should a fee in lieu be required for construction of SW Brookman Road, overhead utilities may remain in place until such time as a County Capital Improvement Project completes required right-of-way improvements to ultimate line and grade, if deemed acceptable by the City. Therefore, these criteria can be met.

16.118.050 - Private Streets

The construction of new private streets, serving single family residential developments shall be prohibited unless it provides principal access to two or fewer residential lots or parcels i.e. flag lots. Provisions shall be made to assure private responsibility for future access and maintenance through recorded easements. Unless otherwise specifically authorized, a private street shall comply with the same standards as a public street identified in the Community Development Code and the Transportation System Plan. A private street shall be distinguished from public streets and reservations or restrictions relating to the private street shall be described in land division documents and deed records. A private street shall also be signed differently from public streets and include the words "Private Street".

RESPONSE: The application includes two private streets, with one located in each of Tracts C and D. Each private street will serve one single-family dwellings, and will be maintained, identified and recorded as required above. Therefore, these criteria are met.

Chapter 16.120 - SUBDIVISIONS

16.120.010 - Purpose

Subdivision regulations are intended to promote the public health, safety and general welfare; lessen traffic congestion; provide adequate light and air; prevent overcrowding of land; and facilitate adequate water supply, sewage and drainage.

16.120.020 - General Subdivision Provisions

A. Approval of a subdivision occurs through a two-step process: the preliminary plat and the final plat.

1. The preliminary plat shall be approved by the Approval Authority before the final plat can be submitted for approval consideration; and

2. *The final plat shall reflect all conditions of approval of the preliminary plat.*

RESPONSE: This application fulfills the requirement for the approval of the preliminary plat step of the two-step process. Following approval of the preliminary plat application, and subsequent engineering approvals as applicable, the applicant will submit a separate application for final plat approval that will demonstrate compliance with the conditions of approval from the preliminary plat approval. Therefore, these criteria can be met.

B. All subdivision proposals shall conform to all state regulations set forth in ORS Chapter 92, Subdivisions and Partitions.

RESPONSE The applicable subdivision and partition regulations contained in ORS Chapter 92 are implemented through the City's Municipal Code, and compliance with all applicable requirements is identified in this narrative. Therefore, this criterion is met.

C. Future re-division

When subdividing tracts into large lots, the Approval Authority shall require that the lots be of such size and shape as to facilitate future re-division in accordance with the requirements of the zoning district and this Division.

D. Future Partitioning

When subdividing tracts into large lots which may be resubdivided, the City shall require that the lots be of a size and shape, and apply additional building site restrictions, to allow for the subsequent division of any parcel into lots of smaller size and the creation and extension of future streets.

RESPONSE: No lots of a size or shape which would facilitate future re-division or future partitioning will be created through this development. These criteria are not applicable.

E. Lot averaging

Lot size may be averaged to allow lots less than the minimum lot size allowed in the underlying zoning district subject to the following regulations:

1. *The average lot area for all lots is not less than allowed by the underlying zoning district.*

2. *No lot created under this provision shall be less than 90 % of the minimum lot size allowed in the underlying zoning district.*

3. *The maximum lot size cannot be greater than 10 % of the minimum lot size.*

RESPONSE: As previously described, each of the lots meets the required dimensional standards of the MDRL Zone, with the exception that a small number of the lots (Lots 2, 9, 10, 13, 26, and 27) do not meet the minimum lot size, including both lot area and minimum lot width at the building line. In accordance with Section 16.144.030.B.1., the applicant is requesting an exception to these dimensional standards for those lots which do not meet the minimum requirement, to the maximum permitted 10% reduction, to allow for some level of flexibility in Final Plat design. However, the minimum lot size proposed is only approximately 6% below the minimum lot size at 4,722 square feet (Lot 27), with a minimum lot width at the building line of 45 feet (multiple lots). Please see the response to Section 16.144.030.B.1. for findings related to the exception criteria.

As the applicant is demonstrating compliance with the requirements of Section 16.144.030.B.1., the applicant is not utilizing the lot averaging standards of this Section.

F. Required Setbacks

All required building setback lines as established by this Code, shall be shown in the preliminary subdivision plat.

RESPONSE: Proposed building envelopes are shown on Sheet P4, Conceptual Building Setback Plan, of the submitted plan set. All of the 28 proposed lots are capable of supporting a detached single-family dwelling meeting the setbacks of the MDRL Zone. Therefore, this criterion is met.

G. Property Sales

No property shall be disposed of, transferred, or sold until required subdivision approvals are obtained, pursuant to this Code.

RESPONSE: The applicant acknowledges that individual lots may not be disposed of, transferred, or sold until the preliminary and final plat applications are approved and the final subdivision plat is recorded. This criterion will be met.

16.120.030 - Approval Procedure-Preliminary Plat

A. Approval Authority

1. *The approving authority for preliminary and final plats of subdivisions shall be in accordance with Section 16.72.010 of this Code.*

   a. *A subdivision application for 4-10 lots will follow a Type II review process.*
   b. *A subdivision application for 11-50 lots will follow a Type III review process.*

c. A subdivision application for over 50 lots will follow a Type IV review process.

2. Approval of subdivisions is required in accordance with this Code before a plat for any such subdivision may be filed or recorded with County. Appeals to a decision may be filed pursuant to Chapter 16.76.

RESPONSE: The proposed subdivision includes 28 residential lots, and will therefore follow a Type III review process. The applicant acknowledges the requirement that approval from the City is required prior to recordation of the final plat with Washington County. These criteria are considered to be met.

B. Phased Development

1. The Approval Authority may approve a time schedule for developing a subdivision in phases, but in no case shall the actual construction time period for any phase be greater than two years without reapplying for a preliminary plat.

2. The criteria for approving a phased subdivision review proposal are:

a. The public facilities shall be scheduled to be constructed in conjunction with or prior to each phase to ensure provision of public facilities prior to building occupancy;
b. The development and occupancy of any phase shall not be dependent on the use of temporary public facilities:

(1) For purposes of this subsection, a temporary public facility is an interim facility not constructed to the applicable City or district standard; and
(2) The phased development shall not result in requiring the City or other property owners to construct public facilities that were required as a part of the approval of the preliminary plat.

3. The application for phased development approval shall be reviewed concurrently with the preliminary plat application and the decision may be appealed in the same manner as the preliminary plat.

RESPONSE: The applicant is not requesting approval of the development in phases. These criteria are not applicable.

16.120.040 - Approval Criteria: Preliminary Plat

No preliminary plat shall be approved unless:

A. Streets and roads conform to plats approved for adjoining properties as to widths, alignments, grades, and other standards, unless the City determines that the public interest is served by modifying streets or road patterns.

B. Streets and roads held for private use are clearly indicated on the plat and all reservations or restrictions relating to such private roads and streets are set forth thereon.

C. The plat complies with applicable zoning district standards and design standards in Division II, and all provisions of Divisions IV, VI, VIII and IX. The subdivision complies with Chapter 16.128 (Land Division Design Standards).

D. Adequate water, sanitary sewer, and other public facilities exist to support the use of land proposed in the plat.

E. Development of additional, contiguous property under the same ownership can be accomplished in accordance with this Code.

F. Adjoining land can either be developed independently or is provided access that will allow development in accordance with this Code.

G. Tree and woodland inventories have been submitted and approved as per Section 16.142.060.

H. The plat clearly shows the proposed lot numbers, setbacks, dedications and easements.

I. A minimum of five percent (5%) open space has been provided per Section 16.44.010.B.8 (Townhome-Standards) or Section 16.142.030 (Parks, Open Spaces and Trees-Single Family Residential Subdivisions), if applicable.

RESPONSE: This written narrative includes responses to the applicable criteria listed above, demonstrating compliance with this section. Compliance is further demonstrated by the submitted preliminary plan set, and the relevant attachments including the storm drainage report, arborist report, biologists report, and geotechnical report, upon which these compliance statements are based. Accordingly, these standards are considered to be met.

Chapter 16.128 - LAND DIVISION DESIGN STANDARDS

16.128.010 - Blocks

A. Connectivity

1. Block Size

The length, width, and shape of blocks shall be designed to provide adequate building sites for the uses proposed, and for convenient access, circulation, traffic control and safety.

RESPONSE: As described throughout this written narrative, blocks and overall street layouts have been designed to create convenient access and circulation, while creating lots suitable for the construction of single-family detached dwelling units which meet the intent and purpose of the MDRL Zone. This criterion is considered to be met.

2. Block Length

Block length standards shall be in accordance with Section 16.108.040. Generally, blocks shall not exceed five-hundred thirty (530) feet in length, except blocks adjacent to principal arterial, which shall not exceed one thousand eight hundred (1,800) feet. The extension of streets and the formation of blocks shall conform to the Local Street Network map contained in the Transportation System Plan.

RESPONSE: As previously described, only one new interior block is created as part of this development, being SW Wapato Lake Drive between SW Trillium Lane in the north and SW White Oak Terrace in the west. As measured along the nearside right-of-way line, the proposed block length is approximately 745 feet. However, it is noted that due to the location of significant natural resources on the property, the block face generally forms the continuous hypotenuse of a triangular block as created and anticipated as part of the Middlebrook Subdivision approval. If measuring block length along the predominantly east-west versus north-south sections, block lengths measure approximately 506 feet and 239 feet respectively, in compliance with the requirements of this section. Similarly, the development constitutes the completion of the existing block created by the Middlebrook Subdivision located along SW Trillium Lane. Again, given the nature of the development, and the approved configuration dictated by the Middlebrook Subdivision, it is not considered practical to create a mid-block vehicular connection south of SW Trillium Lane. However, as noted in response to Section 16.128.20 below, a pedestrian connection matching that approved on the north side of SW Trillium Lane with the Middlebrook Subdivision is provided here, extending south between SW Trillium Lane and SW Wapato Lake Drive. The existing southern block of SW Wapato Lake Drive meets the block length standards as described above, while access to the public trail system is conveniently provided at the intersection of SW Wapato Lake Drive and SW Trillium Street. This meets the requirement that block lengths "*Generally*", shall not exceed five-hundred thirty There are no blocks a created along SW Brookman Road due to the location of significant natural resources and arterial access spacing restrictions. This criterion is met.

3. *Pedestrian and Bicycle Connectivity. Paved bike and pedestrian accessways shall be provided on public easements or right-of-way consistent with Figure 7.401.*

RESPONSE: The subject site contains an extensive network of trails, providing connections to the north, east, south, and west as demonstrated on the submitted preliminary plan set. These accessways will be located within public pedestrian easements, to ensure public access. This criterion is met.

B. Utilities Easements for sewers, drainage, water mains, electric lines, or other utilities shall be dedicated or provided for by deed. Easements shall be a minimum of ten (10) feet in width and centered on rear or side lot lines; except for tieback easements, which shall be six (6) feet wide by twenty (20) feet long on side lot lines at the change of direction.

RESPONSE: All new public utility mains required to serve the proposed development will be located within the rights-of-way adjacent to individual lots. An 8-foot-wide public utility easement is provided along the frontage of the lots to accommodate necessary franchise utilities. Further, a public utility easement is located over Tracts B and E, as well as over Tracts C and D, where appropriate for public utilities. Final easement locations will be determined in conjunction with the appropriate service providers based on the approved engineering designs and construction of the sewer trunk lines. Therefore, this criterion is met.

C. Drainages

Where a subdivision is traversed by a watercourse, drainage way, channel or street, drainage easements or rights-of-way shall be provided conforming substantially to the alignment and size of the drainage.

RESPONSE: Tract B within the development and as shown on the preliminary plan set submitted with the application contains the Cedar Creek drainage and its associated riparian areas and floodplain. It is anticipated that the Tract in its entirety will include stormwater drainage easements to Clean Water Services, in order to ensure accesses for public utility needs. It is anticipated that these easements will be required as a Condition of Approval. This criterion will be met.

16.128.020 - Pedestrian and Bicycle Ways

Pedestrian or bicycle ways may be required to connect cul-de-sacs, divide through an unusually long or oddly shaped block, or to otherwise provide adequate circulation.

RESPONSE: As described above, the proposed subdivision provides extensive pedestrian and bicycle circulation throughout the site, with sidewalks created on SW Trillium Lane and the extension of SW Wapato Lake Drive, and a community trail located along the north side of the Cedar Creek significant natural resource area. Connections to the Community Trail are provided

at the east and west ends of SW Wapato Lake Drive, with a direct connection to SW Brookman Road provided in the southwest corner of the site. To the east, the Community Trail will connect directly to the Community Trail provided within the Reserve at Cedar Creek subdivision, which in turn links to an extensive network of trails and sidewalks. Each of these trails will be located with public pedestrian and bicycle access easements, as required.

Additionally, as shown on the plan set submitted with this application, a pedestrian and bicycle accessway is provided between Lots 6/7 and 14/15 to connect SW Trillium Lane to SW Wapato Lake Drive, and reduce the block length for pedestrians and bicyclists per the requirements of this Section. The Middlebrook Subdivision was approved to provide a 15 ft. wide pedestrian access easement between its Lots 122/123 and 134/135 north of SW Trillium Lane, and this pedestrian easement will provide a continuous connection south to SW Wapato Lake Drive, and ultimately beyond to SW Brookman Road via the proposed Community Trail. Therefore, this criterion is met.

16.128.030 - Lots

A. Size and Shape

Lot size, width, shape, and orientation shall be appropriate for the location and topography of the subdivision or partition, and shall comply with applicable zoning district requirements, with the following exception:

1. Lots in areas not served by public sewer or water supply shall conform to any special County Health Department standards.

RESPONSE: As discussed previously, and shown within the submitted preliminary plan set, lot dimension and orientation are proposed consistent with the requirements of the MDRL Zone, with the allowance for a 10% reduction in lot size (lot area and width at the building line), consistent with the exception criteria of Section 16.144.030.B.1. All lots within the subdivision are to be served by public sewer and water supply. These criteria are met.

B. Access

All lots in a subdivision shall abut a public street, except as allowed for infill development under Chapter 16.68.

RESPONSE: As shown on the preliminary plan set and described in this written narrative, all lots abut a public street. Therefore, this criterion is satisfied.

C. Double Frontage

Double frontage and reversed frontage lots are prohibited except where essential to provide separation of residential development from railroads, traffic arteries, adjacent nonresidential uses, or to overcome

specific topographical or orientation problems. A five (5) foot wide or greater easement for planting and screening may be required.

RESPONSE: The proposed subdivision does not include any double frontage or reversed frontage lots. Therefore, this criterion does not apply.

D. Side Lot Lines Side lot lines shall, as far as practicable, run at right angles to the street upon which the lots face, except that on curved streets side lot lines shall be radial to the curve of the street.

RESPONSE: To the extent practicable, all side lot lines are perpendicular or radial to the fronting street, with the exception of Lots 25 and 28, which have street side lot lines, with access from small private street tracts running from the frontage street. These lots are oriented in this fashion due to the location of significant natural resources on the site, which compresses the lots at these locations such that appropriate lot depth can only be achieved through the use of a street side yard. Therefore, these criteria are met to the extent practicable.

E. Grading

Grading of building sites shall conform to the following standards, except when topography of physical conditions warrants special exceptions:

1. *Cut slopes shall not exceed one (1) and one-half (1 1/2) feet horizontally to one (1) foot vertically.*

2. *Fill slopes shall not exceed two (2) feet horizontally to one (1) foot vertically.*

RESPONSE: Proposed site grading is shown on the submitted Preliminary Grading and Erosion Control Plan Sheet P6. All site grading has been designed to comply with the above standards relating to cut and fill slopes, as will be demonstrated through the Grading Permit process. These criteria will be met.

Division VIII. - ENVIRONMENTAL RESOURCES

Chapter 16.134 - FLOODPLAIN (FP) OVERLAY

16.134.010 - Generally

Special resource zones are established to provide for preservation, protection, and management of unique natural and environmental resources in the City that are deemed to require additional standards beyond those contained elsewhere in this Code. Special resource zones may be implemented as underlying or overlay zones depending on patterns of property ownership and the nature of the resource. A property or properties may be within more than one resource zone. In addition, the City may

identify special resource areas and apply a PUD overlay zone in advance of any development in order to further protect said resources.

The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled, "The Flood Insurance Study for Washington County, Oregon and Incorporated Areas," (flood insurance study) dated November 4, 2016, with accompanying Flood Insurance Maps are hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study is on file with the Sherwood City Engineer at Sherwood City Hall.

16.134.020 - Purpose

The purpose of this ordinance is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by complying with the provisions of this chapter.

A. The FP zoning district is an overlay district that controls and regulates flood hazard areas in order to protect the public health, safety and general welfare; to reduce potential flood damage losses; and to protect floodways and natural drainageways from encroachment by uses which may adversely affect water quality and water flow and subsequent upstream or downstream flood levels. The FP zone shall be applied to all areas within the base flood, and shall supplement the regulations of the underlying zoning district.

B. FP zoning districts are areas within the base flood as identified by the Federal Emergency Management Agency (FEMA) in a Flood Insurance Study (FIS) and in Flood Insurance Rate Maps (FIRM) published for the City and surrounding areas, or as otherwise identified in accordance with Section 16.134.020C. These FEMA documents are adopted by reference as part of this Code, and are on file at the City.

C. When base flood elevation data is not available from the FIS or FIRM, the City shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, state, or other source, and standards developed by the FEMA, in order to administer the provisions of this Code.

RESPONSE: The site topography slopes from the north and south ends towards the interior of the site along the Cedar Creek riparian corridor, which flows from west to east near the south eastern corner of the site, and which separates the proposed development area in the north from SW Brookman Road to the south. The forested slopes from Cedar Creek and the small tributary in the south end range from 20 percent to 42 percent. The topography at the north end is generally flat within the pasture areas with a small depression in the northwest corner. The site

currently drains to Cedar Creek running through the center of the project which conveys storm water easterly and then north eventually releasing into the Tualatin River. The base flood elevation of Cedar Creek as it enters the south west corner of the site adjacent to SW Brookman Road is approximately 178.7 feet above MSL. The lowest elevation on the site is approximately 170 feet, at the northeastern corner. Therefore, these criteria are applicable.

16.134.030 – Greenways

The FP zoning districts overlaying the Rock Creek and Cedar Creek floodplains are designated greenways in accordance with Chapter 5 of the Community Development Plan. All development in these two floodplains shall be governed by the policies in Division V, Chapter 16.142 of this Code, in addition to the requirements of this Section and the Clean Water Services Design and Construction Standards R&O 07-20, or its replacement.

16.134.040 - Development Review and Floodplain Administrator Duties

A. The City Engineer is the designated local Floodplain Administrator and is responsible for maintaining local floodplain management records for the City.

B. Provided land is not required to be dedicated as per Section 16.134.030, a conditional use permit (CUP) is required before any use, construction, fill, or alteration of a floodplain, floodway, or watercourse, or any other development begins within any FP zone, except as provided in Section 16.134.050.

C. Application for a CUP for development in a floodplain shall conform to the requirements of Chapter 16.82 and may include, but is not limited to, plans and scale drawings showing the nature, location, dimensions, and elevations of the area in question, existing or proposed structures, fill, storage of materials, and drainage facilities.

D. The following specific information is required in a floodplain CUP application and shall be certified and verified by a registered civil engineer or architect. The City shall maintain such certifications as part of the public record. All certifications shall be based on the as-built elevations of lowest building floors.

1. Elevations in relation to the current FIRM and FIS of the lowest floor (including basement) of all structures;

2. Elevations in relation to the current FIRM and FIS to which any structure has been flood proofed.

3. *That the flood proofing methods for any structure meet the requirements of this section, Floodplain Structures.*

4. *Description of the extent to which any watercourse will be altered or relocated as a result of the proposed development.*

5. *A base flood survey and impact study made by a registered civil engineer.*

6. *Proof all necessary notifications have been sent to, and permits have been obtained from, those federal, state, or other local government agencies for which prior approval of the proposed development is required.*

7. *Any other information required by this section, by any applicable federal regulations, or as otherwise determined by the City to be necessary for the full and proper review of the application.*

E. The floodplain administrator shall review all development permits to determine if the proposed development is located in the floodway. If located in the floodway, assure that the encroachment provisions of Section 16.134.070.F are met.

F. Where base flood elevation data is provided through the Flood Insurance Study, FIRM or required under Section 16.134.020.C the local Floodplain Administrator shall:

1. *Obtain and record the actual elevation (in relation to mean sea level) of the lowest floor (including basement) of all new and substantially improved structures, and*

2. *If the structure has been floodproofed in accordance with Sections 16.134.090.A.3 and D.1.a, then obtain the elevation (in relation to mean sea level) to which the structure was floodproofed, and*

3. *Maintain all elevation and floodproofing certificates required under Section 16.134.040.D, and*

4. *Maintain for public inspection all records pertaining to the provisions of this ordinance.*

G. Where elevation data is not available as per subsection D of this section, or from other sources as per Section 16.134.020.C, a floodplain CUP shall be reviewed using other relevant data, as determined by the City, such as historical information, high water marks, and other evidence of past flooding. The City may

require utility structures and habitable building floor elevations, and building flood proofing, to be at least two feet above the probable base flood elevation, in such circumstances where more definitive flood data is not available.

H. The floodplain administrator shall:

1. Notify adjacent communities, the Department of Land Conservation and Development and other appropriate state and federal agencies, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration as required in Section 16.134.100.C.

2. Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

I. The floodplain administrator shall make interpretations where needed, as to exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation. Such appeals shall be granted consistent with the standards of Section 60.6 of the Rules and Regulations of the National Flood Insurance Program (44 CFR 59-76).

J. Variances to any standard within the floodplain overlay shall comply with the provisions of the Code of Federal Regulations (CFR) section 44 CFR 60.6(a)(1)—(7).

16.134.050 - Permitted Uses

In the FP zone the following uses are permitted outright, and do not require a CUP, provided that floodway flow, or floodplain capacity, will not be impeded, as determined by the City, and when greenway dedication is not required as per Section 16.134.030.

A. Agricultural uses, provided that associated structures are not allowed, except for temporary building and boundary fences that do not impede the movement of floodwaters and flood-carried materials.

B. Open space, park and recreational uses, and minor associated structures, if otherwise allowed in the underlying zoning district that do not impede the movement of floodwaters and flood-carried materials.

C. Public streets and appurtenant structures, and above and underground utilities, subject to the provisions of Sections 16.134.080 and 16.134.090.

D. Other accessory uses allowed in the underlying zoning district that do not involve structures, and will not, in the City's determination, materially alter the stability or storm drainage absorption capability of the floodplain.

16.134.060 - Conditional Uses

In the FP zone the following uses are permitted as conditional uses, subject to the provisions of this Section and Chapter 16.82, when greenway dedication is not required as per this Section.

Greenways:

A. Any permitted or conditional use allowed in the underlying zoning district, when located in the flood fringe only, as specifically defined by this Code.

16.134.070 - Prohibited Uses

In the FP zone the following uses are expressly prohibited:

A. The storage or processing of materials that are buoyant, flammable, contaminants, explosive, or otherwise potentially injurious to human, animal or plant life.

B. Public and private sewerage treatment systems, including drainfields, septic tanks and individual package treatment plants.

C. Any use or activity not permitted in the underlying zoning district.

D. Any use or activity that, in the City's determination, will materially alter the stability or storm drainage absorption capability of the floodplain.

E. Any use or activity that, in the City's determination, could create an immediate or potential hazard to the public health, safety and welfare, if located in the floodplain.

F. Any use, activity, or encroachment located in the floodway, including fill, new construction, improvements to existing developments, or other development, except as otherwise allowed

by Section 16.134.050 and unless certification by a registered professional engineer or architect is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the use, activity, or encroachment will not result in any increase to flood levels during the occurrence of the base flood discharge.

a. If paragraph F of this section is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard provisions of Sections 16.134.080 and .090, or ASCE 24, whichever is more stringent.

G. The storage of recreational vehicles. This is the most restrictive provision wherein.

16.134.080 - Floodplain Development

A. Floodplain Alterations

1. Floodplain Survey

The floodplain, including the floodway and flood fringe areas, shall be surveyed by a registered land surveyor or civil engineer, and approved by the City, based on the findings of the flood insurance study and other available data. Such delineation shall be based on the current FIRM and FIS data and be field-located from recognized valid benchmarks.

2. Grading Plan

Alteration of the existing topography of floodplain areas may be made upon approval of a grading plan by the City. The plan shall include both existing and proposed topography and a plan for alternate drainage. Contour intervals for existing and proposed topography shall be included and shall be not more than one foot for ground slopes up to five percent (5%) and for areas immediately adjacent to a stream or drainage way, two feet for ground slopes between five and ten percent (5% to 10%), and five feet for greater slopes.

3. Fill and Diked Lands

a. Proposed floodplain fill or diked lands may be developed if a site plan for the area to be altered within the floodplain is prepared and certified by a registered civil engineer and approved by the Commission pursuant to the applicable provisions of this Code.

b. Vehicular access shall be provided from a street above the elevation of the base flood to any proposed fill or dike area if the area supports structures for human occupancy. Unoccupied fill or dike areas shall be provided with emergency vehicle access.

4. Alteration Site Plan

a. The certified site plan prepared by a registered civil engineer or architect for an altered floodplain area shall show that:

(1) Proposed improvements will not alter the flow of surface water during flooding such as to cause a compounding of flood hazards or changes in the direction or velocity of floodwater flow.

(2) No structure, fill, storage, impervious surface or other uses alone, or in combination with existing or future uses, will materially reduce the capacity of the floodplain or increase in flood heights.

(3) Proposed floodplain fill or diked areas will benefit the public health, safety and welfare and incorporate adequate erosion and storm drainage controls, such as pumps, dams and gates.

(4) No serious environmental degradation shall occur to the natural features and existing ecological balance of upstream and downstream areas.

(5) On-going maintenance of altered areas is provided so that flood-carrying capacity will not be diminished by future erosion, settling, or other factors.

b. Applicants must obtain a conditional letter of map revision (CLOMR) from FEMA before any encroachment, including fill, new construction, substantial improvement, or other development, in the regulatory floodway is permitted. Applicants are responsible for preparing technical data to support the CLOMR application and paying any processing or application fees to FEMA.

RESPONSE: The applicant has obtained the base flood elevation from FEMA Maps for the site and Cedar Creek, and has mapped the flood elevation on plans submitted with the application. As designed, no permanent impacts to the Cedar Creek flood plain, which is proposed to be

contained entirely within the boundaries of Tract B, are anticipated and therefore the requirements listed above generally are not applicable to the application. Pedestrian and bicycle trails within the flood plain will utilize existing formed hard surface areas, including the crossing of Cedar Creek, which will utilize the existing driveway culvert crossing. Uses in the floodplain area will be limited to the pedestrian and bicycle trail, and temporary impacts to the flood plain for public utilities, both of which are identified as permitted uses under Section 16.134.050.B. and C. respectively. The above criteria, as applicable, can be met.

5. Subdivisions and Partitions

All proposed subdivisions or partitions including land within an FP zone must establish the boundaries of the base flood by survey and dedicate said land as per Section 16.134.030. The balance of the land and development must:

a. Be designed to include adequate drainage to reduce exposure to flood damage, and have public sewer, gas, electrical and other utility systems so located and constructed to minimize potential flood damage, as determined by the City.

b. Provide for each parcel or lot intended for structures, a building site which is at or above the base flood elevation, and meets all setback standards of the underlying zoning district.

c. Where base flood elevation data is not provided, or is not available from an authoritative source, it shall be generated by the applicant for subdivision proposals and other proposed developments which contain at least fifty (50) lots or five acres, whichever is less.

RESPONSE: As stated above, the applicant has obtained the base flood elevation from FEMA Maps for the site and Cedar Creek, and has mapped the flood elevation on plans submitted with the application. All aspects of the subdivision have been designed to include adequate drainage to reduce exposure to flood damage, and have public sewer, gas, electrical and other utility systems so located and constructed to minimize potential flood damage, as will be determined by the City and appropriate jurisdictional districts through the review of final engineering plans. Each residential lot within the subdivision contains a building site which is above the delineated base flood elevation, and meets all setback standards of the MDRL. These criteria will be met.

16.134.090 - Floodplain Structures

Structures in the FP zone permitted in accordance with this section, shall be subject to the following conditions, in addition to the standards of the underlying zoning district:

A. Generally

1. *All structures, including utility equipment, and manufactured housing dwellings, shall be anchored to prevent lateral movement, floatation, or collapse during flood conditions, and shall be constructed of flood-resistant materials, to standards approved by the City, State Structural and Plumbing Specialty Codes and applicable building codes.*

2. *The lowest floor elevation of a structure designed for human occupancy must be at least one and one-half feet above the base flood elevation and the building site must comply with the provisions of Section 16.134.080.A.*

3. *The lower portions of all structures shall be flood proofed according to the provisions of the State Structural and Plumbing Specialty Code to an elevation of at least one and one-half feet above the base flood elevation.*

4. *The finished ground elevation of any under floor crawl space shall be above the grade elevation of an adjacent street, or natural or approved drainage way unless specifically approved by the City. A positive means of drainage from the low point of such crawl space shall be provided.*

5. *All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.*

RESPONSE: All residential structures located on the site will be situated such that all construction is located at least one and one-half feet above the base flood elevation. Utilities and other service structures such as outfall locations will either be elevated above the flood plain, or will be anchored to prevent lateral movement, floatation, or collapse during flood conditions, and will be constructed of flood-resistant materials. All on-site construction will minimize flood damage using appropriate construction techniques. These criteria will be met.

B. Utilities

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

2. *Electrical service equipment, or other utility structures, shall be constructed at or above the base flood elevation. All openings in utility structures shall be sealed and locked.*

3. *Water supply and sanitary sewer systems (not prohibited under section 16.134.070.B) shall be approved by the Washington County Health Department, and shall be designed to minimize or eliminate the infiltration of floodwaters into the systems, or any discharge from systems into floodwaters.*

    a. *On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding consistent with Washington County Health Authority and Oregon Department of Environmental Quality.*

RESPONSE: While the final design of utilities has not yet been reviewed or approved by the appropriate jurisdictional districts at this time, it is anticipated that utilities including water and sanitary sewer will be constructed within the area of the Cedar Creek flood plain. All water supply and sanitary sewer systems will be designed and permitted to meet or exceed the standards of the applicable jurisdictional district, and approved by the Washington County Health Department. These systems will be designed to minimize or eliminate the infiltration of floodwaters into the systems, or any discharge from systems into floodwaters. These criteria will be met.

C. Residential Structures

1. *All residential structures shall have the lowest floor, including basement, elevated to at least one and one-half feet above the base flood elevation.*

2. *Fully enclosed areas below the lowest floor that are subject to flooding are not permitted unless they are designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered engineer or architect, or must meet or exceed the following minimum criteria:*

    a. *A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.*

    b. *The bottom of all openings shall be no higher than one foot above grade.*

    c. *Openings may be equipped with screens, louvers, or other coverings or devices, provided they permit the automatic entry and exit of floodwaters.*

3. *Shall be constructed with materials resistant to flood damage.*

RESPONSE: All residential structures located on the site will be situated such that all construction is located at least one and one-half feet above the base flood elevation. This criterion is will be met, and will be confirmed at the time of building permit approval.

D. Non-Residential Construction

1. All commercial, industrial or other non-residential structures shall have either the lowest floor, including basement, elevated to the level of the base flood elevation; or, together with attendant utility and sanitary facilities, shall:

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

b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

c. Be certified by a Registered Professional Engineer or Architect that the design and methods of construction are in accordance with accepted standards of practice for meeting all provisions of this Section. A record of such certificates shall be maintained by the Floodplain Administrator in accordance with Section 16.134.040.A.

d. Nonresidential structures that are elevated and not flood proofed must meet the same standards for space below the lowest floor as per Section 16.134.090.C.2.

RESPONSE: All structures proposed to be located on the site are for residential, rather than commercial, industrial or other non-residential uses. This criterion is not applicable.

E. Manufactured Dwellings

1. Manufactured dwellings supported on solid foundation walls shall be constructed with flood openings that comply with paragraph C.2 of this section;

2. The bottom of the longitudinal chassis frame beam in A zones (excluding coastal A zones), shall be at or above BFE;

3. The manufactured dwelling shall be anchored to prevent flotation, collapse, and lateral movement during the base flood. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA's "Manufactured Home Installation in

Flood Hazard Areas" guidebook for additional techniques), and;

4. *Electrical crossover connections shall be a minimum of 12 inches above BFE.*

RESPONSE: No manufactured dwellings are proposed to be located on the site. This criterion is not applicable.

F. Recreational Vehicles

Except where prohibited under Section 16.134.070.G Recreational vehicles placed on sites are required to:

1. *Be on the site for fewer than 180 consecutive days, and*

2. *Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or*

3. *Meet the requirements of paragraph E of this section and the elevation and anchoring requirements for manufactured dwellings.*

RESPONSE: No recreational vehicles are proposed to be located on the site. This criterion is not applicable.

16.134.100 - Additional Requirements

A. *Dimensional standards or developments in the FP zone are the same as in the underlying zoning district, except as provided in Section 16.134.100.*

B. *Approval of a site plan pursuant to Chapter 16.90 that includes portions of the FP overlay may be conditioned by the City to protect the best interests of the surrounding area or the community as a whole, and to carry out the terms of the Comprehensive Plan. These conditions may include, but are not limited to:*

1. *Increasing the required lot sizes, yard dimensions, modifying street widths, or off-street parking spaces.*

2. *Limiting the height, size, or location of buildings.*

3. *Controlling the location and number of vehicle access points.*

4. *Limiting the number, size, location, or lighting of signs.*

5. *Requiring diking, fencing, screening, landscaping, or other facilities to protect the proposed development, or any adjacent or nearby property.*

6. *Designating sites for open space or water retention purposes.*

7. *Construction, implementation, and maintenance of special drainage facilities and activities.*

RESPONSE: No activities are proposed within the Cedar Creek floodplain which would necessitate the imposition of Conditions of Approval under provisions 1. through 5. and 7 above. The entirety of the delineated 100-year flood plain will be located within an open space tract(s), meeting the intent of 6. above. These criteria are met or are otherwise not applicable.

C. FEMA Notification.

1. *Notify FEMA within six months of project completion when a conditional letter of map revision (CLOMR) has been obtained from FEMA or when development altered a watercourse, modified floodplain boundaries, or modified base flood elevations. This notification shall be provided as a letter of map revision (LOMR).*

2. *The applicant is responsible for preparing technical data to support the LOMR application and paying any processing or application fees to FEMA. 3. The floodplain administrator is under no obligation to sign the Community Acknowledgement Form, which is part of the CLOMR/LOMR application, until the applicant demonstrates that the project will or has met the requirements of this Code and all applicable state and federal laws.*

RESPONSE: No activities are proposed within the Cedar Creek floodplain which would necessitate the requirement for a LOMA, CLOMR, or LOMR. This criterion is not applicable.

Chapter 16.142 - PARKS, TREES AND OPEN SPACES

16.142.010 - Purpose

This Chapter is intended to assure the provision of a system of public and private recreation and open space areas and facilities consistent with this Code and applicable portions of Chapter 5 of the Community Development Plan Part 2. The standards of this section do not supersede the open space

requirements of a Planned Unit Development, found in Chapter 16.40 - Planned Unit Development (PUD).

RESPONSE: The subject site includes open space areas complying with the intent of this Code. This application is not submitted as a Planned Unit Development; therefore, the open space standards of this section apply.

16.142.030 - Single-Family or Duplex Residential Subdivisions

A. A minimum of five percent (5%) of the net buildable site (after exclusion of public right-of-way and environmentally constrained areas) shall be maintained as "open space". Open space must include usable areas such as public parks, swimming and wading pools, grass areas for picnics and recreational play, walking paths, and other like space. The following may not be used to calculate open space:

1. Required yards or setbacks.

2. Required visual corridors.

3. Required sensitive areas and buffers.

4. Any area required to meet a standard found elsewhere in this code.

RESPONSE: Based on the definition of Net Developable Site within the City of Sherwood Municipal Code, the net developable area of the site is approximately 166,919 square feet (3.83 acres), and accordingly this section requires the creation of 5% of the net buildable area, or 8,346 square feet (0.19 acres), of open space. The development, as illustrated on the Conceptual Open Space Plan (Sheet P5), is currently shown to include approximately 32,069 square feet (19.2% of net buildable area/0.74 acres) of additional open space outside of required yards/setbacks, Sensitive Areas, Vegetated Corridor, Visual Corridor, and 100-Year Flood Plain. However, this open space area is required to be reduced by 850 square feet to accommodate the requirements of Section 16.144.030.B.1., for a total additional open space provision of 31,219 square feet (18.7% of net buildable area/0.72 acres)

The additional 31,219 square feet of open space areas are located within Tract B, including the pedestrian paths located adjacent to, but outside of, the natural resource areas associated with Cedar Creek, and the pocket park area at the north east corner of the site. An additional pocket park is located within Tract A. The open space will primarily be improved with a network of connected pedestrian trails not otherwise required by the Code, consistent with Section 16.142.030.A., which includes walking paths as an approved improvement. In total, these areas will provide for approximately 0.25 lineal miles of pedestrian trails, not counting sidewalks, accessible to both residents and the wider community. The proposed pedestrian connection between SW Trillium Lane and SW Wapato Lake Drive is not included in these numbers, as it is otherwise required by the code to meet connectivity requirements. Due to the creek crossing

between the northern portion of the site and SW Brookman Road, and the multiple proposed links to properties to the north, east and west, it is anticipated that the trails will be heavily used by the public for circulation within and through the development. Due to the trail locations, numerous educational and recreational opportunities will also be available for passive enjoyment of Cedar Creek and its associated riparian areas. This requirement can and will be met.

B. Enhanced streetscapes such as "boulevard treatments" in excess of the minimum public street requirements may count toward a maximum of 10,000 square feet of the open space requirement.

1. Example: if a 52-foot-wide right-of-way [ROW] is required for a 1,000 foot-long street and a 62-foot wide ROW with 5-foot additional plantings/meandering pathway is provided on each side of the street, the additional 10-foot-wide area x 1,000 linear feet, or 10,000 square feet, counts toward the open space requirement.

RESPONSE: The subdivision and street designs do not include boulevard treatments. This criterion is not applicable.

C. The open space shall be conveyed in accordance with one of the following methods:

1. By dedication to the City as public open space (if acceptable to the City). Open space proposed for dedication to the City must be acceptable to the City Manager or the Manager's designee with regard to the size, shape, location, improvement, environmental condition, and budgetary and maintenance abilities;

2. By leasing or conveying title (including beneficial ownership) to a corporation, homeowners' association or other legal entity, with the City retaining the development rights to the open space. The terms of such lease or other instrument of conveyance must include provisions (e.g., maintenance, property tax payment, etc.) suitable to the City.

RESPONSE: In accordance with 2. above, the open space areas and other tracts, including Tracts B, C, D, E, and F are anticipated to be conveyed to a future homeowner's association per C.2. above. However, if requested by the City or other appropriate jurisdictional district, the open spaces could potentially be publicly dedicated. Therefore, this criterion can be met.

D. The density of a single-family residential subdivision shall be calculated based on the net buildable site prior to exclusion of open space per this Section.

1. *Example: a 40,000 square foot net buildable site would be required to maintain 2,000 square feet (5%) of open space but would calculate density based on 40,000 square feet.*

RESPONSE: The density of the proposed subdivision was calculated using the net buildable site area, prior to the removal of the 19.2% open space provided. This criterion is met.

E. If a proposed residential subdivision contains or is adjacent to a site identified as "parks" on the Acquisition Map of the Parks Master Plan (2006) or has been identified for acquisition by the Sherwood Parks and Recreation Board, establishment of open space shall occur in the designated areas if the subdivision contains the park site, or immediately adjacent to the parks site if the subdivision is adjacent to it.

RESPONSE: The Brookman Addition Concept Plan does not identify a park site within or immediately adjacent to the development site. This criterion can be met.

F. If the proposed residential subdivision does not contain or is not adjacent to a site identified on the Parks Master Plan map or otherwise identified for acquisition by the Parks and Recreation Board, the applicant may elect to convey off-site park/open space.

G. This standard does not apply to a residential partition provided that a development may not use phasing or series partitions to avoid the minimum open space requirement. A partition of land that was part of an approved partition within the previous five (5) years shall be required to provide the minimum five percent (5%) open space in accordance with subsection (A) above.

RESPONSE: The applicant has not elected to convey off site park/open space. However, it is noted that if requested by the City or other appropriate jurisdictional district, the open spaces within the development could potentially be publicly dedicated. The above criteria do not apply.

H. The value of the open space conveyed under Subsection (A) above may be eligible for Parks System Development Charges (SDCs) credits based on the methodology identified in the most current Parks and Recreation System Development Charges Methodology Report.

RESPONSE: Eligibility for System Development Charges (SDCs) credits will be assessed if and when open space is conveyed, using the methodology identified in the most current Parks and Recreation System Development Charges Methodology Report. The criterion can be met as applicable.

16.142.040 - Visual Corridors

A. Corridors Required

New developments located outside of the Old Town Overlay with frontage on Highway 99W, or arterial or collector streets designated on Figure 8-1 of the Transportation System Plan shall be required to establish a landscaped visual corridor according to the following standards:

Highway 99W: 25 feet
Arterial: 15 feet
Collector: 10 feet

In residential developments where fences are typically desired adjoining the above described major street the corridor may be placed in the road right-of-way between the property line and the sidewalk. In all other developments, the visual corridor shall be on private property adjacent to the right-of-way.

B. Landscape Materials

The required visual corridor areas shall be planted as specified by the review authority to provide a continuous visual and/or acoustical buffer between major streets and developed uses. Except as provided for above, fences and walls shall not be substituted for landscaping within the visual corridor. Uniformly planted, drought resistant street trees and ground cover, as specified in Section 16.142.060, shall be planted in the corridor by the developer. The improvements shall be included in the compliance agreement. In no case shall trees be removed from the required visual corridor.

C. Establishment and Maintenance

Designated visual corridors shall be established as a portion of landscaping requirements pursuant to Chapter 16.92. To assure continuous maintenance of the visual corridors, the review authority may require that the development rights to the corridor areas be dedicated to the City or that restrictive covenants be recorded prior to the issuance of a building permit.

D. Required Yard

Visual corridors may be established in required yards, except that where the required visual corridor width exceeds the required yard width, the visual corridor requirement shall take precedence. In no case shall buildings be sited within the required visual corridor, with the exception of front porches on townhomes, as permitted in Section 16.44.010(E)(4)(c).

E. Pacific Highway 99W Visual Corridor

1. Provide a landscape plan for the highway median paralleling the subject frontage. In order to assure continuity, appropriate plant materials and spacing, the plan shall be coordinated with the City Planning Department and ODOT.

2.Provide a visual corridor landscape plan with a variety of trees and shrubs. Fifty percent (50%) of the visual corridor plant materials shall consist of groupings of at least five (5) native evergreen trees a minimum of ten (10) feet in height each, spaced no less than fifty (50) feet apart, if feasible. Deciduous trees shall be a minimum of four (4) inches DBH and twelve (12) feet high, spaced no less than twenty-five (25) feet apart, if feasible.

RESPONSE: SW Brookman Road is classified as an Arterial street; therefore a 15-foot landscaped visual corridor is required. As shown on the preliminary plat, a 15-foot wide visual corridor is provided along the SW Brookman Road frontage, except where Tract B (containing Cedar Creek and associated flood plain and riparian areas) intersects the SW Brookman Road right-of-way. These visual corridors are identified as Tracts F and G on the Preliminary Plat, as opposed to being provided within required yards, and are proposed to be landscaped in accordance with the requirements of this section. Therefore, this criterion is met.

16.142.050 - Park Reservation

Areas designated on the Natural Resources and Recreation Plan Map, in Chapter 5 of the Community Development Plan, which have not been dedicated pursuant to Section 16.142.030 or 16.134.020, may be required to be reserved upon the recommendation of the City Parks Board, for purchase by the City within a period of time not to exceed three (3) years.

RESPONSE: The Community Development Plan does not include the Brookman Addition area. However, the site is located within the adopted Brookman Addition Concept Plan Area which illustrates the conceptual location of natural resource areas. If requested by the City or other appropriate jurisdictional district, the open spaces within the development could however potentially be publicly dedicated or purchased. The criterion can be met.

16.142.060 - Street Trees

A. Installation of Street Trees on New or Redeveloped Property.

Trees are required to be planted to the following specifications along public streets abutting or within any new development or re-development. Planting of such trees shall be a condition of development approval. The City shall be subject to the same

standards for any developments involving City-owned property, or when constructing or reconstructing City streets. After installing street trees, the property owner shall be responsible for maintaining the street trees on the owner's property or within the right-of-way adjacent to the owner's property.

1. *Location: Trees shall be planted within the planter strip along a newly created or improved streets. In the event that a planter strip is not required or available, the trees shall be planted on private property within the front yard setback area or within public street right-of-way between front property lines and street curb lines or as required by the City.*

2. *Size: Trees shall have a minimum trunk diameter of two (2) caliper inches, which is measured six inches above the soil line, and a minimum height of six (6) feet when planted.*

3. *Types: Developments shall include a variety of street trees. The trees planted shall be chosen from those listed in 16.142.080 of this Code.*

4. *Required Street Trees and Spacing:*

    a. *The minimum spacing is based on the maximum canopy spread identified in the recommended street tree list in section 16.142.080 with the intent of providing a continuous canopy without openings between the trees. For example, if a tree has a canopy of forty (40) feet, the spacing between trees is forty (40) feet. If the tree is not on the list, the mature canopy width must be provided to the planning department by a certified arborist.*
    b. *All new developments shall provide adequate tree planting along all public streets. The number and spacing of trees shall be determined based on the type of tree and the spacing standards described in a. above and considering driveways, street light locations and utility connections. Unless exempt per c. below, trees shall not be spaced more than forty (40) feet apart in any development.*
    c. *A new development may exceed the forty-foot spacing requirement under section b. above, under the following circumstances:*

        (1) Installing the tree would interfere with existing utility lines and no substitute tree is appropriate for the site; or
        (2) There is not adequate space in which to plant a street tree due to driveway or street light locations, vision clearance or utility connections, provided the

driveways, street light or utilities could not be reasonably located elsewhere so as to accommodate adequate room for street trees; and

(3) The street trees are spaced as close as possible given the site limitations in (1) and (2) above.

(4) The location of street trees in an ODOT or Washington County right-of-way may require approval, respectively, by ODOT or Washington County and are subject to the relevant state or county standards.

(5) For arterial and collector streets, the City may require planted medians in lieu of paved twelve foot wide center turning lanes, planted with trees to the specifications of this subsection.

RESPONSE: The Preliminary Street Tree and Open Space Planting Plan (Sheet L1) of the submitted plan set shows the location, spacing, and species of street trees proposed within the development. The Preliminary Street Tree and Open Space Planting Plan demonstrates compliance with the above requirements. Accordingly, these criteria are met.

B. Removal and Replacement of Street Trees.

The removal of a street tree shall be limited and in most cases, necessitated by the tree. A person may remove a street tree as provided in this section. The person removing the tree is responsible for all costs of removal and replacement. Street trees less than five (5) inches DBH can be removed by right by the property owner or his or her assigns, provided that they are replaced. A street tree that is removed must be replaced within six (6) months of the removal date.

1. Criteria for All Street Tree Removal for trees over five (5) inches DBH. No street tree shall be removed unless it can be found that the tree is:

a. *Dying, becoming severely diseased, or infested or diseased so as to threaten the health of other trees, or*
b. *Obstructing public ways or sight distance so as to cause a safety hazard, or*
c. *Interfering with or damaging public or private utilities, or*
d. *Defined as a nuisance per City nuisance abatement ordinances.*

2. Street trees between five (5) and ten (10) inches DBH may be removed if any of the criteria in 1. above are met and a tree removal permit is obtained.

a. The Tree Removal Permit Process is a Type I land use decision and shall be approved subject to the following criteria:

(1) The person requesting removal shall submit a Tree Removal Permit application that identifies the location of the tree, the type of tree to be removed, the proposed replacement and how it qualifies for removal per Section 1. above.
(2) The person shall post a sign, provided by the City, adjacent to the tree for ten (10) calendar days prior to removal that provides notice of the removal application and the process to comment on the application.
(3) If an objection to the removal is submitted by the City or to the City during the ten (10) calendar day period, an additional evaluation of the tree will be conducted by an arborist to determine whether the tree meets the criteria for street tree removal in Section 1. above. The person requesting the Tree Removal Permit shall be responsible for providing the arborist report and associated costs.
(4) Upon completion of the additional evaluation substantiating that the tree warrants removal per Section 1. above or if no objections are received within the ten-day period, the tree removal permit shall be approved.
(5) If additional evaluation indicates the tree does not warrant removal, the Tree Removal Permit will be denied.

3. Street trees over ten (10) inches DBH may be removed through a Type I review process subject to the following criteria.

a. The applicant shall provide a letter from a certified arborist identifying:

(1) The tree's condition,
(2) How it warrants removal using the criteria listed in Section 1. above, and identifying any reasonable actions that could be taken to allow the retention of the tree.

b. The applicant shall provide a statement that describes whether and how the applicant sought assistance from the City, HOA or neighbors to address any issues or actions that would enable the tree to be retained.
c. The person shall post a sign, provided by the City, adjacent to the tree for ten (10) calendar days prior to removal that provides notice of the removal application and the process to comment on the application.

d. Review of the materials and comments from the public confirm that the tree meets the criteria for removal in Section 1. above.

RESPONSE: The application does not include the removal of existing street trees. The above criteria are not applicable. However, it is noted that future homeowners will be subject to the requirements of this section.

C. Homeowner's Association Authorization.

The Planning Commission may approve a program for the adoption, administration and enforcement by a homeowners' association (HOA) of regulations for the removal and replacement of street trees within the geographic boundaries of the association.

1. *An HOA that seeks to adopt and administer a street tree program must submit an application to the City. The application must contain substantially the following information:*

    a. *The HOA must be current and active. The HOA should meet at least quarterly and the application should include the minutes from official HOA Board meetings for a period not less than eighteen (18) months (six (6) quarters) prior to the date of the application.*
    b. *The application must include proposed spacing standards for street trees that are substantially similar to the spacing standards set forth in 16.142.060.A above.*
    c. *The application must include proposed street tree removal and replacement standards that are substantially similar to the standards set forth in 16.142.060.B above.*
    d. *The application should include a copy of the HOA bylaws as amended to allow the HOA to exercise authority over street tree removal and replacement, or demonstrate that such an amendment is likely within ninety (90) days of a decision to approve the application.*
    e. *The application should include the signatures of not less than seventy-five (75) percent of the homeowners in the HOA in support of the application.*

2. *An application for approval of a tree removal and replacement program under this section shall be reviewed by the City through the Type IV land use process. In order to approve the program, the City must determine:*

    a. *The HOA is current and active.*

b. The proposed street tree removal and replacement standards are substantially similar to the standards set forth in 16.142.060.B above.
c. The proposed street tree spacing standards are substantially similar to the standards set forth in 16.142.060.A above.
d. The HOA has authority under its bylaws to adopt, administer and enforce the program.
e. The signatures of not less than seventy-five (75) percent of the homeowners in the HOA in support of the application.

3. A decision to approve an application under this section shall include at least the following conditions:

a. Beginning on the first January 1 following approval and on January 1 every two (2) years thereafter, the HOA shall make a report to the city planning department that provides a summary and description of action taken by the HOA under the approved program. Failure to timely submit the report that is not cured within sixty (60) days shall result in the immediate termination of the program.

b. The HOA shall comply with the requirements of Section 12.20 of the Sherwood Municipal Code.

4. The City retains the right to cancel the approved program at any time for failure to substantially comply with the approved standards or otherwise comply with the conditions of approval.

a. If an HOA tree removal program is canceled, future tree removals shall be subject to the provisions of section 16.142.060.
b. A decision by the City to terminate an approved street tree program shall not affect the validity of any decisions made by the HOA under the approved program that become final prior to the date the program is terminated.
c. If the city amends the spacing standards or the removal and replacement standards in this section (SZCDC 16.142.060) the City may require that the HOA amend the corresponding standards in the approved street tree program.

5. An approved HOA tree removal and replacement program shall be valid for five (5) years; however the authorization may be extended as approved by the City, through a Type II Land Use Review.

RESPONSE: No street trees are proposed for removal as part of this development. In the future, a tree removal and replacement program managed by a homeowners' association (HOA), may be desirable, but it is not part of this application. The street trees are planned to be in public rights-of-way and by law become the responsibility of the future abutting property owner to maintain, unless another legal entity such as a HOA assumes responsibility. These criteria do not apply to this application.

D. Exemption from Replacing Street Trees.

A street tree that was planted in compliance with the Code in effect on the date planted and no longer required by spacing standards of section A.4. above may be removed without replacement provided:

1. *Exemption is granted at the time of street tree removal permit or authorized homeowner's association removal per Section 16.142.060.C. above.*

2. *The property owner provides a letter from a certified arborist stating that the tree must be removed due to a reason identified in the tree removal criteria listed in Section 16.142.060.B.1. above, and*

3. *The letter describes why the tree cannot be replaced without causing continued or additional damage to public or private utilities that could not be prevented through reasonable maintenance.*

E. Notwithstanding any other provision in this section, the city manager or the manager's designee may authorize the removal of a street tree in an emergency situation without a tree removal permit when the tree poses an immediate threat to life, property or utilities. A decision to remove a street tree under this section is subject to review only as provided in ORS 34.100.

F. Trees on Private Property Causing Damage.

Any tree, woodland or any other vegetation located on private property, regardless of species or size, that interferes with or damages public streets or utilities, or causes an unwarranted increase in the maintenance costs of same, may be ordered removed or cut by the City Manager or his or her designee. Any order for the removal or cutting of such trees, woodlands or other vegetation, shall be made and reviewed under the applicable City nuisance abatement ordinances.

G. Penalties. The abuse, destruction, defacing, cutting, removal, mutilation or other misuse of any tree planted on public property

or along a public street as per this Section, shall be subject to the penalties defined by Section 16.02.040, and other penalties defined by applicable ordinances and statutes, provided that each tree so abused shall be deemed a separate offense.

RESPONSE: As a greenfield site, this development application does not include the removal of street trees, as none currently exist. The Applicant is aware of the penalty for illegal abuse, destruction, or removal of street trees. The criteria, as applicable, are met.

16.142.070 - Trees on Property Subject to Certain Land Use Applications

A. Generally

The purpose of this Section is to establish processes and standards which will minimize cutting or destruction of trees and woodlands within the City. This Section is intended to help protect the scenic beauty of the City; to retain a livable environment through the beneficial effect of trees on air pollution, heat and glare, sound, water quality, and surface water and erosion control; to encourage the retention and planting of tree species native to the Willamette Valley and Western Oregon; to provide an attractive visual contrast to the urban environment, and to sustain a wide variety and distribution of viable trees and woodlands in the community over time.

B. Applicability

All applications including a Type II - IV land use review, shall be required to preserve trees or woodlands, as defined by this Section to the maximum extent feasible within the context of the proposed land use plan and relative to other codes, policies, and standards of the City Comprehensive Plan.

RESPONSE: The proposed subdivision is being reviewed through a Type IV land use review procedure. As such, the criteria of this section apply.

C. Inventory

1. *To assist the City in making its determinations on the retention of trees and woodlands, land use applications including Type II - IV development shall include a tree and woodland inventory and report. The report shall be prepared by a qualified professional and must contain the following information:*

    a. *Tree size (in DBH and canopy area)*
    b. *Tree species*
    c. *The condition of the tree with notes as applicable explaining the assessment*

d. The location of the tree on the site
e. The location of the tree relative to the planned improvements
f. Assessment of whether the tree must be removed to accommodate the development

g. Recommendations on measures that must be taken to preserve trees during the construction that are not proposed to be removed.

2. In addition to the general requirements of this Section, the tree and woodland inventory's mapping and report shall also include, but is not limited to, the specific information outlined in the appropriate land use application materials packet.

3. Definitions for the inventory purposes of this Section

a. A tree is a living woody plant having a trunk diameter as specified below at Diameter at Breast Height (DBH). Trees planted for commercial agricultural purposes, and/or those subject to farm forest deferral, such as nut and fruit orchards and Christmas tree farms, are excluded from this definition and from regulation under this Section, as are any living woody plants under six (6) inches at DBH. All trees six (6) inches or greater shall be inventoried.
b. A woodland is a biological community dominated by trees covering a land area of 20,000 square feet or greater at a density of at least fifty (50) trees per every 20,000 square feet with at least fifty percent (50%) of those trees of any species having a six (6) inches or greater at DBH. Woodlands planted for commercial agricultural purposes and/or subject to farm forest deferral, such as nut and fruit orchards and Christmas tree farms, are excluded from this definition, and from regulation under this Section.
c. A large stature tree is over 20 feet tall and wide with a minimum trunk diameter of 30 inches at DBH.

RESPONSE: The applicant has submitted an Arborist Report, including a tree and woodland inventory, prepared by Morgan Holen & Associates, Inc, dated March 22, 2020, with this application. As described in the Arborist Report, a Visual Tree Assessment (VTA) was performed on the 351 individual trees surveyed across the site, looking for defect symptoms and evaluating overall condition and vitality of individual trees. The individual surveyed trees were evaluated in terms of species, diameter, crown radius, general condition and potential construction impacts.

Beyond the individual tree survey area and within the mapped vegetated corridor where no development is proposed, existing trees were not surveyed. This area does not meet the City's definition of woodland because there are fewer than 50 trees per 20,000 square feet. Regardless, the area is unaffected by the proposed development, and discussions with City staff confirmed that the area could be described more generally without individual tree data. A summary of trees in the unaffected area of the vegetated corridor is enclosed and no canopy credit is accounted for since these trees are located beyond the net development site. These criteria, as applicable, are met.

D. Retention requirements

1. Trees may be considered for removal to accommodate the development including buildings, parking, walkways, grading etc., provided the development satisfies of D.2 or D.3, below.

RESPONSE: As shown on the Existing Conditions and Demolition Plan (Sheet P2) and Tree Preservation and Removal Plan (Sheet P3), and within the revised Arborist Report (May 27, 2020), there are 351 trees located on the subject site. Of these, 177 trees (approximately 50%) are slated for removal, including 73 trees within proposed building lots, 52 trees within the proposed new street and sidewalks, 15 trees within the proposed water quality facility, 27 trees within the proposed trail alignment or along the associated retaining wall, 2 trees in proposed open space areas that are not suitable for preservation because of poor condition or structure (#6687 and #7240); One tree on the northern boundary (#14125) and one tree located just off-site near the northern boundary (#14124) for proposed sidewalk construction; 2 trees are planned for removal from the right of way in the southwest corner of the site for proposed grading and trail construction (#6687 and #7240);and 4 trees are planned for removal from the vegetated corridor including two decrepit Lombardy poplars (*Populus nigra*) (#6146 and #30210), one invasive English hawthorn (*Crataegus monogyna*) (#6140), and one Douglas-fir (#6681) along the proposed retaining wall alignment of the proposed trail.

As is typical with greenfield developments, removal of trees is necessary to accommodate the required site improvements, including utility installation, earthwork, and grading necessary for street construction, proper drainage, and future home construction. It is noted, however, that Morgan Holen & Associates and Pioneer Design Group consulted on recommended adjustments, specifically to the proposed trail alignment and retaining wall construction as feasible, which resulted in significantly reduced tree impacts and better tree protection. Section D.2 is satisfied. Therefore, this criterion is met.

2. Required Tree Canopy - Residential Developments (Single Family Attached, Single Family Detached and Two - Family)

Each net development site shall provide a variety of trees to achieve a minimum total tree canopy of 40 percent. The canopy percentage is based on the expected mature canopy of each tree by using the equation πr 2 to calculate the expected square footage of canopy for each tree. The expected mature canopy is counted for each tree regardless of an overlap of multiple tree canopies.

The canopy requirement can be achieved by retaining existing trees or planting new trees. Required street trees can be used toward the total on site canopy required to meet this standard. The expected mature canopy spread of the new trees will be counted toward the needed canopy cover. A certified arborist or other qualified professional shall provide the estimated tree canopy of the proposed trees to the planning department for review.

RESPONSE: The Preliminary Tree Preservation and Removal Plan (Sheet P3) and Preliminary Street Tree and Open Space Planting Plan (L1), in combination with the submitted Arborist Report, demonstrate that an approximately 47% canopy coverage of the net development site will be provided, in excess of the 40% requirement.

As described in greater detail in the Arborist Report, and subsequent revision dated May 27, 2020, using the criteria described above and the locations of the trees relative to grading, paving, construction, and other site improvements, site wide 177 trees will be removed and 170 trees will be retained (another 2 trees will either likely be retained, and 2 will be used to create snags). Of the retained trees, 13 will be located on-site outside of environmentally constrained areas, with a total combined canopy area of 5,634 square feet (not including the tree likely retained within the net developable area). Since retained trees receive double canopy credit, the credit from preservation of the trees is 11,268 square feet. This represents 6.75% of the final net buildable area of 166,919 square feet[1]. The minimum canopy requirement for residential development is 40%, or 66,768 square feet, for an additional 55,500 square feet (33.25%) of canopy cover required. Pioneer Design Group's Registered Landscape Architect developed the proposed planting plan for new trees on-site. Sheet L2 provides the canopy credit calculation for 48 proposed street trees, which totals 62,409 square feet of canopy. Therefore, the minimum required tree canopy is satisfied (11,268 retained + 62,409 planted = 73,677 / 166,919 = 44.14%). In addition, numerous other trees are proposed for planting in open space tracts and the storm water facility.

The trees to be retained will be adequately protected by adhering to the recommendations in the submitted Tree Plan. Any change to the tree protection plan will be approved by the project arborist to ensure that the trees to be retained are adequately protected. This criterion is met.

3. Required Tree Canopy - Non-Residential and Multi-family Developments

Each net development site shall provide a variety of trees to achieve a minimum total tree canopy of 30 percent. The canopy percentage is based on the expected mature canopy of each tree by using the equation πr^2 to calculate the expected square footage of each tree. The expected mature canopy is counted for each tree even if there is an overlap of multiple tree canopies.

[1] **Following completion of the revised arborists report, the Net Developable Area of the site was revised down from 176,001 square feet to 166,919 square feet**

The canopy requirement can be achieved by retaining existing trees or planting new trees. Required landscaping trees can be used toward the total on site canopy required to meet this standard. The expected mature canopy spread of the new trees will be counted toward the required canopy cover. A certified arborist or other qualified professional shall provide an estimated tree canopy for all proposed trees to the planning department for review as a part of the land use review process.

RESPONSE: This application involves the creation of a 28-Lot residential subdivision for future detached single-family homes. The criteria of D.3. above do not apply.

4. *The City may determine that, regardless of D.1 through D.3, that certain trees or woodlands may be required to be retained. The basis for such a decision shall include; specific findings that retention of said trees or woodlands furthers the purposes and goals of this Section, is feasible and practical both within the context of the proposed land use plan and relative to other policies and standards of the City Comprehensive Plan, and are:*

    a. *Within a Significant Natural Area, 100-year floodplain, City greenway, jurisdictional wetland or other existing or future public park or natural area designated by the City Comprehensive Plan, or*

RESPONSE: The site includes jurisdictional wetlands, flood plain, vegetated corridor, and additional natural open spaces areas to be retained. The trees within these areas are planned to be protected and retained within Tract B. These criteria are met.

    b. *A landscape or natural feature as per applicable policies of the City Comprehensive Plan, or are necessary to keep other identified trees or woodlands on or near the site from being damaged or destroyed due to windfall, erosion, disease or other natural processes, or*

RESPONSE: The site includes the Cedar Creek wetlands, flood plain, and vegetated corridor areas. The trees within these areas are planned to be protected and retained within Tract B, as described above. These criteria are met.

    c. *Necessary for soil stability and the control of erosion, for managing and preserving surface or groundwater quantities or quality, or for the maintenance of a natural drainageway, as per Clean Water Services stormwater management plans and standards of the City Comprehensive Plan, or*

RESPONSE: The applicant's submitted geotechnical report demonstrates that additional tree preservation is not necessary for soil stability or erosion control. The application meets all CWS requirements for preserving surface water quality, and for protecting and maintaining the natural drainageway of Cedar Creek. In doing so, the application also complies with the standards of the comprehensive plan.

d. Necessary in required buffers between otherwise incompatible land uses, or from natural areas, wetlands and greenways, or

RESPONSE: The abutting properties are proposed to include compatible residential uses with low to medium density residential zoning designations, as contained within the Brookman Area Concept Plan. Natural areas, wetlands and greenways associated with Cedar Creek have been provided buffers/vegetated corridors, and preserved within Tract B. Therefore, additional tree protection is not necessary.

e. Otherwise merit retention because of unusual size, size of the tree stand, historic association or species type, habitat or wildlife preservation considerations, or some combination thereof, as determined by the City.

RESPONSE: The proposed subdivision preserves a substantially large area of open space along the Cedar Creek riparian corridor, including flood plain, wetland, vegetated corridor, and additional upland areas. The result is the preservation of a significant tree stand through the center of the site, preserved within Tract B. There are no known historic association or species located on the site. Wildlife habitat preservation is also provided through the preservation of natural areas within Tract B.

5. Tree retention requirements for properties located within the Old Town Overlay or projects subject to the infill standards of Chapter 16.68 are only subject to retention requirements identified in D.4. above.

RESPONSE: The subject site is not within the Old Town Overlay and is not subject to the infill standards of Chapter 16.68. This criterion is not applicable.

6. The Notice of Decision issued for the land use applications subject to this Section shall indicate which trees and woodlands will be retained as per subsection D of this Section, which may be removed or shall be retained as per subsection D of this Section and any limitations or conditions attached thereto.

RESPONSE: The applicant acknowledges that the Notice of Decision for the project will indicate which trees and woodlands will be retained as per subsection D, which may be removed or shall be retained as per subsection D of this Section and any limitations or conditions attached thereto.

7. *All trees, woodlands, and vegetation located on any private property accepted for dedication to the City for public parks and open space, greenways, Significant Natural Areas, wetlands, floodplains, or for storm water management or for other purposes, as a condition of a land use approval, shall be retained outright, irrespective of size, species, condition or other factors. Removal of any such trees, woodlands, and vegetation prior to actual dedication of the property to the City shall be cause for reconsideration of the land use plan approval.*

RESPONSE: All trees described in the criterion of this section, not effected by the installation of approved features such as trails and utilities, will be preserved in their entirety.

E. Tree Preservation Incentive

Retention of existing native trees on site which are in good health can be used to achieve the required mature canopy requirement of the development. The expected mature canopy can be calculated twice for existing trees. For example, if one existing tree with an expected mature canopy of 10 feet (78.5 square feet) is retained it will count as twice the existing canopy (157 square feet).

F. Additional Preservation Incentives

1. *General Provisions. To assist in the preservation of trees, the City may apply one or more of the following flexible standards as part of the land use review approval. To the extent that the standards in this section conflict with the standards in other sections of this Title, the standards in this section shall apply except in cases where the City determines there would be an unreasonable risk to public health, safety, or welfare. Flexibility shall be requested by the applicant with justification provided within the tree preservation and protection report as part of the land use review process and is only applicable to trees that are eligible for credit towards the effective tree canopy cover of the site. A separate adjustment application as outlined in Section 16.84.030.A is not required.*

2. *Flexible Development Standards. The following flexible standards are available to applicants in order to preserve trees on a development site. These standards cannot be combined with any other reductions authorized by this code.*

   a. *Lot size averaging. To preserve existing trees in the development plan for any Land Division under Division VII, lot size may be averaged to allow lots less than the*

minimum lot size required in the underlying zone as long as the average lot area is not less than that allowed by the underlying zone. No lot area shall be less than 80 percent of the minimum lot size allowed in the zone;

b. Setbacks. The following setback reductions will be allowed for lots preserving existing trees using the criteria in subsection (1) below. The following reductions shall be limited to the minimum reduction necessary to protect the tree.

(1) Reductions allowed:

(a.) Front yard - up to a 25 percent reduction of the dimensional standard for a front yard setback required in the base zone. Setback of garages may not be reduced by this provision.

(b.) Interior setbacks - up to a 40 percent reduction of the dimensional standards for an interior side and/or rear yard setback required in the base zone.

(c.) Perimeter side and rear yard setbacks shall not be reduced through this provision.

c. Approval criteria:

(1.) A demonstration that the reduction requested is the least required to preserve trees; and

(2.) The reduction will result in the preservation of tree canopy on the lot with the modified setbacks; and

(3.) The reduction will not impede adequate emergency access to the site and structure.

3. Sidewalks. Location of a public sidewalk may be flexible in order to preserve existing trees or to plant new large stature street trees. This flexibility may be accomplished through a curb-tight sidewalk or a meandering public sidewalk easement recorded over private property and shall be reviewed on a case by case basis in accordance with the provisions of the Engineering Design Manual, Street and Utility Improvement Standards. For preservation, this flexibility shall be the minimum required to achieve the desired effect. For planting, preference shall be given to retaining the planter strip and separation between the curb and sidewalk wherever practicable. If a preserved tree is to be utilized as a street tree, it must meet the criteria found in the Street Tree section, 16.142.060.

4. *Adjustments to Commercial and Industrial development Standards. Adjustments to Commercial or Industrial Development standards of up to 20 feet additional building height are permitted provided;*

   a. *At least 50% of a Significant Tree stand's of canopy within a development site (and not also within the sensitive lands or areas that areas dedicated to the City) is preserved;*
   b. *The project arborist or qualified professional certifies the preservation is such that the connectivity and viability of the remaining significant tree stand is maximized;*
   c. *Applicable buffering and screening requirements are met;*
   d. *Any height adjustments comply with state building codes;*
   e. *Significant tree stands are protected through an instrument or action subject to approval by the City Manager or the City manager's designee that demonstrates it will be permanently preserved and managed as such;*

      (1.)A conservation easement;
      (2.)An open space tract;
      (3.)A deed restriction; or
      (4.)Through dedication and acceptance by the City.

RESPONSE: The Applicant is not pursuing the Tree Preservation Incentive to qualify for the use of lot averaging within the development.

G. Tree Protection During Development

The applicant shall prepare and submit a final Tree and Woodland Plan prior to issuance of any construction permits, illustrating how identified trees and woodlands will be retained, removed or protected as per the Notice of Decision. Such plan shall specify how trees and woodlands will be protected from damage or destruction by construction activities, including protective fencing, selective pruning and root treatments, excavation techniques, temporary drainage systems, and like methods. At a minimum, trees to be protected shall have the area within the drip line of the tree protected from grading, stockpiling, and all other construction related activity unless specifically reviewed and recommended by a certified arborist or other qualified professional. Any work within the dripline of the tree shall be supervised by the project arborist or other qualified professional onsite during construction.

RESPONSE: The applicant has submitted a Preliminary Tree Plan including tree protection recommendations, prepared by Morgan Holen & Associates, Inc, dated March 22, 2020, with

this application, meeting the requirements of this section. Final plans will be submitted prior to issuance of any construction permits for the site. This criterion is met.

H. Penalties

Violations of this Section shall be subject to the penalties defined by Section 16.02.040, provided that each designated tree or woodland unlawfully removed or cut shall be deemed a separate offense.

RESPONSE: The applicant recognizes the penalty for the unlawful removal of trees protected by this ordinance.

Chapter 16.144 - WETLAND, HABITAT AND NATURAL AREAS

16.144.010 - Generally

Unless otherwise permitted, residential, commercial, industrial, and institutional uses in the City shall comply with the following wetland, habitat and natural area standards if applicable to the site as identified on the City's Wetland Inventory, the Comprehensive Plan Natural Resource Inventory, the Regionally Significant Fish and Wildlife Habitat Area map adopted by Metro, and by reference into this Code and the Comprehensive Plan. Where the applicability of a standard overlaps, the more stringent regulation shall apply.

RESPONSE: The Applicant's Site Assessment and supplemental memorandum, prepared by Environmental Science and Assessment (ESA) and submitted with this application, identifies and describes those significant resources located within the boundaries and within 50 feet of the site, as described below.

16.144.020 - Standards

A. The applicant shall identify and describe the significance and functional value of wetlands on the site and protect those wetlands from adverse effects of the development. A facility complies with this standard if it complies with the criteria of subsections A.1.a and A.1.b, below:

1. The facility will not reduce the area of wetlands on the site, and development will be separated from such wetlands by an area determined by the Clean Water Services Design and Construction Standards R&O 00-7 or its replacement provided Section 16.140.090 does not require more than the requested setback.

a. A natural condition such as topography, soil, vegetation or other feature isolates the area of development from the wetland.

RESPONSE: ESA have identified two primary wetland areas on the site: Wetland A, and seven small wetlands associated with Cedar Creek.

Wetland A is a Palustrine Forested Broad-leaved Deciduous seasonally flooded (PFO1C) wetland, totaling 10,582 square feet (0.24 acres). Topography indicates this wetland is associated with the area historically created where Cedar Creek and the tributary converged in the southwest site corner, prior to construction of SW Brookman Road. The wetland determination data plots associated with Wetland A are DP-14 through DP-17, within Appendix C of the ESA Site Assessment.

The plant community located within and adjacent to Wetland A is Oregon Ash canopy cover with Red-Osier Dogwood (*Cornus sericea*) in the shrub strata and dense Slough sedge) in the herbaceous layer.

Wetland hydrology is through collection of overland flow from the onsite tributary, seasonal surface water ponding, and high seasonal groundwater. Hydric soils met Redox Dark Surface (F6) indicator.

The Cedar Creek Wetlands are a series of seven small Palustrine Forested Broad-leaved Deciduous seasonally flooded (PFO1C) wetlands, totaling 11,577 square feet (0.26 acres), and are in the south-central, southeast and eastern area of the site. The wetlands are located both east and west of the Cedar Creek channel, all within 80-feet. In the four wetland areas east of the creek in the southeast site corner at the toe of the forested slope, the vegetation is primarily mature Oregon Ash with dense patches of Slough Sedge. There are four small functional wetland areas, surrounded by riparian habitat. Shrub cover within and along the wetlands includes, Osoberry, Wild Gooseberry, and Red-Osier Dogwood. Other tree cover in the southeast site corner within the floodplain includes Douglas fir, Wild Cherry (*Prunus avium*) and Douglas Hawthorn.

In the three wetland areas west of Cedar Creek in the south-central and eastern portion of the site, the canopy is Oregon Ash with Red-Osier Dogwood in the understory and dense Slough Sedge in the herbaceous layer. Within one of the wetland areas associated with Cedar Creek is a mature Douglas Fir with a buttressed base, a morphological adaptation indicating long term inundation in this area.

The hydric soils met Redox Dark Surface (F6) indicators. The wetland determination data plots associated with the Cedar Creek Wetlands are DP-2 through DP-8 and DP-10 through DP-13, within Appendix C of the ESA Site Assessment.

The proposed facility is located in the southwestern area of the site, between the proposed extension of SW Wapato Lake Drive and the vegetated corridor north of Cedar Creek and its associated wetlands. The facility is separated from and located outside of the wetlands and other sensitive areas and meets the requirements of CWS R&O 19-22, as demonstrated by CWS service provider letter 20-000663 issued for the development, and included with this application.

b. Impact mitigation measures will be designed, implemented, and monitored to provide effective protection against harm to the wetland from sedimentation, erosion, loss of surface or ground water supply, or physical trespass.

RESPONSE: No wetland impacts will result from the subdivision development as discussed in the Site Assessment report. The future Brookman Road improvement will impact wetland and waterway along Cedar Creek and these impacts will be evaluated and mitigated by the City of Sherwood and Washington County as part of the overall future SW Brookman Road ROW improvements. It is noted that while the City of Sherwood has allowed the developer, in this case, to defer improvements and mitigation for encroachment into wetland and waters within the Cedar Creek floodplain, CWS is requiring that any potential impacts to the vegetated corridor due to the road dedication need to be accounted for at this time. The proposed subdivision project avoids all impacts to the Cedar Creek wetlands and floodplain in the middle of the site, north of the existing and proposed SW Brookman Road right-of-way. Compliance with this standard is evidenced by Amended CWS service provider letter 20-000663 issued for the development, and included with this application. This criterion is met.

c. A lesser setback complies with federal and state permits, or standards that will apply to state and federal permits, if required.

RESPONSE: As required by Conditions of CWS service provider letter 20-000663, prior to any work within the sensitive areas onsite the applicant must obtain authorization from the United States Army Corp of Engineers, and the State of Oregon Department of State Lands. The applicant will comply with all such requirements.

2. If existing wetlands are proposed to be eliminated by the facility, the applicant shall demonstrate that the project can, and will develop or enhance an area of wetland on the site or in the same drainage basin that is at least equal to the area and functional value of wetlands eliminated.

RESPONSE: As discussed above, no wetland impacts will result from the subdivision development. The future Brookman Road improvement will impact wetland and waterway along Cedar Creek and these impacts will be evaluated and mitigated by the City of Sherwood and Washington County as part of the overall future SW Brookman Road ROW improvements. However, any potential impacts to the vegetated corridor due to the road dedication will be accounted for at this time. The proposed subdivision project avoids all impacts to the Cedar Creek wetlands and floodplain in the middle of the site, north of the existing and proposed SW Brookman Road right-of-way. CWS service provider letter 20-000663 provides concurrence with this assessment. Therefore, this criterion is met.

B. The applicant shall provide appropriate plans and text that identify and describe the significance and functional value of natural features on the site (if identified in the Community Development Plan, Part 2) and

protect those features from impacts of the development or mitigate adverse effects that will occur. A facility complies with this standard if:

1. *The site does not contain an endangered or threatened plant or animal species or a critical habitat for such species identified by Federal or State government (and does not contain significant natural features identified in the Community Development Plan, Part 2, Natural Resources and Recreation Plan).*

RESPONSE: The Site Assessment prepared by ESA describes and delineates the significance and functional value of natural features on the site. The Site Assessment did not identify endangered or threatened plant or animal species or a critical habitat for such species on the subject site. Therefore, this criterion does not apply.

2. *The facility will comply with applicable requirements of the zone.*

RESPONSE: As demonstrated within the compliance narrative and submitted plans and exhibits, the proposed development complies with the applicable requirements of the MDRL Zone. This criterion is met.

3. *The applicant will excavate and store topsoil separate from subsurface soil, and shall replace the topsoil over disturbed areas of the site not covered by buildings or pavement or provide other appropriate medium for re-vegetation of those areas, such as yard debris compost.*

RESPONSE: Topsoil removed during the initial construction phases will be stored on site in a manner that protects it from erosion while grading operations are underway. The topsoil will be placed in a location where it will not suffocate root systems of trees that may remain. The topsoil will be restored after construction to provide a suitable base for seeding and planting of areas of the site not covered by buildings or pavement. This criterion does not apply.

4. *The applicant will retain significant vegetation in areas that will not be covered by buildings or pavement or disturbed by excavation for the facility; will replant areas disturbed by the development and not covered by buildings or pavement with native species vegetation unless other vegetation is needed to buffer the facility; will protect disturbed areas and adjoining habitat from potential erosion until replanted vegetation is established; and will provide a plan or plans identifying each area and its proposed use.*

RESPONSE: As described by ESA, the total area of Sensitive Areas on the site is approximately 38,964 square feet, with an additional Vegetated Corridor (VC) of approximately 141,230 square feet. The VC width for most of the corridor along wetland A, Cedar Creek, and the associated Cedar Creek Wetlands is 50 feet in areas of less than 25% slopes. There are several areas onsite where slopes are greater than 25%. For these areas, a break in slope line was determined based on CWS methodology (R&O 19-22). All areas with steep slopes are within

good condition corridor, so the 35-foot off-set from the slope break is used. The VC for the northern most wetland is 25 feet based on less than 25% slopes and the wetland being under 0.5 acres. The slope break was determined using the surveyed base topographic map.

The VC in the southwest site corner along the tributary (VC-1) is in good condition despite a dense herbaceous layer of primarily English Ivy between the tributary and SW Brookman Road. VC east and west of the Cedar Creek channel within the floodplain is in good condition, with mature Oregon Ash, Western Beaked Hazelnut and Osoberry throughout and patches of dense Piggy Back Plant (*Tolmiea menziesii*) in the herbaceous layer (VC-3 to VC-6). In the southeast site corner, the VC adjacent to the wetland areas is in good condition (Photo 3) and plant community shifts to Douglas Fir and Serviceberry with Swordfern in the understory as the slopes increase towards SW Brookman Road (VC-7). The corridor adjacent to the constructed channel in the SW Brookman Road ROW is in good condition (VC-2).

There is extensive English Ivy cover from the driveway between SW Brookman Road and the tributary in the forested areas extending into the VC associated with wetland A in the southwest corner. The remainder of the riparian and wetland areas of the site have low percent relative cover of invasive and non-native plants.

As described throughout this written narrative, areas of the site with significant vegetation as described above are planned to be retained in the areas preserved within Tract B of the preliminary plat. The Preliminary Street Tree and Open Space Planting Plan (Sheet L1) shows proposed planting on the site. Appropriate erosion and sediment control methods will be utilized through the development phase. This criterion is met.

> 5. *Development associated with the facility will be set back from the edge of a significant natural area by an area determined by the Clean Water Services Design and Construction standards R&O 00-7 or its replacement, provided Section 16.140.090A does not require more than the requested setback. Lack of adverse effect can be demonstrated by showing the same sort of evidence as in subsection A.1 above.*

RESPONSE: The proposed subdivision preserves a substantially large area of open space along the Cedar Creek riparian corridor, including flood plain, wetland, vegetated corridor, and additional upland areas. The result is the preservation of a significant natural area along the south end of the site, preserved within Tract B. Evidence of the appropriateness of Tract B and associated setbacks from the resource is provided by the CWS service provider letter issued for the development, and included with this application. This criterion is met.

> C. *When the Regionally Significant Fish and Wildlife Habitat map indicates there are resources on the site or within 50 feet of the site, the applicant shall provide plans that show the location of resources on the property. If resources are determined to be located on the property, the plans shall show the value of environmentally sensitive areas using the methodologies described in Sections 1 and 2 below.*

RESPONSE: The subject site is outside the study area for the Sherwood Local Wetlands Inventory (LWI) map. The National Wetland Inventory (NWI) maps Cedar Creek as a Freshwater Forested/Shrub wetland (PFO1). Additionally, the Brookman Addition Concept Plan maps Class 1 Riparian areas along the Cedar Creek corridor with wetlands located within the floodplain area. Plans submitted with the application, including the Conceptual Open Space Plan (Sheet P5) identify these areas, and the Site Assessment prepared by ESA has determined the value of environmentally sensitive areas. The accuracy of these determinations is demonstrated by the CWS service provider letter, 20-000663, issued for the development, and included with this application. This criterion is met.

16.144.030 - Exceptions to Standards

In order to protect environmentally sensitive areas that are not also governed by floodplain, wetland and Clean Water Services vegetated corridor regulations, the City allows flexibility of the specific standards in exchange for the specified amount of protection inventoried environmentally sensitive areas as defined in this code.

A. Process

The flexibility of standards is only applicable when reviewed and approved as part of a land use application and shall require no additional fee or permit provided criteria is addressed. In the absence of a land use application, review may be processed as a Type 1 administrative interpretation.

B. Standards modified

1. *Lot size — Not withstanding density transfers permitted through Chapter 16.40, when a development contains inventoried regionally significant fish and wildlife habitats as defined in Section 16.144.020 above, lot sizes may be reduced up to ten percent (10%) below the minimum lot size of the zone when an equal amount of inventoried resource above and beyond that already required to be protected is held in a public or private open space tract or otherwise protected from further development.*

RESPONSE: As described above and detailed in the *Riverside Homes Brookman Road – CWS Site Assessment* prepared by Environmental Science and Assessment and submitted with this application, the subject site contains inventoried regionally significant fish and wildlife habitat associated with the Cedar Creek drainage and associated flood plain and wetland areas. Accordingly, the applicant requests the ability to reduce lot sizes by up to 10% to reduce the minimum lot area within the development from 5,000 square feet to 4,500 square feet (actual minimum preliminary measurement is Lot 27 at 4,722 square feet), and to reduce the lot width at the building line from 50 feet to 45 feet (Lots 1 – 10, 13 – 20, and 22 - 24).

In total, 5 of the 28 Lots are proposed to be reduced in area to between 4,500 square feet and 5,000 square feet. The total area of these lots is a combined 24,150 square feet, against a

minimum of 25,000 square feet for 5 standard 5,000 square foot lots. Accordingly, the 850 square foot shortfall in lot area is required to be accommodated within open space areas on the site above and beyond that already required to be protected.

As described in the ESA report and site plans submitted with the application, a total of 38,964 square feet of Sensitive Area and 141,230 square feet of Vegetated Corridor exists on the site, and is required to be preserved and protected from future development. In addition, when eliminating overlapping areas, a further 1,486 square feet of 100-year flood plain exists, and 8,346 square feet (5% of the net buildable area of the site) of open space is required pursuant to Section 16.142.030 for a total area of 190,026 square feet required to be provided.

As indicated on the Preliminary Plat (Sheet P1), 203,158 square feet of open space area is proposed to be designated for inclusion and protection within Tract B. This equates to 13,132 square feet of open space not otherwise required by this Code, which far exceeds the minimum of an additional 850 square feet required by this Section. This requirement can and will be met, and therefore the applicant meets the requirements for a 10% reduction in minimum lot area and lot width at the building line.

2. *Setbacks — For residential zones, the setback may be reduced up to thirty percent (30%) for all setbacks except the garage setback provided the following criteria are satisfied:*

    a. *The setback reduction must result in an equal or greater amount of significant fish and/or wildlife habitat protection. Protection shall be guaranteed with deed restrictions or public or private tracts.*
    b. *In no case shall the setback reduction supersede building code and/or Tualatin Valley Fire and Rescue separation requirements.*
    c. *In no case shall the setback be reduced to less than five feet unless otherwise provided for by the underlying zone.*

3. *Density — per Section 16.10.020 (Net Buildable Acre definition), properties with environmentally sensitive areas on site may opt to exclude the environmentally sensitive areas from the minimum density requirements provided the sensitive areas are protected via tract or restrictive easement. A proposal to remove said area from the density calculation must include: a delineation of the resource in accordance with Section 16.144.020C, the acreage being protected, and the net reduction below the normally required minimum for accurate reporting to Metro.*

4. *Parking — Per Section 16.94.020.B.6, 10-25% of the required parking spaces may be reduced in order to protect inventoried regionally significant fish and wildlife habitat areas, provided these resources are protected via deed restrictions or held in public or private tracts.*

5. *Landscaping Per Section 16.92.030.B.6, exceptions may be granted to the landscaping standards in certain circumstances as outlined in that section.*

RESPONSE: The applicant is not requesting exceptions to setbacks, density, parking, or landscaping requirements; therefore, these criteria are not applicable.

Chapter 16.156 - ENERGY CONSERVATION

16.156.010 - Purpose

This Chapter and applicable portions of Chapter 5 of the Community Development Plan provide for natural heating and cooling opportunities in new development. The requirements of this Chapter shall not result in development exceeding allowable densities or lot coverage, or the destruction of existing trees.

16.156.020 - Standards

A. *Building Orientation - The maximum number of buildings feasible shall receive sunlight sufficient for using solar energy systems for space, water or industrial process heating or cooling. Buildings and vegetation shall be sited with respect to each other and the topography of the site so that unobstructed sunlight reaches the south wall of the greatest possible number of buildings between the hours of 9:00 AM and 3:00 PM, Pacific Standard Time on December 21st.*

RESPONSE: Within the development, the street alignment is generally east-west in orientation, resulting in a majority of the lots including a front lot line on a generally east-west axis, and a lot depth of over 90 feet, to maximize solar gain on the south building wall. In all, 25 Lots 1 – 25) of the 28 lots on the site achieve sufficient solar access or approximately 89%, which can be considered to meet the requirement for maximum solar access. Therefore, this criterion is met.

B. *Wind - The cooling effects of prevailing summer breezes and shading vegetation shall be accounted for in site design. The extent solar access to adjacent sites is not impaired vegetation shall be used to moderate prevailing winter wind on the site.*

RESPONSE: The site design of the proposed subdivision, including significant open space surrounding the lots as well as compliance with building setbacks, will allow for adequate air circulation and cooling. There is sufficient room for the addition of landscaping to regulate prevailing winter winds from the south and east. The criterion is met.

16.156.030 - Variance to Permit Solar Access

Variances from zoning district standards relating to height, setback and yard requirements approved as per Chapter 16.84 may be granted by the Commission where necessary for the proper functioning of solar energy systems, or to otherwise preserve solar access on a site or to an adjacent site.

RESPONSE: The application does not include a variance from applicable standards. This criterion does not apply.

IV. Conclusion

The required findings have been made, and this written narrative and submitted materials demonstrate the application is consistent with the applicable provisions of the City of Sherwood Municipal Code. Accordingly, the applicant respectfully requests approval of the 28-Lot subdivision, "Riverside at Cedar Creek, as submitted.

City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

Pre-Application Conference Notes

File # PAC 19-13
Meeting Date – November 7, 2019
Staff Contact - Eric Rutledge
rutledgee@sherwoodoregon.gov
503-625-4242

Subdivision 11-50 Lots (Type III)

The pre-application conference and notes cannot cover all code requirements and aspects that apply to the proposal. Failure of staff to provide information required by the code does not constitute a waiver of the applicable standards or requirements. It is recommended that a prospective applicant obtain and read the Zoning and Community Development Code and/or ask any questions of City staff relative to code requirements prior to submitting an application.

PROJECT SUMMARY

Proposed Project Name: Scott Property Subdivision

Proposal Description: The applicant is proposing a 28-lot subdivision on a 10.47 acre parcel in the Medium Density Residential Low (MDRL) zoning district. The site is part of the Brookman Addition and was annexed into the City of Sherwood in April 2017 (Ord. 2017-002).

The preliminary site plan shows street access is proposed from SW Trillium Lane and an extension of SW Wapato Lake Drive, both streets were included in the Middlebrook Subdivision which has received preliminary plan approval. Lots will be situated on the south side of SW Trillium Lane and on the north and south side of SW Wapato Lake Drive and range in size from 4,778 to 7,260 SF.

A vegetation corridor associated with Cedar Creek is proposed along the south and west portion of the site. Storm facility, open space, and other tracts are also indicated on the preliminary site plan.

Applicant: Riverside Homes / Niki Munson
17993 NE Evergreen Place, Suite 370
Beaverton, OR 97006

Owner: Richard and Linda Scott
17433 SW Brookman Road
Sherwood, OR 97140

Site Address:	17433 SW Brookman Road
Tax Lot ID:	3S1060000104
Land Use Designation:	Medium Density Residential Low (MDRL)

APPLICATION TYPE, TIMELINE & FEES

Full details on application type, noticing, and public hearing procedures listed under 16.72

Application Type and Hearing Authority

Type III quasi judicial (Subdivisions between 11-50 lots)

- The Type III Hearing Authority is the Hearings Officer and the Appeal Authority is the Planning Commission.

Approval Timeline

- 30 day completeness review
- 45-60 days for public hearing after application is deemed complete*
- 14 day appeal period for all land use decisions

*Applications involving difficult or protracted issues or requiring review by other jurisdictions may take additional time to review. Written recommendations from planning staff are issued seven (7) days prior to the public hearing.

Land Use Fees

Fees as of July 1, 2019. Please confirm fees with staff prior to submittal as fee schedule is revised annually. Engineering plan review, building permit, and SDC fees separate.

• Subdivision	$6,577.41 + $20.73 per lot
• Publication and Distribution of Type III Notice	$466.00
• Final plat processing (Subdivision)	$1,165.25

APPLICATION SUBMITTAL REQUIREMENTS

See attached form "Application Materials Required for Subdivision Plat"

Note: Applicants are encouraged to submit 4 full and reduced size paper copies and one electronic copy for completeness review. The full number of paper copies (15) and one updated electronic copy will be required after the application is deemed complete.

SUMMARY OF APPLICABLE CODE CRITERIA

*These sections **must** be addressed in the narrative submitted with the land use application*

Title 16 Zoning & Community Development Code

Division II Land Use & Development		**Division VII Land Divisions, Subdivisions, Partitions, Lot Line Adjustments & Modifications**	
16.12 Residential Land Use Districts	X	16.120 Subdivisions	X
16.38 Special Uses		16.122 Land Partitions	
16.44 Townhomes		16.124 Property Line Adjustments & Lot Consolidations	
16.48 Non-Conforming Uses		16.126 Replatting, Lot Consolidations, and Vacation of Plats	
16.50 Accessory Structures, Architectural Features, & Decks		16.128 Land Division Design Standards	X
16.58 Clear Vision & Fence Standards			
16.60 Yard Requirements		**Division VIII Environmental Resources**	
16.68 Infill Development Standards		16.134 Floodplain Overlay	X
		16.138 Mineral Resources	
Division IV Planning Procedures		16.140 Solid Waste	
16.80 Plan Amendments		16.142 Parks, Trees, and Open Space	X
16.82 Conditional Uses		16.144 Wetland, Habitat & Natural Areas	X
16.84 Variances		16.146 Noise	
16.86 Temporary Uses		16.148 Vibrations	
		16.150 Air Quality	
Division V Community Design		16.152 Odors	
16.90 Site Planning		16.154 Heat & Glare	
16.92 Landscaping	X	15.156 Energy Conservation	X
16.94 Off-Street Parking & Loading	X		
16.96 On-Site Circulation	X	**Division IX Historic Resources**	
16.98 On-Site Storage		16.162 Old Town Overlay District	
16.100 Permanent Signs		16.168 Landmark Alteration	
Division VI Public Infrastructure			
16.106 Transportation Facilities	X		
16.110 Sanitary Sewers	X		
16.112 Water Supply	X		
16.114 Storm Water	X		
16.116 Fire Protection	X		
16.118 Public & Private Utilities	X		

STAFF COMMENTS ON APPLICABLE CRITERIA AND GENERAL REQUIREMENTS

The following comments are based on staff's review of the information provided on the pre-application form and accompanying attachments.

Summary of important issues / information:

- Development permits cannot be issued until the public improvements associated with the Middlebrook Subdivision have been constructed and are accepted by the City.
- Annexation to Clean Water Services (CWS) and Metro Service District is required. Please contact Washington County and Metro Regional Government directly to begin the application process.
- Brookman Road is classified by Washington County as an arterial road with a 5-lane section. A TIA may be required to identify critical road issues that are exacerbated by the proposed development.
    - A 33 ft. right-of-way dedication is required along the site frontage with Brookman Road (53 ft. to centerline).
- Cedar Creek runs through the site and Chapters 16.134 Floodplain Overlay and 16.144 Wetland, Habitat and Natural Areas will apply.
- A minimum of 5% of the net buildable site (after exclusion of public right-of-way and environmentally constrained areas) shall be maintained as open space.
- Based on the tentative site plan, the maximum block length of 530 ft. has been exceeded for SW Wapato Lake Drive. Provide a pedestrian pathway connecting SW Trillium Lane to SW Wapato Lake Drive to provide a break in the street length.

Chapter 16.12 Residential Land Use Districts

Staff comments: The site is zoned Medium Density Residential Low. The MDRL zoning district provides for single-family and two-family housing, manufactured housing and other related uses with a density of 5.6 to 8 dwelling units per acre.

16.12.030(C)

Minimum Lot Area	
• Single Family Detached	5,000 SF
• Single Family Attached	5,000 SF
• Two or Multi-Family; for the first 2 units	10,000 SF
Minimum Lot Width	
• Front Property Line	25 ft.
• Building Line (Single-Family)	50 ft.
• Building Line (Two-Family)	60 ft.
Lot Depth	80 ft.
Setbacks	
• Front yard / face of garage	14 / 20
• Interior side yard single family detached / attached	5 / 10

• Interior side yard two-family	5
• Corner lot street side	15
• Rear yard	20

See Table 16.12.030(C) for full lot, setback, height, and development standards in the MDRL zone.

Lot averaging allowed per 16.120.020(E) as noted below under the "Subdivisions" chapter.

16.58 Clear Vision Standards
Staff comments: A clear vision area is required on the corners of all property at the intersection of two (2) streets, intersection of a street with a railroad, and intersection of a street with an alley or private driveway. See 16.58.010 for full details. The minimum distance from a corner curb to any driveway is 25 ft. Clear vision areas shall be indicates on the plat.

16.92 Landscaping
Staff comments: New developments along arterial and collector streets are required to establish a landscaped visual corridor (see 16.142.040 below). Trees to be planted in or adjacent to public rights-of-way shall meet the requirements of the landscaping chapter 16.92. The Portland Plant List can be used as a reference for a wide variety of suitable plants.

16.94 Off-Street Parking & Loading
Staff comments: One (1) off-street space is required per dwelling unit for single, two-family, and manufactured homes on individual lots. Residential off-street parking spaces cannot be counted in garages or enclosed buildings. Off-street spaces shall be located on the same lot or development as the residential use.

16.96 On-Site Circulation
Staff comments: On-site facilities shall be provided that accommodate safe and convenient pedestrian access within new subdivisions, multi-family developments, planned unit developments, shopping centers and commercial districts, and connecting to adjacent residential areas and neighborhood activity centers within one-half mile of the development. Neighborhood activity centers include but are not limited to existing or planned schools, parks, shopping areas, transit stops or employment centers. All new development, (except single-family detached housing), shall provide a continuous system of private pathways/sidewalks.

Single and two-family uses and manufactured homes on individual residential lots shall not be granted permanent driveway ingress or egress from Highway 99W and arterial roadways.

Chapter 16.104 General Provisions (Public Infrastructure)
Staff Comments: All public improvements shall conform to City standards and specifications found in the Engineering Design Manual and installed in accordance with Chapter 16.108 Improvement Plan Review.

Type	ROW Width	Lanes	Min. Lane Width	On-Street Parking Width	Bike Lane Width	Sidewalk Width	Landscape Strip (Exclusive of Curb)	Median Width
Arterial	60 – 102'	2-5	12'	Limited	6'	6-8'	5'	14' if required
Local	52'	2	14'	8' one side only	None	6'	5' with 1' buffer	None

Required improvements (16.106.020) – All developments containing or abutting an existing or proposed street, that is either unimproved or substandard in right-of-way width or improvement, shall dedicate the necessary right-of-way prior to issuance of building permits and/or complete acceptable improvements prior to issuance of occupancy permits.

Location (16.106.030) – The location, width, and grade of streets shall be considered in their relation to existing and planned streets, topographic conditions, and proposed land uses.

- Connectivity map – new residential development involving construction of new streets shall be submitted with a site plan that implements, responds to and expands on the Local Street Connectivity map contained in the TSP.
- Block length – the block length for new streets (except arterials) shall not exceed 530 feet. The length of blocks adjacent to arterials shall not exceed 1,800 ft.
- Underground utilities – all public and private underground utilities, including sanitary sewer and storm water drains, shall be constructed prior to the surfacing of streets. Stubs for service connections shall be long enough to avoid disturbing the street improvements when service connections are made.

Design (16.106.040) – Standard cross sections showing street design and pavement dimensions are located in the City of Sherwood's Engineering Design Manual.

- Alignment – proposed streets shall be in alignment with existing streets as far as practicable.
- Median islands – median islands may be required on arterial or collector streets for the purpose of controlling access, providing pedestrian safety or for aesthetic purposes.
- Traffic controls – the number and type of traffic controls necessary to accommodate anticipated traffic flow will be determined by the traffic impact analysis

- Roadway access – minimum right-of-way radius is fifteen (15) ft. Access restrictions may apply if the radius standards are not met.

Sidewalks (16.106.060) – A 12 ft. wide community trail is required along SW Brookman Road . Residential areas shall have a minimum of six (6) foot side sidewalk. When full street connections are not possible, bike and pedestrian connections with spacing of no more than 330 ft. are required.

Traffic Impact Analysis (16.106.080) – A traffic impact analysis (TIA) is required with the land use application if the proposed development generates more than fifty (50) or more PM peak-hour trips on Hwy 99W or one hundred (100) PM peak-hour trips on the local transportation system. TIA also required if the proposed access driveway does not meet minimum spacing or sight distance requirements. Full applicability requirements under 16.106.080(B). If a TIA is required, please see subsections C-F for requirements.

Chapter 16.108 Improvement Plan Review
Staff Comments: A public infrastructure improvement plan shall be prepared and stamped by a Registered Civil Engineer certifying compliance with City specifications. An engineering agreement between the applicant and Registered Civil Engineer is required.

Construction permit (16.108.020) – upon approval of the improvement plan, the applicant shall obtain a construction permit. Liability insurance and a performance bond equal to one hundred twenty-five (125%) of the estimated costs of the improvements is required.

Construction (16.108.030) – a complete set of as-built in AutoCad or PDF format showing public improvements is required upon completion of the project.

Acceptance of improvements (16.108.040) – prior to the acceptance of public improvements, the applicant shall provide the City with a maintenance bond computed at ten percent (10%) of the full value of the improvements, for the purpose of correcting any defective work or maintenance that becomes apparent or arises within two (2) years after final acceptance of the improvements.

Chapter 16.110 Sanitary Sewers
Staff Comments: Sanitary sewers shall be installed to serve all new developments and shall connect to existing sanitary sewer mains. Sanitary sewers shall be constructed, located, sized, and installed at standards consistent with the Development Code, Sanitary Sewer Service Plan Map in the Sanitary Sewer Master Plan, and other applicable Clean Water Services and City standards in order to adequately serve the proposed development and allow for future extensions.

Development permits for utilities will not be issued until the public improvements associated with the Middlebrook Subdivision have been constructed and are accepted by the City.

Chapter 16.112 Water Supply

Staff Comments: Water lines and fire hydrants conforming to City and Fire District standards shall be installed to serve all building sites in a proposed development. Water lines providing potable water supply shall be sized, constructed, located and installed at standards consistent with this Code, the Water System Master Plan, the City's Design and Construction Manual, and with other applicable City standards and specifications, in order to adequately serve the proposed development and allow for future extensions. All new development shall also comply with the fire protection requirements of 16.116 and the applicable portions of Chapter 7 of the Community Development Plan, and the Fire District.

Development permits for utilities will not be issued until the public improvements associated with the Middlebrook Subdivision have been constructed and are accepted by the City.

Chapter 16.114 Storm water
Staff Comments: Storm water facilities, including appropriate source control and conveyance facilities, shall be installed in new developments and shall connect to the existing downstream drainage systems consistent with the Comprehensive Plan and the requirements of the Clean Water Services water quality regulations contained in their Design and Construction Standards R&O 04-9, or its replacement. On-site source control and conveyance system improvement requirements are included under 16.114.020(B) and (C).

Development permits for utilities will not be issued until the public improvements associated with the Middlebrook Subdivision have been constructed and are accepted by the City.

Chapter 16.116 Fire Protection
Staff Comments: When land is developed so that any commercial or industrial structure is further than two hundred and fifty (250) feet or any residential structure is further than five hundred (500) feet from an adequate water supply for fire protection, as determined by the Fire District, the developer shall provide fire protection facilities necessary to provide adequate water supply and fire safety. See 16.116.020 and the attached fire comments for full requirements related to capacity, flow, access, and hydrants.

- Timing of installation - when fire protection facilities are required, such facilities shall be installed and made serviceable prior to or at the time any combustible construction begins on the land unless, in the opinion of the Fire District, the nature or circumstances of said construction makes immediate installation impractical.

Chapter 16.118 Public and Private Utilities
Staff Comments: Public telecommunication conduits as well as conduits for franchise utilities including, but not limited to, electric power, telephone, natural gas, lighting, and cable television shall be installed to serve all newly created lots and developments in Sherwood. Except as otherwise provided, all utility facilities, including but not limited to, electric power, telephone, natural gas, lighting, cable television, and telecommunication cable, shall be placed underground, unless specifically authorized for above ground installation, because the points of connection to existing utilities make underground installation impractical, or for other reasons deemed acceptable by the City. See 16.118.020 for installation standards.

Development permits for utilities will not be issued until the public improvements associated with the Middlebrook Subdivision have been constructed and are accepted by the City.

Chapter 16.120 Subdivisions

Staff Comments: Approval of a subdivision occurs through a two-step process: the preliminary plat and the final plat. The preliminary plat shall be approved by the Approval Authority (Hearings Officer) before the final plat can be submitted for consideration. All subdivision proposals shall conform to state regulations in ORS Chapter 92 Subdivisions and Partitions. No property shall be disposed of, transferred, or sold until required subdivision approvals are obtained.

- Lot averaging – lot size may be averaged to allow lots less than the minimum size allowed in the underlying zoning district provided: 1. The average lot area for all lots is not less than allowed by the underlying zoning district 2. No lot created shall be less than 90% of the minimum lot size allowed in the underlying zoning district 3. The maximum lot size cannot be greater than 10% of the minimum lot size.
- All required building setback lines shall be shown on the preliminary plat.
- Phased Development – the Approval Authority (Hearings Officer) may approve a time schedule for developing a subdivision in phases, but in no case shall the actual construction time period for any phase be greater than two years without reapplying for a preliminary plat. See 16.120.030(B) for full phasing criteria.

The approval criteria for the preliminary plat is listed under 16.20.040 and is as follows:

No preliminary plat shall be approved unless:

A. Streets and roads conform to plats approved for adjoining properties as to widths, alignments, grades, and other standards, unless the City determines that the public interest is served by modifying streets or road patterns.

B. Streets and roads held for private use are clearly indicated on the plat and all reservations or restrictions relating to such private roads and streets are set forth thereon.

C. The plat complies with applicable zoning district standards and design standards in Division II, and all provisions of Divisions IV, VI, VIII and IX. The subdivision complies with Chapter 16.128 (Land Division Design Standards).

D. Adequate water, sanitary sewer, and other public facilities exist to support the use of land proposed in the plat.

E. Development of additional, contiguous property under the same ownership can be accomplished in accordance with this Code.

F. Adjoining land can either be developed independently or is provided access that will allow development in accordance with this Code.

G. Tree and woodland inventories have been submitted and approved as per Section 16.142.060.

H. The plat clearly shows the proposed lot numbers, setbacks, dedications and easements.

I. A minimum of five percent (5%) open space has been provided per Section 16.44.010.B.8 (Townhome-Standards) or Section 16.142.030 (Parks, Open Spaces and Trees-Single-Family Residential Subdivisions), if applicable.

- Final plat - the final subdivision procedures and approval criteria are listed under 16.120.050.
- An improvement agreement and performance guarantee is required per 16.120.060-70.
- Land division design standards – the block length shall not exceed five-hundred thirty (530) ft. in length.
- Utility easements for sewers, drainage, water mains, or other utilities shall be dedicated or provided for by deed. Easements shall be a minimum of ten (10) ft. wide and centered on rear or side lot lines.
- Pedestrian and bicycle ways – pedestrian or bicycle ways may be required to connect cul-de-sacs, divide through an unusually long or oddly shaped block, or to otherwise provide adequate circulation.
- Lots – all lots shall abut a public street. Side lot lines shall run at right angles to the street upon which the lot faces, as far as practicable.

Chapter 16.134 Floodplain (FP) Overlay
Staff Comments: A 100-year floodplain (base flood) associated with Cedar Creek runs through the south-east portion of the site and this chapter applies. The floodplain overlay along Cedar Creek is also a designated greenway a dedication is required per Chapter 5 Section C Policy 1 of the Comprehensive Plan. Greenways shall also comply with the Development Code Chapter 16.142 Parks, Trees, and Open Space.

Chapter 16.142 Parks, Trees, and Open Spaces
Staff Comments: For residential subdivisions - a minimum of 5% of the net buildable site (after exclusion of public right-of-way and environmentally constrained areas) shall be maintained as open space. Open space must include usable areas such as public parks, swimming pools, grass areas, walking paths, and similar spaces. The value of the open space may be eligible for Parks System Development Charges credits. Density of single-family subdivisions shall be calculated based on the net buildable site prior to exclusion of open space.

Visual corridors (16.142.040) – SW Brookman Road is classified as an arterial street and this section applies. A 15 ft. wide landscaped visual corridor is required on private property outside of the public right-of-way.

Street trees (16.142.060) – street trees are required in accordance with 16.142.060.

Trees on property subject to certain land use decisions (16.142.070) – the subdivision will be processed as a Type III land use decision and this section applies.

- A tree and woodland inventory and report is required to be submitted with the application.

- Each net development site requires a minimum of 40% total tree canopy (single-family residential developments). Canopy can be obtained by retaining existing trees or planting new trees. Street trees can be used towards the total on-site canopy.
- The city may determine that certain trees or woodlands are required to be retained if they are within a significant natural area, 100-year floodplain, wetland, and other criteria under 16.142.070(D)(4).
- Various tree preservation incentives are available under 16.142.070(E).

Chapter 16.144 Wetland, Habitat, and Natural Areas
Staff Comments: Residential uses are required to comply with wetland, habitat and natural area standards as identified on the City's Wetland Inventory, Comprehensive Plan Natural Resource Inventory, the Regionally Significant Fish and Wildlife Habitat Map adopted by Metro, and other provisions of the Development Code and Comprehensive Plan.

- The applicant shall identify and describe the significance and functional value of wetlands on the site and protect those wetlands from adverse effects of the development.
- Protection of wetlands is required per 16.144.020(A)(1) and if a reduction in the wetland area is proposed, mitigation is required per 16.144.020(A)(2).
- Regionally Significant Fish and Wildlife Habitat is located on the site and section 16.144.020(C) applies.

Chapter 16.156 Energy Conservation
Staff Comments: Building orientation - buildings and vegetation shall be sited with respect to each other and the topography of the site so that unobstructed sunlight reaches the south wall of the greatest possible number of buildings between the hours of 9:00 am and 3:00 pm PST on December 21st.

Wind – the cooling effects of prevailing summer breezes and shading vegetation shall be accounted for in site design.

City of Sherwood Engineering Comments
Please refer to the **City Engineering Department** Notes dated November 5, 2019.

City of Sherwood Building Division
Comments provided during pre-application conference. Please contact Scott McKie, Building Official, follow up questions at 503-625-4217 or mckies@sherwoodoregon.gov

Tualatin Valley Fire & Rescue Comments
Please see comments from Tom Mooney, Deputy Fire Marshall II, dated October 31, 2019.

Washington County Land Use and Transportation Comments
Comments provided during pre-application conference and in a follow-up email to City staff dated November 15, 2019 (attached).

Engineering Department
Pre-Application Comments

City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

To: Erika Palmer, Planning Manager

From: Bob Galati P.E., City Engineer

Project: PAC 19-13 Brookman Riverside Homes

Date: November 7, 2019

Engineering staff have reviewed the proposed site development submittal information. All final approved construction plans will need to conform to the design and construction standards established by the City of Sherwood's Engineering and Public Works Departments, Washington County Department of Land Use and Transportation (WACO), Clean Water Services (CWS), Tualatin Valley Fire and Rescue (TVF&R), in addition to other jurisdictional agencies which may provide land use comments. The City of Sherwood Engineering Department pre-application review comments are as follows:

General Observations

The proposed site development is located at 17433 SW Brookman Road (Tax Lot # 3S1060000104), which is approximately 50-feet east of the intersection of SW Oberst Road and SW Brookman Road. The site development proposes 28 SFR lots along with associated public infrastructure improvements.

The site development is located within the northern portion of the site, and is bounded on east and south sides by wetlands and vegetated corridors. The north and west side of the site development abuts the proposed Holt Homes site development (Middlebrook Subdivision).

Transportation Comments

Any development along Brookman Road will have challenging impacts to Brookman Road and the intersections of Hwy 99W, and the railroad crossing. Brookman Road is classified by WACO TSP as an arterial road, with a 5-lane section. A TIA may be required to identify critical road issues that are significantly exacerbated by the proposed development.

The proposed subdivision includes an interior road whose section appear to meet City standards for residential streets, in this case a 28-foot wide paved width with parking limited to one side only. This parking condition will need to be addressed or highlighted in the Land Use application.

The proposed development includes completion of the SW Trillium Lane road section. The Middlebrook Subdivision proposed a ¾ street development section, which will be completed as part of this development.

The proposed development appears to show a community trail and visual corridor improvements along the Brookman Road frontage. These improvements are not consistent with the City or WACO frontage improvement requirements for Brookman Road. It can be anticipated that to meet pre-established frontage requirements;

a) A 33-foot right-of-way dedication will be required.

b) An 8-foot wide PUE will be required along Brookman Road and along all interior public streets.
c) A 15-foot wide visual corridor outside the right-of-way limits.

A public access easement granted to the City over the interior community trail system may be required.

Actual access to a public street is limited to after Middlebrook Subdivision has completed construction of its street improvement requirements and the City has accepted the improvements as public infrastructure. Until such time, Engineering Department approval for the proposed Land Use may not be given.

Sanitary Sewer System Comments

The proposed site development does not have direct access to any public sanitary sewer until the Middlebrook Subdivision site development project has constructed it public sanitary sewer system.

The proposed development will be required to extend a proposed sanitary sewer trunk line being constructed with the Middlebrook Subdivision development. The extension will connect where the Middlebrook Subdivision sanitary sewer project ends, and extend that trunk line system to SW Brookman Road. Coordination with CWS on the design requirements for this system will also be required.

Since the sanitary sewer trunk line extension is sized to service a significant area much larger than the adjacent site developments, the applicant may wish to establish a reimbursement district to recover the costs associated with the installation of the sanitary sewer trunk line.

Actual access to a public sanitary sewer system is limited to after Middlebrook Subdivision has completed construction of it sanitary sewer improvement requirements and the City has accepted the improvements as public infrastructure. Until such time, Engineering Department approval for the proposed Land Use may not be given.

Water System Comments

The proposed development will route a public waterline between Wapato Lake Drive and Trillium Lane.

The proposed development may also be required to extend a water trunk line along Brookman Road, between the two property corners. This trunk line is identified in the City's Water Master Plan. The development may recover some of the costs of this line due to oversizing.

Actual access to a public water system is limited to after Middlebrook Subdivision has completed construction of its public water improvement requirements and the City has accepted the improvements as public infrastructure. Until such time, Engineering Department approval for the proposed Land Use may not be given.

Stormwater System Comments

The proposed development has shown accommodations for a regional stormwater treatment facility to provide storm water quality treatment and detention The applicant will need to comply with CWS current design standards including hydromodification. The stormwater report will also need to address hydromodification requirements.

Other Engineering Miscellaneous Comments

A. An "As-Built Request" form is available on the City of Sherwood website for obtaining as-built information and documents. A fee is associated with the As-Built Request.

B. City of Sherwood MC standards require an 8-foot wide Public Utility Easement (PUE) along all dedicated right-of-way.

C. Site developments which create a surface area impact of 5 or more acres will require obtaining an NPDES 1200-C permit from CWS. For surface are impacts of between 1 and 5 acres, an NPDES 1200-CN permit will need to be obtained through the City of Sherwood. Surface area impacts of less than 1 acre will only require a site grading and erosion control permit issued from the City of Sherwood Building Department.

D. As part of the Land Use submittal requirements, the applicant must submit a Site Pre-Screening Assessment request to CWS, and provide the City with a copy of the Service Provider Letter (SPL) issued by CWS for the site development. Final site development approval will require a Stormwater Connection Permit being issued from CWS for the proposed site development.

E. Permits for demolition of any existing structures located on the proposed site development, will be obtained from the City of Sherwood Building Department. Permit fees for the demolition permit will be apply.

F. City of Sherwood Broadband utilities shall be installed (if not in existence) along the proposed site development frontage along all public street right-of-way, as per requirements set forth in City Ordinances 2005-017 and City Resolution 2005-074.

G. A draft estimate of City SDCs, CWS SDCs and WACO TDT, has been provided as part of this review, if the application has provided sufficient development information to conduct such estimate. If provided, the estimate will list the assumptions made in the calculations. If certain SDCs have been left undefined it is because there is not sufficient information to provide said estimate amount. NOTE: SDC/TDT estimate amounts are based on assumptions and SDC/TDT rates current at the time the estimate was created. Final authorized SDC/TDT fee amounts will be calculated at the time building permits are issued, and may vary significantly from the estimate amount provided with these review comments.

End of Comments

Disclaimer

The comments provided above are initial in nature and are in no way binding as to what the conditions may or may not be imposed on the development due to the City of Sherwood Land Use approval process. Engineering have applied standard efforts to provide applicant with accurate public infrastructure information and engineering development standards related to the level and completeness of the applicants submittal. Note that in lacking certain applicant development information engineering has made best reasonable assumptions in development of the comments. However, the comments provided may not be complete and may not accurately reflect the site developments end product.

Tualatin Valley Fire & Rescue

www.tvfr.com

October 31, 2019

Eric Rutledge
Associate Planner
City of Sherwood
22560 SW Pine Street
Sherwood, Oregon 97140

Re: Scott Property
Tax Lot I.D: 3S1060000104

Dear Eric,

Thank you for the opportunity to review the proposed site plan surrounding the above named development project. These notes are provided in regards to the pre-application meeting held on November 5, 2019. There may be more or less requirements needed based upon the final project design, however, Tualatin Valley Fire & Rescue will endorse this proposal predicated on the following criteria and conditions of approval.

FIRE APPARATUS ACCESS:

1. **FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDINGS AND FACILITIES:** Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)

2. **FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE:** Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1)

3. **FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS:** Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)

4. **SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced as to provide all-weather driving capabilities. (OFC 503.2.3)

5. **TURNING RADIUS:** The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

6. **ACCESS ROAD GRADE:** Fire apparatus access roadway grades shall not exceed 15%.

7. **ANGLE OF APPROACH/GRADE FOR INTERSECTIONS:** Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)

8. **ACCESS DURING CONSTRUCTION:** Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3309 and 3310.1)

9. **TRAFFIC CALMING DEVICES:** Shall be prohibited on fire access routes unless approved by the Fire Marshal. (OFC 503.4.1). Traffic calming measures linked here: http://www.tvfr.com/DocumentCenter/View/1578

FIREFIGHTING WATER SUPPLIES:

10. **FIREFIGHTING WATER SUPPLY FOR INDIVIDUAL ONE- AND TWO-FAMILY DWELLINGS:** The minimum available fire flow for one and two-family dwellings served by a municipal water supply shall be 1,000 gallons per minute. If the structure(s) is (are) 3,600 square feet or larger, the required fire flow shall be determined according to OFC Appendix B. (OFC B105.2)

    Minimum required water supply is 1,000GPM.

11. **FIRE FLOW WATER AVAILABILITY:** Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

    Provide documentation of fire hydrant flow test or modeling.

12. **WATER SUPPLY DURING CONSTRUCTION IN MUNICIPAL AREAS:** In areas with fixed and reliable water supply, approved firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

FIRE HYDRANTS:

13. **FIRE HYDRANTS – ONE- AND TWO-FAMILY DWELLINGS & ACCESSORY STRUCTURES:** Where the most remote portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided. (OFC 507.5.1)

14. **FIRE HYDRANT NUMBER AND DISTRIBUTION:** The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 105.1. (OFC Appendix C)

    Indicate location of fire hydrants on plans.

15. **FIRE HYDRANT(S) PLACEMENT:** (OFC C104)
    - Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
    - Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the Fire Marshal.
    - Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the Fire Marshal.

- Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the Fire Marshal.

16. **PRIVATE FIRE HYDRANT IDENTIFICATION:** Private fire hydrants shall be painted red in color. Exception: Private fire hydrants within the City of Tualatin shall be yellow in color. (OFC 507)

17. **FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD:** Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the Fire Marshal. (OFC C102.1)

18. **REFLECTIVE HYDRANT MARKERS:** Fire hydrant locations shall be identified by the installation of blue reflective markers. They shall be located adjacent and to the side of the center line of the access roadway that the fire hydrant is located on. In the case that there is no center line, then assume a center line and place the reflectors accordingly. (OFC 507)

19. **PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6 & OFC 312)

20. **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

BUILDING ACCESS AND FIRE SERVICE FEATURES

21. **PREMISES IDENTIFICATION:** New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

If you have questions or need further clarification or would like to discuss any alternate methods and/or materials, please feel free to contact me at **503-259-1419.**

Sincerely,

Tom Mooney

Tom Mooney
Deputy Fire Marshal II

Thomas.mooney@tvfr.com

Cc: File
City of Sherwood

A full copy of the New Construction Fire Code Applications Guide for Residential Development is available at http://www.tvfr.com/DocumentCenter/View/1438

From: Naomi Vogel
To: Eric Rutledge
Subject: RE: Scott Property Pre-App (PAC 19-13)
Date: Friday, November 15, 2019 1:19:34 PM

Hi Eric,

County staff agree that a half-street improvement would not be proportional in this case.

- ROW dedication of 53 feet from centerline. Additional slope/drainage easement may be required pending discussion with City staff regarding the Visual Corridor.
- Stormwater treatment consideration for future half-street on the site (via proposed stormwater system or easements within the CWS VC via plat).
- Widening of pavement to minimum 22 feet total width if possible.

Thank you,

Naomi Vogel | Associate Planner
503-846-7639 Naomi_Vogel@co.washington.or.us

From: Eric Rutledge [mailto:RutledgeE@SherwoodOregon.gov]
Sent: Thursday, November 14, 2019 9:49 AM
To: Naomi Vogel
Subject: Scott Property Pre-App (PAC 19-13)

Hi Naomi,

I'm wrapping up the Scott Property Pre-App notes for the conference held last week. Will WACO be providing written comments?

Thanks,

Eric Rutledge
Associate Planner
City of Sherwood
503-625-4242
rutledgee@sherwoodoregon.gov

From: Eric Rutledge
To: Niki Munson
Cc: Morgan Holen (morgan.holen@comcast.net); Matt Sprague
Subject: RE: Scott Pre-App Follow Up Questions
Date: Wednesday, November 13, 2019 8:38:00 AM
Attachments: image001.png

Hi Niki,

Good questions – thanks for clarifying early. I checked-in with Joy and Erika to confirm the responses below:

- The first recommendation is to confirm with CWS about their requirements for tree inventory and protection related to the vegetated corridor of Cedar Creek. The stricter requirements between CWS and the City will apply.
- For City review we can accept bubbled areas on the plans that indicate groupings of trees. This should only be used when all trees in that group are proposed for either protection or removal and an individual breakdown is not warranted (e.g. in the riparian corridor where no trees are proposed for removal). The transect approach you described will work. We'll want to understand generally the variety, size, and health of those groups of trees. Of course we'll also need to know whether the group is identified for removal or protection.
- For areas where a more detailed analysis is warranted, like along the new trail, the approach you described should also work well. Each individual tree should be surveyed and inventoried with a proposal for protection or removal.

Thank you,

Eric Rutledge
Associate Planner
City of Sherwood
503-625-4242
rutledgee@sherwoodoregon.gov

From: Niki Munson <NMunson@riversidehome.com>
Sent: Friday, November 8, 2019 8:10 AM
To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: Morgan Holen (morgan.holen@comcast.net) <morgan.holen@comcast.net>; Matt Sprague <MSprague@pd-grp.com>
Subject: Scott Pre-App Follow Up Questions

Hi Eric,

Thank you for managing our pre-app so well yesterday. As we discussed, there was not enough time to talk about trees. I have the following questions and am copying our planner and our arborist on this email so we are all on the same page. Could you reply all as soon as possible so our arborist can properly scope this project? Thank you.

- Do all trees in the forested stand have to be surveyed and inventoried individually? Or is there a way to survey only the trees we will be impacting?
- Does this area meet the definition of a woodland? And if so, can we take a more efficient approach to the inventory?
- As an alternative to individual tree inventory, would it be acceptable for us to cruise the woodland to obtain a statistically valid sample of the species mix and average diameters and general conditions? This would involve running transects through the woodland and collecting sample data at plots, then extrapolating the data based on the total size of the stand.
- The site plan shows that the stand will be partially removed and the community trail is the boundary of the new edge. In addition to cruising the stand to describe what's there as a whole, we could have survey locate individual trees along the trail alignment and 20' to the south, and collect individual tree data for these trees. We may also need to do this along the southern boundary where a new edge will be created for street improvements. This would allow a more detailed assessment as to the condition of the trees that will be exposed by adjacent tree removal—I'm more concerned with the trees that would remain and be exposed along the new edge than what would need to be removed for development. The concern is that trees that have grown up interior to the stand may have poor height to diameter ratios and small live crowns making them susceptible to wind throw. We want to make sure that trees left along the new edges are not at risk of failure once exposed. It will be challenging to know for sure how good the new edges are during design—but we can take our best shot at it. That being said, will the City provide flexibility to reassess the new edges at the time of site clearing in terms of tree condition, structure and risk potential, and permit additional tree removal if any trees that were originally proposed for preservation are identified and documented as hazardous?

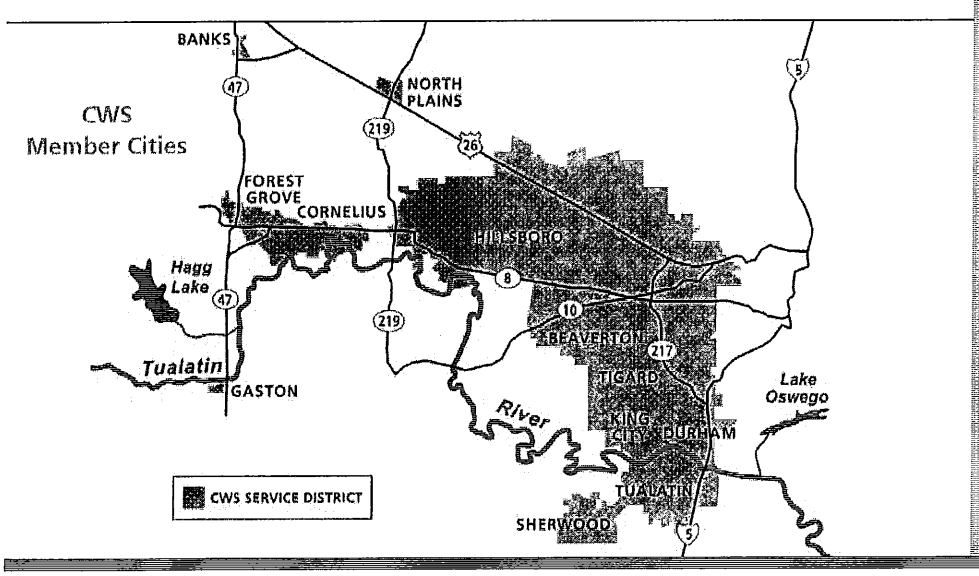
Niki Munson, Land Acquisition Manager
Riverside Homes
17933 NW Evergreen Place, Ste 370, Beaverton, OR 97006
503.645.0986 office |971.222.9965 cell

Clean Water Services

ANNEXATION

Clean Water Services and the Member Cities own and maintain the public storm and sanitary conveyance and treatment systems in the urbanized portion of the Tualatin River Watershed. Annexation to CWS is required of any property that will connect to this public system for urban services, including:

- Connection of a private lateral pipe to a public conveyance or treatment system;
- Extension of the public conveyance system for private connection, as a result of development;
- Addition of impervious surface which causes surface water to flow to the public stormwater system, which includes conveyance pipes, roadside ditch, curb and gutter, swale, etc.



County role in CWS annexations

Washington County Long Range Planning Division processes all annexation requests to Special Service Districts, including CWS.

Contact the County for information about filing a petition to annex to CWS, including fees and timelines. Once a petition is filed with the County, CWS will be notified. No separate application to CWS is required.

City role in CWS annexations

If a property is located within a City, and the owner requests annexation to CWS, the City must endorse the annexation petition. Endorsement from a city generally comes from the City Council and will be in the form of a council resolution or a similar document that demonstrates the City's support.

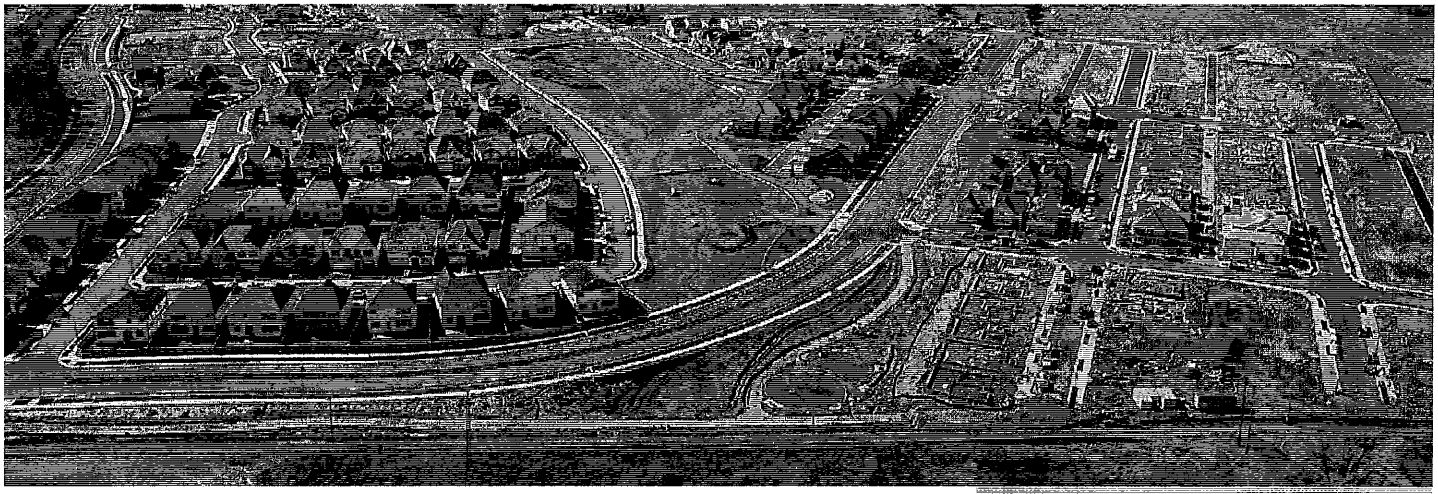
Contact the individual City planning department for information about City annexation requirements.

CWS Board role

CWS Board of Directors must endorse the petition for annexation. County staff will route annexation requests to CWS for review and staff recommendation to the Board of Commissioners. There is nothing additional that the applicant needs to do to request CWS Board endorsement.

The CWS Board has the authority to endorse property annexations individually, or in batch requests. In new UGB expansion areas, the Board can issue a blanket endorsement in support of future annexation, which results in a reduction of application fees and paperwork. If a blanket endorsement of multiple properties is desired, this should be reflected in the application to Washington County.

ANNEXATION



Are there any exceptions?

Yes. Annexation to CWS is not required when construction of public storm and sanitary infrastructure takes place on or across properties outside District boundaries, and there is no private connection to infrastructure.

Example: A sanitary forcemain conveying flows from one urban area to another across rural reserve farmland with no private rural connection. However, if future connection is planned, annexation will be required with permits at the time of connection.

Does annexation to CWS ever trigger annexation to a City?

Yes. If a property outside of a City plans to connect to a City owned storm or sanitary sewer, confirmation of Service Availability must be provided by the City. This often results in a requirement for the property to annex to the City as well as to CWS.

What areas are served?

- The cities of Banks, Beaverton, Cornelius, Durham, Forest Grove, Gaston, Hillsboro, King City, North Plains, Sherwood, Tigard, Tualatin
- Large portions of unincorporated Washington County
- Small portions of Portland, Lake Oswego, Multnomah County, and Clackamas County.

Contact us if you are close to a jurisdictional boundary, and are unsure whether the property will be served by CWS.

How does annexation fit into the CWS permit process and timeline?

At any point during or after annexation, CWS can:

- Issue a Service Provider Letter
- Accept permit applications
- Review plans

After annexation is approved:

- CWS can issue permits
- Construction can begin

Revised June 2016

Resources

CWS boundaries:
Find a link to the web map tool on cleanwaterservices.org/permits-development/resource-directory

Contact/visit:
Washington County Long Range Planning Division
155 N. First Avenue
Suite 350-14
Hillsboro, Oregon 97123
503.846.3519
co.washington.or.us/LUT

The CWS Development Services group is here to review your project in the most effective and efficient way, while protecting the Tualatin River Watershed. Our partners include municipalities, environmental organizations, and developers large and small.

Clean Water Services

DEVELOPMENT SERVICES
2550 SW Hillsboro Highway
Hillsboro, Oregon 97123
503.681.5100
permits@cleanwaterservices.org
cleanwaterservices.org/permits-development

RECEIVED
OCT 14 2019
City of Sherwood
Planning Dept.

Case No. PAC19-13
Fee 400.00
Receipt # 011228
Date 10.14.19
TYPE PAC

City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

Pre-application Form

Type of Land Use Action(s) Proposed:

- ☐ Annexation
- ☐ Plan Amendment
- ☐ Variance
- ☐ Planned Unit Development
- ☐ Sign Permit
- ☐ Conditional Use
- ☐ Minor Partition
- ☒ Subdivision
- ☐ Site Plan
- ☐ Other: _____

Owner/Applicant Information:

Applicant(s): Riverside Homes, Niki Munson Phone: 503-645-0986

Address(s): 17993 NW Evergreen Place, Suite 370
Beaverton, OR 97006

Owner(s): Richard L. & Linda R. Scott Phone: _____

Address: 17433 SW Brookman Road, Sherwood.

Contact for Additional Information: Matt Sprague 503-643-8286
msprague@pd-grp.com

Property Information:

Street Location: 17433 SW Brookman Road, Sherwood.
Tax Lot and Map No: T3S1W 06 Tax Lot 104
Existing Structures/Use: Single Family Home and out buildings
Existing Plan/Zone Designation: Medium Density Residential Low - MDRL

Proposed Action:

Proposed Use: 28-Lot Subdivision

Proposed Plan/Zone Designation: Medium Density Residential Low - MDRL

Proposed No. of Phases (one year each): _____

Standard to be Varied & the amount of the variance Varied (Variance Only):

Exhibit A3

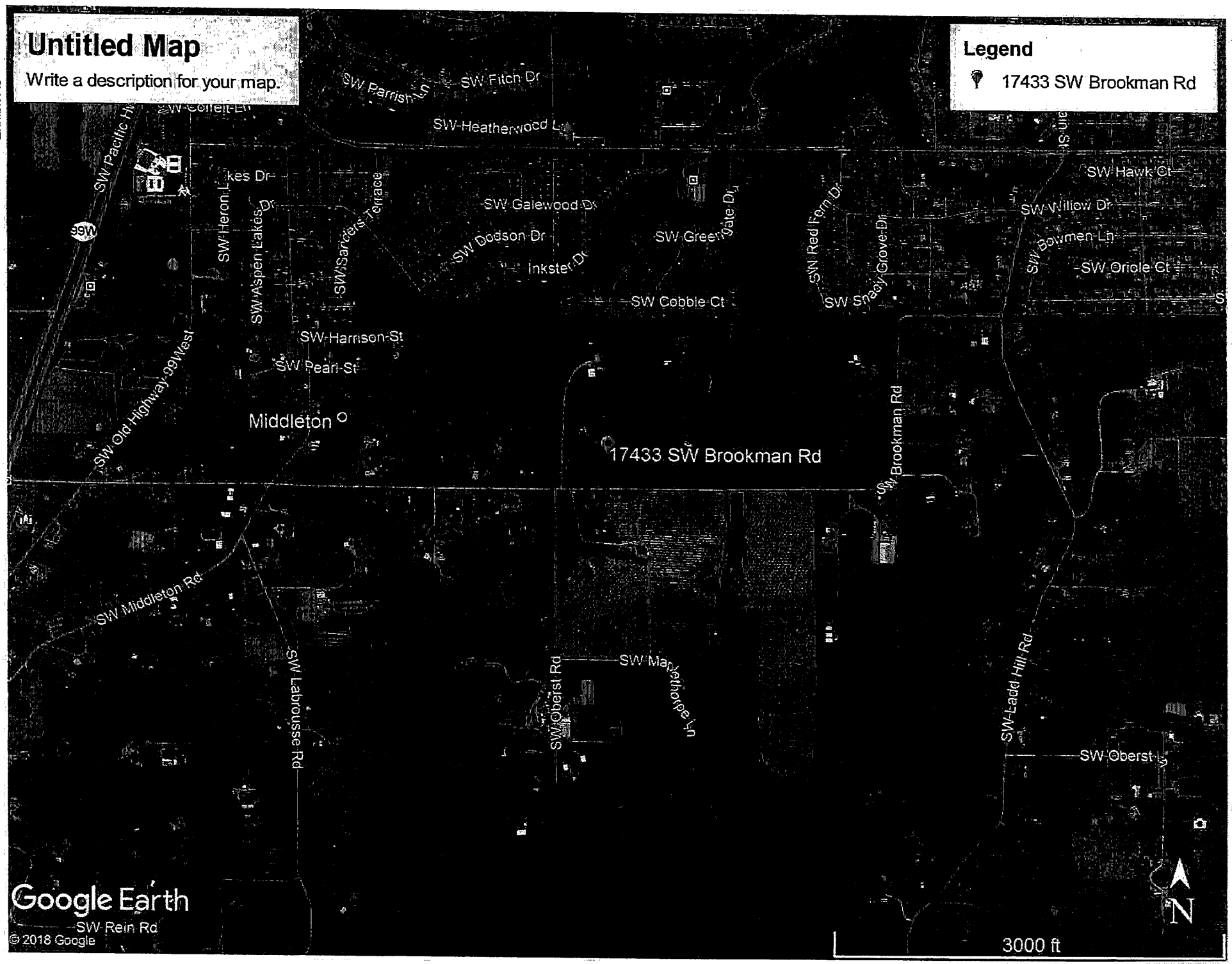

Untitled Map
Write a description for your map.
Legend
17433 SW Brookman Rd
SW Parrish Ln
SW Fitch Dr
SW Heatherwood Ln
SW Pacific Hwy
SW Heron Lakes Dr
SW Aspen Lakes Dr
SW Sanders Terrace
SW Galewood Dr
SW Dodson Dr
SW Greengate Dr
SW Red Fern Dr
SW Shady Grove Dr
SW Hawk Ct
SW Willow Dr
SW Bowmen Ln
SW Oriole Ct
Inkster Dr
SW Cobble Ct
SW Harrison St
SW Pearl St
SW Old Highway 99 West
Middleton
17433 SW Brookman Rd
SW Brookman Rd
SW Middleton Rd
SW Labrousse Rd
SW Oberst Rd
SW Marionbrook Ln
SW Ladd Hill Rd
SW Oberst Ln
SW Rein Rd
Google Earth
© 2018 Google
N
3000 ft

Exhibit A3

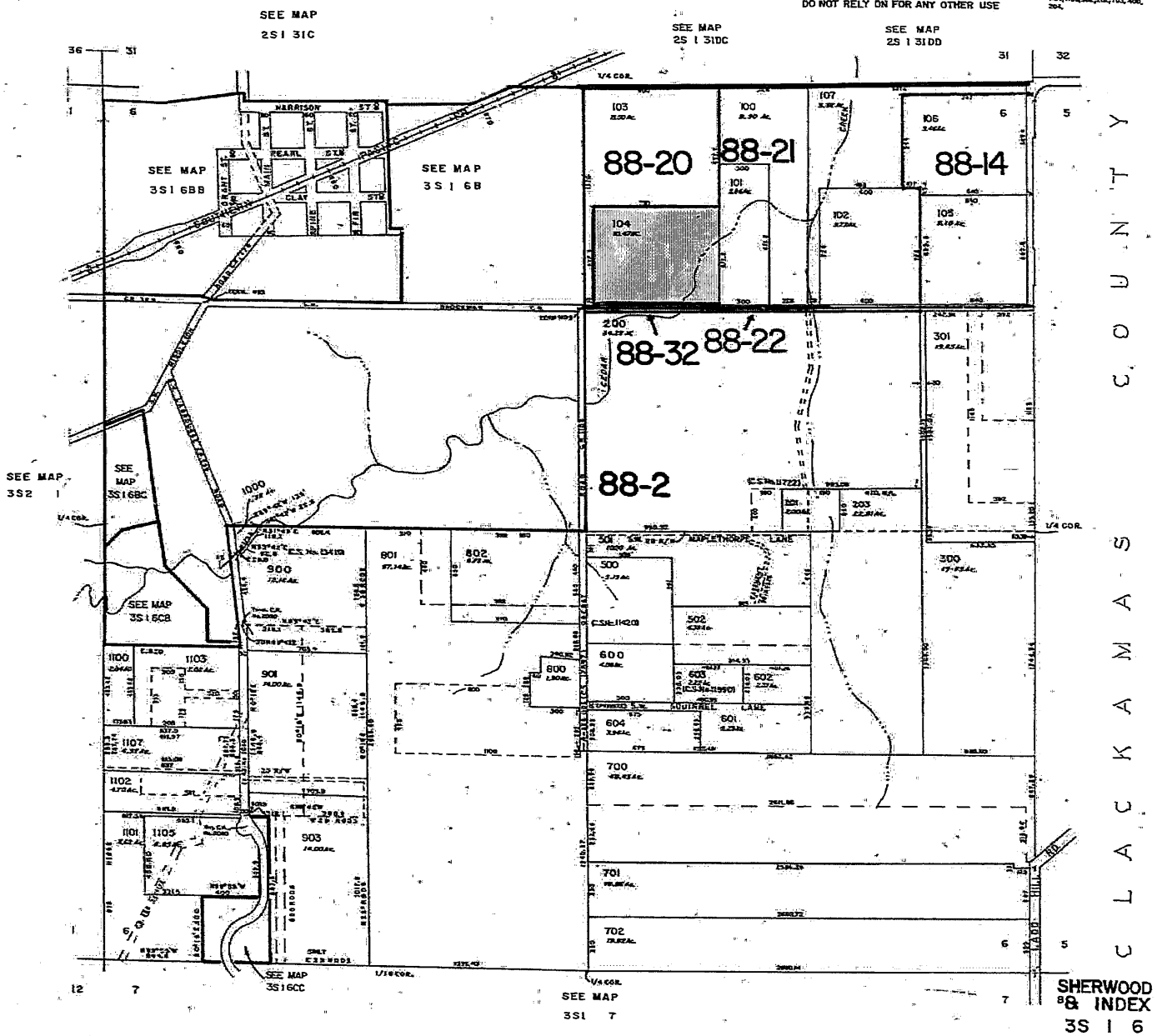
SECTION 6 T3S R1W W.M.

WASHINGTON COUNTY OREGON

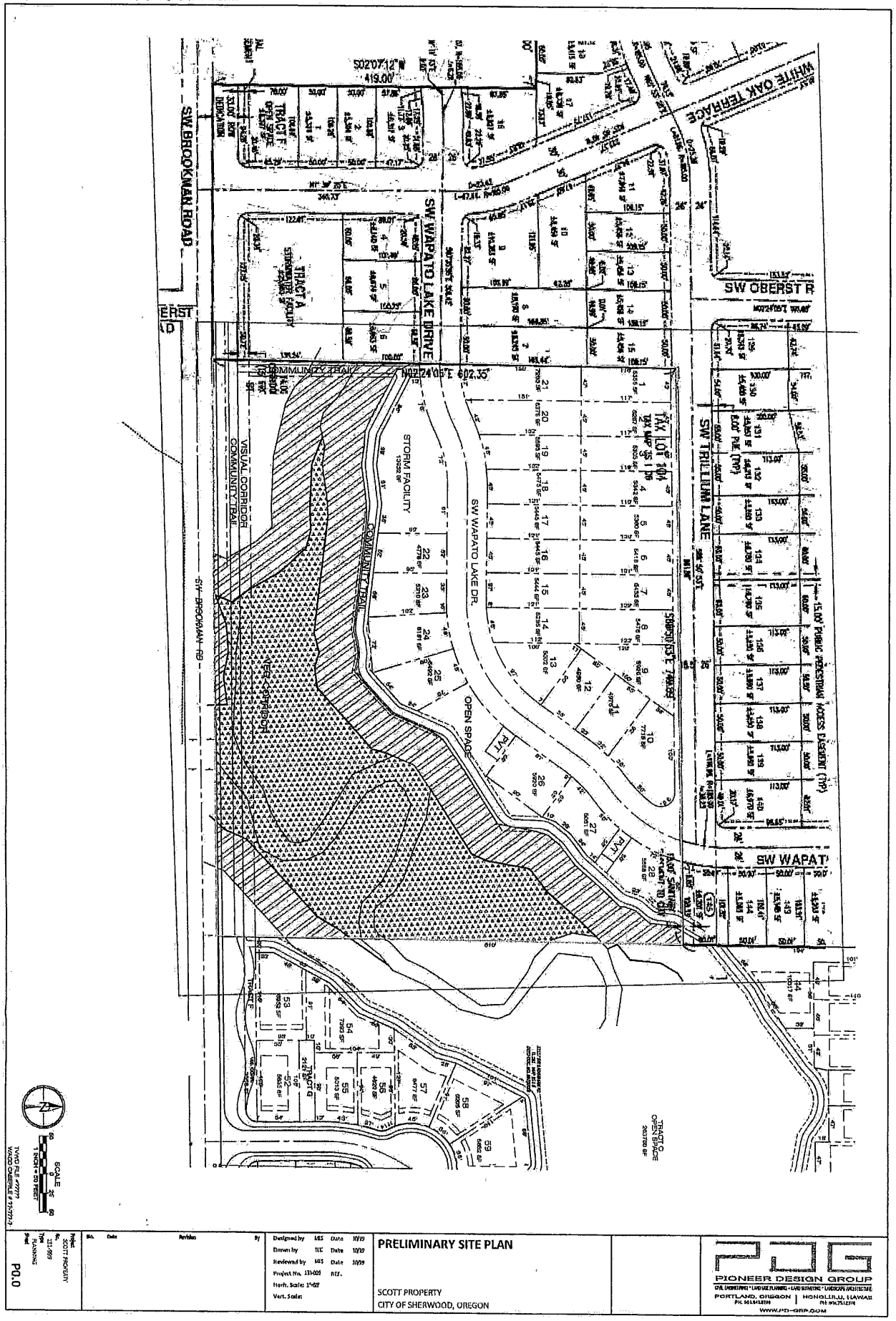
SCALE 1"=400'

3S1 6 & INDEX

FOR ASSESSMENT PURPOSES ONLY
DO NOT RELY ON FOR ANY OTHER USE



SHERWOOD & INDEX 3S1 6



No.	Date	Revision	By

Designed by MS Date 10/19
Drawn by TLE Date 10/19
Reviewed by MS Date 10/19
Project No. 131-025 Ref.
Horiz. Scale: 1"=50'
Vert. Scale:

PRELIMINARY SITE PLAN

SCOTT PROPERTY
CITY OF SHERWOOD, OREGON

PIONEER DESIGN GROUP
CIVIL ENGINEERING • LAND USE PLANNING • LAND SURVEYING • LANDSCAPE ARCHITECTURE
PORTLAND, OREGON | HONOLULU, HAWAII
PH: 503.643.8286 PH: 808.754.5294
WWW.PD-GRP.COM

Proj. SCOTT PROPERTY
No. 131-025
Type PLANNING
Shed

P0.0

TVKD FILE #7777
WOOD CASEFILE # 777777-7

RECEIPT DATE 10-14-19 No. 011228

RECEIVED FROM Riverside Home/Nicky Munson $400.00

four hundred 00/100 DOLLARS

○ FOR RENT
⊗ FOR PAC 19-13 Scott Property

ACCOUNT	
PAYMENT	400 -
BAL. DUE	

○ CASH
○ CHECK
○ MONEY ORDER
⊗ CREDIT CARD

FROM _____ TO _____

BY Colleen

3-11

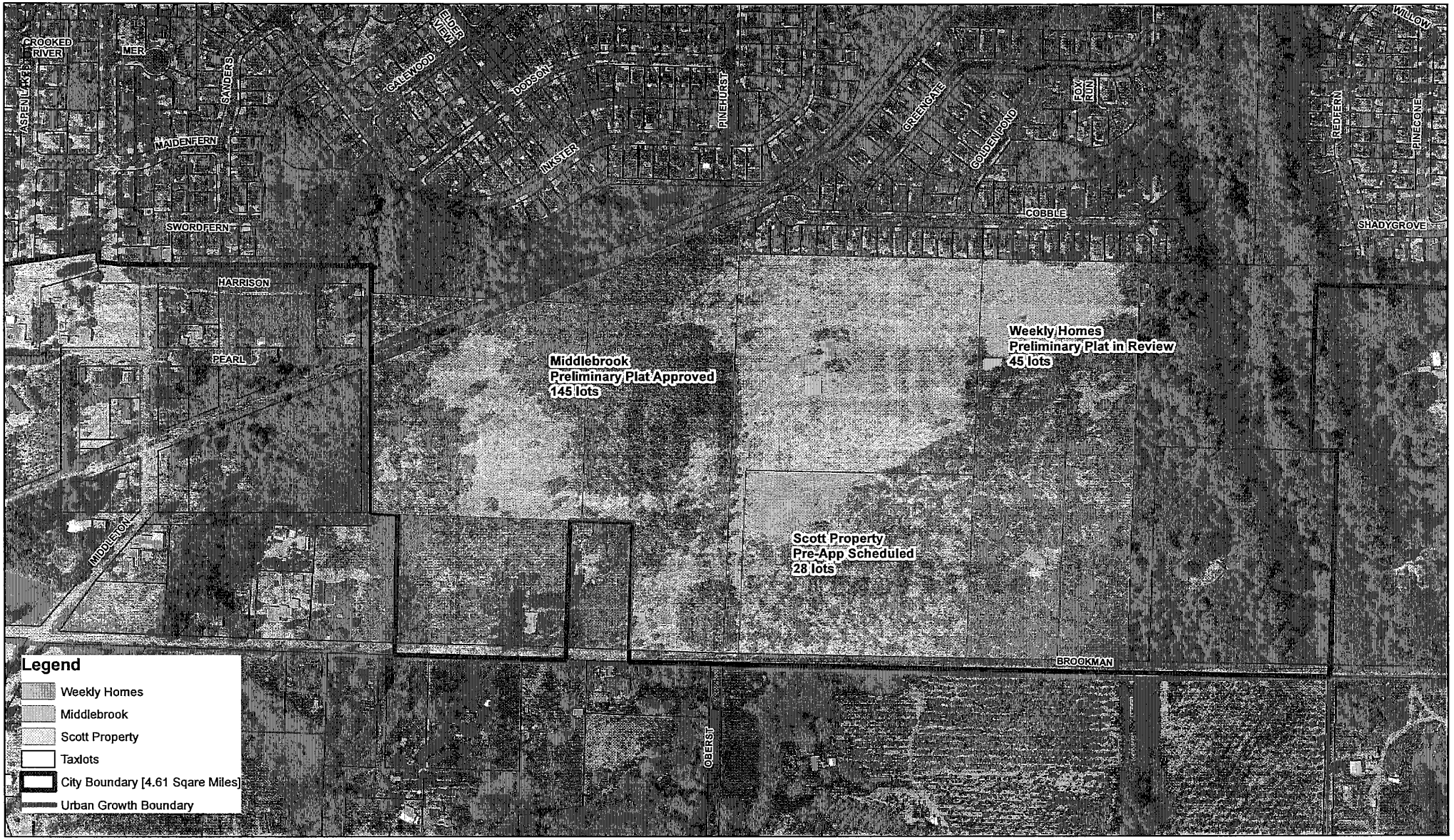
CITY OF SHERWOOD, OR
22560 SW PINE ST
SHERWOOD , OR 97140
10/14/2019 13:38:26
MID: XXXXXXXXXXXX853 TID: XXXXX681

CREDIT CARD

VISA SALE

Card # Token	XXXXXXXXXXXX8943
SEQ #:	2
Batch #:	928
INVOICE	3
Approval Code:	038649
Entry Method:	Manual
Mode:	Online
Tax Amount:	$0.00
Cust Code:	17933
Avs Code:	NNN

SALE AMOUNT $400.00



Date: 11/7/2019

N

0 145 290 580 870 1,160

Feet

City of Sherwood Oregon

Map data provided by METRO and the City of Sherwood. The City of Sherwood's infrastructure records,drawings, and other documents have been gathered over many years, using many different formats and standards. While the data provided is generally believed to be accurate, occasionally it proves to be incorrect; thus its accuracy is not guaranteed.

APPLICATION MATERIALS REQUIRED FOR

SUBDIVISION PLAT

Submit the following to the City of Sherwood Planning Department, 22560 SW Pine St., Sherwood, OR 97140: (503) 925-2308.

It is strongly suggested that you have a pre-application meeting with the City prior to submitting for a Subdivision. (See *Pre-application Process* form for information.)

Note: The Clean Water Services (CWS) requires a pre-screening to determine if water quality sensitive areas exist on the property. If these sensitive areas exist, a Site Assessment and Service Provider Letter is required prior to submitting for a subdivision or minor land partition or undertaking any development. **This application will not be accepted without a completed Pre-Screening Form and if required a Service Provider Letter.** Please contact CWS at (503) 681-3600.

If the proposal is next to a Washington County roadway, the applicant must submit an Access Report (Traffic Study) to Washington County Department of Land Use and Transportation (503) 846-8761. **This application will not be accepted until an Access Report (Traffic Study) is submitted to Washington County and the Access Report is deemed complete by the County; or written verification from Washington County that an Access Report is not required is provided.**

I. **Fee -** See City of Sherwood current Fee Schedule, which includes the "Publication/Distribution of Notice" fee, at **www.sherwoodoregon.gov.** Click on Departments/Planning/ Fee Schedule.

Note: The above fee is required at the time you submit for a subdivision. Additional fees will be charged for building permit, system development charges, impact fees and other fees applicable to the development. These fees will be charged when you make application for building permit. Building permit application will not be accepted until the final plat is recorded.

II. **BACKGROUND INFORMATION** (all materials collated and folded (not rolled) to create fifteen (15) sets)

*Note that the *final* application must contain fifteen (15) folded sets of the above, however, upon initial submittal of the application and prior to completeness review, the applicant may submit four (4) complete folded sets with the application in lieu of fifteen (15), with the understanding that fifteen (15) complete sets of the application materials will be required before the application is deemed complete and scheduled for review.

☐ **Application Form –** One original and fourteen (14) copies of a completed **City of Sherwood Application for Land Use Action** form. Original signatures from all owners must be on the application form.

☐ **Documentation of Neighborhood Meeting** - Affidavits of mailing, sign-in sheets and a summary of the meeting notes shall be included with the application.

☐ **Tax Map** - Fifteen (15) copies of the latest Tax Map available from the Washington County Assessor's Office showing property within at least 300 feet with scale (1"=100' or 1"= 200') north point, date and legend.

☐ **Mailing Labels –** Two (2) sets of mailing labels for property owners within 1,000 feet of the subject site, including a map of the area showing the properties to receive notice. Mailing labels are available from the Washington County Assessors office or a private title insurance company. . Ownership records shall be based on the most current available information from the Tax Assessor's office. *It is the applicant's responsibility to provide mailing labels that accurately reflect all property owners that reside within 1,000 feet of the subject site.*

☐ **Vicinity Map –** Fifteen (15) copies of a vicinity map. A photocopy of the Thomas Guide is adequate, showing the City limits and the Urban Growth Boundary.

☐ **Narrative –** Fifteen (15) copies and **an electronic copy** of a narrative explaining the proposal in detail and a response to the Required Findings for Subdivision, located in Chapter 16 of the Municipal Code/Zoning & Development, Section 16.120. The Municipal Code/Zoning & Development is available online at www.sherwoodoregon.gov, City Government/Records.

☐ **Electronic Copy –** An electronic copy of the entire application packet. This should include all submittal materials (narrative, vicinity map, mailing labels, site plan, preliminary plat, etc.).

III. REQUIRED PLANS

Submit fifteen (15) sets of the following folded full-size plans and **an electronic copy in PDF format**. Plans must have:

1) The proposed name of the development. If a proposed project name is the same as or similar to other existing projects in the City of Sherwood, the applicant may be required to modify the project name.
2) The name, address and phone of the owner, developer, applicant and plan producer.
3) North arrow,
4) Legend,
5) Date plans were prepared and date of any revisions
6) Scale clearly shown. Other than architectural elevations, all plans must be drawn to an engineer scale.
7) All dimensions clearly shown.

☐ **Existing Conditions Plan** - Existing conditions plan drawn to scale showing: property lines and dimensions, existing structures and other improvements such as streets and utilities, existing vegetation including trees, any floodplains or wetlands and any easements on the property. The existing conditions plan shall also include the slope of the site at 5-foot contour intervals

☐ **Preliminary Development Plans-** Plans must be sufficient for the Hearing Authority to determine compliance with applicable standards. The following information is typically needed for adequate review:

1. The subject parcel(s), its dimensions and area and the buildable area of each lot.

2. The location and dimensions of proposed development, including the following:

Transportation

a. Public and private streets with proposed frontage improvements including curb, gutters, sidewalks, planter strip, street lighting, distances to street centerline, pavement width, right-of-way width, bike lanes and driveway drops.
b. Public and private access easements, width and location.
c. General circulation plan showing location, widths and direction of existing and proposed streets, bicycle and pedestrian ways and transit routes and facilities.
d. Show the location and distance to neighboring driveways and the width and locations of driveways located across the street.
e. The location and size of accesses, sight distance and any fixed objects on collectors or arterial streets.
f. Emergency accesses.

Grading and Erosion Control

g. Indicate the proposed grade at two (2)-foot contour intervals.
h. Indicate the proposed erosion control measures to CWS standards (refer to CWS R&O 07-20).
i. Show areas of cut and fill with areas of structural fill.
j. Show the location of all retaining walls, the type of material to be used, the height of the retaining wall from the bottom of the footing to the top of the wall and the exposed height of the wall.

Utilities

k. Utilities must be shown after proposed grade with 2-foot contour intervals.
l. Map location, purpose, dimensions and ownership of easements.
m. Fire hydrant locations and fire flows.
n. Water, sewer and stormwater line locations, types and sizes.
o. Clearly indicate the private and public portions of the system.
p. Above-ground utilities and manhole locations

Preliminary Stormwater Plan

q. Show location, size and slope of water quality facility.
r. Preliminary calculations justifying size of facility.
s. The total square footage of the new and existing impervious area.
t. Indicate a stormwater facility to CWS standards (CWS R&O 07-20).

Sensitive Areas

u. Show any and all streams, ponds, wetlands and drainage ways.
v. Indicate the vegetative corridor for sensitive areas to CWS standards. (R&O 07-20).
w. Indicate measures to avoid environmental degradation that meet CWS, DSL and Army Corp requirements.
x. Flood elevation.
y. Wetland delineation and buffering proposed.

Land Use

z. The square footage of each building and a break down of square footage by use. (i.e. retail, office, industrial, residential, etc.).
aa. Net buildable acres. (The land remaining after unbuildable areas are taken out, such as the floodplain and wetland areas.)
bb. Net density calculation for residential use.
cc. Existing trees proposed to remain and trees to be removed and the drip-lines of trees proposed to remain.
dd. Street tree location, size and type. (refer to Ch. 8, Section 8.304.06 of the Community Development Code).
ee. Location, size and height of proposed free-standing signs.
ff. Location, height and type of fencing and walls.
gg. For each lot indicated the building envelope.

☐ **Reduced - Proposed Development Plans –** One (1) reduced copy of the Proposed Development Plans on 8 1/2" by 11" sheets and fifteen (15) reduced copies on 11" by 17" sheets.

☐ **Lighting Plan** – Photometric lighting plan indicating foot candle power on and along the perimeter of the site. Proposed locations, height and size of lights. (If outdoor lighting is proposed).

☐ **Surrounding Land Uses –** Existing land use including nature, size and location of existing structures within 300 feet. .

IV. DOCUMENTS REQUIRED

☐ **Title Report** – Two (2) copies of a current preliminary title report available from a private title insurance company.

☐ **CWS Service Provider Letter** – Four (4) copies of the CWS service provider letter.

☐ **Soils Analysis and/or Geotechnical Report** – Four (4) copies completed by a registered Soils Engineer or Geologist including measures to protect natural hazards. (If required by the City Engineer).

☐ **Traffic Study –** Four (4) copies of a traffic study. (If required by the City Engineer

V. ADDITIONAL DOCUMENTS THAT MAY BE REQUIRED

☐ **Army Corps and DSL wetland applications and/or permits –** Four (4) copies of required Divisions of State Lands and/or Army Corp of Engineers permits and/or permit applications if applicable.

☐ **Trip Analysis** - verifying compliance with the Capacity Allocation Program, if required per 16.108.070.

☐ **Tree Report –** Two (2) copies of a tree report prepared by an arborist, forester, landscape architect, botanist or other qualified professional. (If trees are on-site).

- ☐ **Natural Resource Assessment –** If required by Clean Water Services (CWS). The CWS Pre-Screening indicates as to whether this report is required or not.

- ☐ **Wetland Delineation Study –** if required by Oregon Division of State Lands (DSL) or the Army Corps of Engineers.

- ☐ **Other Special Studies and/or Reports –** if required by the Planning Director or the City Engineer to address issues identified in the pre-application meeting or during project review.

- ☐ Verification of compliance with other agency standards such as CWS, DSL, Army Corps of Engineers, ODOT, PGE, BPA, Washington County

CITY OF SHERWOOD

PRE-APPLICATION CONFERENCE SIGN-IN SHEET

Project:	PAC 19-13	**Meeting Date:**	November 7, 2019
Facilitator:	Eric Rutledge, Associate Planner	**Place/Room:**	City of Sherwood, Conf. Rm. A

Name	Agency or Representation	Email Address
Joy Chaney	COS - Planning	on file
Bob Galati	COS - ENG.	
Scott McKie	COS - Building	
Nick Knight	Seller	nick@knight-realtygroup.com
Johanna Knight	seller agent	joni@Knightrealtygroup.com
Linda Scott	property owner ✓	lindasct@gmail.com
Richard Scott		richsct@gmail.com
Niki Munson	Riverside Homes	NMunson@RiversideHome.com
Matt Sprague	Pioneer Design Group	msprague@pd-grp.com
Jack Dalton	ESA	jack@esapdx.com
Brent Fitch	Pioneer Design Group	bfitch@pd-grp.com
Kelly Asmus	Buyer Agent	Kelly@TKrealestategroup.com
Naomi Vogel	Wash County	naomi_vogel@co.washington.or.us
ERIC RUTLEDGE	COS	AUTLEDGE@SHERWOODOREGON.GOV

PLANNING DEPARTMENT NEIGHBORHOOD MEETING PACKET

(Required for all Type III, IV or V projects)

Submit the following with land use application materials to the City of Sherwood Planning Department, 22560 SW Pine St., Sherwood, OR 97140: (503) 625-5522.

The purpose of the neighborhood meeting is to solicit input and exchange information about the proposed development per Sherwood Zoning and Community Development Code 16.70.020. The meeting must be held in a public location **prior** to submitting a land use application.

☑ Affidavits of mailing to adjacent property owners that are within 1,000 feet of the subject application.

☑ Sign-in sheet(s)

☑ Summary of the meeting notes

(Projects requiring a neighborhood meeting in which the City or Urban Renewal District is the property owner or applicant shall also provide published and posted notice of the neighborhood meeting consistent with the notice requirements in 16.72.020.)

Affidavit of Mailing

DATE:

STATE OF OREGON)
)
Washington County)

I, Ben Altman, representative for the 28-Lot Subdivision proposed development project do hereby certify that the attached notice to adjacent property owners and recognized neighborhood organizations that are within 1,000 feet of the subject project, was placed in a U.S. Postal receptacle on January 17, 2020.

Ben Altman

Representatives Name: Ben Altman
Name of the Organization: Pioneer Design Group

PIONEER DESIGN GROUP, INC.
CIVIL LAND USE PLANNING SURVEY
P 503.643.8286 F 844.715.4743 www.pd-grp.com
9020 SW Washington Square Rd Suite 170
Portland, Oregon 97223

January 17, 2020

RE: NOTICE OF NEIGHBORHOOD REVIEW MEETING FOR A PROPOSED 28-LOT SUBDIVISION.

Dear Resident or Property Owner:

Pioneer Design Group represents the owner of property located at 17433 SW Brookman Road, also identified as Tax Lot 104 of Tax Map T3S R1W 06, as shown on the attached Tax Map. This property is currently zoned Medium Density Residential Low (MDRL) by the City of Sherwood.

We are considering a proposal for a 28-Lot Subdivision. Before applying to the City of Sherwood Planning Department we would like to take the opportunity to informally discuss the proposal in more detail with you.

Pursuant to Sherwood Zoning and Community Development Code Section 16.70.020, you are invited to attend a meeting scheduled for:

Thursday, February 13, 2020 @ 6:30 pm
Marjorie Stewart Community Center
21907 SW Sherwood Blvd., Sherwood, OR 97140

The purpose of this informal meeting is to provide a forum for surrounding property owners / residents to review the proposal and to identify issues so they can be considered before the formal application is submitted. This meeting gives you the opportunity to share with us any special information you know about the property involved. We will try to answer questions related to how the project meets relevant development standards consistent with the City of Sherwood's land use regulations.

Please note that this will be an informational meeting on preliminary development plans prior to official submission to the City. These plans may change slightly before the application is submitted to the City. Depending upon the type of application, you may receive an official notice from the City of Sherwood providing the opportunity to comment either by submitting written comments, and/or by attending a public hearing.

Please feel free to contact us at 503-643-8286 or msprague@pd-grp.com if you have questions about this meeting or the proposed project. We look forward to discussing this proposal with you.

Sincerely,

Matthew L. Sprague
Principal
Pioneer Design Group

Exhibit A4

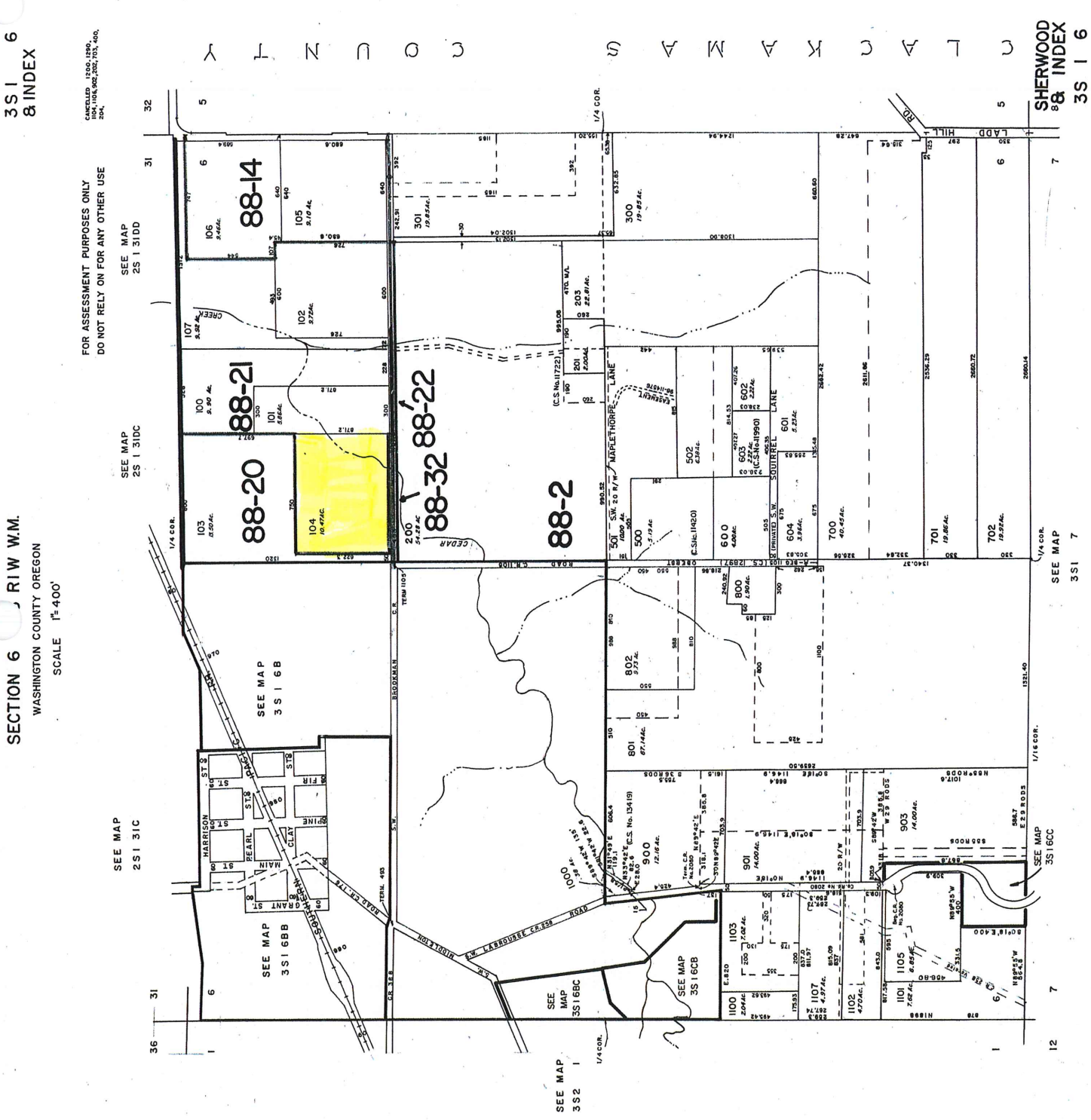

3S I 6
& INDEX
SECTION 6 R I W W.M.
WASHINGTON COUNTY OREGON
SCALE 1"= 400'
FOR ASSESSMENT PURPOSES ONLY
DO NOT RELY ON FOR ANY OTHER USE
CANCELLED: 1200, 1250, 1301, 1400, 1402, 1700, 1701, 400, 204.
SEE MAP 2S I 31DD
SEE MAP 2S I 31DC
SEE MAP 2S I 31C
SEE MAP 3S I 6B
SEE MAP 3S I 6BB
SEE MAP 3S I 6BC
SEE MAP 3S I 6CB
SEE MAP 3S I 6CC
SEE MAP 3S I 7
SEE MAP 3S2 I
88-14
88-21
88-20
88-32
88-22
88-2
COUNTY
CLACKAMAS
SHERWOOD
& INDEX
3S I 6
LADD HILL RD.
MAPLETHORPE LANE
SQUIRREL LANE
CEDAR
MAIN
PEARL
CLAY
HARRISON
GRANT ST.
PINE
FIR
MIDDLE ROAD
S.W. FARMINGTON RD.
ROAD
1/4 COR.
1/16 COR.

Exhibit A4

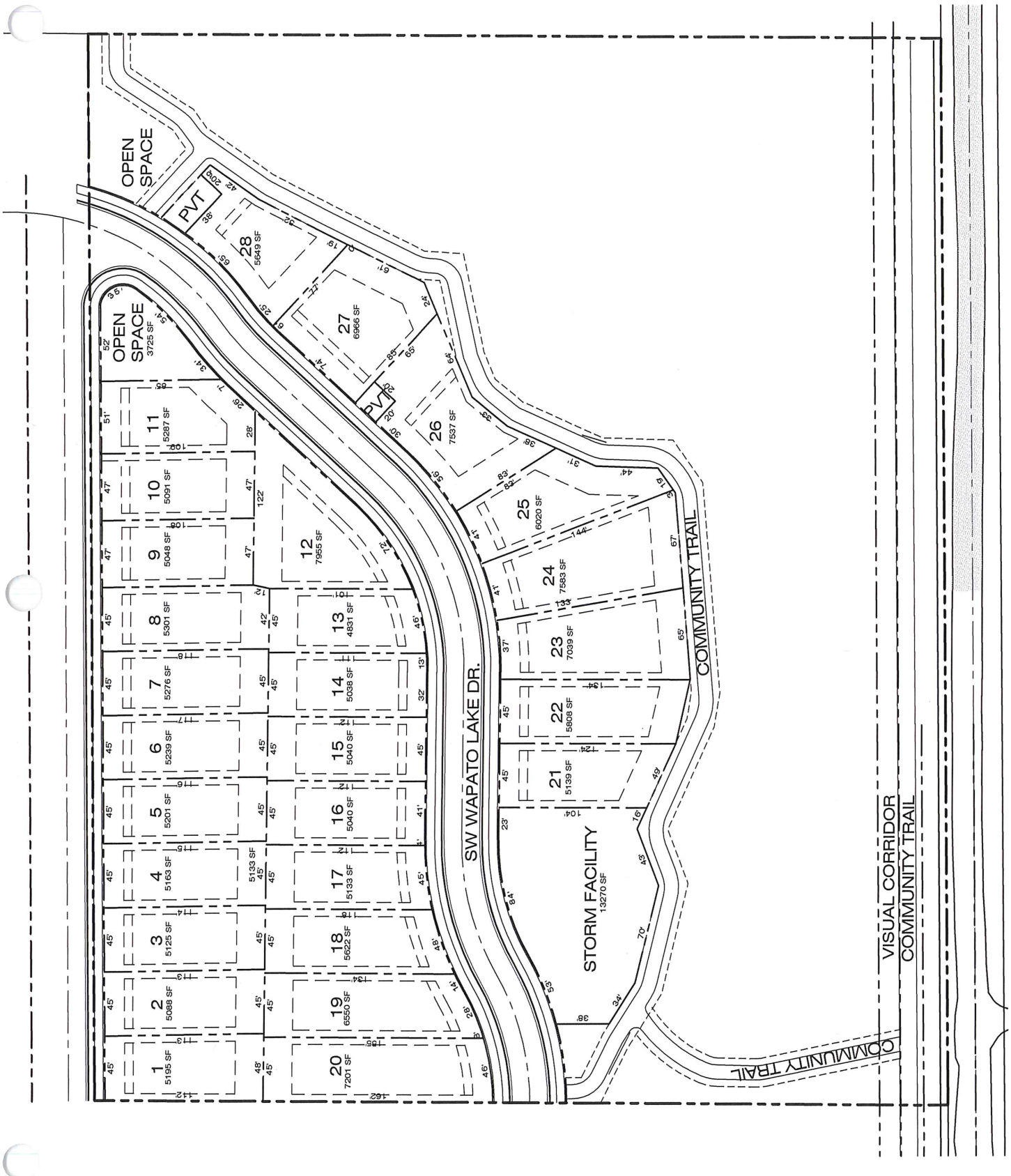

OPEN SPACE
OPEN SPACE 3725 SF
PVT
PVT
SW WAPATO LAKE DR.
COMMUNITY TRAIL
STORM FACILITY 13270 SF
COMMUNITY TRAIL
VISUAL CORRIDOR
COMMUNITY TRAIL
SW BROOKMAN ROAD (COUNTY ROAD 493)
1 5195 SF
2 5088 SF
3 5125 SF
4 5163 SF
5 5201 SF
6 5239 SF
7 5276 SF
8 5301 SF
9 5048 SF
10 5091 SF
11 5287 SF
12 7955 SF
13 4831 SF
14 5038 SF
15 5040 SF
16 5040 SF
17 5133 SF
18 5622 SF
19 6550 SF
20 7201 SF
21 5139 SF
22 5808 SF
23 7039 SF
24 7583 SF
25 6020 SF
26 7537 SF
27 6966 SF
28 5649 SF

Exhibit A4

3S10600 00100
Gerald Ouellette
Po Box 1468
Sherwood, OR 97140

3S10600 00101
Bonnie David
17117 SW Brookman Rd
Sherwood, OR 97140

3S10600 00102
Charles Bissett Jr.
16871 SW Brookman Rd
Sherwood, OR 97140

3S10600 00103
Brookman Development LLC
Po Box 61426
Vancouver, WA 98666

3S10600 00104
Linda Scott
17433 SW Brookman Rd
Sherwood, OR 97140

3S10600 00107
Wayne Chronister
Po Box 1474
Sherwood, OR 97140

3S10600 00200
Philip Lapp
17400 SW Brookman Rd
Sherwood, OR 97140

3S10600 00200
Philip Lapp
17400 SW Brookman Rd
Sherwood, OR 97140

3S106B0 00100
Brookman Development LLC
Po Box 61426
Vancouver, WA 98666

3S106B0 00101
Thomas Bartlett
17687 SW Brookman Rd
Sherwood, OR 97140

3S106B0 00200
George Boyd
Po Box 85
Tualatin, OR 97062

3S106B0 00300
Kevin Durrell
24661 SW Oberst Rd
Sherwood, OR 97140

3S106B0 00302
Leroy Moser
16121 SW 129th Ter
Tigard, OR 97224

3S106B0 00303
Thomas & Kristina Herold
17636 SW Brookman Rd
Sherwood, OR 97140

3S106B0 00400
Michael Fullmer
17878 SW Brookman Rd
Sherwood, OR 97140

3S106B0 00500
Jason Higgins
17890 SW Brookman Rd
Sherwood, OR 97140

3S106B0 01401
Wendy Ann Wells
24895 SW Oberst Rd
Sherwood, OR 97140

3S106B0 01402
Kenneth Kolb Jr.
24799 SW Oberst Rd
Sherwood, OR 97140

2S131DC 02300
Wayne Vaincourt
23898 SW Golden Pond Ter
Sherwood, OR 97140

2S131DC 02400
Eitoku Yamanaka
23921 SW Golden Pond Ter
Sherwood, OR 97140

2S131DC 02500
James Anderson Jr.
23907 SW Golden Pond Ter
Sherwood, OR 97140

2S131DC 03800
Carol Weber
17328 SW Greengate Dr
Sherwood, OR 97140

2S131DC 03900
Todd Preston Card
17340 SW Greengate Dr
Sherwood, OR 97140

2S131DC 04000
Melissa McKinney
17357 SW GREENGATE DR
SHERWOOD, OR 97140-6929

2S131DC 06200
Sherwood City
22560 SW Pine St
Sherwood, OR 97140

2S131CD 07000
Sherwood City
22560 SW Pine St
Sherwood, OR 97140

2S131DC 06500
Jessica Vanbergen
17185 SW Cobble Ct
Sherwood, OR 97140

2S131DC 06600
Donald Rogie
17171 SW Cobble Ct
Sherwood, OR 97140

2S131DC 06700
Marsha Brown
17157 SW Cobble Ct
Sherwood, OR 97140

2S131DC 06800
Naoki Kuze
17143 SW Cobble Ct
Sherwood, OR 97140

2S131DC 06900
Satish & Ruchi Singh
15132 NW Delia St
Portland, OR 97229

2S131DC 07000
Wendy Hubbenette
17115 SW Cobble Ct
Sherwood, OR 97140

2S131DC 07100
Pranger
17101 SW Cobble Ct
Sherwood, OR 97140

2S131DC 07200
Jonathan Wisniewski
17087 SW Cobble Ct
Sherwood, OR 97140

2S131DC 07300
Richard Mikulak
17073 SW Cobble Ct
Sherwood, OR 97140

2S131DC 07400
Courtney & Kurt Penberthy
17057 SW Cobble Ct
Sherwood, OR 97140

2S131DC 07800
Thomas Gall
17010 SW Cobble Ct
Sherwood, OR 97140

2S131DC 07900
Teresa Conrad
17024 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08000
Brian & Melanie Crabtree
17038 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08100
Daniel Defreval
17052 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08200
Isidro Toscano
17066 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08300
John Arzner
17080 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08400
Jodi Briggs
17094 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08500
Robert Frailey
17108 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08600
Robert Costley
50485 Spyglass Hill Dr
La Quinta, CA 92253

2S131DC 08700
Robert Savage
17136 SW Cobble Ct
Sherwood, OR 97140

2S131DC 08800
Ang Ho
1249 Alemany Blvd
San Francisco, CA 94112

2S131DC 08900
Adam Gemmil
17164 SW COBBLE CT
SHERWOOD, OR 97140-6954

2S131DC 09000
Sherryl Hardman
17178 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09100
Jeremy Price
17192 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09200
Scott Bernard Nelson
17206 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09300
Jose Valdes Aceves
17232 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09400
Scott Demming
17258 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09500
Karen Blair
17286 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09600
Lisa Ring
17320 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09700
Christine Marr
17348 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09800
Yang Lu
17374 SW Cobble Ct
Sherwood, OR 97140

2S131DC 09900
Clifton Taylor
17400 SW Cobble Ct
Sherwood, OR 97140

2S131DC 10000
Micah Ling
17414 SW Cobble Ct
Sherwood, OR 97140

2S131DC 10100
Nicholas Morad
17428 SW Cobble Ct
Sherwood, OR 97140

Exhibit A4

2S131DC 10200
Eric McMuldren
17442 SW Cobble Ct
Sherwood, OR 97140

2S131DC 10300
Brant Stai
17456 SW Cobble Ct
Sherwood, OR 97140

2S131DC 10400
Anthony Jr & Kimberly Budesilich
17470 SW Cobble Ct
Sherwood, OR 97140

2S131DC 10500
Ryan Krause
17484 SW Cobble Ct
Sherwood, OR 97140

2S131DC 10600
Paul Billeci
17961 SW Bridger Ln
Sherwood, OR 97140

2S131DC 10700
Michael Cornett
17461 SW Cobble Ct
Sherwood, OR 97140

2S131DC 10800
Rod Widows
17433 SW COBBLE CT
SHERWOOD, OR 97140-6299

2S131DC 10900
Cameron Shayegi
17419 SW Cobble Ct
Sherwood, OR 97140

2S131DC 11000
Stephen Hilt
17369 SW Greengate Dr
Sherwood, OR 97140

2S131DC 11100
Nathan Bush
17363 SW Cobble Ct
Sherwood, OR 97140

2S131DC 11200
Hpa Jv Borrower 2019-1 Ml LLC
180 N Stetson Ave #3650
Chicago, IL 60601

2S131DC 11300
Stephanie Lynn Charters
17281 SW Cobble Ct
Sherwood, OR 97140

2S131DC 11400
Karen Koehler
23935 SW GOLDEN POND TER
SHERWOOD, OR 97140-6958

2S131CD 16400
Julie Bouris
17612 SW Inkster Dr
Sherwood, OR 97140

2S131CD 16500
Katie Cook
17588 SW Inkster Dr
Sherwood, OR 97140

2S131CD 16600
Stephen Kuske
17562 SW Inkster Dr
Sherwood, OR 97140

2S131CD 16700
17536 Sw Inkster LLC
21455 Miles Dr
West Linn, OR 97068

2S131CD 16800
Laurie Holm
17510 SW Inkster Dr
Sherwood, OR 97140

2S131CD 16900
Walter Beach
17496 SW Inkster Dr
Sherwood, OR 97140

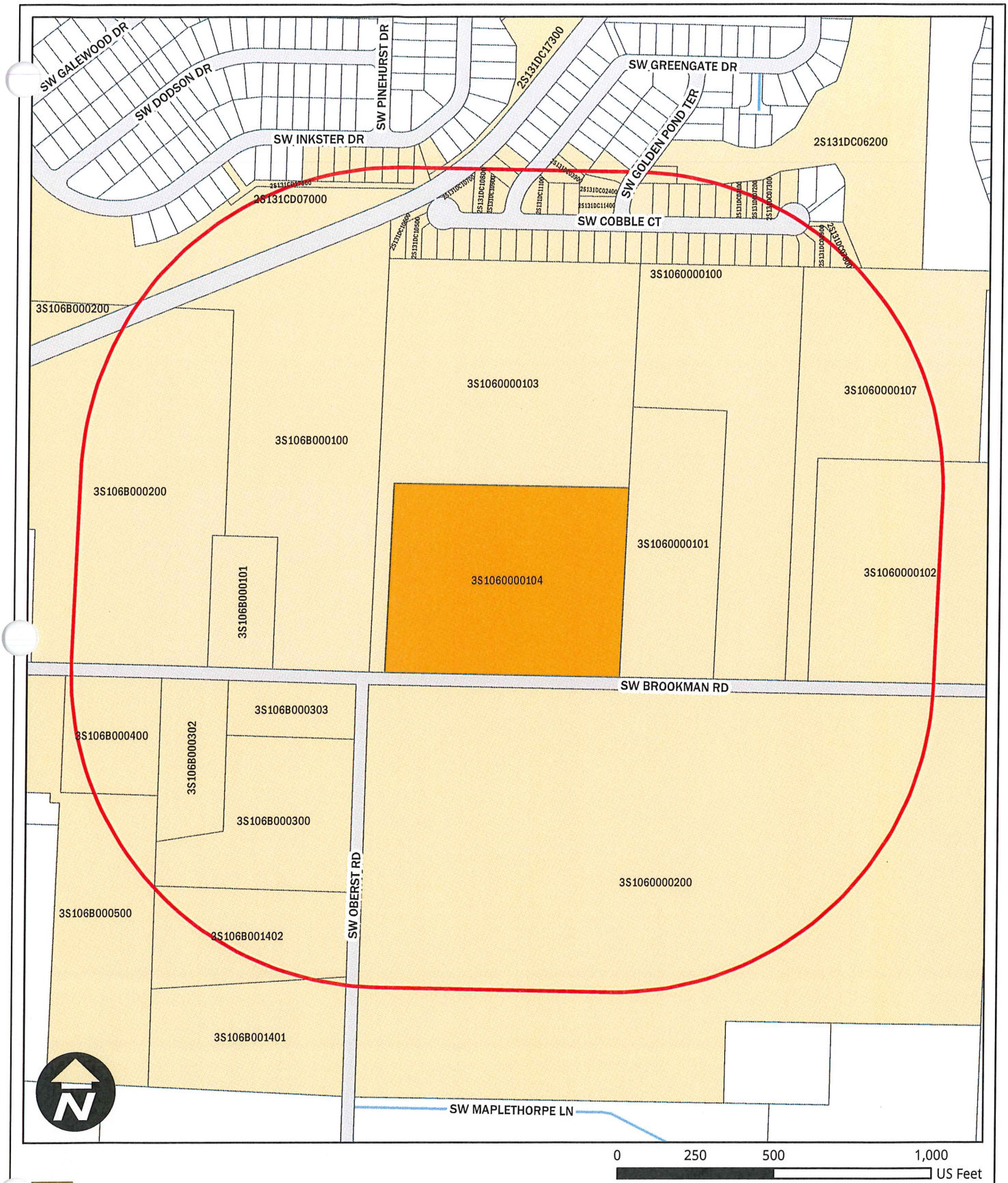
2S131CD 17000
Donnerberg Construction Inc
14400 SW 86th Ave
Portland, OR 97224

2S131CD 17500
Sherwood City
22560 SW Pine St
Sherwood, OR 97140

2S131DC 17200
Nasrin Zaman
2519 Sierra Sage St
Las Vegas, NV 89134

2S131DC 17300
Sherwood City
22560 SW Pine St
Sherwood, OR 97140

Exhibit A4



Subject
Radius
Notification

Prepared by: Fidelity National Title
Data: CoreLogic, Metro RLIS
Date: 1/15/2020
This information is reliable, but not guaranteed. It is not a survey.

NEIGHBORHOOD MEETING SIGN IN SHEET

Proposed Project: Riverside at Cedar Creek - a 28-Lot Residential Subdivision

Proposed Project Location: 17433 SW Brookman Road, Sherwood, OR 97140

Project Contact: Wayne Hayson - Pioneer Design Group

Meeting Location: Marjorie Stewart Community Center

Meeting Date: 02/13/2020

Name	Address	E-Mail	Please identify yourself (check all that apply)			
			Resident	Property owner	Business owner	Other
Wayne Hayson	9020 SW Washington Sq Rd	whayson@pd-grp.com				✓
Matt Sprague	" " " "	MSprague@pd-grp.com				✓

Exhibit A4

Neighborhood Meeting Notes
Riverside at Cedar Creek - A 28-Lot Subdivision
February 13, 2020 Beginning at 6:30 PM
Marjorie Stewart Community Center

Representatives of the applicant, Wayne Hayson and Matthew Sprague, both of Pioneer Design Group, were in attendance. No further attendees had arrived by 7pm, so Messrs. Hayson and Sprague closed the meeting room and left the Community Center at approximately 7:10pm.

Clean Water Services
Our commitment is clear.

CWS File Number
20-000663

Service Provider Letter

This form and the attached conditions will serve as your Service Provider Letter in accordance with Clean Water Services Design and Construction Standards (R&O 19-5, as amended by R&O 19-22).

Jurisdiction:	City of Sherwood	**Review Type:**	Tier 2 Analysis
Site Address / Location:	17433 SW Brookman Rd Sherwood, OR 97140	**SPL Issue Date:** **SPL Expiration Date:**	May 11, 2020 May 11, 2022

Applicant Information:		**Owner Information:**	
Name	NIKI MUNSON	Name	LINDA & RICHARD SCOTT
Company	RIVERSIDE HOMES LLC	Company	
Address	17933 NWEVERGREEN PKW #370	Address	17433 SW BROOKMAN RD
	BEAVERTON, OR 97006		SHERWOOD OR 97140
Phone/Fax	(503) 645-0986	Phone/Fax	
E-mail:	nmunson@riversidehome.com	E-mail:	

Tax lot ID	**Development Activity**
3S1060000104	Riverside at Cedar Creek Residential Subdivision (with right-of-way improvements)

Pre-Development Site Conditions:		**Post Development Site Conditions:**	
Sensitive Area Present:	[X] On-Site [X] Off-Site	Sensitive Area Present:	[X] On-Site [X] Off-Site
Vegetated Corridor Width:	Variable	Vegetated Corridor Width:	Variable
Vegetated Corridor Condition:	Good		

Enhancement of Remaining Vegetated Corridor Required: [X]

Square Footage to be enhanced: 118,571

Encroachments into Pre-Development Vegetated Corridor:

Type and location of Encroachment:	Square Footage:
SW Brookman Road right-of-way, community trail, stormwater outfall (Permanent encroachment; Mitigation required)	15,234
Temporary grading and access (Temporary encroachment; Restoration and planting in-place required)	2,740

Mitigation Requirements:

Type/Location	Sq. Ft./Ratio/Cost
On-site Replacement Mitigation	18,453/1:1.2

[X] Conditions Attached [X] Development Figures Attached ( ) [ ] Planting Plan Attached [ ] Geotech Report Required

This Service Provider Letter does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered on your property.

In order to comply with Clean Water Services water quality protection requirements the project must comply with the following conditions:

1. No structures, development, construction activities, gardens, lawns, application of chemicals, uncontained areas of hazardous materials as defined by Oregon Department of Environmental Quality, pet wastes, dumping of materials of any kind, or other activities shall be permitted within the sensitive area or Vegetated Corridor which may negatively impact water quality, except those allowed in R&O 19-5, Chapter 3, as amended by R&O 19-22.
2. Prior to any site clearing, grading or construction the Vegetated Corridor and water quality sensitive areas shall be surveyed, staked, and temporarily fenced per approved plan. During construction the Vegetated Corridor shall remain fenced and undisturbed except as allowed by R&O 19-5, Section 3.06.1, as amended by R&O 19-22 and per approved plans.
3. **If there is any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.**
4. An approved Oregon Department of Forestry Notification is required for one or more trees harvested for sale, trade, or barter, on any non-federal lands within the State of Oregon.
5. **Prior to ground disturbing activities, an erosion control permit is required. Appropriate Best Management Practices (BMP's) for Erosion Control, in accordance with Clean Water Services' Erosion Prevention and Sediment Control Planning and Design Manual, shall be used prior to, during, and following earth disturbing activities.**
6. Prior to construction, a Stormwater Connection Permit from Clean Water Services or its designee is required pursuant to Ordinance 27, Section 4.B.
7. Activities located within the 100-year floodplain shall comply with R&O 19-5, Section 5.10, as amended by R&O 19-22.
8. Removal of native, woody vegetation shall be limited to the greatest extent practicable.
9. The water quality swale and detention pond shall be planted with Clean Water Services approved native species, and designed to blend into the natural surroundings.
10. **Should final development plans differ significantly from those submitted for review by Clean Water Services, the applicant shall provide updated drawings, and if necessary, obtain a revised Service Provider Letter.**
11. The Vegetated Corridor width for sensitive areas within the project site shall be a minimum of 50 feet wide, as measured horizontally from the delineated boundary of the sensitive area.
12. For Vegetated Corridors that extend 35 feet from the break in slope, the width of Vegetated Corridors may be reduced to 15 feet wide if a stamped geotechnical report confirms that slope stability can be maintained with the reduced setback from the break in slope.
13. **For Vegetated Corridors greater than 50 feet in width, the applicant shall enhance the first 50 feet closest to the sensitive area to meet or exceed good corridor condition as defined in R&O 19-5, Section 3.14.2, Table 3-3, as amended by R&O 19-22.**
14. **Removal of invasive non-native species by hand is required in all Vegetated Corridors rated ""good."" Replanting is required in any cleared areas larger than 25 square feet using low impact methods. The applicant shall calculate all cleared areas larger than 25 square feet prior to the preparation of the required Vegetated Corridor enhancement/restoration plan.**
15. Prior to any site clearing, grading or construction, the applicant shall provide Clean Water Services with a Vegetated Corridor enhancement/restoration plan. Enhancement/restoration of the Vegetated Corridor shall be provided in accordance with R&O 19-5, Appendix A, as amended by R&O 19-22, and shall include planting specifications for all Vegetated Corridor, including any cleared areas larger than 25 square feet in Vegetated Corridor rated ""good.""
16. Prior to installation of plant materials, all invasive vegetation within the Vegetated Corridor shall be removed per methods described in Clean Water Services' Integrated Pest Management

Plan, 2019. During removal of invasive vegetation care shall be taken to minimize impacts to existing native tree and shrub species.

17. **Clean Water Services and/or City shall be notified 72 hours prior to the start and completion of enhancement/restoration activities. Enhancement/restoration activities shall comply with the guidelines provided in Planting Requirements (R&0 19-5, Appendix A, as amended by R&O 19-22).**
18. **Maintenance and monitoring requirements shall comply with R&O 19-5, Section 2.12.2, as amended by R&O 19-22. If at any time during the warranty period the landscaping falls below the 80% survival level, the owner shall reinstall all deficient planting at the next appropriate planting opportunity and the two year maintenance period shall begin again from the date of replanting.**
19. **Performance assurances for the Vegetated Corridor shall comply with R&O 19-5, Section 2.07.2, Table 2-1 and Section 2.11, Table 2-2, as amended by R&O 19-22.**
20. **For any developments which create multiple parcels or lots intended for separate ownership, Clean Water Services shall require that the sensitive area and Vegetated Corridor be contained in a separate tract and subject to a ""STORM SEWER, SURFACE WATER, DRAINAGE AND DETENTION EASEMENT OVER ITS ENTIRETY"" to be granted to the City or Clean Water Services.**

FINAL PLANS

21. **Final construction plans shall include landscape plans.** In the details section of the plans, a description of the methods for removal and control of exotic species, location, distribution, condition and size of plantings, existing plants and trees to be preserved, and installation methods for plant materials is required. Plantings shall be tagged for dormant season identification and shall remain on plant material after planting for monitoring purposes.
22. **A Maintenance Plan shall be included on final plans** including methods, responsible party contact information, and dates (minimum two times per year, by June 1 and September 30).
23. **Final construction plans shall clearly depict the location and dimensions of the sensitive area and the Vegetated Corridor** (indicating good, marginal, or degraded condition). Sensitive area boundaries shall be marked in the field.
24. Protection of the Vegetated Corridors and associated sensitive areas shall be provided by the installation of permanent fencing and signage between the development and the outer limits of the Vegetated Corridors. **Fencing and signage details to be included on final construction plans.**

This Service Provider Letter is not valid unless CWS-approved site plan is attached.

Please call (503) 681-3653 with any questions.

Lindsey Obermiller
Environmental Plan Review

Attachments (1)

Exhibit A5

CWS FILE NO. 20-000663
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LD Date 05/11/2020
SPL ATTACHMENT 1 OF 1

Suite 249
Portland, OR 97214
Phone: 503.478.0424
www.esapdx.com

Environmental Science & Assessment, LLC

Site Plan
Riverside at Cedar Creek
Sherwood, Oregon

Vegetated Corridor: 141,230 SF

VC Perm. Impacts: 15,299 SF
2,554 SF: Trail/Wall
12,680 SF: R.O.W. Dedication
65 SF: WQ Outfall
(1,401 SF (trail) & 65 SF will remain within the VC)

VC Temp. Impacts: 2,740 SF

VC Mitigation: 18,453 SF

VC Enhancement: 118,571 SF
Good Condition: Invasive species removal, with replanting in cleared areas >25 SF

VC Mitigation: 18,453 SF
Good Condition: Invasive species removal, with replanting in cleared areas >25 SF, plus 8 Trees

VC Temp. Impacts: 2,740 SF
27 Trees & 137 Shrubs

Trail Easement

Floodplain Line

X Trees Removed in VC (4)

Sensitive Area: ±38,964 SF

N

1' = 60'
0 30 60

Base Map Source: PDG, Inc.	
Mod. By:	KR
Date:	2/20
Job:	19029
Rev:	4/20

Fig. 4

, Environmental Science & Assessment, LLC

TECHNICAL MEMORANDUM

DATE: April 9, 2020

TO: Lindsey Obermiller - CWS SPL Review

FROM: Jack Dalton and Kim Reavis

RE: Riverside at Cedar Creek Subdivision (CWS File No. 20-000663)

This memo provides a response to the email dated March 24, 2020. This memo supplements the site assessment for the proposed Riverside at Cedar Creek on residential project that involves a 28-lot residential subdivision with road access from "Middlebrook" subdivision on the west side including SW Wapato Lake Drive extension in the middle of site and extension of SW Trillium Lane in the north end (Figure 4).

The proposed mitigation for the CWS VC impacts associated with SW Brookman Right-of-Way dedication have been updated and are detailed in next section.

Wetland Impacts

No wetland impacts will result from the subdivision development as discussed in the Site Assessment report. The future Brookman Road improvement will impact wetland and waterway along Cedar Creek and these impacts will be evaluated and mitigated by the City of Sherwood and Washington County as part of the overall future SW Brookman Road ROW improvements. (Figure 4). The proposed subdivision project avoids all impacts to the Cedar Creek wetlands and floodplain in the middle of the site, north of Brookman Road.

CWS TIER 2 ALTERNATIVES ANALYSIS

Subdivision VC Impacts

As part of the planned subdivision, road right-of-way dedication of SW Brookman Road is being required by the City of Sherwood. This dedication moves the southern parcel boundary north 33 feet to accommodate future road improvements and expansion. City of Sherwood has allowed the developer, in this case, to defer improvements and mitigation for encroachment into wetland and waters within the Cedar Creek floodplain, however, CWS is requiring that any potential impacts to the VC due to the road dedication need to be accounted for at this time.

VC permanent impacts due to the road ROW dedication totals 12,680 square feet. Additional VC impacts are for the community trail that will extend across the site south

of the subdivision and parallels the VC boundary. To accommodate for the drop in slope between the site development and the open space area a wall will be erected along much of the trail along the south side. VC permanent impacts due to the trail/wall totals 2,554 square feet.

The final VC area is 141,230 square feet, this includes the mitigation area (18,453 SF), outfall impacts and some trail impacts that will remain within the VC (1,466 SF), VC temporary impacts (2,740 SF) and good condition VC enhancement (118,571 SF) (Figure 4).

Tier 2 Impact – SW Brookman Road

The preferred site plan will result in CWS VC encroachment within the existing VC within the SW Brookman Road ROW dedication within the Cedar Creek floodplain totaling 12,680 square-foot that are greater than 30% of depth and 40% of length of the VC. In addition, all VC impacts related to the proposed development will impact Good condition VC (Figure 4). These impacts require a Tier 2 Alternatives Analysis under district standards (CWS 3.07.4).

Alternatives

Two alternatives considered. The Brookman Road ROW dedication is required for the Riverside at Brookman Road project, so the alternatives are either to complete the proposed project with the ROW dedication or a No Build Alternative.

Preferred Alternative

The proposed project includes a discussion of how the project meets Section 3.07.C of the CWS standards is provided in next section.

Section 3.07.4.C Criteria

1. *Mitigation is provided in accordance with Section 3.08*. The proposed site plan will impact CWS VC with both roadway and trail development. The non-exempt VC impacts totaling 15,234 square feet will be mitigated on site within the large open space tract, primarily west of the stream between the development and the VC. The mitigation is provided on-site, totaling 18,453 square feet.

2. *Replacement mitigation protects Vegetated Corridor function and values*. The location of the VC mitigation results in a contiguous forested area that parallels the trail easement and extends southeast to Cedar Creek, rather than leaving large gaps between the VC boundary and the trail that would otherwise not be part of the VC. In some areas the VC width has been widened along the Sensitive Areas, and established forested habitat is being preserved.

3. *Enhancement of replacement area to Good Condition.* The mitigation areas are in good condition and will be preserved and will not need additional plantings, however enhancement does include invasive species removal and planting of the cleared areas greater than 25 square feet. The four trees proposed for removal within the VC will be replaced with 8 additional trees as part of the VC Mitigation plan. Any areas with temporary VC impacts will be replanted to meet Good condition corridor.

4. *District Stormwater Connection Permit is likely to be issued based on proposed plans.* The project engineer has submitted a preliminary storm drainage report with the land use application to City of Sherwood. Upon acceptance of the Tier 2, construction plans with the proposed storm water treatment plan will be submitted with the goal to achieve a Stormwater Connection Permit.

5. *Location of development and site planning minimizes incursion into the Vegetated Corridor*. The development of the subdivision (lots, interior streets, WQ Facility) are all located outside of the VC boundary. The primary reason for the VC impact is due to a wall that needs to be built along the south side of the trail due to the sloped nature of the site. The wall has been proposed to eliminate grading into the VC and impact is less than 5 feet wide into the Good condition corridor, and only results in the elimination of one tree. The remaining three trees to be removed within the VC under the recommendation of the project arborist, two are deemed decrepit and one is an invasive species. The existing driveway that currently crosses through CWS VC on the west side will be repurposed for the community trail, which also minimizes impacts.

   SW Brookman Road is currently developed as a 20-foot wide main arterial for the local area. As this rural area continues to develop into a more urban populated community the road will need to be expanded to meet safe street standards and accommodate traffic movement. There is no alternative to the Brookman Road ROW dedication or subdivision development that reduces incursion into the VC.

6. *No practicable alternative to location of the development exists that will not disturb the Sensitive Area or Vegetated Corridor*. There is no practicable alternative to the expansion of SW Brookman Road. This east/west arterial connects to 99W to the west for all of the developing neighborhoods in the area. Any proposed east/west arterial that functions in this capacity, in this area, will require crossing of Sensitive Areas and therefore will disturb Sensitive Areas or Vegetated Corridor.

7. Proposed encroachment provides public benefits. The site plan provides a 18,453 square foot mitigation area within an approximately 4-acre open space area between the proposed subdivision and the existing SW Brookwood Road. The large contiguous open space area will provide water quality public benefit to serve the surrounding Cedar Creek and downstream Tualatin River

watershed by preserving the hydrologic functions of the Cedar Creek, the associated wetlands and floodplain in the large open space.

Existing encroachment currently exists at the SW Brookwood Road crossing of Cedar Creek and the 2-lane road is narrow, without shoulders or sidewalks and sight lines are limited. The future expansion of this road will increase safety for pedestrians and vehicles along this busy arterial as the population increases. The trail will connect with other regional trails providing safe outdoor recreation opportunities and provide safe commuting options for non-motorized travel.

Attachments:

Figure 4 Site Plan
Arborists Report
Tree Removal Plan

Exhibit A6

TRACT A OPEN SPACE 3725 SF

TRACT B OPEN SPACE

TRACT B OPEN SPACE 203158 SF

TRACT E STORM FACILITY 13270 SF

TRACT F VISUAL CORRIDOR 2926 SF

TRACT G CONSERVATION EASEMENT 594 SF

COMMUNITY PARK

WETLAND

STREAM

Wetland A 10,582 SF

Vegetated Corridor: 141,230 SF

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Floodplain Line

X Trees Removed in VC (4)

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N

1' = 60'

0 30 60

107 SE Washington St.
Suite 249
Portland, OR 97214
Phone: 503.478.0424
www.esapdx.com

Environmental Science & Assessment, LLC

Site Plan
Riverside at Cedar Creek
Sherwood, Oregon

Base Map Source:	PDG, Inc.
Mod. By:	KR
Date:	2/20
Job:	19029
Rev:	4/20

Fig. 4

Exhibit A6

LEGEND

- RIGHT-OF-WAY LINE
- BOUNDARY LINE
- EXISTING LOT LINE
- CENTER LINE
- 201 EXISTING 1' CONTOUR
- 200 EXISTING 5' CONTOUR
- 172 PROPOSED 2' CONTOUR
- 180 PROPOSED 10' CONTOUR
- EXISTING TREE REMAIN
- EXISTING TREE TO BE REMOVED
- EXISTING DRIP LINE
- TREE PROTECTION FENCING
- DRIP LINE ENCROACHMENT AREA (ARBORIST SUPERVISION REQUIRED)
- TREE CANOPY TO REMAIN IN NET DEVELOPABLE AREA (TOTAL = 9,906 SF)
- EXISTING TREE WITH SPECFIC TREATMENT

GENERAL TREE NOTES

1. **EXISTING TREE LIKELY TO RETAIN IN CONSTRUCTION.** TREES #31295 AND #31605 ARE CLASSIFIED AS "LIKELY TO RETAIN" BECAUSE THESE TREES HAVE THE GREATEST POTENTIAL FOR CONSTRUCTION IMPACTS DURING RETAINING WALL CONSTRUCTION, BUT ARE OTHERWISE SUITABLE FOR PRESERVATION. EVERY REASONABLE EFFORT SHALL BE MADE TO PRESERVE THESE TREES AND THE DEVELOPER IS RESPONSIBLE FOR COORDINATING WITH THE PROJECT ARBORIST TO MONITOR AND DOCUMENT RETAINING WALL EXCAVATION BENEATH THE DRIPLINE AREAS. IF THE PROJECT ARBORIST DETERMINES THAT NECESSARY ROOT IMPACTS ARE LIKELY TO IMPACT THE VIABILITY OR STABILITY OF EITHER TREE, THE DEVELOPER MAY PROCEED WITH REMOVAL OF THE TREES WITHOUT DELAY AND THE ARBORIST SHALL SUBMIT DOCUMENTATION TO THE CITY REGARDING THE NECESSITY OF REMOVAL.
2. **CREATE SNAG OUT OF EXISTING TREE.** REFER TO TREE PROTECTION SPECIFICATION #9.
3. **OBTAIN ADJACENT OWNER'S PERMISSION PRIOR TO REMOVING BOUNDARY AND OFF-SITE TREES #14124 AND #14125.**

TREE PROTECTION SPECIFICATIONS

1. **PRE-CONSTRUCTION CONFERENCE.** THE DEVELOPER SHALL ARRANGE AN ON-SITE MEETING WITH THE PROJECT ARBORIST IN ORDER TO REVIEW THE TREE PRESERVATION AND REMOVAL PLAN AND DISCUSS METHODS OF TREE REMOVAL AND TREE PROTECTION PRIOR TO ANY CONSTRUCTION.
2. **TREE PROTECTION ZONE.** THE TREE PROTECTION ZONE (TPZ) IS DEFINED AS THE DRIPLINE OF PROTECTED TREES REGARDLESS OF THE LOCATION OF PROTECTION FENCING; TPZS ARE DEPICTED ON THE TREE PRESERVATION AND REMOVAL PLAN. ANY WORK THAT IS PERFORMED BENEATH THE DRIPLINE OF A PROTECTED TREE SHALL BE MONITORED AND DOCUMENTED BY THE PROJECT ARBORIST. AREAS OF TPZ ENCROACHMENT REQUIRING THE DEVELOPER TO COORDINATE WITH THE PROJECT ARBORIST ARE SHADED ON THE TREE PRESERVATION AND REMOVAL PLAN.
3. **PROTECTION FENCING**. TREES TO BE PRESERVED SHALL BE PROTECTED BY INSTALLATION OF TREE PROTECTION FENCING AS DEPICTED ON THE TREE PRESERVATION AND REMOVAL SITE PLAN TO PREVENT INJURY TO TREE TRUNKS OR ROOTS, OR SOIL COMPACTION. PROTECTION FENCING SHALL BE CHAIN LINK OR GALVANIZED STEEL ON METAL STAKES, INSTALLED PRIOR TO ANY GROUND DISTURBING ACTIVITY AND MAINTAINED IN GOOD REPAIR THROUGHOUT CONSTRUCTION. THE PROTECTION FENCING SHALL NOT BE MOVED, REMOVED OR ENTERED BY EQUIPMENT WITHOUT PRIOR APPROVAL OF THE PROJECT ARBORIST; ADJUSTMENTS TO THE LOCATION OF PROTECTION FENCING SHALL BE DOCUMENTED BY THE PROJECT ARBORIST. TREES LOCATED MORE THAN 30-FEET FROM CONSTRUCTION ACTIVITY SHOULD NOT REQUIRE FENCING.
4. **PROHIBITIONS.** NO SOIL COMPACTION, MATERIALS OR SPOILS STORAGE SHALL BE ALLOWED WITHIN THE TPZ. WITHOUT AUTHORIZATION FROM THE PROJECT ARBORIST, NONE OF THE FOLLOWING SHALL OCCUR BENEATH THE DRIPLINE OF ANY PROTECTED TREE:
   a. GRADE CHANGE OR CUT AND FILL;
   b. NEW IMPERVIOUS SURFACES;
   c. UTILITY OR DRAINAGE FIELD PLACEMENT; OR
   d. VEHICLE MANEUVERING.

   ROOT PROTECTION ZONES MAY BE ENTERED FOR TASKS LIKE SURVEYING, MEASURING, AND, SAMPLING. FENCES MUST BE CLOSED UPON COMPLETION OF THESE TASKS. CONSTRUCTION THAT IS NECESSARY BENEATH PROTECTED TREE DRIPLINES SHALL BE PERFORMED UNDER ARBORIST SUPERVISION.
5. **EROSION CONTROL.** SILT FENCING REQUIRED TO BE INSTALLED WITHIN TPZS SHALL NOT BE TRENCHED IN PER MANUFACTURER SPECIFICATIONS TO AVOID ROOT DAMAGE. INSTEAD, ROLL THE BASE OF THE SILT FENCE AROUND A STRAW WATTLE AND STAKE THE WATTLE SECURELY INTO THE GROUND OR USE COMPOST SOCKS OR OTHER TECHNIQUES THAT AVOID TREE ROOT IMPACTS.
6. **TREE REMOVAL.** TREES TO BE REMOVED SHALL BE CLEARLY IDENTIFIED WITH TREE-MARKING PAINT OR OTHER METHODS APPROVED IN ADVANCED BY THE PROJECT ARBORIST. TREE REMOVAL SHALL BE PERFORMED BY A QUALIFIED TREE SERVICE. DIRECTIONALLY FELL OR SURGICALLY REMOVE TREES TO AVOID CONTACT OR OTHERWISE PREVENT DAMAGE TO THE TRUNKS AND BRANCHES OF TREES TO BE PRESERVED. NO VEHICLES OR HEAVY EQUIPMENT SHALL BE PERMITTED WITHIN TPZS DURING TREE REMOVAL OPERATIONS.
7. **SNAG CREATION.** TREES #6192 AND #31606 LOCATED WITHIN THE VEGETATED CORRIDOR BUT NEAR PROPOSED CONSTRUCTION SHALL BE RETAINED AS WILDLIFE SNAGS RATHER THAN REMOVED TO GROUND LEVEL. SNAG CREATION SHALL BE PERFORMED BY A QUALIFIED TREE SERVICE AND WORK SHOULD BE COMPLETED BY HAND WITHOUT THE USE OF HEAVY EQUIPMENT IN THE TPZ. DELIMB THESE TREES AND REDUCE TRUNKS HEIGHTS TO LESS THAN 1.5-TIMES THE DISTANCE TO HIGH VALUE TARGETS TO MINIMIZE RISK.
8. **STUMP REMOVAL.** STUMPS OF TREES PLANNED FOR REMOVAL THAT ARE LOCATED BENEATH THE DRIPLINE OF PROTECTED TREES SHALL REMAIN IN THE GROUND WHERE FEASIBLE. OTHERWISE, STUMPS MAY BE REMOVED BY STUMP GRINDING TO JUST BELOW THE GROUND SURFACE OR EXTRACTED FROM THE GROUND UNDER PROJECT ARBORIST SUPERVISION.
9. **PRUNING.** TREES TO BE PRESERVED MAY REQUIRE MINOR PRUNING FOR OVERHEAD CLEARANCE AND TO REMOVE DEAD AND DEFECTIVE BRANCHES FOR SAFETY. THE PROJECT ARBORIST CAN HELP IDENTIFY WHETHER PRUNING IS NECESSARY ONCE TREES PLANNED FOR REMOVAL HAVE BEEN REMOVED AND THE SITE IS STAKED AND PREPARED FOR CONSTRUCTION. TREE REMOVAL AND PRUNING SHALL BE PERFORMED BY A QUALIFIED TREE SERVICE.
10. **EXCAVATION BENEATH PROTECTED TREE DRIPLINES.** EXCAVATION BENEATH PROTECTED TREE DRIPLINES SHALL BE AVOIDED IF ALTERNATIVES ARE AVAILABLE. IF EXCAVATION IS UNAVOIDABLE, THE DEVELOPER SHALL COORDINATE WITH THE PROJECT ARBORIST TO EVALUATE THE PROPOSED EXCAVATION TO DETERMINE METHODS TO MINIMIZE IMPACTS TO TREES. THIS CAN INCLUDE TUNNELING, HAND DIGGING, USING A MODIFIED PROFILE OR OTHER APPROACHES.
11. **ROOT PRUNING.** ROOTS SMALLER THAN 2-INCHES IN DIAMETER MAY BE PRUNED CLEAN TO SOUND WOOD USING A SHARP SAW AS DIGGING PROGRESSES TO AVOID PULLING AND TEARING ROOTS. EXCAVATION IMMEDIATELY ADJACENT TO ROOTS LARGER THAN 2-INCHES IN DIAMETER WITHIN THE TPZ SHALL BE BY HAND OR OTHER NON-INVASIVE TECHNIQUES TO ENSURE THAT ROOTS ARE NOT DAMAGED. THE PROJECT ARBORIST OR SHALL ASSESS AND DOCUMENT ROOTS 2-INCHES AND LARGER IN DIAMETER PRIOR TO IMPACTS. WHERE FEASIBLE, THESE SHALL BE PROTECTED BY TUNNELING OR OTHER MEANS TO AVOID DESTRUCTION OR DAMAGE. EXCEPTIONS CAN BE MADE IF, IN THE OPINION OF THE PROJECT, UNACCEPTABLE DAMAGE WILL NOT OCCUR TO THE TREE.
12. **LANDSCAPING.** FOLLOWING CONSTRUCTION AND PRIOR TO LANDSCAPING, THE PROTECTION FENCING MAY BE REMOVED. WHERE LANDSCAPING IS DESIRED, APPLY APPROXIMATELY 3-INCHES OF MULCH BENEATH THE DRIPLINE OF PROTECTED TREES, BUT NOT DIRECTLY AGAINST TREE TRUNKS. SHRUBS AND GROUND COVER PLANTS MAY BE PLANTED WITHIN TPZS. IF IRRIGATION IS USED, USE DRIP IRRIGATION ONLY BENEATH THE DRIPLINES OF PROTECTED TREES; INSTALL DRIP IRRIGATION LINES ON THE GROUND SURFACE AND COVER WITH MULCH (NO TRENCHING TO INSTALL IRRIGATION LINES BENEATH PROTECTED TREE DRIPLINES).
13. **QUALITY ASSURANCE.** THE PROJECT ARBORIST WILL BE AVAILABLE ON-CALL DURING CONSTRUCTION TO SUPERVISE PROPER EXECUTION OF THIS PLAN; IT IS THE DEVELOPER'S RESPONSIBILITY TO COORDINATE WITH THE PROJECT ARBORIST IN A TIMELY MANNER AS NEEDED.
14. **FINAL REPORT.** AFTER THE PROJECT HAS BEEN COMPLETED, THE PROJECT ARBORIST SHOULD PROVIDE A FINAL REPORT THAT DESCRIBES THE MEASURES NEEDED TO MAINTAIN AND PROTECT THE REMAINING TREES.

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

PIONEER DESIGN GROUP
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PRELIMINARY TREE PRESERVATION AND REMOVAL PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	2/2020
Drawn by	BDH	Date	2/2020
Reviewed by	MLS	Date	2/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
PLANNING
Sheet
P3

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Morgan Holen & Associates LLC
Consulting Arborists and Urban Forest Management
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Riverside at Cedar Creek – Sherwood, Oregon
Arborist Report
March 22, 2020

MHA19064

Purpose

This arborist report describes the tree preservation and removal plan for the Riverside at Cedar Creek subdivision project in Sherwood, Oregon, pursuant to Sherwood Code Section 16.142.070. This report describes the existing trees located on the project site, provides recommendations for tree protection and removal, and explains how the City's tree canopy requirements are satisfied. This report is based on observations made by International Society of Arboriculture (ISA) Board Certified Master Arborist and Qualified Tree Risk Assessor Morgan Holen (PN-6145B) during site visits conducted on January 20 and March 5, 2020, and subsequent site plan coordination with Riverside Homes and Pioneer Design Group.

Scope of Work and Limitations

Morgan Holen & Associates was contracted by Riverside Homes to collect tree inventory data for existing individual trees and develop an arborist report to address the tree preservation standards contained in Sherwood Code Section 16.142.070, *Trees on Property Subject to Certain Land Use Applications*.

Visual Tree Assessment (VTA) was performed on 351 individual trees surveyed across the site. 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. The individual surveyed trees were evaluated in terms of species, diameter, crown radius, general condition and potential construction impacts.

Beyond the individual tree survey and within the mapped vegetated corridor where no development is proposed, existing trees were not surveyed. This area does not meet the City's definition of woodland because there are fewer than 50 trees per 20,000 square feet. Regardless, the area is unaffected by the proposed development and City staff said it could be described more generally without individual tree data. Therefore, we walked the entire area tallying trees by species and diameter and noting general conditions. A summary of trees in the unaffected area of the vegetated corridor is enclosed and no canopy credit is accounted for since these trees are located beyond the net development site.

Following the tree inventory fieldwork, we coordinated with the design team to develop the tree preservation and removal plan and discuss tree canopy requirements.

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 Cedar Creek subdivision project is located at 17433 SW Brookman Road in Sherwood, Oregon. Much of the site is heavily treed and in a relatively natural and unmanaged stand grown condition, with some planted landscape trees near the existing home. Cedar Creek runs through the southeast quadrant of the site and a vegetated corridor covers most of the south quadrant.

The existing site includes one home and two barns, which are planned for demolition. The project proposes to create 28 single family residential lots, a new street to access the subdivision from the north, two open space tracts, a storm water tract and a community trail. The total net development site, as calculated by Pioneer Design Group, is 176,001 square feet in size. This does not include the SW Brookman Road right of way or environmentally constrained areas including the 100-year flood plain or vegetated corridor. The proposed trail running along the north boundary of the vegetated corridor requires grading and retaining wall construction that will impact a few trees along the boundary as described herein, otherwise trees within environmentally constrained areas are unaffected by the proposed development but do not provide canopy credit.

Tree Inventory

In all, 351 existing trees were surveyed and inventoried, including 21 different species. Table 1 provides a summary of the quantity of inventoried trees by species and general location, either: On-site (not within environmentally constrained areas or rights-of-way); Boundary (limited to tree #14125 on the northern boundary); Off-Site (limited to tree #14124 near the northern boundary); ROW (for trees located in the SW Brookman Road right-of-way); and Env (for trees located within environmentally constrained areas including the 100-year flood plain or vegetated corridor). A complete description of individual trees is provided in the enclosed tree data (attachment A).

Table 1. Count of Trees by Species and General Location – Cedar Creek Subdivision, Sherwood, OR.

Common Name	Species Name	On-Site	Boundary	Off-Site	ROW	Env	Total	Percent*
apple	*Malus* spp.	2				0	2	1%
bigleaf maple	*Acer macrophyllum*	5				0	5	1%
black hawthorn	*Crataegus douglasii*				4	0	4	1%
Cherry	*Prunus* spp.	12				0	12	3%
deciduous	Unknown	1				0	1	0.3%
dogwood	*Cornus* spp.	1				0	1	0.3%
Douglas-fir	*Pseudotsuga menziesii*	118	1	1	26	38	184	52%
English hawthorn^	*Crataegus monogyna*	8			2	8	18	5%
English holly^	*Ilex aquifolium*	1				1	2	1%
grand fir	*Abies grandis*	1				0	1	0.3%
Lombardy poplar	*Populus nigra*					2	2	1%
London plane	*Platanus × acerifolia*	2				0	2	1%
Oregon ash	*Fraxinus latifolia*	14			27	32	73	21%
pacific yew	*Taxus brevifolia*					1	1	0.3%
paper birch	*Betula papyrifera*	1				0	1	0.3%
plum	*Prunus* spp.	2				0	2	1%
red alder	*Alnus rubra*					6	6	2%
scots pine	*Pinus sylvestris*	1				0	1	0.3%
Scouler's willow	*Salix scouleriana*	1			1	1	3	1%
sweet cherry^	*Prunus avium*	10			7	8	25	7%
western redcedar	*Thuja plicata*	2				3	5	1%
Total		**182**	**1**	**1**	**67**	**100**	**351**	
Percent*		**52%**	**0.3%**	**0.3%**	**19%**	**28%**		**100%**

^Identifies species widely accepted as being invasive in our region.

*Percent total may not sum to 100% due to rounding.

An additional 127 trees were accounted for beyond the individual tree survey and within the mapped vegetated corridor where no development is proposed. Attachment B provides a summary of the additional tree data collected for the unaffected vegetated corridor area, which encompasses approximately 4-acres including Cedar Creek. Most of these additional trees are mature Oregon ashes (*Fraxinus latifolia*) in fair to poor condition with dead and broken branches and trunk and crown decay. Although they are not in the best condition, these trees are suitable for preservation in the natural area considering that there is low target potential for risk to people or property, and they provide good wildlife habitat and stream shading.

Tree Plan Recommendations

Table 2 provides a summary of proposed treatments by general location as illustrated on the tree preservation and removal plan prepared by Pioneer Design Group.

Table 2. Count of Trees by Treatment and General Location – Cedar Creek Subdivision, Sherwood, OR.

Treatment	On-Site	Boundary	Off-Site	ROW	Env	Total	Percent*
Unaffected	4			61	48	113	33%
Retain	9			4	45	58	17%
Likely to Retain	1				1	2	< 1%
Create Snag					2	2	< 1%
Remove	168	1	1	2	4	176	50%
Total	**182**	**1**	**1**	**67**	**100**	**351**	**100%**

*Percent total may not sum to 100% due to rounding.

Of the 351 inventoried trees, 113 (33%) are unaffected by the proposed development including four on-site trees in and adjacent to proposed tract G, 61 trees located along the SW Brookman Road right of way and 48 trees within environmental constrained areas. This is in addition to the 127 non-surveyed trees accounted for in attachment B. Tree protection measures are not needed for trees classified as unaffected because no work is proposed nearby.

Another 58 trees (17%) are planned for retention with tree protection measures during construction including nine on-site trees (two in open space tract A, one in open space tract B, three near the western boundary adjacent to the proposed trail, and three south of the proposed trail just beyond the 100-year flood plain and vegetated corridor boundaries), four trees in the right of way near the southwest corner of the site near proposed trail construction and grading, and 45 trees within environmentally constrained areas adjacent to proposed retaining wall, trail and stormwater outfall construction.

Sherwood Code Section 16.142.040.G provides tree protection requirements, mainly that trees to be retained are protected with temporary fencing at the dripline or as recommended by a Certified Arborist. The code does require that work within the dripline be supervised by a qualified professional on-site during construction. The tree preservation and removal plan prepared by Pioneer Design Group in coordination with us illustrates which trees are planned for removal and which trees will be protected, specifying tree protection measures and where on-site supervision by the project arborist is required. Tree protection specifications corresponding with the tree plan are also provided in this report.

Two trees are classified as likely to retain, including tree #31605, a 36-inch diameter Douglas-fir (*Pseudotsuga menziesii*) located on-site, and tree #31295, a 9-inch diameter western redcedar (*Thuja plicata*) located in the vegetated corridor. Both trees are in good condition and generally suitable for preservation. However, the proposed trail and associated retaining wall construction encroaches within the dripline area. The tree plan already specifies that work beneath the dripline of any protected tree be performed under arborist supervision. Unlike other trees planned for retention, the potential impacts at these two trees are greater. The objective of classifying these trees as likely to retain is to provide protection for them, but to allow for their removal without delay if and when the project arborist determines that the extent of actual and unavoidable impacts will result in detrimental harm to the health or stability of one or both trees. At that point, the arborist would document the conditions that led to a removal recommendation and submit that documentation to the Owner for submittal to the City, while contractors are able to proceed with removal without delay. We hope that the City of Sherwood will accept this approach in an effort to retain these trees along the proposed trail.

Two potentially hazardous trees located within the vegetated corridor, including tree #6192, a 19-inch diameter Oregon ash in poor condition with an old codominant stem failure, trunk decay and poor crown structure, and tree #31616, a 25-inch diameter Douglas-fir in fair condition but with an old broken top and multiple leaders, are both classified as create snag. This means that rather than removing the whole tree, each tree would be delimbed and reduced in height to non-hazardous lengths based on proximity to the adjacent trail and left as standing dead trees for wildlife habitat.

The tree preservation and removal plan identifies trees with these special classifications and includes notes defining how likely to retain trees shall be protected and specifications for snag creation.

The other 176 trees (50%) are planned for removal for the purposes of site development. Sherwood Code Section 16.142.070.D stipulates that trees may be considered for removal to accommodate development including buildings, parking, walkways, grading, etc., provided that tree canopy requirements are satisfied. Reasons for the proposed removal are summarized below by general location:

- 168 on-site trees are planned for removal, including 73 trees within proposed building lots, 51 trees within the proposed new street and sidewalks, 15 trees within the proposed water quality facility, 27 trees within the proposed trail alignment or along the associated retaining wall, and two trees in proposed open space areas that are not suitable for preservation because of poor condition or structure (#6687 and #7240).
- One tree on the northern boundary (#14125) and one tree located just off-site near the northern boundary (#14124) are planned for removal for proposed sidewalk construction. Prior written consent of the adjacent property owner is typically required for boundary or off-site tree removal.
- Two trees are planned for removal from the right of way in the southwest corner of the site for proposed grading and trail construction (#6687 and #7240).
- Four trees are planned for removal from the vegetated corridor including two decrepit Lombardy poplars (*Populus nigra*) (#6146 and #30210) and one invasive English hawthorn (*Crataegus monogyna*) (#6140) located in a group near the western property boundary just west of the proposed trail and one Douglas-fir (#6681) along the proposed retaining wall alignment south of the proposed trail.

We did coordinate with Pioneer Design Group to recommend adjustments specifically to the proposed trail alignment and retaining wall construction as feasible, which resulted in far fewer tree impacts and better tree protection. The proposed removals are necessary to accommodate the development and tree canopy requirements are satisfied as discussed in the next section of this report.

Required Tree Canopy

Sherwood Code Section 16.142.040.D(2) requires that the net development site of a residential development achieve a minimum 40-percent tree canopy. This requirement can be achieved by retaining existing trees or planting new trees. Existing trees provide double canopy credit based on existing canopy spreads. Canopy credit for trees proposed to be planted is based on the expected mature canopy of each species and is counted for each tree regardless of an overlap of multiple tree canopies. The total size of the net development area is 176,001 square feet. Therefore, 70,400 square feet of tree canopy is required (176,001 / 0.40 = 70,400).

Pioneer Design Group plotted the driplines of the 13 existing on-site trees planned for retention on the Tree Preservation and Removal Plan based on crown radius data we provided in the inventory. This canopy area was delineated with a unique hatching for on-site trees planned for preservation. The total canopy area for retaining existing trees is 9,906 square feet, which equates to 19,812 square feet of canopy credit (9,906 x 2 = 19,812). Note that the one on-site tree classified as likely to retain was not included in the existing tree canopy credit just in case it is removed during construction.

A minimum of 50,588 square feet of tree canopy is needed by planting new trees (70,400 - 19,812 = 50,588). A Registered Landscape Architect with Pioneer Design Group developed the proposed planting plan. Sheet L2 provides the canopy credit calculation for 48 proposed street trees, which totals 62,409 square feet.

Therefore, the minimum required tree canopy is satisfied (19,812 retained + 62,409 planted = 82,221 / 176,001 = 47%). In addition, numerous other trees are proposed for planting in open space tracts and the storm water facility.

Tree Protection Standards

The trees planned for retention will need special consideration to assure their protection during construction. We recommend a preconstruction meeting with the owner, contractors, and project arborist to review tree protection measures and address questions or concerns on site. Tree protection measures include:

1. **Preconstruction Conference.** The developer shall arrange an on-site meeting with the project arborist in order to review the Tree Preservation and Removal Plan and discuss methods of tree removal and tree protection prior to any construction.
2. **Tree Protection Zone.** The Tree Protection Zone (TPZ) is defined as the dripline of protected trees regardless of the location of protection fencing; TPZs are depicted on the Tree Preservation and Removal Plan. Any work that is performed beneath the dripline of a protected tree shall be monitored and documented by the project arborist. Areas of TPZ encroachment requiring the developer to coordinate with the project arborist are shaded on the Tree Preservation and Removal Plan.

3. **Protection Fencing**. Trees to be preserved shall be protected by installation of tree protection fencing as depicted on the Tree Preservation and Removal Site Plan to prevent injury to tree trunks or roots, or soil compaction. Protection fencing shall be chain link or galvanized steel on metal stakes, installed prior to any ground disturbing activity and maintained in good repair throughout construction. The protection fencing shall not be moved, removed or entered by equipment without prior approval of the project arborist; adjustments to the location of protection fencing shall be documented by the project arborist. Trees located more than 30-feet from construction activity should not require fencing.

4. **Prohibitions.** No soil compaction, materials or spoils storage shall be allowed within the TPZ. Without authorization from the project arborist, none of the following shall occur beneath the dripline of any protected tree:
    a. Grade change or cut and fill;
    b. New impervious surfaces;
    c. Utility or drainage field placement; or
    d. Vehicle maneuvering.

    Root protection zones may be entered for tasks like surveying, measuring, and, sampling. Fences must be closed upon completion of these tasks. Construction that is necessary beneath protected tree driplines shall be performed under arborist supervision.

5. **Erosion Control.** Silt fencing required to be installed within TPZs shall not be trenched in per manufacturer specifications to avoid root damage. Instead, roll the base of the silt fence around a straw wattle and stake the wattle securely into the ground or use compost socks or other techniques that avoid tree root impacts.

6. **Tree Removal.** Trees to be removed shall be clearly identified with tree-marking paint or other methods approved in advanced by the project arborist. Tree removal shall be performed by a Qualified Tree Service. Directionally fell or surgically remove trees to avoid contact or otherwise prevent damage to the trunks and branches of trees to be preserved. No vehicles or heavy equipment shall be permitted within TPZs during tree removal operations.

7. **Snag Creation.** Trees #6192 and #31606 located within the Vegetated Corridor but near proposed construction shall be retained as wildlife snags rather than removed to ground level. Snag creation shall be performed by a Qualified Tree Service and work should be completed by hand without the use of heavy equipment in the TPZ. Delimb these trees and reduce trunks heights to less than 1.5-times the distance to high value targets to minimize risk.

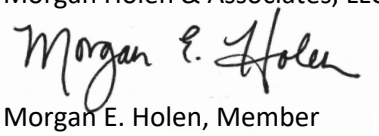
8. **Stump Removal.** Stumps of trees planned for removal that are located beneath the dripline of protected trees shall remain in the ground where feasible. Otherwise, stumps may be removed by stump grinding to just below the ground surface or extracted from the ground under project arborist supervision.

9. **Pruning.** Trees to be preserved may require minor pruning for overhead clearance and to remove dead and defective branches for safety. The project arborist can help identify whether pruning is necessary once trees planned for removal have been removed and the site is staked and prepared for construction. Tree removal and pruning shall be performed by a Qualified Tree Service.

10. **Excavation Beneath Protected Tree Driplines.** Excavation beneath protected tree driplines shall be avoided if alternatives are available. If excavation is unavoidable, the developer shall coordinate with the project arborist to evaluate the proposed excavation to determine methods to minimize impacts to trees. This can include tunneling, hand digging, using a modified profile or other approaches.
11. **Root Pruning.** Roots smaller than 2-inches in diameter may be pruned clean to sound wood using a sharp saw as digging progresses to avoid pulling and tearing roots. Excavation immediately adjacent to roots larger than 2-inches in diameter within the TPZ shall be by hand or other non-invasive techniques to ensure that roots are not damaged. The project arborist or shall assess and document roots 2-inches and larger in diameter prior to impacts. Where feasible, these shall be protected by tunneling or other means to avoid destruction or damage. Exceptions can be made if, in the opinion of the project, unacceptable damage will not occur to the tree.
12. **Landscaping.** Following construction and prior to landscaping, the protection fencing may be removed. Where landscaping is desired, apply approximately 3-inches of mulch beneath the dripline of protected trees, but not directly against tree trunks. Shrubs and ground cover plants may be planted within TPZs. If irrigation is used, use drip irrigation only beneath the driplines of protected trees; install drip irrigation lines on the ground surface and cover with mulch (no trenching to install irrigation lines beneath protected tree driplines).
13. **Quality Assurance.** The project arborist will be available on-call during construction to supervise proper execution of this plan; it is the developer's responsibility to coordinate with the project arborist in a timely manner as needed.
14. **Final Report.** After the project has been completed, the project arborist should provide a final report that describes the measures needed to maintain and protect the remaining trees.

Please contact us if you have questions or need any additional information. Thank you for choosing Morgan Holen & Associates to provide consulting arborist services for the Riverside at Cedar Creek subdivision project.

Thank you,
Morgan Holen & Associates, LLC



Morgan E. Holen, Member
ISA Board Certified Master Arborist, PN-6145B
ISA Tree Risk Assessment Qualified
Forest Biologist

Enclosures: Attachment A: Tree Inventory
Attachment B: Additional Data for Unaffected Vegetated Corridor

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6045	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	14	F		Remove	Trail
6059	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	26,38	26	G	Codominant stems, basal wound	Remove	Grading
6068	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	53	34	E		Remove	Trail
6072	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	61	34	G	Codominant stems, some included bark	Retain	N/A
6074	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	30	26	G	Lower trunk swelling	Retain	N/A
6075	ROW	Dec	sweet cherry	*Prunus avium*	7	11	F	Nuisance species	Unaffected	N/A
6076	On-Site	Dec	sweet cherry	*Prunus avium*	6	11	F	Nuisance species	Retain	N/A
6077	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	10	8	F		Unaffected	N/A
6078	VC	Dec	sweet cherry	*Prunus avium*	7	11	F	Nuisance species	Unaffected	N/A
6083	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	37	18	G	Dominant crown class, some ivy	Unaffected	N/A
6084	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	22	14	F	Codominant crown class, major asymmetry, some ivy	Unaffected	N/A
6085	VC	Dec	red alder	*Alnus rubra*	12	10	F	Poor structure, ivy	Unaffected	N/A
6086	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	P	Suppressed	Unaffected	N/A
6103	ROW	Dec	Oregon ash	*Fraxinus latifolia*	9,15, 17,24	24	F	Poor structure, dead and broken branches, crown decay	Unaffected	N/A
6104	VC	Dec	Oregon ash	*Fraxinus latifolia*	23	16	P	Advanced trunk decay, previous failures	Unaffected	N/A
6105	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	37	18	G	P. pini conks	Unaffected	N/A
6107	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	21	13	G	Codominant crown class	Unaffected	N/A
6110	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	47	31	G	Some history of branch failure	Unaffected	N/A
6111	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	20	24	F	Poor structure, old broken top	Retain	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6113	ROW	Dec	sweet cherry	*Prunus avium*	15	20	P	Nuisance species, trunk damage	Retain	N/A
6139	VC	Dec	red alder	*Alnus rubra*	8,9	15	F		Retain	N/A
6140	VC	Dec	English hawthorn	*Crataegus monogyna*	10	10	P	Nuisance species, very poor structure	Remove	Condition
6146	VC	Dec	Lombardy poplar	*Populus nigra*	41	8	P	Progressive decline, severe crown decay, very poor structure, inherent species limitations	Remove	Condition
6163	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	43	24	G	Codominant leaders with some included bark	Remove	Trail
6173	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	34	26	G	Self-correcting lean on steep bank	Retain	N/A
6177	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	40	28	G	Spur leader	Retain	N/A
6192	VC	Dec	Oregon ash	*Fraxinus latifolia*	19	17	P	Old codominant stem failure, trunk decay, poor crown structure	Create Snag	Condition
6195	VC	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F		Unaffected	N/A
6205	VC	Dec	red alder	*Alnus rubra*	18	12	P	Broken top	Unaffected	N/A
6214	VC	Dec	Oregon ash	*Fraxinus latifolia*	15	0	D	Wind snapped	Retain	N/A
6218	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	9	F	One-sided crown	Remove	WQ Facility
6219	On-Site	Dec	cherry	*Prunus* spp.	16	16	F	Codominant leaders with included bark	Remove	Street
6220	On-Site	Dec	cherry	*Prunus* spp.	8,10	14	F	Codominant stems with included bark	Remove	Sidewalk
6272	On-Site	Dec	London plane	*Platanus × acerifolia*	18	20	G	One-sided crown, cable compartmentalized in trunk	Remove	Lot 16
6273	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	33	25	G	Multiple stems	Remove	Lot 15

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6274	On-Site	Dec	London plane	*Platanus × acerifolia*	15	20	G	Codominant leaders	Remove	Lot 15
6277	On-Site	Dec	cherry	*Prunus* spp.	13	16	F	Moderate structure	Remove	Lot 14
6278	On-Site	Dec	cherry	*Prunus* spp.	9	13	F	Moderate structure	Remove	Lot 14
6279	On-Site	Dec	cherry	*Prunus* spp.	14	16	F	Moderate structure	Remove	Lot 14
6280	On-Site	Dec	cherry	*Prunus* spp.	8	18	F	Moderate structure	Remove	Lot 14
6281	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	53	38	E	Rx aerial assessment if potential for retention	Remove	Wall
6282	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	46	28	G	Pistolbutt	Remove	Lot 8
6283	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	30	G	Dense group	Remove	Lot 9
6284	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25	18	F	Dense group	Remove	Lot 9
6285	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	34	22	F	Codominant stems with included bark, old broken top, multiple leaders, pini conks	Remove	Lot 9
6291	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	43	32	E		Remove	Lot 13
6292	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	24	G		Remove	Lot 12
6293	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	8	17	P	Poor structure, trunk decay	Remove	Lot 12
6294	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	9	11	P	Poor structure, trunk decay	Remove	Lot 12
6296	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	27	27	G		Remove	Lot 12
6297	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	16	11	F	Codominant stems	Remove	Lot 12
6298	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	24	G	Small pini conks at old branch stubs	Remove	Lot 12
6299	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	34	28	G		Remove	Lot 12
6300	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	35	24	G		Remove	Sidewalk
6301	On-Site	Dec	Scouler's willow	*Salix scouleriana*	7,8,10	15	F	Multiple stems	Remove	Street
6302	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	13	G		Remove	Street
6303	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	24	G		Remove	Street
6304	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	41	24	G		Remove	Lot 25

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6305	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	7	16	F	Poor structure	Remove	Street
6306	On-Site	Dec	cherry	*Prunus* spp.	6	20	F	Poor structure, one-sided crown	Remove	Lot 13
6307	On-Site	Dec	cherry	*Prunus* spp.	7	20	F	Poor structure, one-sided crown	Remove	Lot 12
6308	On-Site	Dec	cherry	*Prunus* spp.	10	20	P	Poor structure, one-sided crown, codominant stems with seam, decay	Remove	Sidewalk
6309	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	13	F		Remove	Street
6310	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	F		Remove	Street
6311	On-Site	Dec	cherry	*Prunus* spp.	6	20	P	Very poor structure, one-sided crown	Remove	Street
6312	On-Site	Dec	cherry	*Prunus* spp.	7,9	12	F	Codominant stems	Remove	Street
6313	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	38	26	E		Remove	Street
6314	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	13	18	F		Remove	Lot 24
6315	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	20	E		Remove	Lot 23
6316	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	40	22	F	Codominant stems with tight V-shaped attachment and included bark, twig dieback	Remove	Lot 22
6317	On-Site	Dec	cherry	*Prunus* spp.	19	14	F	Poor structure	Remove	Lot 21
6320	On-Site	Dec	Douglas-fir	*Pseudotsuga menziesii*	6	7	F	Blackberries in lower crown	Remove	Lot 23
6321	On-Site	Dec	Douglas-fir	*Pseudotsuga menziesii*	6	8	F	Blackberries in lower crown	Remove	Lot 23
6322	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	5,2x6	9	F		Remove	Trail
6332	VC	Dec	Oregon ash	*Fraxinus latifolia*	21	25	F		Unaffected	N/A
6337	ROW	Dec	English hawthorn	*Crataegus monogyna*	11	15	F	Nuisance species	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6343	ROW	Dec	Oregon ash	*Fraxinus latifolia*	9	20	F	Very poor structure	Unaffected	N/A
6344	ROW	Dec	Oregon ash	*Fraxinus latifolia*	18,23,37	22	F	History of branch failure, trunk and crown decay	Unaffected	N/A
6348	ROW	Dec	Scouler's willow	*Salix scouleriana*	18	12	P	Poor structure, history of failure, trunk and crown decay	Unaffected	N/A
6350	ROW	Dec	Oregon ash	*Fraxinus latifolia*	16	14	F	Assessment limited by standing water	Unaffected	N/A
6355	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F	Assessment limited by standing water	Unaffected	N/A
6358	ROW	Dec	Oregon ash	*Fraxinus latifolia*	8	10	F	Assessment limited by standing water	Unaffected	N/A
6359	ROW	Dec	Oregon ash	*Fraxinus latifolia*	8	10	F	Assessment limited by standing water	Unaffected	N/A
6364	VC	Dec	Oregon ash	*Fraxinus latifolia*	26	20	F		Unaffected	N/A
6368	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	51	22	E		Unaffected	N/A
6373	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	14	F	Dead and broken branches	Unaffected	N/A
6377	VC	Dec	Oregon ash	*Fraxinus latifolia*	16	14	F	Assessment limited by standing water	Unaffected	N/A
6379	VC	Dec	Oregon ash	*Fraxinus latifolia*	8	10	F	Assessment limited by standing water	Unaffected	N/A
6382	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F	Assessment limited by standing water	Unaffected	N/A
6384	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	22	12	F	Broken top, off-center leaders	Unaffected	N/A
6401	ROW	Dec	Oregon ash	*Fraxinus latifolia*	22	18	F		Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6402	ROW	Dec	sweet cherry	*Prunus avium*	12,16	14	F	Nuisance species, trunk decay	Unaffected	N/A
6403	ROW	Dec	Oregon ash	*Fraxinus latifolia*	6	6	F		Unaffected	N/A
6404	ROW	Dec	sweet cherry	*Prunus avium*	10	10	F	Nuisance species	Unaffected	N/A
6405	ROW	Dec	sweet cherry	*Prunus avium*	14	14	F	Nuisance species	Unaffected	N/A
6406	ROW	Dec	sweet cherry	*Prunus avium*	8	0	D	Snag	Unaffected	N/A
6407	ROW	Dec	sweet cherry	*Prunus avium*	12	10	F	Nuisance species, trunk decay	Unaffected	N/A
6408	ROW	Dec	black hawthorn	*Crataegus douglasii*	8	12	F	Assessment limited by standing water	Unaffected	N/A
6409	ROW	Dec	black hawthorn	*Crataegus douglasii*	10	12	F	Assessment limited by standing water	Unaffected	N/A
6410	ROW	Dec	black hawthorn	*Crataegus douglasii*	12	12	F	Assessment limited by standing water	Unaffected	N/A
6411	ROW	Dec	black hawthorn	*Crataegus douglasii*	10	12	F	Assessment limited by standing water	Unaffected	N/A
6412	ROW	Dec	Oregon ash	*Fraxinus latifolia*	12	12	F	Assessment limited by standing water	Unaffected	N/A
6419	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	16	F	Assessment limited by standing water	Unaffected	N/A
6420	ROW	Dec	Oregon ash	*Fraxinus latifolia*	18	22	F	Assessment limited by standing water	Unaffected	N/A
6421	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	16	F	Assessment limited by standing water	Unaffected	N/A
6422	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	12	F	Assessment limited by standing water	Unaffected	N/A
6429	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10, 2x14	16	F	Assessment limited by standing water	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6437	ROW	Dec	Oregon ash	*Fraxinus latifolia*	12,18	22	F	Assessment limited by standing water	Unaffected	N/A
6472	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	45	34	E		Retain	N/A
6497	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14,22	20	F	Poor structure, dead and broken branches, trunk decay	Unaffected	N/A
6500	ROW	Dec	Oregon ash	*Fraxinus latifolia*	8,12,24	20	F	8" snag, other codominant stems with poor structure, dead and broken branches	Unaffected	N/A
6502	ROW	Dec	Oregon ash	*Fraxinus latifolia*	25	22	F	Mostly one-sided to south	Unaffected	N/A
6504	ROW	Dec	English hawthorn	*Crataegus monogyna*	9	12	F	Nuisance species	Unaffected	N/A
6505	ROW	Dec	Oregon ash	*Fraxinus latifolia*	16	14	F	History of large branch failure	Unaffected	N/A
6510	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	14	F	Beaver damage	Unaffected	N/A
6514	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	12	F	Trunk decay	Unaffected	N/A
6515	ROW	Dec	Oregon ash	*Fraxinus latifolia*	16	16	F	Trunk damage	Unaffected	N/A
6516	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	14	F	One-sided to south	Unaffected	N/A
6517	ROW	Dec	Oregon ash	*Fraxinus latifolia*	13	14	F	One-sided to south	Unaffected	N/A
6519	ROW	Dec	Oregon ash	*Fraxinus latifolia*	9	0	D	Decay	Unaffected	N/A
6525	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	27	18	F	Codominant crown class	Unaffected	N/A
6526	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	32	12	F	Codominant crown class, swollen lower trunk	Unaffected	N/A
6527	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	33	26	F	Codominant crown class, self-correcting lean	Unaffected	N/A
6529	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	28	18	G	Crown asymmetry	Unaffected	N/A
6531	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	16	F	Codominant crown class	Unaffected	N/A
6532	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F	Suppressed	Unaffected	N/A
6533	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	14	F	Codominant crown class	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6534	On-Site	Con	western redcedar	*Thuja plicata*	17	13	G		Unaffected	N/A
6535	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	18	10	F	Codominant crown class	Unaffected	N/A
6536	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	16	9	F	Codominant crown class	Unaffected	N/A
6537	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	24	16	F	Codominant crown class	Unaffected	N/A
6538	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	18	18	F	Poor structure, one-sided to south with lean to road	Unaffected	N/A
6539	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	21	19	F	Codominant crown class, P. pini conks	Unaffected	N/A
6540	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	17	16	F	Codominant crown class, trunk sweep	Unaffected	N/A
6541	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	11	10	F	Suppressed	Unaffected	N/A
6542	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	23	18	F	Codominant crown class, broken top, off-center leader	Unaffected	N/A
6543	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	31	20	F	Codominant leaders	Unaffected	N/A
6573	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	24	18	F	Codominant crown class	Unaffected	N/A
6574	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	12	13	F	Intermediate crown class	Unaffected	N/A
6575	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	10	9	P	Suppressed	Unaffected	N/A
6576	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	12	10	P	Suppressed, P. pini conks	Unaffected	N/A
6577	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	31	20	F	Codominant crown class	Unaffected	N/A
6578	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	30	26	F	Codominant crown class, poor structure, codominant leaders with included bark and seam	Unaffected	N/A
6591	VC	Dec	sweet cherry	*Prunus avium*	13	20	F	Nuisance species	Unaffected	N/A
6593	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	39	22	G	Lower trunk sweep off steep bank	Retain	N/A
6601	VC	Con	western redcedar	*Thuja plicata*	43	18	G	Lower trunk wound	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6666	100yr FP	Con	western redcedar	*Thuja plicata*	12	13	G		Retain	N/A
6667	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18	16	P	History of branch failure, broken to, small live crown	Remove	Lot 26
6668	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	15	G		Remove	Lot 26
6669	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18	16	F		Remove	Lot 27
6670	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	17	20	F	Codominant leaders	Remove	Lot 27
6671	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18,19	18	F	Poor structure	Remove	Lot 27
6672	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	11	11	F	Intermediate crown class, pini conk	Remove	Lot 27
6673	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	18	F		Remove	Lot 27
6674	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	5,8	14	F		Remove	Sidewalk
6675	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F	Trunk wound	Remove	Street
6676	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	F	Pistolbutt	Remove	Street
6677	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	F		Remove	Street
6678	On-Site	Dec	English hawthorn	*Crataegus monogyna*	12	10	P	Nuisance species, very poor structure	Remove	Street
6679	On-Site	Dec	sweet cherry	*Prunus avium*	7	10	F	Nuisance species, poor structure	Remove	Lot 25
6680	On-Site	Dec	deciduous	unknown	7	16	P	Very poor structure	Remove	Wall
6681	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	45	22	E		Remove	Wall
6682	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	6	13	F	Poor structure	Remove	Trail
6683	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	26	21	G		Retain	N/A
6684	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	25	22	G		Retain	N/A
6685	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	16	P	Old broken top, very poor structure, suppressed beneath dominant canopy	Remove	Trail
6686	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	39	32	G		Remove	Trail

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6687	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	11	F	Poor structure, self-correcting lean, suppressed	Remove	Condition
6688	VC	Dec	Scouler's willow	*Salix scouleriana*	10	11	F		Retain	N/A
6689	VC	Dec	sweet cherry	*Prunus avium*	5,7	10	F	Nuisance species	Retain	N/A
6690	VC	Dec	English hawthorn	*Crataegus monogyna*	7	10	F	Poor structure, excessive lean south	Unaffected	N/A
6691	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	29	16	F	Reduced vigor, dead branches, dieback	Unaffected	N/A
6692	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	10	11	F	Intermediate crown class	Unaffected	N/A
6693	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	19	16	F		Unaffected	N/A
6694	100yr FP	Dec	English hawthorn	*Crataegus monogyna*	7	10	P	Nuisance species, very poor structure	Unaffected	N/A
6695	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	25	14	F		Unaffected	N/A
6696	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	7	11	F	Suppressed	Retain	N/A
6697	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	10	13	F	Suppressed	Retain	N/A
7172	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18	7	P	Low vigor, dying	Remove	Lot 11
7173	On-Site	Dec	sweet cherry	*Prunus avium*	8	9	F	Nuisance species	Remove	Lot 11
7174	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	34	20	F	History of branch failure, crown asymmetry, large pini conks	Remove	Lot 11
7175	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	26	12	F	History of branch failure, broken top, major asymmetry	Remove	Lot 10
7176	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	15	F	Codominant crown class with 7175	Remove	Lot 10
7177	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	22	16	F	Numerous pini conks	Remove	Lot 11
7178	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	8	15	F	Moderate structure	Remove	Lot 11

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
7179	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	40	20	G	Dead and broken branches, broken top, pitch seam on lower trunk	Remove	Lot 11
7180	On-Site	Dec	sweet cherry	*Prunus avium*	7	10	F	Nuisance species	Remove	Lot 11
7181	On-Site	Dec	sweet cherry	*Prunus avium*	7	10	F	Nuisance species	Remove	Lot 11
7182	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	0	D	Snag	Remove	Lot 11
7183	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	11	7	P	Broken top	Remove	Lot 11
7184	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	19	16	F		Remove	Sidewalk
7185	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	12	16	F		Remove	Sidewalk
7186	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	0	D	Mostly dead	Remove	Sidewalk
7187	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	20	F	Old broken top with new leaders	Remove	Sidewalk
7188	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	7	G	Young tree	Retain	N/A
7189	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	20	G	Some history of branch failure, epicormics	Retain	N/A
7190	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	7	F	Young tree, minor asymmetry, lower limbs poorly pruned, trunk damage	Retain	Sidewalk
7191	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	9	F	Young tree, minor asymmetry, lower limbs poorly pruned	Remove	Sidewalk
7192	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	17	10	P	High live crown, windthrow risk	Remove	Lot 28
7193	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	10	F	Blackberries in lower crown	Remove	Street
7194	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	F	Blackberries in lower crown	Remove	Street

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
7195	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F		Remove	Street
7196	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F	Blackberries in lower crown, trunk damage	Remove	Sidewalk
7197	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	8	P	Broken top, small live crown, hollow with advanced trunk decay	Remove	Sidewalk
7198	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	7	F		Remove	Street
7199	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	7	F		Remove	Street
7200	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	9	F		Remove	Street
7201	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	F	Self-correcting but excessive lean	Remove	Street
7202	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	G		Remove	Street
7203	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	G		Remove	Street
7204	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	G		Remove	Lot 28
7205	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	F	Crooked leader	Remove	Lot 28
7206	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	10	F	Self-correcting lean	Remove	Lot 28
7207	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	G		Remove	Lot 28
7240	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	10	11	P	Small live crown, sunscald, low vigor, not viable	Remove	Condition
7241	VC	Dec	sweet cherry	*Prunus avium*	9	11	F	Nuisance species, codominant stems, some included bark, self-correcting lean	Retain	N/A
7242	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	19	16	G		Retain	N/A
7243	On-Site	Dec	dogwood	*Cornus* spp.	7	12	F	Poor structure	Remove	Trail
7244	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	10,19	12	G	Codominant stems	Retain	N/A
9001	On-site	Con	Douglas-fir	*Pseudotsuga menziesii*	10	11	G		Remove	Sidewalk

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
9002	On-Site	Dec	sweet cherry	*Prunus avium*	6	8	F	Nuisance species	Remove	Street
9003	On-Site	Dec	English hawthorn	*Crataegus monogyna*	6	0	D	Nuisance species	Remove	Street
9004	On-Site	BLE	English holly	*Ilex aquifolium*	8	12	F	Nuisance species	Remove	Street
9005	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	F		Remove	Street
10039	On-Site	Dec	plum	*Prunus* spp.	6,10, 20,24	18	P	Very poor structure, dead and broken branches, trunk and crown decay	Remove	Lot 20
10042	On-Site	Dec	plum	*Prunus* spp.	4x6,2x8, 2x10	17	F	Very poor structure, trunk decay	Remove	Lot 20
10054	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	42	22	G	Pini conks	Remove	Lot 20
10055	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	12	F	Intermediate crown class, numerous pini conks	Remove	Sidewalk
10059	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	24	F	Codominant stems, pini conks	Remove	Street
10061	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25	22	F	Dead branches	Remove	Street
10063	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	33	24	G	Dense group	Remove	Street
10067	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	40	28	F	Dense group, codominant stems with included bark	Remove	Street
10068	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	43	32	E	Dense group	Remove	Street
10070	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	50	33	E	Dense group	Remove	Street
10086	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	20	20	G	Dense group	Remove	Sidewalk
10087	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	24	G	Dense group	Remove	Sidewalk
10088	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	14	22	G	Dense group	Remove	Sidewalk
10101	On-Site	Dec	apple	*Malus* spp.	10	13	F	Poor structure, decay	Remove	Street
10104	On-Site	Dec	apple	*Malus* spp.	10	13	F	Poor structure	Remove	Sidewalk
10108	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25,26	30	G	Codominant stems, ivy infestation	Remove	WQ Facility
10116	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	12	P	Low vigor, trunk damage	Remove	WQ Facility

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
10117	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	13	P	Low vigor	Remove	WQ Facility
10118	On-Site	Dec	English hawthorn	*Crataegus monogyna*	14	20	F	Nuisance species	Remove	WQ Facility
10122	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	15	22	G	Moderate structure	Remove	WQ Facility
10123	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	16	20	G	Moderate structure	Remove	WQ Facility
10126	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	41	34	G	Ivy infestation	Remove	Lot 21
10128	On-Site	Con	scots pine	*Pinus sylvestris*	13	16	P	Very poor structure, small one-sided live crown, broken top	Remove	WQ Facility
10134	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	53	40	E		Remove	WQ Facility
10148	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	30	G	Multiple leaders, aerial inspection and possible cable/brace if retained	Remove	Trail
10150	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	20	G		Remove	WQ Facility
10151	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	11	P	Suppressed	Remove	WQ Facility
10153	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	13	F	Reduced vigor	Remove	WQ Facility
10165	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	32	34	G	Dead and broken branches	Remove	Lot 21
10169	On-Site	Dec	English hawthorn	*Crataegus monogyna*	8	12	P	Nuisance species	Remove	Trail
10170	On-Site	Con	grand fir	*Abies grandis*	8	11	F		Remove	Trail
10178	VC	Dec	English hawthorn	*Crataegus monogyna*	3x8	12	P	Poor structure, decay	Retain	N/A
10180	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	36	27	G	Crown asymmetry	Retain	N/A
10182	On-Site	Dec	paper birch	*Betula papyrifera*	7,9	11	P	Poor structure, dead and broken branches, lower trunk damage	Remove	WQ Facility
14124	Off-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	25	F	Codominant crown class with 14125	Remove	Street
14125	Boundary	Con	Douglas-fir	*Pseudotsuga menziesii*	13,2x22	18	F	Fence in trunk	Remove	Sidewalk

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
30210	VC	Dec	Lombardy poplar	*Populus nigra*	32	8	P	Dead and broken branches, crown decay, inherent species limitations	Remove	Condition
30235	VC	Dec	English hawthorn	*Crataegus monogyna*	6	10	P	Extensive ivy	Retain	N/A
30241	VC	Dec	Oregon ash	*Fraxinus latifolia*	24	28	G	Dead and broken branches, ivy	Retain	N/A
30252	VC	Dec	English hawthorn	*Crataegus monogyna*	12	15	P	Nuisance species, poor structure, ivy	Retain	N/A
30255	VC	Dec	Oregon ash	*Fraxinus latifolia*	17	16	P	Extensive ivy	Retain	N/A
30257	VC	Dec	English hawthorn	*Crataegus monogyna*	11	14	P	Nuisance species, excessive lean	Retain	N/A
30273	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	12	14	F		Remove	Trail
30278	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	13	15	F	Forked leaders	Retain	N/A
30282	On-Site	Dec	English hawthorn	*Crataegus monogyna*	7	8	P	Nuisance species, poor structure, ivy	Retain	N/A
30283	On-Site	Dec	English hawthorn	*Crataegus monogyna*	4,6,8	8	P	Nuisance species, poor structure, ivy	Retain	N/A
30298	VC	BLE	English holly	*Ilex aquifolium*	2x6	6	F	Nuisance species	Retain	N/A
30299	VC	Dec	sweet cherry	*Prunus avium*	9	10	F	Nuisance species, broken top, poor structure	Retain	N/A
30309	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	19	23	F	Not suitable for retention with exposure from adjacent removals, poor crown structure, lower trunk wound	Remove	Trail
30312	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	17	24	F	High live crown	Remove	Lot 21
30314	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	6	14	P	Very poor structure, small live crown	Remove	WQ Facility

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
30315	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	11	13	F	High live crown	Remove	WQ Facility
30322	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	21	F	Poor structure	Remove	Lot 22
30328	VC	Dec	Oregon ash	*Fraxinus latifolia*	33	20	F	Poor structure, dead and broken branches, lower trunk wound	Retain	N/A
30329	VC	Dec	English hawthorn	*Crataegus monogyna*	10	10	F	Poor structure	Retain	N/A
30341	VC	Dec	sweet cherry	*Prunus avium*	9	9	F	Nuisance species, crook in lower trunk	Unaffected	N/A
30346	VC	Dec	Oregon ash	*Fraxinus latifolia*	14	0	D	Wind snapped	Unaffected	N/A
30354	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	45	26	E		Retain	N/A
30403	VC	Dec	red alder	*Alnus rubra*	17	20	F	Leans northwest	Retain	N/A
30409	VC	Dec	red alder	*Alnus rubra*	19	16	F	Leans west	Retain	N/A
30417	VC	Dec	Oregon ash	*Fraxinus latifolia*	8	12	P	Column of advanced trunk decay	Retain	N/A
30420	VC	Dec	red alder	*Alnus rubra*	19	14	P	Broken top, trunk decay	Unaffected	N/A
30421	VC	Dec	Oregon ash	*Fraxinus latifolia*	13	8	P	Snag	Retain	N/A
30422	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	10	P	Broken top	Retain	N/A
30431	VC	Dec	Oregon ash	*Fraxinus latifolia*	28	20	F	Dead and broken branches	Unaffected	N/A
30459	On-Site	Dec	English hawthorn	*Crataegus monogyna*	12	12	P	Nuisance species, recently uprooted	Remove	Trail
30521	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	14	G		Remove	Trail
30594	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	30	E		Remove	Lot 22
30603	On-Site	Dec	sweet cherry	*Prunus avium*	8	11	F	Nuisance species	Remove	Lot 24
30622	On-Site	Dec	sweet cherry	*Prunus avium*	2x15	15	P	Nuisance species, decrepit, history of failure, advanced decay	Remove	Lot 25
30627	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	11	F	Self-correcting lean, crown asymmetry, pini conks	Remove	Condition/ Wall

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
30636	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	33	20	G	One-sided crown	Retain	N/A
30638	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	10	12	P	Sunscald	Retain	N/A
30639	On-Site	Dec	sweet cherry	*Prunus avium*	6	10	F	Nuisance species; not suitable for retention with removal of #30627	Remove	Wall
30640	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	22	12	F		Retain	N/A
30641	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	13	14	F		Retain	N/A
30646	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	27	25	F		Remove	Wall
30647	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	12	F	Non-self correcting lean	Remove	Condition/ Wall
30653	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	21	17	F		Retain	N/A
30659	VC	Dec	Oregon ash	*Fraxinus latifolia*	13	16	F	Poor structure, multiple leaders, trunk decay	Unaffected	N/A
30683	VC	Dec	sweet cherry	*Prunus avium*	17	25	F	Nuisance species	Retain	N/A
31250	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	49	32	G	Codominant leaders with included bark	Remove	Trail
31257	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	16	G	Codominant crown class	Remove	Trail
31263	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	29	24	F	History of branch failure	Retain	N/A
31283	VC	Con	Oregon ash	*Fraxinus latifolia*	30	20	F	Dead and broken branches	unaffected	N/A
31289	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	9	G		Remove	Trail
31293	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	33	26	G	Basal hollow, may just be rooting and not decay	Remove	Trail
31295	VC	Con	western redcedar	*Thuja plicata*	9	12	G		Likely to Retain	Assess wall impacts
31296	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	12	11	F		Remove	Trail
31300	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	38	24	G		Unaffected	N/A
31313	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	31	20	G		Retain	N/A
31319	On-Site	Dec	sweet cherry	*Prunus avium*	10	17	F	Nuisance species	Remove	Lot 26

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
31320	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	48	28	G	Few dead and broken branches	Remove	Lot 26
31323	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	38	28	F	Reduced vigor	Retain	N/A
31333	100yr FP	Dec	sweet cherry	*Prunus avium*	21	20	F	Nuisance species, previous codominant stem failure, open wound with some decay	Retain	N/A
31337	VC	Dec	Douglas-fir	*Pseudotsuga menziesii*	14	10	F	Heavy sweep leaning uphill, self-correcting	Unaffected	N/A
31340	On-Site	Con	western redcedar	*Thuja plicata*	22	18	G		Remove	Lot 27
31342	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	9	9	F		Retain	N/A
31347	VC	Dec	Oregon ash	*Fraxinus latifolia*	10	10	P	Broken top, very poor structure	Unaffected	N/A
31349	VC	Dec	Oregon ash	*Fraxinus latifolia*	28,29	20	F	Codominant stems, advanced trunk decay	Unaffected	N/A
31350	VC	Dec	Oregon ash	*Fraxinus latifolia*	12	14	F	Dead and broken branches	Unaffected	N/A
31353	VC	Dec	Oregon ash	*Fraxinus latifolia*	10,21	14	F	10” stem is dead, 21” stem with high live crown	Unaffected	N/A
31355	VC	Dec	Oregon ash	*Fraxinus latifolia*	7	10	P	Leans west	Unaffected	N/A
31360	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	10	F	Small high live crown, codomi	Unaffected	N/A
31361	VC	Dec	Oregon ash	*Fraxinus latifolia*	19	16	F	Dead and broken branches, trunk decay with hollow	Unaffected	N/A
31362	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	15	F	Small high live crown	Unaffected	N/A
31365	VC	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F	Major lower trunk sweep	Unaffected	N/A
31373	VC	Dec	Oregon ash	*Fraxinus latifolia*	29	20	F	Poor structure, dead and broken branches	Unaffected	N/A
31386	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	17	14	F		Remove	Wall

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
31393	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	32	15	F	Codominant stems	Remove	Lot 27
31421	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	G		Retain	N/A
31574	On-Site	Dec	English hawthorn	*Crataegus monogyna*	9	9	P	Nuisance species, very poor structure	Remove	Lot 23
31575	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	44	26	G	Codominant stems with tight V-shaped attachment, active pitch flow lower trunk, some pini conks, unidentified mushrooms in root zone	Remove	Lot 23
31577	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25	22	G		Remove	Lot 23
31583	On-Site	Dec	Douglas-fir	*Pseudotsuga menziesii*	8	7	P	Poor structure	Remove	Lot 23
31584	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	8	16	F	Poor structure, trunk wound	Remove	Lot 23
31585	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	46	26	G	History of branch failure, lower trunk damage	Remove	Lot 23
31605	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	36	24	G		Likely to Retain	Assess wall impacts
31606	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	25	21	F	Old broken top, multiple leaders	Create Snag	Condition
31610	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	28	E		Remove	Trail
31614	VC	Dec	Oregon ash	*Fraxinus latifolia*	12	16	F	Codominant leaders	Retain	N/A
71092	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	37	32	G		Unaffected	N/A
71095	VC	Dec	Oregon ash	*Fraxinus latifolia*	17	20	F	Poor crown structure, dead and broken branches	Unaffected	N/A
71097	VC	Dec	Oregon ash	*Fraxinus latifolia*	9,11,31	26	P	Very poor structure, advanced trunk decay, good habitat, low target potential	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
80001	VC	Con	pacific yew	*Taxus brevifolia*	8	3	P	Mostly dead, but sprouting and unique native species	Retain	N/A
80002	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	7	6	F	Suppressed	Unaffected	N/A
80003	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	15	15	F	Poor structure, trunk sweep, off-center leader, one-sided crown to south	Unaffected	N/A

[1]**Location** identifies where trees are located, either: On-site (not within environmentally constrained areas or rights-of-way); Off-Site (limited to tree #14124 near the northern boundary); Boundary (limited to tree #14125 on the northern boundary); ROW (for trees located in the SW Brookman Road right-of-way); VC (for trees located within or on the Vegetated Corridor boundary); or, 100yr FP (for trees located outside of the VC but within the 100 year flood plain).

[2]**DBH** is tree diameter measured at 4.5-feet above ground level in inches, except off-site tree diameter was visually estimated; trees with multiple trunks splitting below DBH were measured at the narrowest point beneath the split or are indicated as quantity x size.

[3]**C-Rad** is the average crown radius measured in feet.

[4]**Cond** is an arborist assigned rating to generally describe the condition of individual trees as follows- **D**ead; **P**oor; **F**air; **G**ood; or, **E**xcellent Condition.

[5]**Treatment** corresponds with the Tree Preservation and Removal Plan.

[6]**Reason** lists the general reason for removal for the purposes of site development typically associated with grading that is required for building lots, sidewalks and streets, retaining walls and trails, or because a tree's condition is not suitable for retention with the proposed development; N/A is indicated for trees classified as Retain or Unaffected in the Treatment column.

Morgan Holen & Associates LLC

Attachment B: Additional Tree Data for Unaffected Vegetated Corridor
MHA19064 Riverside at Cedar Creek - Tree Data 01-20-2020 Rev. 03-05-2020.xlsx

Stand No.	Tree Species	Count	Average DBH[1]	Average Condition	Total Canopy Preserved	Comments
1	Oregon ash (*Fraxinus latifolia*)	103	20	Fair-Poor	~4-acres	Non-surveyed stand grown trees within the unaffected Vegetated Corridor were generally assessed in terms of species, diameter, and general condition. These trees are unaffected by the proposed development. No canopy credit is accounted for since they are located beyond the Net Development Site.
	hawthorn (*Crataegus* spp.)	17	9	Fair		
	Douglas-fir (*Pseudotsuga menziesii*)	3	30	Good		
	red alder (*Alnus rubra*)	3	12	Fair		
	sweet cherry (*Prunus avium*)	1	8	Fair		
Total Stand		**127**	**16**	**Fair**		

[1]**DBH** is tree diameter measured at 4.5-feet above the ground level, in inches.

Morgan Holen & Associates, LLC
Consulting Arborists and Urban Forest Management
3 Monroe Parkway, Suite P220, Lake Oswego, OR 97035
morgan@mholen.com | 971.409.9354

Clean Water Services File Number

Sensitive Areas Certification Form

1. Property Information *(example 1S234AB01400)*

Tax lot ID(s): 3S1060000104

Site Address: 17433 SW Brookman Road

City, State, Zip: Sherwood, Oregon, 97140

Nearest Cross Street: SW Brookman Rd. & Pacific Hwy 99

2. Owner Information

Name: Linda and Richard Scott

Company: n/a

Address: 17433 SW Brookman Road

City, State, Zip: Sherwood, Oregon 97140

Phone/Fax:

E-Mail:

3. Development Activity *(check **all** that apply)*

- ☐ Addition to Single Family Residence (rooms, deck, garage)
- ☐ Lot Line Adjustment
- ☐ Minor Land Partition
- ☐ Residential Condominium
- ☐ Commercial Condominium
- ☑ Residential Subdivision
- ☐ Commercial Subdivision
- ☐ Single Lot Commercial
- ☐ Multi Lot Commercial

Other

4. Applicant Information

Name: Niki Munson

Company: Riverside Homes

Address: 17933 NW Evergreen Pkwy, #370

City, State, Zip: Beaverton, Oregon 97006

Phone/Fax: 503-645-0986

E-Mail: nmunson@riversidehome.com

5. Check any of the following that apply to this project.

- ☐ Adds less than 500 square feet of impervious surface.
- ☐ Does not encroach closer to the Sensitive Area than existing development on the property.
- ☐ Is not located on a slope greater than 25%.

6. Applicant Information

Name: Jack Dalton

Company: Environmental Science & Assessment, LLC

Address: 107 SE Washington Street, #249

City, State, Zip: Portland, OR 97214

Phone/Fax: 503-478-0424

E-Mail: jack@esapdx.com

7. Will the project involve any off-site work? ☐ Yes ☑ No ☐ Unknown *(check appropriate box)*

If yes, location and description of off-site work

8. Additional comments or information that may be needed to understand your project

SW Brookman Road right of way improvements will be deferred to Washington County until the time of actual improvements, which the county will be responsible for.

2550 SW Hillsboro Highway Hillsboro, Oregon 97123
Phone: 503.681.3600 Fax: 503.681.3603 cleanwaterservices.org

Clean Water Services

Clean Water Services File Number

Sensitive Areas Certification Form *(continued)*

9. An on-site, water quality sensitive area reconnaissance was completed on:

Date	By	Title	Company
12/17-18/2019	K. Reavis, K. Sanderford	Wetland Scientists	Environmental Science and Assessment

10. Existence of Water Quality Sensitive Areas *(check all appropriate boxes)*

As defined in the Districts Design and Construction Standards:

A. Water-quality-sensitive areas ☑ do ☐ do not exist on the tax lot.

B. Water-quality-sensitive areas ☑ do ☐ do not exist within 200' on adjacent properties, or ☐ unable to evaluate adjacent property.

C. Vegetated corridors ☑ do (136,610 SF) ☐ do not exist on the tax lot.

D. Vegetated corridors ☑ do ☐ do not exist within 200' on adjacent properties, or ☐ unable to evaluate adjacent property.

E. Impacts to sensitive areas and/or vegetated corridors will occur ☑ On-site ☐ Off-site ☐ None proposed at this time.

F. If impacts, mitigation is ☑ On-site ☐ Off-site ☐ Other _____

11. Simplified Site Assessment containing the following information: *(check only items submitted).*

Please refer to Design and Construction Standards 17-05 section 3.02.2 for application requirements.

☐ Complete Certification Form *(2 pages)*

☐ Written description of the site and proposed activity.

☐ Site plan of the entire property.

☐ Photographs of the site labeled and keyed to the site plan.

12. Standard Site Assessment containing the following information: *(check only items submitted).*

Please refer to Design and Construction Standards 17-05 section 3.02.2 for application requirements.

☑ Complete Certification Form (2 pages)

☑ Written description per Design and Construction Standards 17-05 section 3.13.3 b. 1

☑ Wetland Data sheets

☑ Vegetated Corridor Data sheets

☑ Existing Site Condition Figures

☑ Proposed Development Figures

By signing this form the Owner, or Owner's authorized agent or representative, acknowledges and agrees that employees of Clean Water Services have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related to the project site.

I certify that I am familiar with the information contained in this document, and to the best of my knowledge and belief, this information is true, complete, and accurate.

Applicant:

Jack Dalton	Senior Wetland Scientist
Print/Type Name	Print/Type Title
Signature	Date

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INTRODUCTION

Environmental Science & Assessment, LLC (ES&A) was contracted by Riverside Homes to conduct a site assessment on 10.35-acre site at 17433 SW Brookman Road in Sherwood, Oregon (Figure 1). The study area includes one tax lot located in Section 6, Township 3 South, Range 1 West: Tax Lot 104 on Washington County's assessor's map 3S106.

SITE DESCRIPTION

The site is located within the Brookman Addition community in the south end of Sherwood, Oregon (Figure 1). The site is a large acre parcel with a residential subdivision to the north, Hazelnut orchard to the south, and Cedar Creek riparian corridor to the east. The site includes a single-family home and several outbuildings and structures. A packed dirt driveway extends into the site from SW Brookman Road at the southwest corner. The driveway splits into two dirt roads: one extends to the residence and the other extends into the open grass area near the outbuildings in the northwest site corner. The southern and eastern areas of the site are forested with a riparian forested community along Cedar Creek, which flows through the southwestern site corner (Figure 2, 3). There are multiple wetland areas within the Cedar Creek floodplain.

The site is bare ground and mowed grass in the northwest half of the site surrounding the residence and outbuildings. The remainder of the site is a mix of riparian and wetland communities. The riparian areas include mature Douglas fir (*Pseudotsuga menziesii*), Douglas Hawthorn (*Crataegus douglasii*), Oregon ash (*Fraxinus latifolia*), and Big Leaf Maple (*Acer macrophyllum*) with a canopy cover of up to 90 percent throughout. Understory plants include mainly native species such as Western Beaked Hazelnut (*Corylus cornuta*), Vine Maple (*Acer circinatum*), Snowberry (*Symphoricarpos albus*), Serviceberry (*Amelanchier alnifolia*), Osoberry (*Oemleria cerasiformis*) and Swordfern (*Polystichum munitum*).

The residence was built in 1976 and the site has been managed in its current condition since that time. The subdivision to the north was built in 1997. The parcel to the south is a large acreage single family home. Surrounding parcels to the north, east, and west are large acreage single-family properties slated for development of residential subdivisions (Figure 4).

The topography slopes from the northwest site corner southeast towards the Cedar Creek riparian corridor. The topography at the northwest corner is generally flat within the maintained grass areas but begins to slope 14-30% down through the riparian corridor approaching Cedar Creek. There is a high point in the southeast site corner, where topography slopes northwest approaching Cedar Creek with 21-28% slopes.

The soils within the northern half of the study area are mapped as Aloha silt loam (Map Unit 1) and Woodburn silt loam, 3 to 7 percent slopes (45B), with both soil

types of hydric rating 1. In the south end, along the Cedar Creek channel soils include Verboort silty clay loam, 0 to 3 percent slopes (2027A) and Wapato silty clay loam (43). Both these soil types have high hydric ratings; 99 and 92 rating respectively. The southeastern site corner is mapped a non-hydric soil, Willamette silt loam, 3 to 7 percent slopes (44B), with a hydric soil rating of 3.

The site is outside the study area for the Sherwood Local Wetlands Inventory (LWI) map and the National Wetland Inventory (NWI) maps Cedar Creek as a Freshwater Forested/Shrub wetland (PFO1). Additionally, the Brookman Addition Concept Plan maps Class 1 Riparian along the Cedar Creek corridor with wetlands located within the floodplain area.

Brookman Road Right of Way

The southern site boundary is in the public right of way (ROW) for SW Brookman Road and will be impacted for improvements. City of Sherwood has allowed the developer in this case to defer improvements and mitigation for encroachment into wetland and waters within the Cedar Creek floodplain.

From the existing driveway on the western site boundary to about 75-feet east along Brookman Rd., the right of way is forested with mature Douglas Fir canopy and dense English Ivy (*Hedera helix*) in the understory. The area between the constructed channel and SW Brookman Rd is good condition forested area and runs in a uniform strip east to the culvert where Cedar Creek passes under the road. East of this culvert the area in the right of way slopes steeply up with slopes >20% from Cedar Creek into a forested area with mature Douglas Fir and Sword Fern in the understory. This forested area continues offsite to the east.

Topography indicates Cedar Creek and the tributary historically converged in the southwest site corner to create Wetland A along the southern site edge. When SW Brookman Road was built, Cedar Creek was channelized offsite along the southern side of the road and flows through a flat bottom culvert into the southeast corner, which severed the historic connection between wetland A and Cedar Creek. A channel was dug on the eastern edge of the wetlands about 50-feet north of and parallel to Brookman Road, to convey the tributary/wetland waters to Cedar Creek. The channel is about 180-feet long, straight, uniform in width and depth, and was likely installed during the road construction (Photo 6, Figure 3).

METHODOLOGY

The primary guidance document for this report is the *Design and Construction Standards for Sanitary Sewer and Surface Water Management* (Resolution and Order 19-22; Clean Water Services, 2019), which provides the methodology for assessing the presence and extent of Sensitive Areas (SAs) within the development site and within 200 feet of the site, and the required Vegetated Corridors (VCs) adjacent to them.

Two levels of investigation were used to evaluate the presence or absence of Sensitive Areas. The first level included a review of existing and available background data. The second level consisted of a data collection effort conducted during an on-site evaluation.

Reviewed background data included the following information:

- U.S. Geological Survey (USGS) 1:24,000 Topographic Map (MetroMap 2013).
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Map Washington County, OR area (Wetlands Mapper, 2019)
- Sherwood Local Wetlands Inventory (David Evans, Inc, 1992)
- Natural Resource Conservation Service (NRCS) *Soil Survey of Washington County Area, Oregon* (Web Soil Survey, 2019)
- Brookman Addition Concept Plan – Final Report (Otak 2009)

ES&A wetland scientists, Kim Reavis and Kim Sanderford conducted the site investigations on December 17-18, 2019. ES&A collected wetland determination data at seventeen (17) locations to define the wetland boundaries (Figure 3). The wetlands are documented by wetland delineation data forms DP-1 through DP-17 (Appendix C). CWS VC data was recorded at seven (7) VC data plots to characterize the adjacent VC (Appendix D).

The wetland delineation data was collected using the methodology provided in the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE, 2010).

The Sensitive Area boundaries and the data plot locations were flagged in the field and subsequently surveyed by Pioneer Design Group, a professional land surveyor (Figure 3). The Vegetated Corridor data locations (VC1 –VC7) were mapped in the field from known locations and added to the base survey.

SENSITIVE AREAS

There are four main resource areas located within the southern portion of the site which include: eight (8) wetland areas, the main Cedar Creek channel, an unnamed tributary, and a constructed channel (Figure 3). The tributary flows seasonally from offsite through the driveway culvert west to southeast (Photo 1)

until it's outfall into Wetland A onsite. The constructed channel then flows from wetland A due east about 180-feet to an outfall into Cedar Creek. Cedar Creek flows into the site through a culvert under SW Brookman Road in the southeast site corner. The creek then flows south to northeast through the riparian corridor and extends offsite to the northeast. (Figure 3). All mapped water resources are within the 100-year Cedar Creek flood plain.

The plant community in the wetland areas of site is primarily Slough Sedge (*Carex obnupta*) with Oregon Ash canopy cover, with Wild Gooseberry (*Ribes divaricatum*) in the understory in wetland areas in the southeastern site corner.

Wetland A and Tributary

Wetland A is a Palustrine Forested Broad-leaved Deciduous seasonally flooded (PFO1C) wetland, totaling 10,582 square feet (0.24 acres). Topography indicates this wetland is associated with the area historically created where Cedar Creek and the tributary converged in the southwest site corner. The wetland determination data plots associated with Wetland A are DP-14 through DP-17 (Appendix C).

The plant community within and adjacent to Wetland A is Oregon Ash canopy cover with Red-Osier Dogwood (*Cornus sericea*) in the shrub strata and dense Slough sedge) in the herbaceous layer.

Wetland hydrology is collection of overland flow from the onsite tributary, seasonal surface water ponding, and high seasonal groundwater. Hydric soils met Redox Dark Surface (F6) indicator (Appendix B).

Cedar Creek Wetlands

The Cedar Creek Wetlands are a series of seven small Palustrine Forested Broad-leaved Deciduous seasonally flooded (PFO1C) wetlands, totaling 11,577 square feet (0.26 acres), and are in the south-central, southeast and eastern area of the site (Figure 3). The wetlands are located both east and west of the Cedar Creek channel (Photo 4), all within 80-feet.

In the four wetland areas east of the creek in the southeast site corner at the toe of the forested slope, the vegetation is primarily mature Oregon Ash with dense patches of Slough Sedge. There are four small functional wetland areas, surrounded by riparian habitat. Shrub cover within and along the wetlands includes, Osoberry, Wild Gooseberry, and Red-Osier Dogwood. Other tree cover in the southeast site corner within the floodplain includes Douglas fir, Wild Cherry (*Prunus avium*) and Douglas Hawthorn.

In the three wetland areas west of Cedar Creek in the south-central and eastern portion of the site, the canopy is Oregon Ash with Red-Osier Dogwood in the understory and dense Slough Sedge in the herbaceous layer (Photo 2). Within one of the wetland areas associated with Cedar Creek is a mature Douglas Fir

with a buttressed base, a morphological adaptation indicating long term inundation in this area (DP-11).

The hydric soils met Redox Dark Surface (F6) indicators (Appendix B). The wetland determination data plots associated with the Cedar Creek Wetlands are DP-2 through DP-8 and DP-10 through DP-13 (Appendix C).

Cedar Creek

The Cedar Creek channel flows from a culvert under SW Brookman Road (Photo 5) at the southeastern edge of site in an "S" shape: curving northeast, northwest, then east and extending offsite along the southeastern property boundary. The constructed channel (Photo 6) conveys flow from wetland A in the southwest corner to Cedar Creek about 20-feet north of the Brookman Road culvert. Additionally, seasonal inundation from Cedar Creek backs up into the constructed channel.

The riparian forested community bordering both sides of Cedar Creek extends approximately 100-feet on both sides. The stream channel is 6 to 8 feet wide at the Ordinary High Water (OHW) line and is bordered by wetland areas intermingled with riparian areas (Figure 3). The vegetative community is forested wetland and riparian habitat comprised of species already discussed for the associated Cedar Creek Wetlands above.

VEGETATED CORRIDORS

The total area of vegetated corridor is 137,711-square feet on site (Figure 3). Seven (7) vegetated corridor plots were taken to identify the condition of the vegetated corridor. The VC in the southwest site corner along the tributary (VC-1) is in good condition despite a dense herbaceous layer of primarily English Ivy between the tributary and SW Brookman Road. VC east and west of the Cedar Creek channel within the floodplain is in good condition, with mature Oregon Ash, Western Beaked Hazelnut and Osoberry throughout and patches of dense Piggy Back Plant (*Tolmiea menziesii*) in the herbaceous layer (VC-3 to VC-6). In the southeast site corner, the VC adjacent to the wetland areas is in good condition (Photo 3) and plant community shifts to Douglas Fir and Serviceberry with Swordfern in the understory as the slopes increase towards SW Brookman Road (VC-7). The corridor adjacent to the constructed channel in the SW Brookman Road ROW is in good condition (Photo 6, VC-2).

There is extensive English Ivy cover from the driveway between SW Brookman Rd. and the tributary in the forested areas extending into the VC associated with wetland A in the southwest corner. The remainder of the riparian and wetland areas of the site have low percent relative cover of invasive and non-native plants.

The VC width for most of the corridor along wetland A, Cedar Creek, and the associated Cedar Creek Wetlands is 50 feet in areas of less than 25% slopes.

There are several areas onsite where slopes are greater than 25%, for these areas, a break in slope line was determined based on CWS methodology (R&O 19-22). All areas with steep slopes are within good condition corridor, so the 35-foot off-set from the slope break is used. The VC for the northern most wetland is 25 feet based on less than 25% slopes and the wetland being under 0.5 acres. The slope break was determined using the base topographic map provided by Pioneer Design Group, Inc (Figure 3).

PROPOSED SITE PLAN

The proposed project is a 28-lot residential subdivision. Access to the central area of the development is from SW Wapato Lake Drive extending east from the approved "Middlebrook" subdivision on the west side through to the northeast corner, where it connects to the "Middlebrook" subdivision at the end. Access to the northern lots is from SW Trillium Lane, an offsite road running east-west through the adjacent subdivision to the north (Figure 4).

The site plan clusters all lots on the northwestern side of Cedar Creek and the tributary with a community trail extending between the development and the riparian corridor. The trail will utilize the existing driveway and culvert crossing in the southwest corner before turning east to follow the riparian corridor corresponding to the VC corridor. The trail follows the VC corridor boundary until it reaches the northeast corner, where it passes through the VC to connect to the adjacent subdivision to the east (Figure 4). The community trail has a proposed retaining wall along its southern boundary necessary to keep the trail outside the steep slopes and reduce grading into the VC associated with Cedar Creek.

There are two open space tracts planned. One open space tract is in the northeast site corner adjacent to the northeast end of the community trail, and the other is a large open space tract containing the Cedar Creek floodplain and all water resources onsite, south of the community trail (Figure 4). The proposed plan also includes a water quality facility (Tract E) in the southwestern area of site between the proposed road and VC corridor north of the tributary.

Vegetated Corridor Impacts

Permanent VC Impacts (total: 6,451 SF) to be mitigated on site:

- Impacts from the community trail and retaining wall construction
    - Encroachment into the VC at several locations (1,036 SF)
    - Some tree removal recommended by arborist for safety reasons
- Right of Way impacts along SW Brookman Road (5,350 SF)
- Water Quality Facility pipe outfall (65 SF)

Temporary VC Impacts (total: 1,085 SF) to be mitigated on site:

- Installation of the stormwater pipe

See Figure 4 for location of all VC impacts

The current gravel driveway will be utilized for the community trail to the extent possible (Figure 4), minimizing impact to the surrounding good quality VC. Utilizing this existing feature in the construction of the community trail will decrease total impact. No permanent or temporary wetland or waterway impacts are proposed.

VC impacts will result from frontage improvements along about 145-feet of SW Brookman Road required by City of Sherwood. Frontage improvements impact VC in the southwest and southeast site corners in the right of way but exclude impacts within the Cedar Creek floodplain. The City of Sherwood has allowed the remainder of required frontage improvements to be deferred due to the complicated and expensive nature of replacing the stream crossing in a floodplain area, as discussed at the project pre-application conference on November 7, 2019. Washington County will address the floodplain, wetland, and waters encroachment later within the overall SW Brookman Road ROW improvements.

VC Mitigation and Enhancement

There will be two mitigation areas for permanent impacts. One is in the southwest corner adjacent to the proposed community trail and improvements along SW Brookman Road; the other is in the northeast site corner along the community trail and adjacent to the VC associated with Cedar Creek. The two mitigation areas total 6,451 square feet. Considering the good condition of the CWS VC habitat in both planned mitigation areas, minimal plantings are proposed to replace removed trees in combination with invasive species removal. Temporary impacts will be mitigated in place, totaling 1,085 square feet (Figure 4).

- VC Permanent Impact Mitigation (6,451 SF)
    - Total plantings: 7 trees to be planted in mitigation areas
    - Invasive plant removal
- VC Enhancement (137,711 SF)
    - Invasive plant removal in all VC area
- VC Temporary Impact Mitigation (1,085 SF)
    - Plant 11 trees, 55 shrubs

Planting Guidelines

Final locations of enhancement plantings will be determined in the field based on site conditions following the removal of the invasive non-native species. After plant removal, all areas of bare ground within the good condition and planting areas that exceed 25 square feet upon removal of the invasive non-native species shall be planted to CWS density standards (shrubs 5 foot on center spacing, or clustered 3 foot on center and trees 10-foot on-center spacing).

Table 1 is a suggested list of native species that can be planted in the VC temporary impact mitigation area. Table 2 is a suggested seed mix to be distributed in areas disturbed or denuded by the proposed site plan or invasive removal, as well as in areas with low understory diversity in the enhancement

and mitigation areas. This is a recommended seed mix, but any mix of herbaceous species native to shady riparian areas of western Oregon would be well suited to mitigation and enhancements areas planned for this site.

The plant list and planting densities are subject to final approval from CWS environmental review staff. A condition of the Service Provider Letter will be to coordinate with CWS on the final quantity and placement of the enhancement plantings.

Table 1: Recommended Plant List for VC Enhancement/ Mitigation Areas A

Common Name	Scientific Name	Plant Form/Size [1]	Plant Spacing (ft on center)	Total Number of plants
VC MITGATION AREAS (7,536 SF)				
Trees				***18***
Vine Maple	*Acer circinatum*	1 gal/18"	10 ft O.C.	5
Oregon Ash	*Fraxinus latifolia*	2 gal/36"	10 ft O.C.	5
Douglas fir	*Pseudotsuga menziesii*	2 gal/36"	10 ft O.C.	5
Western red cedar	*Thuja plicata*	2 gal/36"	10 ft O.C.	3
Shrubs				***55***
Serviceberry	*Amelanchier alnifolia*	1 gal/18"	Single 5 ft O.C.	5
Beaked Hazelnut	*Corylus cornuta*	1 gal/18"	Single 5 ft O.C.	5
Oregon Grape	*Mahonia aquifolium*	1 gal/18"	Cluster 3-5, 3 ft O.C.	5
Osoberry	*Oemleria cerasiformis*	1 gal/18"	Single 5 ft O.C.	10
Swordfern	*Polystichum munitum*	1 gal/18"	Cluster 3-5, 3 ft O.C.	10
Red Flowering Currant	*Ribes sanguineum*	1 gal/18"	Single 5 ft O.C.	5
Red Elderberry	*Sambucus racemosa*	1 gal/18"	Single 5 ft O.C.	5
Snowberry	*Symphoricarpos albus*	1 gal/18"	Cluster 3-5, 3 ft O.C.	10

NOTES: [1] Substitutes for plant form and species may be used based on availability. [2] Individual species quantities to be determined in landscape plan.

Table 2. Enhancement Area Seed Mix

Common Name	Scientific Name	Percentage of Seed Mix **
Native Wildflower/Grass Mix		
Native California brome	*Bromus carinatus*	15
Blue wildrye	*Elymus glaucus*	30
Meadow barley	*Hordeum brachyantherum*	15
Spike bentgrass	*Agrostis exarata*	20
California Oat Grass	*Danthonia californica*	20
	TOTAL	**100**

*Seeding rate of pure live seed (PLS) in pounds per acre for hydroseed application. **Seed mix application quantity is to be calculated for VC planting area and is subject to availability and measure PLS.

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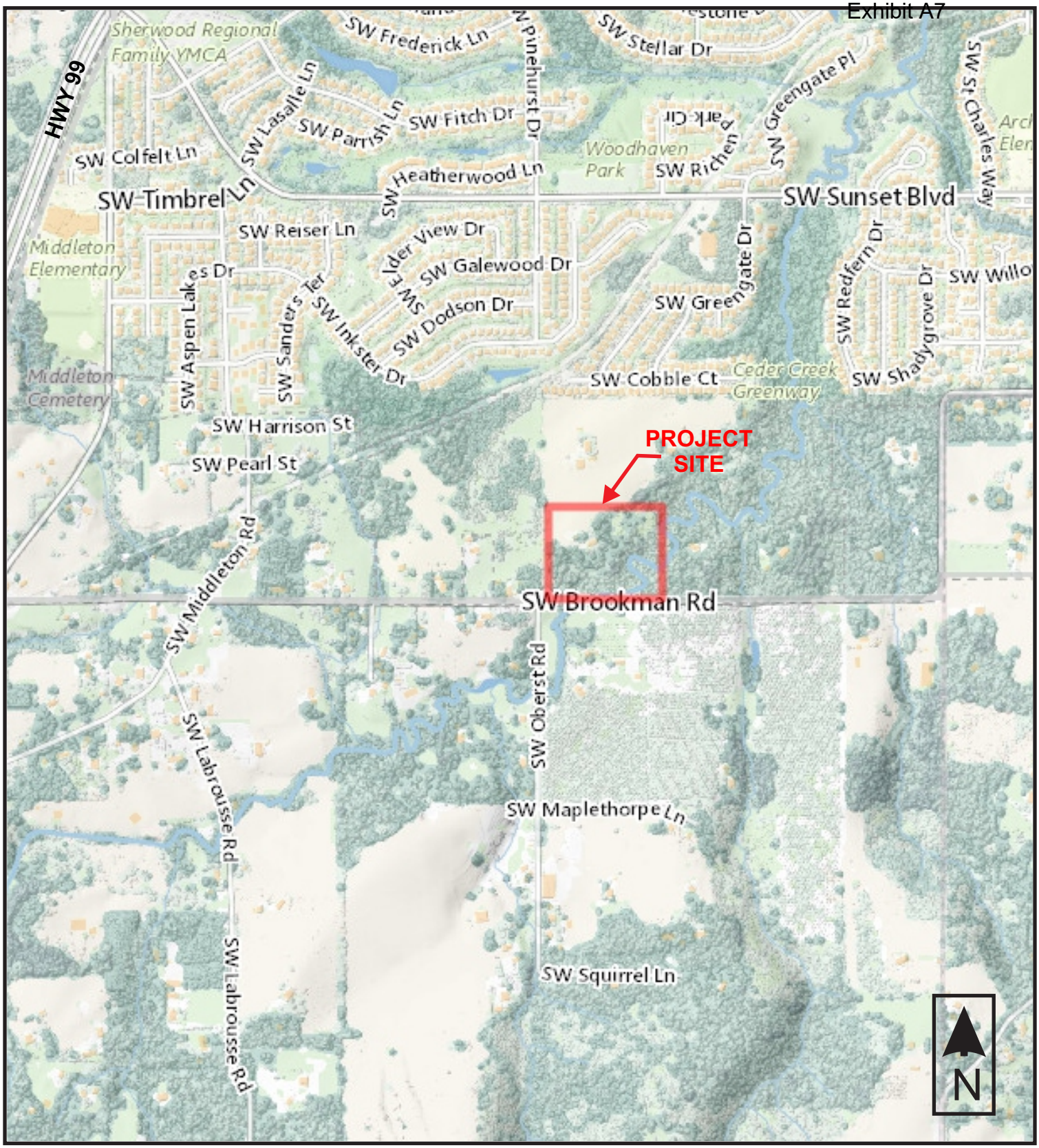
APPENDIX A: FIGURES

Exhibit A7



Source: MetroMap, https://gis.oregonmetro.gov/metromap/.

Environmental Science & Assessment, LLC e s a	Vicinity Map Riverside at Cedar Creek Sherwood, Oregon	Figure 1 Approx. Scale: 1in. = 760 ft.

Source: MetroMap, https://gis.oregonmetro.gov/metromap/.

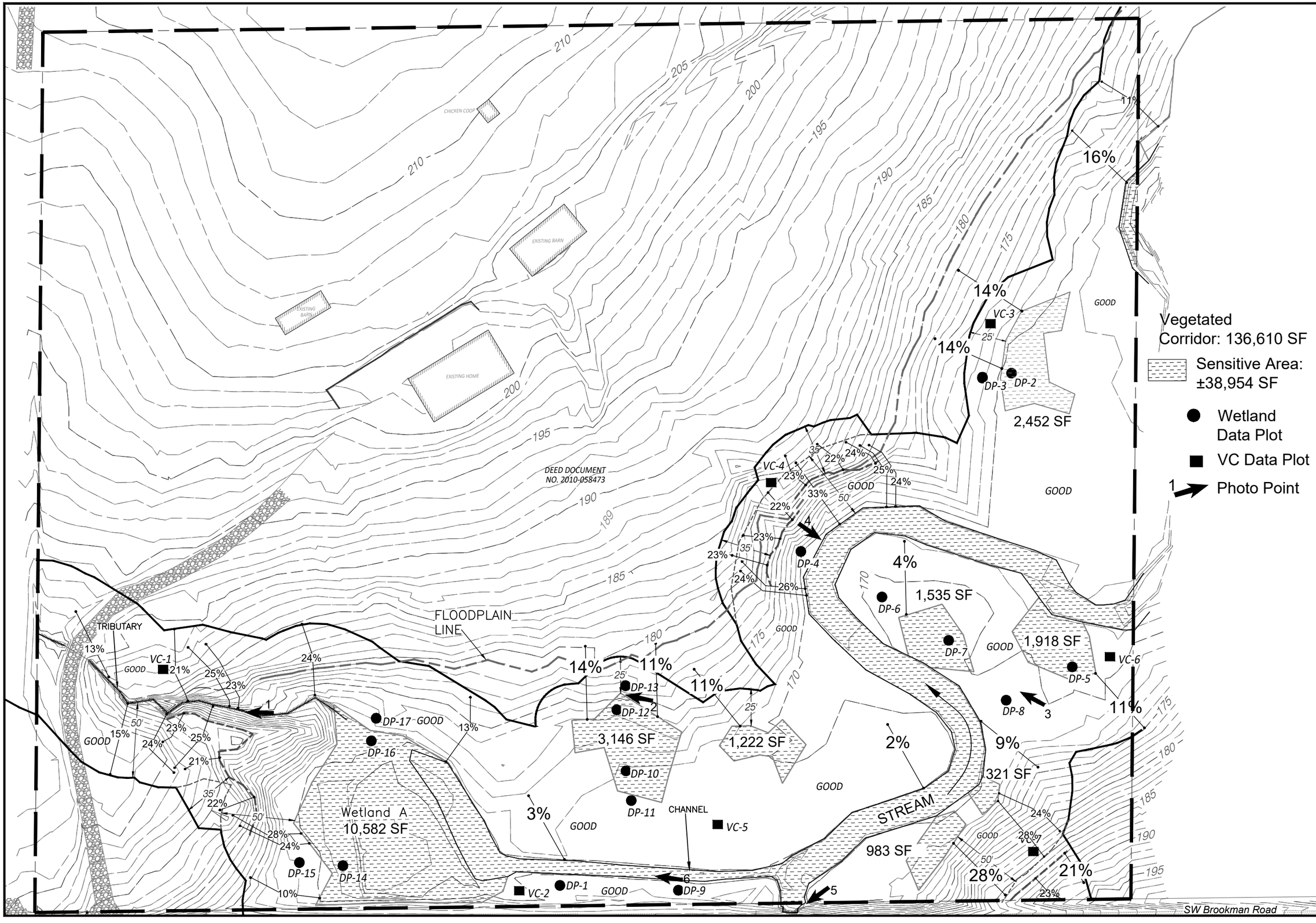
Environmental Science & Assessment, LLC	Aerial Map Riverside at Cedar Creek Sherwood, Oregon	Figure 2 Approx. Scale: 1in. = 110 ft.

Exhibit A7

Environmental Science & Assessment, LLC

107 SE Washington St., Suite 249
Portland, OR 97214
Phone: 503.478.0424
www.esapdx.com

Existing Conditions
Riverside at Cedar Creek
Sherwood, Oregon



Base Map Source: PDG, Inc.	
Modified By:	KR
Date:	12/19
Job:	19029
Rev:	00/00

Figure 3

Exhibit A7

Environmental Science & Assessment, LLC
107 SE Washington St., Suite 249
Portland, OR 97214
Phone: 503.478.0424
www.esapdx.com

Site Plan
Riverside at Cedar Creek
Sherwood, Oregon

Vegetated Corridor: 137,711 SF

- VC Temp. Impacts: 1,085 SF
- VC Perm. Impacts: 6,451 SF
  - 1,036 SF: Trail
  - 5,350 SF: R.O.W.Dedication
  - 65 SF: WQ Outfall
- VC Mitigation: 6,451 SF
- Sensitive Area: ±38,964 SF

N

1' = 60'

0 30 60

Base Map Source: PDG, Inc.	
Modified By:	KR
Date:	12/19
Job:	19029
Rev:	00/00

Figure 4

APPENDIX B: SITE PHOTOGRAPHS

Photo 1: Pointing west up unnamed tributary

Photo 2: Edge of wetland, wetland on the left, upland on the right

Photo 3: View northwest in VC associated with east side of Cedar Creek (DP-8)

Photo 4: Cedar creek showing Slough Sedge (Carex obnupta) patches on both sides

Photo 5: Pointing south where Cedar Creek passes under SW Brookman Rd.

Photo 6: Pointing west along constructed channel with SW Brookman Rd. and VC-2 to the left

APPENDIX C: WETLAND DETERMINATION DATA FORMS

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-1

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): none Slope (%): <5%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Aloha Silt Loam, map unit 1, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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 ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	75	Y	FACW
2. Pseudotsuga menziesii	10		FACU
3.			
4.			
	85	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Rosa pisocarpa	30	Y	FAC
2. Acer circinatum	30	Y	FAC
3. Cornus sericea	20	Y	FACW
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 5' diameter)			
1. Carex obnupta	75	Y	OBL
2. Polystuchum munitum	trace		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	= Total Cover	

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species	95	x 2 =	190
FAC species	60	x 3 =	180
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	240 (A)		485 (B)

Prevalence Index = B/A = 2.02

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 X No ____

Remarks:

SOIL

Sampling Point: DP-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
0-12"	7.5 YR 2.5/3	100%					silt loam	

[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: root refusal

Depth (inches): 12"

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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Data plot location is between the the constructed channel and the road fill slope for SW Brookman Road and above the elevation of the ordinary high water line.

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-2

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 14%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Woodburn Silt Loam, 3 to 7% slopes, map unit 45B, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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: Precipitation for the water year to date is 36%

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	40	Y	FACW
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Cornus sericea	60	Y	FACW
2.			
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Carex obnupta	80	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20

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
- ✓ 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: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	7.5 YR 2.5/2	100					silt loam	
8-14"	10 YR 3/2	93	7.5 YR 4/3	7	C	M	silt loam	some clay
14-17"	7.5 YR 3/2	90	5 YR 3/4	10	C	M	silt clay loam	

[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** 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**)
- ___ 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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-3

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 14%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Woodburn Silt Loam, 3 to 7% slopes, map unit 45B, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	25	Y	FACU
2. Alnus rubra	20	Y	FAC
3.			
4.			
	45	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Cornus sericea	50	Y	FACW
2. Corylus cornuta	20	Y	FACU
3. Oemleria cerasiformis	10		FACU
4. Acer circinatum	10		FAC
5.			
	90	= Total Cover	
Herb Stratum (Plot size: 5' diameter)			
1. Polystichum munitum	40	Y	FACU
2. Carex leptopoda	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	= Total Cover	

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
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: DP-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 Features %	Type[1]	Loc[2]	Texture	Remarks
0-7"	10 YR 2/2	100					silt loam	
7-10"	10 YR 2/2	90	7.5 YR 4/3	10	C	M	silt loam	
10-20"	10 YR 3/4	100					silt loam	

[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 ×

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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ×

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-4

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian Local relief (concave, convex, none): concave Slope (%): 26%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Wapato Silty Clay Loam, map unit 43, rating 92 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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 ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Corylus cornuta	25	Y	FACU
2. Acer circinatum	25	Y	FAC
3. Fraxinus latifolia	15	Y	FACW
4.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Rubus armeniacus	20	Y	FAC
2. Acer circinatum	15	Y	FAC
3. Rosa pisocarpa	5		FAC
4. Ilex aquifolium	trace		FACU
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 5' diameter)			
1. Carex obnupta	80	Y	OBL
2. Polystichum munitum	10		FACU
3. Ranunculus repens	trace		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	15	x 2 =	60
FAC species	65	x 3 =	195
FACU species	35	x 4 =	140
UPL species		x 5 =	
Column Totals:	195 (A)		475 (B)

Prevalence Index = B/A = 2.43

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 X No ____

Remarks:

SOIL

Sampling Point: DP-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 Features %	Type[1]	Loc[2]	Texture	Remarks
0-16"	10 YR 3/3	99	10 YR 3/6	1	C	M	silt loam clay	

[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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/18/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-5

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): none Slope (%): 11%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Wapato Silty Clay Loam, map unit 43, rating 92 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	80	Y	FACW
2.			
3.			
4.			
	80 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Oemleria cerasiformis	30	Y	FACU
2. Symphoricarpos albus	20	Y	FACU
3. Ribes divaricatum	20	Y	FAC
4.			
5.			
	70 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Carex obnupta	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. Rubus ursinus	40	Y	FACU
2. Rubus laciniatus	20	Y	FACU
	60 = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 42% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	80	x 2 =	160
FAC species	20	x 3 =	60
FACU species	110	x 4 =	440
UPL species	0	x 5 =	0
Column Totals:	310 (A)		760 (B)

Prevalence Index = B/A = 2.45

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 X No ____

Remarks: The plant community is marginal with a more upland shrub community and a wet herbaceous community. The worksheet results are mixed between an upland and wetland plant community. Given the size of the Carex obnupta community wetland and the proximity to Cedar Creek it is best professional judgement that this data plot meets the hydrophitic vegetation criteria.

SOIL

Sampling Point: DP-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 %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10 YR 3/3	100					silt loam	
12-22"	10 YR 3/2	100					silt loam	

[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 X **No** _____

Remarks: Soils appear to lack hydric soil indicators or were not observed during the site investigation. Given the size of the hydrophitic herbacious plant community and the location with of the area within the floodplain and proximity to the Cedar Creek it is best professional judgement that is data plot is located within a wetland area.

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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Data plot is located within the Cedar Creek floodplain within a obligate plant community. At the time of the site investigation the precipitation levels were below normal.

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/18/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-6

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): convex Slope (%): 4

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Wapato Silty Clay Loam, map unit 43, rating 92 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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 ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	75	Y	FACW
2.			
3.			
4.			
	75 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Oemleria cerasiformis	60	Y	FACU
2. Acer circinatum	20	Y	FAC
3. Symphoricarpos albus	10		FACU
4.			
5.			
	90 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Tolmiea menziesii	40	Y	FAC
2. Ranunculus repens	30	Y	FAC
3. Glechoma hederacea	10		FACU
4. Galium aparine	trace		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (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 X No ____

Remarks:

SOIL

Sampling Point: DP-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 Features %	Type[1]	Loc[2]	Texture	Remarks
0-16"	10 YR 3/2	100					silt clay loam	
16-20"	10 YR 3/2	90	7.5 YR 4/4	10	C	M	silt clay loam	

[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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ 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: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-7

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): _____ Slope (%): 4%

Subregion (LRR): A-Northwest Forests and Coasts Lat: _____ Long: _____ Datum: n/a

Soil Map Unit Name: Wapato Silty Clay Loam, map unit 43, rating 92 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (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: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	90	Y	FACW
2.			
3.			
4.			
	90 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Oemleria cerasiformis	60	Y	FACU
2.			
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Carex obnupta	100	Y	OBL
2.			
3.			
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 _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (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 X No _____

Remarks:

SOIL

Sampling Point: DP-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-17"	7.5 YR 2.5/2						silt loam	
17-19"	7.5 YR 2.5/2	90	5 YR 3/4	10	C	M	silt loam	

[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 X **No** _____

Remarks: Soils appear to lack hydric soil indicators or were not observed during the site investigation. Given the size of the hydrophitic herbaceous plant community, the location of the area within the floodplain and proximity to Cedar Creek, it is best professional judgement that the data plot is located within a wetland area.

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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Data plot is located within the Cedar Creek floodplain within a obligate herbaceous plant community. At the time of the site investigation the precipitation levels were below normal.

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-8

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): none Slope (%): 4%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Wapato Silty Clay Loam, map unit 43, rating 92 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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 ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	95	Y	FACW
2.			
3.			
4.			
	95 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Oemleria cerasiformis	40	Y	FACU
2. Acer circinatum	30	Y	FAC
3. Malus fusca	10		FACW
4. Symphoricarpos albus	10		FACU
5.			
	90 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Tolmiea menziesii	20	Y	FAC
2. Ranunculus repens	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 70

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	105	x 2 =	210
FAC species	60	x 3 =	180
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	215 (A)		590 (B)

Prevalence Index = B/A = 2.74

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 X No ____

Remarks:

SOIL

Sampling Point: DP-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10 YR 3/2						silt loam	
16-20"	10 YR 3/2	99	7.5 YR 4/6	1	C	M	silt loam	some clay

[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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-9

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): convex Slope (%): 10%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Aloha Silt Loam, map unit 1, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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 ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	50	Y	FACW
2. Crataegus douglasii	20	Y	FAC
3. Prunus avium	10		FACU
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Crataegus douglasii	20	Y	FAC
2. Symphoricarpos albus	20	Y	FACU
3. Acer circinatum	10		FAC
4. Rosa pisocarpa	10		FAC
5. Ribes divaricatum	trace		FAC
	60	= Total Cover	
Herb Stratum (Plot size: 5' diameter)			
1. Carex leptopoda	10	Y	FAC
2. Tellima grandiflora	5	Y	FACU
3. Galium aparine	trace		FACU
4. Polystichum munitum	trace		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. Rubus ursinus	30	Y	FACU
2.			
	30	= Total Cover	

% Bare Ground in Herb Stratum 85

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	70	x 3 =	210
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	185 (A)		570 (B)

Prevalence Index = B/A = 3.08

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 X No ____

Remarks: Marginal plant community: Prevalence Index is 3.08

SOIL

Sampling Point: DP-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7"	7.5 YR 2.5/3	100					silt loam	
7-9"	7.5 YR 2.5/3	98	7.5 YR 3/4	2	C	M	silt loam	
9-14"	10 YR 3/2	100					silt loam	
14-18"	10 YR 3/2	75	7.5 YR 3/4	10	C	M	silt clay loam	
	10 YR 4/2	15						

[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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-10

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 11

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Verboort silty clay loam, 0 to 3% slopes, map unit 2027A, rating 99 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	40	Y	FACW
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Cornus sericea	5	Y	FACW
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Carex obnupta	65	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 35

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
- ✓ 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: DP-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7"	10 YR 2/2	100					silt loam	
7-13	10 YR 3/2	93	7.5 YR 3/4	7	C	M	silt clay loam	
13-17"	10 YR 3/1	85	7.5 YR 3/4	15	C	M	silt clay loam	

[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 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**)
- ___ 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 ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 3"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 1"

Wetland Hydrology Present? Yes X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Pseudotsuga menziesii growing outside of plot in wetland with buttressed roots

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-11

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 11

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Verboort silty clay loam, 0 to 3% slopes, map unit 2027A, rating 99 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer macrophyllum	40	Y	FACU
2. Fraxinus latifolia	30	Y	FACW
3. Ilex aquifolium	5		FACU
4.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Symphoricarpos albus	40	Y	FACU
2. Rosa pisocarpa	5		FAC
3. Amelanchier alnifolia	5		FACU
4. Oemleria cerasirformis	5		FACU
5.			
	55	= Total Cover	
Herb Stratum (Plot size: 5' diameter)			
1. Carex leptopoda	10	Y	FAC
2. Galium aparine	trace		FACU
3. Tolmiea menziesii	trace		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. Rubus ursinus	15	Y	FACU
2.			
	15	= Total Cover	

% Bare Ground in Herb Stratum 90

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	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	15	x 3 =	45
FACU species	110	x 4 =	440
UPL species	0	x 5 =	0
Column Totals:	155 (A)		545 (B)

Prevalence Index = B/A = 3.52

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: DP-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 %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10"	10 YR 3/1	100					silt loam	
10-18"	10 YR 2/2	100					silt loam	

[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 ×

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 ✓ Depth (inches): _____

Water Table Present? Yes ✓ No _____ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 5

Wetland Hydrology Present? Yes × No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-12

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 11

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Verboort silty clay loam, 0 to 3% slopes, map unit 2027A, rating 99 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	30	Y	FACW
2.			
3.			
4.			
	30 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Carex obnupta	100	Y	OBL
2.			
3.			
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 ____

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
- ✓ 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: DP-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7"	10 YR 3/2	99	10 YR 3/4	1	C	M	silt loam	
7-11"	10 YR 3/2	95	10 YR 3/4	5	C	M	silt loam	
11-14"	10 YR 4/1	85	10 YR 3/4	15	C	M	silt loam	
15-18"	10 YR 4/1	80	10 YR 3/4	20	C	M	silt clay loam	

[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** 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**)
- ___ 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 ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 5"

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-13

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 11

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Verboort silty clay loam, 0 to 3% slopes, map unit 2027A, rating 99 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer circinatum	50	Y	FACU
2. Pseudotsuga menziesii	30	Y	FAC
3. Ilex aquifolium	10		FACU
4. Acer macrophyllum	10		FACU
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Ilex aquifolium	50	Y	FACU
2. Oemleria cerasiformis	20	Y	FACU
3. Mahonia aquifolium	10		FACU
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 5' diameter)			
1. Polystichum munitum	25	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	= Total Cover	

% Bare Ground in Herb Stratum 75

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: 16 (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: DP-13

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
0-14"	10 YR 3/3	100					silt loam	
14-18"	10 YR 4/3	100					loam	

[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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-14

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 10

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Aloha Silt loam, map unit 1, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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: Precipitation for the water year to date is 36%

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Cornus sericea	100	Y	FACW
2.			
3.			
4.			
5.			
	100 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 100

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
- ✓ 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: DP-14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	7.5 YR 2.5/2	100						
8-11"	10 YR 3/2	95	10 YR 3/4	5	C	M	silt loam	
11-16"	10 YR 3/1	85	7.5 YR 3/3	15	C	M	silt clay loam	
16-19"	10 YR 4/1	80	7.5 YR 3/4	20	C	M	silt clay loam	

[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 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**)
- ___ 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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-15

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 15

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Aloha Silt Loam, map unit 1, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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 ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	40	Y	FACW
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Acer circinatum	30	Y	FAC
2. Symphoricarpos albus	10		FACU
3. Crataegus douglasii	10		FAC
4. Oemleria cerasiformis	5		FACU
5. Rubus laciniatus	trace		FACU
	55 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Polystichum munitum	15	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. Rubus ursinus	trace		FACU
2. Hedera helix	trace		FACU
	<5 = Total Cover		

% Bare Ground in Herb Stratum 85

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	40	x 3 =	120
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	110 (A)		320 (B)

Prevalence Index = B/A = 2.9

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 X No ____

Remarks: Marginal plant community: Prevalence Index is 3.02

SOIL

Sampling Point: DP-15

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
0-14"	10 YR 3/2	100					silt clay loam	
14-16"	10 YR 3/2	99	7.5 YR 4/6	1	C	M	silt clay loam	

[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: root refusal

Depth (inches): 16"

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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Exhibit A7

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-16

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 13

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Aloha Silt Loam, map unit 1, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (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: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	60	Y	FACW
2.			
3.			
4.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Cornus sericea	40	Y	FACW
2.			
3.			
4.			
5.			
	40 = Total Cover		
Herb Stratum (Plot size: 5' diameter)			
1. Carex leptopoda	5	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 95

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

___ 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: DP-16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7"	7.5 YR 2.5/2	100					silt clay loam	
7-13"	7.5 YR 2.5/2	95	7.5 YR 3/4	5	C	M	silt clay loam	
13-18"	10 YR 3/2	90	7.5 YR 3/4	10	C	M	silt clay loam	

[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** 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**)
- ___ 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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Brookman/Sherwood City/County: Sherwood Sampling Date: 12/17/2019

Applicant/Owner: Riverside Homes State: OR Sampling Point: DP-17

Investigator(s): K. Reavis, K. Sanderford Section, Township, Range: township 3 south, range 1 west, section 6

Landform (hillslope, terrace, etc.): riparian, floodplain Local relief (concave, convex, none): concave Slope (%): 13%

Subregion (LRR): A-Northwest Forests and Coasts Lat: Long: Datum: n/a

Soil Map Unit Name: Aloha Silt Loam, map unit 1, rating 1 NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No X (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 ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Precipitation for the water year to date is 36%.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer circinatum	40	Y	FAC
2.			
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' diameter)			
1. Acer circinatum	20	Y	FAC
2.			
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 5' diameter)			
1. Polystichum munitum	35	Y	FACU
2. Carex leptopoda	5		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	= Total Cover	

% Bare Ground in Herb Stratum 60

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	100 (A)		335 (B)

Prevalence Index = B/A = 3.35

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 X No ____

Remarks: Marginal plant community: Prevalence Index is 3.35

SOIL

Sampling Point: DP-17

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
0-17"	7.5 YR 2.5/2+	100					silt loam	
17-19"	10 YR 4/1	40	7.5 YR 3/4	10	C	M	silt loam	
	10 YR 3/2	50						

[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: root refusal

Depth (inches): 16"

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 ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX D: VEGETATED CORRIDOR DATA FORMS

VEGETATED CORRIDOR DATA SHEET

Client/Project Name: Riverside Homes / Riverside at Cedar Creek	**Site Address: 17433 SW Brookman Rd., Sherwood, OR 97140**	**Plot ID: VC-1, near driveway and onsite tributary**
Township/Range/Section: T3S R1W S06		
Tax Map: T3S R1W S06	**Lot(s): 104**	
Brief Description of Plot Location: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The lot is a rectangle with southern side along SW Brookman Rd.		
Site Investigator Name: Kim Reavis, Kim Sanderford	**Date of Investigation: 12/17/2019, 12/18/2019**	
Plant Community Type: Riparian forest		

Herbaceous Stratum	Percent Aerial Cover	Percent Relative Cover	Native? (1) Yes	Native? (1) No	Noxious?(2) Yes	Noxious?(2) No	Invasive? (3) Yes	Invasive? (3) No
1 *Polystichum munitum*	40	22	x			x		x
2 *Carex leptopoda*	1	1	x			x		x
3 *40% moss/leaf litter*		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Shrub Stratum		0						
1 *Corylus cornuta*	30	16	x			x		x
2 *Rubus ursinus*	15	8	x			x		x
3 *Acer circinatum*	30	16	x			x		x
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Tree Stratum		0						
1 *Pseudotsuga menziesii*	30	16	x			x		x
2 *Prunus avium*	20	11		x		x		x
3 *Fraxinus latifolia*	20	11	x			x		x
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
Total	186	100						

Total percent relative native species cover	**89%**
Total percent aerial cover of tree canopy	**70%**
Total percent relative cover of non-native, noxious, and invasive species	**11%**

X	Good Condition (native species >80% of the community and tree canopy >50% aerial cover)
	Marginal Condition (native species 50-80% of the community and tree canopy 26-50% aerial cover)
	Degraded Condition (native species <50% of the community and tree canopy <25% aerial coverage)

Comments:

(1) Portland Plant List, 2011.
(2) Noxious Weed List, ODA.
(3) R 07-20, Clean Water Services, June, 2007.

VEGETATED CORRIDOR DATA SHEET

Client/Project Name: Brookman/Sherwood	**Site Address: 17433 SW Brookman Rd., Sherwood, OR 97140**	**Plot ID: VC-2, in Brookman ROW, south of channel**
Township/Range/Section: Township 3 south, range 1 west, section 6		
Tax Map: T3S R1W S06	**Lot(s): 104**	
Brief Description of Plot Location: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The lot is a rectangle with southern side along SW Brookman Rd.		
Site Investigator Name: Kim Reavis, Kim Sanderford	**Date of Investigation: 12/17/2019, 12/18/2019**	
Plant Community Type: riparian		

Herbaceous Stratum	Percent Aerial Cover	Percent Relative Cover	Native? (1) Yes	Native? (1) No	Noxious?(2) Yes	Noxious?(2) No	Invasive? (3) Yes	Invasive? (3) No
1 *Tolmiea menziesii*	20	10	x			x		x
2 *Carex leptopoda*	15	8	x			x		x
3 *Galium aparine*	5	3	x			x		x
4 *60% leaf litter*		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Shrub Stratum		0						
1 *Rosa pisocarpa*	30	15	x			x		x
2 *Cornus sericea*	30	15	x			x		x
3 *Symphoricarpos albus*	10	5	x			x		x
4 *Physocarpus capitatus*	5	3	x			x		x
5 *Acer circinatum*	5	3	x			x		x
6		0						
7		0						
8		0						
9		0						
10		0						
Tree Stratum		0						
1 *Fraxinus latifolia*	80	40	x			x		x
2		0						
3		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
Total	200	100						

Total percent relative native species cover	**100%**
Total percent aerial cover of tree canopy	**80%**
Total percent relative cover of non-native, noxious, and invasive species	**0%**

X	Good Condition (native species >80% of the community and tree canopy >50% aerial cover)
	Marginal Condition (native species 50-80% of the community and tree canopy 26-50% aerial cover)
	Degraded Condition (native species <50% of the community and tree canopy <25% aerial coverage)

Comments:

(1) Portland Plant List, 2011.
(2) Noxious Weed List, ODA.
(3) R 07-20, Clean Water Services, June, 2007.

VEGETATED CORRIDOR DATA SHEET

Client/Project Name: Brookman/Sherwood	**Site Address: 17433 SW Brookman Rd., Sherwood, OR 97140**	**Plot ID: VC-3, west of northern most wetland area**
Township/Range/Section: Township 3 south, range 1 west, section 6		
Tax Map: T3S R1W S06	**Lot(s): 104**	
Brief Description of Plot Location: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The lot is a rectangle with southern side along SW Brookman Rd.		
Site Investigator Name: Kim Reavis, Kim Sanderford	**Date of Investigation: 12/17/2019, 12/18/2019**	
Plant Community Type:		

Herbaceous Stratum	Percent Aerial Cover	Percent Relative Cover	Native? (1) Yes	Native? (1) No	Noxious?(2) Yes	Noxious?(2) No	Invasive? (3) Yes	Invasive? (3) No
1 *Polystichum munitum*	60	30	x			x		x
2 *40% leaf litter*		0						
3		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Shrub Stratum		0						
1 *Symphoricarpos albus*	15	8	x			x		x
2 *Corylus cornuta*	25	13	x			x		x
3 *Ilex aquifolium*	10	5		x		x		x
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Tree Stratum		0						
1 *Corylus cornuta*	80	40	x			x		x
2 *Pseudotsuga menziesii*	5	3	x			x		x
3 *Thuja plicata*	5	3	x			x		x
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
Total	200	100						

Total percent relative native species cover	**95%**
Total percent aerial cover of tree canopy	**90%**
Total percent relative cover of non-native, noxious, and invasive species	**5%**

X	Good Condition (native species >80% of the community and tree canopy >50% aerial cover)
	Marginal Condition (native species 50-80% of the community and tree canopy 26-50% aerial cover)
	Degraded Condition (native species <50% of the community and tree canopy <25% aerial coverage)

Comments:

(1) Portland Plant List, 2011.
(2) Noxious Weed List, ODA.
(3) R 07-20, Clean Water Services, June, 2007.

VEGETATED CORRIDOR DATA SHEET

Client/Project Name: Brookman/Sherwood	**Site Address: 17433 SW Brookman Rd., Sherwood, OR 97140**	**Plot ID: VC-4, top of slope on west side of creek at bend**
Township/Range/Section: Township 3 south, range 1 west, section 6		
Tax Map: T3S R1W S06	**Lot(s): 104**	
Brief Description of Plot Location: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The lot is a rectangle with southern side along SW Brookman Rd.		
Site Investigator Name: Kim Reavis, Kim Sanderford	**Date of Investigation: 12/17/2019, 12/18/2019**	
Plant Community Type:		

Herbaceous Stratum	Percent Aerial Cover	Percent Relative Cover	Native? (1) Yes	Native? (1) No	Noxious?(2) Yes	Noxious?(2) No	Invasive? (3) Yes	Invasive? (3) No
1 *Polystichum munitum*	50	28	x			x		x
2 *50% leaf litter*		0						
3		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Shrub Stratum		0						
1 *Mahonia nervosa*	5	3	x			x		x
2 *Ilex aquifolium*	15	8		x		x		x
3 *Acer circinatum*	5	3	x			x		x
4 *Corylus cornuta*	20	11	x			x		x
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Tree Stratum		0						
1 *Pseudotsuga menziesii*	60	33	x			x		x
2 *Tsuga heterophylla*	10	6	x			x		x
3 *Corylus cornuta*	10	6	x			x		x
4 *Thuja plicata*	5	3	x			x		x
5		0						
6		0						
7		0						
8		0						
9		0						
Total	180	100						

Total percent relative native species cover	**92%**
Total percent aerial cover of tree canopy	**85%**
Total percent relative cover of non-native, noxious, and invasive species	**8%**

X	Good Condition (native species >80% of the community and tree canopy >50% aerial cover)
	Marginal Condition (native species 50-80% of the community and tree canopy 26-50% aerial cover)
	Degraded Condition (native species <50% of the community and tree canopy <25% aerial coverage)

Comments:

(1) Portland Plant List, 2011.
(2) Noxious Weed List, ODA.
(3) R 07-20, Clean Water Services, June, 2007.

VEGETATED CORRIDOR DATA SHEET

Client/Project Name: Brookman/Sherwood	**Site Address: 17433 SW Brookman Rd., Sherwood, OR 97140**	**Plot ID: VC-5, north of constructed channel**
Township/Range/Section: Township 3 south, range 1 west, section 6		
Tax Map: T3S R1W S06	**Lot(s): 104**	
Brief Description of Plot Location: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The lot is a rectangle with southern side along SW Brookman Rd.		
Site Investigator Name: Kim Reavis, Kim Sanderford	**Date of Investigation: 12/17/2019, 12/18/2019**	
Plant Community Type:		

Herbaceous Stratum	Percent Aerial Cover	Percent Relative Cover	Native? (1) Yes	Native? (1) No	Noxious?(2) Yes	Noxious?(2) No	Invasive? (3) Yes	Invasive? (3) No
1 *Tolmiea menziesii*	50	23	x			x		x
2 *Carex leptopoda*	5	2	x			x		x
3 *Ranunculus repens*	30	14		x		x	x	
4 *Galium aparine*	1	0		x		x		x
5 *15% leaf litter*		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Shrub Stratum		0						
1 *Sambucus racemosa*	10	5	x			x		x
2 *Acer circinatum*	20	9	x			x		x
3 *Rubus laciniatus*	5	2		x		x	x	
4 *Cornus sericea*	30	14	x			x		x
5 *Physocarpus capitatus*	10	5	x			x		x
6		0						
7		0						
8		0						
9		0						
10		0						
Tree Stratum		0						
1 *Acer circinatum*	15	7	x			x		x
2 *Fraxinus latifolia*	40	19	x			x		x
3		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
Total	216	100						

Total percent relative native species cover	**83%**
Total percent aerial cover of tree canopy	**55%**
Total percent relative cover of non-native, noxious, and invasive species	**17%**

X	Good Condition (native species >80% of the community and tree canopy >50% aerial cover)
	Marginal Condition (native species 50-80% of the community and tree canopy 26-50% aerial cover)
	Degraded Condition (native species <50% of the community and tree canopy <25% aerial coverage)

Comments:

(1) Portland Plant List, 2011.
(2) Noxious Weed List, ODA.
(3) R 07-20, Clean Water Services, June, 2007.

VEGETATED CORRIDOR DATA SHEET

Client/Project Name: Brookman/Sherwood	**Site Address: 17433 SW Brookman Rd., Sherwood, OR 97140**	**Plot ID: VC-6, east of Cedar Creek at e**
Township/Range/Section: Township 3 south, range 1 west, section 6		
Tax Map: T3S R1W S06	**Lot(s): 104**	
Brief Description of Plot Location: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The lot is a rectangle with southern side along SW Brookman Rd.		
Site Investigator Name: Kim Reavis, Kim Sanderford	**Date of Investigation: 12/17/2019, 12/18/2019**	
Plant Community Type:		

Herbaceous Stratum	Percent Aerial Cover	Percent Relative Cover	Native? (1) Yes	Native? (1) No	Noxious?(2) Yes	Noxious?(2) No	Invasive? (3) Yes	Invasive? (3) No
1 *Tolmiea menziesii*	25	14	x			x		x
2 *Glechoma hederacea*	5	3		x		x	x	
3 *70% leaf litter*		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Shrub Stratum		0						
1 *Oemleria cerasiformis*	50	28	x			x		x
2 *Symphoricarpos albus*	10	6	x			x		x
3 *Acer circinatum*	15	8	x			x		x
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Tree Stratum		0						
1 *Fraxinus latifolia*	75	42	x			x		x
2		0						
3		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
Total	180	100						

Total percent relative native species cover	**97%**
Total percent aerial cover of tree canopy	**75%**
Total percent relative cover of non-native, noxious, and invasive species	**3%**

X	Good Condition (native species >80% of the community and tree canopy >50% aerial cover)
	Marginal Condition (native species 50-80% of the community and tree canopy 26-50% aerial cover)
	Degraded Condition (native species <50% of the community and tree canopy <25% aerial coverage)

Comments:

(1) Portland Plant List, 2011.
(2) Noxious Weed List, ODA.
(3) R 07-20, Clean Water Services, June, 2007.

VEGETATED CORRIDOR DATA SHEET

Client/Project Name: Riverside Homes / Riverside at Cedar Creek	Site Address: 17433 SW Brookman Rd., Sherwood, OR 97140	Plot ID: VC-7, on steep slope between Brookman and creek, south
Township/Range/Section: T3S R1w S06		
Tax Map: T3S R1W S06	Lot(s): 104	

Brief Description of Plot Location: The site is located within the Brookman Addition community in the south end of Sherwood, Oregon. The lot is a rectangle with southern side along SW Brookman Rd.

Site Investigator Name: Kim Reavis, Kim Sanderford	Date of Investigation: 12/17/2019, 12/18/2019

Herbaceous Stratum	Percent Aerial Cover	Percent Relative Cover	Native? (1) Yes	Native? (1) No	Noxious?(2) Yes	Noxious?(2) No	Invasive? (3) Yes	Invasive? (3) No
1 *Polystichum munitum*	75	28	x			x		x
2 *Rubus ursinus*	10	4	x			x		x
3 *Mahonia nervosa*	5	2	x			x		x
4 *Leaf Litter 10%*		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Shrub Stratum		0						
1 *Acer circinatum*	10	4	x			x		x
2 *Amelanchier alnifolia*	50	19	x			x		x
3 *Corylus cornuta*	30	11	x			x		x
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
10		0						
Tree Stratum		0						
1 *Pseudotsuga menziesii*	75	28	x			x		x
2 *Amelanchier alnifolia*	10	4	x			x		x
3		0						
4		0						
5		0						
6		0						
7		0						
8		0						
9		0						
Total	265	100						

Total percent relative native species cover	100%
Total percent aerial cover of tree canopy	85%
Total percent relative cover of non-native, noxious, and invasive species	0%

x	Good Condition (native species >80% of the community and tree canopy >50% aerial cover)
	Marginal Condition (native species 50-80% of the community and tree canopy 26-50% aerial cover)
	Degraded Condition (native species <50% of the community and tree canopy <25% aerial coverage)

Comments:

(1) Portland Plant List, 2011.
(2) Noxious Weed List, ODA.
(3) R 07-20, Clean Water Services, June, 2007.

Morgan Holen & Associates LLC
Consulting Arborists and Urban Forest Management
971.409.9354
3 Monroe Parkway, Suite P 220
Lake Oswego, Oregon 97035
morgan@mholen.com

DATE: May 27, 2020

TO: Wayne Hayson, Pioneer Design Group

FROM: Morgan Holen, Consulting Arborist

RE: Riverside at Cedar Creek – Revised Arborist Report

MHA19064

Morgan Holen & Associates was contacted by Riverside Homes to provide design phase consulting arborist services for the Riverside at Cedar Creek project in Sherwood, Oregon. We inventoried the existing trees during site visits in January and March 2020 and coordinated with Pioneer Design Group (PDG) to prepare the tree plan which was summarized in the March 22, 2020 arborist report. On May 15, 2020, Wayne Hayson of PDG e-mail a comment from the City and asked us to respond. The comment is summarized below:

> *The Preliminary Tree Preservation and Removal Plan shows 9,905 SF of tree canopy to remain in the net developable area. Please note trees within environmentally constrained land cannot be counted towards the required 40% canopy. Environmentally constrained land is defined as "Any portion of land located within the floodway, one hundred-year floodplain, wetlands and/or vegetated corridor as defined by Clean Water Services." The plan shows various trees within the floodplain and SW Brookman Road right-of way as counting towards retention canopy.*

In order to provide a response to the comment, I reviewed the tree inventory and found two minor discrepancies. First, tree #7190, a 7-inch diameter Douglas-fir (*Pseudotsuga menziesii*) was listed as retain, even though this tree was clearly marked for removal and the inventory listed the reason for removal due to proposed sidewalk construction. Second, tree #80001, an 8-inch diameter pacific yew (*Taxus brevifolia*) was mistakenly listed as being located within the 100-year floodplain; however, this tree is just beyond the 100-year floodplain and located on-site beyond environmentally constrained areas. The tree inventory was updated to list #7190 as remove and #80001 as located on-site.

Next, I reviewed the tree data to determine which trees should receive canopy credit. There are 13 trees with their trunks located outside of environmentally constrained areas or rights-of-way that are planned for preservation including nine trees listed as retain with tree protection measures and four unaffected trees.

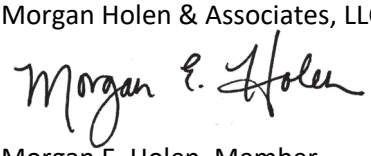
Lastly, I reviewed the tree plan to ensure that these 13 trees were classified correctly. In doing so, I discovered that the hatching shown on the plan to identify tree canopy to remain within the net development area covered more area than just these 13 trees. I sent a mark-up to PDG and asked them to refine the hatching and send me the updated canopy cover area based on the revised hatching in order to recalculate the canopy credit for preserving existing trees. The new area is 5,634 square-feet, which equates to 11,268 square feet of canopy credit.

The enclosed arborist report has been updated to reflect the changes described in this memorandum; any revisions are identified in red type.

Please let me know if you have questions or need any additional information or further assistance.

The client may choose to accept or disregard the recommendations contained herein, or seek additional advice. Neither this author nor Morgan Holen & Associates have assumed any responsibility for liability associated with the trees on or adjacent to this site. Please contact us if you have questions or need any additional information or further assistance.

Thank you,
Morgan Holen & Associates, LLC



Morgan E. Holen, Member
ISA Board Certified Master Arborist, PN-6145B
ISA Tree Risk Assessment Qualified
Forest Biologist

Enclosures: MHA19064 Riverside at Cedar Creek – Arborist Report 03-22-2020 Rev. 05-27-2020

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Riverside at Cedar Creek – Sherwood, Oregon
Arborist Report
March 22, 2020 | Revised: May 27, 2020

MHA19064

Purpose

This arborist report describes the tree preservation and removal plan for the Riverside at Cedar Creek subdivision project in Sherwood, Oregon, pursuant to Sherwood Code Section 16.142.070. This report describes the existing trees located on the project site, provides recommendations for tree protection and removal, and explains how the City's tree canopy requirements are satisfied. This report is based on observations made by International Society of Arboriculture (ISA) Board Certified Master Arborist and Qualified Tree Risk Assessor Morgan Holen (PN-6145B) during site visits conducted on January 20 and March 5, 2020, and subsequent site plan coordination with Riverside Homes and Pioneer Design Group.

Scope of Work and Limitations

Morgan Holen & Associates was contracted by Riverside Homes to collect tree inventory data for existing individual trees and develop an arborist report to address the tree preservation standards contained in Sherwood Code Section 16.142.070, *Trees on Property Subject to Certain Land Use Applications*.

Visual Tree Assessment (VTA) was performed on 351 individual trees surveyed across the site. 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. The individual surveyed trees were evaluated in terms of species, diameter, crown radius, general condition and potential construction impacts.

Beyond the individual tree survey and within the mapped vegetated corridor where no development is proposed, existing trees were not surveyed. This area does not meet the City's definition of woodland because there are fewer than 50 trees per 20,000 square feet. Regardless, the area is unaffected by the proposed development and City staff said it could be described more generally without individual tree data. Therefore, we walked the entire area tallying trees by species and diameter and noting general conditions. A summary of trees in the unaffected area of the vegetated corridor is enclosed and no canopy credit is accounted for since these trees are located beyond the net development site.

Following the tree inventory fieldwork, we coordinated with the design team to develop the tree preservation and removal plan and discuss tree canopy requirements.

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 Cedar Creek subdivision project is located at 17433 SW Brookman Road in Sherwood, Oregon. Much of the site is heavily treed and in a relatively natural and unmanaged stand grown condition, with some planted landscape trees near the existing home. Cedar Creek runs through the southeast quadrant of the site and a vegetated corridor covers most of the south quadrant.

The existing site includes one home and two barns, which are planned for demolition. The project proposes to create 28 single family residential lots, a new street to access the subdivision from the north, two open space tracts, a storm water tract and a community trail. The total net development site, as calculated by Pioneer Design Group, is 176,001 square feet in size. This does not include the SW Brookman Road right of way or environmentally constrained areas including the 100-year flood plain or vegetated corridor. The proposed trail running along the north boundary of the vegetated corridor requires grading and retaining wall construction that will impact a few trees along the boundary as described herein, otherwise trees within environmentally constrained areas are unaffected by the proposed development but do not provide canopy credit.

Tree Inventory

In all, 351 existing trees were surveyed and inventoried, including 21 different species. Table 1 provides a summary of the quantity of inventoried trees by species and general location, either: On-site (not within environmentally constrained areas or rights-of-way); Boundary (limited to tree #14125 on the northern boundary); Off-Site (limited to tree #14124 near the northern boundary); ROW (for trees located in the SW Brookman Road right-of-way); and Env (for trees located within environmentally constrained areas including the 100-year flood plain or vegetated corridor). A complete description of individual trees is provided in the enclosed tree data (attachment A).

Table 1. Count of Trees by Species and General Location – Cedar Creek Subdivision, Sherwood, OR.

Common Name	Species Name	On-Site	Boundary	Off-Site	ROW	Env	Total	Percent*
apple	*Malus* spp.	2				0	2	1%
bigleaf maple	*Acer macrophyllum*	5				0	5	1%
black hawthorn	*Crataegus douglasii*				4	0	4	1%
Cherry	*Prunus* spp.	12				0	12	3%
deciduous	Unknown	1				0	1	0.3%
dogwood	*Cornus* spp.	1				0	1	0.3%
Douglas-fir	*Pseudotsuga menziesii*	118	1	1	26	38	184	52%
English hawthorn^	*Crataegus monogyna*	8			2	8	18	5%
English holly^	*Ilex aquifolium*	1				1	2	1%
grand fir	*Abies grandis*	1				0	1	0.3%
Lombardy poplar	*Populus nigra*					2	2	1%
London plane	*Platanus × acerifolia*	2				0	2	1%
Oregon ash	*Fraxinus latifolia*	14			27	32	73	21%
pacific yew	*Taxus brevifolia*	1				0	1	0.3%
paper birch	*Betula papyrifera*	1				0	1	0.3%
plum	*Prunus* spp.	2				0	2	1%
red alder	*Alnus rubra*					6	6	2%
scots pine	*Pinus sylvestris*	1				0	1	0.3%
Scouler's willow	*Salix scouleriana*	1			1	1	3	1%
sweet cherry^	*Prunus avium*	10			7	8	25	7%
western redcedar	*Thuja plicata*	2				3	5	1%
Total		**183**	**1**	**1**	**67**	**99**	**351**	
Percent*		**52%**	**0.3%**	**0.3%**	**19%**	**28%**		**100%**

^Identifies species widely accepted as being invasive in our region.
*Percent total may not sum to 100% due to rounding.

An additional 127 trees were accounted for beyond the individual tree survey and within the mapped vegetated corridor where no development is proposed. Attachment B provides a summary of the additional tree data collected for the unaffected vegetated corridor area, which encompasses approximately 4-acres including Cedar Creek. Most of these additional trees are mature Oregon ashes (*Fraxinus latifolia*) in fair to poor condition with dead and broken branches and trunk and crown decay. Although they are not in the best condition, these trees are suitable for preservation in the natural area considering that there is low target potential for risk to people or property, and they provide good wildlife habitat and stream shading.

Tree Plan Recommendations

Table 2 provides a summary of proposed treatments by general location as illustrated on the tree preservation and removal plan prepared by Pioneer Design Group.

Table 2. Count of Trees by Treatment and General Location – Cedar Creek Subdivision, Sherwood, OR.

Treatment	On-Site	Boundary	Off-Site	ROW	Env	Total	Percent*
Unaffected	4			61	48	113	33%
Retain	9			4	44	57	16%
Likely to Retain	1				1	2	< 1%
Create Snag					2	2	< 1%
Remove	169	1	1	2	4	177	50%
Total	**183**	**1**	**1**	**67**	**99**	**351**	**100%**

*Percent total may not sum to 100% due to rounding.

Of the 351 inventoried trees, 113 (33%) are unaffected by the proposed development including four on-site trees in and adjacent to proposed tract G, 61 trees located along the SW Brookman Road right of way and 48 trees within environmental constrained areas. This is in addition to the 127 non-surveyed trees accounted for in attachment B. Tree protection measures are not needed for trees classified as unaffected because no work is proposed nearby.

Another 57 trees (16%) are planned for retention with tree protection measures during construction including nine on-site trees (two in open space tract A, one in open space tract B, one in tract F, three near the western boundary adjacent to the proposed trail, and two south of the proposed trail just beyond the 100-year flood plain and vegetated corridor boundaries), four trees in the right of way near the southwest corner of the site near proposed trail construction and grading, and 44 trees within environmentally constrained areas adjacent to proposed retaining wall, trail and stormwater outfall construction.

Sherwood Code Section 16.142.040.G provides tree protection requirements, mainly that trees to be retained are protected with temporary fencing at the dripline or as recommended by a Certified Arborist. The code does require that work within the dripline be supervised by a qualified professional on-site during construction. The tree preservation and removal plan prepared by Pioneer Design Group in coordination with us illustrates which trees are planned for removal and which trees will be protected, specifying tree protection measures and where on-site supervision by the project arborist is required. Tree protection specifications corresponding with the tree plan are also provided in this report.

Two trees are classified as likely to retain, including tree #31605, a 36-inch diameter Douglas-fir (*Pseudotsuga menziesii*) located on-site, and tree #31295, a 9-inch diameter western redcedar (*Thuja plicata*) located in the vegetated corridor. Both trees are in good condition and generally suitable for preservation. However, the proposed trail and associated retaining wall construction encroaches within the dripline area. The tree plan already specifies that work beneath the dripline of any protected tree be performed under arborist supervision. Unlike other trees planned for retention, the potential impacts at these two trees are greater. The objective of classifying these trees as likely to retain is to provide protection for them, but to allow for their removal without delay if and when the project arborist determines that the extent of actual and unavoidable impacts will result in detrimental harm to the health or stability of one or both trees. At that point, the arborist would document the conditions that led to a removal recommendation and submit that documentation to the Owner for submittal to the City, while contractors are able to proceed with removal without delay. We hope that the City of Sherwood will accept this approach in an effort to retain these trees along the proposed trail.

Two potentially hazardous trees located within the vegetated corridor, including tree #6192, a 19-inch diameter Oregon ash in poor condition with an old codominant stem failure, trunk decay and poor crown structure, and tree #31616, a 25-inch diameter Douglas-fir in fair condition but with an old broken top and multiple leaders, are both classified as create snag. This means that rather than removing the whole tree, each tree would be delimbed and reduced in height to non-hazardous lengths based on proximity to the adjacent trail and left as standing dead trees for wildlife habitat.

The tree preservation and removal plan identifies trees with these special classifications and includes notes defining how likely to retain trees shall be protected and specifications for snag creation.

The other 177 trees (50%) are planned for removal for the purposes of site development. Sherwood Code Section 16.142.070.D stipulates that trees may be considered for removal to accommodate development including buildings, parking, walkways, grading, etc., provided that tree canopy requirements are satisfied. Reasons for the proposed removal are summarized below by general location:

- 169 on-site trees are planned for removal, including 73 trees within proposed building lots, 52 trees within the proposed new street and sidewalks, 15 trees within the proposed water quality facility, 27 trees within the proposed trail alignment or along the associated retaining wall, and two trees in proposed open space areas that are not suitable for preservation because of poor condition or structure (#6687 and #7240).
- One tree on the northern boundary (#14125) and one tree located just off-site near the northern boundary (#14124) are planned for removal for proposed sidewalk construction. Prior written consent of the adjacent property owner is typically required for boundary or off-site tree removal.
- Two trees are planned for removal from the right of way in the southwest corner of the site for proposed grading and trail construction (#6687 and #7240).
- Four trees are planned for removal from the vegetated corridor including two decrepit Lombardy poplars (*Populus nigra*) (#6146 and #30210) and one invasive English hawthorn (*Crataegus monogyna*) (#6140) located in a group near the western property boundary just west of the proposed trail and one Douglas-fir (#6681) along the proposed retaining wall alignment south of the proposed trail.

We did coordinate with Pioneer Design Group to recommend adjustments specifically to the proposed trail alignment and retaining wall construction as feasible, which resulted in far fewer tree impacts and better tree protection. The proposed removals are necessary to accommodate the development and tree canopy requirements are satisfied as discussed in the next section of this report.

Required Tree Canopy

Sherwood Code Section 16.142.040.D(2) requires that the net development site of a residential development achieve a minimum 40-percent tree canopy. This requirement can be achieved by retaining existing trees or planting new trees. Existing trees provide double canopy credit based on existing canopy spreads. Canopy credit for trees proposed to be planted is based on the expected mature canopy of each species and is counted for each tree regardless of an overlap of multiple tree canopies. The total size of the net development area is 176,001 square feet. Therefore, 70,400 square feet of tree canopy is required (176,001 / 0.40 = 70,400).

Pioneer Design Group plotted the driplines of trees classified as on-site (with their trunks not located within environmentally constrained areas or rights-of-way) and planned for preservation on the Tree Preservation and Removal Plan based on crown radius data we provided in the inventory. This includes nine existing on-site trees planned for retention with protection measures during construction (trees #6076, #6683, #7188, #7189, #7244, #30278, #30282, #30283 and #80001) and four on-site trees unaffected by the project (trees #6531, #6532, #6533 and #6534). This canopy area was delineated with a unique hatching for on-site trees planned for preservation located within the net development area. The total canopy area for retaining these 13 existing trees is 5,634 square feet, which equates to 11,268 square feet of canopy credit (5,634 x 2 = 11,268). Note that the one on-site tree classified as likely to retain (#31605) was not included in the existing tree canopy credit just in case it is removed during construction.

A minimum of 59,132 square feet of tree canopy is needed by planting new trees (70,400 – 11,268 = 59,132). A Registered Landscape Architect with Pioneer Design Group developed the proposed planting plan. Sheet L2 provides the canopy credit calculation for 48 proposed street trees, which totals 62,409 square feet.

Therefore, the minimum required tree canopy is satisfied (11,268 retained + 62,409 planted = 73,677 / 176,001 = 42%). In addition, numerous other trees are proposed for planting in open space tracts and the storm water facility.

Tree Protection Standards

The trees planned for retention will need special consideration to assure their protection during construction. We recommend a preconstruction meeting with the owner, contractors, and project arborist to review tree protection measures and address questions or concerns on site. Tree protection measures include:

1. **Preconstruction Conference.** The developer shall arrange an on-site meeting with the project arborist in order to review the Tree Preservation and Removal Plan and discuss methods of tree removal and tree protection prior to any construction.
2. **Tree Protection Zone.** The Tree Protection Zone (TPZ) is defined as the dripline of protected trees regardless of the location of protection fencing; TPZs are depicted on the Tree Preservation and Removal Plan. Any work that is performed beneath the dripline of a protected tree shall be monitored and documented by the project arborist. Areas of TPZ encroachment requiring the developer to coordinate with the project arborist are shaded on the Tree Preservation and Removal Plan.

3. **Protection Fencing**. Trees to be preserved shall be protected by installation of tree protection fencing as depicted on the Tree Preservation and Removal Site Plan to prevent injury to tree trunks or roots, or soil compaction. Protection fencing shall be chain link or galvanized steel on metal stakes, installed prior to any ground disturbing activity and maintained in good repair throughout construction. The protection fencing shall not be moved, removed or entered by equipment without prior approval of the project arborist; adjustments to the location of protection fencing shall be documented by the project arborist. Trees located more than 30-feet from construction activity should not require fencing.

4. **Prohibitions.** No soil compaction, materials or spoils storage shall be allowed within the TPZ. Without authorization from the project arborist, none of the following shall occur beneath the dripline of any protected tree:
    a. Grade change or cut and fill;
    b. New impervious surfaces;
    c. Utility or drainage field placement; or
    d. Vehicle maneuvering.

    Root protection zones may be entered for tasks like surveying, measuring, and, sampling. Fences must be closed upon completion of these tasks. Construction that is necessary beneath protected tree driplines shall be performed under arborist supervision.

5. **Erosion Control.** Silt fencing required to be installed within TPZs shall not be trenched in per manufacturer specifications to avoid root damage. Instead, roll the base of the silt fence around a straw wattle and stake the wattle securely into the ground or use compost socks or other techniques that avoid tree root impacts.

6. **Tree Removal.** Trees to be removed shall be clearly identified with tree-marking paint or other methods approved in advanced by the project arborist. Tree removal shall be performed by a Qualified Tree Service. Directionally fell or surgically remove trees to avoid contact or otherwise prevent damage to the trunks and branches of trees to be preserved. No vehicles or heavy equipment shall be permitted within TPZs during tree removal operations.

7. **Snag Creation.** Trees #6192 and #31606 located within the Vegetated Corridor but near proposed construction shall be retained as wildlife snags rather than removed to ground level. Snag creation shall be performed by a Qualified Tree Service and work should be completed by hand without the use of heavy equipment in the TPZ. Delimb these trees and reduce trunks heights to less than 1.5-times the distance to high value targets to minimize risk.

8. **Stump Removal.** Stumps of trees planned for removal that are located beneath the dripline of protected trees shall remain in the ground where feasible. Otherwise, stumps may be removed by stump grinding to just below the ground surface or extracted from the ground under project arborist supervision.

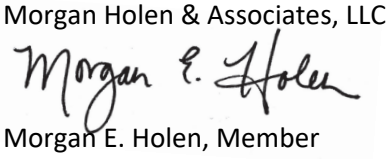
9. **Pruning.** Trees to be preserved may require minor pruning for overhead clearance and to remove dead and defective branches for safety. The project arborist can help identify whether pruning is necessary once trees planned for removal have been removed and the site is staked and prepared for construction. Tree removal and pruning shall be performed by a Qualified Tree Service.

10. **Excavation Beneath Protected Tree Driplines.** Excavation beneath protected tree driplines shall be avoided if alternatives are available. If excavation is unavoidable, the developer shall coordinate with the project arborist to evaluate the proposed excavation to determine methods to minimize impacts to trees. This can include tunneling, hand digging, using a modified profile or other approaches.

11. **Root Pruning.** Roots smaller than 2-inches in diameter may be pruned clean to sound wood using a sharp saw as digging progresses to avoid pulling and tearing roots. Excavation immediately adjacent to roots larger than 2-inches in diameter within the TPZ shall be by hand or other non-invasive techniques to ensure that roots are not damaged. The project arborist or shall assess and document roots 2-inches and larger in diameter prior to impacts. Where feasible, these shall be protected by tunneling or other means to avoid destruction or damage. Exceptions can be made if, in the opinion of the project, unacceptable damage will not occur to the tree.
12. **Landscaping.** Following construction and prior to landscaping, the protection fencing may be removed. Where landscaping is desired, apply approximately 3-inches of mulch beneath the dripline of protected trees, but not directly against tree trunks. Shrubs and ground cover plants may be planted within TPZs. If irrigation is used, use drip irrigation only beneath the driplines of protected trees; install drip irrigation lines on the ground surface and cover with mulch (no trenching to install irrigation lines beneath protected tree driplines).
13. **Quality Assurance.** The project arborist will be available on-call during construction to supervise proper execution of this plan; it is the developer's responsibility to coordinate with the project arborist in a timely manner as needed.
14. **Final Report.** After the project has been completed, the project arborist should provide a final report that describes the measures needed to maintain and protect the remaining trees.

Please contact us if you have questions or need any additional information. Thank you for choosing Morgan Holen & Associates to provide consulting arborist services for the Riverside at Cedar Creek subdivision project.

Thank you,
Morgan Holen & Associates, LLC



Morgan E. Holen, Member
ISA Board Certified Master Arborist, PN-6145B
ISA Tree Risk Assessment Qualified
Forest Biologist

Enclosures: Attachment A: Tree Inventory
Attachment B: Additional Data for Unaffected Vegetated Corridor

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6045	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	14	F		Remove	Trail
6059	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	26,38	26	G	Codominant stems, basal wound	Remove	Grading
6068	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	53	34	E		Remove	Trail
6072	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	61	34	G	Codominant stems, some included bark	Retain	N/A
6074	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	30	26	G	Lower trunk swelling	Retain	N/A
6075	ROW	Dec	sweet cherry	*Prunus avium*	7	11	F	Nuisance species	Unaffected	N/A
6076	On-Site	Dec	sweet cherry	*Prunus avium*	6	11	F	Nuisance species	Retain	N/A
6077	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	10	8	F		Unaffected	N/A
6078	VC	Dec	sweet cherry	*Prunus avium*	7	11	F	Nuisance species	Unaffected	N/A
6083	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	37	18	G	Dominant crown class, some ivy	Unaffected	N/A
6084	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	22	14	F	Codominant crown class, major asymmetry, some ivy	Unaffected	N/A
6085	VC	Dec	red alder	*Alnus rubra*	12	10	F	Poor structure, ivy	Unaffected	N/A
6086	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	P	Suppressed	Unaffected	N/A
6103	ROW	Dec	Oregon ash	*Fraxinus latifolia*	9,15, 17,24	24	F	Poor structure, dead and broken branches, crown decay	Unaffected	N/A
6104	VC	Dec	Oregon ash	*Fraxinus latifolia*	23	16	P	Advanced trunk decay, previous failures	Unaffected	N/A
6105	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	37	18	G	P. pini conks	Unaffected	N/A
6107	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	21	13	G	Codominant crown class	Unaffected	N/A
6110	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	47	31	G	Some history of branch failure	Unaffected	N/A
6111	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	20	24	F	Poor structure, old broken top	Retain	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6113	ROW	Dec	sweet cherry	*Prunus avium*	15	20	P	Nuisance species, trunk damage	Retain	N/A
6139	VC	Dec	red alder	*Alnus rubra*	8,9	15	F		Retain	N/A
6140	VC	Dec	English hawthorn	*Crataegus monogyna*	10	10	P	Nuisance species, very poor structure	Remove	Condition
6146	VC	Dec	Lombardy poplar	*Populus nigra*	41	8	P	Progressive decline, severe crown decay, very poor structure, inherent species limitations	Remove	Condition
6163	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	43	24	G	Codominant leaders with some included bark	Remove	Trail
6173	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	34	26	G	Self-correcting lean on steep bank	Retain	N/A
6177	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	40	28	G	Spur leader	Retain	N/A
6192	VC	Dec	Oregon ash	*Fraxinus latifolia*	19	17	P	Old codominant stem failure, trunk decay, poor crown structure	Create Snag	Condition
6195	VC	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F		Unaffected	N/A
6205	VC	Dec	red alder	*Alnus rubra*	18	12	P	Broken top	Unaffected	N/A
6214	VC	Dec	Oregon ash	*Fraxinus latifolia*	15	0	D	Wind snapped	Retain	N/A
6218	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	9	F	One-sided crown	Remove	WQ Facility
6219	On-Site	Dec	cherry	*Prunus* spp.	16	16	F	Codominant leaders with included bark	Remove	Street
6220	On-Site	Dec	cherry	*Prunus* spp.	8,10	14	F	Codominant stems with included bark	Remove	Sidewalk
6272	On-Site	Dec	London plane	*Platanus × acerifolia*	18	20	G	One-sided crown, cable compartmentalized in trunk	Remove	Lot 16
6273	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	33	25	G	Multiple stems	Remove	Lot 15

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6274	On-Site	Dec	London plane	*Platanus × acerifolia*	15	20	G	Codominant leaders	Remove	Lot 15
6277	On-Site	Dec	cherry	*Prunus* spp.	13	16	F	Moderate structure	Remove	Lot 14
6278	On-Site	Dec	cherry	*Prunus* spp.	9	13	F	Moderate structure	Remove	Lot 14
6279	On-Site	Dec	cherry	*Prunus* spp.	14	16	F	Moderate structure	Remove	Lot 14
6280	On-Site	Dec	cherry	*Prunus* spp.	8	18	F	Moderate structure	Remove	Lot 14
6281	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	53	38	E	Rx aerial assessment if potential for retention	Remove	Wall
6282	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	46	28	G	Pistolbutt	Remove	Lot 8
6283	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	30	G	Dense group	Remove	Lot 9
6284	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25	18	F	Dense group	Remove	Lot 9
6285	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	34	22	F	Codominant stems with included bark, old broken top, multiple leaders, pini conks	Remove	Lot 9
6291	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	43	32	E		Remove	Lot 13
6292	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	24	G		Remove	Lot 12
6293	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	8	17	P	Poor structure, trunk decay	Remove	Lot 12
6294	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	9	11	P	Poor structure, trunk decay	Remove	Lot 12
6296	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	27	27	G		Remove	Lot 12
6297	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	16	11	F	Codominant stems	Remove	Lot 12
6298	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	24	G	Small pini conks at old branch stubs	Remove	Lot 12
6299	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	34	28	G		Remove	Lot 12
6300	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	35	24	G		Remove	Sidewalk
6301	On-Site	Dec	Scouler's willow	*Salix scouleriana*	7,8,10	15	F	Multiple stems	Remove	Street
6302	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	13	G		Remove	Street
6303	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	24	G		Remove	Street
6304	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	41	24	G		Remove	Lot 25

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6305	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	7	16	F	Poor structure	Remove	Street
6306	On-Site	Dec	cherry	*Prunus* spp.	6	20	F	Poor structure, one-sided crown	Remove	Lot 13
6307	On-Site	Dec	cherry	*Prunus* spp.	7	20	F	Poor structure, one-sided crown	Remove	Lot 12
6308	On-Site	Dec	cherry	*Prunus* spp.	10	20	P	Poor structure, one-sided crown, codominant stems with seam, decay	Remove	Sidewalk
6309	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	13	F		Remove	Street
6310	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	F		Remove	Street
6311	On-Site	Dec	cherry	*Prunus* spp.	6	20	P	Very poor structure, one-sided crown	Remove	Street
6312	On-Site	Dec	cherry	*Prunus* spp.	7,9	12	F	Codominant stems	Remove	Street
6313	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	38	26	E		Remove	Street
6314	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	13	18	F		Remove	Lot 24
6315	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	20	E		Remove	Lot 23
6316	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	40	22	F	Codominant stems with tight V-shaped attachment and included bark, twig dieback	Remove	Lot 22
6317	On-Site	Dec	cherry	*Prunus* spp.	19	14	F	Poor structure	Remove	Lot 21
6320	On-Site	Dec	Douglas-fir	*Pseudotsuga menziesii*	6	7	F	Blackberries in lower crown	Remove	Lot 23
6321	On-Site	Dec	Douglas-fir	*Pseudotsuga menziesii*	6	8	F	Blackberries in lower crown	Remove	Lot 23
6322	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	5,2x6	9	F		Remove	Trail
6332	VC	Dec	Oregon ash	*Fraxinus latifolia*	21	25	F		Unaffected	N/A
6337	ROW	Dec	English hawthorn	*Crataegus monogyna*	11	15	F	Nuisance species	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6343	ROW	Dec	Oregon ash	*Fraxinus latifolia*	9	20	F	Very poor structure	Unaffected	N/A
6344	ROW	Dec	Oregon ash	*Fraxinus latifolia*	18,23,37	22	F	History of branch failure, trunk and crown decay	Unaffected	N/A
6348	ROW	Dec	Scouler's willow	*Salix scouleriana*	18	12	P	Poor structure, history of failure, trunk and crown decay	Unaffected	N/A
6350	ROW	Dec	Oregon ash	*Fraxinus latifolia*	16	14	F	Assessment limited by standing water	Unaffected	N/A
6355	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F	Assessment limited by standing water	Unaffected	N/A
6358	ROW	Dec	Oregon ash	*Fraxinus latifolia*	8	10	F	Assessment limited by standing water	Unaffected	N/A
6359	ROW	Dec	Oregon ash	*Fraxinus latifolia*	8	10	F	Assessment limited by standing water	Unaffected	N/A
6364	VC	Dec	Oregon ash	*Fraxinus latifolia*	26	20	F		Unaffected	N/A
6368	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	51	22	E		Unaffected	N/A
6373	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	14	F	Dead and broken branches	Unaffected	N/A
6377	VC	Dec	Oregon ash	*Fraxinus latifolia*	16	14	F	Assessment limited by standing water	Unaffected	N/A
6379	VC	Dec	Oregon ash	*Fraxinus latifolia*	8	10	F	Assessment limited by standing water	Unaffected	N/A
6382	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F	Assessment limited by standing water	Unaffected	N/A
6384	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	22	12	F	Broken top, off-center leaders	Unaffected	N/A
6401	ROW	Dec	Oregon ash	*Fraxinus latifolia*	22	18	F		Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6402	ROW	Dec	sweet cherry	*Prunus avium*	12,16	14	F	Nuisance species, trunk decay	Unaffected	N/A
6403	ROW	Dec	Oregon ash	*Fraxinus latifolia*	6	6	F		Unaffected	N/A
6404	ROW	Dec	sweet cherry	*Prunus avium*	10	10	F	Nuisance species	Unaffected	N/A
6405	ROW	Dec	sweet cherry	*Prunus avium*	14	14	F	Nuisance species	Unaffected	N/A
6406	ROW	Dec	sweet cherry	*Prunus avium*	8	0	D	Snag	Unaffected	N/A
6407	ROW	Dec	sweet cherry	*Prunus avium*	12	10	F	Nuisance species, trunk decay	Unaffected	N/A
6408	ROW	Dec	black hawthorn	*Crataegus douglasii*	8	12	F	Assessment limited by standing water	Unaffected	N/A
6409	ROW	Dec	black hawthorn	*Crataegus douglasii*	10	12	F	Assessment limited by standing water	Unaffected	N/A
6410	ROW	Dec	black hawthorn	*Crataegus douglasii*	12	12	F	Assessment limited by standing water	Unaffected	N/A
6411	ROW	Dec	black hawthorn	*Crataegus douglasii*	10	12	F	Assessment limited by standing water	Unaffected	N/A
6412	ROW	Dec	Oregon ash	*Fraxinus latifolia*	12	12	F	Assessment limited by standing water	Unaffected	N/A
6419	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	16	F	Assessment limited by standing water	Unaffected	N/A
6420	ROW	Dec	Oregon ash	*Fraxinus latifolia*	18	22	F	Assessment limited by standing water	Unaffected	N/A
6421	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	16	F	Assessment limited by standing water	Unaffected	N/A
6422	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	12	F	Assessment limited by standing water	Unaffected	N/A
6429	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10, 2x14	16	F	Assessment limited by standing water	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6437	ROW	Dec	Oregon ash	*Fraxinus latifolia*	12,18	22	F	Assessment limited by standing water	Unaffected	N/A
6472	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	45	34	E		Retain	N/A
6497	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14,22	20	F	Poor structure, dead and broken branches, trunk decay	Unaffected	N/A
6500	ROW	Dec	Oregon ash	*Fraxinus latifolia*	8,12,24	20	F	8" snag, other codominant stems with poor structure, dead and broken branches	Unaffected	N/A
6502	ROW	Dec	Oregon ash	*Fraxinus latifolia*	25	22	F	Mostly one-sided to south	Unaffected	N/A
6504	ROW	Dec	English hawthorn	*Crataegus monogyna*	9	12	F	Nuisance species	Unaffected	N/A
6505	ROW	Dec	Oregon ash	*Fraxinus latifolia*	16	14	F	History of large branch failure	Unaffected	N/A
6510	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	14	F	Beaver damage	Unaffected	N/A
6514	ROW	Dec	Oregon ash	*Fraxinus latifolia*	10	12	F	Trunk decay	Unaffected	N/A
6515	ROW	Dec	Oregon ash	*Fraxinus latifolia*	16	16	F	Trunk damage	Unaffected	N/A
6516	ROW	Dec	Oregon ash	*Fraxinus latifolia*	14	14	F	One-sided to south	Unaffected	N/A
6517	ROW	Dec	Oregon ash	*Fraxinus latifolia*	13	14	F	One-sided to south	Unaffected	N/A
6519	ROW	Dec	Oregon ash	*Fraxinus latifolia*	9	0	D	Decay	Unaffected	N/A
6525	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	27	18	F	Codominant crown class	Unaffected	N/A
6526	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	32	12	F	Codominant crown class, swollen lower trunk	Unaffected	N/A
6527	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	33	26	F	Codominant crown class, self-correcting lean	Unaffected	N/A
6529	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	28	18	G	Crown asymmetry	Unaffected	N/A
6531	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	16	F	Codominant crown class	Unaffected	N/A
6532	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F	Suppressed	Unaffected	N/A
6533	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	14	F	Codominant crown class	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6534	On-Site	Con	western redcedar	*Thuja plicata*	17	13	G		Unaffected	N/A
6535	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	18	10	F	Codominant crown class	Unaffected	N/A
6536	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	16	9	F	Codominant crown class	Unaffected	N/A
6537	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	24	16	F	Codominant crown class	Unaffected	N/A
6538	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	18	18	F	Poor structure, one-sided to south with lean to road	Unaffected	N/A
6539	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	21	19	F	Codominant crown class, P. pini conks	Unaffected	N/A
6540	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	17	16	F	Codominant crown class, trunk sweep	Unaffected	N/A
6541	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	11	10	F	Suppressed	Unaffected	N/A
6542	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	23	18	F	Codominant crown class, broken top, off-center leader	Unaffected	N/A
6543	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	31	20	F	Codominant leaders	Unaffected	N/A
6573	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	24	18	F	Codominant crown class	Unaffected	N/A
6574	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	12	13	F	Intermediate crown class	Unaffected	N/A
6575	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	10	9	P	Suppressed	Unaffected	N/A
6576	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	12	10	P	Suppressed, P. pini conks	Unaffected	N/A
6577	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	31	20	F	Codominant crown class	Unaffected	N/A
6578	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	30	26	F	Codominant crown class, poor structure, codominant leaders with included bark and seam	Unaffected	N/A
6591	VC	Dec	sweet cherry	*Prunus avium*	13	20	F	Nuisance species	Unaffected	N/A
6593	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	39	22	G	Lower trunk sweep off steep bank	Retain	N/A
6601	VC	Con	western redcedar	*Thuja plicata*	43	18	G	Lower trunk wound	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6666	100yr FP	Con	western redcedar	*Thuja plicata*	12	13	G		Retain	N/A
6667	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18	16	P	History of branch failure, broken to, small live crown	Remove	Lot 26
6668	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	15	G		Remove	Lot 26
6669	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18	16	F		Remove	Lot 27
6670	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	17	20	F	Codominant leaders	Remove	Lot 27
6671	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18,19	18	F	Poor structure	Remove	Lot 27
6672	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	11	11	F	Intermediate crown class, pini conk	Remove	Lot 27
6673	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	18	F		Remove	Lot 27
6674	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	5,8	14	F		Remove	Sidewalk
6675	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F	Trunk wound	Remove	Street
6676	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	F	Pistolbutt	Remove	Street
6677	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	F		Remove	Street
6678	On-Site	Dec	English hawthorn	*Crataegus monogyna*	12	10	P	Nuisance species, very poor structure	Remove	Street
6679	On-Site	Dec	sweet cherry	*Prunus avium*	7	10	F	Nuisance species, poor structure	Remove	Lot 25
6680	On-Site	Dec	deciduous	unknown	7	16	P	Very poor structure	Remove	Wall
6681	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	45	22	E		Remove	Wall
6682	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	6	13	F	Poor structure	Remove	Trail
6683	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	26	21	G		Retain	N/A
6684	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	25	22	G		Retain	N/A
6685	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	16	P	Old broken top, very poor structure, suppressed beneath dominant canopy	Remove	Trail
6686	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	39	32	G		Remove	Trail

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
6687	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	11	F	Poor structure, self-correcting lean, suppressed	Remove	Condition
6688	VC	Dec	Scouler's willow	*Salix scouleriana*	10	11	F		Retain	N/A
6689	VC	Dec	sweet cherry	*Prunus avium*	5,7	10	F	Nuisance species	Retain	N/A
6690	VC	Dec	English hawthorn	*Crataegus monogyna*	7	10	F	Poor structure, excessive lean south	Unaffected	N/A
6691	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	29	16	F	Reduced vigor, dead branches, dieback	Unaffected	N/A
6692	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	10	11	F	Intermediate crown class	Unaffected	N/A
6693	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	19	16	F		Unaffected	N/A
6694	100yr FP	Dec	English hawthorn	*Crataegus monogyna*	7	10	P	Nuisance species, very poor structure	Unaffected	N/A
6695	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	25	14	F		Unaffected	N/A
6696	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	7	11	F	Suppressed	Retain	N/A
6697	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	10	13	F	Suppressed	Retain	N/A
7172	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	18	7	P	Low vigor, dying	Remove	Lot 11
7173	On-Site	Dec	sweet cherry	*Prunus avium*	8	9	F	Nuisance species	Remove	Lot 11
7174	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	34	20	F	History of branch failure, crown asymmetry, large pini conks	Remove	Lot 11
7175	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	26	12	F	History of branch failure, broken top, major asymmetry	Remove	Lot 10
7176	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	15	F	Codominant crown class with 7175	Remove	Lot 10
7177	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	22	16	F	Numerous pini conks	Remove	Lot 11
7178	On-Site	Dec	bigleaf maple	*Acer macrophyllum*	8	15	F	Moderate structure	Remove	Lot 11

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
7179	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	40	20	G	Dead and broken branches, broken top, pitch seam on lower trunk	Remove	Lot 11
7180	On-Site	Dec	sweet cherry	*Prunus avium*	7	10	F	Nuisance species	Remove	Lot 11
7181	On-Site	Dec	sweet cherry	*Prunus avium*	7	10	F	Nuisance species	Remove	Lot 11
7182	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	0	D	Snag	Remove	Lot 11
7183	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	11	7	P	Broken top	Remove	Lot 11
7184	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	19	16	F		Remove	Sidewalk
7185	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	12	16	F		Remove	Sidewalk
7186	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	0	D	Mostly dead	Remove	Sidewalk
7187	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	28	20	F	Old broken top with new leaders	Remove	Sidewalk
7188	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	7	G	Young tree	Retain	N/A
7189	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	20	G	Some history of branch failure, epicormics	Retain	N/A
7190	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	7	F	Young tree, minor asymmetry, lower limbs poorly pruned, trunk damage	Remove	Sidewalk
7191	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	9	F	Young tree, minor asymmetry, lower limbs poorly pruned	Remove	Sidewalk
7192	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	17	10	P	High live crown, windthrow risk	Remove	Lot 28
7193	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	10	F	Blackberries in lower crown	Remove	Street
7194	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	F	Blackberries in lower crown	Remove	Street

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
7195	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F		Remove	Street
7196	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	8	10	F	Blackberries in lower crown, trunk damage	Remove	Sidewalk
7197	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	8	P	Broken top, small live crown, hollow with advanced trunk decay	Remove	Sidewalk
7198	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	7	F		Remove	Street
7199	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	7	F		Remove	Street
7200	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	9	F		Remove	Street
7201	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	F	Self-correcting but excessive lean	Remove	Street
7202	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	G		Remove	Street
7203	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	G		Remove	Street
7204	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	G		Remove	Lot 28
7205	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	F	Crooked leader	Remove	Lot 28
7206	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	10	F	Self-correcting lean	Remove	Lot 28
7207	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	8	G		Remove	Lot 28
7240	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	10	11	P	Small live crown, sunscald, low vigor, not viable	Remove	Condition
7241	VC	Dec	sweet cherry	*Prunus avium*	9	11	F	Nuisance species, codominant stems, some included bark, self-correcting lean	Retain	N/A
7242	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	19	16	G		Retain	N/A
7243	On-Site	Dec	dogwood	*Cornus* spp.	7	12	F	Poor structure	Remove	Trail
7244	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	10,19	12	G	Codominant stems	Retain	N/A
9001	On-site	Con	Douglas-fir	*Pseudotsuga menziesii*	10	11	G		Remove	Sidewalk

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
9002	On-Site	Dec	sweet cherry	*Prunus avium*	6	8	F	Nuisance species	Remove	Street
9003	On-Site	Dec	English hawthorn	*Crataegus monogyna*	6	0	D	Nuisance species	Remove	Street
9004	On-Site	BLE	English holly	*Ilex aquifolium*	8	12	F	Nuisance species	Remove	Street
9005	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	6	6	F		Remove	Street
10039	On-Site	Dec	plum	*Prunus* spp.	6,10, 20,24	18	P	Very poor structure, dead and broken branches, trunk and crown decay	Remove	Lot 20
10042	On-Site	Dec	plum	*Prunus* spp.	4x6,2x8, 2x10	17	F	Very poor structure, trunk decay	Remove	Lot 20
10054	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	42	22	G	Pini conks	Remove	Lot 20
10055	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	12	F	Intermediate crown class, numerous pini conks	Remove	Sidewalk
10059	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	24	F	Codominant stems, pini conks	Remove	Street
10061	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25	22	F	Dead branches	Remove	Street
10063	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	33	24	G	Dense group	Remove	Street
10067	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	40	28	F	Dense group, codominant stems with included bark	Remove	Street
10068	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	43	32	E	Dense group	Remove	Street
10070	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	50	33	E	Dense group	Remove	Street
10086	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	20	20	G	Dense group	Remove	Sidewalk
10087	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	24	G	Dense group	Remove	Sidewalk
10088	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	14	22	G	Dense group	Remove	Sidewalk
10101	On-Site	Dec	apple	*Malus* spp.	10	13	F	Poor structure, decay	Remove	Street
10104	On-Site	Dec	apple	*Malus* spp.	10	13	F	Poor structure	Remove	Sidewalk
10108	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25,26	30	G	Codominant stems, ivy infestation	Remove	WQ Facility
10116	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	12	P	Low vigor, trunk damage	Remove	WQ Facility

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
10117	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	9	13	P	Low vigor	Remove	WQ Facility
10118	On-Site	Dec	English hawthorn	*Crataegus monogyna*	14	20	F	Nuisance species	Remove	WQ Facility
10122	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	15	22	G	Moderate structure	Remove	WQ Facility
10123	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	16	20	G	Moderate structure	Remove	WQ Facility
10126	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	41	34	G	Ivy infestation	Remove	Lot 21
10128	On-Site	Con	scots pine	*Pinus sylvestris*	13	16	P	Very poor structure, small one-sided live crown, broken top	Remove	WQ Facility
10134	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	53	40	E		Remove	WQ Facility
10148	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	30	G	Multiple leaders, aerial inspection and possible cable/brace if retained	Remove	Trail
10150	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	24	20	G		Remove	WQ Facility
10151	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	7	11	P	Suppressed	Remove	WQ Facility
10153	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	16	13	F	Reduced vigor	Remove	WQ Facility
10165	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	32	34	G	Dead and broken branches	Remove	Lot 21
10169	On-Site	Dec	English hawthorn	*Crataegus monogyna*	8	12	P	Nuisance species	Remove	Trail
10170	On-Site	Con	grand fir	*Abies grandis*	8	11	F		Remove	Trail
10178	VC	Dec	English hawthorn	*Crataegus monogyna*	3x8	12	P	Poor structure, decay	Retain	N/A
10180	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	36	27	G	Crown asymmetry	Retain	N/A
10182	On-Site	Dec	paper birch	*Betula papyrifera*	7,9	11	P	Poor structure, dead and broken branches, lower trunk damage	Remove	WQ Facility
14124	Off-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	30	25	F	Codominant crown class with 14125	Remove	Street
14125	Boundary	Con	Douglas-fir	*Pseudotsuga menziesii*	13,2x22	18	F	Fence in trunk	Remove	Sidewalk

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
30210	VC	Dec	Lombardy poplar	*Populus nigra*	32	8	P	Dead and broken branches, crown decay, inherent species limitations	Remove	Condition
30235	VC	Dec	English hawthorn	*Crataegus monogyna*	6	10	P	Extensive ivy	Retain	N/A
30241	VC	Dec	Oregon ash	*Fraxinus latifolia*	24	28	G	Dead and broken branches, ivy	Retain	N/A
30252	VC	Dec	English hawthorn	*Crataegus monogyna*	12	15	P	Nuisance species, poor structure, ivy	Retain	N/A
30255	VC	Dec	Oregon ash	*Fraxinus latifolia*	17	16	P	Extensive ivy	Retain	N/A
30257	VC	Dec	English hawthorn	*Crataegus monogyna*	11	14	P	Nuisance species, excessive lean	Retain	N/A
30273	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	12	14	F		Remove	Trail
30278	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	13	15	F	Forked leaders	Retain	N/A
30282	On-Site	Dec	English hawthorn	*Crataegus monogyna*	7	8	P	Nuisance species, poor structure, ivy	Retain	N/A
30283	On-Site	Dec	English hawthorn	*Crataegus monogyna*	4,6,8	8	P	Nuisance species, poor structure, ivy	Retain	N/A
30298	VC	BLE	English holly	*Ilex aquifolium*	2x6	6	F	Nuisance species	Retain	N/A
30299	VC	Dec	sweet cherry	*Prunus avium*	9	10	F	Nuisance species, broken top, poor structure	Retain	N/A
30309	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	19	23	F	Not suitable for retention with exposure from adjacent removals, poor crown structure, lower trunk wound	Remove	Trail
30312	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	17	24	F	High live crown	Remove	Lot 21
30314	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	6	14	P	Very poor structure, small live crown	Remove	WQ Facility

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
30315	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	11	13	F	High live crown	Remove	WQ Facility
30322	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	21	F	Poor structure	Remove	Lot 22
30328	VC	Dec	Oregon ash	*Fraxinus latifolia*	33	20	F	Poor structure, dead and broken branches, lower trunk wound	Retain	N/A
30329	VC	Dec	English hawthorn	*Crataegus monogyna*	10	10	F	Poor structure	Retain	N/A
30341	VC	Dec	sweet cherry	*Prunus avium*	9	9	F	Nuisance species, crook in lower trunk	Unaffected	N/A
30346	VC	Dec	Oregon ash	*Fraxinus latifolia*	14	0	D	Wind snapped	Unaffected	N/A
30354	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	45	26	E		Retain	N/A
30403	VC	Dec	red alder	*Alnus rubra*	17	20	F	Leans northwest	Retain	N/A
30409	VC	Dec	red alder	*Alnus rubra*	19	16	F	Leans west	Retain	N/A
30417	VC	Dec	Oregon ash	*Fraxinus latifolia*	8	12	P	Column of advanced trunk decay	Retain	N/A
30420	VC	Dec	red alder	*Alnus rubra*	19	14	P	Broken top, trunk decay	Unaffected	N/A
30421	VC	Dec	Oregon ash	*Fraxinus latifolia*	13	8	P	Snag	Retain	N/A
30422	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	10	P	Broken top	Retain	N/A
30431	VC	Dec	Oregon ash	*Fraxinus latifolia*	28	20	F	Dead and broken branches	Unaffected	N/A
30459	On-Site	Dec	English hawthorn	*Crataegus monogyna*	12	12	P	Nuisance species, recently uprooted	Remove	Trail
30521	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	14	G		Remove	Trail
30594	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	30	E		Remove	Lot 22
30603	On-Site	Dec	sweet cherry	*Prunus avium*	8	11	F	Nuisance species	Remove	Lot 24
30622	On-Site	Dec	sweet cherry	*Prunus avium*	2x15	15	P	Nuisance species, decrepit, history of failure, advanced decay	Remove	Lot 25
30627	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	11	F	Self-correcting lean, crown asymmetry, pini conks	Remove	Condition/ Wall

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
30636	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	33	20	G	One-sided crown	Retain	N/A
30638	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	10	12	P	Sunscald	Retain	N/A
30639	On-Site	Dec	sweet cherry	*Prunus avium*	6	10	F	Nuisance species; not suitable for retention with removal of #30627	Remove	Wall
30640	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	22	12	F		Retain	N/A
30641	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	13	14	F		Retain	N/A
30646	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	27	25	F		Remove	Wall
30647	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	12	F	Non-self correcting lean	Remove	Condition/ Wall
30653	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	21	17	F		Retain	N/A
30659	VC	Dec	Oregon ash	*Fraxinus latifolia*	13	16	F	Poor structure, multiple leaders, trunk decay	Unaffected	N/A
30683	VC	Dec	sweet cherry	*Prunus avium*	17	25	F	Nuisance species	Retain	N/A
31250	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	49	32	G	Codominant leaders with included bark	Remove	Trail
31257	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	21	16	G	Codominant crown class	Remove	Trail
31263	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	29	24	F	History of branch failure	Retain	N/A
31283	VC	Con	Oregon ash	*Fraxinus latifolia*	30	20	F	Dead and broken branches	unaffected	N/A
31289	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	15	9	G		Remove	Trail
31293	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	33	26	G	Basal hollow, may just be rooting and not decay	Remove	Trail
31295	VC	Con	western redcedar	*Thuja plicata*	9	12	G		Likely to Retain	Assess wall impacts
31296	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	12	11	F		Remove	Trail
31300	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	38	24	G		Unaffected	N/A
31313	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	31	20	G		Retain	N/A
31319	On-Site	Dec	sweet cherry	*Prunus avium*	10	17	F	Nuisance species	Remove	Lot 26

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
31320	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	48	28	G	Few dead and broken branches	Remove	Lot 26
31323	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	38	28	F	Reduced vigor	Retain	N/A
31333	100yr FP	Dec	sweet cherry	*Prunus avium*	21	20	F	Nuisance species, previous codominant stem failure, open wound with some decay	Retain	N/A
31337	VC	Dec	Douglas-fir	*Pseudotsuga menziesii*	14	10	F	Heavy sweep leaning uphill, self-correcting	Unaffected	N/A
31340	On-Site	Con	western redcedar	*Thuja plicata*	22	18	G		Remove	Lot 27
31342	100yr FP	Con	Douglas-fir	*Pseudotsuga menziesii*	9	9	F		Retain	N/A
31347	VC	Dec	Oregon ash	*Fraxinus latifolia*	10	10	P	Broken top, very poor structure	Unaffected	N/A
31349	VC	Dec	Oregon ash	*Fraxinus latifolia*	28,29	20	F	Codominant stems, advanced trunk decay	Unaffected	N/A
31350	VC	Dec	Oregon ash	*Fraxinus latifolia*	12	14	F	Dead and broken branches	Unaffected	N/A
31353	VC	Dec	Oregon ash	*Fraxinus latifolia*	10,21	14	F	10” stem is dead, 21” stem with high live crown	Unaffected	N/A
31355	VC	Dec	Oregon ash	*Fraxinus latifolia*	7	10	P	Leans west	Unaffected	N/A
31360	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	10	F	Small high live crown, codomi	Unaffected	N/A
31361	VC	Dec	Oregon ash	*Fraxinus latifolia*	19	16	F	Dead and broken branches, trunk decay with hollow	Unaffected	N/A
31362	VC	Dec	Oregon ash	*Fraxinus latifolia*	18	15	F	Small high live crown	Unaffected	N/A
31365	VC	Dec	Oregon ash	*Fraxinus latifolia*	10	10	F	Major lower trunk sweep	Unaffected	N/A
31373	VC	Dec	Oregon ash	*Fraxinus latifolia*	29	20	F	Poor structure, dead and broken branches	Unaffected	N/A
31386	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	17	14	F		Remove	Wall

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
31393	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	32	15	F	Codominant stems	Remove	Lot 27
31421	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	7	8	G		Retain	N/A
31574	On-Site	Dec	English hawthorn	*Crataegus monogyna*	9	9	P	Nuisance species, very poor structure	Remove	Lot 23
31575	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	44	26	G	Codominant stems with tight V-shaped attachment, active pitch flow lower trunk, some pini conks, unidentified mushrooms in root zone	Remove	Lot 23
31577	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	25	22	G		Remove	Lot 23
31583	On-Site	Dec	Douglas-fir	*Pseudotsuga menziesii*	8	7	P	Poor structure	Remove	Lot 23
31584	On-Site	Dec	Oregon ash	*Fraxinus latifolia*	8	16	F	Poor structure, trunk wound	Remove	Lot 23
31585	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	46	26	G	History of branch failure, lower trunk damage	Remove	Lot 23
31605	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	36	24	G		Likely to Retain	Assess wall impacts
31606	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	25	21	F	Old broken top, multiple leaders	Create Snag	Condition
31610	On-Site	Con	Douglas-fir	*Pseudotsuga menziesii*	45	28	E		Remove	Trail
31614	VC	Dec	Oregon ash	*Fraxinus latifolia*	12	16	F	Codominant leaders	Retain	N/A
71092	VC	Con	Douglas-fir	*Pseudotsuga menziesii*	37	32	G		Unaffected	N/A
71095	VC	Dec	Oregon ash	*Fraxinus latifolia*	17	20	F	Poor crown structure, dead and broken branches	Unaffected	N/A
71097	VC	Dec	Oregon ash	*Fraxinus latifolia*	9,11,31	26	P	Very poor structure, advanced trunk decay, good habitat, low target potential	Unaffected	N/A

No.	Location[1]	Type	Common Name	Species Name	DBH[2]	C-Rad[3]	Cond[4]	Comments	Treatment[5]	Reason[6]
80001	On-Site	Con	pacific yew	*Taxus brevifolia*	8	3	P	Mostly dead, but sprouting and unique native species	Retain	N/A
80002	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	7	6	F	Suppressed	Unaffected	N/A
80003	ROW	Con	Douglas-fir	*Pseudotsuga menziesii*	15	15	F	Poor structure, trunk sweep, off-center leader, one-sided crown to south	Unaffected	N/A

[1]**Location** identifies where trees are located, either: On-site (not within environmentally constrained areas or rights-of-way); Off-Site (limited to tree #14124 near the northern boundary); Boundary (limited to tree #14125 on the northern boundary); ROW (for trees located in the SW Brookman Road right-of-way); VC (for trees located within or on the Vegetated Corridor boundary); or, 100yr FP (for trees located outside of the VC but within the 100 year flood plain).

[2]**DBH** is tree diameter measured at 4.5-feet above ground level in inches, except off-site tree diameter was visually estimated; trees with multiple trunks splitting below DBH were measured at the narrowest point beneath the split or are indicated as quantity x size.

[3]**C-Rad** is the average crown radius measured in feet.

[4]**Cond** is an arborist assigned rating to generally describe the condition of individual trees as follows- **D**ead; **P**oor; **F**air; **G**ood; or, **E**xcellent Condition.

[5]**Treatment** corresponds with the Tree Preservation and Removal Plan.

[6]**Reason** lists the general reason for removal for the purposes of site development typically associated with grading that is required for building lots, sidewalks and streets, retaining walls and trails, or because a tree's condition is not suitable for retention with the proposed development; N/A is indicated for trees classified as Retain or Unaffected in the Treatment column.

Morgan Holen & Associates LLC

Attachment B: Additional Tree Data for Unaffected Vegetated Corridor
MHA19064 Riverside at Cedar Creek - Tree Data 01-20-2020 Rev. 03-05-2020.xlsx

Stand No.	Tree Species	Count	Average DBH[1]	Average Condition	Total Canopy Preserved	Comments
1	Oregon ash (*Fraxinus latifolia*)	103	20	Fair-Poor	~4-acres	Non-surveyed stand grown trees within the unaffected Vegetated Corridor were generally assessed in terms of species, diameter, and general condition. These trees are unaffected by the proposed development. No canopy credit is accounted for since they are located beyond the Net Development Site.
	hawthorn (*Crataegus* spp.)	17	9	Fair		
	Douglas-fir (*Pseudotsuga menziesii*)	3	30	Good		
	red alder (*Alnus rubra*)	3	12	Fair		
	sweet cherry (*Prunus avium*)	1	8	Fair		
Total Stand		**127**	**16**	**Fair**		

[1]**DBH** is tree diameter measured at 4.5-feet above the ground level, in inches.

Morgan Holen & Associates, LLC
Consulting Arborists and Urban Forest Management
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morgan@mholen.com | 971.409.9354

GEO CONSULTANTS NORTHWEST

March 26, 2020

Riverside Homes, LLC
17933 NW Evergreen Place, Ste. 370
Beaverton, OR 97006

Attn: Niki Munson

Subject: Geotechnical Site Evaluation
Cedar Creek Subdivision
GCN Project 1497

This report presents our Geotechnical Site Evaluation for the proposed Cedar Creek Subdivision, a single-family home development in Sherwood, Oregon. The report summarizes the work accomplished and provides our conclusions and recommendations for site development. It has been prepared in accordance with Riverside's Independent Contractor Agreement dated February 10, 2020.

PROJECT INFORMATION

The approximate 10.5-acre property is located at 17433 Brookman Road and is currently developed with a single-family home and several outbuildings. About 60 percent of the property is developable, the southern 40 percent or so is within the 100-year flood plain or flood plain buffer zone. The eastern and southern portions of the site are heavily wooded. All the buildings and most of the trees will be removed when the property is developed.

You provided us with a preliminary grading plan prepared by Pioneer Design Group that shows the general site layout. The proposed development will include a public roadway, underground utilities, and a detention pond. The detention pond will outfall to Cedar Creek.

The proposed homes are expected to be supported on shallow spread foundations with crawl

The site relative to surrounding features is shown in Figure 1.

SCOPE OF WORK

The purpose of our services was to explore the site and provide recommendations for design and construction. The following describes our specific scope of services:

- Coordinate and manage the field investigation, including utility locates, authorization for site access, access preparation, scheduling of contractors and GCN staff.
- Observe excavation of 5 test pits to depths up to 11 feet below the existing ground surface. The test pits were made using a small tracked excavator.
- Maintain a log of soil, rock, and groundwater, as encountered, and obtain soil samples to be classified in the field and returned to our lab for further evaluation and testing. We classify soil in general accordance with the Unified Soil Classification System.
- Determine the moisture content and dry unit weight of selected soil samples in general accordance with ASTM D2216 and D4318, respectively.

- Provide a written Geotechnical Report summarizing our explorations, geotechnical analysis, conclusions, and recommendations that include:
  - A discussion on the geologic conditions and the seismic setting of the site including general geologic features, tectonic faulting in the area, and seismic design criteria in accordance with the Oregon Structural Specialty Code.
  - Recommendations for site preparation, grading and drainage, compaction criteria, and wet-weather earthwork procedures.
  - Recommendations for excavation, utility trenches, backfill materials, and backfill compaction.
  - Recommendations for design and construction of shallow-spread foundations, including allowable design bearing pressures, minimum footing depth and width, lateral resistance to sliding, and estimates of settlement.
  - Geotechnical engineering recommendations for the design and construction of concrete floor slabs, including an anticipated value for subgrade modulus.
  - Recommendations for asphalt pavement including, soil subgrade condition and preparation, asphalt and base rock thickness, asphalt mix design, and construction testing.
  - A discussion of groundwater conditions on the site and recommendations for subsurface drainage of foundations, floor slabs, and pavement.

SITE CONDITIONS

The site is in a relatively flat uplands plateau at the base of Parrot Mountain in Sherwood. The following paragraphs describe the area geology, surface, and subsurface features.

SITE GEOLOGY

The most recent geologic material in the site vicinity Quaternary sediment consisting of is silt and sand placed during episodic, cataclysmic, flooding in the Quaternary age Missoula Floods. The deposits are several hundred feet thick in portions of the Tualatin Basin. Bedrock that underlies the area is basalt of the Columbia River Basalt flows that was deposited 15 to 16 million years ago.[1]

SURFACE CONDITIONS

The project site is located at the foot of Parrot Mountain in an area of large wooded properties. The site is currently improved with a single family home and several small outbuildings. The site access and driveway are paved with gravel. The northwest portion of the site is covered with pasture grass and most of the remaining area is forested with small to large trees. The area immediately around the home is landscaped with lawn and grass and shrubs. There are two vegetable garden areas and a separate graveled driveway area.

[1]Lina Ma, Ian P. Madin, Serin Duplantis, and Kendra J. Williams, "Lidar-Based Surficial Geologic Map and Database of the Greater Portland Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County,:100,000quadrangle, Washington, Multnomah, Clackamas, and Marion Counties Washington ", 1:63,360,Oregon: State of Oregon Department of Geology and Mineral Industries, Open File Report O-12-02.

Site grades show the site slopes downward to the south from elevation 210 to 178 feet above mean sea level. The site layout is shown in Figure 2.

SUBSURFACE CONDITIONS

We explored subsurface conditions at the site by observing excavation five test pits (TP-1through TP-5) to depths up to 11 feet below the ground surface (bgs) on March 23, 2020. The exploration locations are shown in Figure 2.

Soil samples obtained from the test pits were returned to our laboratory for additional evaluation and testing. Selected samples were used to determine the natural soil moisture content. Descriptions of field and laboratory procedures and the exploration logs are included in Attachment A.

We encountered an approximate one-foot thick zone of soft topsoil at the ground surface in all five of the test pit explorations. The topsoil included a heavily rooted organic zone about 2 inches thick in both pasture and forested areas. The forest areas included dense tree roots that extend to several feet bgs. The dry unit weight of the topsoil obtained from a Shelby tube sample collected in test pit TP-2 varied from 75 to 81 pounds per cubic foot.

The topsoil surficial layer was underlain by stiff to very stiff silt to the depth of our explorations. The moisture content of the silt varied from 28 to 40 percent. The dry unit weight of the silt obtained from a Shelby tube sample collected in test pit TP-2 varied from 86 to 87 pounds per cubic foot.

We encountered slow ground groundwater seepage in test pit TP-2 at 11 feet bgs. The color of soil observed in the test pits indicated that the depth of perched groundwater on the site is at about 10 feet bgs in the driest months of the year and within 2 feet of the ground surface during the wet season.

SEISMIC SETTING

The Portland area is subject to seismic events stemming from three possible sources: the Cascadia Subduction Zone (CSZ), intraslab faults within the Juan de Fuca Plate, and crustal faults

There are three faults within 10 miles of the site: the Beaverton Fault Zone 8.9 miles to the north, the Newberg Fault 6.4 miles to the southeast, and the Canby-Molalla Fault 6 miles to the northwest[2]. The USGS considers the faults to be greater than 150,000 years old and are considered inactive.

The contribution of potential earthquake-induced ground motion from all known sources, including the faults described above, are included in probabilistic ground motion maps developed by the USGS. Based on site explorations and geologic mapping, the site falls into Site Class E for seismic design. Seismic design parameters for the project site are provided in Table 1.

[2]United States Geological Survey, 2019, Quaternary Fault and Fold Database of the United States; USGS Earthquake Hazards Program.

TABLE 1 – SEISMIC DESIGN PARAMETERS

2019 IBC CODE BASED RESPONSE SPECTRUM MCER GROUND MOTION - 5% DAMPING 1% IN 50 YEARS PROBABILITY OF COLLAPSE			
LAT	45.345	LON	-122.856
S_S		0.832g	
S_1		0.395g	
MAPPED MAXIMUM CONSIDERED EARTHQUAKE SPECTRAL RESPONSE ACCELERATION PARAMETER (SITE CLASS E)			
F_A		1.3	
F_V		SEE ASCE 7-16 SECTION 11.4.8*	
S_{MS}		1.082g	
S_{M1}		SEE ASCE 7-16 SECTION 11.4.8*	
DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETER			
S_{DS}		0.721g	
S_{D1}		SEE ASCE 7-16 SECTION 11.4.8*	

* Factors dependent on structural design.

The site is not subject to liquefaction.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our field explorations and our engineering analysis, it is our opinion that the site can be developed as proposed. On-site soil conditions are favorable for mass grading in dry weather conditions. It can be expected that extra costs will accrue if earthwork is planned for the winter months.

The presence of soft agricultural and forest topsoil on the site is a geotechnical concern. Soft surficial soil that will remain at the base of structures will need to be scarified and compacted to support the intended loads.

Our specific recommendations for site development are provided in the following paragraphs.

CONSTRUCTION CONSIDERATIONS

Fine-grained soils on the site are easily disturbed during the wet season. If not carefully executed, site preparation, utility trench work, and roadway excavation can create extensive soft areas and significant repair costs can result. Earthwork should be planned and executed to minimize subgrade disturbance.

The base rock thickness for project streets, as described below in the section titled "Pavement Recommendations," are intended to support post construction design traffic loads. The base rock thickness determined for post construction traffic will not support construction traffic or pavement construction when the subgrade soils are wet. Accordingly, if construction is planned for periods when the subgrade soils are not dry and firm, then an increased thickness of base rock or other methods to support construction traffic could be required.

If construction occurs during wet conditions, site preparation activities may need to be accomplished using track-mounted equipment, loading removed material into trucks supported on granular haul roads. The use of granular haul roads or staging areas will be necessary for support of construction traffic during wet conditions.

The imported granular material should be placed in one lift over the prepared or undisturbed subgrade and compacted using a smooth drum, non-vibratory roller. We recommend that geotextile be placed as a barrier between the subgrade and imported fill in areas of repeated construction traffic. The geotextile should have a minimum Mullen burst strength of 250 pounds per square inch (psi) for puncture resistance and an apparent opening size between the U.S. Standard No. 70 and No. 100 Sieve to minimize migration of fines into the imported granular material.

We recommend that a minimum of 2-inch thickness of lightly compacted granular material be placed at the base of footing excavations made in wet weather conditions. The granular material reduces water softening of subgrade soils and reduces subgrade disturbance during placement of forms and reinforcement.

TOPSOIL ZONE

Much of the site includes an approximate 12 inch thick tilled zone from agricultural use. The till zone should be scarified to a depth of 12 inches and compacted as structural fill in areas that will be occupied by buildings, roadways, new fill, or other structures. These measures may be omitted where; 1) mass grading will remove the upper 12 inches of soil or ; 2) building footings or other structural elements will penetrate the eventual ground surface to a depth greater than the till zone depth.

The on-site silt can be sensitive to small changes in moisture content and may be difficult to compact during wet weather. Accordingly, scarification and compaction of the subgrade may only be possible during extended dry periods and following moisture conditioning of the soil.

As an alternative, amendment of the tilled zone materials with lime or portland cement is possible. Recommendations for soil amendment are provided in the "Structural Fill" section of this report.

SITE PREPARATION

The existing heavily rooted zone that cover the ground surface should be removed from building and structural areas to the depth of firm compacted fill or native soil. We estimate the stripping depth will generally be 2 to 4 inches. The actual stripping depth should be based on field observations at the time of construction. Stripped material should be transported off site for disposal or used in landscaping areas.

Trees, shrubs, and brush should be removed from all building and paved areas. Root balls should be grubbed out to a depth such that roots greater than ½-inch in diameter are removed. The depth of excavation to remove root balls of trees could exceed 5 feet bgs.

Depending on the methods used, considerable disturbance and loosening of the subgrade could occur during grubbing and stripping. Soil disturbed during these operations should be removed to expose firm undisturbed subgrade. The resulting excavations should be backfilled with structural fill.

The existing building footings, floor slabs, septic tanks and drain fields and other structural elements should be removed from the site. Remaining utilities should be abandoned by removing the conduit and backfilling with granular structural fill. Soil disturbed during building demolition and grubbing operations be removed to expose firm undisturbed subgrade. The resulting excavations should be backfilled with structural fill.

If basements are present, they should be backfilled with granular structural fill after breaking and removing the sidewalls. The basement floors may be left in place but should be broken with an excavator bucket to allow movement of groundwater.

We recommend proof rolling the subgrade with a fully loaded dump truck or similar size, rubber-tire construction equipment after stripping, scarification and required site cutting have been completed. The proof rolling should be observed by a member of our geotechnical staff to identify areas of excessive yielding. Areas of excessive yielding should be excavated and replaced with compacted materials recommended for structural fill. Areas that appear to be too wet and soft to support proof rolling equipment should be prepared in accordance with the recommendations for wet weather construction presented in the following section of this report.

The test pits were backfilled using little compactive effort and soft spots can be expected at these locations. We recommend that these soft soils be removed from the test pits that are located within the proposed building and paved areas to a depth of 3 feet below finished subgrade. The resulting excavation should be brought back to grade with structural fill.

UTILITY TRENCH EXCAVATIONS

Trench construction and maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Local, state, and federal safety codes should be followed. Temporary excavations should either be shored or sloped in accordance with Safety Standards for Excavation, Oregon Administrative Rules (OARs) 1926.650.

The on-site silt soil, if groundwater or seepage is not present, is classified as soil type A per Appendix A of OAR 1926.650. For planning purposes, this type of soil should be sloped no steeper than 3/4 H:1V of the unshored portion of the trench or excavation. Depending on actual site conditions, flatter slopes may be necessary.

Trench backfill should consist of well-graded granular material with a maximum particle size of ¾-inch and less than 8 percent by weight passing the U.S. Standard No. 200 Sieve. The material should be free of roots, organic matter, and other unsuitable materials.

Trench backfill in the bedding zone and pipe zone should be placed and compacted in maximum lifts of 6 inches. Trench backfill above the pipe zone should be placed and compacted with a minimum of two lifts. A minimum cover of 3 feet over the top of the pipe should be placed before compacting with a hydraulic plate compactor (hoe-pack).

Trench backfill should be compacted to at least 90 percent of the maximum dry density at depths greater than 4 feet below finished grade and to 95 percent of the maximum dry density within 4 feet of finished grade. Compaction is based on ASTM D698/AASHTO T-99, the standard proctor test, or as recommended by the pipe manufacturer.

PERMANENT SLOPES

Permanent cut and fill slopes should not exceed a grade of 2H:1V (Horizontal to Vertical). Slopes that will be maintained by mowing should not be constructed steeper than 3H:1V. Structures and paved surfaces should be located at least 5 feet from the slope face.

The slopes should be planted with vegetation to provide protection against erosion. Surface water runoff should be collected and directed away from slopes steeper than 3H:1V to prevent water from running down the face of the slope.

STRUCTURAL FILL

General: Fill within building, pavement, and sidewalk areas should be placed as compacted structural fill. Structural fill should be compacted to at least 95percent of the maximum dry density as determined by ASTM D 698.

The earthwork contractor's compactive effort should be evaluated based on field observations. Lift thicknesses should be adjusted to meet compaction requirements. The moisture content for compaction should be within 3 percent of optimum.

Brush, roots, construction debris, and other deleterious material should not be placed in the structural fill. Additional information regarding specific types of fill is provided below.

On-Site Silt: The on-site soil is suitable for use as structural fill provided it can be moisture-conditioned, separated from concentrations of organics and other unsuitable material, and compacted to the specified density. The fill should be placed in lifts with a maximum loose thickness of 8 inches.

Imported Granular Material: Imported granular fill material may include sand, gravel, fragmented rock, or recycled crushed concrete with a maximum size of 4 inches and with not more than about 8 percent passing the No. 200 sieve (washed analysis). Material satisfying these requirements can usually be placed during periods of wet weather. The first lift of granular fill placed over a fine-grained subgrade should be about 18 inches thick and subsequent lifts about 12 inches thick when using medium- to heavy-weight vibratory rollers. Granular structural fill should be limited to a maximum size of about 1-½ inches when compacted with hand-operated equipment. Lift thicknesses should be limited to less than 8 inches when using hand-operated vibratory plate compactors.

Free-Draining Fill: Free-draining material should have less than 2 percent passing the No. 200 sieve (washed analysis). Examples of materials that would satisfy this requirement include ¾ to ¼ inch, 1½ to ¾ inch, or 3- to 1-inch crushed rock.

Cement Amended Fill: Portland cement can be used to stabilize and strengthen soils, to stabilize expansive soil, or to permit use of native soils when moisture contents are above optimum. The amount of cement used to amend the soils generally varies with moisture content and clay content. For planning purposes, we expect acceptable soil strength will be obtained using an amendment rate of 5 pounds portland cement placed per square foot of area, tilled to a depth of 12 inches.

The permeability of amended soil is extremely low. Amendment should not be completed in landscape areas or the amended material should be removed from landscape areas prior to planting.

SHALLOW FOUNDATIONS

In our opinion, the proposed structures can be supported on continuous or isolated column footings founded on new structural fill, or on undisturbed native silt.

Continuous wall and spread footings and retaining wall footings should be proportioned for an allowable bearing pressure of 1,500 pounds per square foot (psf). For this allowable bearing pressure, foundations should be at least 14 inches wide. Footing embedment should be as required by the Oregon Structural Specialty Code.

The recommended allowable bearing pressure applies to the total of dead plus long-term live loads. The allowable bearing pressure may be increased by a factor of 1/3 for short-term wind or seismic loads.

Differential and total settlement of footings is anticipated to be less than ½ inch and 1-inch under static conditions, respectively.

SLAB-ON-GRADE FLOORS

Satisfactory subgrade support for lightly loaded building floor slabs can be obtained on the undisturbed native soil or on engineered structural fill. A subgrade modulus of 100 pounds per cubic inch may be used to design floor slabs.

A minimum 4-inch-thick layer of free draining fill should be placed and compacted over the prepared subgrade to assist as a capillary break and blanket drain. The free draining fill layer may be capped with a 1- to 2-inch-thick layer of clean ¾ inch minus crushed rock that contains no more than 5 percent fines.

A vapor retarder manufactured for use beneath floor slabs should be installed above the free draining fill in inhabited spaces and spaces that will receive floor coverings. Careful attention should be made during construction to prevent perforating the retarder and to seal edges and utility penetrations. We recommend following ACI 302.1, Chapter 3 with regard to installing a vapor retarder.

RETAINING WALLS & EMBEDDED BUILDING WALLS

The following recommendations assume that the walls are less than 12 feet in height, backfill extends a distance behind the wall equal to the wall height, and that the backfill is well drained and meets the requirements detailed above for imported granular material. Reevaluation of our recommendations will be required if retaining walls vary from these assumptions.

In general, cantilever retaining walls yield under lateral loads and should be designed with active lateral earth pressures. Restrained walls, such as embedded building walls and vaults should be designed to withstand at-rest lateral earth pressures. We recommend using the lateral earth pressures shown in Table 2. The loads are provided as equivalent fluid density (G). Diagrams showing use of the lateral earth pressures in design calculations are provided in Figure 3.

TABLE 2 – EQUIVALENT FLUID DENSITY (G) ACTING ON RETAINING WALLS

WALL TYPE	BACKFILL CONDITION	BACKFILL COMPONENT (PCF)	SURCHARGE COMPONENT (PSF)	SEISMIC COMPONENT (PCF)
YIELDING WALL	FLAT	30	80	15
	2H:1V	45		28
NON-YIELDING WALL	FLAT	50	120	15
	2H:1V	70		28

Static lateral earth pressures acting on a retaining wall should be increased to account for surcharge loadings resulting from any traffic, construction equipment, material stockpiles, or structures located within a horizontal distance equal to the wall height. We have included lateral earth pressures for surcharge loads up to 250 psf placed as a distributed load within the distance H from the wall face.

Retaining wall drains should consist of a perforated drainpipe embedded in a minimum 1-foot-wide zone of free draining fill that is wrapped 360 degrees around by a geotextile filter that overlaps a minimum of 6 inches. The geotextile filter should be placed between the granular materials and the native soil to prevent movement of fines into the clean granular material. The geotextile filter should be a non-woven fabric with an apparent opening size between the U.S. Standard No. 70 and No. 100 Sieve sizes and a water permittivity of greater than 1.5 sec^{-1}.

Backfill for retaining walls should extend a horizontal distance of H/2 from the back of wall, where H is the embedded height, and compacted as recommended for structural fill, except for backfill placed immediately adjacent to walls. To reduce pressure on walls, backfill located within a horizontal distance of 3 feet from retaining walls should be compacted to approximately 90 percent of the maximum dry density, as determined by ASTM D698, and should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as a jumping jack or vibratory plate compactor).

LATERAL RESISTANCE

Lateral loads of buildings and retaining walls can be resisted by passive earth pressure on the sides of footings or by friction on the base of the footings but not both. We recommend using the equivalent fluid pressures and coefficients of friction provided in Table 3.

TABLE 3 – LATERAL RESISTANCE FACTORS

SOIL TYPE	EQUIVALENT FLUID PRESSURE (γ – PCF)	FRICTION COEFFICIENT (μ)
ON-SITE SILT	300	0.35
IMPORTED CRUSHED ROCK	800	0.45

In order to develop the tabulated capacity for passive resistance using on-site silt, concrete must be placed directly against the walls of the footing excavations. When using the value for imported crushed rock, the rock should extend a minimum horizontal distance equal to half the footing

embedment and should be compacted to not less than 95 percent of the dry density as determined by ASTM D698. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

SITE DRAINAGE

Foundation and crawl space drainage should be sloped to drain to a sump or low point drain outlet. Water should not be allowed to pond within crawl spaces.

Roof drains should be connected to a tightline drainpipe leading to storm drain outlet facilities. Pavement surfaces and open space areas should be sloped such that surface water runoff is collected and routed to suitable discharge points. Ground surfaces adjacent to buildings should be sloped to drain away from the buildings.

ASPHALT PAVEMENT

The pavement subgrade should be prepared in accordance with the previously described recommendations described in the "Construction Considerations", and "Structural Fill" sections of this report.

We recommend using the minimum pavement section specified by the City of Sherwood as shown in Table 4 which includes thicknesses for both wet and dry weather construction.

TABLE 4: ACC PAVEMENT SECTION THICKNESSES

CONSTRUCTION CONDITION	ACC THICKNESS (IN)	AGGREGATE BASE (IN)	COMPACTED SUBGRADE (IN)
DRY WEATHER	4 (2+2)	10 (2 + 8)	12
WET WEATHER	4 (2+2)	13 (2 + 11)	0

The City of Sherwood requires the upper 12-inch thickness of subgrade be improved by compaction to not less than 95 percent of the maximum density as determined by AASHTO T-99. When it is not possible to compact subgrade soil, primarily due to wet weather conditions, the value of subgrade stiffness added by improvement may be substituted with additional crushed rock base. As shown in Table 4, pavement subgrade preparation when the subgrade cannot be improved by compaction will required an additional 3inches of crushed rock base.

The aggregate base should conform to Section 02630 of the Standard Specification for Highway Construction, Oregon Highway Specifications.

Aggregate subbase base should be placed in one lift and compacted to not less than 90 percent of the maximum dry density as determined by AASHTO T-99. Aggregate base should be compacted to not less than 95 percent of the maximum. A separation fabric is required between the silt subgrade and the aggregate subbase. Aggregate base contaminated with soil during construction should be removed and replaced before paving.

The AC pavement should conform to Section 00744 of the specifications. We recommend half inch dense graded Hot Mix Asphalt Concrete for Design Level 2 using Performance Grade Asphalt PG-70-22.

Pavement construction in wet weather conditions may require additional base rock over and above the minimum shown in Table 4.

ADDITIONAL SERVICES

Because the future performance and integrity of the structural elements will depend largely on proper site preparation, drainage, fill placement, and construction procedures, monitoring and testing (geotechnical special inspection) by experienced geotechnical personnel should be considered an integral part of the design and construction process. Consequently, we recommend that GCN be retained to provide the following post-investigation services:

- Review construction plans and specifications to verify that our design criteria presented in this report have been properly integrated into the design.
- Attend a pre-construction conference with the design team and contractor to discuss geotechnical related construction issues.
- Observe site preparation before placement of fill.
- Observe placement and conduct density testing of structural fill.
- Conduct density testing of underground utility backfill.
- Observe proof rolling of pavement and curb line base rock and compaction of asphalt pavement as it is placed.
- Observe footing subgrade before footings are constructed in order to verify the soil conditions.
- Prepare a post-construction letter-of-compliance summarizing our field observations, inspections, and test results.

LIMITATIONS

This report was prepared for the exclusive use of Riverside Homes, LLC and members of the design team for this specific project. It should be made available to prospective contractors for information on the factual data only, and not as a warranty of subsurface conditions, such as those interpreted from the explorations and discussed in this report.

The recommendations contained in this report are preliminary, and are based on information derived through site reconnaissance, subsurface testing, and knowledge of the site area. Variation of conditions within the area and the presence of unsuitable materials are possible and cannot be determined until exposed during construction. Accordingly, GCN's recommendations can be finalized only through GCN's observation of the project's earthwork construction. GCN accepts no responsibility or liability for any party's reliance on GCN's preliminary recommendations.

Unanticipated soil conditions are commonly encountered and cannot fully be determined by exploratory methods. Such unexpected conditions frequently require that additional expenditures be made to attain properly constructed projects. Therefore, a contingency fund is recommended to accommodate the potential for extra costs.

Within the limitations of the scope of work, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at the time this report was prepared. We make no warranty, either express or implied.

♦ ♦ ♦

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,
GEO Consultants Northwest, Inc.

EXPIRES 06/30/2021

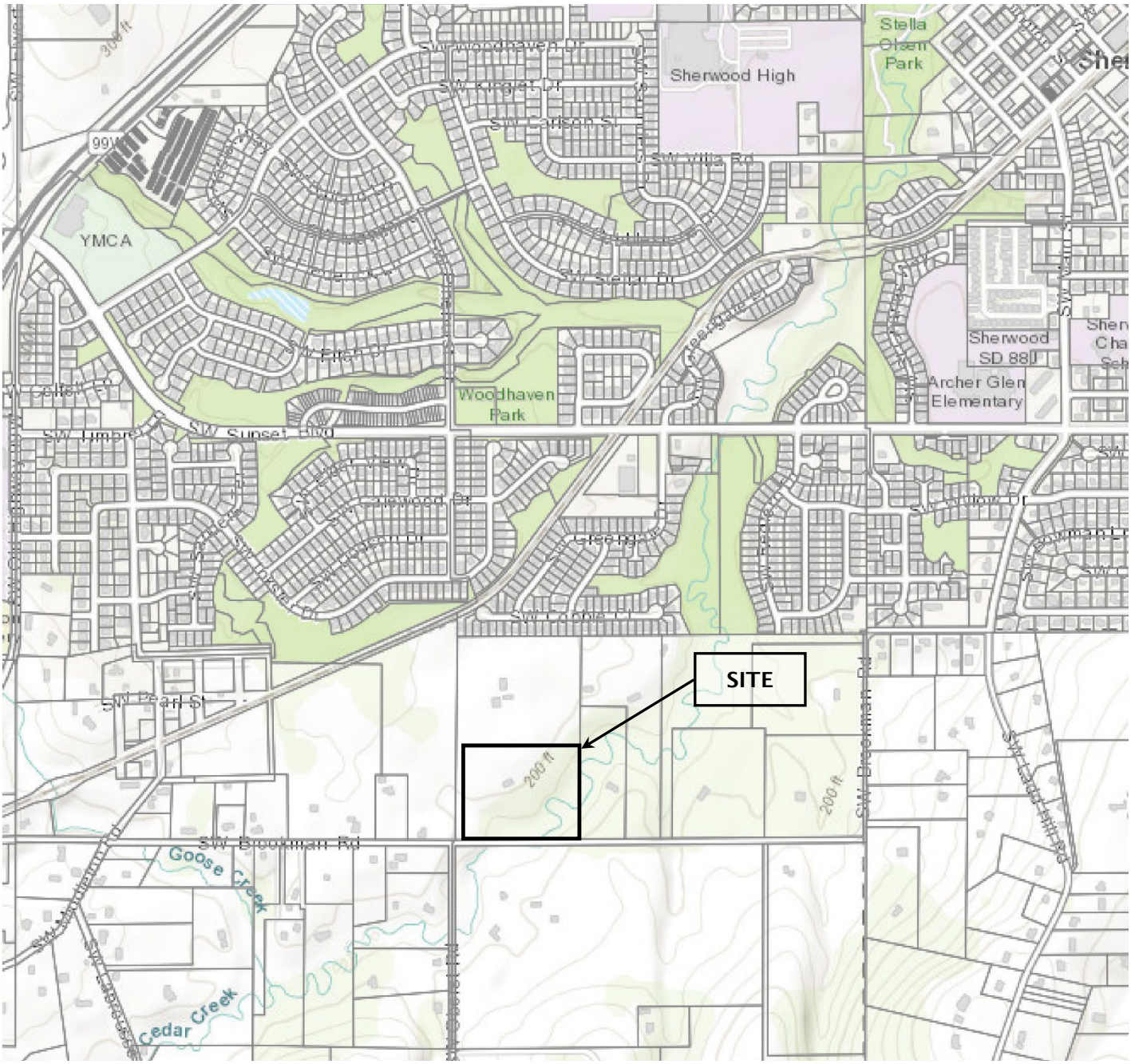
Brad L. Hupy
Managing Principal

Randall S. Goode, PE
Geotechnical Engineer

Figures: Figure 1 – Site Vicinity
Figure 2 – Preliminary Site Layout with Explorations
Figure 3 – Retaining Wall Pressures

Attachments: Attachment A – Field Exploration and Laboratory Testing

Exhibit A9



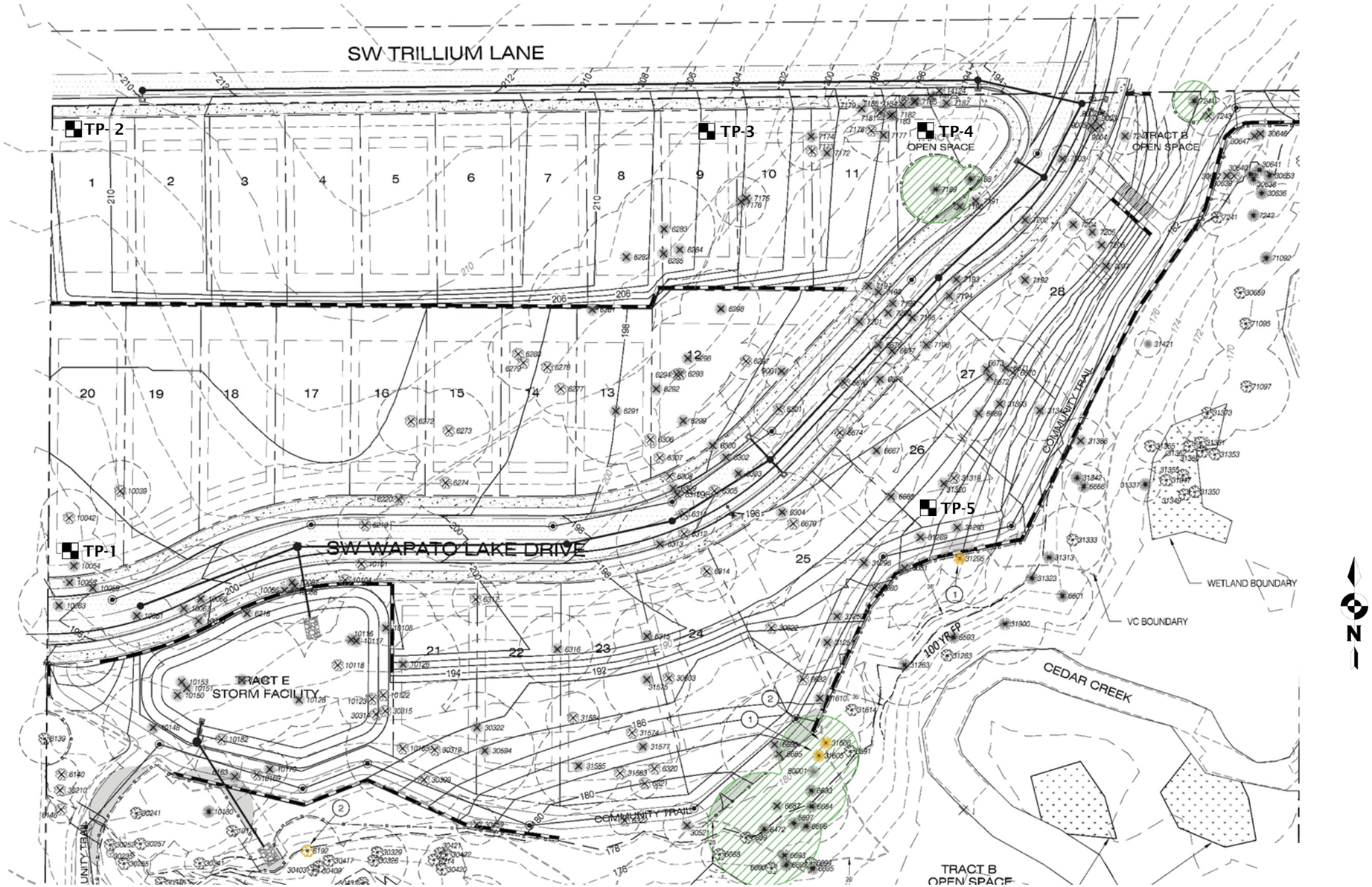
PROVIDED BY OREGONMETRO.GOV

17433 SW BROOKMAN ROAD

LAT 45.345N, LON 122.856 W; TOWNSHIP 3S RANGE 1W SECTION 6

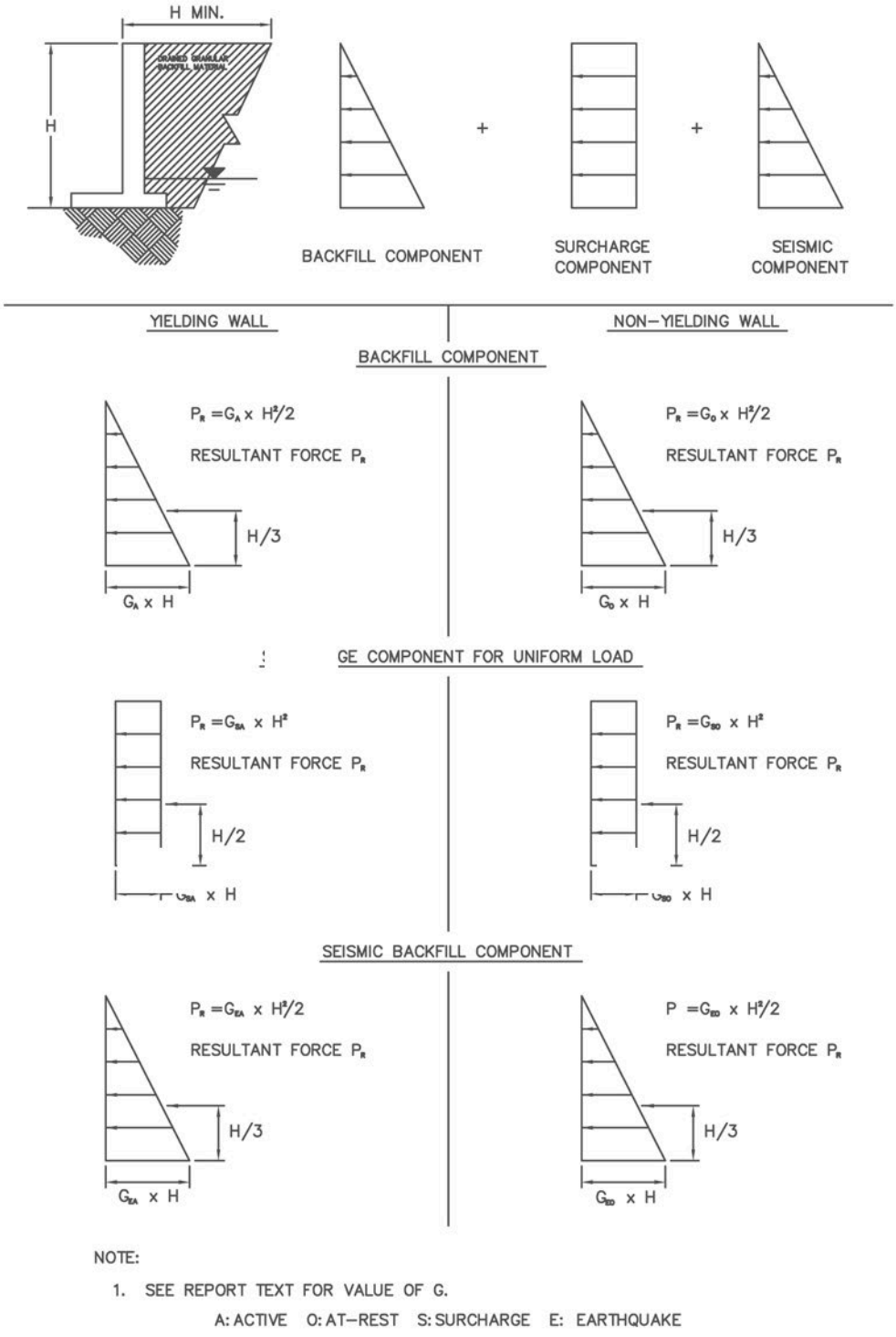
N

GEO CONSULTANTS NORTHWEST	PROJECT 1497	**RIVERSIDE HOMES CEDAR CREEK SUBDIVISION**	
2839 SE Milwaukie Avenue Portland, OR 97202	MAR 2020 Drawn By: blh	**SITE VICINITY**	**FIGURE 1**



TP-1 ■ TEST PITS EXCAVATED MARCH 23, 2020 – LOCATIONS APPROXIMATE
BASE DRAWING "PRELIMINARY GRADING AND EROSION CONTROL PLAN"
PREPARED BY PIONEERDESIGN GROUP, DATED DECEMBER 6, 2019

GEO CONSULTANTS NORTHWEST	PROJECT 1497	**RIVERSIDE HOMES CEDAR CREEK SUBDIVISION**
2839 SE Milwaukie Avenue Portland, OR 97202	MAR 2020	**SITE LAYOUT AND EXPLORATIONS** / **FIGURE #**
	Drawn By: blh	



NOTE:

1. SEE REPORT TEXT FOR VALUE OF G.

A: ACTIVE O: AT-REST S: SURCHARGE E: EARTHQUAKE

GEO CONSULTANTS NORTHWEST	PROJECT 1497	**RIVERSIDE HOMES CEDAR CREEK SUBDIVISION**	
2839 SE Milwaukie Avenue Portland, OR 97202	MAR 2020	**RETAINING WALL PRESSURES**	**FIGURE 3**
	Drawn By: blh		

ATTACHMENT A

FIELD EXPLORATION PROCEDURES

LABORATORY TESTING PROCEDURES

KEY TO BORING AND TEST PIT LOGS

TEST PIT LOGS

FIELD EXPLORATION PROCEDURES

GENERAL

Subsurface conditions were explored on March 23, 2020 using shallow test pits with a rubber-tired backhoe owned and operated by Dan Fisher Excavation of Forest Grove, Oregon. A member of GCN's geotechnical staff observed subsurface explorations to record the soil, rock, and groundwater conditions and to obtain soil samples for laboratory testing.

SOIL SAMPLING

Representative grab samples of the soil observed in the explorations were obtained from the test pit walls and/or base using the excavator bucket. Relatively undisturbed soil samples were obtained using a standard Shelby tube in general accordance with guidelines presented in ASTM D 1587, the Standard Practice for Thin-walled Tube Sampling of Soils. Samples obtained in the exploration were sealed in airtight, plastic bags or the Shelby tubes to retain moisture and returned to our laboratory for additional examination and testing. The test pits were loosely backfilled.

FIELD CLASSIFICATION

Soil samples were initially classified visually in the field. Consistency, color, relative moisture, degree of plasticity, peculiar odors, and other distinguishing characteristics of the soil samples were noted. The terminology used is described in the key and glossary that follow.

POCKET PENETROMETER TESTING

The undrained shear strength of fine-grained soil (silt and clay) was estimated with a pocket penetrometer applied to the sidewalls of the test pits. A pocket penetrometer is a hand-held device that indicates undrained compressive strength in tons per square foot. The test method is approximate and applicable only to fine-grained soil.

SUMMARY EXPLORATION LOGS

Results from the test pits are show in the summary exploration logs. The left-hand portion of a log provides our interpretation of the soil encountered, sample depths, and groundwater information. The right-hand, graphic portion of a log shows the results of pocket penetrometer and laboratory testing. Soil descriptions and interfaces between soil types shown in summary logs are interpretive, and actual transitions may be gradual.

LABORATORY TESTING PROCEDURES

Soil samples obtained during field explorations are examined in our laboratory, and representative samples may be selected for further testing. The testing program included visual-manual classification and natural moisture content.

VISUAL-MANUAL CLASSIFICATION

Soil samples are classified in general accordance with guidelines presented in ASTM D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*. The physical characteristics of the samples are noted, and the field classifications are modified, where necessary, in accordance with ASTM terminology, though certain terminology that incorporates

current local engineering practice may be used. The term which best described the major portion of the sample is used to describe the soil type.

NATURAL MOISTURE CONTENT

Natural moisture content is determined in general accordance with guidelines presented in ASTM D2216, *Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*. The natural moisture content is the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of solid particles.

DRY UNIT WEIGHT (IN-PLACE DRY DENSITY)

Dry unit weight (in-place dry density) testing is performed in general accordance with guidelines presented in ASTM D2937, *Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method*. The dry unit weight is defined as the ratio of the dry weight of the soil sample to the volume of that sample. The dry unit weight typically is expressed in pounds per cubic foot.

BORING AND TEST PIT LOGS

DISTINCTION BETWEEN FIELD LOGS AND FINAL LOGS

A field log is prepared for exploration by our field representative. The log contains information concerning soil and groundwater encountered, sampling depths, sampler types used and identification of samples selected for laboratory analysis. The final logs presented in this report represent our interpretation of subsurface conditions based on the contents of the field logs, observations made during explorations, and the results of laboratory testing. Our recommendations are based on the contents of the final logs and the information contained therein, and not on the field logs.

SOIL CLASSIFICATION SYSTEM

Soil samples are classified in the field in general accordance with the United Soil Classification System (USCS) presented in ASTM D2488 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)." Final logs reflect field soil classifications and laboratory testing results. A summary of the USCS is provided on page 3. Classifications and sampling intervals are shown in the logs.

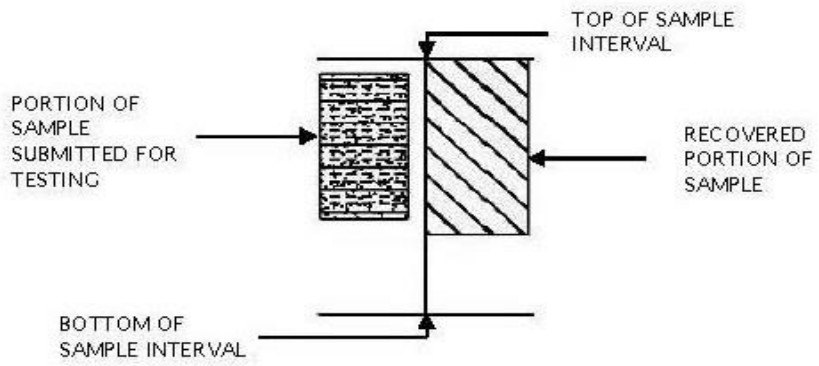
VARIATION OF SOIL BETWEEN EXPLORATIONS

The final logs and related information depict subsurface conditions only at the specific location and on the date(s) indicated. Those using the information contained herein should be aware that soil conditions at other locations or on other dates may differ.

TRANSITION BETWEEN SOIL AND ROCK CLASSIFICATIONS

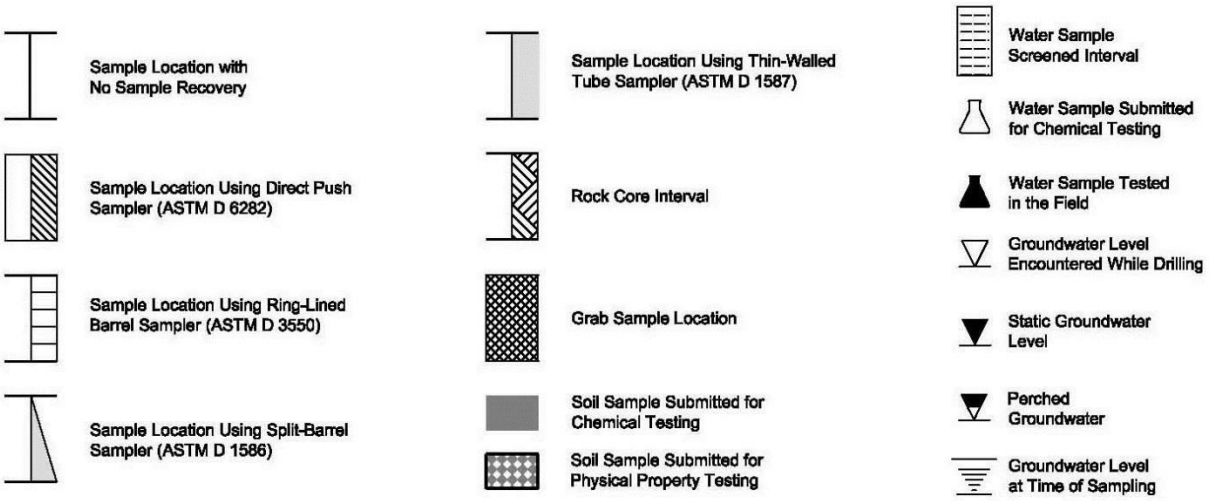
The lines designating the interface between soil, fill, or rock on the final logs and on the subsurface profiles presented in the report are determined by interpolation and are, therefore, approximate. The transition between the materials may be abrupt or gradual. Only at specific exploration locations should profiles be considered as reasonably accurate and then only to the degree implied by the notes.

BORING LOG SAMPLES



GEO CONSULTANTS NORTHWEST	2019	KEY TO BORING AND TEST PIT LOGS	
2839 SE Milwaukie Avenue Portland, OR 97202	Drawn By: GCN	GENERAL INFORMATION	1/5

EXPLORATION LOG SYMBOLS



SOIL CHARACTER

Granular Soil		Cohesive Soil		
Density	Standard Penetration Test *	Consistency	Standard Penetration Test*	Unconfined Compressive Strength (tsf)
Very Loose	0 - 4	Very Soft	Less Than 2	Less Than 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.5
Medium Dense	10 - 30	Medium Stiff	4 - 8	0.50 - 1.0
Dense	30 - 50	Stiff	8 - 16	1.0 - 2.0
Very Dense	Greater Than 50	Very Stiff	16 - 32	2.0 - 4.0
Blows Required to Drive a Split-Barrel Sampler 12 inches		Hard	Greater Than 32	Greater Than 4.0

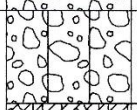
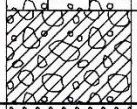
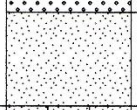
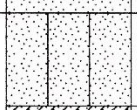
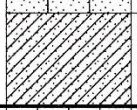
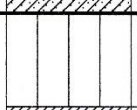
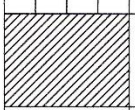
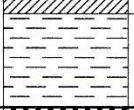
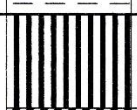
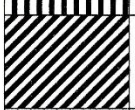
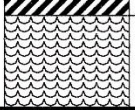
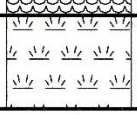
DEFINITIONS AND ABBREVIATIONS

AT	ATTERBERG LIMITS TEST	ND	NON DETECT	PPB	PARTS PER BILLION
BGS	BELOW GROUND SURFACE	NEG	NEGATIVE RESULT	PPM	PARTS PER MILLION
CO	CONSOLIDATION TEST	NS	NO VISIBLE SHEEN	PSF	POUNDS PER SQUARE FOOT
DS	DIRECT SHEAR TEST	OC	ORGANIC CONTENT	RS	SOIL RESISTIVITY TEST
DW	DRY UNIT WEIGHT	P	PUSHED SAMPLE	S4	SUDAN IV SOIL TEST
GS	MECHANICAL GRAIN SIZE TEST	P200	P200 FINES CONTENT TEST	SG	SPECIFIC GRAVITY TEST
HS	HEAVY SHEEN	PCF	POUNDS PER CUBIC FOOT	SPT	STD. PENETRATION TEST
HYD	HYDROMETER TEST	PH	SOIL pH	SS	SLIGHT SHEEN
MC	MOISTURE CONTENT	PID	PHOTOIONIZATION DETECTOR	TO	TOREVANE
MG/KG	MILLIGRAMS PER KILOGRAM	POS	POSITIVE RESULT	TSF	TONS PER SQUARE FOOT
MS	MODERATE SHEEN	PP	POCKET PENETROMETER	UV	ULTRAVIOLET LIGHT TEST

GRAIN SIZE DEFINITIONS			MINOR FRACTIONS IN FINE GRAINED SOIL		GROUNDWATER SEEPAGE	
SAND	FINE	No. 200 to No. 40	No Mention (CLAY, SILT)	< 15 percent	Slow	< 1 gpm
	MEDIUM	No. 40 to No. 10	With Sand, With Gravel	15 to 30 percent	Moderate	1-3 gpm
	COARSE	No. 10 to No. 4	Sandy, Gravelly	30 to 49 percent	Rapid	> 3 gpm
GRAVEL	FINE	No. 4 to 3/4-inch	FIELD MOISTURE OBSERVATION		CAVING	
	COARSE	3/4- to 3-inch	Dry	Absence of moisture, dusty, dry to touch	Minor	
COBBLE		3-inches to 12-inches	Moist	Damp but no visible water.	Moderate	
BOULDER		> 12-inches	Wet	Saturated, below groundwater	Severe	

GEO CONSULTANTS NORTHWEST	2019	KEY TO BORING AND TEST PIT LOGS	
2839 SE Milwaukie Avenue Portland, OR 97202	Drawn By: GCN	SYMBOLS AND ABBREVIATIONS	2/5

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS: GRAPH	SYMBOLS: LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

GEO CONSULTANTS NORTHWEST	2019	KEY TO BORING AND TEST PIT LOGS	
2839 SE Milwaukie Avenue Portland, OR 97202	Drawn By: GCN	SOIL CLASSIFICATION	3/5

ROCK CLASSIFICATION GUIDELINES

HARDNESS		DESCRIPTION
Very soft	(RH-0)	For plastic material only
Soft	(RH-1)	Carved or gouged with a knife
Moderate	(RH-2)	Scratched with a knife
Hard	(RH-3)	Difficult to scratch with a knife
Very hard	(RH-4)	Rock scratches metal; rock cannot be scratched with a knife

STRENGTH	DESCRIPTION
Plastic	Easily deformable with finger pressure
Friable	Crumbles by rubbing with fingers
Weak	Crumbles only under light hammer blows
Moderately Strong	Few heavy hammer blows before breaking
Strong	Withstands few heavy hammer blows and yields large fragments
Very Strong	Withstands many heavy hammer blows, yields dust and small fragments

WEATHERING	DESCRIPTION
Severe	Rock decomposed; thorough discoloration; all fractures extensively coated with clay, oxides, or carbonates.
Moderate	Intense localized discoloration of rock; fracture surfaces coated with weathering minerals.
Little	Slight and intermittent discoloration of rock; few stains on fracture surfaces.
Fresh	Rock unaffected by weathering

FRACTURING	FRACTURE SPACING
Crushed	Less than 5/8 inch to contains clay
Highly Fractured	5/8 inch to 2 inches
Closely Fractured	2 inches to 6 inches
Moderately fractured	6 inches to 1 foot
Little Fractured	1 foot to 4 feet
Massive	Greater than 4 feet

JOINT SPACING	DESCRIPTION
Papery	Less than 1/8 inch
Shaley or Platey	1/8 inch to 5/8 inch
Very Close	5/8 inch to 3 inches
Close	3 inches to 2 feet
Blocky	2 to 4 feet
Massive	Greater than 4 feet

GLOSSARY

Alluvial – Made up of or found in the materials that are left by the water of rivers, streams, floods, etc.

Bearing pressure – The total stress transferred from the structure to the foundation, then to the soil below the foundation.

Bulk density (Soil density) – The total mass of water and soil particles contained in a unit volume of soil: lb/ft³.

Coefficient of active earth pressure – The ratio of the minimum horizontal effective stress of a soil to the vertical effective stress at a single point in a soil mass retained by a retaining wall as the wall moves away from the soil.

Cohesive soil – Clay type soil with angles of internal friction close to zero. Cohesion is the force that holds together molecules or like-particles within a substance.

Colluvium – A loose accumulation of soil and rock fragments deposited through the action of gravity, such as erosion and soil creep.

Differential settlement – The vertical displacement due to settlement of one point in a foundation with respect to another point of the foundation.

Engineered fill – Soil used as fill, such as retaining wall backfill, foundation support, dams, slopes, etc., that are to be placed in accordance with engineered specifications. These specifications may delineate soil grain-size, plasticity, moisture, compaction, angularity, and many other index properties depending on the application.

Excess pore pressure – That increment of pore water pressures greater than hydro-static values, produced by consolidation stresses in compressible materials or by shear strain; excess pore pressure is dissipated during consolidation.

Factor of safety – The ratio of a limiting value of a quantity to the design value of that quantity.

Fines – Material by weight passing the U.S. Standard No. 200 Sieve by washed analysis.

Fluvial – Produced by the action of rivers or streams.

Homogenous soil – A mass of soil where the soil is of one characteristic having the same engineering and index properties.

In situ – Undisturbed, existing field conditions.

Lacustrine – Of a lake, e.g., the depositional environment of a lake.

Liquefaction – The sudden, large decrease of shear strength of cohesionless soil caused by collapse of the soil structure, produced by small shear strains associated with sudden but temporary increase of pore water pressure. Usually a problem in submerged, poorly graded sands within the upper 50 feet of subgrade in earthquake-prone environments.

Maximum dry density – A soil property obtained in the laboratory from a Proctor test. Density of soil at 100% compaction.

Overbank deposit – Sediment that has been deposited on the floodplain of a river or stream by flood waters that have broken through or overtopped the banks.

Permeability – A measure of continuous voids in a soil. The property which allows the flow of water through a soil. See also coefficient of permeability.

Porosity (Pore space) – The ratio of the volume of voids to the total volume: unitless or expressed as a percentage.

Residual soil – Soil that has been formed in place by rock decay.

Shear strength – The maximum shear stress which a soil can sustain under a given set of conditions. For clay, shear strength = cohesion. For sand, shear strength = the product of effective stress and the tangent of the angle of internal friction.

Surcharge – An additional force applied at the exposed upper surface of a restrained soil.

Tuff – An igneous rock (from molten material) that forms from the debris ejected by an explosive volcanic eruption.

Unit weight – The ratio of the total weight of soil to the total volume of a unit of soil: lb/ft³.

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	WATER CONTENT (%)	GROUND WATER	FIELD TESTING	TESTING AND LABORATORY DATA
0		ML	Soft, brown SILT with trace fine sand (forest topsoil); moist. (2-inch heavily rooted zone at the ground surface)					
			Stiff, brown SILT with trace fine sand; moist.	1	38		1.5	
			Becomes gray mottled brown at 3 feet.				1.0	
				2	31		1.5	
5		ML						
			Becomes gray at 8 feet.					
10				3	36			
			End at 11 feet in stiff silt.					
			No caving and no groundwater to the depth explored.					
15								
20								

Station:		**LOGGED BY:**	Brad Hupy
Approximate Elevation:	200	**Excavator:**	CASE Backhoe
Excavation Started:	3/23/2020	**Excavation Completed:**	3/23/2020

1497 Riverside - Cedar Creek

GEO Consultants Northwest
2839 SE Milwaukie Avenue
Portland OR 97202
Tel 503-616-9425
Fax 1-866-293-9037

GEO CONSULTANTS NORTHWEST

LOG OF TEST PIT
TP-1

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	WATER CONTENT (%)	GROUND WATER	FIELD TESTING	TESTING AND LABORATORY DATA
0		ML	Soft, brown SILT with trace fine sand (forest topsoil); moist. (2-inch heavily rooted zone at the ground surface)	1	35			DW=75pcf
		ML			28			DW=81pcf
					28			DW=87pcf
					26			DW=86pcf
			Very stiff, gray motled brown SILT with trace fine sand; moist.	2	35		2.5	
				3	36		5.0	
							5.0	
5								
10						▼		
			End at 11 1/2 feet in very stiff silt. No caving to the depth explored. Slow groundwater seepage at 11 feet.					
15								
20								

Station:		**LOGGED BY:**	Brad Hupy
Approximate Elevation:	209	**Excavator:**	CASE Backhoe
Excavation Started:	3/23/2020	**Excavation Completed:**	3/23/2020

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GEO CONSULTANTS NORTHWEST

LOG OF TEST PIT
TP-2

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	WATER CONTENT (%)	GROUND WATER	FIELD TESTING	TESTING AND LABORATORY DATA
0			Soft, brown SILT (forest topsoil); moist. (2-inch heavily rooted zone at the ground surface)					
			Stiff, brown SILT with trace fine sand; moist.	1	28		1.5	
							2.0	
				2	37		2.5	
5		ML					3.0	
		ML						
10			Becomes gray at 10 feet.					
				3	34			
			End at 11 1/2 feet in stiff silt. No caving and no groundwater to the depth explored.					
15								
20								

Station:		**LOGGED BY:**	Brad Hupy
Approximate Elevation:	204	**Excavator:**	CASE Backhoe
Excavation Started:	3/23/2020	**Excavation Completed:**	3/23/2020

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GEO CONSULTANTS NORTHWEST

LOG OF TEST PIT
TP-3

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	WATER CONTENT (%)	GROUND WATER	FIELD TESTING	TESTING AND LABORATORY DATA
0		ML	Medium stiff, brown SILT with trace fine sand (forest topsoil); moist. (2-inch heavily rooted zone at the ground surface)					
			Very stiff, brown SILT with trace fine sand; moist.				1.0	
				2	25		2.5	
							4.0	
				3	30		4.0	
5		ML						
10			Becomes gray at 10 feet.					
				1	34			
			End at 11 feet in very stiff silt.					
			No caving and no groundwater to the depth explored.					
15								
20								

Station:		**LOGGED BY:**	Brad Hupy
Approximate Elevation:	194	**Excavator:**	CASE Backhoe
Excavation Started:	3/23/2020	**Excavation Completed:**	3/23/2020

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GEO CONSULTANTS NORTHWEST

LOG OF TEST PIT
TP-4

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	WATER CONTENT (%)	GROUND WATER	FIELD TESTING	TESTING AND LABORATORY DATA
0		ML	Soft, brown SILT with trace fine sand (forest topsoil); moist. (2-inch heavily rooted zone at the ground surface)				2.5	
			Very stiff, brown SILT with trace fine sand; moist.	1	26		3.0	
							3.5	
				2	35		4.0	
5		ML						
				3	40			
10			End at 9 feet in very stiff silt. No caving and no groundwater to the depth explored.					
15								
20								

Station:		**LOGGED BY:**	Brad Hupy
Approximate Elevation:	188	**Excavator:**	CASE Backhoe
Excavation Started:	3/23/2020	**Excavation Completed:**	3/23/2020

1497 Riverside - Cedar Creek

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2839 SE Milwaukie Avenue
Portland OR 97202
Tel 503-616-9425
Fax 1-866-293-9037

GEO CONSULTANTS NORTHWEST

LOG OF TEST PIT
TP-5

EXPERIENCED • INNOVATIVE • COMMITTED

PIONEER DESIGN GROUP

Preliminary Storm Drainage Report

Riverside at Cedar Creek

Washington County, Oregon

Applicant:
Riverside Homes, LLC
17933 NW Evergreen Place
Suite 370
Beaverton, Oregon 97006
503.645.0908

Engineer:
Pioneer Design Group, Inc.
9020 SW Washington Sq. Rd.
Suite 170
Portland, Oregon 97223
503.643.8286

Sherwood Casefile No:

REGISTERED PROFESSIONAL ENGINEER
78484PE
OREGON
JAN. 09, 2007
GEOFF A. MIHALKO

VALID THROUGH 12–31–20

Date: February 8, 2020
Prepared by: Cory Schermesser, EIT
Reviewed by: Geoff A. Mihalko, PE
PDG Job No. 131-025

TABLE OF CONTENTS

TECHNICAL APPENDIX

1.0 INTRODUCTION

This report represents the preliminary storm drainage and storm water analysis for the Riverside at Cedar Creek project. The basis of this report is to comply with City of Sherwood, Clean Water Services (CWS), and the State of Oregon's regulations and engineering standards as well as the latest edition of the Oregon Plumbing Specialty Code (OPSC). Compiled in this report are the design criteria for the site, the hydrologic methodology, and the preliminary drainage analysis.

2.0 SITE DESCRIPTION AND LOCATION

The proposed project is a 28-Lot Single-Family Detached Residential Subdivision located on the north side of SW Brookman Road and approximately 50 feet east of its intersection with SW Oberst Rd in the City of Sherwood. The subject site is approximately 10.47 acres and is specifically identified as Tax Lot 104 of Tax Map 3S1 06. The property is zoned Medium Density Residential Low (MDRL).

3.0 EXISTING CONDITIONS

The site currently contains a single-family detached home, plus associated residential accessory structures and outbuildings. The north end of the site is used primarily as pasture for livestock, storage for landscaping materials and a small horse corral. The southern end of the site is forested with a riparian forested community along Cedar Creek and a short tributary flowing north from SW Brookman Road to a confluence with Cedar Creek in the middle of the site. The plan for the site includes removal of all existing structures to facilitate construction of the development.

3.1 Site Topography

The site topography slopes from the north and south ends to the middle of site along the Cedar Creek riparian corridor. The forested slopes from Cedar Creek and the small tributary in south end range from 20 percent to 42 percent. The topography at the north end is generally flat within the pasture areas with a small depression in the northwest corner. The site currently drains to Cedar Creek running through the center of the project which conveys storm water easterly and then north eventually releasing into the Tualatin River.

3.2 Soil Type

The predominant soils mapped on site with a corresponding hydrologic soil group (HSG) designation are listed below and shown on the attached Natural Resources Conservation Service (NRCS) soil survey for Washington County.

Table 3.2 – NRCS SOIL GROUPS		
Map Unit Name	**Map Unit Symbol**	**HSG Rating**
Aloha Silt Loam	1	C/D
Wapato Silty Clay Loam	43	C/D
Willamette Silt Loam, 3 to 7 percent slopes	44B	B
Woodburn Silt Loam, 3 to 7 percent slopes	45B	C
Verboort Silt Loam, 0 to 3 percent slopes	2027A	D

3.3 Runoff Curve Numbers

Based on the various soil and cover types existing throughout the site, a composite Predeveloped runoff curve number (RCN) of 70 will be used for pervious areas. While Table 3.2 above shows all of the soils on-site, we are only proposing to develop a portion of the site due to the riparian corridor, therefore only those soils located in our developed area have been used in our analysis. Those two soils are Map Unit 1 – Aloha Silt Loam with a hydrologic soil group rating of 'C', and Map Unit 45B - Woodburn Silt Loam at 3 to 7 percent slopes, also with a hydrologic soil group rating of 'C'.

Developed pervious areas represent a runoff curve number (RCN) of 79 for "Open Space" cover type in fair hydrologic condition, relative to HSG 'C'. A runoff curve number of 98 will be used for all predeveloped and developed impervious areas (refer to the *Runoff Curve Numbers (TR-55)* and *NRCS Soil Survey*).

Table 3.3 – RUNOFF CURVE NUMBERS		
Land Description	**Existing RCN**	**Proposed RCN**
Open Space, Good Hydrologic Condition	-	79
Meadows & Woods, Good Hydrologic Condition	70	-
Impervious	98	98

4.0 PROPOSED IMPROVEMENTS

Impervious surfaces will be created as a result of public and private streets and sidewalks along with the eventual homes and driveways. The proposed development will create approximately 114,406 square feet (2.63 acres) of impervious area, which comprise 47.9% of the proposed developed area. Public utilities will be extended throughout the site for use by the proposed lots.

Flows generated by the site will be conveyed to a storm water facility which will outfall to Cedar Creek. All proposed improvements are to be elevated out of the existing 100-year flood plain.

4.1 Hydrology/Hydraulic Methodology

Using the Santa Barbara Urban Hydrograph (SBUH) runoff method based on a Type 1A rainfall distribution, the site has been analyzed to determine the proposed peak runoff rates for the water quality storm, 2, 10, and 25-year 24-hour storm events. The SBUH method uses runoff curve numbers in conjunction with the property's hydrologic soil group to model the site's permeability.

A pre-developed time of concentration of 23.51 minutes and a developed time of concentration of 11.6 minutes were calculated using the methodology outlined in the TR-55 technical manual *(refer to the Time of Concentration Calculations and Exhibits)*.

Rainfall depths for all storm events used in the calculations and design of the proposed storm drainage system are found in latest edition of Clean Water Services (CWS) Design and Construction Standards and as shown below.

Table 4.1 – 24-Hour Rainfall Depths (CWS)

Recurrence Interval, Years	2	5	10	25	100
24-Hour Depths, Inches	2.50	3.10	3.45	3.90	4.50

4.2 Water Quality

As required by Clean Water Services, we will treat runoff from any new impervious surface created as a result of the proposed development. All water quality structures shall be designed to treat storm water generated by 0.36 inches of precipitation falling in 4 hours with an average storm return period of 96 hours. The water quality facilities, in conjunction with the sumped catch basins and a water quality manhole will remove a minimum of 65% of the Total Phosphorous (TP) from the storm water runoff.

Based on the CWS R&O 19-22 Section 4.08.1.d.1, the code requires treating all new impervious surface plus three times the modified impervious surface up to the total existing impervious surface. In this case we will be removing and replacing all of the existing impervious area on site, therefore we will be treating all of our new impervious surface as well as the total existing removed and replaced impervious surface on site.

Stormwater runoff from Riverside at Cedar Creek will convey stormwater to a proposed water quality pond designed to accommodate water quality treatment for the proposed subdivision per the water quality pond design below:

Table 4.2 - WATER QUALITY POND
• *Minimum Pond Volume =3,437 ft^3*
• *Water Quality Depth = 0.45 ft.*
• *Depth = 3.0 ft. max.*
• *Side Slopes = 3:1*
• *Design Inflow = 0.24 ft/s*

4.3 Detention

Per CWS R&O 19-22 Section 4.08.6.c, we are proposing to meet the hydromodification approach by matching (or releasing less than) the developed to ½ the 2-year pre-developed runoff rate, and then matching (or releasing less than) the consecutive 5 and 10-year storm events. The following table summarizes the developed, pre-developed, and released discharges and pond stage storage elevations:

Table 4.3 – APRIL CREST SUBDIVISION – COMBINED HYDROGRAPH (R&O 19-22)

Storm Event (yr)	Developed Discharge (cfs)	Pre-Developed Discharge (cfs)	Actual Released Discharge (cfs)	Water Surface Elevation in Pond (ft.)
2	1.67	0.085 (1/2–2YR)	0.08	188.77
5	2.39	0.41	0.41	188.91
10	2.83	0.61	0.53	188.93

See *Appendix 'A' – Stormwater Detention Facility Report* for complete analysis.

4.4 Conveyance

The conveyance system for the site consists of an underground pipe system with sumped and flow through catch basins. Stormwater will be conveyed through the site via a series of pipes and routed through the stormwater facility before being discharged into Cedar Creek.

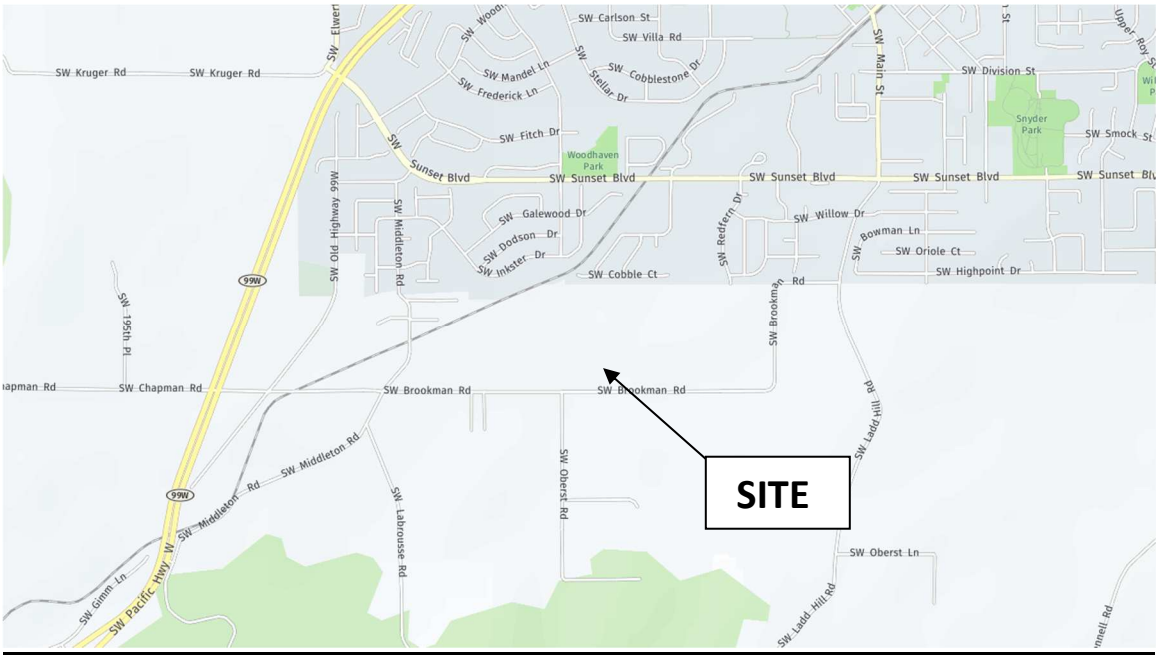
A water quality manhole has been installed upstream of the facility to provide the required stormwater pretreatment. As per the requirements of Clean Water Services, the drainage system has been designed to convey the 25-year storm event.

Using a Manning's 'n' value of 0.013, the minimum slope required to convey the 25-year storm event for the site in n 18" PVC pipe is 0.0050 ft./ft. (refer to the *Stormwater Conveyance Calculations).*

5.0 CONCLUSION

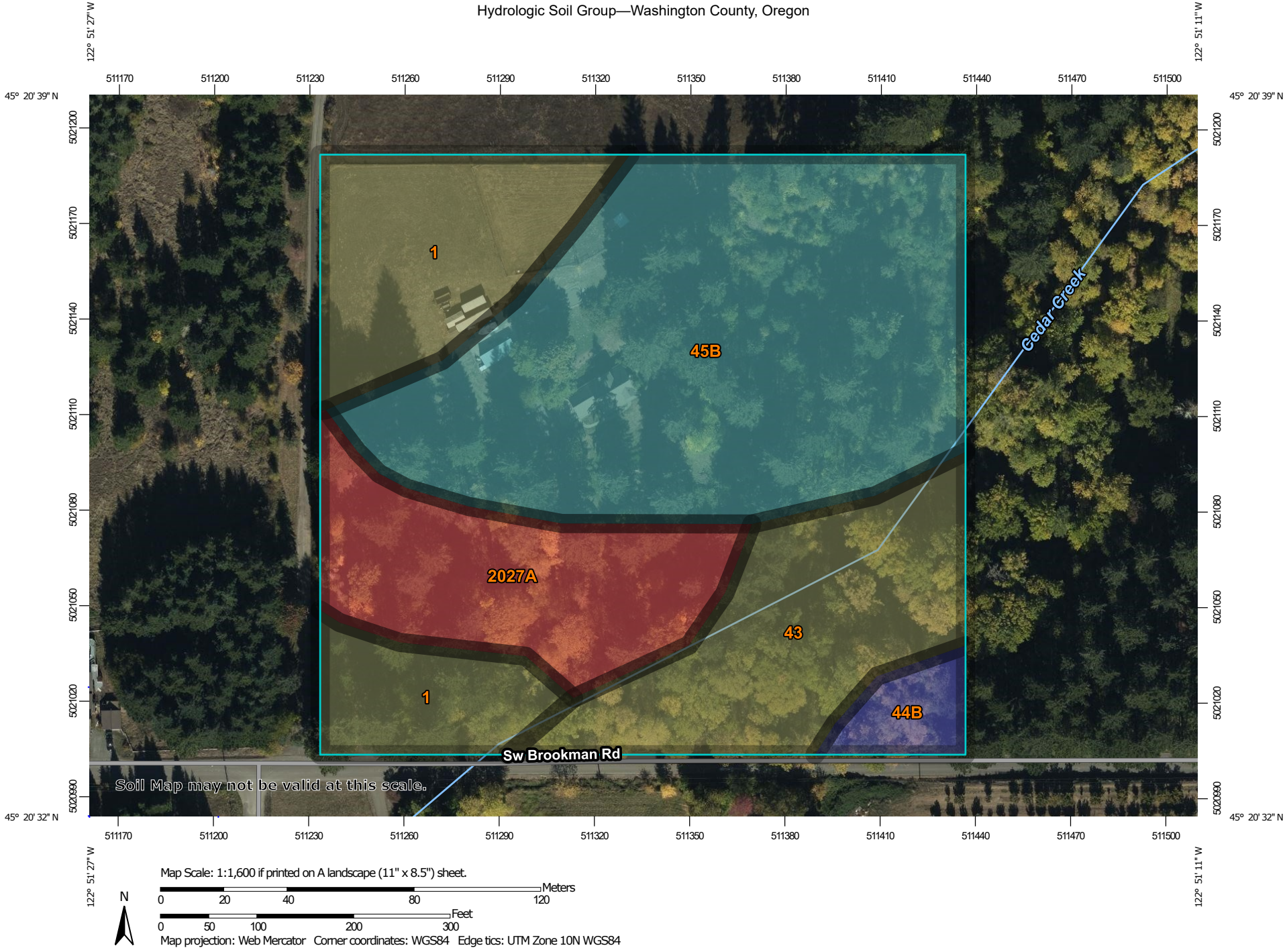
Based on the supporting stormwater calculations and attached analysis, it is the opinion of Pioneer Design Group that the development of the Riverside at Cedar Creek Subdivision project will not adversely affect the existing downstream drainage system or adjacent property owners. Water quality treatment for all new impervious areas created by the development will be treated by an onsite water quality pond and water quantity control is proposed meeting CWS's hydromodification approach. Therefore, all the requirements associated with the City of Sherwood, Clean Water Services' design and construction standards and Washington County have been met for this project.

7.0 VICINITY MAP



ENGINEERING CALCULATONS AND SPREADSHEETS

Hydrologic Soil Group—Washington County, Oregon



Map Scale: 1:1,600 if printed on A landscape (11" x 8.5") 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:
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: Washington County, Oregon
Survey Area Data: Version 17, Sep 10, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 19, 2018—Oct 20, 2018

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

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Aloha silt loam	C/D	1.8	19.3%
43	Wapato silty clay loam	C/D	1.6	17.1%
44B	Willamette silt loam, 3 to 7 percent slopes	B	0.3	2.8%
45B	Woodburn silt loam, 3 to 7 percent slopes	C	4.3	44.9%
2027A	Verboort silty clay loam, 0 to 3 percent slopes	D	1.5	15.9%
Totals for Area of Interest			**9.5**	**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

Exhibit A10

17495 SW BROOKMAN RD
TL 103 MAP 3S 1 6
DEED DOC. NO. 2017-040512

17117 SW BROOKMAN RD
TL 101 MAP 3S 1 6
DEED DOC. NO. 99109559

N89°16'37"E 749.98'

S00°31'38"W 602.48'

S89°17'18"W 749.99'

CHICKEN COOP

EXISTING STRUCTURES TO BE REMOVED

EXISTING BARN

EXISTING BARN

EXISTING HOUSE WITH ASSOCIATED FOUNDATION AND DECKING TO BE REMOVED

EXISTING HOME

EXISTING GRAVEL DRIVEWAY TO BE REMOVED

DEED DOCUMENT NO. 2010-058473

VC BOUNDARY

VC BOUNDARY

VC BOUNDARY

WETLAND BOUNDARY

WETLAND BOUNDARY

100 YR FP

100 YR FP

CEDAR CREEK

SW BROOKMAN ROAD

CULVERT IE=166.48'

CULVERT IE=165.62'

12" RCP IE=189.06'

20" CMP IE=188.29'

30" CMP IE=187.26'

12" RCP IE=191.05'

12" RCP IE=186.26'

12" RCP IE=182.68'

12" RCP IE=179.84'

12" RCP IE=172.98'

LEGEND

- RIGHT-OF-WAY LINE
- BOUNDARY LINE
- EXISTING LOT LINE
- CENTER LINE
- SD — STORM DRAINAGE LINE
- XSS — SANITARY SEWER LINE
- XW — WATER LINE
- XG — GAS LINE
- XCOM — COMMUNICATION LINE
- XE — UNDERGROUND POWER LINE
- XOH — OVERHEAD WIRE
- X — WOOD FENCE (AS NOTED)
- 201 — EXISTING 1' CONTOUR
- 200 — EXISTING 5' CONTOUR
- CONIFEROUS TREE (DBH)
- DECIDUOUS TREE (DBH)
- CATCH BASIN/DRAIN INLET
- STORM DITCH INLET
- STORM MANHOLE
- SANITARY MANHOLE
- WATER VALVE
- FIRE HYDRANT ASSEMBLY
- WATER METER
- GAS VALVE
- GAS METER
- STREET SIGN
- MAILBOX
- ELECTRIC PEDESTAL
- LIGHT POLE
- POWER POLE
- COMMUNICATION VAULT
- TELECOMMUNICATION PEDESTAL
- UTILITY EXTENSION
- FOUND SURVEY MONUMENT AS NOTED
- EXISTING CONCRETE
- EXISTING ASPHALT PAVEMENT
- EXISTING GRAVEL SURFACE
- EXISTING BUILDING FOOTPRINT
- EXISTING TREE TO BE REMOVED
- -1.0% EXISTING SLOPE DIRECTION

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

PIONEER DESIGN GROUP
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EXISTING CONDITIONS AND DEMOLITION PLAN

SW BROOKMAN RD
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	2/2020
Drawn by	BDH	Date	2/2020
Reviewed by	MLS	Date	2/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
PLANNING
Sheet
P2

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Exhibit A10

MIDDLEBROOK SUBDIVISION (BY OTHERS)

SW TRILLIUM LANE

MIDDLEBROOK SUBDIVISION (BY OTHERS)

SW WAPATO LAKE DR.

SW BROOKMAN ROAD

CEDAR CREEK

COMMUNITY TRAIL

TRACT A OPEN SPACE 3725 SF

TRACT B OPEN SPACE

TRACT C PVT 779 SF

TRACT D PVT 300 SF

TRACT E STORM FACILITY 13270 SF

TRACT B OPEN SPACE 202312 SF

TRACT F VISUAL CORRIDOR 1926 SF

TRACT G VIS. CORR. 594 SF

1 5645 SF | 2 5089 SF | 3 5127 SF | 4 5165 SF | 5 5203 SF | 6 5240 SF | 7 5278 SF | 8 5289 SF | 9 4835 SF | 10 4873 SF | 11 5286 SF

12 7943 SF | 13 4831 SF | 14 5038 SF | 15 5040 SF | 16 5040 SF | 17 5133 SF | 18 5622 SF | 19 6550 SF | 20 7201 SF

21 5766 SF | 22 6486 SF | 23 8135 SF | 24 7933 SF | 25 7953 SF | 26 4889 SF | 27 4722 SF | 28

12"SD | 18"SD | 8"SS | 8"W

100 YR FP

VC BOUNDARY

WETLAND BOUNDARY

LEGEND

- PROPOSED EASEMENT LINE
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- BOUNDARY LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED PAVEMENT
- PROPOSED STANDARD CURB
- PROPOSED STORM LINE & MANHOLE
- PROPOSED SANITARY LINE & MANHOLE
- PROPOSED 1" WATER SERVICE & METER
- PRELIMINARY STREET LIGHT LOCATIONS

SCALE 40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # ____

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PH: 503.643.8286 PH: 808.753.2276
WWW.PD-GRP.COM

PRELIMINARY COMPOSITE UTILITY PLAN

SW BROOKMAN RD
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	2/2020
Drawn by	BDH	Date	2/2020
Reviewed by	MLS	Date	2/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
PLANNING
Sheet
P10

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SOIL FEATURES FOR WASHINGTON COUNTY

Soil name and map symbol	Hydro-logic group	Flooding		
		Frequency	Duration	Months
Aloha:				
1	C	NONE	NONE	NONE
Amity:				
2	C	NONE	NONE	NONE
Astoria:				
3E, 3F	B	NONE	NONE	NONE
Briedwell:				
4B, 5B, 5C, 5D	B	NONE	NONE	NONE
Carlton:				
6B, 6C	B	NONE	NONE	NONE
Cascade:				
7B, 7C, 7D, 7E, 7F	C	NONE	NONE	NONE
Chehalem:				
8C	C	NONE	NONE	NONE
Chehalis:				
9, 10	B	COMMON	BRIEF	NOV-MAR
Cornelius:				
11B, 11C, 11D, 11E, 11F:				
Cornelius part	C	NONE	NONE	NONE
Kinton part	C	NONE	NONE	NONE
Cornelius Varient:				
12A, 12B, 12C	C	NONE	NONE	NONE
Cove:				
13, 14	D	COMMON	BRIEF	DEC-APR
Dayton:				
15	D	NONE	NONE	NONE
Delena:				
16C	D	NONE	NONE	NONE
Goble:				
17B, 17C, 17D, 17E, 18E, 18F	C	NONE	NONE	NONE
Helvetia:				
19B, 19C, 19D, 19E	C	NONE	NONE	NONE
Hembre:				
20E, 20F, 20G	B	NONE	NONE	NONE
Hillsboro:				
21A, 21B, 21C, 21D	B	NONE	NONE	NONE
Hubberly:				
22	D	NONE	NONE	NONE
Jory:				
23B, 23C, 23D, 23E, 23F	C	NONE	NONE	NONE
Kilchis:				
24G				
Kilchis part	C	NONE	NONE	NONE
Klickitat part	B	NONE	NONE	NONE

SOIL FEATURES FOR WASHINGTON COUNTY

Soil name and map symbol	Hydro-logic group	Flooding		
		Frequency	Duration	Months
Klickitat:				
25E, 25F, 25G	B	NONE	NONE	NONE
Knappa:				
26	B	NONE	NONE	NONE
Lablish:				
27	D	FREQUENT	VERY LONG	DEC - APR
Laurelwood:				
28B, 28C, 28D, 28E, 29E, 29F	B	NONE	NONE	NONE
McBee:				
30	B	FREQUENT	BRIEF	NOV - MAY
Melborne:				
31B, 31C, 31D, 31E, 31F	B	NONE	NONE	NONE
Melby:				
32C, 32D, 32E, 33E, 33F, 33G	C	NONE	NONE	NONE
Olyic:				
34C, 34D, 34E, 35E, 35F, 35G	B	NONE	NONE	NONE
Pervina:				
36C, 36D, 36E, 36F	C	NONE	NONE	NONE
Quatama:				
37A, 37B, 37C, 37D	C	NONE	NONE	NONE
Saum:				
38B, 38C, 38D, 38E, 38F	C	NONE	NONE	NONE
Tolke:				
39E, 39F	B	NONE	NONE	NONE
Udifluvents:				
40	B	FREQUENT	VERY LONG	NOV - APR
Verboot:				
42	D	FREQUENT	BRIEF	DEC - APR
Wapato:				
43	D	FREQUENT	BRIEF	DEC - APR
Willamette:				
44A, 44B, 44C, 44D	B	NONE	NONE	NONE
Woodburn:				
45A, 45B, 45C, 45D	C	NONE	NONE	NONE
Xerchrepts:				
46F				
Xerochrepts part	B	NONE	NONE	NONE
Haploxerolls part	C	NONE	NONE	NONE
47D				
Xerochrepts part	D	NONE	NONE	NONE
Rock outcrop part				

RUNOFF CURVE NUMBERS (TR55)

Table 2-2a: Runoff curve numbers for urban areas [1]

Cover description		CN for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover <50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover >75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]	77	86	91	94	
Idle lands (CNs are determined using cover types similar to those in table 2-2c)					

POST

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 hava 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.

RUNOFF CURVE NUMBERS (TR55)

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						
<50% ground cover or heavily grazed with no mulch.	Poor	68	79	86	89	
50% to 75% ground cover and not heavily grazed.	Fair	49	69	79	84	
>75% ground cover and lightly or only occasionally grazed.	Good	39	61	74	80	
Meadow -- continuous grass, protected from grazing and generally mowed for hay	--	30	58	71	78	PRE
Brush – weed-grass mixture with brush as the major element						
<50% ground cover	Poor	48	67	77	83	
50% to 75% ground cover	Fair	35	56	70	77	
>75% ground cover	Good	30 [2]	48	65	73	
Woods – grass combination (orchard or tree farm) [3]	Poor	57	73	82	86	
	Fair	43	65	76	82	
	Good	32	58	72	79	
Woods						
Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.	Poor	45	66	77	83	
Woods are grazed but not burned, and some forest litter covers the soil.	Fair	36	60	73	79	
Woods are protected from grazing, and litter and brush adequately cover the soil.	Good	30 [2]	55	70	77	PRE
Farmsteads -- buildings, lanes, driveways, and surrounding lots	--	59	74	82	86	

1: Average runoff condition, and $I_a = 0.2S$.

2: Actual curve number is less than 30; use CN = 30 for runoff computations.

3: 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.

PIONEER DESIGN GROUP

EXISTING CONDITIONS - PERVIOUS COMPOSITE CURVE NUMBERS

JOB NUMBER: 131-025
PROJECT: Riverside at Cedar Creek
FILE: 131-025_Preliminary Hydro.xls

TOTAL AREA= 238,944 SF

EXISTING CONDITIONS

COVER TYPE	SOIL TYPE	AREA (SF)	SOIL GRADE	CURVE NUMBER
MEADOWS	1 Aloha silt loam	87,176	C/D	71
WOODS "GOOD CONDITION"	45B Woodburn silt loam	151,768	C	70

EXISTING COMPOSITE CN (PERVIOUS) = $\frac{(109{,}447 \times 71) + (130569 \times 84)}{238{,}944}$ = **70**

MANNING'S "n" VALUES

SHEET FLOW EQUATION MANNING'S VALUES	n_s
Smooth Surfaces (concrete, asphault, gravel, or bare hand packed soil)	0.011
Fallow Fields or loose soil surface (no residue)	0.05
Cultivated soil with residue cover (≤ 20%)	0.06
Cultivated soil with residue cover (> 20%)	0.17
Short prairie grass and lawns	0.15
Dense grasses	0.24
Bermuda grasses	0.41
Range (natural)	0.13
Woods or forrest with light underbrush	0.40
Woods or forrest with dense underbrush	0.80

SHALLOW CONCENTRATED FLOW (after initial 300 ft of sheet flow, R = 0.1)	k_s
Forest with heavy ground litter and meadows (n = 0.010)	3
Brushy ground with some trees (n = 0.060)	5
Fallow or minimum tillage cultivation (n = 0.040)	8
High grass (n = 0.035)	9
Short grass, pasture and lawns (n = 0.030)	11
Nearly bare ground (n = 0.25)	13
Paved and gravel areas (n = 0.012)	27

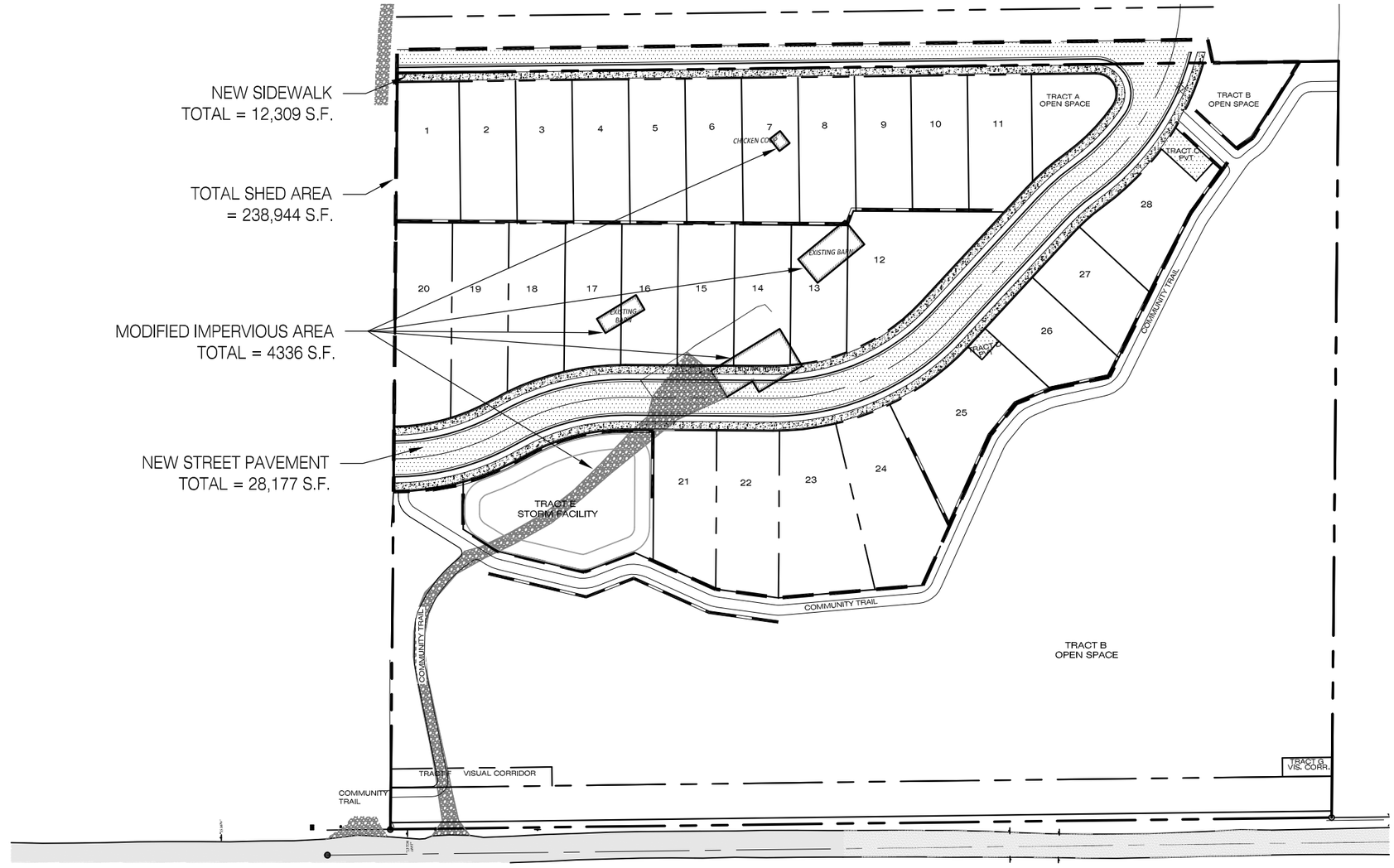
CHANNEL FLOW (Intermittent) (At the beginning of all visible channels, R = 0.2)	k_c
Forested swale with heavy ground cover (n = 0.10)	5
Forested drainage course/ravine with defined channel bed (n = 0.050)	10
Rock-lined waterway (n = 0.035)	15
Grassed waterway (n = 0.030)	17
Earth-lined waterway (n = 0.025)	20
CMP pipe (n = 0.024)	21
Concrete pipe (n = 0.012)	42
Other waterways and pipe 0.508/n	

CHANNEL FLOW (continuous stream, R = 0.4)	k_c
Meandering stream (n = 0.040)	20
Rock-lined stream (n = 0.035)	23
Grass-lined stream (n = 0.030)	27
Other streams, man-made channels and pipe (n = 0.807/n)	

Exhibit A10

IMPERVIOUS AREA

RIVERSIDE AT CEDAR CREEK



PROPOSED IMPERVIOUS AREA

NEW SIDEWALK PAVEMENT:	12,309 S.F.
NEW STREET PAVEMENT:	28,177 S.F.
PRIVATE LOTS:	73,920 S.F.
TOTAL IMPERVIOUS:	114,406 S.F.

MODIFIED IMPERVIOUS AREA

MODIFIED AREA:	4,336 S.F.

TOTAL AREA

TOTAL SHED AREA:	238,944 S.F.
TOTAL SITE AREA:	451,690 S.F.

SCALE
100 0 50 100
1 INCH = 100 FEET

PIONEER DESIGN GROUP
CIVIL ENGINEERING • LAND USE PLANNING • LAND SURVEYING • LANDSCAPE ARCHITECTURE
PORTLAND, OREGON | HONOLULU, HAWAII
PH: 503.643.8286 PH: 808.753.2376
WWW.PD-GRP.COM

Designed by	GAM	Date	3/2020
Drawn by	CFS	Date	3/2020
Reviewed by	GAM	Date	3/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

Project
RIVERSIDE AT CEDAR CRK
No.
131-025
Type
PLANNING
Sheet
1 of 1

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PIONEER DESIGN GROUP

IMPERVIOUS AREA CALCULATIONS

JOB NUMBER: 131-025
PROJECT: Riverside at Cedar Creek
FILE: 131-025_Preliminary Hydro.xls

PROPOSED IMPERVIOUS AREA

28 LOTS AT 2,640-SF IMPERVIOUS AREA / LOT	73,920.00 ft^2	
SIDEWALKS	12,309.00 ft^2	
STREET PAVEMENT	28,177.00 ft^2	
	114,406.00 ft^2	**2.63 ac**

MODIFIED IMPERVIOUS AREA

BUILDINGS	488.00 ft^2	
SIDEWALKS	0.00 ft^2	
GRAVEL AT 60% IMPERVIOUS	3,848.00 ft^2	
STREET PAVEMENT	0.00 ft^2	
	4,336.00 ft^2	**0.10 ac**

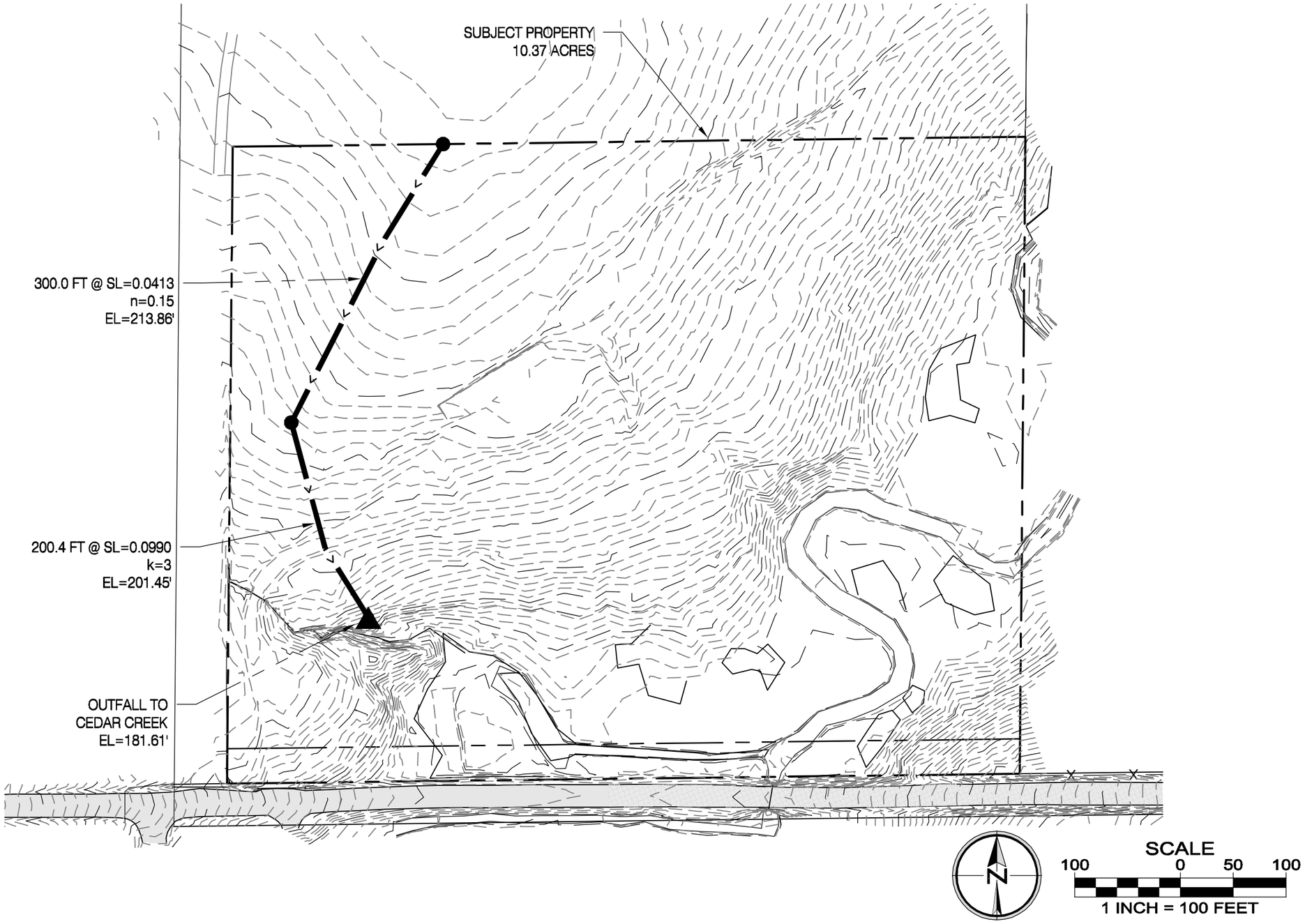
NEW IMPERVIOUS AREA	**110,070.00 ft^2**	**2.53 ac**

Total Shed Area	**238,944.00 ft^2**	**5.49 ac**
Existing Impervious Area	**4,336.00 ft^2**	**0.10 ac**
% Impervious		**1.8 %**
Proposed Impervious Area	**114,406.00 ft^2**	**2.63 ac**
% Impervious		**47.9 %**

Exhibit A10

PREDEVELOPED TIME OF CONCENTRATION

RIVERSIDE AT CEDAR CREEK



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PIONEER DESIGN GROUP
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PORTLAND, OREGON | HONOLULU, HAWAII
PH: 503.643.8286 PH: 808.753.2376
WWW.PD-GRP.COM

Designed by	GAM	Date	2/2020
Drawn by	CFS	Date	2/2020
Reviewed by	GAM	Date	2/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

Project
BROOKMAN

No.
131-025

Type
PLANNING

Sheet
1 of 1

PIONEER DESIGN GROUP

PREDEVELOPED TIME OF CONCENTRATION

JOB NUMBER: 131-025
PROJECT: Riverside at Cedar Creek
FILE: 131-025_Preliminary Hydro.xls

				Accum. Tc
LAG ONE: SHEET FLOW (FIRST 300 FEET)				
Tt = Travel time				
Manning's "n " =	0.15			
Flow Length, L =	300	ft	(300 ft. max.)	
P = 2-year, 24hr storm =	2.5	in		
Slope, S_0 =	0.041	ft/ft		
$T_T = \frac{(0.42)(n * L)^{0.8}}{(P)^{0.5}(S_0)^{0.4}}$	19.97	min.		19.97 min.
LAG TWO: SHALLOW CONCENTRATED FLOW (NEXT 200.4 FEET)				
Tc Velocity factor, k=	3			
Slope, S_0 =	0.099	ft/ft		
$V = k\sqrt{S_o}$	0.94	ft/s		
Flow Length, L =	200.4	ft		
$T = \frac{L}{(60)(V)}$	3.54	min.		23.51 min.

TOTAL PREDEVELOPED TIME OF CONCENTRATION (Tc) = 23.51 min.

PIONEER DESIGN GROUP

DEVELOPED TIME OF CONCENTRATION

JOB NUMBER: 131-025
PROJECT: Riverside at Cedar Creek
FILE: 131-025_Preliminary Hydro.xls

Catchment Time	5	min.
Longest Run of Pipe	1187	ft
Velocity of Flow	3	ft/s
Time in Pipe = (1187 ft)/(3.00 ft/s) =	396	s
TOTAL DEVELOPED Tc =	**11.6**	**min.**

PIONEER DESIGN GROUP

WATER QUALITY POND CALCULATIONS

JOB NUMBER: 131-025
PROJECT: Riverside at Cedar Creek
FILE: 131-025_Preliminary Hydro.xls

REFERENCES:
1. Clean Water Services R&O 07-20.
2. Discussions with Clean Water Services.

REQUIRED WATER QUALITY TREATMENT: 65% Phosphorus Removal.

PROPOSED TREATMENT METHODS:

1. Sumped Catch Basins		15%
2. Water quality Pond		50%
	total	65%

DESIGN STORM

Precipitation:	0.36	inches
Storm Duration:	4	hours
Storm Return Period:	96	hours
Storm Window:	2	weeks

IMPERVIOUS AREA:

Watershed Area:	5.49	acres
Percent imp:	47.88	%
Impervious Area:	2.63	acres

Design Inflow = (2.63 ac)*(43560 ft^2/ac)*(0.36 in / 4.0 hrs) = **0.24 cfs**

VOLUME CALCULATION:

POND VOLUME = (2.63 acres)(43560 sqft/acre)(0.36 inch)/(12 in/ft) = **3,437 ft^3**

POND PARAMETERS:

Storage Volume (Sd)=	3,437	ft^3
Storage Depth (Hd)=	3	ft (3' maximum)
Side Slopes =	3	:1

SOLVE FOR BOTTOM AREA:

Bottom Area (Ab) = 558 ft^2

STAGE VS STORAGE CALCULATIONS:

Stage, H* ft	Storage, S(H) ft^3	Water Surface Area S.F.
0.0	0.0	558.3
0.5	316.9	709.1
1.0	718.1	877.9
1.5	1217.3	1064.7
2.0	1827.8	1269.4
2.5	2563.2	1492.2
3.0	3437.0	1733.0
3.5	4462.7	1991.8
4.0	5653.8	2268.5
4.5	7023.7	2563.3
5.0	8586.1	2876.1

POND OUTLET ORIFICE CALCULATIONS:

Q = (3,437 ft3)/(48 hrs)/(60 min/hrs)/(60 s/min)= 0.02 cfs

h = average hydraulic head = 48 inches below high flow

A = 0.00 ft^2

$A = \pi r^2$

r = 0.03 ft. radius

d = 2r

d = 0.61 in. diameter, use **6/8 " orifice**

PIONEER DESIGN GROUP

WATER QUALITY MANHOLE
(SUMP CALCULATION)

JOB NUMBER: 131-025
PROJECT: Riverside at Cedar Creek
FILE: 131-025_Preliminary Hydro.

Q_{25}	=	**3.39 cfs**	
V_{REQ}	=	$^{20\ CF}/_{1\ CFS}$	
V_{REQ}	=	67.8	cf
WQ MH Radius	=	2.5	ft

Volume for a 60" Manhole
36" min. to 60" max. sump depth

$$V = H \times \pi r^2$$

(depth of sump)	H	=	4.0	ft
(radius of manhole)	r	=	2.5	ft
	V	=	78.5	ft^3

Is 78.5 cf > 67.8 cf ✓

PIONEER DESIGN GROUP

STORMWATER CONVEYANCE CALCULATIONS

JOB NUMBER: 131-025
PROJECT: Riverside at Cedar Creek
FILE: 131-025_Preliminary Hydro.xls

Design Storm: 25 YR
Storm Duration: 24 HRS
Precipitation: 3.9 IN
Manning's "n" 0.013

LINE	INC. AREA (AC)	AREA TOTAL (AC)	% IMP.	AREA PERV. (AC)	CN PER.	AREA IMP. (AC)	CN IMP.	TIME (MIN)	Q (CFS)	PIPE SIZE (IN)	SLOPE (FT/FT)	Qf (CFS)	Q/Qf (%)	Vf (FPS)	V/Vf (%)	ACTUAL V (FPS)
ENTIRE SHED	5.49	5.49	47.88	2.86	79	2.63	98	5.00	4.02	18	0.0050	7.45	53.94%	4.21	1.03	4.32

APPENDIX 'A' – STORMWATER DETENTION FACILITY REPORT

Table of Contents

Exhibit A10

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SBUH Runoff	0.17	5	540	9,073	----	------	------	Pre Developed
2	SBUH Runoff	1.67	5	480	27,531	----	------	------	Developed
3	Reservoir	0.08	5	1455	21,271	2	188.77	24,812	Pond

Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

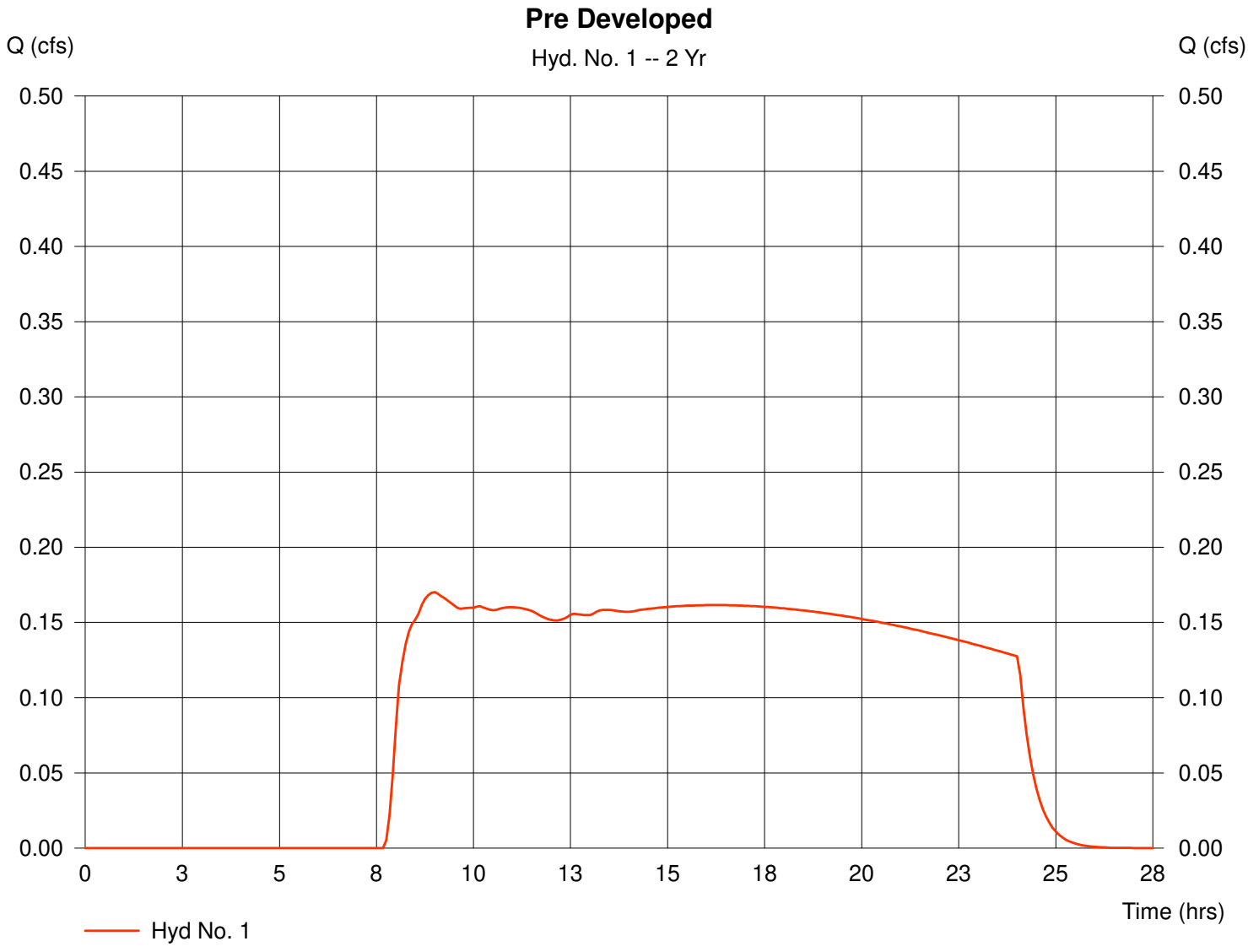
Friday, Feb 7 2020, 2:3 PM

Hyd. No. 1

Pre Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.17 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 23.51 min
Total precip.	= 2.50 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 9,073 cuft



Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

Hyd. No. 2

Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 1.67 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 11.60 min
Total precip.	= 2.50 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 27,531 cuft

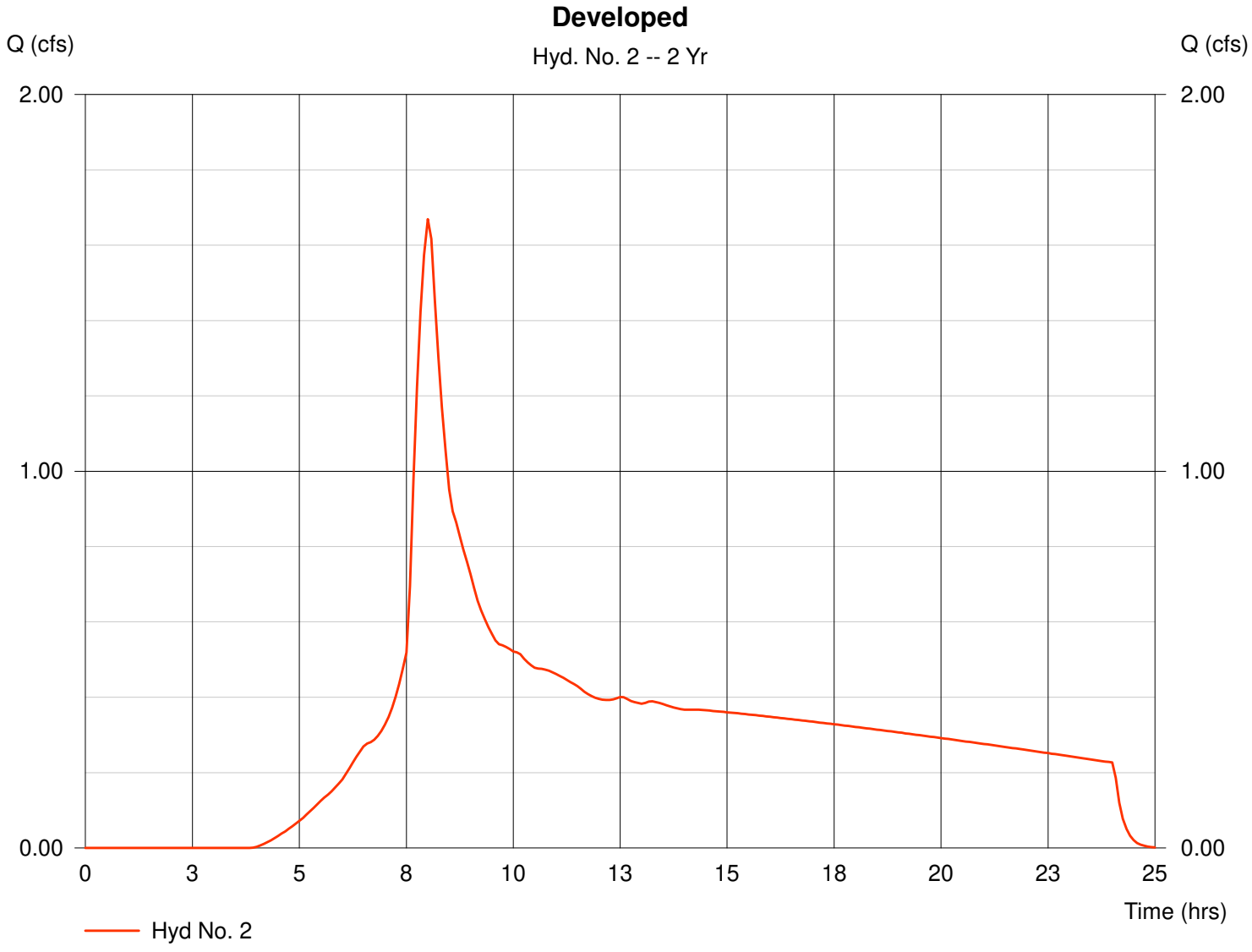


Exhibit A10

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SBUH Runoff	-------	-------	0.17	-------	0.41	0.61	0.90	-------	-------	Pre Developed
2	SBUH Runoff	-------	-------	1.67	-------	2.39	2.83	3.39	-------	-------	Developed
3	Reservoir	2	-------	0.08	-------	0.41	0.53	0.68	-------	-------	Pond

Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

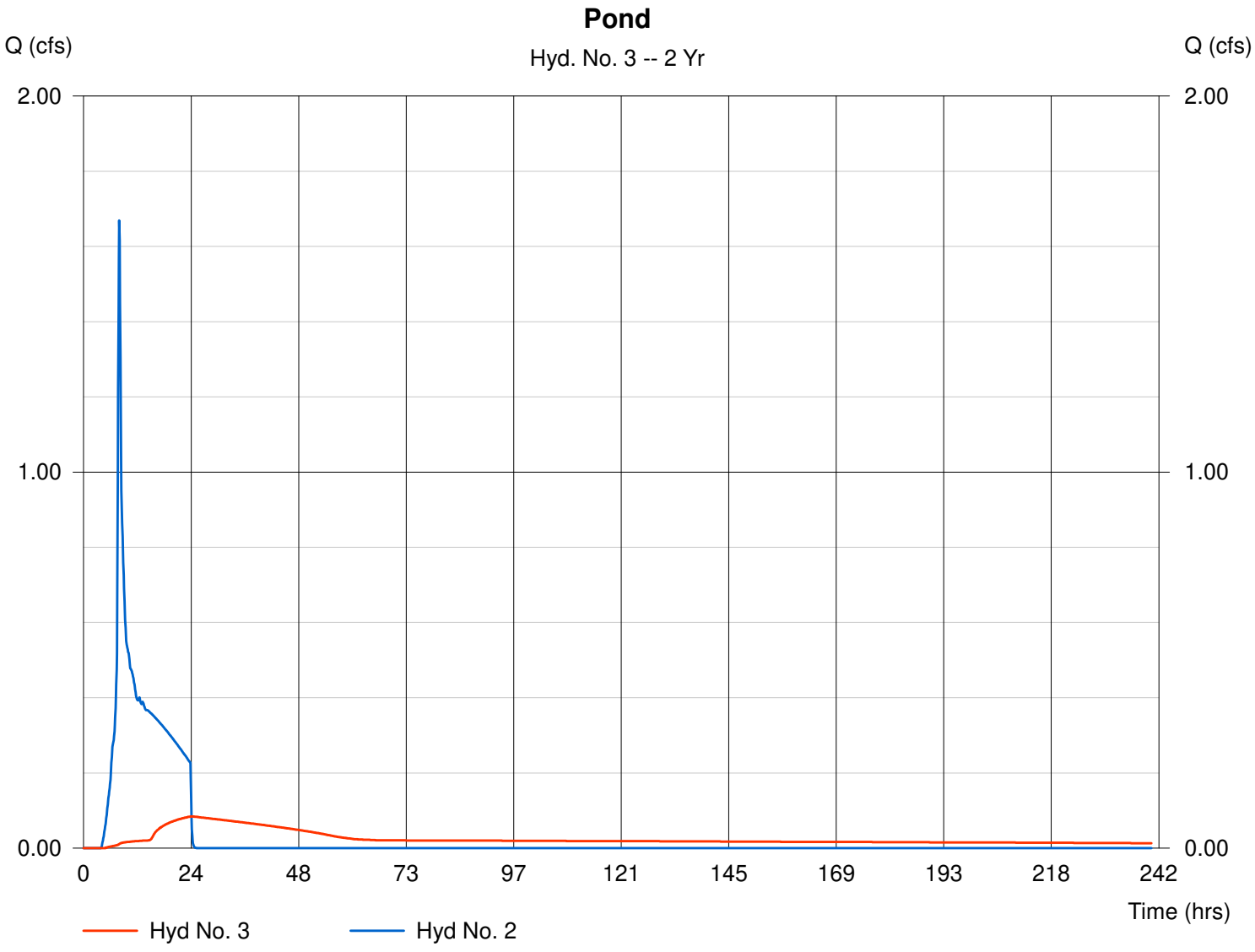
Hyd. No. 3

Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.08 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Inflow hyd. No.	=	2	Max. Elevation	=	188.77 ft
Reservoir name	=	Pond	Max. Storage	=	24,812 cuft

Storage Indication method used.

Hydrograph Volume = 21,271 cuft



Pond Report

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

Pond No. 1 - Pond

Pond Data

Bottom LxW = 121.3 x 60.7 ft Side slope = 3.0:1 Bottom elev. = 186.00 ft Depth = 8.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	186.00	7,357	0	0
0.40	186.40	7,799	3,031	3,031
0.80	186.80	8,253	3,210	6,241
1.20	187.20	8,719	3,394	9,635
1.60	187.60	9,196	3,583	13,217
2.00	188.00	9,684	3,776	16,993
2.40	188.40	10,184	3,973	20,966
2.80	188.80	10,696	4,176	25,142
3.20	189.20	11,219	4,383	29,525
3.60	189.60	11,754	4,594	34,119
4.00	190.00	12,300	4,810	38,929
4.40	190.40	12,857	5,031	43,960
4.80	190.80	13,426	5,256	49,216
5.20	191.20	14,007	5,486	54,703
5.60	191.60	14,599	5,721	60,424
6.00	192.00	15,203	5,960	66,384
6.40	192.40	15,818	6,204	72,587
6.80	192.80	16,445	6,452	79,040
7.20	193.20	17,083	6,705	85,745
7.60	193.60	17,733	6,963	92,708
8.00	194.00	18,394	7,225	99,933

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	0.75	1.65	0.00
Span (in)	= 18.00	0.75	1.65	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 181.25	179.25	188.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 188.83	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Wet area) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Discharge

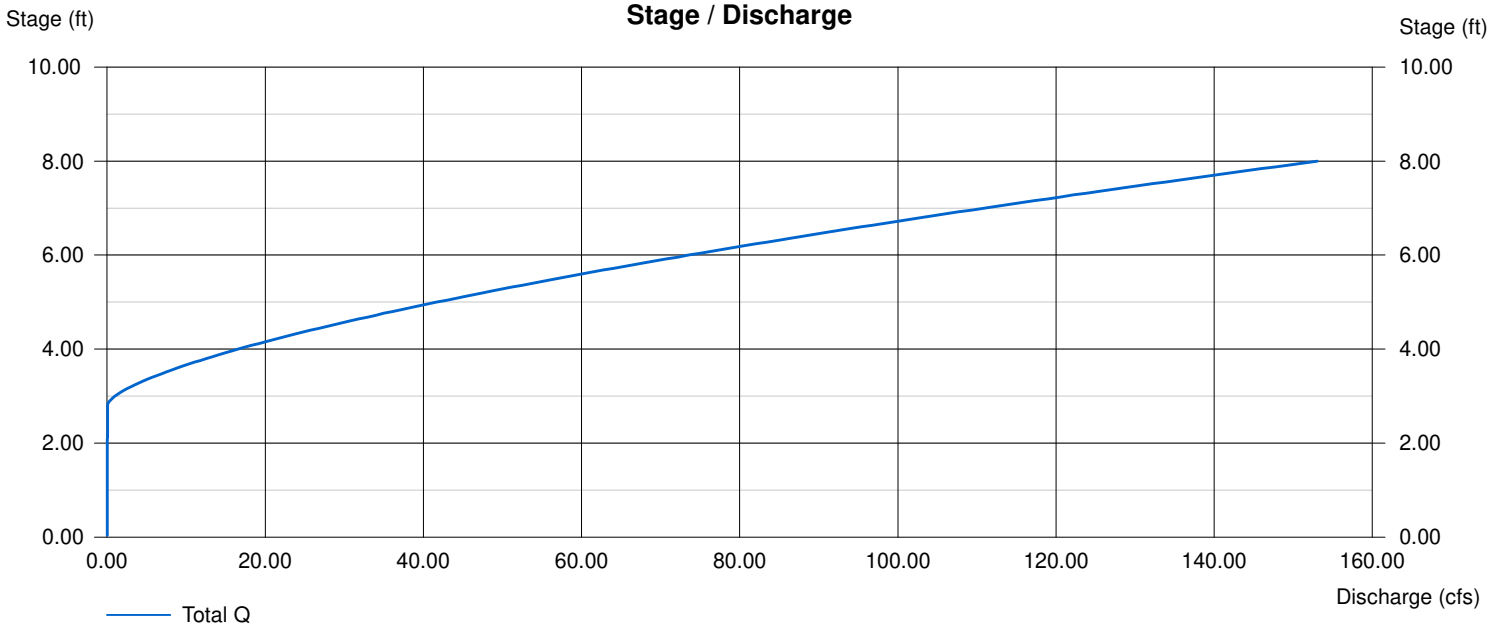


Exhibit A10

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SBUH Runoff	0.41	5	495	15,356	----	------	------	Pre Developed
2	SBUH Runoff	2.39	5	480	38,011	----	------	------	Developed
3	Reservoir	0.41	5	1100	31,601	2	188.91	26,397	Pond

Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

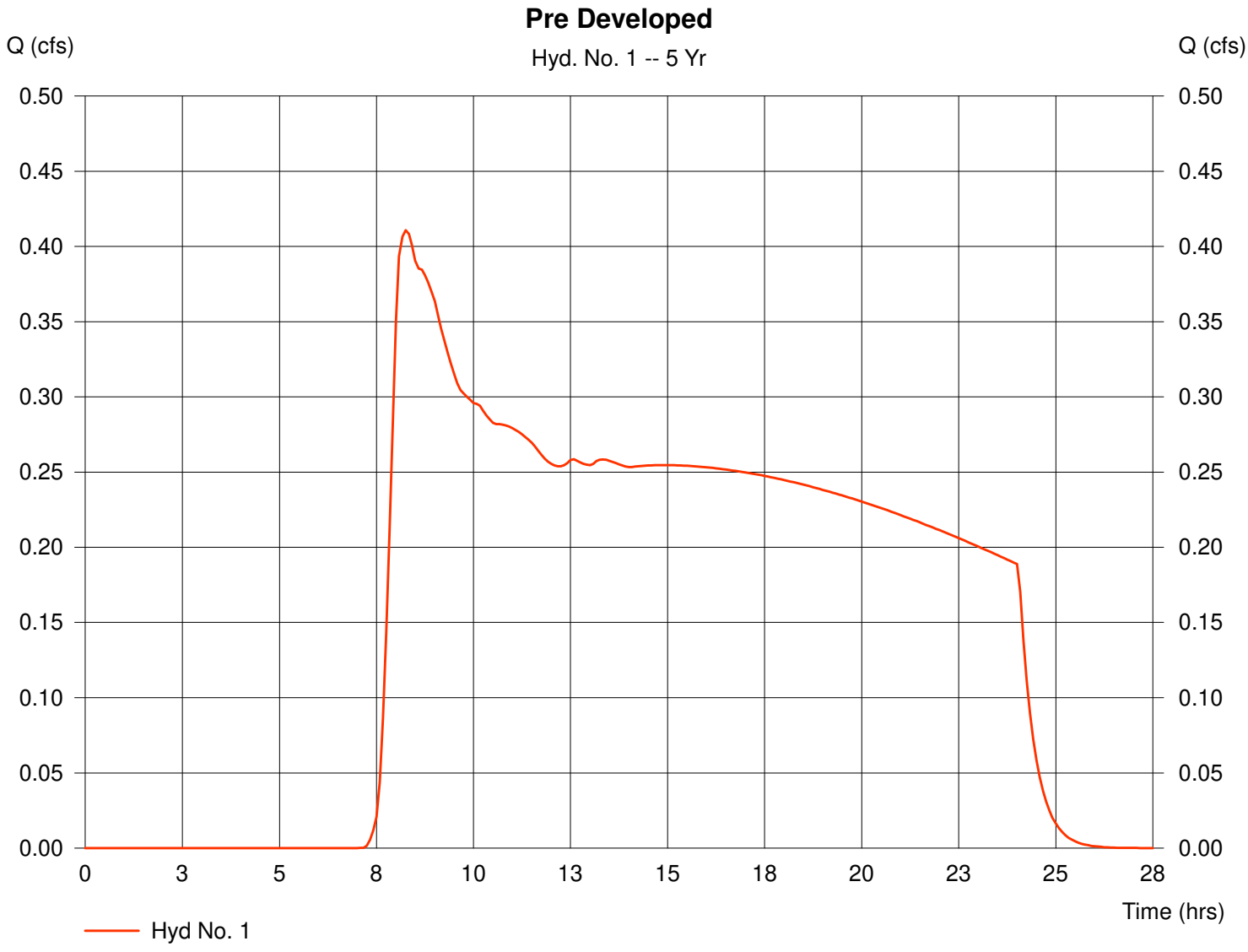
Friday, Feb 7 2020, 2:3 PM

Hyd. No. 1

Pre Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.41 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 23.51 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 15,356 cuft



Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

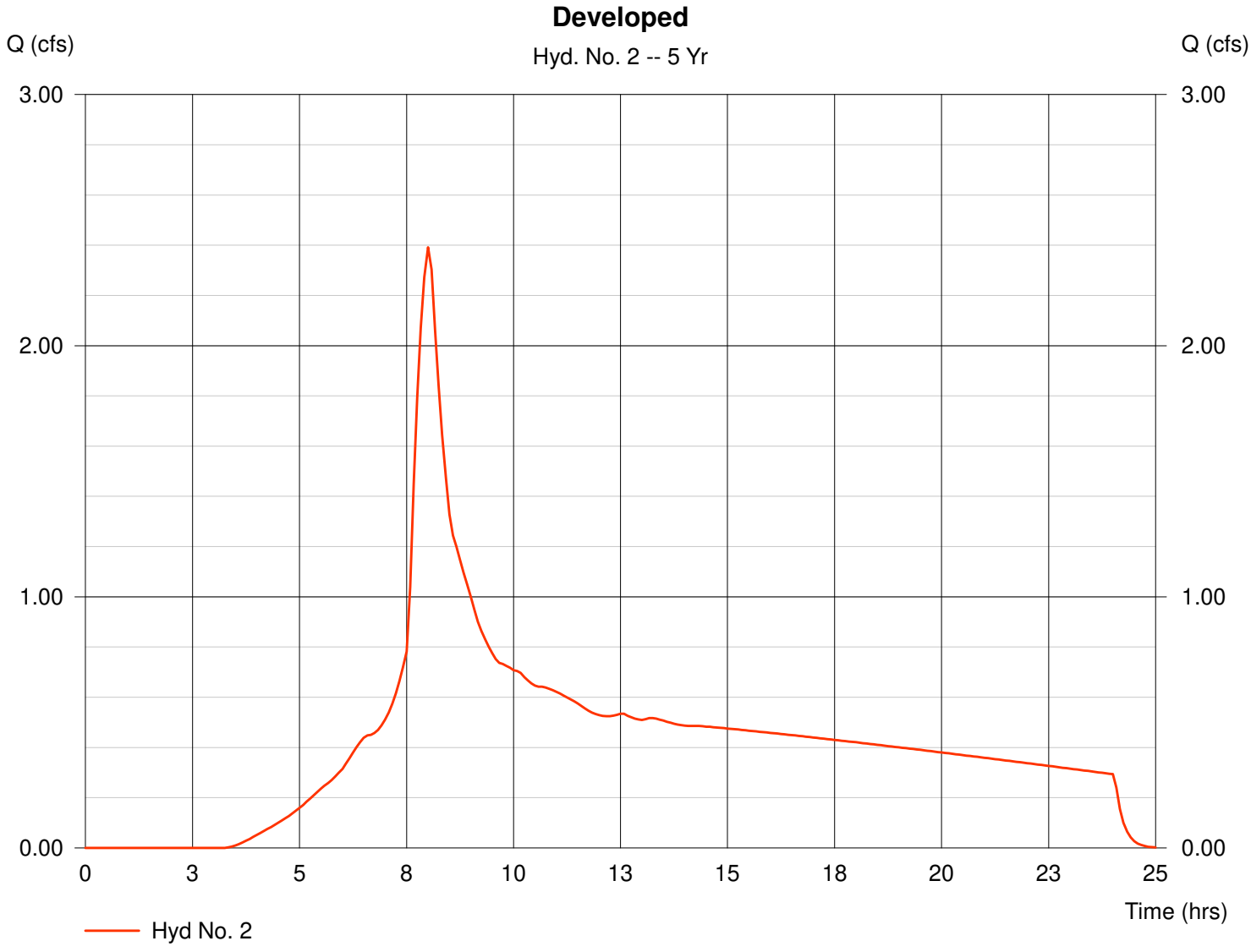
Friday, Feb 7 2020, 2:3 PM

Hyd. No. 2

Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 2.39 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 11.60 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 38,011 cuft



Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

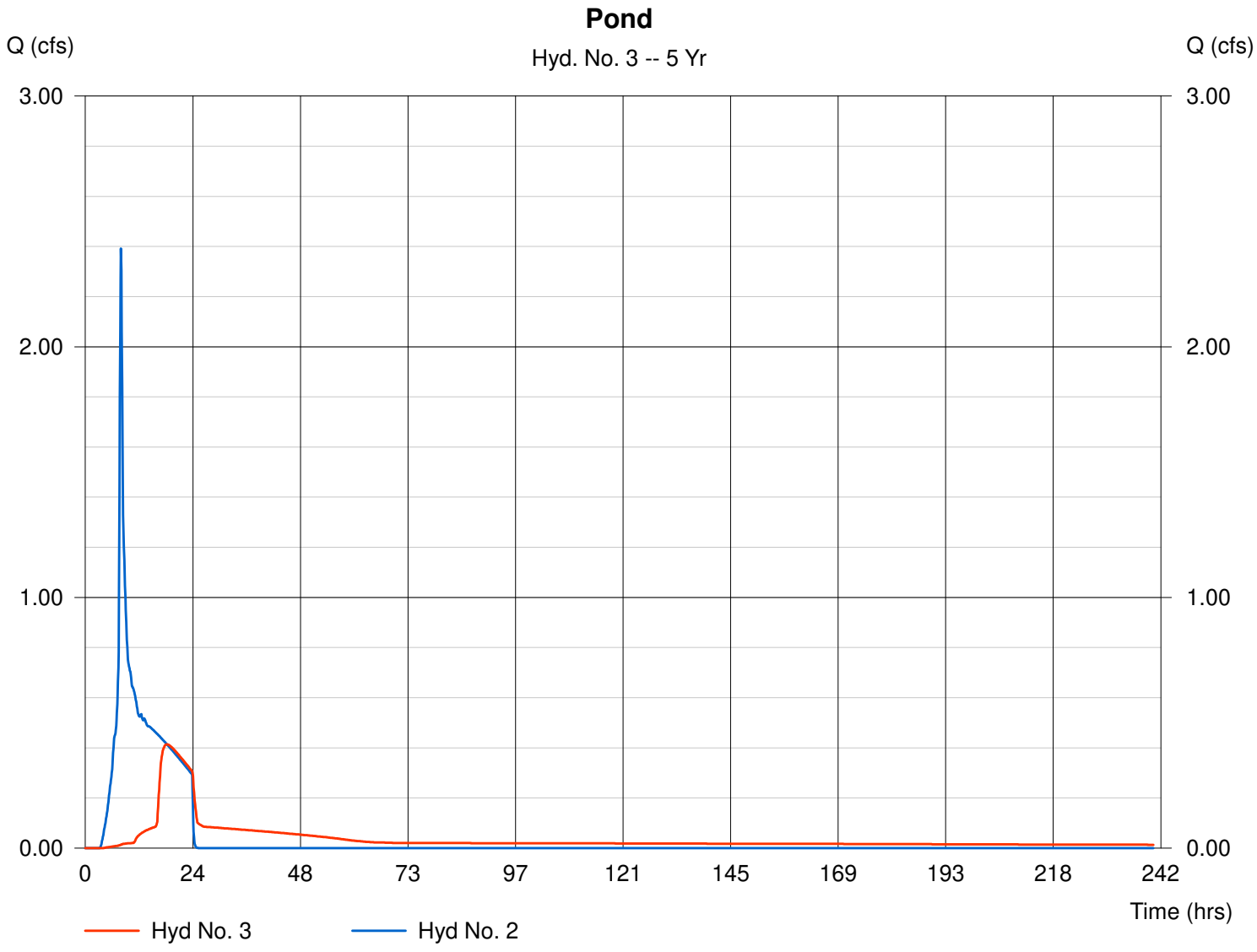
Hyd. No. 3

Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.41 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Inflow hyd. No.	=	2	Max. Elevation	=	188.91 ft
Reservoir name	=	Pond	Max. Storage	=	26,397 cuft

Storage Indication method used.

Hydrograph Volume = 31,601 cuft



Pond Report

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

Pond No. 1 - Pond

Pond Data

Bottom LxW = 121.3 x 60.7 ft Side slope = 3.0:1 Bottom elev. = 186.00 ft Depth = 8.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	186.00	7,357	0	0
0.40	186.40	7,799	3,031	3,031
0.80	186.80	8,253	3,210	6,241
1.20	187.20	8,719	3,394	9,635
1.60	187.60	9,196	3,583	13,217
2.00	188.00	9,684	3,776	16,993
2.40	188.40	10,184	3,973	20,966
2.80	188.80	10,696	4,176	25,142
3.20	189.20	11,219	4,383	29,525
3.60	189.60	11,754	4,594	34,119
4.00	190.00	12,300	4,810	38,929
4.40	190.40	12,857	5,031	43,960
4.80	190.80	13,426	5,256	49,216
5.20	191.20	14,007	5,486	54,703
5.60	191.60	14,599	5,721	60,424
6.00	192.00	15,203	5,960	66,384
6.40	192.40	15,818	6,204	72,587
6.80	192.80	16,445	6,452	79,040
7.20	193.20	17,083	6,705	85,745
7.60	193.60	17,733	6,963	92,708
8.00	194.00	18,394	7,225	99,933

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	0.75	1.65	0.00
Span (in)	= 18.00	0.75	1.65	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 181.25	179.25	188.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 188.83	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Wet area) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Discharge

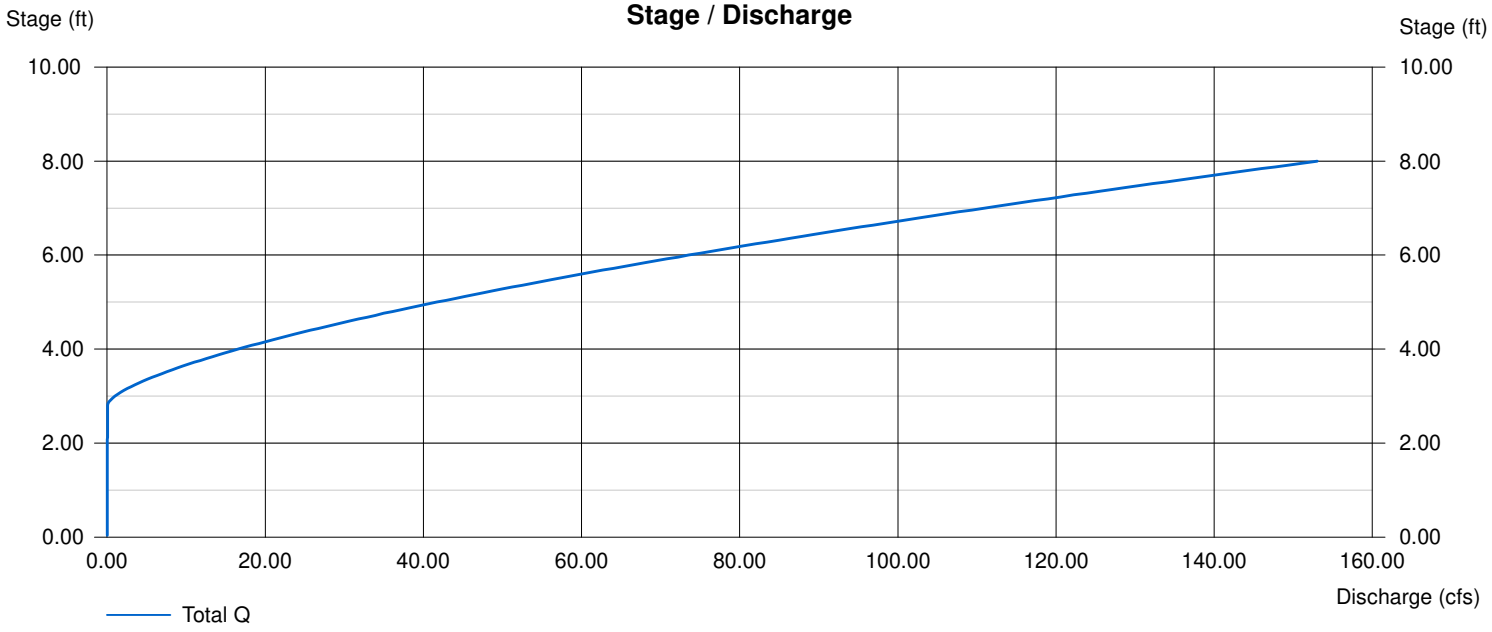


Exhibit A10

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SBUH Runoff	0.61	5	490	19,478	----	------	------	Pre Developed
2	SBUH Runoff	2.83	5	480	44,304	----	------	------	Developed
3	Reservoir	0.53	5	935	37,891	2	188.93	26,606	Pond

Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

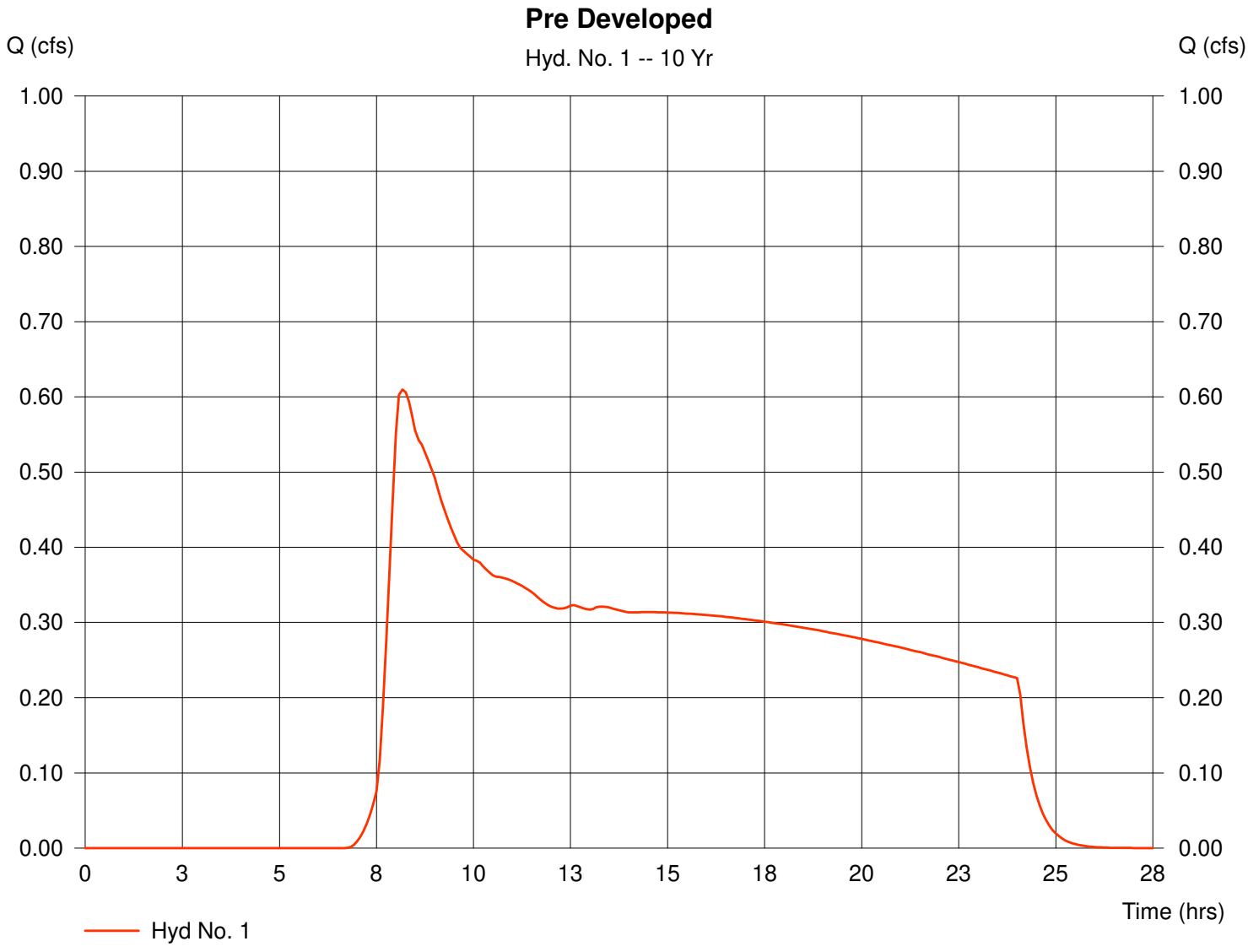
Friday, Feb 7 2020, 2:3 PM

Hyd. No. 1

Pre Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.61 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 23.51 min
Total precip.	= 3.45 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 19,478 cuft



Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

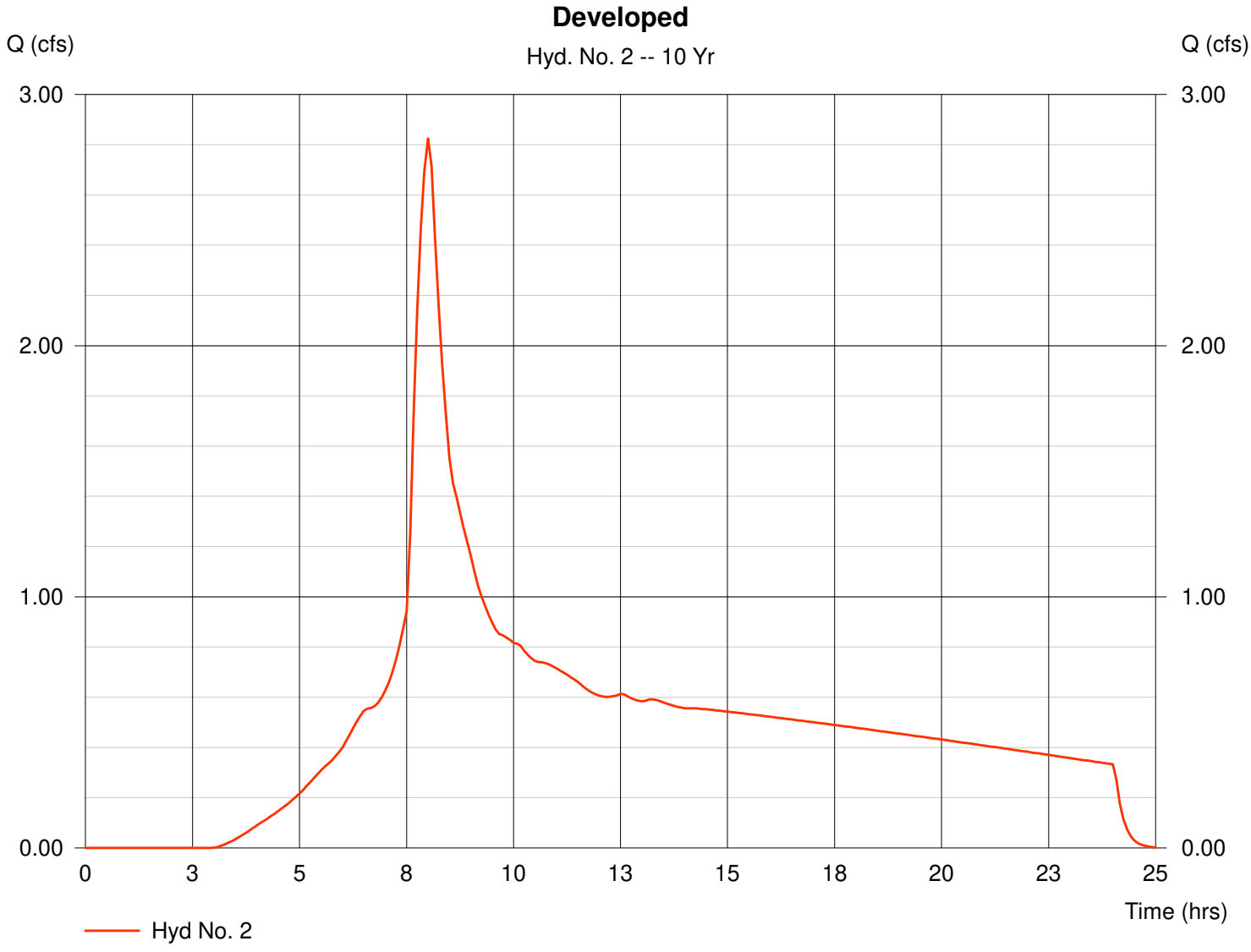
Friday, Feb 7 2020, 2:3 PM

Hyd. No. 2

Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 2.83 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 11.60 min
Total precip.	= 3.45 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 44,304 cuft



Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

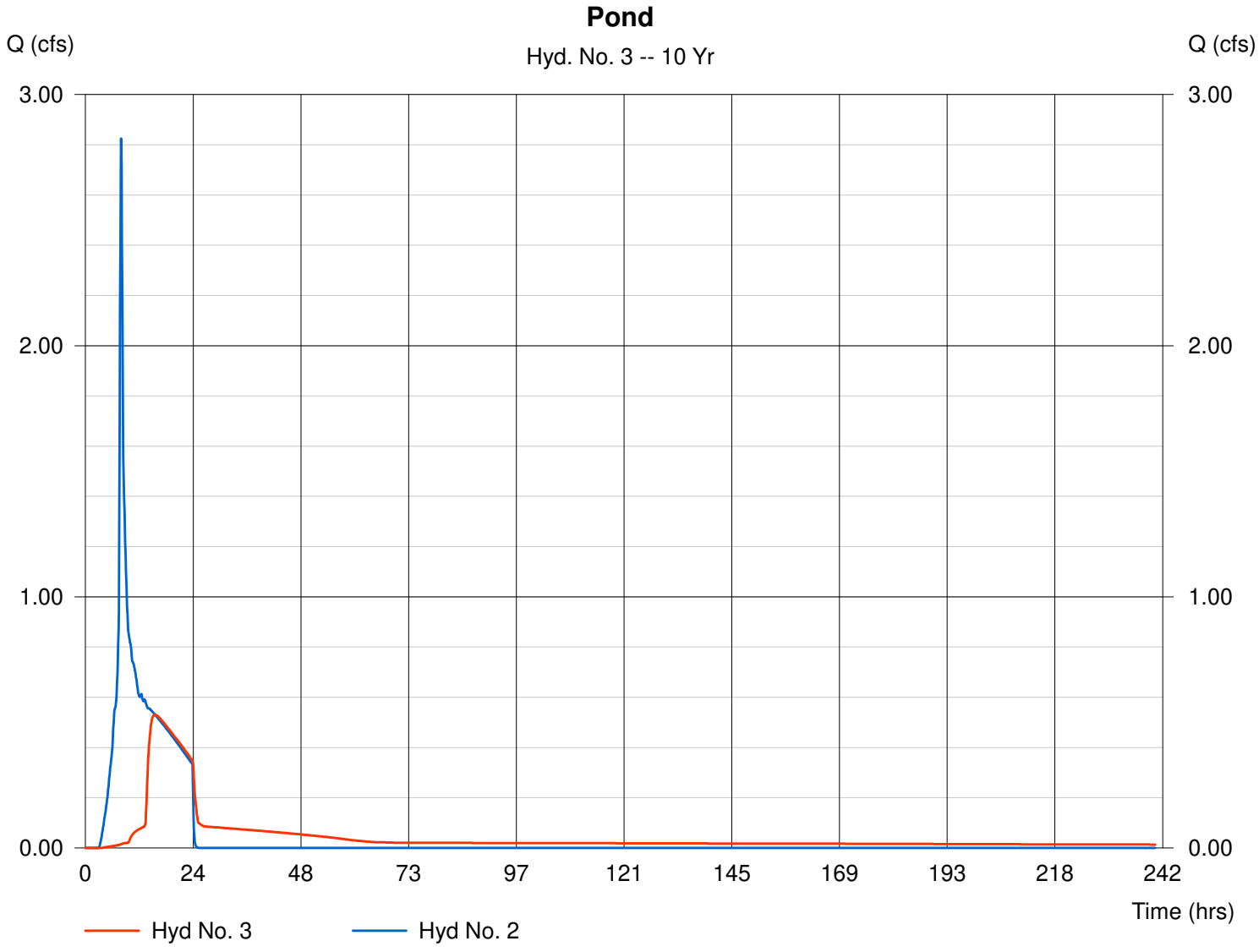
Hyd. No. 3

Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.53 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Inflow hyd. No.	=	2	Max. Elevation	=	188.93 ft
Reservoir name	=	Pond	Max. Storage	=	26,606 cuft

Storage Indication method used.

Hydrograph Volume = 37,891 cuft



Pond Report

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

Pond No. 1 - Pond

Pond Data

Bottom LxW = 121.3 x 60.7 ft Side slope = 3.0:1 Bottom elev. = 186.00 ft Depth = 8.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	186.00	7,357	0	0
0.40	186.40	7,799	3,031	3,031
0.80	186.80	8,253	3,210	6,241
1.20	187.20	8,719	3,394	9,635
1.60	187.60	9,196	3,583	13,217
2.00	188.00	9,684	3,776	16,993
2.40	188.40	10,184	3,973	20,966
2.80	188.80	10,696	4,176	25,142
3.20	189.20	11,219	4,383	29,525
3.60	189.60	11,754	4,594	34,119
4.00	190.00	12,300	4,810	38,929
4.40	190.40	12,857	5,031	43,960
4.80	190.80	13,426	5,256	49,216
5.20	191.20	14,007	5,486	54,703
5.60	191.60	14,599	5,721	60,424
6.00	192.00	15,203	5,960	66,384
6.40	192.40	15,818	6,204	72,587
6.80	192.80	16,445	6,452	79,040
7.20	193.20	17,083	6,705	85,745
7.60	193.60	17,733	6,963	92,708
8.00	194.00	18,394	7,225	99,933

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	0.75	1.65	0.00
Span (in)	= 18.00	0.75	1.65	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 181.25	179.25	188.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 188.83	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Wet area) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Discharge

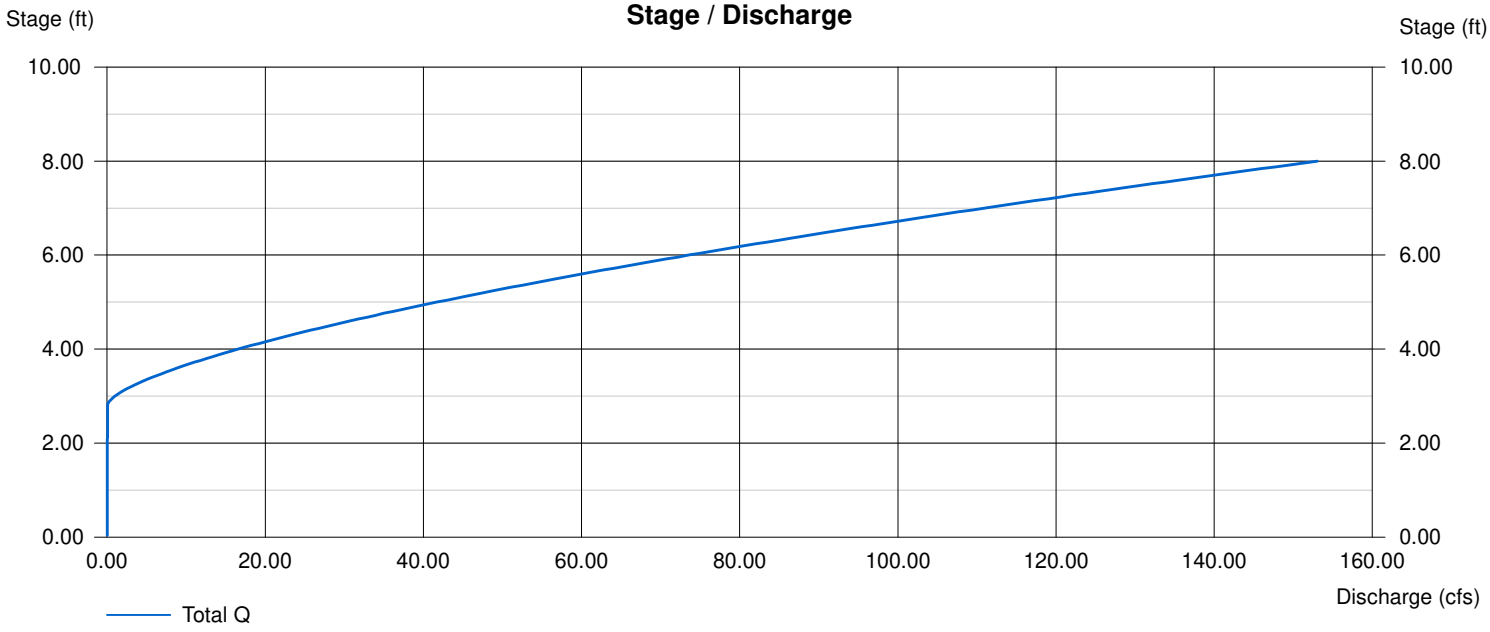


Exhibit A10

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SBUH Runoff	0.90	5	485	25,178	----	------	------	Pre Developed
2	SBUH Runoff	3.39	5	480	52,536	----	------	------	Developed
3	Reservoir	0.68	5	800	46,119	2	188.96	26,863	Pond

Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

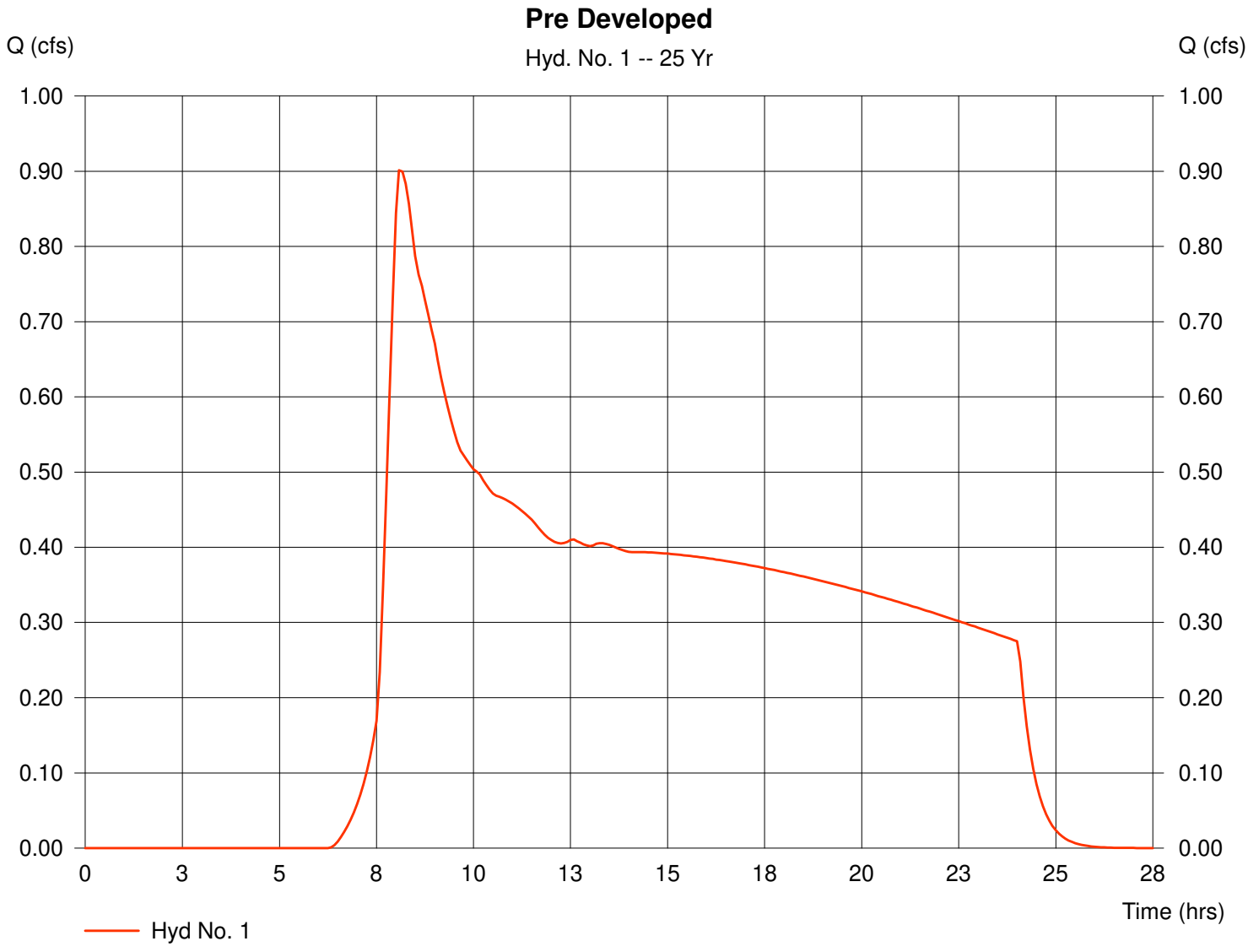
Friday, Feb 7 2020, 2:3 PM

Hyd. No. 1

Pre Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.90 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 23.51 min
Total precip.	= 3.90 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 25,178 cuft



Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

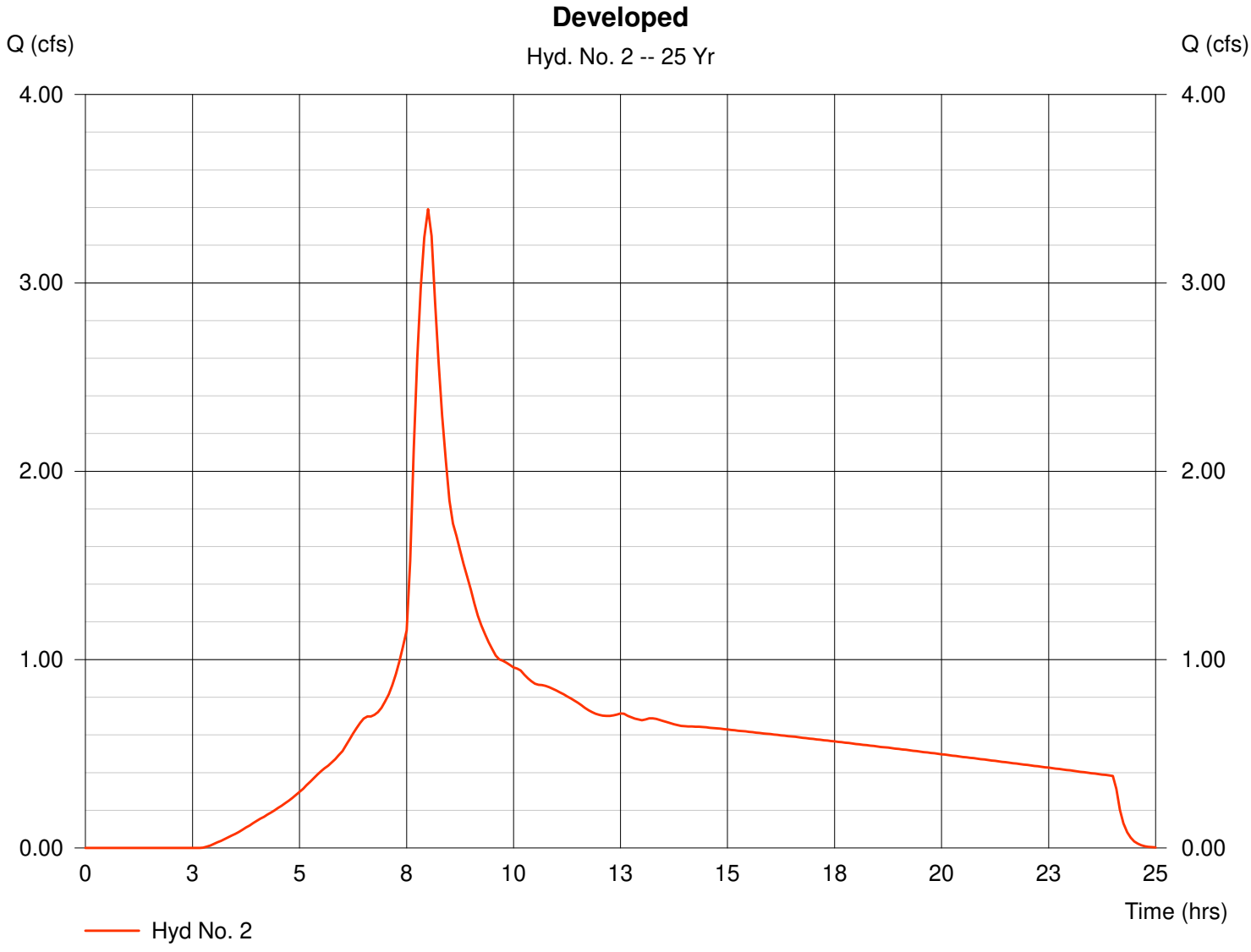
Friday, Feb 7 2020, 2:3 PM

Hyd. No. 2

Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 3.39 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Drainage area	= 5.490 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 11.60 min
Total precip.	= 3.90 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

Hydrograph Volume = 52,536 cuft



Hydrograph Plot

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

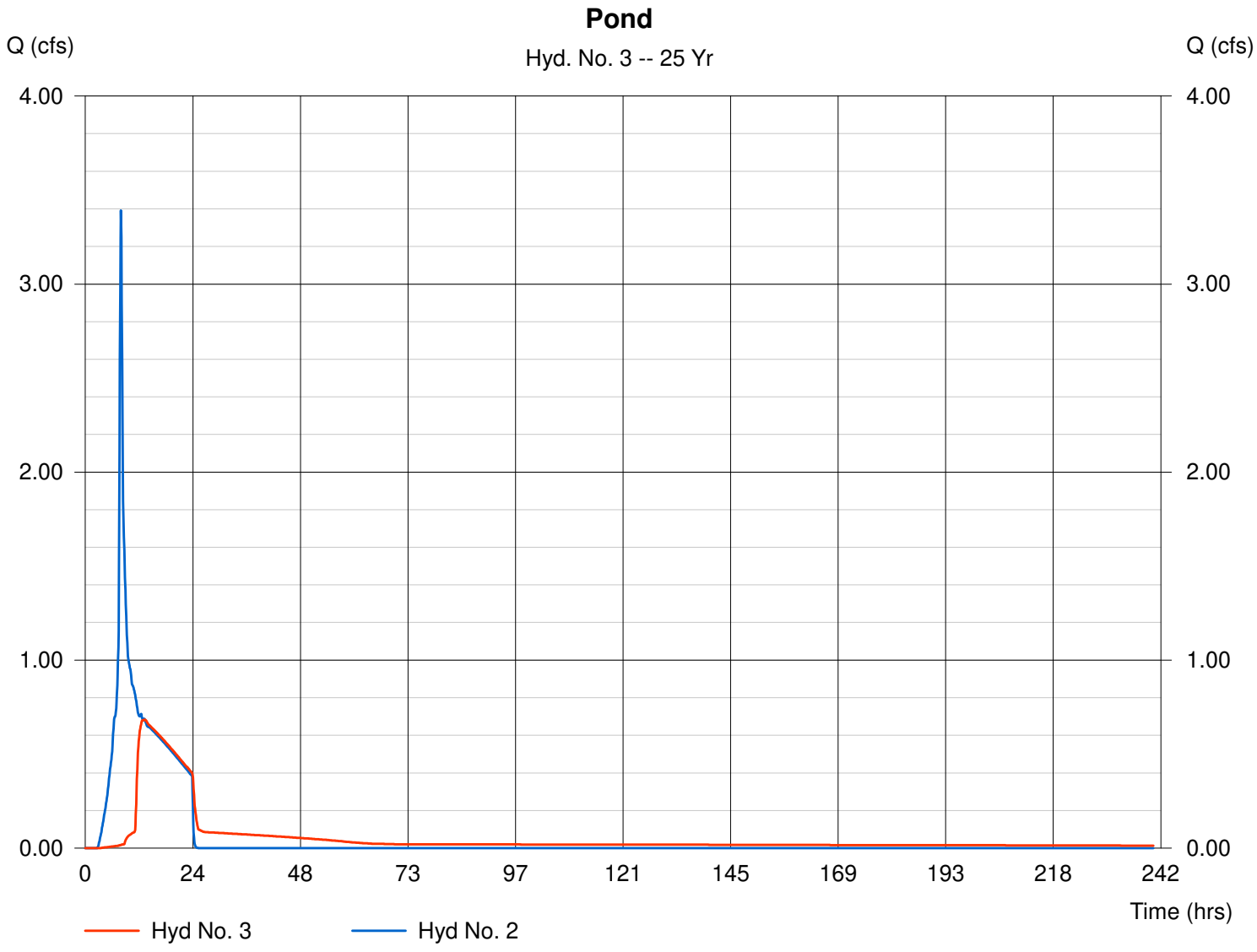
Hyd. No. 3

Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.68 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Inflow hyd. No.	=	2	Max. Elevation	=	188.96 ft
Reservoir name	=	Pond	Max. Storage	=	26,863 cuft

Storage Indication method used.

Hydrograph Volume = 46,119 cuft



Pond Report

Exhibit A10

Hydraflow Hydrographs by Intelisolve

Friday, Feb 7 2020, 2:3 PM

Pond No. 1 - Pond

Pond Data

Bottom LxW = 121.3 x 60.7 ft Side slope = 3.0:1 Bottom elev. = 186.00 ft Depth = 8.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	186.00	7,357	0	0
0.40	186.40	7,799	3,031	3,031
0.80	186.80	8,253	3,210	6,241
1.20	187.20	8,719	3,394	9,635
1.60	187.60	9,196	3,583	13,217
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4.00	190.00	12,300	4,810	38,929
4.40	190.40	12,857	5,031	43,960
4.80	190.80	13,426	5,256	49,216
5.20	191.20	14,007	5,486	54,703
5.60	191.60	14,599	5,721	60,424
6.00	192.00	15,203	5,960	66,384
6.40	192.40	15,818	6,204	72,587
6.80	192.80	16,445	6,452	79,040
7.20	193.20	17,083	6,705	85,745
7.60	193.60	17,733	6,963	92,708
8.00	194.00	18,394	7,225	99,933

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	0.75	1.65	0.00
Span (in)	= 18.00	0.75	1.65	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 181.25	179.25	188.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 188.83	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Wet area) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Discharge

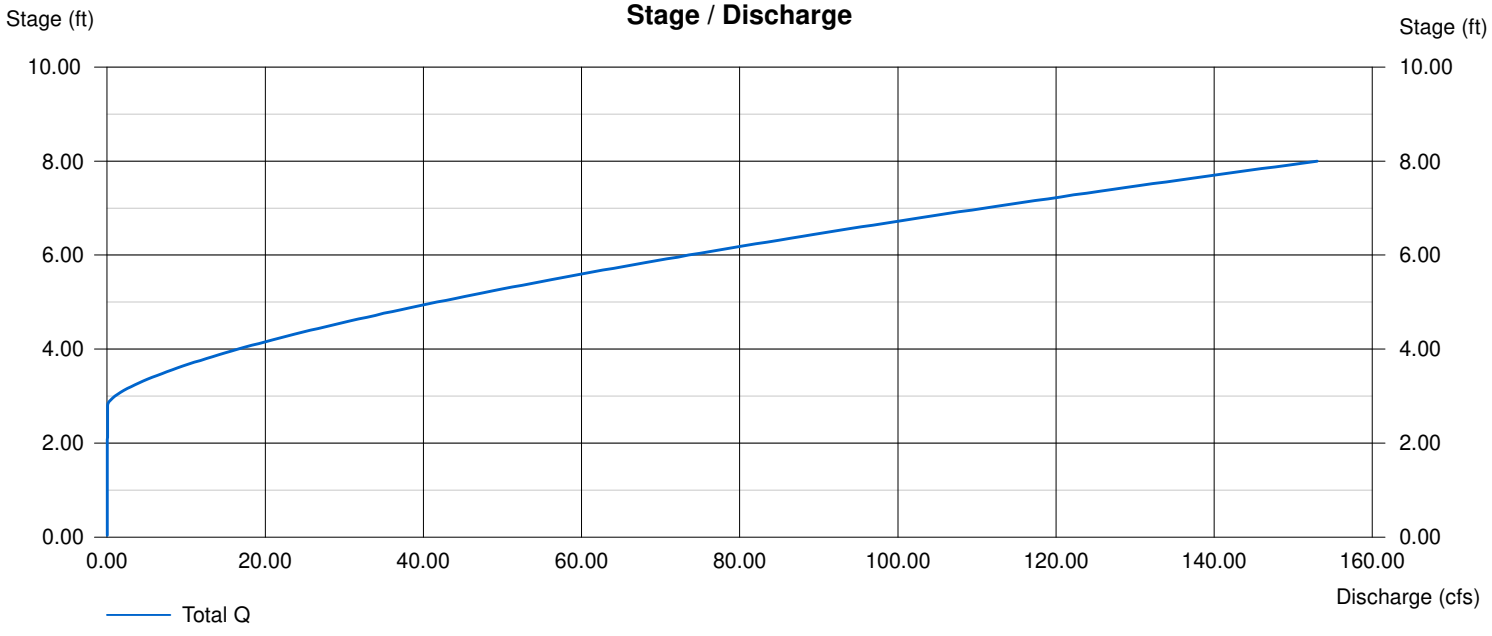

Exhibit A11

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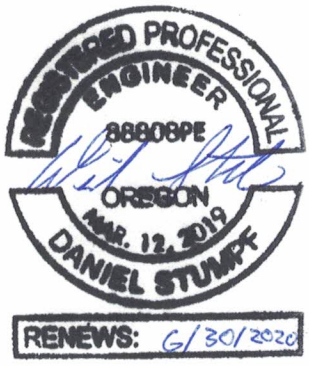


Cedar Creek Subdivision

Transportation Impact Analysis

Sherwood, Oregon

Date:
April 8, 2020

Prepared for:
Niki Munson,
Riverside Homes

Prepared by:
Terrington Smith, EIT
Daniel Stumpf, PE

Table of Figures

Table of Tables

Executive Summary

1. The property located at 17433 SW Brookman Road in Sherwood, Oregon is proposed for the construction of 28 single-family houses. The site currently has one single-family house which will be removed upon redevelopment. The site will be served by internal roads within the adjacent Middlebrook and Reserve developments with access taken along SW Brookman Road via the planned White Oak Terrace roadway alignment within the Middlebrook site.
2. The proposed development is projected to generate an additional 20 net new morning peak hour trips, 27 net new evening peak hour trips, and 254 net new average weekday trips
3. No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. No safety mitigation is recommended per the crash data analysis.
4. Left-turn lane warrants are not projected to be met at the site access intersection along SW Brookman Road upon completion and occupancy of the proposed development. Accordingly, installation of a left-turn lane at the site access intersection is not necessary or recommended.
5. All study intersections are projected to operate acceptably per their respectively jurisdictional standards by year 2024 with buildout of the proposed subdivision. No operational mitigation is necessary as part of the proposed Cedar Creek Subdivision.
6. *The Reserve at Cedar Creek Transportation Impact Analysis* (TIA) – *Sherwood, Oregon*, dated September 19th, 2019, identified four intersections as currently exceeding acceptable jurisdictional standards. Based on the projected site trip impacts to these intersections, a total proportionate share fee to mitigate impacts of $48,207.49 was calculated.

Project Description

Introduction

This report describes and evaluates the transportation impacts associated with the proposed development of the Cedar Creek subdivision located at 17433 SW Brookman Road in Sherwood, Oregon. The proposed development includes the construction of 28 single-family houses, removing one existing house for a net increase of 27 houses. Access to the site will be provided along SW Brookman Road via the planned White Oak Terrace roadway alignment within the in-process Middlebrook site.

Based on correspondence with the City of Sherwood, a safety and capacity/level of service analysis was conducted at the following intersections:

1. SW Elwert Road/SW Sunset Boulevard at Highway 99W
2. SW Brookman Road at Highway 99W
3. SW Brookman Road at Site Access

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Location Description

The subject site is located at 17433 SW Brookman Road and is situated between two in-process residential subdivision projects: Middlebrook and The Reserve at Cedar Creek. The site is located on the north side of SW Brookman Road with the Middlebrook development to the west and The Reserve to the east. The subject property consists of one tax lot (tax lot 3S1060000104) totaling approximately 10.35 acres. There is an existing single-family house on the property which will be removed upon development.

Vicinity Roadways

The proposed development is expected to impact three vicinity roadways. Table 1 on page 6 provides a description of each vicinity roadway.

Table 1: Vicinity Roadway Descriptions

Roadway	Jurisdiction	Functional Classification	Cross-Section	Speed	On-street Parking	Bicycle Lanes	Curbs	Sidewalks
Highway 99W	ODOT	Principal Arterial	4 Lanes	45 to 55 mph Posted	Not Permitted	Partial Both Sides	None	None
SW Elwert Road/SW Sunset Boulevard	City of Sherwood	Arterial	2 to 3 Lanes	35 mph Posted	Not Permitted	Both Sides	Both Sides	Both Sides
SW Brookman Road	Washington County	Arterial	2 Lanes	25/35/55 mph Posted/ Staturtory	Not Permitted	None	None	None

Notes: Functional Classification based on the City of Sherwood Transportation System Plan

Study Intersections

The proposed development is expected to impact three vicinity intersections of significance. Table 2 below provides a summarized description of each study intersection.

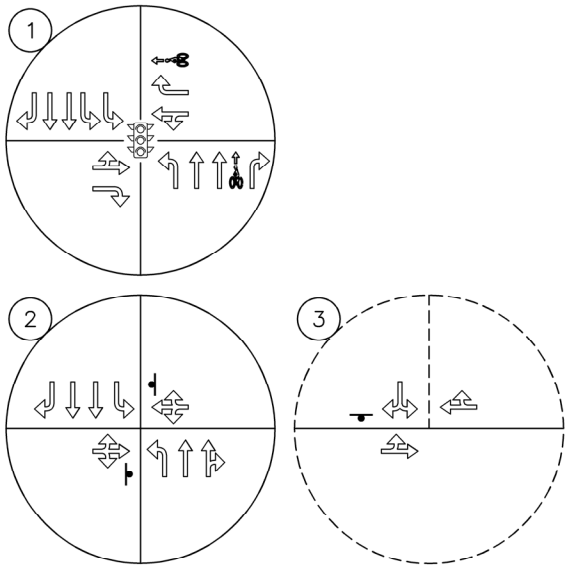
Table 2: Vicinity Intersection Descriptions

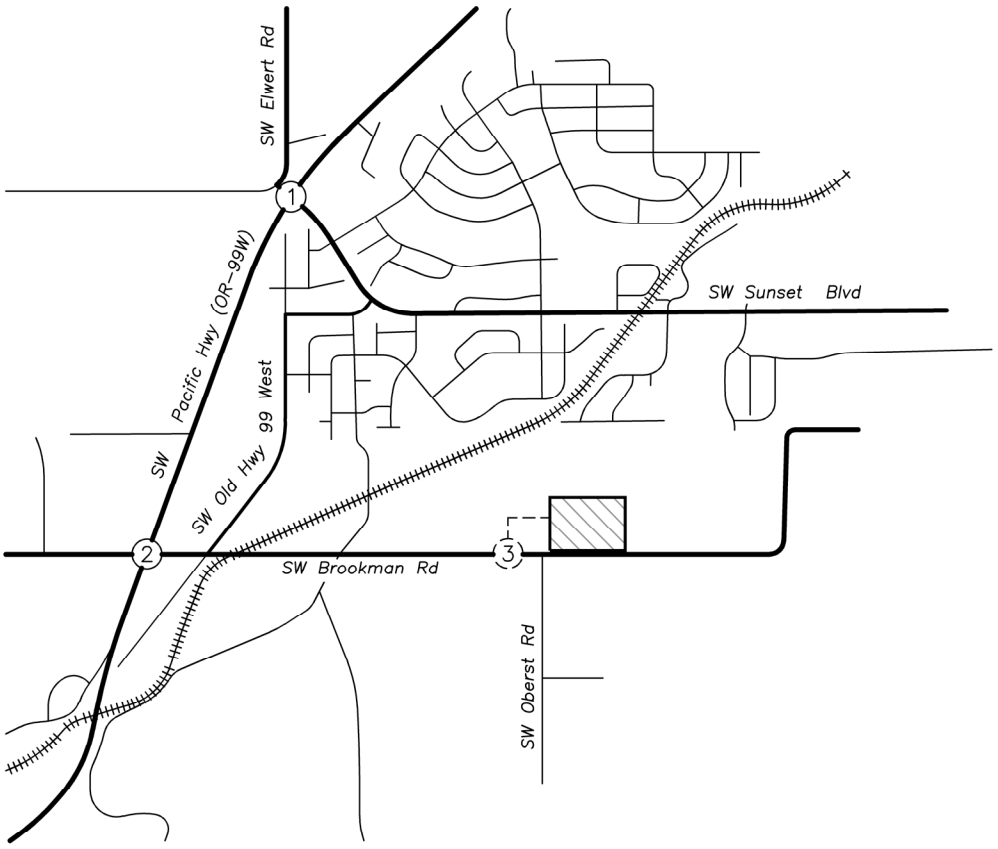
Number	Name	Geometry	Traffic Control	Phasing/Stopped Approaches
1	SW Elwert Road/SW Sunset Boulevard at Highway 99W	Four-Legged	Signalized	WB/EB Permitted LT, NB/SB Protected LT
2	SW Brookman Road at Highway 99W	Four-Legged	Stop-Controlled	EB/WB Stop Controlled Approach
3	SW Brookman Road at Site Access	Three-Legged (Future)	Stop-Controlled	SB Stop Controlled Approach

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations and control types is shown in Figure 1 on page 7.

LEGEND

- STUDY INTERSECTION (EXISTING)
- STUDY INTERSECTION (FUTURE)
- STOP SIGN
- TRAFFIC SIGNAL
- BICYCLE LANE
- PROJECT SITE
- ARTERIAL ROADWAY
- COLLECTOR ROADWAY
- LOCAL ROADWAY
- FUTURE ROADWAY
- RAILROAD TRACKS





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VICINITY MAP

Figure 1
Cedar Creek Subdivision
3/31/2020

Site Trips

Trip Generation

The proposed development includes the construction of 28 single-family houses. As part of the proposed development, an existing single-family house will be removed for a net increase of 27 houses.

To estimate the number of site trips generated under existing and proposed conditions, trip rates from the *Trip Generation Manual*[1] were used. Specifically, data from land-use codes 210, *Single-Family Detached Housing*, was used based on the number of dwelling units.

The trip generation calculations show that the proposed development is projected to generate an additional 20 morning peak hour trips, 27 evening peak hour trips, and 254 average weekday trips. The trip generation estimates are summarized in Table 3 below. Detailed trip generation calculations are included in the technical appendix to this report.

Table 3: Trip Generation Summary

	ITE Code	Units	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Existing Conditions									
Single Family House	210	1	0	1	1	1	0	1	10
Proposed Development									
Single Family House	210	28	5	16	21	18	10	28	264
Net New Site Trips			5	15	20	17	10	27	254

[1] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

Trip Distribution

The directional distribution of site trips to/from the project site was referenced from *The Reserve at Cedar Creek Transportation Impact Analysis* (TIA) – *Sherwood, Oregon*, dated September 19th, 2019. The following trip distribution was used for analysis:

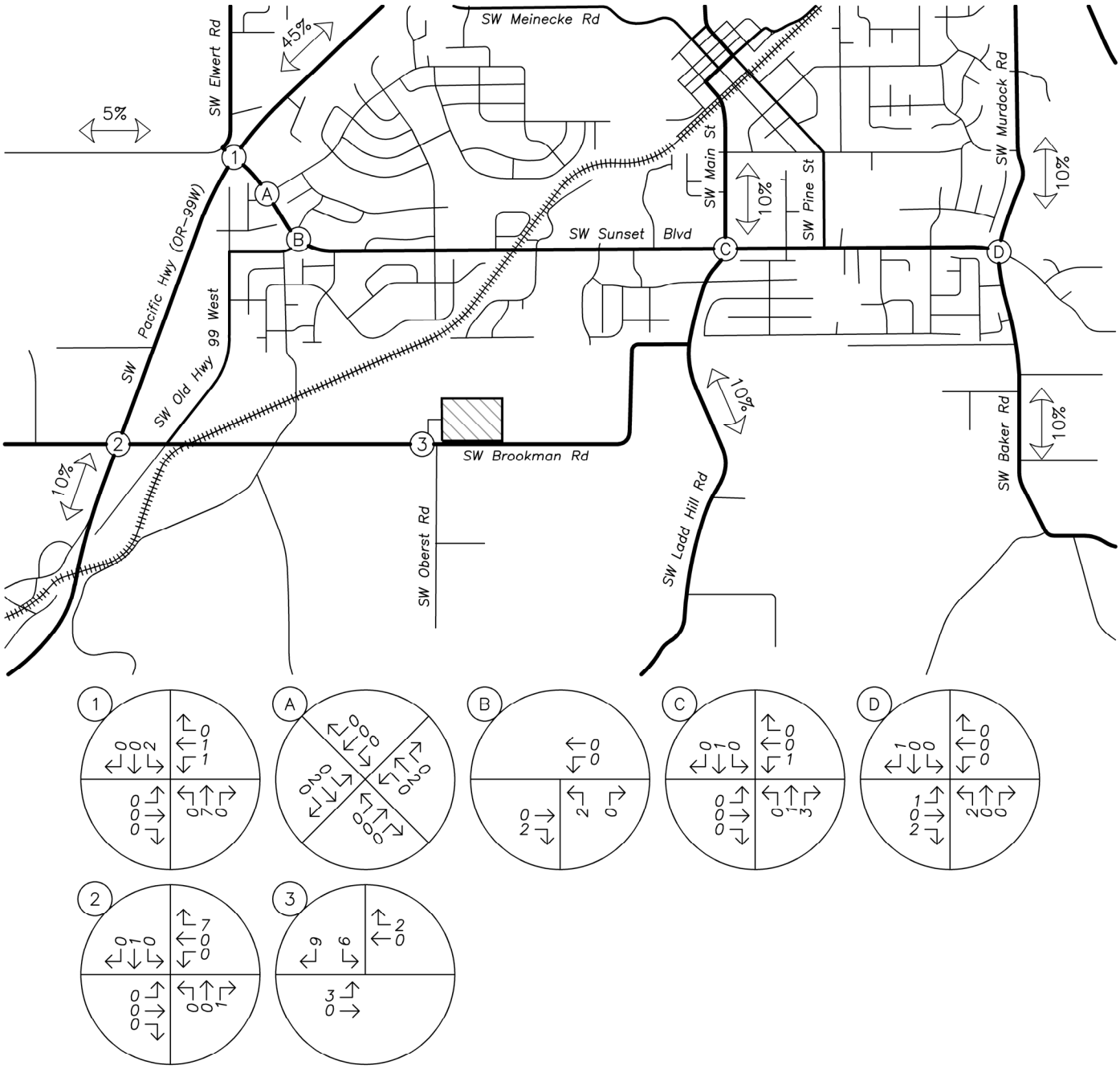
- Approximately 45 percent of site trips will travel to/from the north along Highway 99W
- Approximately 10 percent of site trips will travel to/from the north along SW Main Street
- Approximately 10 percent of site trips will travel to/from the north along SW Murdock Road
- Approximately 10 percent of site trips will travel to/from the south along Highway 99W
- Approximately 10 percent of site trips will travel to/from the south along SW Ladd Hill Road
- Approximately 10 percent of site trips will travel to/from the south along SW Baker Road
- Approximately 5 percent of site trips will travel to/from the west along SW Kruger Road

Four intersections were identified as exceeding acceptable operation standards in *The Reserve TIA*:

A. SW Sunset Boulevard at SW Woodhaven Drive
B. SW Sunset Boulevard at SW Timbrel Lane
C. SW Sunset Boulevard at SW Main Street/SW Ladd Hill Road
D. SW Sunset Boulevard at SW Murdock Road/SW Baker Road

Site trip assignment through these intersections was conducted to determine expected impacts from the proposed development to these intersections.

The trip distribution for site trips generated by the proposed development during is shown in Figure 2 on page 10 for the morning peak hour and Figure 3 on page 11 for the evening peak hour.

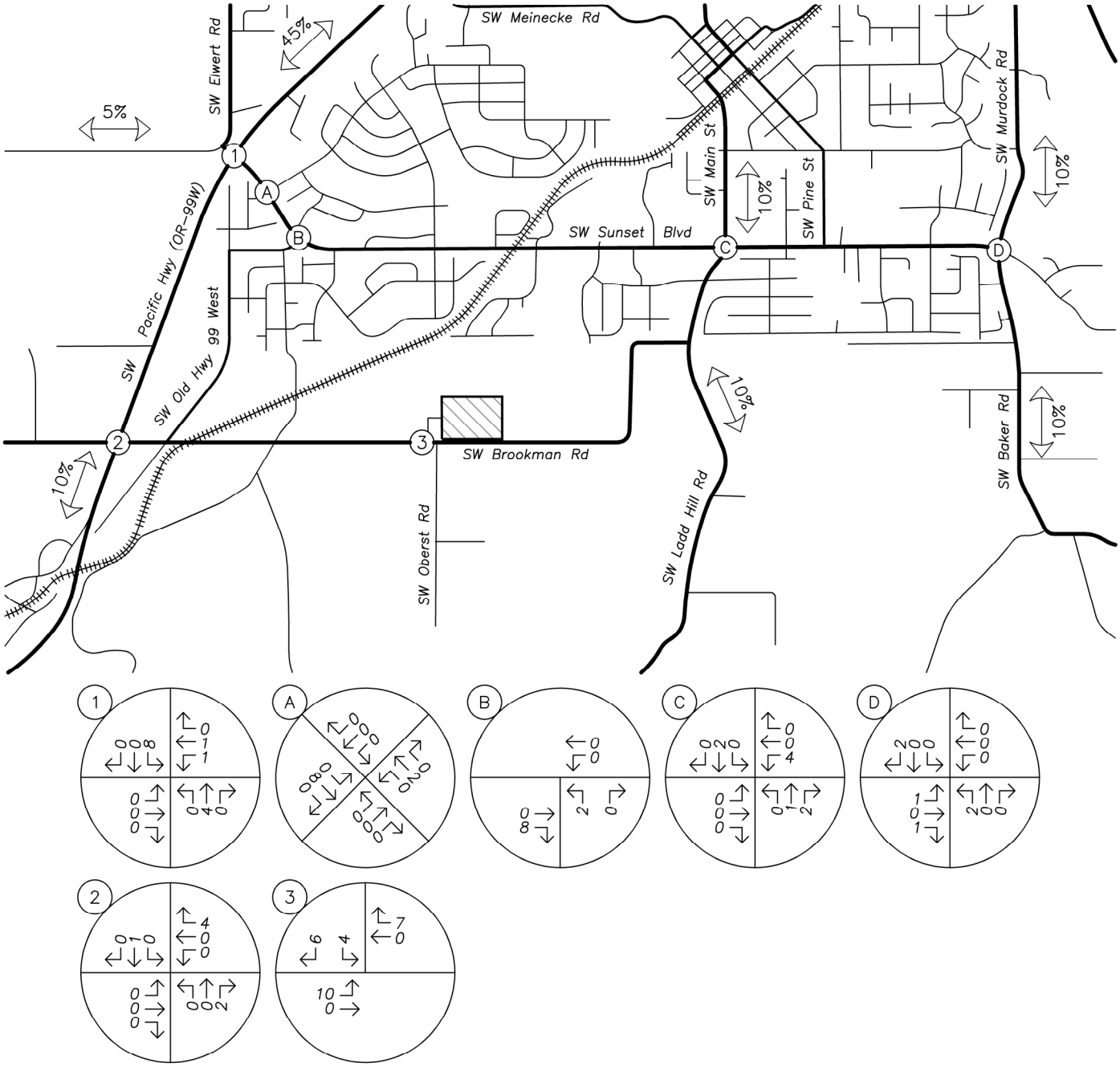


no scale

SITE TRIP DISTRIBUTION & ASSIGNMENT

Proposed Development Plan - Site Trips
AM Peak Hour

Figure 2
Cedar Creek Subdivision
3/31/2020



no scale

SITE TRIP DISTRIBUTION & ASSIGNMENT

Proposed Development Plan - Site Trips

PM Peak Hour

Figure 3

Cedar Creek Subdivision

3/31/2020

Traffic Volumes

Existing Conditions

To estimate existing traffic conditions, year 2017 traffic count data was referenced *The Reserve TIA*, specifically volumes from Figures 4 and 5. Consistent with background growth methodologies used in *The Reserve TIA*, the year 2017 volumes were increased by 1% annually along Highway 99W and by 2% annually on all other movements at the study intersections to reflect existing year 2020 conditions.

Figure 4 on page 13 shows the existing traffic volumes at the study intersections during the morning and evening peak hours.

Background Conditions

To provide analysis of the impact of the proposed development on the existing transportation facilities, an estimation of future traffic volumes is required. In order to reflect future traffic conditions without the proposed subdivision, the *Year 2024 Total Intersection Operations* (Figures 12 and 13) volumes were referenced from *The Reserve TIA*.

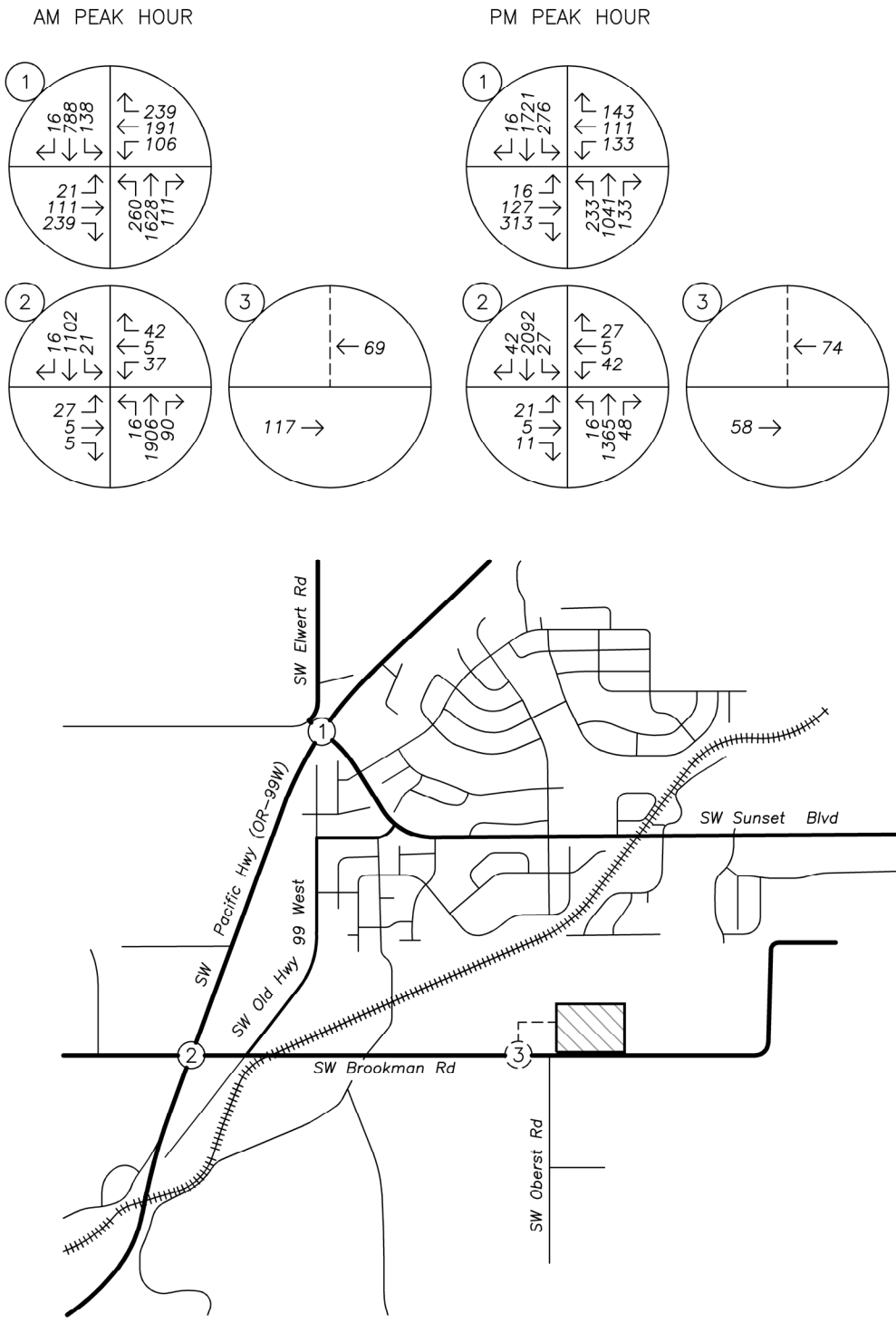
It should be noted that *The Reserve TIA* assumed that by year 2024 the intersection of SW Elwert Road/SW Sunset Boulevard at Highway 99W will be reconstructed to include a second northeast-bound left-turn lane, and a dedicated left-turn lane, through lane, and shared through/right-turn lane on the southeast-bound and northwest-bound approaches. In addition, turning movement restrictions at the intersection of SW Brookman Road at Highway 99W would be implemented by year 2024. Specific restrictions include access to minor-street approaches (i.e. eastbound and westbound approaches) being restricted to right-in/right-out only. In addition, U-turns along Highway 99W at the intersection would also be restricted.

Figure 5 on page 14 shows the background traffic volumes at the study intersections during the morning and evening peak hours.

Build-Out Conditions

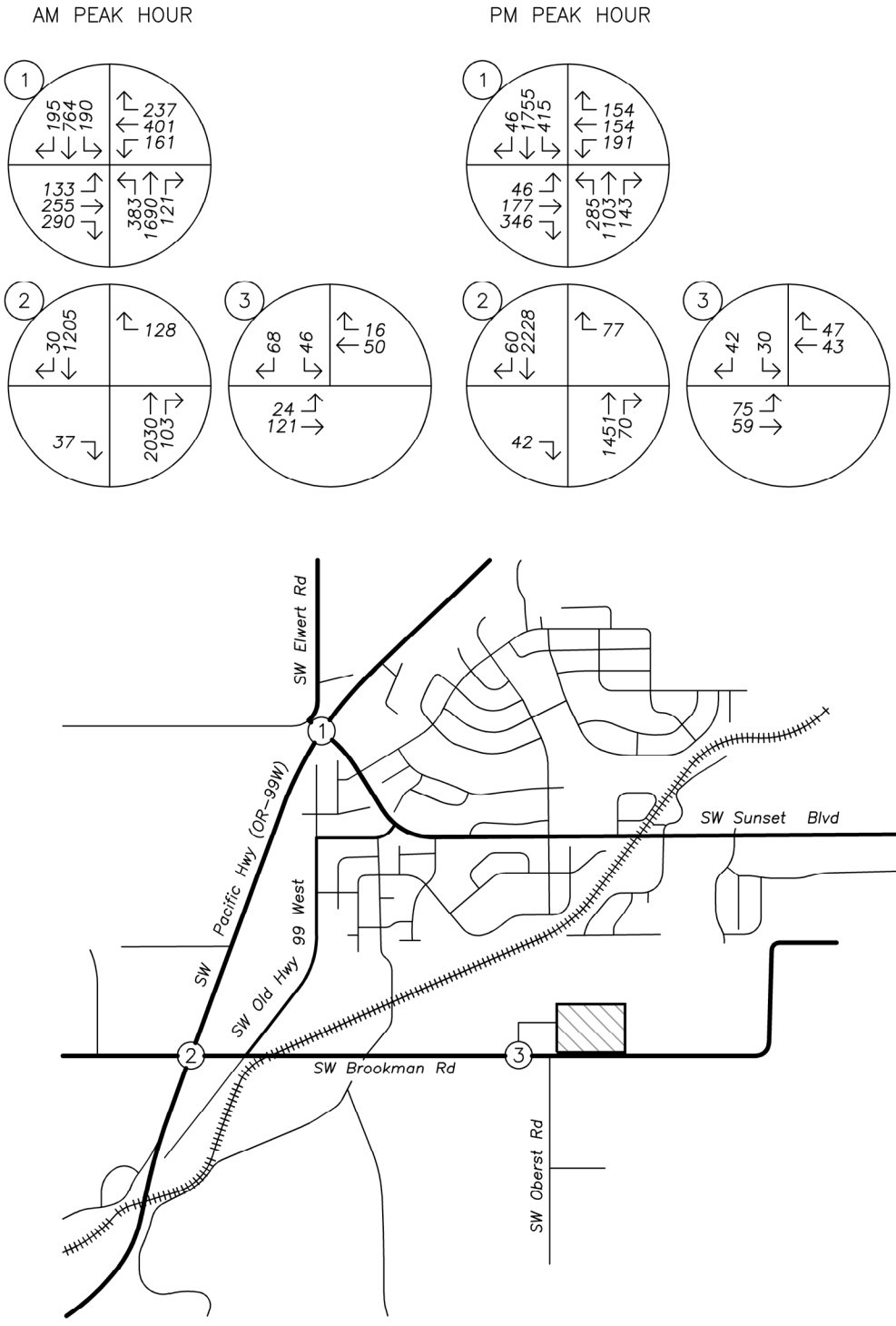
Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2024 background traffic volumes to obtain the expected 2024 build-out volumes.

Figure 6 on page 15 shows the build-out traffic volumes at the study intersections during the morning and evening peak hours.



TRAFFIC VOLUMES
Year 2020 Existing Conditions
AM & PM Peak Hours

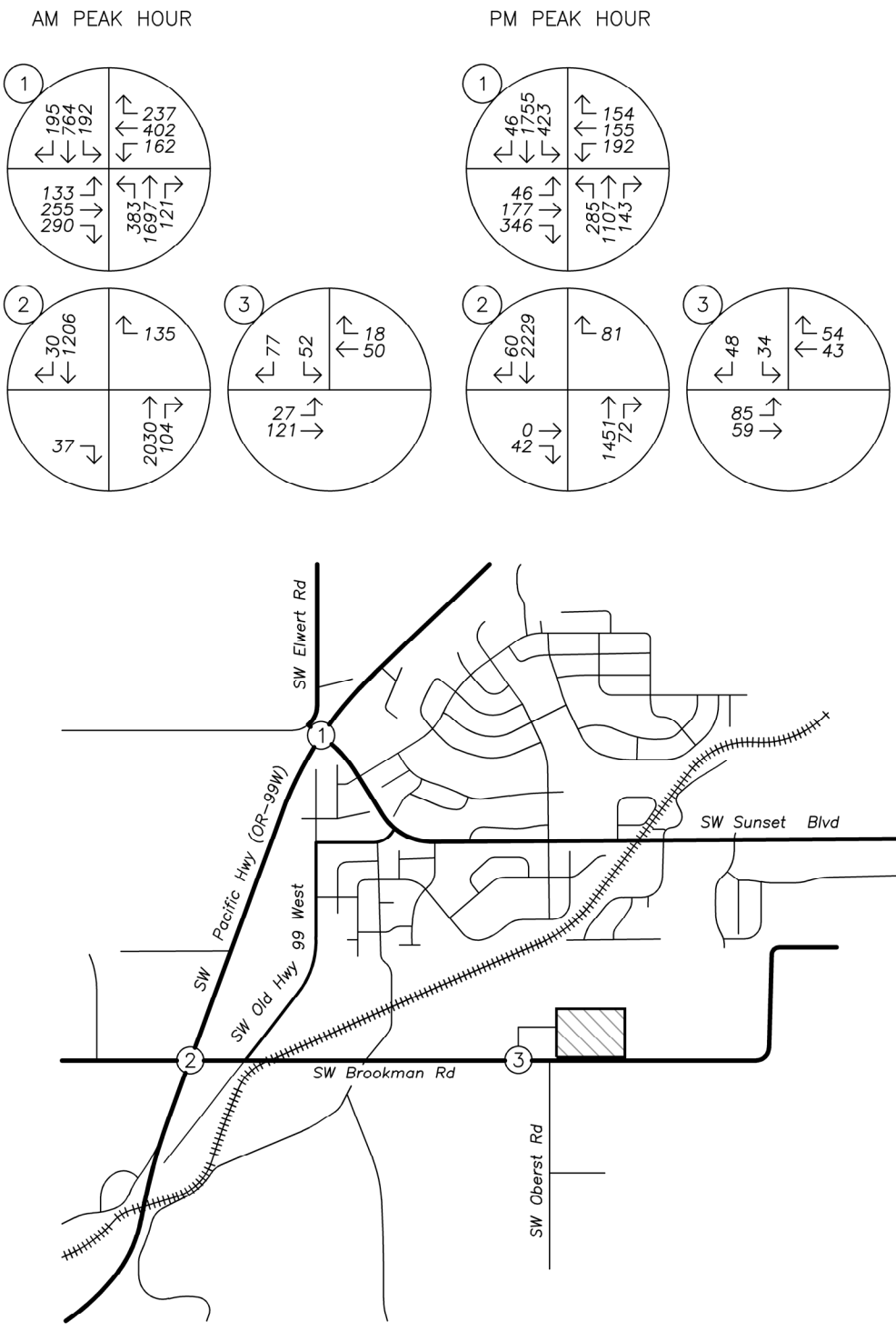
Figure 4
Cedar Creek Subdivision
3/31/2020



no scale

TRAFFIC VOLUMES
Year 2024 Background Conditions
AM & PM Peak Hours

Figure 5
Cedar Creek Subdivision
3/31/2020



lancaster mobley

TRAFFIC VOLUMES
Year 2024 Buildout Conditions
AM & PM Peak Hours

Figure 6
Cedar Creek Subdivision
3/31/2020

Safety Analysis

Crash History Review

Using data obtained from ODOT's Crash Analysis and Reporting Unit, a review was performed of the most recent five years of available crash data at the study intersections (January 2013 through December 2017). The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for each intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated under the common assumption that traffic counted during the evening peak hour represents approximately ten percent of annual average daily traffic (AADT) at each intersection. Crash rates in excess of 1.00 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation. Additionally, the crash rates for study intersections along Highway 99W were compared against ODOT's average and 90th percentile crash rates for intersections with similar approach configurations and traffic control types to determine whether safety mitigation is necessary or appropriate.

The study intersections along Highway 99W are ODOT facilities which adhere to the crash analysis methodologies within ODOT's APM[2]. According to *Exhibit 4-1: Intersection Crash Rates per MEV by Land Type and Traffic Control* of the APM, intersections which experience crash rates in excess of their respective 90th percentile crash rates should be "flagged for further analysis". For intersections in urban settings, the following average and 90th percentile rates are applicable to the study intersections:

- Unsignalized, four-legged intersection: average rate of 0.198 CMEV and 90th percentile rate of 0.408 CMEV.
- Signalized, four-legged intersection: average rate of 0.477 CMEV and 90th percentile rate of 0.860 CMEV.

With regard to crash severity, ODOT classifies crashes in the following categories:

- Property Damage Only (PDO);
- Possible Injury – Complaint of Pain (Injury C);
- Non-Incapacitating Injury (Injury B);
- Incapacitating Injury – Bleeding, Broken Bones (Injury A); and
- Fatality or Fatal Injury.

Table 4 on page 17 provides a summary of crash types while Table 5 on page 17 summarizes crash severities and rates for each of the study intersections. Detailed crash reports are included in the technical appendix to this report.

[2] Oregon Department of Transportation, *Analysis Procedures Manual Version 2*. December 2019.

Table 4: Crash Type Summary

	Intersection	Crash Type									Total Crashes
		Rear End	Turn	Angle	Fixed Object	Side Swipe	Head On	Other	Ped	Bike	
1	SW Elwert Road/SW Sunset Boulevard at Highway 99W	22	5	1	0	0	0	0	0	1	29
2	SW Brookman Road at Highway 99W	1	7	9	0	0	0	0	0	0	17

Table 5: Crash Severity and Rate Summary

	Intersection	Crash Severity					Total Crashes	AADT	Crash Rate
		PDO	C	B	A	Fatal			
1	SW Elwert Road/SW Sunset Boulevard at Highway 99W	15	11	3	0	0	29	40,930	0.39
2	SW Brookman Road at Highway 99W	12	2	1	2	0	17	35,760	0.26

BOLDED text indicates a crash rate in excess of the 90th percentile crash rate.

At the intersection of SW Elwert Road/SW Sunset Boulevard at Highway 99W, there was one reported crash that involved a bicyclist. The crash occurred when the driver of a northwest-bound, left-turning passenger car failed to yield right-of-way to a northwest/southeast crossing bicyclist. The bicyclist sustained injuries consistent with *Injury B* classification.

At the intersection of SW Brookman Road at Highway 99W, there were two reported crashes classified as *Injury A* collisions. The following narrative describes each crash:

- The first crash occurred when an eastbound passenger car entered the intersection and collided with a southbound passenger car. The eastbound driver proceeded into the intersection after stopping at the stop sign but failed to yield the right-of-way to the southbound vehicle. The driver of the eastbound vehicle sustained injuries consistent with *Injury A* classification, while a passenger in the southbound vehicle sustained injuries consistent with *Injury C* classification. The driver of the southbound vehicle was uninjured.
- The second crash occurred when a westbound passenger car entered the intersection and collided with a northbound motorcyclist. The westbound driver proceeded into the intersection after stopping at the stop sign but failed to yield the right-of-way to the northbound motorcycle. The driver of the passenger car was uninjured, while the motorcyclist sustained injuries.

It should be noted that with restriction of the minor-street approaches to right-in/right-out only, future collisions similar to the above *Injury A* collisions are not expected to occur.

Based on the review of the crash data, no significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

Warrant Analysis

Left-turn lane warrants were examined for the site access intersection under year 2024 buildout conditions. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream.

Warrants for an eastbound left-turn lane at the site access intersection were based on the methodology outlined in the National Cooperative Highway Research Program (NCHRP) Report Number 457[3]. This methodology evaluates the need for a left-turn lane based on the number of left-turning vehicles, the number of travel lanes, the number of advancing and opposing vehicles, and the roadway travel speed.

Left-turn lane warrants are not projected to be met upon completion and occupancy of the proposed development. Detailed warrant analyses for each study intersection are included in the technical appendix to this report.

[3] Bonneson, James A. and Michael D. Fontaine, *NCHRP Report 457: An Engineering Study Guide for Evaluating Intersection Improvements*, Transportation Research Board, 2001.

Operational Analysis

A capacity and delay analysis was conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *Highway Capacity Manual*[4] (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

Performance Standards

The operating standards adopted by Washington County, ODOT, and the City of Sherwood are summarized below.

Washington County

SW Brookman Road is under the jurisdiction of Washington County. The County has defined operating standards for signalized and stop controlled intersections as follows:

- For signalized intersections, the maximum intersection v/c ratio shall be no greater than 0.99.
- For unsignalized intersections, no movement shall experience a v/c ratio greater than 0.99.

ODOT

ODOT operates and maintains Highway 99W. ODOT's operating mobility target for intersections along Highway 99W in the study area is an intersection v/c ratio no greater than 0.99 during the 1st and 2nd peak hours per Table 7 of the *Oregon Highway Plan*[5].

City of Sherwood

According to the City of Sherwood's Transportation System Plan (TSP), both signalized and unsignalized intersections under City jurisdiction must operate at LOS D or better with a v/c ratio of 0.85 or less; however, two-way stop-controlled intersections are required to operate at LOS E or better with a v/c ratio of 0.90 or less[6].

Delay & Capacity Analysis

Synchro, a Trafficware analysis software, was used to calculate the LOS and v/c ratio of the study intersections for all analysis scenarios. The reported results are generally based on the analysis methodologies provided in the HCM 6th Edition; however, the HCM 6th edition (utilizing Trafficware software) does not report an overall v/c ratio for signalized intersections, which is the standard ODOT uses to evaluate intersection operation. Therefore, the v/c ratio for the signalized intersection of SW Elwert Road/SW Sunset Boulevard at Highway 99W was based on HCM 2000 methodologies.

[4] Transportation Research Board, *Highway Capacity Manual 6th Edition*, 2016.
[5] Oregon Department of Transportation, *Oregon Highway Plan*. 1999
[6] City of Sherwood, *Sherwood Transportation System Plan*. Adopted June 17th, 2014.

The v/c, delay, and LOS results of the capacity analysis are shown in Table 6 below for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

Table 6: Intersection Capacity Analysis Summary

		Morning Peak Hour			Evening Peak Hour		
		LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
1	**SW Elwert Road/SW Sunset Boulevard at Highway 99W**						
	2020 Existing Conditions	F	>120	0.90	F	>120	0.99
	2024 Background Conditions	E	69	**1.00**	E	77	**1.01**
	2024 Buildout Conditions	E	70	**1.00**	E	78	**1.02**
2	**SW Brookman Road at Highway 99W**						
	2020 Existing Conditions	F	>120	**>1.10**	C	22	0.07
	2024 Background Conditions	F	57	0.69	D	30	0.24
	2024 Buildout Conditions	F	63	0.73	D	30	0.25
3	**SW Brookman Road at Site Access**						
	2024 Background Conditions	B	11	0.21	B	11	0.14
	2024 Buildout Conditions	B	11	0.24	B	11	0.17

BOLDED results indicate operation above acceptable jurisdictional standards.

The delay and capacity analysis shows that the intersection of SW Brookman Road at Highway 99W is currently operating in excess of ODOT standards. However, by year 2024, the intersection is planned and assumed to be reconfigured to restrict minor-street turning movements to right-in/right-out. With implementation of this mitigation, the intersection is projected to operate acceptably per ODOT standards.

The intersection of SW Elwert Road/SW Sunset Boulevard at Highway 99W is projected to operate in excess of ODOT's 0.99 v/c ratio standard for Highway 99W by year 2024, even with the planned installation of an additional northeast-bound left-turn lane and reconstructing the southeast-bound and northwest-bound approaches to each include a left-turn lane, through lane, and shared through/right-turn lane. Although the intersection is projected to exceed the v/c standard, according to the Oregon Highway Plan:

> *In applying OHP mobility targets to analyze mitigation, ODOT recognizes that there are many variables and levels of uncertainty in calculating volume-to-capacity ratios, particularly over a specified planning horizon. After negotiating reasonable levels of mitigation for actions required under OAR 660-012-0060, ODOT considers calculated values for v/c ratios that are within 0.03 of the adopted target in the OHP to be considered in compliance with the target. The adopted mobility target still applies for determining significant affect under OAR 660-012-0060.*

Given the intersection is projected to operate at a v/c ratio no greater than 1.02 post planned improvements (i.e. within 0.03 of ODOT's 0.99 v/c standard), no further mitigation is necessary at the intersection as part of the proposed development.

Based on the above analysis and findings, all study intersections are projected to operate acceptably per their respectively jurisdictional standards by year 2024 with buildout of the proposed subdivision. Accordingly, no operational mitigation is necessary as part of the proposed Cedar Creek Subdivision.

Proportionate Share Mitigation Assessment

Consistent with *The Reserve TIA*, proportionate share fees were evaluated at intersections determined as failing, using methodologies similar to those presented in Table 6 of the referenced TIA. Table 7 on the following page provides the methodology used to calculate proportionate share fees based on the proposed development's trip generation impacts.

Table 7: Proportional Share Methology Summary

Intersection	A. SW Sunset Boulevard at SW Woodehaven Drive	B. SW Sunset Boulevard at SW Timbrel Lane	C. SW Sunset Boulevard at SW Main Street/SW Ladd Hill Road	D. SW Sunset Boulevard at SW Murdock Road/SW Baker Road
Mitigation Project Summary	Construct Traffic Signal	Construct Mini Roundabout	Construct Traffic Signal	Construct NB LTL & SB RTL
City TSP Project ID	NA	D28	D26	D33
Peak Hour	Weekday AM	Weekday AM	Weekday PM	Weekday PM
Scenario when Mitigation is Triggered	No Build (2024)	No Build (2024)	No Build (2024)	No Build (2024)
Existing Total Entering Volume, TEV (X)	1,012	894	1,208	1,208
2024 No Build (Background with RIRO, Y)	1,541	1,318	1,487	1,371
2024 Project Trips (PT)	4	4	9	6
Background Growth (Z=Y-X)	529	424	279	163
Proportional Share (%, PT/(PT+Z))	0.75%	0.93%	3.13%	3.55%
Mitigation Cost Estimate ($)	$1,050,000	$630,000	$250,000	$750,000
Cost Estimate Reference	DKS (Ref 10)	DKS (Ref 10)	TSP (Ref 5)	TSP (Ref 5)
Proportional Share Cost	$7,879.92	$5,887.85	$7,812.50	$26,627.22

Based on the proportionate share fee calculations, a total proportionate share fee to mitigate site trip impacts to the above intersections is $48,207.49.

Conclusions

No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

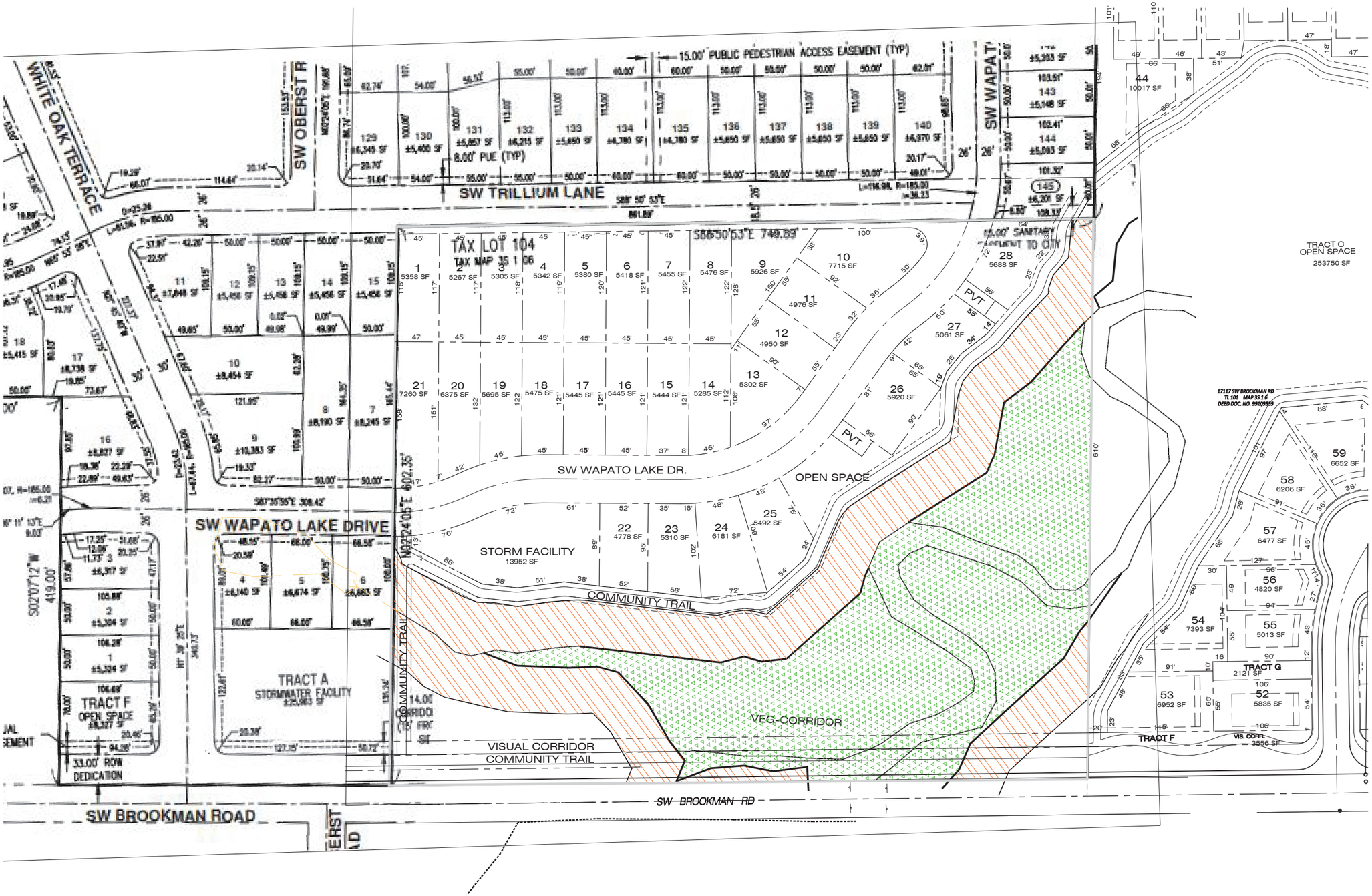
Left-turn lane warrants are not projected to be met at the site access intersection along SW Brookman Road upon completion and occupancy of the proposed development. Accordingly, installation of a left-turn lane at the site access intersection is not necessary or recommended.

All study intersections are projected to operate acceptably per their respectively jurisdictional standards by year 2024 with buildout of the proposed subdivision. Accordingly, no operational mitigation is necessary as part of the proposed Cedar Creek Subdivision.

The Reserve at Cedar Creek Transportation Impact Analysis (TIA) – *Sherwood, Oregon*, dated September 19th, 2019, identified four intersections as currently exceeding acceptable jurisdictional standards. Based on the projected site trip impacts to these intersections, a total proportionate share fee to mitigate impacts of $48,207.49 was calculated.

Appendix

Exhibit A11



SCALE
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1 INCH = 50 FEET

TVWD FILE #?????
WACO CASEFILE # ??-???-?

PIONEER DESIGN GROUP
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WWW.PD-GRP.COM

PRELIMINARY SITE PLAN

SCOTT PROPERTY
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	10/19
Drawn by	TCC	Date	10/19
Reviewed by	MLS	Date	10/19
Project No.	131-999	REF.	
Horiz. Scale:	1"=50'		
Vert. Scale:			

No.	Date	Revision	By

Project: SCOTT PROPERTY
No.: 131-999
Type: PLANNING
Sheet: **P0.0**

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TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 1

AM PEAK HOUR

Trip Rate: 0.74

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	**0**	**1**	**1**

PM PEAK HOUR

Trip Rate: 0.99

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**1**	**0**	**1**

WEEKDAY

Trip Rate: 9.44

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**5**	**5**	**10**

SATURDAY

Trip Rate: 9.54

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**5**	**5**	**10**

Source: Trip Generation Manual, Tenth Edition

TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 28

AM PEAK HOUR

Trip Rate: 0.74

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	**5**	**16**	**21**

PM PEAK HOUR

Trip Rate: 0.99

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**18**	**10**	**28**

WEEKDAY

Trip Rate: 9.44

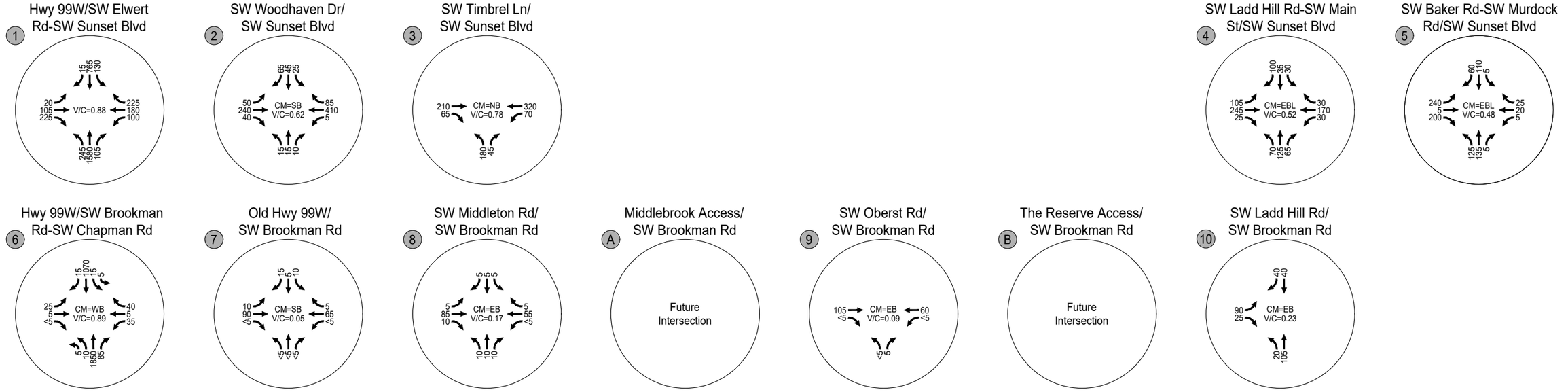
	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**132**	**132**	**264**

SATURDAY

Trip Rate: 9.54

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**134**	**134**	**268**

Source: Trip Generation Manual, Tenth Edition



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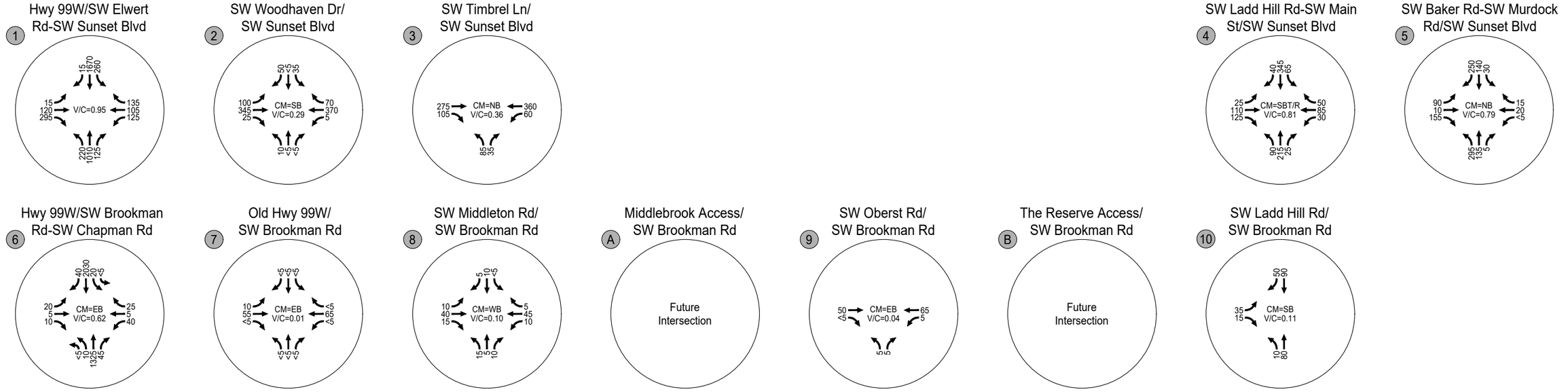
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL

Existing Intersection Operations
Weekday AM Peak Hour
Sherwood, Oregon

Figure 4



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TWSC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL

Existing Intersection Operations
Weekday PM Peak Hour
Sherwood, Oregon

Figure 5

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KITTELSON & ASSOCIATES

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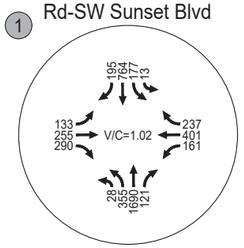
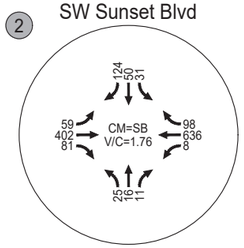
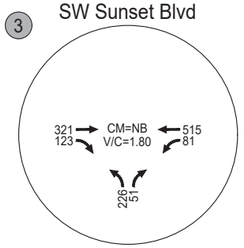


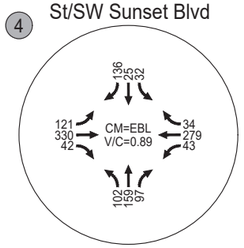
SW Woodhaven Dr/ SW Sunset Blvd



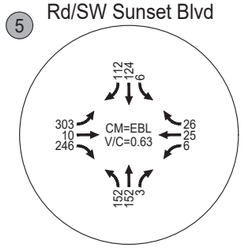
SW Timbrel Ln/ SW Sunset Blvd



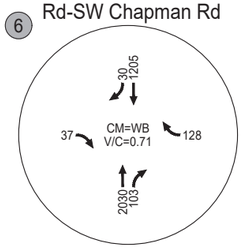
SW Ladd Hill Rd-SW Main St/SW Sunset Blvd



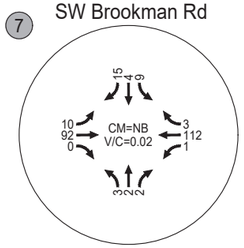
SW Baker Rd-SW Murdock Rd/SW Sunset Blvd



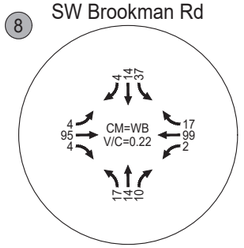
Hwy 99W/SW Brookman Rd-SW Chapman Rd



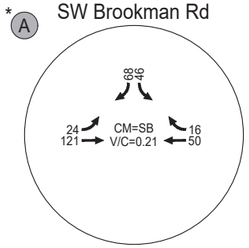
Old Hwy 99W/ SW Brookman Rd



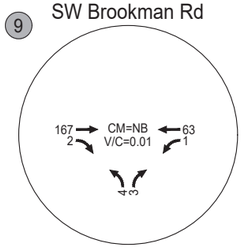
SW Middleton Rd/ SW Brookman Rd



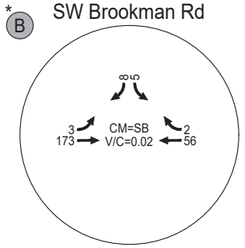
Middlebrook Access/ SW Brookman Rd



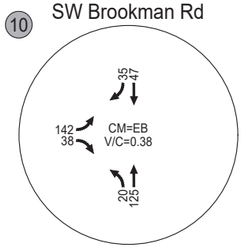
SW Oberst Rd/ SW Brookman Rd



The Reserve Access/ SW Brookman Rd



SW Ladd Hill Rd/ SW Brookman Rd



* Note: Trips were added to intersections A and B to account for rerouted trips associated with the existing two homes on site.

CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
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TWSC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL

Year 2024 Total Intersection Operations
Weekday AM Peak Hour
Sherwood, Oregon

Figure 12

KITTELSON & ASSOCIATES

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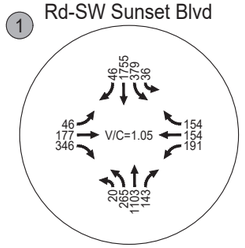
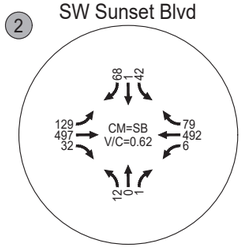
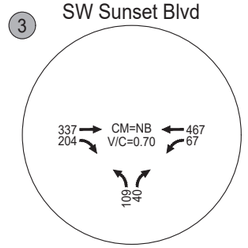
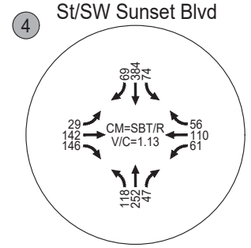
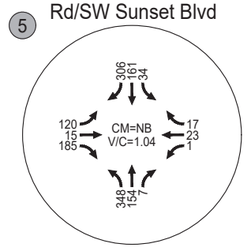
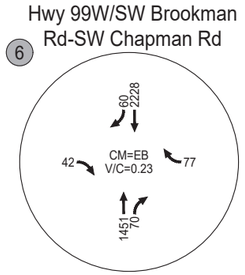


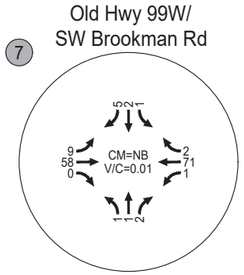


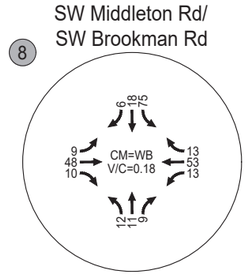


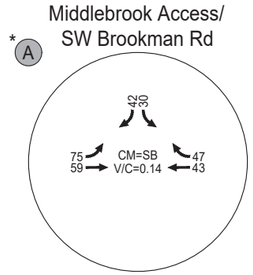


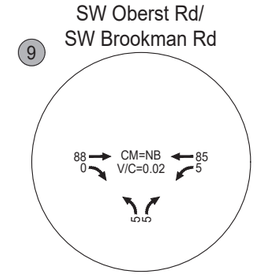


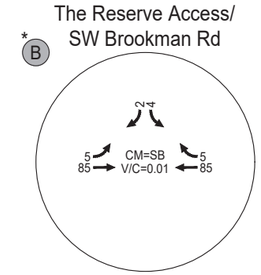


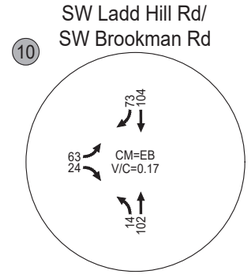












* Note: Trips were added to intersections A and B to account for rerouted trips associated with the existing two homes on site.

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
TWSC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL

Year 2024 Total Intersection Operations
Weekday PM Peak Hour
Sherwood, Oregon

Figure 13

C:\KAI Applications\Autodesk\TEMP\AcPublish_10660\24316_The Reserve_Figures_NP_2019-09-09.dwg Sep 17, 2019 - 12:25pm - nick Layout Tab: 13_TL_PM

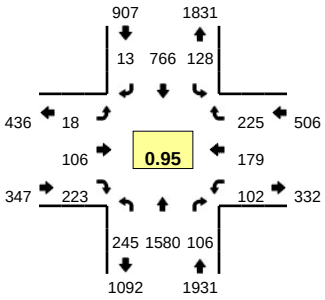
KITTELSON & ASSOCIATES

Type of peak hour being reported: Intersection Peak

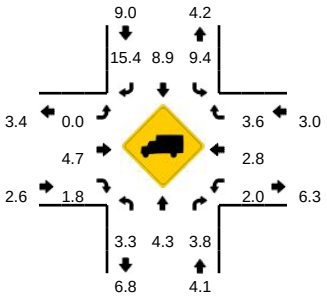
Method for determining peak hour: Total Entering Volume

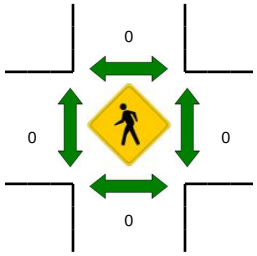
LOCATION: SW Pacific Hwy -- SW Elwert Rd/SW Sunset Blvd
CITY/STATE: Sherwood, OR

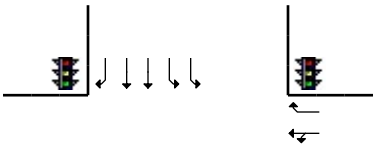
QC JOB #: 14401717
DATE: Thu, May 11 2017

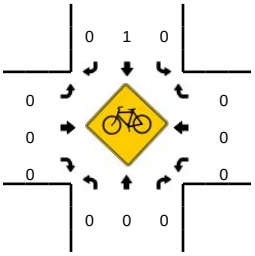


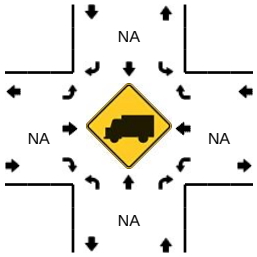
Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

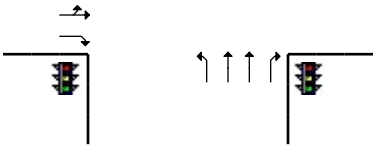


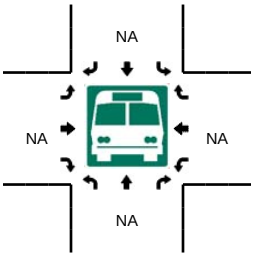












5-Min Count Period Beginning At	SW Pacific Hwy (Northbound)				SW Pacific Hwy (Southbound)				SW Elwert Rd/SW Sunset Blvd (Eastbound)				SW Elwert Rd/SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	22	126	6	0	2	43	0	1	0	5	15	0	11	13	12	0	256	
7:05 AM	10	136	9	0	3	71	2	0	3	5	19	0	8	8	17	0	291	
7:10 AM	20	118	8	0	8	54	1	1	1	7	25	0	14	19	12	0	288	
7:15 AM	34	127	9	0	6	44	1	1	1	9	17	0	9	15	19	0	292	
7:20 AM	23	140	8	0	5	60	0	0	3	5	16	0	16	8	16	0	300	
7:25 AM	22	154	14	0	7	76	1	0	0	5	14	0	3	15	16	0	327	
7:30 AM	19	119	7	0	11	50	1	1	4	14	20	0	4	21	17	0	288	
7:35 AM	22	123	5	0	12	52	1	1	1	9	14	0	13	25	16	0	294	
7:40 AM	20	139	9	0	13	64	0	1	1	9	14	0	7	19	19	0	315	
7:45 AM	23	122	7	0	20	69	2	2	2	9	21	0	7	15	23	0	322	
7:50 AM	14	121	8	0	11	100	2	0	0	13	24	0	8	14	23	0	338	
7:55 AM	26	115	10	0	17	59	1	1	2	10	20	0	7	11	29	0	308	3619
8:00 AM	11	166	12	1	7	67	1	0	0	11	19	0	6	9	18	0	328	3691
8:05 AM	8	79	9	0	8	63	0	1	1	5	26	0	10	5	15	0	230	3630
8:10 AM	16	81	4	0	6	48	0	3	2	2	11	0	7	14	12	0	206	3548
8:15 AM	12	133	6	0	6	83	0	1	1	4	12	0	5	7	12	0	282	3538
8:20 AM	23	98	8	0	6	40	0	4	0	6	16	0	7	8	7	0	223	3461
8:25 AM	11	110	9	0	6	55	0	2	2	2	19	0	7	8	9	0	240	3374
8:30 AM	16	76	5	0	13	51	0	3	0	3	10	0	7	6	14	0	204	3290
8:35 AM	17	128	7	0	7	66	2	1	1	8	13	0	5	9	11	0	275	3271
8:40 AM	9	112	11	0	9	62	1	1	1	3	10	0	3	4	3	0	229	3185
8:45 AM	8	93	8	0	7	60	0	0	1	4	10	0	11	8	17	0	227	3090
8:50 AM	9	96	11	0	3	59	0	1	1	7	23	0	7	6	12	0	235	2987
8:55 AM	9	86	6	0	8	74	1	3	1	8	8	0	5	3	11	0	223	2902

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	228	1528	96	0	176	932	16	12	12	124	236	0	88	192	260	0	3900
Heavy Trucks	12	68	4		12	60	4		0	4	0		0	4	16		184
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/19/2017 4:01 PM

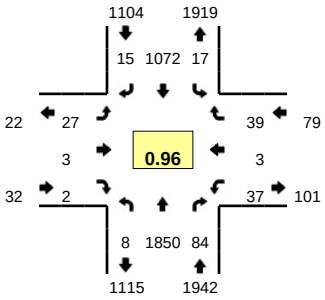
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

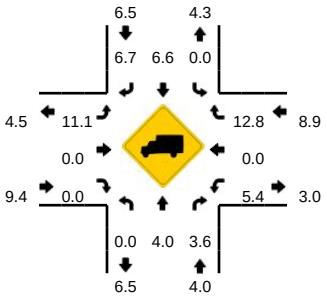
Method for determining peak hour: Total Entering Volume

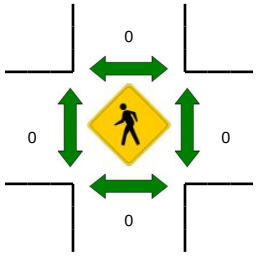
LOCATION: SW Pacific Hwy -- SW Chapman Rd
CITY/STATE: Sherwood, OR

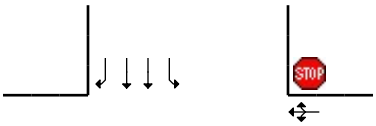
QC JOB #: 14401706
DATE: Thu, May 11 2017

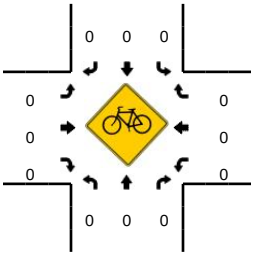


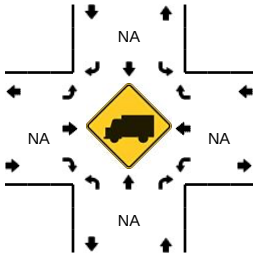
Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

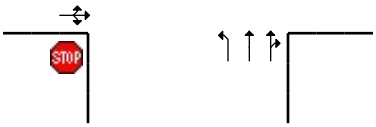


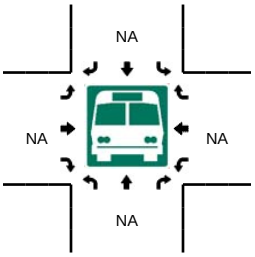












5-Min Count Period Beginning At	SW Pacific Hwy (Northbound)				SW Pacific Hwy (Southbound)				SW Chapman Rd (Eastbound)				SW Chapman Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	133	2	0	0	74	0	0	1	0	0	0	4	0	3	0	217	
7:05 AM	0	169	5	1	0	81	4	0	0	0	0	0	2	0	0	0	262	
7:10 AM	0	159	6	0	0	99	1	1	1	0	0	0	1	0	1	0	269	
7:15 AM	1	165	11	0	1	75	0	0	0	1	0	0	2	0	2	0	258	
7:20 AM	0	174	7	0	0	100	0	1	1	1	0	0	3	0	1	0	288	
7:25 AM	0	141	8	1	1	78	1	0	3	0	0	0	4	0	2	0	239	
7:30 AM	0	177	8	0	1	84	0	0	4	0	1	0	0	1	4	0	280	
7:35 AM	0	177	8	0	0	85	1	0	0	0	0	0	4	0	3	0	278	
7:40 AM	1	147	14	1	1	85	1	0	4	0	0	0	3	1	5	0	263	
7:45 AM	1	142	9	0	4	99	2	0	3	0	0	0	2	0	4	0	266	
7:50 AM	0	147	6	0	1	125	1	1	2	0	0	0	4	1	3	0	291	
7:55 AM	1	133	1	0	3	82	2	0	1	1	1	0	8	0	6	0	239	3150
8:00 AM	0	119	1	1	2	79	2	0	8	0	0	0	4	0	8	0	224	3157
8:05 AM	0	98	4	0	2	85	4	0	5	0	0	0	2	1	1	0	202	3097
8:10 AM	0	127	2	0	1	82	1	0	0	1	0	0	3	0	1	0	218	3046
8:15 AM	0	130	3	0	2	72	2	0	3	0	1	0	2	0	2	0	217	3005
8:20 AM	1	135	6	0	1	89	1	1	0	1	0	0	3	0	2	0	240	2957
8:25 AM	0	115	5	0	3	63	0	0	0	0	0	0	0	0	1	0	187	2905
8:30 AM	0	127	3	0	1	71	0	0	1	0	0	0	3	1	3	0	210	2835
8:35 AM	0	118	3	0	1	83	2	0	2	0	0	0	0	1	1	0	211	2768
8:40 AM	1	143	0	1	1	68	2	1	1	0	0	0	3	0	0	0	221	2726
8:45 AM	0	108	1	0	1	87	4	1	0	1	0	0	3	0	2	0	208	2668
8:50 AM	1	127	3	0	0	88	1	0	0	1	1	0	1	0	1	0	224	2601
8:55 AM	0	93	4	0	1	89	3	0	2	1	1	0	3	1	1	0	199	2561

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	4	2004	120	4	8	1016	8	0	32	0	4	0	28	8	48	0	3284
Heavy Trucks	0	64	4		0	100	0		0	0	0		4	0	4		176
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/19/2017 4:01 PM

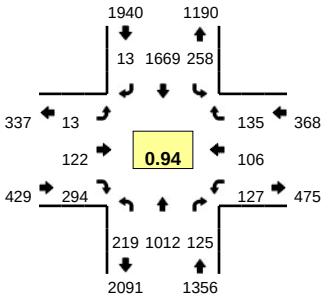
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

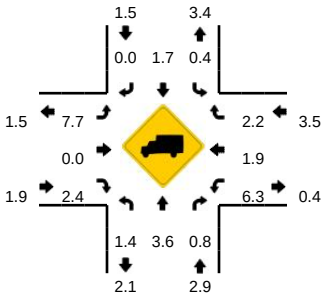
Method for determining peak hour: Total Entering Volume

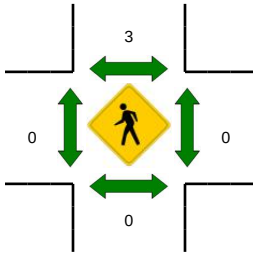
LOCATION: SW Pacific Hwy -- SW Elwert Rd/SW Sunset Blvd
CITY/STATE: Sherwood, OR

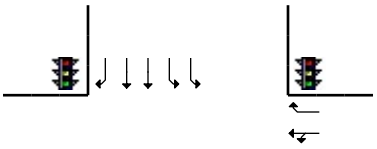
QC JOB #: 14401718
DATE: Thu, May 11 2017

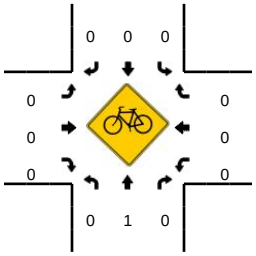


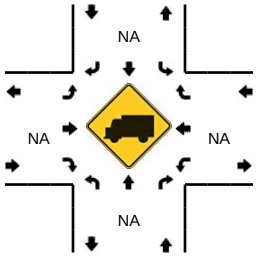
Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

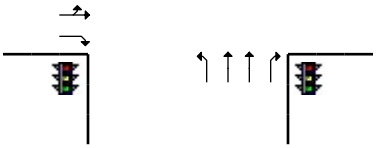


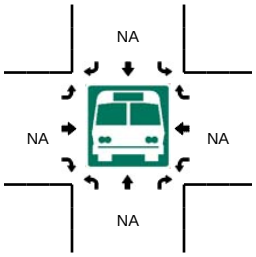












5-Min Count Period Beginning At	SW Pacific Hwy (Northbound)				SW Pacific Hwy (Southbound)				SW Elwert Rd/SW Sunset Blvd (Eastbound)				SW Elwert Rd/SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	15	71	6	1	11	141	3	4	3	11	27	0	10	6	6	0	315	
4:05 PM	4	62	14	0	14	154	0	1	0	12	26	0	7	5	11	0	310	
4:10 PM	12	76	3	0	11	132	0	2	0	10	27	0	9	8	10	0	300	
4:15 PM	13	96	13	1	10	111	3	3	1	7	25	0	11	8	15	0	317	
4:20 PM	16	91	13	1	13	149	0	5	0	12	18	0	13	7	11	0	349	
4:25 PM	13	82	5	0	12	140	2	3	1	9	21	0	12	10	16	0	326	
4:30 PM	22	73	10	0	12	110	3	2	0	11	28	0	6	7	11	0	295	
4:35 PM	16	82	8	0	19	121	2	6	0	11	26	0	10	8	11	0	320	
4:40 PM	24	100	17	1	13	129	1	2	0	7	29	0	12	8	9	0	352	
4:45 PM	23	79	9	0	19	136	0	3	1	7	22	0	11	19	15	0	344	
4:50 PM	22	87	11	0	22	124	1	3	2	12	27	0	11	10	12	0	344	
4:55 PM	14	78	16	0	25	136	1	1	2	6	28	0	12	8	18	0	345	3917
5:00 PM	19	77	8	0	10	117	0	5	2	11	29	0	9	11	10	0	308	3910
5:05 PM	13	63	8	0	16	153	2	2	0	12	22	0	17	6	16	0	330	3930
5:10 PM	16	80	9	0	22	158	0	0	1	13	23	0	13	4	10	0	349	3979
5:15 PM	15	95	17	0	14	157	2	2	5	7	22	0	11	10	8	0	365	4027
5:20 PM	14	108	4	0	25	154	1	4	0	12	22	0	12	9	12	0	377	4055
5:25 PM	22	75	7	0	16	142	1	5	0	13	24	0	6	8	7	0	326	4055
5:30 PM	21	93	11	0	25	110	2	1	0	9	27	0	7	6	11	0	323	4083
5:35 PM	15	77	8	0	21	153	2	2	0	13	19	0	6	7	7	0	330	4093
5:40 PM	17	89	9	0	21	131	0	7	0	10	25	0	4	8	8	0	329	4070
5:45 PM	17	88	13	0	8	136	3	1	1	5	26	0	7	8	11	0	324	4050
5:50 PM	19	87	15	0	22	134	0	3	1	11	25	0	10	5	11	0	343	4049
5:55 PM	17	64	8	0	31	134	4	2	0	12	15	0	11	6	11	0	315	4019

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	180	1132	120	0	244	1876	12	24	24	128	268	0	144	92	120	0	4364
Heavy Trucks	8	40	4		0	20	0		4	0	8		8	0	0		92
Pedestrians		0				8				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/19/2017 4:01 PM

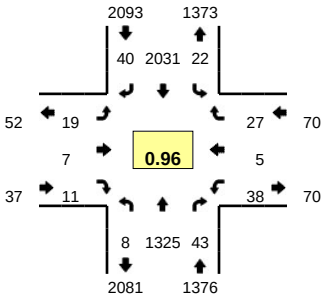
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

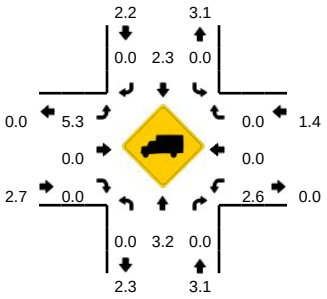
Method for determining peak hour: Total Entering Volume

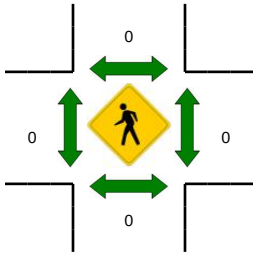
LOCATION: SW Pacific Hwy -- SW Chapman Rd
CITY/STATE: Sherwood, OR

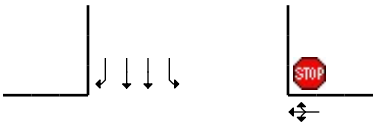
QC JOB #: 14401707
DATE: Thu, May 11 2017

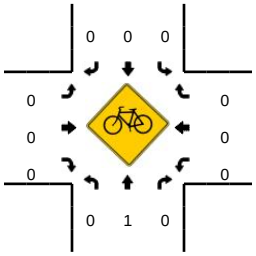


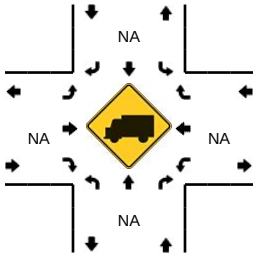
Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

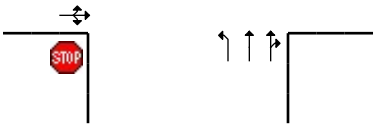


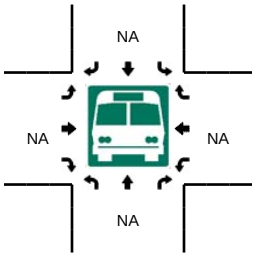












5-Min Count Period Beginning At	SW Pacific Hwy (Northbound)				SW Pacific Hwy (Southbound)				SW Chapman Rd (Eastbound)				SW Chapman Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	89	1	0	1	184	2	0	1	1	0	0	2	0	0	0	281	
4:05 PM	0	72	6	1	0	166	3	0	0	0	1	0	5	0	0	0	254	
4:10 PM	1	103	2	1	1	160	1	0	1	0	1	0	3	0	1	0	275	
4:15 PM	0	126	4	0	1	163	4	0	4	0	0	0	4	0	2	0	308	
4:20 PM	0	124	1	0	1	153	1	0	1	0	0	0	4	0	0	0	285	
4:25 PM	1	92	5	0	1	172	4	0	1	0	0	0	4	0	2	0	282	
4:30 PM	1	102	2	0	3	149	0	0	0	0	0	0	4	0	2	0	263	
4:35 PM	2	114	0	0	1	153	3	0	2	2	0	0	1	0	4	0	282	
4:40 PM	0	117	2	0	3	149	4	0	5	1	3	0	6	0	4	0	294	
4:45 PM	0	108	2	0	0	176	3	0	3	1	1	0	3	0	5	0	302	
4:50 PM	0	117	5	0	2	177	4	0	0	1	1	0	4	1	1	0	313	
4:55 PM	2	121	3	0	1	173	5	0	0	0	1	0	1	0	3	0	310	3449
5:00 PM	0	102	6	0	4	159	1	1	0	0	2	0	3	0	1	0	279	3447
5:05 PM	0	91	2	0	2	183	3	0	1	0	1	0	0	1	0	0	284	3477
5:10 PM	0	110	6	0	4	187	2	1	4	0	0	0	5	0	1	0	320	3522
5:15 PM	2	119	3	0	1	189	5	0	0	1	1	0	2	1	1	0	325	3539
5:20 PM	1	107	1	1	0	161	3	0	2	0	0	0	6	0	5	0	287	3541
5:25 PM	0	114	6	0	2	177	5	0	1	0	1	0	4	0	0	0	310	3569
5:30 PM	0	105	7	0	0	147	2	0	1	1	0	0	3	2	2	0	270	3576
5:35 PM	0	100	0	0	1	164	2	1	1	0	1	0	4	1	2	0	277	3571
5:40 PM	0	132	4	0	0	156	2	0	1	0	1	0	0	0	1	0	297	3574
5:45 PM	0	114	4	0	0	149	1	0	4	0	0	0	5	0	2	0	279	3551
5:50 PM	0	93	3	0	3	158	1	0	0	4	0	0	5	1	1	0	269	3507
5:55 PM	0	82	3	0	2	151	0	0	1	2	0	0	5	0	1	0	247	3444

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	12	1344	40	4	20	2148	40	4	24	4	4	0	52	4	28	0	3728
Heavy Trucks	0	44	0		0	40	0		0	0	0		0	0	0		84
Pedestrians		0				0				0				0			0
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/19/2017 4:01 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

CITY OF SHERWOOD, WASHINGTON COUNTY **PACIFIC HY 99W at SUNSET BLVD, City of Sherwood, Washington County, 01/01/2013 to 12/31/2017**

1 - 4 of 17 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D C	A L G S	M R U N V	J I H L	S C O R K	W DAY TIME LAT	DATE / CLASS / DIST FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
07197	N	N	N		N	N	10/23/2014	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT										27,29
CITY							TH		SW SUNSET BLVD	NE		TRF SIGNAL	N	WET	REAR		PRVTE	NE-SW								000	00
N							4P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	33	F	SUSP		016,026	038	27,29
N							45 21 11.85	-122 52 4.18	009100100S00															OR<25				
																02	NONE 0	STOP									
																	PRVTE	NE-SW								011	00
																	PSNGR CAR		01	DRVR	NONE	43	F	OR-Y		000	000	00
																								OR<25				
04491	N	N	N				04/13/2016	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 9	STRGHT										29
NONE							WE		SW SUNSET BLVD	NE		TRF SIGNAL	N	DRY	REAR		N/A	NE-SW								000	00
N							5P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N							45 21 11.45	-122 52 3.31	009100200S00															UNK				
																02	NONE 9	STOP									
																	N/A	NE-SW								011	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																								UNK				
04289	N	N	N				04/27/2017	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 9	STRGHT										29
NONE							TH		SW SUNSET BLVD	E		TRF SIGNAL	N	DRY	REAR		N/A	SE-NW								000	00
N							7A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N							45 21 11.45	-122 52 3.31	009100200S00															UNK				
																02	NONE 9	STOP									
																	N/A	SE-NW								013	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																								UNK				
02740	N	N	N				05/20/2015	17	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										29
NONE							WE	0	SW SUNSET BLVD	SE		TRF SIGNAL	N	DRY	REAR		PRVTE	SE-NW								000	00
N							1P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	UNK		026	000	29
N							45 21 11.45	-122 52 3.31																UNK				
																02	NONE 0	STOP									
																	PRVTE	SE-NW								011	00
																	PSNGR CAR		01	DRVR	NONE	23	F	OR-Y		000	000	00
																								OR>25				
05133	N	N	N		N	N	09/13/2013	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										27,07
CITY							FR		SW SUNSET BLVD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE								000	00
N							9P			06	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	22	M	OR-Y		016,043,026	038	27,07
N							45 21 11.446128	-122 52 3.314892	009100200S00															OR<25				
																02	NONE 0	STOP									
																	PRVTE	SW-NE								011	00
																	PSNGR CAR		01	DRVR	INJC	79	M	OR-Y		000	000	00
																								OR<25				

SER# / INVEST / RD DPT / UNLOC?	S P E D	D R E A	M J L C	S G N S	W H V L	O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
																02	NONE 0	STOP										
																	PRVTE	SW-NE								011		00
																	PSNGR CAR		02	PSNG	INJC	60	F			000	000		00
																02	NONE 0	STOP										
																	PRVTE	SW-NE								011		00
																	PSNGR CAR		03	PSNG	INJC	77	F			000	000		00
07058	N	N	N	N	N		12/04/2013	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	27,07
CITY							WE		SW SUNSET BLVD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE								000		00
N							8A			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	61	M	OR-Y	016,043,026	038		27,07
N							45 21 11.446128	-122 52 3.314892	009100200S00															OR<25				
																02	NONE 0	STOP										
																	PRVTE	SW-NE								011	013	00
																	PSNGR CAR		01	DRVR	INJC	64	F	OR-Y	000	000		00
																								OR<25				
																03	NONE 0	STOP										
																	PRVTE	SW-NE								022	013	00
																	PSNGR CAR		01	DRVR	NONE	20	F	OR-Y	000	000		00
																								OR<25				
																04	NONE 0	STOP										
																	PRVTE	SW-NE								022		00
																	PSNGR CAR		01	DRVR	INJC	49	F	OR-Y	000	000		00
																								OR<25				
01988	N	N	N	N	N		03/05/2014	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT											29
CITY							WE		SW SUNSET BLVD	SW		TRF SIGNAL	N	WET	REAR		PRVTE	SW-NE								000		00
N							3P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	51	M	SUSP	026	000		29
N							45 21 11.45	-122 52 3.31	009100200S00															OR<25				
																02	NONE 0	STOP										
																	PRVTE	SW-NE								011		00
																	PSNGR CAR		01	DRVR	NONE	42	F	EXP	000	000		00
																								OR<25				
06054	N	N	N				10/15/2014	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											29
NO RPT							WE		SW SUNSET BLVD	SW		TRF SIGNAL	N	WET	REAR		PRVTE	SW-NE								000		00
N							7A			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y	026	000		29
N							45 21 11.45	-122 52 3.31	009100200S00															OR<25				
																02	NONE 0	STOP										
																	PRVTE	SW-NE								011		00
																	PSNGR CAR		01	DRVR	INJC	39	M	OR-Y	000	000		00
																								OR<25				

SER# / INVEST / RD DPT / UNLOC?	S P E D	D E A C	M R A S	J U L V	S I G L	W C N S	O H R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
05463	N	N	N					09/04/2015	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE								FR		SW SUNSET BLVD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N								11A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	18	M	OR-Y		026	000		29
N								45 21 11.45	-122 52 3.31	009100200S00															OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		000	000		00
																									OR<25					
01834	Y	Y	N	N	N			03/19/2016	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT										013	07,30
CITY								SA		SW SUNSET BLVD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N								6P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	23	M	NONE		043,050	000		07,30
N								45 21 11.45	-122 52 3.31	009100200S00															OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									012	013	00
																		PSNGR CAR		01	DRVR	INJC	46	M	OR-Y		000	000		00
																									OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									012	013	00
																		PSNGR CAR		02	PSNG	INJC	28	F			000	000		00
																	03	NONE 0	STOP											
																		PRVTE	SW-NE									022		00
																		PSNGR CAR		01	DRVR	NONE	34	M	OR-Y		000	000		00
																									OR<25					
02965	N	N	N					05/06/2016	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE								FR		SW SUNSET BLVD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N								8A			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	32	M	OR-Y		026	000		29
N								45 21 11.45	-122 52 3.31	009100200S00															OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	INJC	40	M	OR-Y		000	000		00
																									OR<25					
06420	N	N	N	N	N			09/22/2016	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLD	S-STRGHT	01	NONE 0	STRGHT										087	07
CITY								TH		SW SUNSET BLVD	SW		TRF SIGNAL	N	SNO	REAR		PRVTE	SW-NE									000	087	00
N								5P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	17	M	OR-Y		043	000		07
N								45 21 11.45	-122 52 3.31	009100200S00															OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	SW-NE									006	087	00
																		PSNGR CAR		01	DRVR	INJC	28	F	OR-Y		000	000		00
																									OR<25					

SER# / INVEST / RD DPT / UNLOC?	S P E D	D R E C	M A L S	J G N V	S H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
08928	N	N	N				12/25/2016	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE							SU		SW SUNSET BLVD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N							12P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	58	M	OR-Y		026	000		29
N							45 21 11.45	-122 52 3.31	009100200S00															OR<25					
																02	NONE 0	STOP											
																	PRVTE	SW-NE									011		00
																	PSNGR CAR		01	DRVR	INJC	59	F	OR-Y		000	000		00
																								OR<25					
																02	NONE 0	STOP											
																	PRVTE	SW-NE									011		00
																	PSNGR CAR		02	PSNG	INJC	40	M			000	000		00
																02	NONE 0	STOP											
																	PRVTE	SW-NE									011		00
																	PSNGR CAR		03	PSNG	INJC	54	M			000	000		00
07321	N	N	N	N	N		11/18/2017	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	FOG	S-STRGHT	01	NONE 9	STRGHT											07
CITY							SA		SW SUNSET BLVD	SW		TRF SIGNAL	N	DRY	REAR		N/A	SW-NE									000		00
N							8P			06	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 21 11.45	-122 52 3.31	009100200S00															UNK					
																02	NONE 9	STRGHT											
																	N/A	SW-NE									006		00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																								UNK					
00574	N	N	N	N	N		01/31/2014	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE 0	STRGHT											04
CITY							FR		SW SUNSET BLVD	CN		L-GRN-SIG	N	WET	TURN		PRVTE	SW-NE									000		00
N							2P			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	16	F	OR-Y		020	000		04
N							45 21 11.446164	-122 52 3.3149279	009100200S00															OR<25					
																02	NONE 0	TURN-L											
																	PRVTE	NE-SE									000		00
																	PSNGR CAR		01	DRVR	NONE	37	F	OR-Y		000	000		00
																								OR<25					
04827	N	N	N	N	N		08/24/2015	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											04
CITY							MO		SW SUNSET BLVD	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	SW-NE									000		00
N							1P			02	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	93	F	OR-Y		020	000		04
N							45 21 11.45	-122 52 3.31	009100200S00															OR<25					
																02	NONE 0	TURN-L											
																	PRVTE	SE-SW									000		00
																	PSNGR CAR		01	DRVR	INJB	35	F	OR-Y		000	000		00
																								OR<25					

SER# / INVEST RD DPT / UNLOC?	S P E D	A L C	D R J G S	U I N V	C O H L	W R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
																02	NONE 0	TURN-L									
																	PRVTE	SE-SW								000	00
																	PSNGR CAR		02	PSNG	INJC	05	M			000	000	00
05152	N	N	N	N	N		08/23/2017	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
CITY							WE		SW SUNSET BLVD	CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	SW-NE								000	00
N							12P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	59	M	EXP		020	000	04
N							45 21 11.45	-122 52 3.31	009100200S00															OR<25				
																02	NONE 0	STRGHT									
																	PRVTE	NW-SE								000	00
																	PSNGR CAR		01	DRVR	INJC	36	F	OR-Y		000	000	00
																								OR<25				
																03	NONE 0	TURN-R									
																	PRVTE	SE-NE								022	00
																	PSNGR CAR		01	DRVR	INJC	19	F	OR-Y		000	000	00
																								OR<25				

CDS380 — OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION — Page: 1
03/30/2020 — TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING
WASHINGTON COUNTY — **PACIFIC HY 99W at ELWERT RD, City of Outside City Limits, Washington County, 01/01/2013 to 12/31/2017**
1 - 1 of 1 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D R E C	M J A L	U G S	I N V	C H L	O R K	W	DATE / DAY / TIME / LAT	MILEPNT / DIST FROM / INTERSECT / LONG	COUNTY ROADS / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
04232	N	N	N						07/09/2014		SW ELWERT RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07
NONE									WE	0	SW PACIFIC HY 99W	NW		TRF SIGNAL	N	DRY	REAR		PRVTE	NW-SE								000		00
N									4P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		026	000		07
N									45 21 11.85	-122 52 4.18																OR<25					
																		02	NONE 0	STOP											
																			PRVTE	NW-SE									011		00
																			PSNGR CAR		01	DRVR	NONE	40	M	OR-Y		000	000		00
																										OR<25					

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CDS380 | OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION | Page: 1

03/30/2020 | TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT

CONTINUOUS SYSTEM CRASH LISTING

091: PACIFIC HIGHWAY WEST

Highway 091 ALL ROAD TYPES, MP 16.66 to 16.67 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

1 - 4 of 27 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R G S	U N V	J H L	S C K	W O R	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF-CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
07197	N	N	N	N	N	N	N	10/23/2014	WASHINGTON	1 14			INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											27,29
CITY								TH	SHERWOOD	MN 0		SW PACIFIC HY 99W	NE		TRF SIGNAL	N	WET	REAR		PRVTE	NE-SW								000		00
N								4P	PORTLAND UA	16.66		SW SUNSET BLVD	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	33	F	SUSP		016,026	038		27,29
N								45 21 11.85	-122 52 4.18			009100100S00															OR<25					
																			02	NONE 0	STOP										
																				PRVTE	NE-SW								011		00
																				PSNGR CAR		01	DRVR	NONE	43	F	OR-Y		000	000		00
																											OR<25					
06134	N	N	N	N	N	N	N	10/21/2013	WASHINGTON	1 14			INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										002	27,07
CITY								MO		MN 0			NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE-SW								000		00
N								4P	PORTLAND UA	16.67			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	23	F	OR-Y		016,043,026	038	002	27,07
N								45 21 11.84688	-122 52 4.1808359			009100100S00															OR<25					
																			01	NONE 0	STRGHT										
																				PRVTE	NE-SW								000		00
																				PSNGR CAR		02	PSNG	NO<5	03	M			000	010		00
																			02	NONE 0	STOP										
																				PRVTE	NE-SW								011		00
																				PSNGR CAR		01	DRVR	NONE	64	F	OR-Y		000	000		00
																											OR<25					
03548	N	N	N	N	N	N	N	06/25/2014	WASHINGTON	1 14			INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 1	STRGHT											07
CITY								WE		MN 0			NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE-SW								000		00
N								9A	PORTLAND UA	16.67			06	0		N	DAY	PDO		SEMI TOW		01	DRVR	NONE	63	M	OTH-Y		043,026	000		07
N								45 21 11.85	-122 52 4.18			009100100S00															N-RES					
																			02	NONE 0	STOP										
																				PRVTE	NE-SW								011		00
																				PSNGR CAR		01	DRVR	NONE	39	F	OR-Y		000	000		00
																											OR<25					
00404	N	N	N	N	N	N	N	01/23/2015	WASHINGTON	1 14			INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											04
COUNTY								FR		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N -S								000		00
N								6A	PORTLAND UA	16.67			01	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	26	M	OR-Y		020	000		04
N								45 21 11.85	-122 52 4.18			009100100S00															OR<25					
																			02	NONE 0	TURN-L										
																				PRVTE	S -W								000		00
																				PSNGR CAR		01	DRVR	INJC	29	M	OR-Y		000	000		00
																											OR>25					
03342	N	N	N	N	N	N	N	06/06/2017	WASHINGTON	1 14			INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	TURN-L										087	27,04
CITY								TU		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	S -W								000		00
N								2P	PORTLAND UA	16.67			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	21	M	OR-Y		016,004,020	038		27,04
N								45 21 11.85	-122 52 4.18			009100100S00															OR>25					
																			02	NONE 0	STRGHT										
																				PRVTE	N -S								000	087	00
																				PSNGR CAR		01	DRVR	INJC	25	F	OR-Y		000	000		00
																											OR<25					
																			02	NONE 0	STRGHT										
																				PRVTE	N -S								000	087	00
																				PSNGR CAR		02	PSNG	NO<5	01	F			000	000		00

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5 - 9 of 27 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R J S W U I C O H R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
														02	NONE 0	STRGHT										
															PRVTE	N -S									000	087	00
															PSNGR CAR		03	PSNG	NO<5	02	F			000	000		00
03825	N	N	N N N	07/08/2015	WASHINGTON	1 14		INTER	CROSS	N	N	CLR	BIKE	01	NONE 0	TURN-L											02
NONE				WE		MN 0		CN		TRF SIGNAL	N	DRY	TURN		PRVTE	SE-SW									000		00
N				7P	PORTLAND UA	16.67		03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	25	F	OTH-Y		027	000		02
N				45 21 11.85	-122 52 4.18		009100100S00															OR<25					
																-											
																STRGHT	01	BIKE	INJB	23	M		I	INRD 000	035		00
																NW SE											
04491	N	N	N N N	04/13/2016	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NONE				WE	SHERWOOD	MN 0	SW PACIFIC HY 99W	NE		TRF SIGNAL	N	DRY	REAR		N/A	NE-SW									000		00
N				5P	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N				45 21 11.45	-122 52 3.31		009100200S00															UNK					
														02	NONE 9	STOP											
															N/A	NE-SW									011		00
															PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																						UNK					
04670	N	N	N N N N N	07/31/2017	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-STRGHT	01	NONE 0	STRGHT											07
CITY				MO	SHERWOOD	MN 0	SW ELWERT RD	NE		UNKNOWN	N	DRY	REAR		PRVTE	NE-SW									000		00
N				4P	PORTLAND UA	16.66	SW PACIFIC HY 99W	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	16	M	OR-Y		043	000		07
N				45 21 11.45	-122 52 3.31		009100200S00															OR<25					
														01	NONE 0	STRGHT											
															PRVTE	NE-SW									000		00
															PSNGR CAR		02	PSNG	INJC	18	F			000	000		00
														02	NONE 0	STRGHT											
															PRVTE	NE-SW									006		00
															PSNGR CAR		01	DRVR	INJC	18	F	OR-Y		000	000		00
																						OR<25					
04289	N	N	N N N	04/27/2017	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 9	STRGHT											29
NONE				TH	SHERWOOD	MN 0	SW PACIFIC HY 99W	E		TRF SIGNAL	N	DRY	REAR		N/A	SE-NW									000		00
N				7A	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N				45 21 11.45	-122 52 3.31		009100200S00															UNK					
														02	NONE 9	STOP											
															N/A	SE-NW									013		00
															PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																						UNK					
02885	N	N	N N N	05/22/2014	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE				TH		MN 0		S		TRF SIGNAL	N	DRY	REAR		PRVTE	S -N									000		00
N				7A	PORTLAND UA	16.66		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	42	M	OR-Y		026	000		07
N				45 21 11.45	-122 52 3.31		009100200S00															OR<25					

10 - 13 of 27 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	U H L	I C K	S O R	W DAY TIME LAT	DATE / CITY / URBAN AREA / LONG	COUNTY / COMPNT / MLG TYP / MILEPNT	RD# FC / FIRST STREET / SECOND STREET / LRS	CONN#	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
																			02	NONE 0	STOP									
																				PRVTE	S -N								011		00
																				PSNGR CAR		01	DRVR	NONE	43	M	OR-Y		000	000		00
																											OR<25					
04595	N	N	N	N	N	N	N	08/11/2014	WASHINGTON	2 14			INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07
CITY								MO		MN 0			S		TRF SIGNAL	N	DRY	REAR		PRVTE	S -N								000		00
N								8A	PORTLAND UA	16.66			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	25	F	OR-Y		026	000		07
N								45 21 11.45	-122 52 3.31		009100200S00																OR<25					
																			02	NONE 0	STOP									
																				PRVTE	S -N								011		00
																				PSNGR CAR		01	DRVR	INJC	17	F	OR-Y		000	000		00
																											OR<25					
03115	N	N	N	N				06/12/2013	WASHINGTON	2 14			INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07
NONE								WE	SHERWOOD	MN 0	LEG TO ELWERT		SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE								000		00
N								9A	PORTLAND UA	16.66	SW PACIFIC HY 99W		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	F	UNK		043	000		07
N								45 21 11.446128	-122 52 3.314892		009100200S00																UNK					
																			02	NONE 0	STOP									
																				PRVTE	SW-NE								011		00
																				PSNGR CAR		01	DRVR	NONE	50	F	OR-Y		000	000		00
																											OR<25					
05133	N	N	N	N	N	N	N	09/13/2013	WASHINGTON	2 14			INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										27,07
CITY								FR	SHERWOOD	MN 0	SW PACIFIC HY 99W		SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE								000		00
N								9P	PORTLAND UA	16.66	SW SUNSET BLVD		06	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	22	M	OR-Y		016,043,026	038		27,07
N								45 21 11.446128	-122 52 3.314892		009100200S00																OR<25					
																			02	NONE 0	STOP									
																				PRVTE	SW-NE								011		00
																				PSNGR CAR		01	DRVR	INJC	79	M	OR-Y		000	000		00
																											OR<25					
																			02	NONE 0	STOP									
																				PRVTE	SW-NE								011		00
																				PSNGR CAR		02	PSNG	INJC	60	F			000	000		00
																			02	NONE 0	STOP									
																				PRVTE	SW-NE								011		00
																				PSNGR CAR		03	PSNG	INJC	77	F			000	000		00
07058	N	N	N	N	N	N	N	12/04/2013	WASHINGTON	2 14			INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	27,07
CITY								WE	SHERWOOD	MN 0	SW PACIFIC HY 99W		SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE								000		00
N								8A	PORTLAND UA	16.66	SW SUNSET BLVD		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	61	M	OR-Y		016,043,026	038		27,07
N								45 21 11.446128	-122 52 3.314892		009100200S00																OR<25					
																			02	NONE 0	STOP									
																				PRVTE	SW-NE								011	013	00
																				PSNGR CAR		01	DRVR	INJC	64	F	OR-Y		000	000		00
																											OR<25					

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

091: PACIFIC HIGHWAY WEST

Highway 091 ALL ROAD TYPES, MP 16.66 to 16.67 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage

14 - 18 of 27 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D A L C	M R G S	J U N V	S I H L	W C R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
																	03	NONE 0	STOP										
																		PRVTE	SW-NE									022	013	00
																		PSNGR CAR		01	DRVR	NONE	20	F	OR-Y		000	000		00
																									OR<25					
																	04	NONE 0	STOP										
																		PRVTE	SW-NE									022		00
																		PSNGR CAR		01	DRVR	INJC	49	F	OR-Y		000	000		00
																									OR<25					
01988	N	N	N	N	N	N	03/05/2014	WASHINGTON	2 14		INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT											29
CITY							WE	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	WET	REAR		PRVTE	SW-NE									000		00
N							3P	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	51	M	SUSP		026	000		29
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STOP										
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	NONE	42	F	EXP		000	000		00
																									OR<25					
06054	N	N	N	N			10/15/2014	WASHINGTON	2 14		INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											29
NO RPT							WE	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	WET	REAR		PRVTE	SW-NE									000		00
N							7A	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		026	000		29
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STOP										
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	INJC	39	M	OR-Y		000	000		00
																									OR<25					
04990	N	N	N	N	N	N	07/21/2015	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
CITY							TU	SHERWOOD	MN 0	SW ELWERT RD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N							4P	PORTLAND UA	16.66	SW PACIFIC HY 99W	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	29	F	SUSP		043	000		07
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STOP										
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	NONE	61	M	OR-Y		000	000		00
																									OR<25					
05463	N	N	N	N			09/04/2015	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE							FR	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N							11A	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	18	M	OR-Y		026	000		29
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STOP										
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		000	000		00
																									OR<25					

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

19 - 21 of 27 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D M R A L C	J U G S	S I N V	W C H L	O R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
01834	Y	Y N N N N				N	03/19/2016	WASHINGTON	2 14		INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT											013	07,30
CITY							SA	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N							6P	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	23	M	NONE		043,050	000		07,30
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									012	013	00
																		PSNGR CAR		01	DRVR	INJC	46	M	OR-Y		000	000		00
																									OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									012	013	00
																		PSNGR CAR		02	PSNG	INJC	28	F			000	000		00
																	03	NONE 0	STOP											
																		PRVTE	SW-NE									022		00
																		PSNGR CAR		01	DRVR	NONE	34	M	OR-Y		000	000		00
																									OR<25					
02965	N	N N N					05/06/2016	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT												29
NONE							FR	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N							8A	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	32	M	OR-Y		026	000		29
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	INJC	40	M	OR-Y		000	000		00
																									OR<25					
06420	N	N N N N	N	N			09/22/2016	WASHINGTON	2 14		INTER	CROSS	N	N	CLD	S-STRGHT	01	NONE 0	STRGHT										087	07
CITY							TH	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	SNO	REAR		PRVTE	SW-NE									000	087	00
N							5P	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	17	M	OR-Y		043	000		07
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	SW-NE									006	087	00
																		PSNGR CAR		01	DRVR	INJC	28	F	OR-Y		000	000		00
																									OR<25					
08928	N	N N N					12/25/2016	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT												29
NONE							SU	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
N							12P	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	58	M	OR-Y		026	000		29
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		01	DRVR	INJC	59	F	OR-Y		000	000		00
																									OR<25					
																	02	NONE 0	STOP											
																		PRVTE	SW-NE									011		00
																		PSNGR CAR		02	PSNG	INJC	40	M			000	000		00

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R J S W U I C O G N H R V L K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
														02	NONE 0	STOP											
															PRVTE	SW-NE										011		00
															PSNGR CAR		03	PSNG	INJC	54	M			000	000		00
07321	N	N	N N N N N	11/18/2017	WASHINGTON	2 14		INTER	CROSS	N	N	FOG	S-STRGHT	01	NONE 9	STRGHT											07
CITY				SA	SHERWOOD	MN 0	SW PACIFIC HY 99W	SW		TRF SIGNAL	N	DRY	REAR		N/A	SW-NE										000		00
N				8P	PORTLAND UA	16.66	SW SUNSET BLVD	06	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N				45 21 11.45	-122 52 3.31		009100200S00															UNK					
														02	NONE 9	STRGHT											
															N/A	SW-NE										006		00
															PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																						UNK					
04827	N	N	N N N N N	08/24/2015	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											04
CITY				MO	SHERWOOD	MN 0	SW PACIFIC HY 99W	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	SW-NE										000		00
N				1P	PORTLAND UA	16.66	SW SUNSET BLVD	02	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	93	F	OR-Y		020	000		04
N				45 21 11.45	-122 52 3.31		009100200S00															OR<25					
														02	NONE 0	TURN-L											
															PRVTE	SE-SW										000		00
															PSNGR CAR		01	DRVR	INJB	35	F	OR-Y		000	000		00
																						OR<25					
														02	NONE 0	TURN-L											
															PRVTE	SE-SW										000		00
															PSNGR CAR		02	PSNG	INJC	05	M			000	000		00
06861	N	N	N N N N N	10/30/2017	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 9	TURN-L											04
CITY				MO	SHERWOOD	MN 0	SW ELWERT RD	CN		TRF SIGNAL	N	DRY	TURN		N/A	SE-SW										000		00
N				6A	PORTLAND UA	16.66	SW PACIFIC HY 99W	03	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N				45 21 11.45	-122 52 3.31		009100200S00															UNK					
														02	NONE 9	STRGHT											
															N/A	NW-SE										000		00
															PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																						UNK					
00574	N	N	N N N N N	01/31/2014	WASHINGTON	2 14		INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE 0	STRGHT											04
CITY				FR	SHERWOOD	MN 0	SW PACIFIC HY 99W	CN		L-GRN-SIG	N	WET	TURN		PRVTE	SW-NE										000		00
N				2P	PORTLAND UA	16.66	SW SUNSET BLVD	04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	16	F	OR-Y		020	000		04
N				45 21 11.446164	-122 52 3.3149279		009100200S00															OR<25					
														02	NONE 0	TURN-L											
															PRVTE	NE-SE										000		00
															PSNGR CAR		01	DRVR	NONE	37	F	OR-Y		000	000		00
																						OR<25					

27 - 27 of 27 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R G S	J N V	S H L	W R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED LOC	ERROR	ACT	EVENT	CAUSE
05152	N	N	N	N	N	N	08/23/2017	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											04
CITY							WE	SHERWOOD	MN 0	SW PACIFIC HY 99W	CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	SW-NE									000		00
N							12P	PORTLAND UA	16.66	SW SUNSET BLVD	04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	59	M	EXP		020	000		04
N							45 21 11.45	-122 52 3.31		009100200S00															OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	NW-SE									000		00
																		PSNGR CAR		01	DRVR	INJC	36	F	OR-Y		000	000		00
																									OR<25					
																	03	NONE 0	TURN-R											
																		PRVTE	SE-NE									022		00
																		PSNGR CAR		01	DRVR	INJC	19	F	OR-Y		000	000		00
																									OR<25					

CDS380 — OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION — Page: 1
03/30/2020 — TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING
091: PACIFIC HIGHWAY WEST — **Highway 091 ALL ROAD TYPES, MP 17.46 to 17.47 01/01/2013 to 12/31/2017, Both Add and Non-Add mileage**

1 - 6 of 18 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	U H L	I C O K	W	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF-CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
91883	N	N	N	N				04/03/2014	WASHINGTON	1 14		STRGHT		N	N	RAIN	S-STRGHT	01	NONE 0	STRGHT										07
COUNTY								TH		MN 0		UN	(DIVMD)	NONE	N	WET	REAR		PRVTE	N -S								000		00
N								8P	PORTLAND UA	17.46		03			N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	35	F	OR-Y		042	000		07
N								45 20 33.38	-122 52 25.87		009100100S00		(04)													OR<25					
																		02	NONE 0	STRGHT									006		00
																			PRVTE	N -S										
																			PSNGR CAR		01	DRVR	NONE	59	F	OR-Y		000	000		00
																										OR<25					
06064	N	N	N	N				09/29/2017	WASHINGTON	1 14		INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 9	STRGHT										29
NONE								FR		MN 0		N		STOP SIGN	N	WET	REAR		N/A	N -S								000		00
N								2P	PORTLAND UA	17.47		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N								45 20 32.89	-122 52 26.13		009100100S00															UNK					
																		02	NONE 9	STRGHT									000		00
																			N/A	N -S										
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																										UNK					
00236	N	N	N	N				01/15/2015	WASHINGTON	1 14		INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT										02
COUNTY								TH		MN 0		CN		STOP SIGN	N	WET	TURN		PRVTE	N -S								000		00
N								5P	PORTLAND UA	17.47		01	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	20	M	OR-Y		000	000		00
N								45 20 32.89	-122 52 26.13		009100100S00															OR<25					
																		02	NONE 0	TURN-L									015		00
																			PRVTE	E -S										
																			PSNGR CAR		01	DRVR	NONE	25	F	OR-Y		028	000		02
																										OR<25					
08443	N	N	N	N	N	N	N	12/09/2016	WASHINGTON	1 14		INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 9	STRGHT										03
COUNTY								FR		MN 0		CN		STOP SIGN	N	WET	ANGL		N/A	N -S								000		00
N								3P	PORTLAND UA	17.47		01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N								45 20 32.89	-122 52 26.13		009100100S00															UNK					
																		02	NONE 9	STRGHT									000		00
																			N/A	E -W										
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																										UNK					
07975	N	N	N	N				12/13/2017	WASHINGTON	1 14		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										03
COUNTY								WE		MN 0		CN		STOP SIGN	N	DRY	ANGL		PRVTE	E -W								000		00
N								7P	PORTLAND UA	17.47		01	0		N	DARK	INJ		PSNGR CAR		01	DRVR	NONE	48	M	OR-Y		021	000		03
N								45 20 32.89	-122 52 26.13		009100100S00															OR<25					
																		02	NONE 0	STRGHT									000		00
																			PRVTE	N -S										
																			PSNGR CAR		01	DRVR	INJC	56	F	OR-Y		000	000		00
																										OR<25					
01598	N	N	N	N				03/21/2017	WASHINGTON	1 14		INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 9	STRGHT										02
NO RPT								TU		MN 0		CN		STOP SIGN	N	WET	ANGL		N/A	E -W								000		00
N								7A	PORTLAND UA	17.47		01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N								45 20 32.89	-122 52 26.13		009100100S00															UNK					
																		02	NONE 9	STRGHT									000		00
																			N/A	N -S										
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																										UNK					

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7 - 11 of 18 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	D M R J S W A U I C O G N H R L K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED LOC	ERROR	ACT	EVENT	CAUSE
07202	N	N N N N N N	12/01/2014	WASHINGTON	1 14		INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT											02
COUNTY			MO		MN 0		CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E									015		00
N			10A	PORTLAND UA	17.47		03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJA	56	F	OR-Y		028	000		02
N			45 20 32.89	-122 52 26.13		009100100S00															OR>25					
													02	NONE 0	STRGHT											
														PRVTE	N -S									000		00
														PSNGR CAR		01	DRVR	NONE	29	F	OR-Y		000	000		00
																					OR<25					
													02	NONE 0	STRGHT											
														PRVTE	N -S									000		00
														PSNGR CAR		02	PSNG	INJC	00	F			000	000		00
02701	N	N N N N	05/18/2015	WASHINGTON	1 14		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
NO RPT			MO		MN 0		CN		STOP SIGN	N	DRY	TURN		PRVTE	W -E									000		00
N			5P	PORTLAND UA	17.47		03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	40	F	OR-Y		000	000		00
N			45 20 32.89	-122 52 26.13		009100100S00															OR<25					
													02	NONE 0	TURN-L											
														PRVTE	E -S									000		00
														PSNGR CAR		01	DRVR	NONE	30	M	OR-Y		004,028	000		02
																					OR<25					
01335	N	N N N N N N	03/08/2017	WASHINGTON	1 14		INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT										058	02
COUNTY			WE		MN 0		CN		STOP SIGN	N	WET	ANGL		PRVTE	W -E									000	053	00
N			5P	PORTLAND UA	17.47		03	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	INJB	27	M	OR-Y		000	000		00
N			45 20 32.89	-122 52 26.13		009100100S00															OR<25					
													02	NONE 0	STRGHT											
														PRVTE	N -S									000		00
														PSNGR CAR		01	DRVR	NONE	18	F	OR-Y		028	000		02
																					OR<25					
05249	N	N N N N	08/27/2017	WASHINGTON	1 14		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 9	TURN-L											02
NONE			SU		MN 0		CN		STOP SIGN	N	DRY	TURN		N/A	E -S									000		00
N			12P	PORTLAND UA	17.47		03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N			45 20 32.89	-122 52 26.13		009100100S00															UNK					
													02	NONE 9	STRGHT											
														N/A	W -E									000		00
														PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																					UNK					
00180	N	N N N N N N	01/11/2014	WASHINGTON	1 14		INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											02
COUNTY			SA		MN 0		CN		STOP SIGN	N	WET	ANGL		PRVTE	S -N									000		00
N			11P	PORTLAND UA	17.47		04	0		N	DARK	INJ		PSNGR CAR		01	DRVR	INJC	30	F	OR-Y		000	000		00
N			45 20 32.885592	-122 52 26.1274079		009100100S00															OR<25					
													02	NONE 0	STRGHT											
														PRVTE	W -E									015		00
														PSNGR CAR		01	DRVR	NONE	16	M	OR-Y		028	000		02
																					OR<25					
00536	Y	N N N N N N	01/28/2017	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	ANGL-STP	01	NONE 9	TURN-R											01,08
COUNTY			SA		MN 0		E		STOP SIGN	N	DRY	TURN		N/A	S -E									000		00
N			4P	PORTLAND UA	17.46		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N			45 20 32.9	-122 52 24.87		009100200S00															UNK					

12 - 17 of 18 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R J S W O H R K	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
														02	NONE 9	STOP										
															N/A	E -W									011	00
															PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																						UNK				
05762	N	N	N N N N N	09/18/2017	WASHINGTON	2 14		INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 9	STRGHT										27,02
COUNTY				MO		MN 0		S		STOP SIGN	N	WET	TURN		N/A	N -S									000	00
N				10A	PORTLAND UA	17.46		03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N				45 20 32.9	-122 52 24.87		009100200S00															UNK				
														02	NONE 9	TURN-R										
															N/A	W -S									000	00
															PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																						UNK				
02243	N	N	N N N N N	04/27/2015	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
COUNTY				MO		MN 0		CN		STOP SIGN	N	DRY	ANGL		PRVTE	S -N									000	00
N				2P	PORTLAND UA	17.46		01	0		N	DAY	INJ		MTRCYCLE		01	DRVR	INJA	68	M	OTH-Y		000	000	00
N				45 20 32.9	-122 52 24.87		009100200S00															N-RES				
														02	NONE 0	STRGHT										
															PRVTE	E -W									015	00
															PSNGR CAR		01	DRVR	NONE	74	F	OR-Y		028	000	02
																						OR<25				
05349	N	N	N N N	09/22/2013	WASHINGTON	2 14		INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT										02
NONE				SU		MN 0		CN		STOP SIGN	N	WET	ANGL		PRVTE	E -W									000	00
N				11A	PORTLAND UA	17.46		02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	F	OR-Y		028	000	02
N				45 20 32.90352	-122 52 24.8735999		009100200S00															OR>25				
														02	NONE 0	STRGHT										
															PRVTE	S -N									000	00
															PSNGR CAR		01	DRVR	NONE	73	F	OR-Y		000	000	00
																						OR<25				
														02	NONE 0	STRGHT										
															PRVTE	S -N									000	00
															PSNGR CAR		02	PSNG	NO<5	03	F			000	000	00
03099	N	N	N N N	06/03/2014	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L										08
NO RPT				TU		MN 0		CN		STOP SIGN	N	DRY	TURN		PRVTE	W -N									000	00
N				5P	PORTLAND UA	17.46		02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	F	UNK		001	000	08
N				45 20 32.9	-122 52 24.87		009100200S00															OR<25				
														02	NONE 0	STRGHT										
															PRVTE	S -N									000	00
															PSNGR CAR		01	DRVR	NONE	32	F	OTH-Y		000	000	00
																						N-RES				
03254	N	N	N N N	05/18/2016	WASHINGTON	2 14		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 9	TURN-L										02
NO RPT				WE		MN 0		CN		STOP SIGN	N	DRY	TURN		N/A	W -N									000	00
N				6A	PORTLAND UA	17.46		02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N				45 20 32.9	-122 52 24.87		009100200S00															UNK				
														02	NONE 9	STRGHT										
															N/A	E -W									000	00
															PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																						UNK				

18 - 18 of 18 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	J N V	I H L	C R K	O W	DATE / DAY / TIME / LAT	COUNTY / CITY / URBAN AREA / LONG	RD# FC / COMPNT / MLG TYP / MILEPNT	CONN# / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
07481	N	N	N	N	N	N	N	11/25/2017	WASHINGTON	2 14		INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 9	STRGHT										02,32
COUNTY								SA		MN 0		CN		STOP SIGN	N	WET	ANGL		N/A	W -E								000		00
N								8P	PORTLAND UA	17.46		04	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N								45 20 32.9	-122 52 24.87		009100200S00															UNK					
																		02	NONE 9	STRGHT										
																			N/A	S -N								000		00
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00

Left-Turn Lane Warrant Analysis

Project: Cedar Creek Subdivision
Intersection: Site Access at SW Brookman Road
Date: 3/30/2020
Scenario: Year 2024 Background Conditions AM

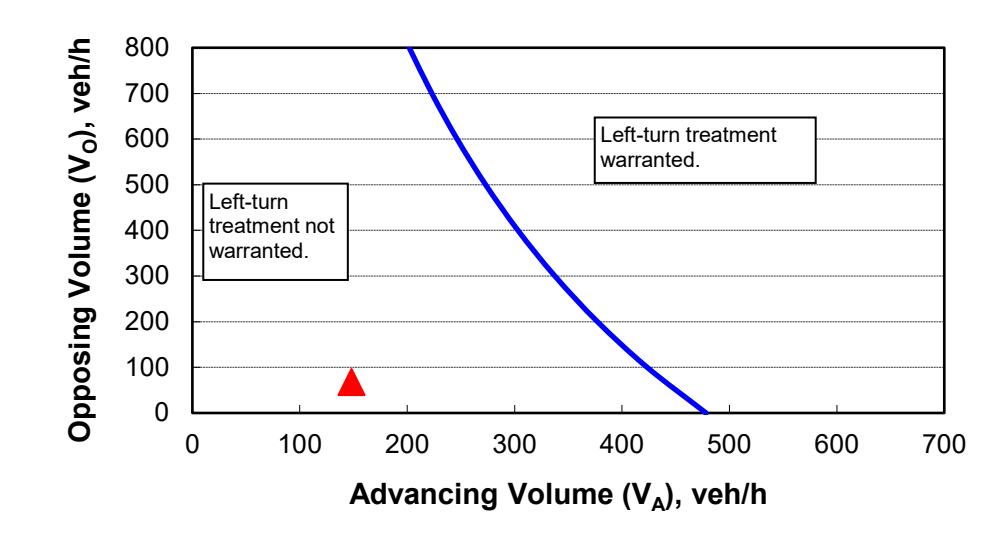
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (VA), %:	18%
Advancing volume (V_A), veh/h:	148
Opposing volume (V_O), veh/h:	68

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	440
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Cedar Creek Subdivision
Intersection: Site Access at SW Brookman Road
Date: 3/30/2020
Scenario: Year 2024 Background Conditions PM

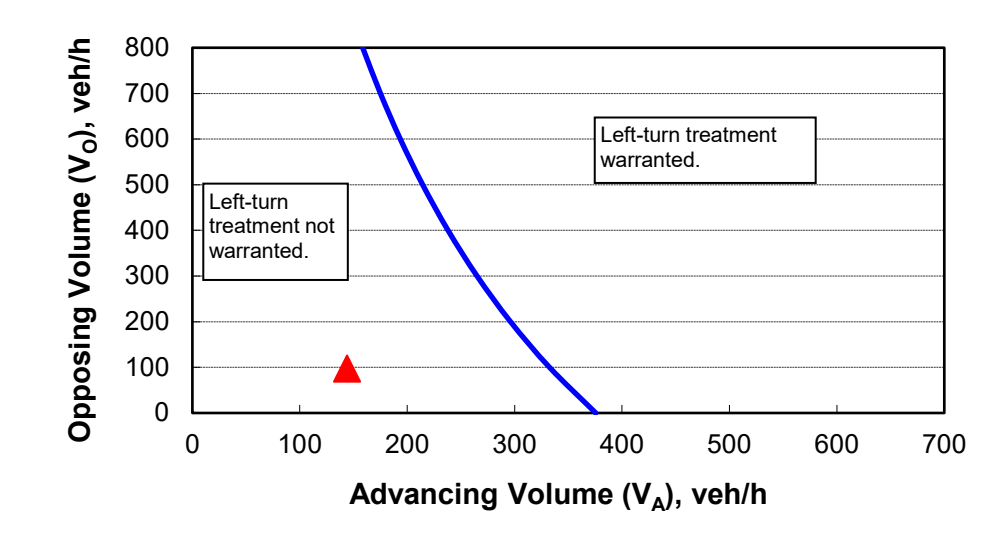
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (VA), %:	59%
Advancing volume (V_A), veh/h:	144
Opposing volume (V_O), veh/h:	97

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	334
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

HCM Signalized Intersection Capacity Analysis
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/02/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	111	239	106	191	239	260	1628	111	138	788	16
Future Volume (vph)	21	111	239	106	191	239	260	1628	111	138	788	16
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	0.97	0.95	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		0.99	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1830	1568		1812	1568	1736	3471	1553	3213	3312	1482
Flt Permitted		0.84	1.00		0.76	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1550	1568		1397	1568	1736	3471	1553	3213	3312	1482
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)	22	117	252	112	201	252	274	1714	117	145	829	17
RTOR Reduction (vph)	0	0	187	0	0	102	0	0	29	0	0	10
Lane Group Flow (vph)	0	139	65	0	313	150	274	1714	88	145	829	7
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	9%	9%	9%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		28.7	28.7		28.7	28.7	22.7	60.5	60.5	7.9	45.7	45.7
Effective Green, g (s)		28.7	28.7		28.7	28.7	22.7	60.5	60.5	7.9	45.7	45.7
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.21	0.55	0.55	0.07	0.41	0.41
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)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		402	406		362	406	356	1898	849	229	1368	612
v/s Ratio Prot							c0.16	c0.49		0.05	0.25	
v/s Ratio Perm		0.09	0.04		c0.22	0.10			0.06			0.00
v/c Ratio		0.35	0.16		0.86	0.37	0.77	0.90	0.10	0.63	0.61	0.01
Uniform Delay, d1		33.3	31.6		39.1	33.5	41.5	22.4	12.0	49.9	25.4	19.1
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		0.5	0.2		18.8	0.6	9.6	6.5	0.1	5.6	0.8	0.0
Delay (s)		33.8	31.8		57.9	34.1	51.1	28.9	12.1	55.6	26.2	19.1
Level of Service		C	C		E	C	D	C	B	E	C	B
Approach Delay (s)		32.5			47.3			30.8			30.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/02/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	111	239	106	191	239	260	1628	111	138	788	16
Future Volume (veh/h)	21	111	239	106	191	239	260	1628	111	138	788	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1841	1841	1841	1767	1767	1767
Adj Flow Rate, veh/h	22	117	252	112	201	252	274	1714	117	145	829	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	4	4	4	9	9	9
Cap, veh/h	36	161	447	42	26	447	307	1883	840	198	1424	635
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.17	0.54	0.54	0.06	0.42	0.42
Sat Flow, veh/h	0	565	1572	0	91	1572	1753	3497	1560	3264	3357	1497
Grp Volume(v), veh/h	139	0	252	313	0	252	274	1714	117	145	829	17
Grp Sat Flow(s),veh/h/ln	565	0	1572	91	0	1572	1753	1749	1560	1632	1678	1497
Q Serve(g_s), s	0.0	0.0	15.8	0.0	0.0	15.8	17.7	51.3	4.3	5.1	21.9	0.8
Cycle Q Clear(g_c), s	32.9	0.0	15.8	32.9	0.0	15.8	17.7	51.3	4.3	5.1	21.9	0.8
Prop In Lane	0.16		1.00	0.36		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	197	0	447	68	0	447	307	1883	840	198	1424	635
V/C Ratio(X)	0.71	0.00	0.56	4.60	0.00	0.56	0.89	0.91	0.14	0.73	0.58	0.03
Avail Cap(c_a), veh/h	197	0	447	68	0	447	453	1986	886	223	1424	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	0.0	35.3	45.7	0.0	35.3	46.7	24.2	13.3	53.4	25.5	19.4
Incr Delay (d2), s/veh	11.0	0.0	1.6	1652.2	0.0	1.6	14.4	6.6	0.1	10.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	6.2	33.2	0.0	6.2	8.7	20.7	1.4	2.3	8.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.3	0.0	36.9	1697.8	0.0	36.9	61.1	30.7	13.4	63.8	26.1	19.4
LnGrp LOS	D	A	D	F	A	D	E	C	B	E	C	B
Approach Vol, veh/h		391			565			2105			991	
Approach Delay, s/veh		39.9			957.0			33.7			31.5	
Approach LOS		D			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.5	66.8		37.4	24.7	53.6		37.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.9	65.7		32.9	29.9	43.7		32.9				
Max Q Clear Time (g_c+I1), s	7.1	53.3		34.9	19.7	23.9		34.9				
Green Ext Time (p_c), s	0.0	8.9		0.0	0.6	5.3		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			162.5									
HCM 6th LOS			F									

Intersection	
Int Delay, s/veh	321.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	5	5	37	5	42	16	1906	90	21	1102	16
Future Vol, veh/h	27	5	5	37	5	42	16	1906	90	21	1102	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	275	-	-	260	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	9	9	9	9	9	9	4	4	4	7	7	7
Mvmt Flow	28	5	5	39	5	44	17	1985	94	22	1148	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2221	3305	574	2687	3275	1040	1165	0	0	2079	0	0
Stage 1	1192	1192	-	2066	2066	-	-	-	-	-	-	-
Stage 2	1029	2113	-	621	1209	-	-	-	-	-	-	-
Critical Hdwy	7.68	6.68	7.08	7.68	6.68	7.08	4.18	-	-	4.24	-	-
Critical Hdwy Stg 1	6.68	5.68	-	6.68	5.68	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.68	5.68	-	6.68	5.68	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.24	-	-	2.27	-	-
Pot Cap-1 Maneuver	~ 22	7	445	~ 9	8	215	584	-	-	246	-	-
Stage 1	188	245	-	51	88	-	-	-	-	-	-	-
Stage 2	238	83	-	425	240	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 6	6	445	~ 2	7	215	584	-	-	246	-	-
Mov Cap-2 Maneuver	~ 6	6	-	~ 2	7	-	-	-	-	-	-	-
Stage 1	183	223	-	50	85	-	-	-	-	-	-	-
Stage 2	173	81	-	374	219	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $	3050.4	$ 11162.5	0.1	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	584	-	-	7	4	246	-	-
HCM Lane V/C Ratio	0.029	-	-	5.506	21.875	0.089	-	-
HCM Control Delay (s)	11.3	-	-	$ 3050.4	$ 11162.5	21.1	-	-
HCM Lane LOS	B	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	6.3	13	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM Signalized Intersection Capacity Analysis
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/02/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	127	313	133	111	143	233	1041	133	276	1721	16
Future Volume (vph)	16	127	313	133	111	143	233	1041	133	276	1721	16
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	0.97	0.95	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		0.99	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1852	1583		1779	1553	1752	3505	1568	3433	3539	1583
Flt Permitted		0.91	1.00		0.63	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1690	1583		1155	1553	1752	3505	1568	3433	3539	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	135	333	141	118	152	248	1107	141	294	1831	17
RTOR Reduction (vph)	0	0	185	0	0	118	0	0	52	0	0	8
Lane Group Flow (vph)	0	152	148	0	259	34	248	1107	89	294	1831	9
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	3%	3%	3%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		26.5	26.5		26.5	26.5	17.5	65.2	65.2	14.8	62.5	62.5
Effective Green, g (s)		26.5	26.5		26.5	26.5	17.5	65.2	65.2	14.8	62.5	62.5
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.15	0.54	0.54	0.12	0.52	0.52
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)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		373	349		255	342	255	1904	851	423	1843	824
v/s Ratio Prot							c0.14	c0.32		0.09	c0.52	
v/s Ratio Perm		0.09	0.09		c0.22	0.02			0.06			0.01
v/c Ratio		0.41	0.43		1.02	0.10	0.97	0.58	0.10	0.70	0.99	0.01
Uniform Delay, d1		40.0	40.2		46.8	37.2	51.0	18.3	13.3	50.4	28.5	13.9
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		0.7	0.8		60.4	0.1	48.4	0.5	0.1	4.9	19.3	0.0
Delay (s)		40.8	41.0		107.2	37.4	99.4	18.7	13.3	55.3	47.9	13.9
Level of Service		D	D		F	D	F	B	B	E	D	B
Approach Delay (s)		40.9			81.4			31.6			48.6	
Approach LOS		D			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	45.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/02/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	127	313	133	111	143	233	1041	133	276	1721	16
Future Volume (veh/h)	16	127	313	133	111	143	233	1041	133	276	1721	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1856	1856	1856	1870	1870	1870
Adj Flow Rate, veh/h	17	135	333	141	118	152	248	1107	141	294	1831	17
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	4	4	4	3	3	3	2	2	2
Cap, veh/h	33	196	350	46	0	344	258	1985	886	358	1851	826
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.15	0.56	0.56	0.10	0.52	0.52
Sat Flow, veh/h	0	888	1585	0	0	1560	1767	3526	1572	3456	3554	1585
Grp Volume(v), veh/h	152	0	333	259	0	152	248	1107	141	294	1831	17
Grp Sat Flow(s),veh/h/ln	888	0	1585	0	0	1560	1767	1763	1572	1728	1777	1585
Q Serve(g_s), s	0.0	0.0	24.9	0.0	0.0	10.1	16.7	24.0	5.2	10.0	61.1	0.6
Cycle Q Clear(g_c), s	26.5	0.0	24.9	26.5	0.0	10.1	16.7	24.0	5.2	10.0	61.1	0.6
Prop In Lane	0.11		1.00	0.54		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	0	350	46	0	344	258	1985	886	358	1851	826
V/C Ratio(X)	0.66	0.00	0.95	5.59	0.00	0.44	0.96	0.56	0.16	0.82	0.99	0.02
Avail Cap(c_a), veh/h	229	0	350	46	0	344	258	1985	886	481	1851	826
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	0.0	46.1	60.0	0.0	40.4	50.9	16.7	12.6	52.7	28.4	13.9
Incr Delay (d2), s/veh	6.9	0.0	35.5	2111.8	0.0	0.9	45.5	0.3	0.1	8.2	18.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	13.1	28.6	0.0	3.9	10.4	9.0	1.7	4.6	28.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.4	0.0	81.6	2171.8	0.0	41.2	96.5	17.0	12.7	60.9	46.8	13.9
LnGrp LOS	D	A	F	F	A	D	F	B	B	E	D	B
Approach Vol, veh/h		485			411			1496			2142	
Approach Delay, s/veh		70.9			1383.9			29.8			48.5	
Approach LOS		E			F			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.9	72.1		31.0	22.0	67.0		31.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	16.7	63.3		26.5	17.5	62.5		26.5				
Max Q Clear Time (g_c+I1), s	12.0	26.0		28.5	18.7	63.1		28.5				
Green Ext Time (p_c), s	0.4	9.7		0.0	0.0	0.0		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			165.7									
HCM 6th LOS			F									

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	5	11	42	5	27	16	1365	48	27	2092	42
Future Vol, veh/h	21	5	11	42	5	27	16	1365	48	27	2092	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	275	-	-	260	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	1	1	1	3	3	3	2	2	2
Mvmt Flow	22	5	11	44	5	28	17	1422	50	28	2179	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2983	3741	1090	2629	3760	736	2223	0	0	1472	0	0
Stage 1	2235	2235	-	1481	1481	-	-	-	-	-	-	-
Stage 2	748	1506	-	1148	2279	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	6.96	7.52	6.52	6.92	4.16	-	-	4.14	-	-
Critical Hdwy Stg 1	6.56	5.56	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	3.33	3.51	4.01	3.31	2.23	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 6	~ 4	209	~ 12	~ 4	364	228	-	-	454	-	-
Stage 1	43	77	-	133	189	-	-	-	-	-	-	-
Stage 2	368	181	-	213	75	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 3	209	-	~ 3	364	228	-	-	454	-	-
Mov Cap-2 Maneuver	-	~ 3	-	-	~ 3	-	-	-	-	-	-	-
Stage 1	40	72	-	123	175	-	-	-	-	-	-	-
Stage 2	305	167	-	175	70	-	-	-	-	-	-	-

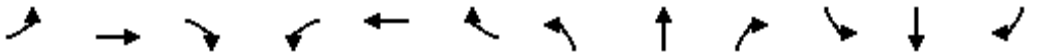
Approach	EB	WB	NB	SB
HCM Control Delay, s			0.2	0.2
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	228	-	-	-	-	454	-	-
HCM Lane V/C Ratio	0.073	-	-	-	-	0.062	-	-
HCM Control Delay (s)	22	-	-	-	-	13.5	-	-
HCM Lane LOS	C	-	-	-	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM Signalized Intersection Capacity Analysis
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020

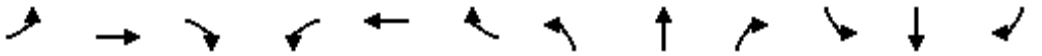


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	255	290	161	401	237	383	1690	121	190	764	195
Future Volume (vph)	133	255	290	161	401	237	383	1690	121	190	764	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	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	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.92		1.00	0.94		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)	1752	3225		1752	3310		3367	3471	1553	3213	3312	1482
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	3225		1752	3310		3367	3471	1553	3213	3312	1482
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)	140	268	305	169	422	249	403	1779	127	200	804	205
RTOR Reduction (vph)	0	173	0	0	72	0	0	0	46	0	0	117
Lane Group Flow (vph)	140	400	0	169	599	0	403	1779	81	200	804	88
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	9%	9%	9%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.1	19.0		12.6	21.5		18.9	62.3	62.3	8.1	51.5	51.5
Effective Green, g (s)	10.1	19.0		12.6	21.5		18.9	62.3	62.3	8.1	51.5	51.5
Actuated g/C Ratio	0.08	0.16		0.10	0.18		0.16	0.52	0.52	0.07	0.43	0.43
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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	147	510		183	593		530	1802	806	216	1421	636
v/s Ratio Prot	0.08	0.12		c0.10	c0.18		c0.12	c0.51		0.06	0.24	
v/s Ratio Perm									0.05			0.06
v/c Ratio	0.95	0.79		0.92	1.01		0.76	0.99	0.10	0.93	0.57	0.14
Uniform Delay, d1	54.7	48.5		53.2	49.2		48.4	28.5	14.6	55.7	25.8	20.8
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	59.6	7.8		44.9	39.4		6.4	18.1	0.1	40.8	0.5	0.1
Delay (s)	114.3	56.3		98.1	88.6		54.7	46.5	14.7	96.5	26.3	20.9
Level of Service	F	E		F	F		D	D	B	F	C	C
Approach Delay (s)		67.7			90.6			46.2			37.0	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	54.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	255	290	161	401	237	383	1690	121	190	764	195
Future Volume (veh/h)	133	255	290	161	401	237	383	1690	121	190	764	195
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1841	1841	1841	1767	1767	1767
Adj Flow Rate, veh/h	140	268	305	169	422	249	403	1779	127	200	804	205
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	4	4	4	9	9	9
Cap, veh/h	149	279	249	186	384	224	471	1815	810	220	1504	671
Arrive On Green	0.08	0.16	0.16	0.11	0.18	0.18	0.14	0.52	0.52	0.07	0.45	0.45
Sat Flow, veh/h	1767	1763	1572	1767	2142	1251	3401	3497	1560	3264	3357	1497
Grp Volume(v), veh/h	140	268	305	169	347	324	403	1779	127	200	804	205
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1630	1700	1749	1560	1632	1678	1497
Q Serve(g_s), s	9.5	18.1	19.0	11.4	21.5	21.5	13.9	59.7	5.1	7.3	20.9	10.5
Cycle Q Clear(g_c), s	9.5	18.1	19.0	11.4	21.5	21.5	13.9	59.7	5.1	7.3	20.9	10.5
Prop In Lane	1.00		1.00	1.00		0.77	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	149	279	249	186	316	292	471	1815	810	220	1504	671
V/C Ratio(X)	0.94	0.96	1.22	0.91	1.10	1.11	0.86	0.98	0.16	0.91	0.53	0.31
Avail Cap(c_a), veh/h	149	279	249	186	316	292	610	1817	810	220	1504	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.6	50.1	50.5	53.1	49.2	49.2	50.5	28.2	15.1	55.5	24.0	21.2
Incr Delay (d2), s/veh	56.1	42.8	131.3	41.6	79.2	85.5	9.3	16.6	0.1	36.5	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	11.2	16.5	7.1	16.3	15.6	6.4	26.7	1.8	4.0	7.9	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.8	92.9	181.8	94.8	128.4	134.7	59.8	44.8	15.2	92.0	24.4	21.4
LnGrp LOS	F	F	F	F	F	F	E	D	B	F	C	C
Approach Vol, veh/h		713			840			2309			1209	
Approach Delay, s/veh		134.4			124.1			45.8			35.1	
Approach LOS		F			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	66.7	17.1	23.5	21.1	58.2	14.6	26.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.1	62.3	12.6	19.0	21.5	48.9	10.1	21.5
Max Q Clear Time (g_c+I1), s	9.3	61.7	13.4	21.0	15.9	22.9	11.5	23.5
Green Ext Time (p_c), s	0.0	0.5	0.0	0.0	0.7	6.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	68.7
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	37	0	0	128	0	2030	103	0	1205	30
Future Vol, veh/h	0	0	37	0	0	128	0	2030	103	0	1205	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	9	9	9	9	9	9	4	4	4	7	7	7
Mvmt Flow	0	0	39	0	0	133	0	2115	107	0	1255	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	628	-	-	1111	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.08	-	-	7.08	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.39	-	-	3.39	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	409	0	0	193	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	409	-	-	193	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.7	57.2	0	0
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	409	193	-	-
HCM Lane V/C Ratio	-	-	0.094	0.691	-	-
HCM Control Delay (s)	-	-	14.7	57.2	-	-
HCM Lane LOS	-	-	B	F	-	-
HCM 95th %tile Q(veh)	-	-	0.3	4.3	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	24	121	50	16	46	68
Future Vol, veh/h	24	121	50	16	46	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	1	1	8	8	0	0
Mvmt Flow	35	178	74	24	68	100

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	98	0	-	0	334	86
Stage 1	-	-	-	-	86	-
Stage 2	-	-	-	-	248	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1501	-	-	-	665	978
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1501	-	-	-	648	978
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	798	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1501	-	-	-	811
HCM Lane V/C Ratio	0.024	-	-	-	0.207
HCM Control Delay (s)	7.5	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

HCM Signalized Intersection Capacity Analysis
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	177	346	191	154	154	285	1103	143	415	1755	46
Future Volume (vph)	46	177	346	191	154	154	285	1103	143	415	1755	46
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	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.90		1.00	0.93		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)	1770	3188		1736	3211		3400	3505	1568	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3188		1736	3211		3400	3505	1568	3433	3539	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	188	368	203	164	164	303	1173	152	441	1867	49
RTOR Reduction (vph)	0	145	0	0	130	0	0	0	86	0	0	25
Lane Group Flow (vph)	49	411	0	203	198	0	303	1173	66	441	1867	24
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	3%	3%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.7	18.3		13.6	25.2		10.6	52.2	52.2	18.2	59.8	59.8
Effective Green, g (s)	6.7	18.3		13.6	25.2		10.6	52.2	52.2	18.2	59.8	59.8
Actuated g/C Ratio	0.06	0.15		0.11	0.21		0.09	0.43	0.43	0.15	0.50	0.50
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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	484		196	672		299	1520	680	519	1759	786
v/s Ratio Prot	0.03	c0.13		c0.12	0.06		c0.09	0.33		0.13	c0.53	
v/s Ratio Perm									0.04			0.02
v/c Ratio	0.50	0.98dr		1.04	0.30		1.01	0.77	0.10	0.85	1.06	0.03
Uniform Delay, d1	55.2	49.7		53.4	40.1		54.9	29.0	20.1	49.7	30.2	15.5
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	4.0	13.1		74.0	0.2		55.5	2.5	0.1	12.3	39.9	0.0
Delay (s)	59.1	62.7		127.3	40.3		110.3	31.5	20.2	62.1	70.1	15.5
Level of Service	E	E		F	D		F	C	C	E	E	B
Approach Delay (s)		62.4			73.6			45.1			67.5	
Approach LOS		E			E			D			E	

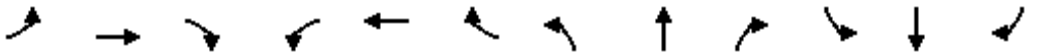
Intersection Summary			
HCM 2000 Control Delay	60.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM 6th Signalized Intersection Summary
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	177	346	191	154	154	285	1103	143	415	1755	46
Future Volume (veh/h)	46	177	346	191	154	154	285	1103	143	415	1755	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1856	1856	1856	1870	1870	1870
Adj Flow Rate, veh/h	49	188	368	203	164	164	303	1173	152	441	1867	49
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	4	4	4	3	3	3	2	2	2
Cap, veh/h	63	267	238	199	398	355	303	1559	695	500	1771	790
Arrive On Green	0.04	0.15	0.15	0.11	0.23	0.23	0.09	0.44	0.44	0.14	0.50	0.50
Sat Flow, veh/h	1781	1777	1585	1753	1749	1560	3428	3526	1572	3456	3554	1585
Grp Volume(v), veh/h	49	188	368	203	164	164	303	1173	152	441	1867	49
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1753	1749	1560	1714	1763	1572	1728	1777	1585
Q Serve(g_s), s	3.3	12.1	18.0	13.6	9.6	10.9	10.6	33.4	7.2	15.0	59.8	1.9
Cycle Q Clear(g_c), s	3.3	12.1	18.0	13.6	9.6	10.9	10.6	33.4	7.2	15.0	59.8	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	267	238	199	398	355	303	1559	695	500	1771	790
V/C Ratio(X)	0.77	0.71	1.55	1.02	0.41	0.46	1.00	0.75	0.22	0.88	1.05	0.06
Avail Cap(c_a), veh/h	132	267	238	199	398	355	303	1559	695	544	1771	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.4	48.5	51.0	53.2	39.5	40.0	54.7	28.0	20.7	50.3	30.1	15.6
Incr Delay (d2), s/veh	18.0	8.2	266.3	69.6	0.7	0.9	51.9	2.1	0.2	14.8	37.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	5.9	24.6	9.8	4.2	4.2	6.6	13.7	2.6	7.3	32.4	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.4	56.7	317.3	122.8	40.2	40.9	106.6	30.1	20.8	65.2	67.4	15.6
LnGrp LOS	E	E	F	F	D	D	F	C	C	E	F	B
Approach Vol, veh/h		605			531			1628			2357	
Approach Delay, s/veh		216.7			72.0			43.5			65.9	
Approach LOS		F			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.9	57.5	18.1	22.5	15.1	64.3	8.8	31.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.9	51.5	13.6	18.0	10.6	59.8	8.9	22.7
Max Q Clear Time (g_c+I1), s	17.0	35.4	15.6	20.0	12.6	61.8	5.3	12.9
Green Ext Time (p_c), s	0.3	7.6	0.0	0.0	0.0	0.0	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	77.2
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	42	0	0	77	0	1451	70	0	2228	60
Future Vol, veh/h	0	0	42	0	0	77	0	1451	70	0	2228	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	1	1	1	3	3	3	2	2	2
Mvmt Flow	0	0	44	0	0	80	0	1511	73	0	2321	63

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	1161	-	-	792	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.92	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.31	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	187	0	0	334	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	187	-	-	334	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30	19.2	0	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	187	334	-	-
HCM Lane V/C Ratio	-	-	0.234	0.24	-	-
HCM Control Delay (s)	-	-	30	19.2	-	-
HCM Lane LOS	-	-	D	C	-	-
HCM 95th %tile Q(veh)	-	-	0.9	0.9	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	59	43	47	30	42
Future Vol, veh/h	75	59	43	47	30	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	2	2	0	0	0	0
Mvmt Flow	109	86	62	68	43	61

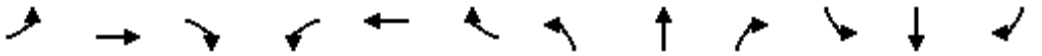
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	130	0	-	0	400	96
Stage 1	-	-	-	-	96	-
Stage 2	-	-	-	-	304	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1455	-	-	-	610	966
Stage 1	-	-	-	-	933	-
Stage 2	-	-	-	-	753	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1455	-	-	-	562	966
Mov Cap-2 Maneuver	-	-	-	-	562	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	753	-

Approach	EB	WB	SB
HCM Control Delay, s	4.3	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1455	-	-	-	743
HCM Lane V/C Ratio	0.075	-	-	-	0.14
HCM Control Delay (s)	7.7	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

HCM Signalized Intersection Capacity Analysis
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020

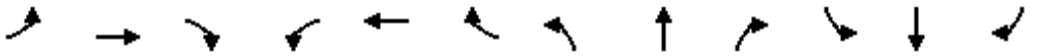


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	255	290	162	402	237	383	1697	121	192	764	195
Future Volume (vph)	133	255	290	162	402	237	383	1697	121	192	764	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	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	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.92		1.00	0.94		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)	1752	3225		1752	3310		3367	3471	1553	3213	3312	1482
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	3225		1752	3310		3367	3471	1553	3213	3312	1482
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)	140	268	305	171	423	249	403	1786	127	202	804	205
RTOR Reduction (vph)	0	173	0	0	71	0	0	0	46	0	0	117
Lane Group Flow (vph)	140	400	0	171	601	0	403	1786	81	202	804	88
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	9%	9%	9%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.1	18.9		12.7	21.5		18.9	62.1	62.1	8.3	51.5	51.5
Effective Green, g (s)	10.1	18.9		12.7	21.5		18.9	62.1	62.1	8.3	51.5	51.5
Actuated g/C Ratio	0.08	0.16		0.11	0.18		0.16	0.52	0.52	0.07	0.43	0.43
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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	147	507		185	593		530	1796	803	222	1421	636
v/s Ratio Prot	0.08	0.12		c0.10	c0.18		c0.12	c0.51		0.06	0.24	
v/s Ratio Perm									0.05			0.06
v/c Ratio	0.95	0.79		0.92	1.01		0.76	0.99	0.10	0.91	0.57	0.14
Uniform Delay, d1	54.7	48.6		53.2	49.2		48.4	28.8	14.7	55.5	25.8	20.8
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	59.6	8.0		44.8	40.2		6.4	19.8	0.1	36.3	0.5	0.1
Delay (s)	114.3	56.6		97.9	89.4		54.7	48.6	14.8	91.8	26.3	20.9
Level of Service	F	E		F	F		D	D	B	F	C	C
Approach Delay (s)		68.0			91.2			47.8			36.3	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	55.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	255	290	162	402	237	383	1697	121	192	764	195
Future Volume (veh/h)	133	255	290	162	402	237	383	1697	121	192	764	195
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1841	1841	1841	1767	1767	1767
Adj Flow Rate, veh/h	140	268	305	171	423	249	403	1786	127	202	804	205
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	4	4	4	9	9	9
Cap, veh/h	149	278	248	187	384	224	471	1810	807	226	1504	671
Arrive On Green	0.08	0.16	0.16	0.11	0.18	0.18	0.14	0.52	0.52	0.07	0.45	0.45
Sat Flow, veh/h	1767	1763	1572	1767	2144	1250	3401	3497	1560	3264	3357	1497
Grp Volume(v), veh/h	140	268	305	171	347	325	403	1786	127	202	804	205
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1631	1700	1749	1560	1632	1678	1497
Q Serve(g_s), s	9.5	18.1	18.9	11.5	21.5	21.5	13.9	60.4	5.1	7.4	20.9	10.5
Cycle Q Clear(g_c), s	9.5	18.1	18.9	11.5	21.5	21.5	13.9	60.4	5.1	7.4	20.9	10.5
Prop In Lane	1.00		1.00	1.00		0.77	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	149	278	248	187	316	292	471	1810	807	226	1504	671
V/C Ratio(X)	0.94	0.97	1.23	0.91	1.10	1.11	0.86	0.99	0.16	0.89	0.53	0.31
Avail Cap(c_a), veh/h	149	278	248	187	316	292	609	1810	807	226	1504	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	50.2	50.6	53.1	49.2	49.3	50.5	28.5	15.2	55.4	24.0	21.2
Incr Delay (d2), s/veh	56.3	44.4	134.2	42.4	79.9	86.2	9.3	18.0	0.1	33.2	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	11.3	16.6	7.2	16.3	15.6	6.4	27.4	1.8	4.0	7.9	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.9	94.6	184.7	95.5	129.1	135.4	59.8	46.6	15.3	88.7	24.4	21.4
LnGrp LOS	F	F	F	F	F	F	E	D	B	F	C	C
Approach Vol, veh/h		713			843			2316			1211	
Approach Delay, s/veh		136.4			124.7			47.2			34.6	
Approach LOS		F			F			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	66.6	17.2	23.4	21.1	58.3	14.6	26.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	62.1	12.7	18.9	21.5	48.9	10.1	21.5
Max Q Clear Time (g_c+I1), s	9.4	62.4	13.5	20.9	15.9	22.9	11.5	23.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.7	6.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	69.6
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑↱			↑↑	↱
Traffic Vol, veh/h	0	0	37	0	0	135	0	2030	104	0	1206	30
Future Vol, veh/h	0	0	37	0	0	135	0	2030	104	0	1206	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	9	9	9	9	9	9	4	4	4	7	7	7
Mvmt Flow	0	0	39	0	0	141	0	2115	108	0	1256	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	628	-	-	1112	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.08	-	-	7.08	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.39	-	-	3.39	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	409	0	0	192	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	409	-	-	192	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.7	62.6	0	0
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	409	192	-	-
HCM Lane V/C Ratio	-	-	0.094	0.732	-	-
HCM Control Delay (s)	-	-	14.7	62.6	-	-
HCM Lane LOS	-	-	B	F	-	-
HCM 95th %tile Q(veh)	-	-	0.3	4.7	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	121	50	18	52	77
Future Vol, veh/h	27	121	50	18	52	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	1	1	8	8	0	0
Mvmt Flow	40	178	74	26	76	113

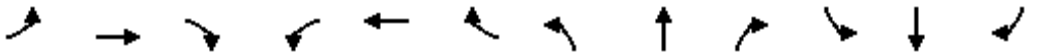
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	100	0	-	0	345	87
Stage 1	-	-	-	-	87	-
Stage 2	-	-	-	-	258	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1499	-	-	-	656	977
Stage 1	-	-	-	-	941	-
Stage 2	-	-	-	-	790	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1499	-	-	-	636	977
Mov Cap-2 Maneuver	-	-	-	-	636	-
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	790	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1499	-	-	-	803
HCM Lane V/C Ratio	0.026	-	-	-	0.236
HCM Control Delay (s)	7.5	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

HCM Signalized Intersection Capacity Analysis
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	177	346	192	155	154	285	1107	143	423	1755	46
Future Volume (vph)	46	177	346	192	155	154	285	1107	143	423	1755	46
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	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.90		1.00	0.93		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)	1770	3188		1736	3212		3400	3505	1568	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3188		1736	3212		3400	3505	1568	3433	3539	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	188	368	204	165	164	303	1178	152	450	1867	49
RTOR Reduction (vph)	0	145	0	0	130	0	0	0	87	0	0	25
Lane Group Flow (vph)	49	411	0	204	199	0	303	1178	65	450	1867	24
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	3%	3%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.7	18.3		13.7	25.3		10.6	51.8	51.8	18.5	59.7	59.7
Effective Green, g (s)	6.7	18.3		13.7	25.3		10.6	51.8	51.8	18.5	59.7	59.7
Actuated g/C Ratio	0.06	0.15		0.11	0.21		0.09	0.43	0.43	0.15	0.50	0.50
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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	484		197	675		299	1509	675	527	1756	785
v/s Ratio Prot	0.03	c0.13		c0.12	0.06		0.09	0.34		c0.13	c0.53	
v/s Ratio Perm									0.04			0.02
v/c Ratio	0.50	0.98dr		1.04	0.30		1.01	0.78	0.10	0.85	1.06	0.03
Uniform Delay, d1	55.2	49.7		53.3	40.0		54.9	29.4	20.4	49.6	30.3	15.5
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	4.0	13.1		73.7	0.2		55.5	2.7	0.1	12.7	40.5	0.0
Delay (s)	59.1	62.7		127.0	40.2		110.3	32.1	20.4	62.3	70.8	15.5
Level of Service	E	E		F	D		F	C	C	E	E	B
Approach Delay (s)		62.4			73.5			45.5			68.1	
Approach LOS		E			E			D			E	

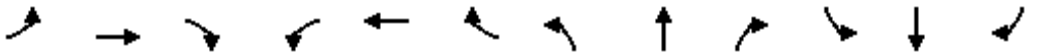
Intersection Summary			
HCM 2000 Control Delay	60.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM 6th Signalized Intersection Summary
1: Highway 99W & SW Elwert Road/SW Sunset Boulevard

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	177	346	192	155	154	285	1107	143	423	1755	46
Future Volume (veh/h)	46	177	346	192	155	154	285	1107	143	423	1755	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1856	1856	1856	1870	1870	1870
Adj Flow Rate, veh/h	49	188	368	204	165	164	303	1178	152	450	1867	49
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	4	4	4	3	3	3	2	2	2
Cap, veh/h	63	267	238	200	400	357	303	1546	690	509	1768	789
Arrive On Green	0.04	0.15	0.15	0.11	0.23	0.23	0.09	0.44	0.44	0.15	0.50	0.50
Sat Flow, veh/h	1781	1777	1585	1753	1749	1560	3428	3526	1572	3456	3554	1585
Grp Volume(v), veh/h	49	188	368	204	165	164	303	1178	152	450	1867	49
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1753	1749	1560	1714	1763	1572	1728	1777	1585
Q Serve(g_s), s	3.3	12.1	18.0	13.7	9.6	10.9	10.6	33.8	7.2	15.3	59.7	1.9
Cycle Q Clear(g_c), s	3.3	12.1	18.0	13.7	9.6	10.9	10.6	33.8	7.2	15.3	59.7	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	267	238	200	400	357	303	1546	690	509	1768	789
V/C Ratio(X)	0.77	0.71	1.55	1.02	0.41	0.46	1.00	0.76	0.22	0.88	1.06	0.06
Avail Cap(c_a), veh/h	132	267	238	200	400	357	303	1546	690	553	1768	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.4	48.5	51.0	53.2	39.4	39.9	54.7	28.4	20.9	50.2	30.2	15.6
Incr Delay (d2), s/veh	18.0	8.2	266.3	68.7	0.7	0.9	51.9	2.3	0.2	14.9	38.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	5.9	24.6	9.8	4.2	4.2	6.6	13.9	2.7	7.5	32.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.4	56.7	317.3	121.9	40.1	40.8	106.6	30.7	21.1	65.1	68.1	15.7
LnGrp LOS	E	E	F	F	D	D	F	C	C	E	F	B
Approach Vol, veh/h		605			533			1633			2366	
Approach Delay, s/veh		216.7			71.6			43.9			66.4	
Approach LOS		F			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.2	57.1	18.2	22.5	15.1	64.2	8.8	31.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.2	51.1	13.7	18.0	10.6	59.7	8.9	22.8
Max Q Clear Time (g_c+I1), s	17.3	35.8	15.7	20.0	12.6	61.7	5.3	12.9
Green Ext Time (p_c), s	0.3	7.4	0.0	0.0	0.0	0.0	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	77.5
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	42	0	0	81	0	1451	72	0	2229	60
Future Vol, veh/h	0	0	42	0	0	81	0	1451	72	0	2229	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	1	1	1	3	3	3	2	2	2
Mvmt Flow	0	0	44	0	0	84	0	1511	75	0	2322	63

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	1161	-	-	793	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.92	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.31	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	187	0	0	334	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	187	-	-	334	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30	19.4	0	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	187	334	-	-
HCM Lane V/C Ratio	-	-	0.234	0.253	-	-
HCM Control Delay (s)	-	-	30	19.4	-	-
HCM Lane LOS	-	-	D	C	-	-
HCM 95th %tile Q(veh)	-	-	0.9	1	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	85	59	43	54	34	48
Future Vol, veh/h	85	59	43	54	34	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	2	2	0	0	0	0
Mvmt Flow	123	86	62	78	49	70

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	140	0	-	0	433	101
Stage 1	-	-	-	-	101	-
Stage 2	-	-	-	-	332	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1443	-	-	-	584	960
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	731	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1443	-	-	-	532	960
Mov Cap-2 Maneuver	-	-	-	-	532	-
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	731	-

Approach	EB	WB	SB
HCM Control Delay, s	4.6	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1443	-	-	-	720
HCM Lane V/C Ratio	0.085	-	-	-	0.165
HCM Control Delay (s)	7.7	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.6

Exhibit A12

WASHINGTON COUNTY
LAND USE AND TRANSPORTATION
SURVEYOR'S OFFICE

SUBDIVISION PLAT NAMING

I request that the Washington County Surveyor's Office reserve the following subdivision name:

PROPOSED NAME OF SUBDIVISION:	"Riverside at Cedar Creek"
MAP AND TAX LOT NUMBER:	3S1C-104
CITY JURISDICTION (Which City?) or COUNTY JURISDICTION:	Washington County
SURVEYOR'S NAME: PLS NUMBER: COMPANY NAME:	Mike Harris 57863 Pioneer Design Group
OWNER'S NAME:	Riverside Homes

I understand that if the name is not used within five years, it will be automatically canceled.

Name of person reserving name: Mike Harris
Company name: Pioneer Design Group
Address: 9020 SW Washington Sq. Rd. Suite 170 Ptld. OR 97223
Telephone number: 503-643-8286
E-Mail: mharris@pd-grp.com

12-17-19
Name approved *Date*
Washington County Surveyor's Office

Name added to SID ~

155 North First Avenue, Suite 350, MS 15, Hillsboro, OR 97124 ***Phone: 503-846-8723***

\Shared\SURVEY\DATADIR\Web site\Downloadable Files\Subdivision-Plat-Naming.pdf
\Shared\SURVEY\DATADIR\Web site\Downloadable Files\Word to PDF\subname08-05-14.doc

Fidelity National Title
Company of Oregon

PUBLIC RECORD REPORT FOR NEW SUBDIVISION OR LAND PARTITION

THIS REPORT IS ISSUED BY THE ABOVE-NAMED COMPANY ("THE COMPANY") FOR THE EXCLUSIVE USE OF THE FOLLOWING CUSTOMER:

Fidelity National Title
Phone No.: (503)223-8338

Date Prepared: March 12, 2020
Effective Date: March 9, 2020 / 08:00 AM
Charge: $350.00
Order No.: 45142005870
Reference: Riverside at Cedar Creek

The information contained in this report is furnished to the Customer by Fidelity National Title Company of Oregon (the "Company") as an information service based on the records and indices maintained by the Company for the county identified below. This report is not title insurance, is not a preliminary title report for title insurance, and is not a commitment for title insurance. No examination has been made of the Company's records, other than as specifically set forth in this report ("the Report"). Liability for any loss arising from errors and/or omissions is limited to the lesser of the fee paid or the actual loss to the Customer, and the Company will have no greater liability by reason of this report. This report is subject to the Definitions, Conditions and Stipulations contained in it.

REPORT

A. The Land referred to in this report is located in the County of Washington, State of Oregon, and is described as follows:

As fully set forth on Exhibit "A" attached hereto and by this reference made a part hereof.

B. As of the Effective Date, the tax account and map references pertinent to the Land are as follows:

As fully set forth on Exhibit "B" attached hereto and by this reference made a part hereof.

C. As of the Effective Date and according to the Public Records, we find title to the land apparently vested in:

As fully set forth on Exhibit "C" attached hereto and by this reference made a part hereof.

D. As of the Effective Date and according to the Public Records, the Land is subject to the following liens and encumbrances, which are not necessarily shown in the order of priority:

As fully set forth on Exhibit "D" attached hereto and by this reference made a part hereof.

Fidelity National Title Company of Oregon
Public Record Report for New Subdivision or Land Partition
Order No. 45142005870

EXHIBIT "A"
(Land Description)

That portion of the North one-half of the Northeast one-quarter of Section 6, Township 3 South, Range 1 West of the Willamette Meridian, in the County of Washington and State of Oregon, described as follows:

Beginning at the Southwest corner of the said North one-half of the Northeast one-quarter of Section 6; thence East along the South line of the said North one-half of the Northeast one-quarter, a distance of 50 feet to the true point of beginning of the tract to be described; thence North parallel with the North-South center section line of said Section 6, a distance of 622.3 feet to a point; thence East parallel with the South line of the said North one-half of the Northeast one-quarter, a distance of 750 feet, more or less, to the West line of that tract of land conveyed to Lowell E. Weston, et ux, by deed recorded in Book 962, Page 155, Records of Washington County; thence South along the West line of the Weston Tract, a distance of 622.3 feet, more or less, to the South line of the North one-half of the Northeast one-quarter of said Section 6; thence West along the South line of the North one-half of the Northeast one-quarter of said Section 6, a distance of 750 feet, more or less, to the true point of beginning.

EXCEPTING THEREFROM any portion thereof lying within the boundaries of public roads.

Fidelity National Title Company of Oregon
Public Record Report for New Subdivision or Land Partition
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EXHIBIT "B"
(Tax Account and Map)

APN/Parcel ID(s) R586146 as well as Tax/Map ID(s) 3S106-00104

Fidelity National Title Company of Oregon
Public Record Report for New Subdivision or Land Partition
Order No. 45142005870

EXHIBIT "C"
(Vesting)

Linda R. Scott and Richard L. Scott, as equal tenants in common

Fidelity National Title Company of Oregon
Public Record Report for New Subdivision or Land Partition
Order No. 45142005870

EXHIBIT "D"
(Liens and Encumbrances)

1. Subject to any and all unpaid taxes, including exemptions or deferrals. The tax information is not presently available, and we will supplement this report at a later date. Said supplement will also disclose further information generally obtained by use of the County Assessor's Rolls.

   Tax Year: 2019-2020
   Tax Account Number: R586146

2. The Land has been classified as Forestland, as disclosed by the tax roll. If the Land becomes disqualified, said Land may be subject to additional taxes and/or penalties.

3. City Liens, if any, in favor of the City of Sherwood.

4. The rights of the public and governmental bodies for fishing, navigation and commerce in and to any portion of the Land herein described, lying below the high water line of the Cedar Creek.

   The right, title and interest of the State of Oregon in and to any portion lying below the high water line of Cedar Creek.

5. Rights of the public to any portion of the Land lying within streets, roads and highways.

6. A line of credit deed of trust to secure an indebtedness in the amount shown below,

   Amount: $250,000.00
   Dated: November 4, 2006
   Trustor/Grantor: Richard L. Scott Trustee of the The Scott Living Trust DTD 03/31/2003, Linda R. Scott Trustee of the The Scott Living Trust DTD 03/31/2003, Richard L. Scott, Linda R. Scott
   Trustee: Chicago Title
   Beneficiary: Bank of America, NA
   Loan No: Not disclosed
   Recording Date: December 5, 2006
   Recording No.: 2006-143187

End of Liens & Encumbrances

Boundary Documents:

99109559
2017-040512
2019-088141

Fidelity National Title Company of Oregon
Public Record Report for New Subdivision or Land Partition
Order No. 45142005870

DEFINITIONS, CONDITIONS AND STIPULATIONS

1. **Definitions.** The following terms have the stated meaning when used in this report:
   (a) "Customer": The person or persons named or shown as the addressee of this report.
   (b) "Effective Date": The effective date stated in this report.
   (c) "Land": The land specifically described in this report and improvements affixed thereto which by law constitute real property.
   (d) "Public Records": Those records which by the laws of the state of Oregon impart constructive notice of matters relating to the Land.
2. **Liability of Company.**
   (a) This is not a commitment to issue title insurance and does not constitute a policy of title insurance.
   (b) The liability of the Company for errors or omissions in this public record report is limited to the amount of the charge paid by the Customer, provided, however, that the Company has no liability in the event of no actual loss to the Customer.
   (c) No costs (including without limitation attorney fees and other expenses) of defense, or prosecution of any action, is afforded to the Customer.
   (d) In any event, the Company assumes no liability for loss or damage by reason of the following:
      (1) Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records.
      (2) Any facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
      (3) Easements, liens or encumbrances, or claims thereof, which are not shown by the Public Records.
      (4) Discrepancies, encroachments, shortage in area, conflicts in boundary lines or any other facts which a survey would disclose.
      (5) (i) Unpatented mining claims; (ii) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (iii) water rights or claims or title to water.
      (6) Any right, title, interest, estate or easement in land beyond the lines of the area specifically described or referred to in this report, or in abutting streets, roads, avenues, alleys, lanes, ways or waterways.
      (7) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the Public Records at the effective date hereof.
      (8) Any governmental police power not excluded by 2(d)(7) above, except to the extent that notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the Public Records at the effective date hereof.
      (9) Defects, liens, encumbrances, adverse claims or other matters created, suffered, assumed, agreed to or actually known by the Customer.
3. **Report Entire Contract.** Any right or action or right of action that the Customer may have or may bring against the Company arising out of the subject matter of this report must be based on the provisions of this report. No provision or condition of this report can be waived or changed except by a writing signed by an authorized officer of the Company. By accepting this form report, the Customer acknowledges and agrees that the Customer has elected to utilize this form of public record report and accepts the limitation of liability of the Company as set forth herein.
4. **Charge.** The charge for this report does not include supplemental reports, updates or other additional services of the Company.

Fidelity National Title Company of Oregon
Public Record Report for New Subdivision or Land Partition
Order No. 45142005870

LIMITATIONS OF LIABILITY

"CUSTOMER" REFERS TO THE RECIPIENT OF THIS REPORT.

CUSTOMER EXPRESSLY AGREES AND ACKNOWLEDGES THAT IT IS EXTREMELY DIFFICULT, IF NOT IMPOSSIBLE, TO DETERMINE THE EXTENT OF LOSS WHICH COULD ARISE FROM ERRORS OR OMISSIONS IN, OR THE COMPANY'S NEGLIGENCE IN PRODUCING, THE REQUESTED REPORT, HEREIN "THE REPORT." CUSTOMER RECOGNIZES THAT THE FEE CHARGED IS NOMINAL IN RELATION TO THE POTENTIAL LIABILITY WHICH COULD ARISE FROM SUCH ERRORS OR OMISSIONS OR NEGLIGENCE. THEREFORE, CUSTOMER UNDERSTANDS THAT THE COMPANY IS NOT WILLING TO PROCEED IN THE PREPARATION AND ISSUANCE OF THE REPORT UNLESS THE COMPANY'S LIABILITY IS STRICTLY LIMITED. CUSTOMER AGREES WITH THE PROPRIETY OF SUCH LIMITATION AND AGREES TO BE BOUND BY ITS TERMS

THE LIMITATIONS ARE AS FOLLOWS AND THE LIMITATIONS WILL SURVIVE THE CONTRACT:

ONLY MATTERS IDENTIFIED IN THIS REPORT AS THE SUBJECT OF THE REPORT ARE WITHIN ITS SCOPE. ALL OTHER MATTERS ARE OUTSIDE THE SCOPE OF THE REPORT.

CUSTOMER AGREES, AS PART OF THE CONSIDERATION FOR THE ISSUANCE OF THE REPORT AND TO THE FULLEST EXTENT PERMITTED BY LAW, TO LIMIT THE LIABILITY OF THE COMPANY, ITS LICENSORS, AGENTS, SUPPLIERS, RESELLERS, SERVICE PROVIDERS, CONTENT PROVIDERS AND ALL OTHER SUBSCRIBERS OR SUPPLIERS, SUBSIDIARIES, AFFILIATES, EMPLOYEES, AND SUBCONTRACTORS FOR ANY AND ALL CLAIMS, LIABILITIES, CAUSES OF ACTION, LOSSES, COSTS, DAMAGES AND EXPENSES OF ANY NATURE WHATSOEVER, INCLUDING ATTORNEY'S FEES, HOWEVER ALLEGED OR ARISING, INCLUDING BUT NOT LIMITED TO THOSE ARISING FROM BREACH OF CONTRACT, NEGLIGENCE, THE COMPANY'S OWN FAULT AND/OR NEGLIGENCE, ERRORS, OMISSIONS, STRICT LIABILITY, BREACH OF WARRANTY, EQUITY, THE COMMON LAW, STATUTE OR ANY OTHER THEORY OF RECOVERY, OR FROM ANY PERSON'S USE, MISUSE, OR INABILITY TO USE THE REPORT OR ANY OF THE MATERIALS CONTAINED THEREIN OR PRODUCED**, SO THAT THE TOTAL AGGREGATE LIABILITY OF THE COMPANY AND ITS AGENTS, SUBSIDIARIES, AFFILIATES, EMPLOYEES, AND SUBCONTRACTORS SHALL NOT IN ANY EVENT EXCEED THE COMPANY'S TOTAL FEE FOR THE REPORT.**

CUSTOMER AGREES THAT THE FOREGOING LIMITATION ON LIABILITY IS A TERM MATERIAL TO THE PRICE THE CUSTOMER IS PAYING, WHICH PRICE IS LOWER THAN WOULD OTHERWISE BE OFFERED TO THE CUSTOMER WITHOUT SAID TERM. CUSTOMER RECOGNIZES THAT THE COMPANY WOULD NOT ISSUE THE REPORT BUT FOR THIS CUSTOMER AGREEMENT, AS PART OF THE CONSIDERATION GIVEN FOR THE REPORT, TO THE FOREGOING LIMITATION OF LIABILITY AND THAT ANY SUCH LIABILITY IS CONDITIONED AND PREDICATED UPON THE FULL AND TIMELY PAYMENT OF THE COMPANY'S INVOICE FOR THE REPORT.

THE REPORT IS LIMITED IN SCOPE AND IS NOT AN ABSTRACT OF TITLE, TITLE OPINION, PRELIMINARY TITLE REPORT, TITLE REPORT, COMMITMENT TO ISSUE TITLE INSURANCE, OR A TITLE POLICY, AND SHOULD NOT BE RELIED UPON AS SUCH. THE REPORT DOES NOT PROVIDE OR OFFER ANY TITLE INSURANCE, LIABILITY COVERAGE OR ERRORS AND OMISSIONS COVERAGE. THE REPORT IS NOT TO BE RELIED UPON AS A REPRESENTATION OF THE STATUS OF TITLE TO THE PROPERTY. THE COMPANY MAKES NO REPRESENTATIONS AS TO THE REPORT'S ACCURACY, DISCLAIMS ANY WARRANTY AS TO THE REPORT, ASSUMES NO DUTIES TO CUSTOMER, DOES NOT INTEND FOR CUSTOMER TO RELY ON THE REPORT, AND ASSUMES NO LIABILITY FOR ANY LOSS OCCURRING BY REASON OF RELIANCE ON THE REPORT OR OTHERWISE.

Fidelity National Title Company of Oregon
Public Record Report for New Subdivision or Land Partition
Order No. 45142005870

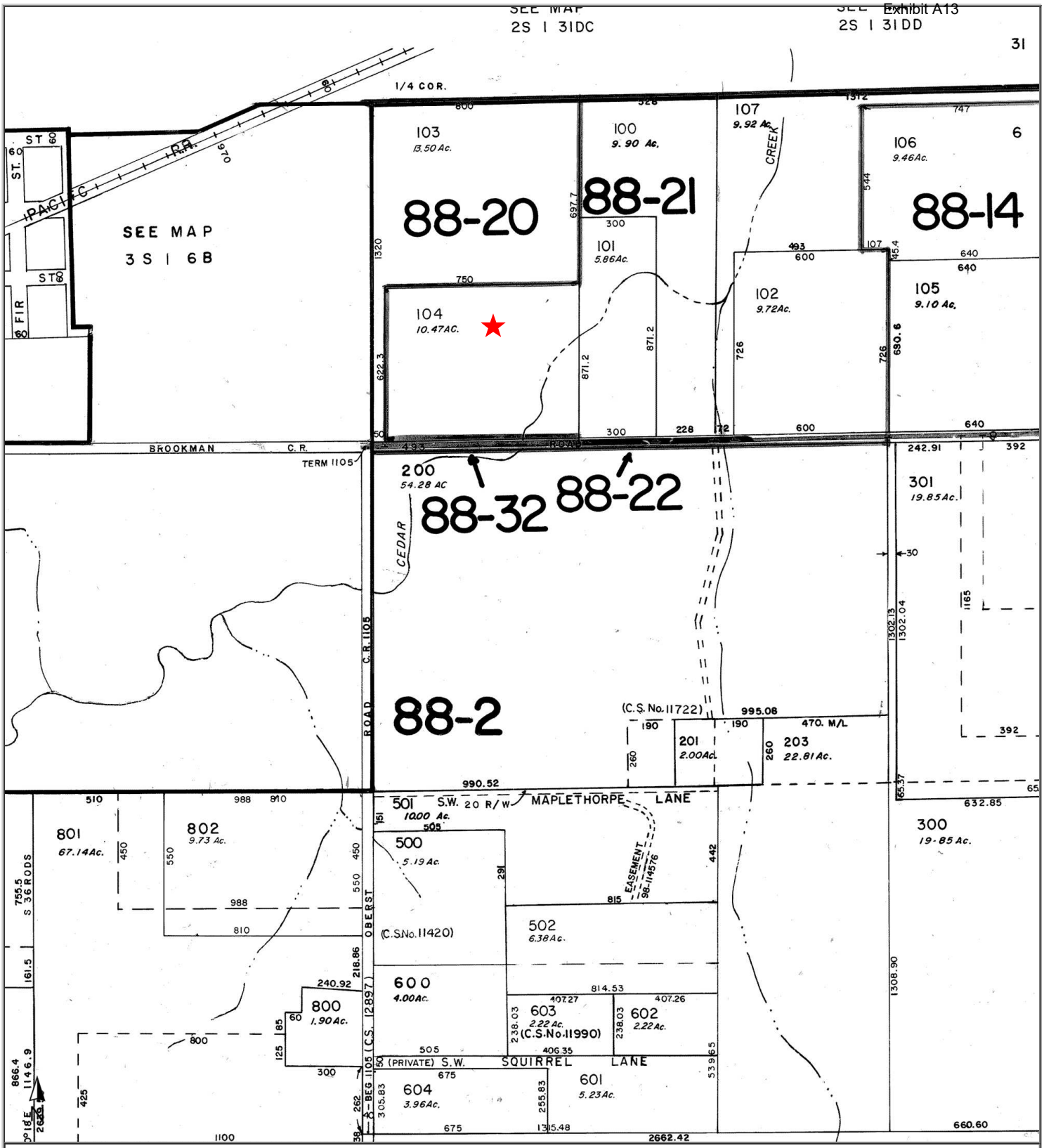
IF CUSTOMER (A) HAS OR WILL HAVE AN INSURABLE INTEREST IN THE SUBJECT REAL PROPERTY, (B) DOES NOT WISH TO LIMIT LIABILITY AS STATED HEREIN AND (C) DESIRES THAT ADDITIONAL LIABILITY BE ASSUMED BY THE COMPANY, THEN CUSTOMER MAY REQUEST AND PURCHASE A POLICY OF TITLE INSURANCE, A BINDER, OR A COMMITMENT TO ISSUE A POLICY OF TITLE INSURANCE. NO ASSURANCE IS GIVEN AS TO THE INSURABILITY OF THE TITLE OR STATUS OF TITLE. CUSTOMER EXPRESSLY AGREES AND ACKNOWLEDGES IT HAS AN INDEPENDENT DUTY TO ENSURE AND/OR RESEARCH THE ACCURACY OF ANY INFORMATION OBTAINED FROM THE COMPANY OR ANY PRODUCT OR SERVICE PURCHASED.

NO THIRD PARTY IS PERMITTED TO USE OR RELY UPON THE INFORMATION SET FORTH IN THE REPORT, AND NO LIABILITY TO ANY THIRD PARTY IS UNDERTAKEN BY THE COMPANY.

CUSTOMER AGREES THAT, TO THE FULLEST EXTENT PERMITTED BY LAW, IN NO EVENT WILL THE COMPANY, ITS LICENSORS, AGENTS, SUPPLIERS, RESELLERS, SERVICE PROVIDERS, CONTENT PROVIDERS, AND ALL OTHER SUBSCRIBERS OR SUPPLIERS, SUBSIDIARIES, AFFILIATES, EMPLOYEES AND SUBCONTRACTORS BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, INDIRECT, PUNITIVE, EXEMPLARY, OR SPECIAL DAMAGES, OR LOSS OF PROFITS, REVENUE, INCOME, SAVINGS, DATA, BUSINESS, OPPORTUNITY, OR GOODWILL, PAIN AND SUFFERING, EMOTIONAL DISTRESS, NON-OPERATION OR INCREASED EXPENSE OF OPERATION, BUSINESS INTERRUPTION OR DELAY, COST OF CAPITAL, OR COST OF REPLACEMENT PRODUCTS OR SERVICES, REGARDLESS OF WHETHER SUCH LIABILITY IS BASED ON BREACH OF CONTRACT, TORT, NEGLIGENCE, THE COMPANY'S OWN FAULT AND/OR NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTIES, FAILURE OF ESSENTIAL PURPOSE, OR OTHERWISE AND WHETHER CAUSED BY NEGLIGENCE, ERRORS, OMISSIONS, STRICT LIABILITY, BREACH OF CONTRACT, BREACH OF WARRANTY, THE COMPANY'S OWN FAULT AND/OR NEGLIGENCE OR ANY OTHER CAUSE WHATSOEVER, AND EVEN IF THE COMPANY HAS BEEN ADVISED OF THE LIKELIHOOD OF SUCH DAMAGES OR KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY FOR SUCH DAMAGES.

END OF THE LIMITATIONS OF LIABILITY

Exhibit A13



ParcelID: R586146

17433 SW Brookman Rd

Sherwood, OR 97140

This map/plat is being furnished as an aid in locating the herein described land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.

Washington County, Oregon
08/02/2010 10:14:31 AM 2010-058473
D-DW Cnt=1 Stn=21 RECORDS1
$10.00 $5.00 $11.00 $15.00 - Total = $41.00

01506207201000584730020021

I, Richard Hobernicht, Director of Assessment and Taxation and Ex-Officio County Clerk for Washington County, Oregon, do hereby certify that the within instrument of writing was received and recorded in the book of records of said county.

Richard Hobernicht, Director of Assessment and Taxation, Ex-Officio County Clerk

Exhibit A15

Linda Scott, Trustee
Scott Living Trust
17433 SW Brookman Road
Sherwood, OR 97140-8801

Richard Scott, Trustee
Scott Living Trust
3401 Crawford SE
Salem, OR 97302
Grantors' Name and Address

Linda Scott
17433 SW Brookman Road
Sherwood, OR 97140-8801

Richard Scott
3401 Crawford SE
Salem, OR 97302
Grantees' Name and Address

AFTER RECORDING, RETURN TO:
Richard A. Carlson
Attorney at Law
4040 Douglas Way
Lake Oswego, or 97035

Until requested otherwise, send all tax statements to:
Linda & Richard Scott
17433 SW Brookman Road
Sherwood, OR 97140-8801

WARRANTY DEED - STATUTORY FORM

Linda R. Scott and Richard L. Scott, Trustees of the Scott Living Trust, **Grantor**, convey and warrant to Linda R. Scott and Richard L. Scott, as equal tenants in common without a right of survivorship, **Grantee**, the following described real property free of encumbrances, except as specifically set forth herein, located at 17433 SW Brookman Road, Sherwood, Washington County, Oregon, more particularly described as follows:

That portion of the North half of the Northeast quarter of Section 6, Township 3 South, Range 1 West, of the Willamette Meridian, Washington County, Oregon, described as follows: Beginning at the Southwest corner of the said North half of the Northeast quarter, a distance of 50 feet to the true point of beginning of the tract to be described; thence North, parallel to the North-South center section line of said Section 6, a distance of 622.3 feet to a point; thence East, parallel with the South line of the said North half of the Northeast quarter, a distance of 750 feet, more or less, to the West line of that tract of land conveyed to Lowell E. Weston, et ux, by deed recorded in Book 962, page 155; Records of Washington County, thence South along the West line of the Weston tract, a distance of 622.3 feet more or less, to the South line of the North half of the Northeast quarter of said section 6; thence West along the South line of the North half of the Northeast

quarter of said Section 6, a distance of 750 feet, more or less, to the true point of beginning, in the County of Washington, State of Oregon; EXCEPTING THEREFROM any portion thereof lying within the boundaries of public roads.

The property is free from encumbrances, except those of record.

The true consideration for this conveyance is $0, pursuant to the General Judgment of Unlimited Separation (Stipulated) entered in Linda Ruth Scott and Richard Lawrence Scott, Washington County Circuit Court Case No. C091964DRC.

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300 , 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, AND SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11,CHAPTER 424, OREGON LAWS 2007, AND SECTIONS 2 TO 9 AND 17, CHAPTER 855. OREGON LAWS 2009.

Dated this 15th day of July, 2010.

Linda R Scott

STATE OF OREGON, County of Clackamas) ss.

This instrument was acknowledged before me on July 15, 2010, by Linda R. Scott as Trustee of the Scott Living Trust.

OFFICIAL SEAL
JANICE L. BLAKESLEE
NOTARY PUBLIC-OREGON
COMMISSION NO. 449780
MY COMMISSION EXPIRES JULY 14, 2014

Janice L Blakeslee
Notary Public

STATE OF OREGON, County of Marion) ss.

This instrument was acknowledged before me on Richard Scott 2010, by Richard L. Scott as Trustee of the Scott Living Trust.

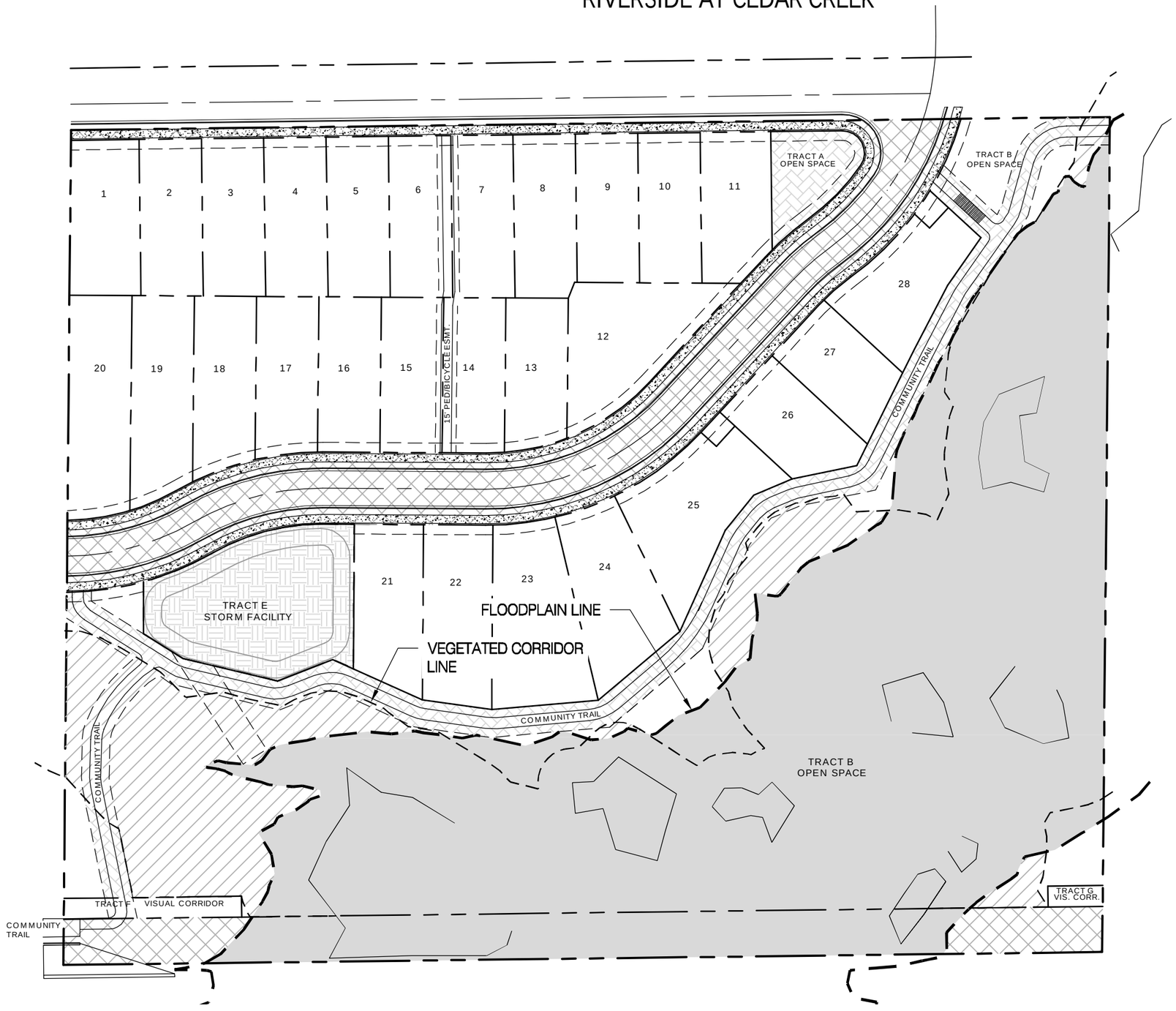
Kaylyn Kimball
Notary Public

OFFICIAL SEAL
KAYLYN KIMBALL
NOTARY PUBLIC-OREGON
COMMISSION NO. 428607
MY COMMISSION EXPIRES APRIL 30, 2012

Exhibit A14

NET DEVELOPABLE AREA EXHIBIT

RIVERSIDE AT CEDAR CREEK



LEGEND

- -FLOOD PLAIN (156,182 SF)
- -V.C. OUT OF F.P. (31,958 SF)
- -STREETS (51,293 SF)
- -PUBLIC PARKS OR TRAILS (32,069 SF)
- -STORM FACILITY (13,270 SF)

AREA CALCULATIONS

GROSS SITE AREA = 451,691 SF (10.37 AC)
AREA TO BE REMOVED = 284,772 SF (6.54 AC)
NET DEVELOPABLE AREA = 166,919 SF (3.83 AC)

N

SCALE
80 0 40 80
1 INCH = 80 FEET

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Designed by	MLS	Date	06/20
Drawn by	TCC	Date	06/20
Reviewed by	WTH	Date	06/20
Project No.	131-025	REF.	
Horiz. Scale:	1"=80'		
Vert. Scale:			

Project
CEDAR CREEK

No.
131-025

Type
PLANNING

Sheet
1 of 1

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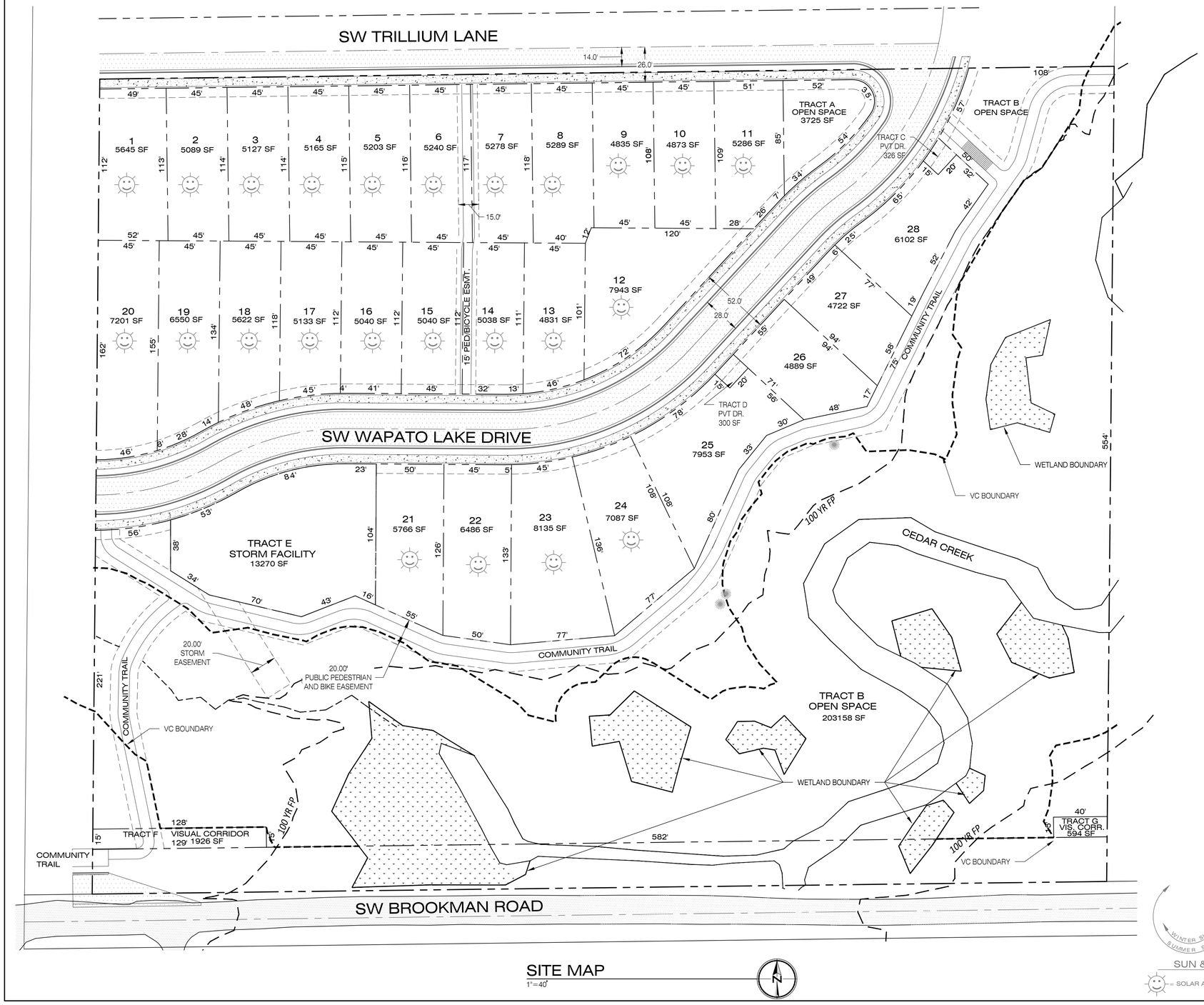
Exhibit A15

RIVERSIDE AT CEDAR CREEK

A 28 LOT SUBDIVISION ON TAX LOT 104, TAX MAP 3S106
17433 SW BROOKMAN ROAD, SHERWOOD, OREGON, 97140



SITE MAP
1"=40'

VICINITY MAP
N.T.S.

OWNER/APPLICANT

RIVERSIDE HOMES, LLC
17933 NW EVERGREEN PLACE, SUITE 370
BEAVERTON, OR 97006
PHONE: (503) 645-0986
CONTACT: NIKI MUNSON

PLANNING/ENGINEERING/SURVEYING

PIONEER DESIGN GROUP, INC.
9020 SW WASHINGTON SQ RD., SUITE 170
PORTLAND, OR 97223
PHONE (503) 643-8286
CONTACT: WAYNE HAYSON

SITE INFORMATION

TAX MAP:	3S106
TAX LOT:	104
SITE ADDRESS:	17433 SW BROOKMAN ROAD
SITE SIZE:	10.47 ACRES
ZONING:	MDRL

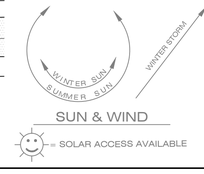
VERTICAL DATUM

BENCHMARK: WASHINGTON COUNTY BENCHMARK NO.118.

DESCRIPTION: A 3" BRASS DISK INSCRIBED "WASH. CO. BM 118" SET IN CONCRETE FILLED WITH METAL, NORTH SIDE OF SW BROOKMAN ROAD ON THE EXTENDED CENTERLINE OF SW OBERST RD

ELEVATION: 194.775' NGVD 29

SHEET INDEX



SHERWOOD CASEFILE # _____

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PRELIMINARY PLAT

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project RIVERSIDE AT CEDAR CREEK
No. 131-025
Type PLANNING
Sheet **P1**

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Exhibit A15

17495 SW BROOKMAN RD
TL 103 MAP 3S 1 6
DEED DOC. NO. 2017-040512

N89°16'37"E 749.98'

S00°31'38"W 602.48'

S89°17'18"W 749.99'

SW BROOKMAN ROAD

CHICKEN COOP

EXISTING STRUCTURES TO BE REMOVED

EXISTING BARN

EXISTING BARN

EXISTING HOUSE

EXISTING HOUSE WITH ASSOCIATED FOUNDATION AND DECKING TO BE REMOVED

EXISTING GRAVEL DRIVEWAY TO BE REMOVED

DEED DOCUMENT NO. 2010-058473

VC BOUNDARY

VC BOUNDARY

VC BOUNDARY

VC BOUNDARY

WETLAND BOUNDARY

WETLAND BOUNDARY

100YR FP

100YR FP

100YR FP

CEDAR CREEK

17117 SW BROOKMAN RD
TL 101 MAP 3S 1 6
DEED DOC. NO. 99109559

LEGEND

- RIGHT-OF-WAY LINE
- BOUNDARY LINE
- EXISTING LOT LINE
- CENTER LINE
- STORM DRAINAGE LINE
- SANITARY SEWER LINE
- WATER LINE
- GAS LINE
- COMMUNICATION LINE
- UNDERGROUND POWER LINE
- OVERHEAD WIRE
- WOOD FENCE (AS NOTED)
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- CONIFEROUS TREE (DBH)
- DECIDUOUS TREE (DBH)
- CATCH BASIN/DRAIN INLET
- STORM DITCH INLET
- STORM MANHOLE
- SANITARY MANHOLE
- WATER VALVE
- FIRE HYDRANT ASSEMBLY
- WATER METER
- GAS VALVE
- GAS METER
- STREET SIGN
- MAILBOX
- ELECTRIC PEDESTAL
- LIGHT POLE
- POWER POLE
- COMMUNICATION VAULT
- TELECOMMUNICATION PEDESTAL
- UTILITY EXTENSION
- FOUND SURVEY MONUMENT AS NOTED
- EXISTING CONCRETE
- EXISTING ASPHALT PAVEMENT
- EXISTING GRAVEL SURFACE
- EXISTING BUILDING FOOTPRINT

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

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EXISTING CONDITIONS AND DEMOLITION PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
PLANNING
Sheet
P2

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Exhibit A15

LEGEND

- RIGHT-OF-WAY LINE
- BOUNDARY LINE
- EXISTING LOT LINE
- CENTER LINE
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR
- EXISTING TREE REMAIN
- EXISTING TREE TO BE REMOVED
- EXISTING DRIP LINE
- TREE PROTECTION FENCING
- DRIP LINE ENCROACHMENT AREA (ARBORIST SUPERVISION REQUIRED)
- TREE CANOPY TO REMAIN IN NET DEVELOPABLE AREA (TOTAL = 5,634 SF)
- EXISTING TREE WITH SPECFIC TREATMENT

GENERAL TREE NOTES

(1) **1. EXISTING TREE LIKELY TO RETAIN IN CONSTRUCTION.** TREES #3129S AND #31605 ARE CLASSIFIED AS "LIKELY TO RETAIN" BECAUSE THESE TREES HAVE THE GREATEST POTENTIAL FOR CONSTRUCTION IMPACTS DURING RETAINING WALL CONSTRUCTION, BUT ARE OTHERWISE SUITABLE FOR PRESERVATION. EVERY REASONABLE EFFORT SHALL BE MADE TO PRESERVE THESE TREES AND THE DEVELOPER IS RESPONSIBLE FOR COORDINATING WITH THE PROJECT ARBORIST TO MONITOR AND DOCUMENT RETAINING WALL EXCAVATION BENEATH THE DRIPLINE AREAS. IF THE PROJECT ARBORIST DETERMINES THAT NECESSARY ROOT IMPACTS ARE LIKELY TO IMPACT THE VIABILITY OR STABILITY OF EITHER TREE, THE DEVELOPER MAY PROCEED WITH REMOVAL OF THE TREES WITHOUT DELAY AND THE ARBORIST SHALL SUBMIT DOCUMENTATION TO THE CITY REGARDING THE NECESSITY OF REMOVAL.

(2) **2. CREATE SNAG OUT OF EXISTING TREE.** REFER TO TREE PROTECTION SPECIFICATION #9.

(3) **3. OBTAIN ADJACENT OWNER'S PERMISSION PRIOR TO REMOVING BOUNDARY AND OFF-SITE TREES #14124 AND #14125.**

TREE PROTECTION SPECIFICATIONS

1. **PRE-CONSTRUCTION CONFERENCE.** THE DEVELOPER SHALL ARRANGE AN ON-SITE MEETING WITH THE PROJECT ARBORIST IN ORDER TO REVIEW THE TREE PRESERVATION AND REMOVAL PLAN AND DISCUSS METHODS OF TREE REMOVAL AND TREE PROTECTION PRIOR TO ANY CONSTRUCTION.
2. **TREE PROTECTION ZONE.** THE TREE PROTECTION ZONE (TPZ) IS DEFINED AS THE DRIPLINE OF PROTECTED TREES REGARDLESS OF THE LOCATION OF PROTECTION FENCING; TPZS ARE DEPICTED ON THE TREE PRESERVATION AND REMOVAL PLAN. ANY WORK THAT IS PERFORMED BENEATH THE DRIPLINE OF A PROTECTED TREE SHALL BE MONITORED AND DOCUMENTED BY THE PROJECT ARBORIST. AREAS OF TPZ ENCROACHMENT REQUIRING THE DEVELOPER TO COORDINATE WITH THE PROJECT ARBORIST ARE SHADED ON THE TREE PRESERVATION AND REMOVAL PLAN.
3. **PROTECTION FENCING**. TREES TO BE PRESERVED SHALL BE PROTECTED BY INSTALLATION OF TREE PROTECTION FENCING AS DEPICTED ON THE TREE PRESERVATION AND REMOVAL SITE PLAN TO PREVENT INJURY TO TREE TRUNKS OR ROOTS, OR SOIL COMPACTION. PROTECTION FENCING SHALL BE CHAIN LINK OR GALVANIZED STEEL ON METAL STAKES, INSTALLED PRIOR TO ANY GROUND DISTURBING ACTIVITY AND MAINTAINED IN GOOD REPAIR THROUGHOUT CONSTRUCTION. THE PROTECTION FENCING SHALL NOT BE MOVED, REMOVED OR ENTERED BY EQUIPMENT WITHOUT PRIOR APPROVAL OF THE PROJECT ARBORIST; ADJUSTMENTS TO THE LOCATION OF PROTECTION FENCING SHALL BE DOCUMENTED BY THE PROJECT ARBORIST. TREES LOCATED MORE THAN 30-FEET FROM CONSTRUCTION ACTIVITY SHOULD NOT REQUIRE FENCING.
4. **PROHIBITIONS.** NO SOIL COMPACTION, MATERIALS OR SPOILS STORAGE SHALL BE ALLOWED WITHIN THE TPZ. WITHOUT AUTHORIZATION FROM THE PROJECT ARBORIST, NONE OF THE FOLLOWING SHALL OCCUR BENEATH THE DRIPLINE OF ANY PROTECTED TREE:
   a. GRADE CHANGE OR CUT AND FILL;
   b. NEW IMPERVIOUS SURFACES;
   c. UTILITY OR DRAINAGE FIELD PLACEMENT; OR
   d. VEHICLE MANEUVERING.

   ROOT PROTECTION ZONES MAY BE ENTERED FOR TASKS LIKE SURVEYING, MEASURING, AND, SAMPLING. FENCES MUST BE CLOSED UPON COMPLETION OF THESE TASKS. CONSTRUCTION THAT IS NECESSARY BENEATH PROTECTED TREE DRIPLINES SHALL BE PERFORMED UNDER ARBORIST SUPERVISION.
5. **EROSION CONTROL.** SILT FENCING REQUIRED TO BE INSTALLED WITHIN TPZS SHALL NOT BE TRENCHED IN PER MANUFACTURER SPECIFICATIONS TO AVOID ROOT DAMAGE. INSTEAD, ROLL THE BASE OF THE SILT FENCE AROUND A STRAW WATTLE AND STAKE THE WATTLE SECURELY INTO THE GROUND OR USE COMPOST SOCKS OR OTHER TECHNIQUES THAT AVOID TREE ROOT IMPACTS.
6. **TREE REMOVAL.** TREES TO BE REMOVED SHALL BE CLEARLY IDENTIFIED WITH TREE-MARKING PAINT OR OTHER METHODS APPROVED IN ADVANCED BY THE PROJECT ARBORIST. TREE REMOVAL SHALL BE PERFORMED BY A QUALIFIED TREE SERVICE. DIRECTIONALLY FELL OR SURGICALLY REMOVE TREES TO AVOID CONTACT OR OTHERWISE PREVENT DAMAGE TO THE TRUNKS AND BRANCHES OF TREES TO BE PRESERVED. NO VEHICLES OR HEAVY EQUIPMENT SHALL BE PERMITTED WITHIN TPZS DURING TREE REMOVAL OPERATIONS.
7. **SNAG CREATION.** TREES #6192 AND #31606 LOCATED WITHIN THE VEGETATED CORRIDOR BUT NEAR PROPOSED CONSTRUCTION SHALL BE RETAINED AS WILDLIFE SNAGS RATHER THAN REMOVED TO GROUND LEVEL. SNAG CREATION SHALL BE PERFORMED BY A QUALIFIED TREE SERVICE AND WORK SHOULD BE COMPLETED BY HAND WITHOUT THE USE OF HEAVY EQUIPMENT IN THE TPZ. DELIMB THESE TREES AND REDUCE TRUNKS HEIGHTS TO LESS THAN 1.5-TIMES THE DISTANCE TO HIGH VALUE TARGETS TO MINIMIZE RISK.
8. **STUMP REMOVAL.** STUMPS OF TREES PLANNED FOR REMOVAL THAT ARE LOCATED BENEATH THE DRIPLINE OF PROTECTED TREES SHALL REMAIN IN THE GROUND WHERE FEASIBLE. OTHERWISE, STUMPS MAY BE REMOVED BY STUMP GRINDING TO JUST BELOW THE GROUND SURFACE OR EXTRACTED FROM THE GROUND UNDER PROJECT ARBORIST SUPERVISION.
9. **PRUNING.** TREES TO BE PRESERVED MAY REQUIRE MINOR PRUNING FOR OVERHEAD CLEARANCE AND TO REMOVE DEAD AND DEFECTIVE BRANCHES FOR SAFETY. THE PROJECT ARBORIST CAN HELP IDENTIFY WHETHER PRUNING IS NECESSARY ONCE TREES PLANNED FOR REMOVAL HAVE BEEN REMOVED AND THE SITE IS STAKED AND PREPARED FOR CONSTRUCTION. TREE REMOVAL AND PRUNING SHALL BE PERFORMED BY A QUALIFIED TREE SERVICE.
10. **EXCAVATION BENEATH PROTECTED TREE DRIPLINES.** EXCAVATION BENEATH PROTECTED TREE DRIPLINES SHALL BE AVOIDED IF ALTERNATIVES ARE AVAILABLE. IF EXCAVATION IS UNAVOIDABLE, THE DEVELOPER SHALL COORDINATE WITH THE PROJECT ARBORIST TO EVALUATE THE PROPOSED EXCAVATION TO DETERMINE METHODS TO MINIMIZE IMPACTS TO TREES. THIS CAN INCLUDE TUNNELING, HAND DIGGING, USING A MODIFIED PROFILE OR OTHER APPROACHES.
11. **ROOT PRUNING.** ROOTS SMALLER THAN 2-INCHES IN DIAMETER MAY BE PRUNED CLEAN TO SOUND WOOD USING A SHARP SAW AS DIGGING PROGRESSES TO AVOID PULLING AND TEARING ROOTS. EXCAVATION IMMEDIATELY ADJACENT TO ROOTS LARGER THAN 2-INCHES IN DIAMETER WITHIN THE TPZ SHALL BE BY HAND OR OTHER NON-INVASIVE TECHNIQUES TO ENSURE THAT ROOTS ARE NOT DAMAGED. THE PROJECT ARBORIST OR SHALL ASSESS AND DOCUMENT ROOTS 2-INCHES AND LARGER IN DIAMETER PRIOR TO IMPACTS. WHERE FEASIBLE, THESE SHALL BE PROTECTED BY TUNNELING OR OTHER MEANS TO AVOID DESTRUCTION OR DAMAGE. EXCEPTIONS CAN BE MADE IF, IN THE OPINION OF THE PROJECT, UNACCEPTABLE DAMAGE WILL NOT OCCUR TO THE TREE.
12. **LANDSCAPING.** FOLLOWING CONSTRUCTION AND PRIOR TO LANDSCAPING, THE PROTECTION FENCING MAY BE REMOVED. WHERE LANDSCAPING IS DESIRED, APPLY APPROXIMATELY 3-INCHES OF MULCH BENEATH THE DRIPLINE OF PROTECTED TREES, BUT NOT DIRECTLY AGAINST TREE TRUNKS. SHRUBS AND GROUND COVER PLANTS MAY BE PLANTED WITHIN TPZS. IF IRRIGATION IS USED, USE DRIP IRRIGATION ONLY BENEATH THE DRIPLINES OF PROTECTED TREES; INSTALL DRIP IRRIGATION LINES ON THE GROUND SURFACE AND COVER WITH MULCH (NO TRENCHING TO INSTALL IRRIGATION LINES BENEATH PROTECTED TREE DRIPLINES).
13. **QUALITY ASSURANCE.** THE PROJECT ARBORIST WILL BE AVAILABLE ON-CALL DURING CONSTRUCTION TO SUPERVISE PROPER EXECUTION OF THIS PLAN; IT IS THE DEVELOPER'S RESPONSIBILITY TO COORDINATE WITH THE PROJECT ARBORIST IN A TIMELY MANNER AS NEEDED.
14. **FINAL REPORT.** AFTER THE PROJECT HAS BEEN COMPLETED, THE PROJECT ARBORIST SHOULD PROVIDE A FINAL REPORT THAT DESCRIBES THE MEASURES NEEDED TO MAINTAIN AND PROTECT THE REMAINING TREES.

N

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

215
PIONEER DESIGN GROUP
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PRELIMINARY TREE PRESERVATION AND REMOVAL PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025		REF.
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
PLANNING
Sheet
P3

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Exhibit A15

17495 SW BROOKMAN RD
TL 103 MAP 3S 1 6
DEED DOC. NO. 2017-040512

SW TRILLIUM LANE

20.00' GARAGE SETBACK (TYP.)

1 2 3 4 5 6 7 8 9 10 11

TRACT A OPEN SPACE

TRACT B OPEN SPACE

TRACT C PVT DR. 326 SF

5.00' SIDE YARD SETBACK (TYP.)

28

20.00' REAR YARD SETBACK (TYP.)

BICYCLE ESMT.

20 19 18 17 16 15 14 13 12

27

14.00' FRONT YARD SETBACK (TYP.)

COMMUNITY TRAIL

26

20.00' GARAGE SETBACK (TYP.)

TRACT D PVT DR. 300 SF

SW WAPATO LAKE DRIVE

25

5.00' SIDE YARD SETBACK (TYP.)

100 YR FP

TRACT E STORM FACILITY

21 22 23 24

14.00' FRONT YARD SETBACK (TYP.)

20.00' REAR YARD SETBACK (TYP.)

CEDAR CREEK

COMMUNITY TRAIL

TRACT B OPEN SPACE

VEGETATED CORRIDOR BOUNDARY

COMMUNITY TRAIL

VEGETATED CORRIDOR BOUNDARY

VEGETATED CORRIDOR BOUNDARY

100 YR FP

TRACT F VISUAL CORRIDOR

100 YR FP

TRACT G VIS. CORR.

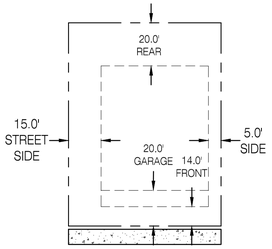
COMMUNITY TRAIL

SW BROOKMAN ROAD

17117 SW BROOKMAN RD
TL 101 MAP 3S 1 6
DEED DOC. NO. 99109559

SETBACK REQUIREMENTS

FRONT YARD:	14 FT.
FACE OF GARAGE:	20 FT.
SIDE YARD:	5 FT.
STREET SIDE YARD:	15 FT.
REAR BUILDING:	20 FT.



SETBACK DETAIL
NTS

SUN & WIND

= SOLAR ACCESS AVAILABLE

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

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CONCEPTUAL BUILDING SETBACK PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	REF.
Project No.	131-025		
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
PLANNING
Sheet
P4

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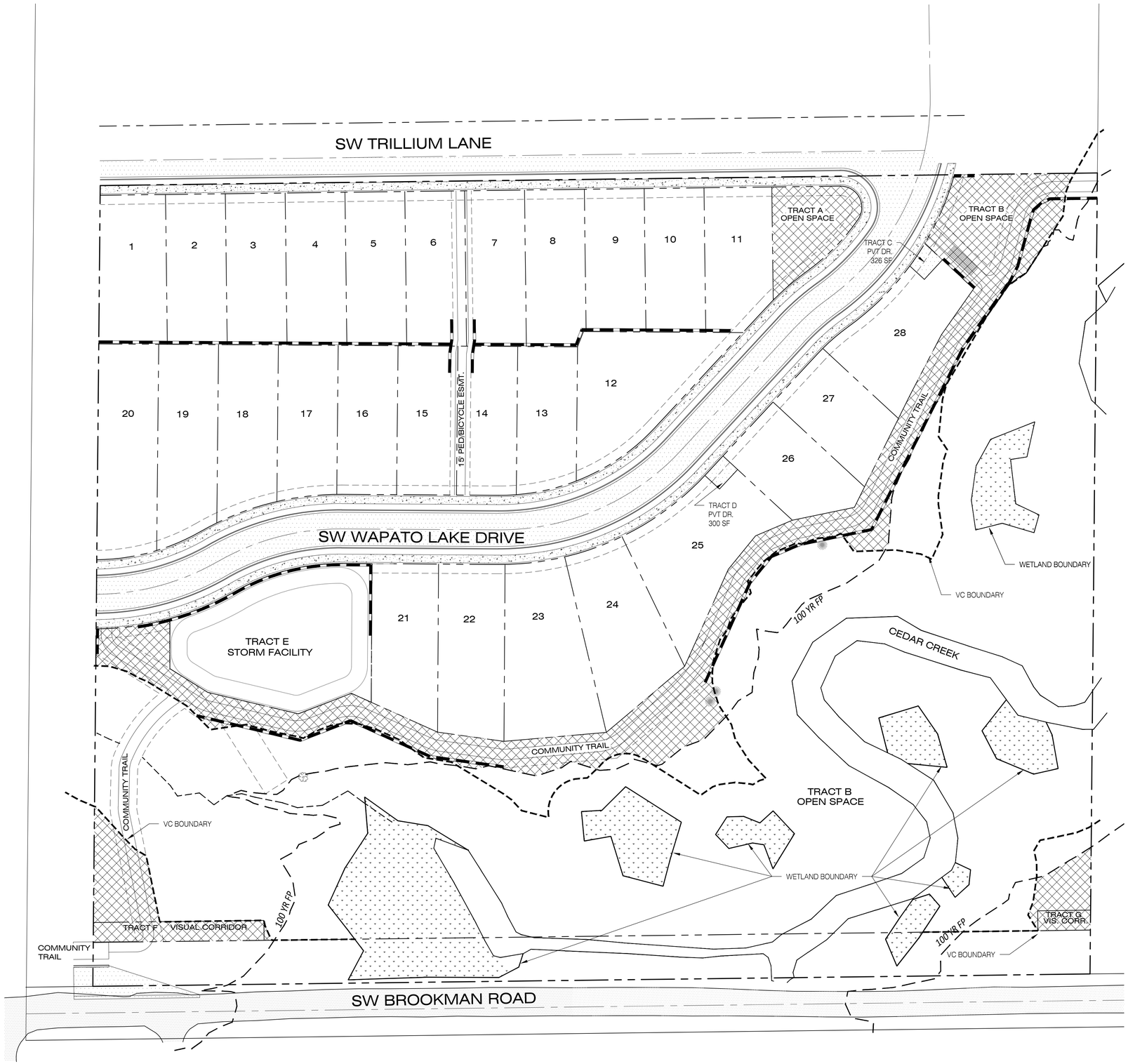
Exhibit A15



LEGEND

- PROPOSED EASEMENT LINE
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- BOUNDARY LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED PAVEMENT
- PROPOSED ACTIVE OPEN SPACE (23% OF NET DEVELOPABLE SITE)
- EXISTING WETLAND

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

PIONEER DESIGN GROUP
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CONCEPTUAL OPEN SPACE PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
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PLANNING
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P5

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Exhibit A15

MIDDLEBROOK SUBDIVISION (BY OTHERS)

SW TRILLIUM LANE

MIDDLEBROOK SUBDIVISION (BY OTHERS)

SW WAPATØ LAKE DR.

TRACT A OPEN SPACE 3725 SF

TRACT B OPEN SPACE

TRACT C PVT DR. 326 SF

TRACT D PVT DR. 300 SF

TRACT E STORM FACILITY 13270 SF

TRACT F VISUAL CORRIDOR 1926 SF

TRACT G VIS. CORR. 594 SF

TRACT B OPEN SPACE 203158 SF

15' PED/BICYCLE ESMT.

75' COMMUNITY TRAIL

COMMUNITY TRAIL

WETLAND BOUNDARY

VC BOUNDARY

100' VR FP

CEDAR CREEK

SW BROOKMAN ROAD

LEGEND

- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR
- PROPOSED EROSION CONTROL FENCING
- PROPOSED TREE PROTECTION FENCING
- PROPOSED FLOW LINE
- PROPOSED RETAINING WALL
- TW = TOP OF WALL; FG = FINISHED GRADE; EG = EXISTING GRADE; H = WALL HEIGHT
- PROPOSED CONSTRUCTION ENTRANCE
- PROPOSED STOCKPILE LOCATION

SCALE 40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

PIONEER DESIGN GROUP
CIVIL ENGINEERING • LAND USE PLANNING • LANDSCAPE ARCHITECTURE
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PRELIMINARY GRADING AND EROSION CONTROL PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project: RIVERSIDE AT CEDAR CREEK
No. 131-025
Type: PLANNING
Sheet: P6

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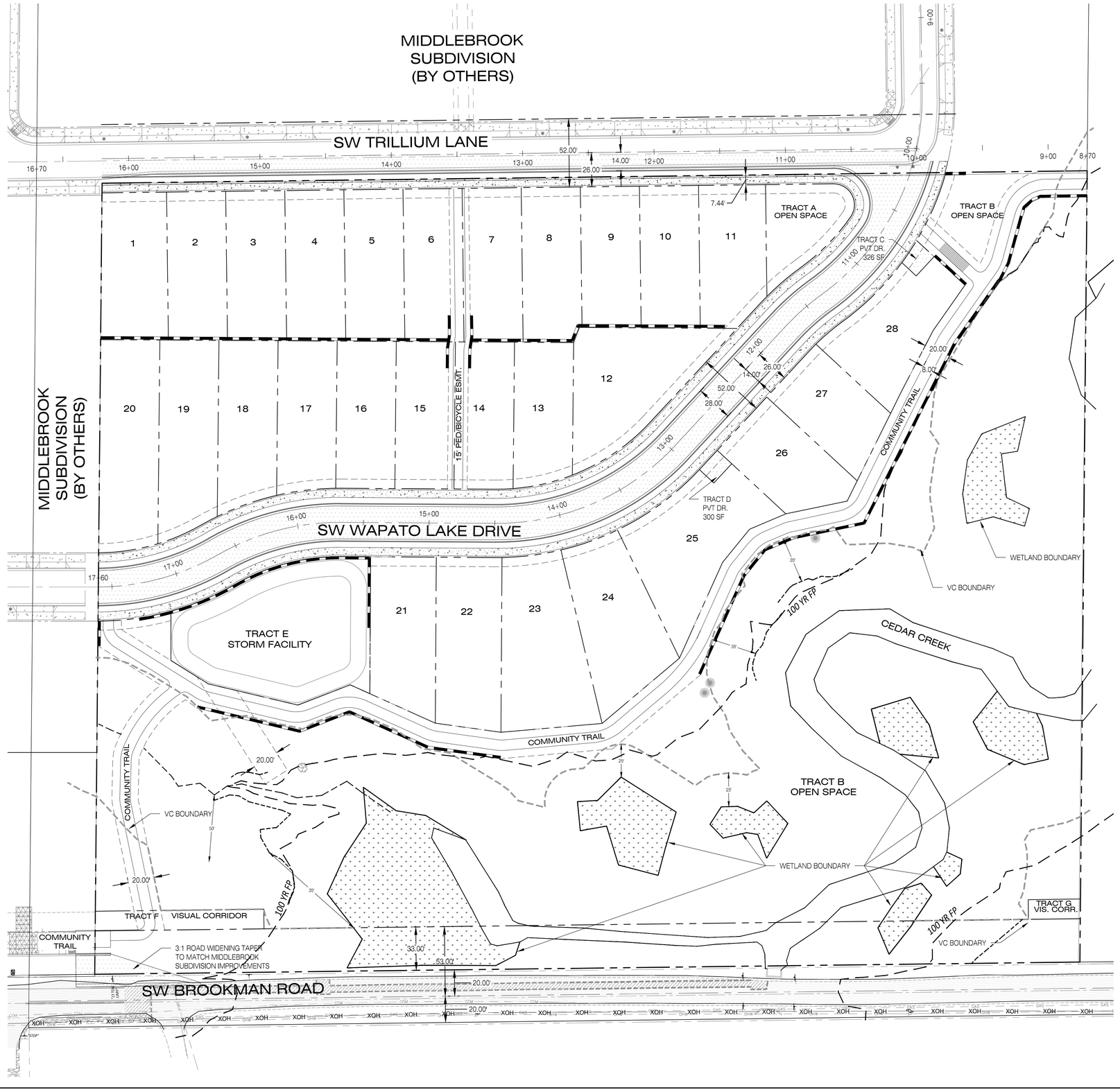
Exhibit A15



LEGEND

- PROPOSED EASEMENT LINE
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- BOUNDARY LINE
- PROPOSED SIDEWALK
- PROPOSED PAVEMENT

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

PIONEER DESIGN GROUP
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OVERALL STREET PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025	REF.	
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Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
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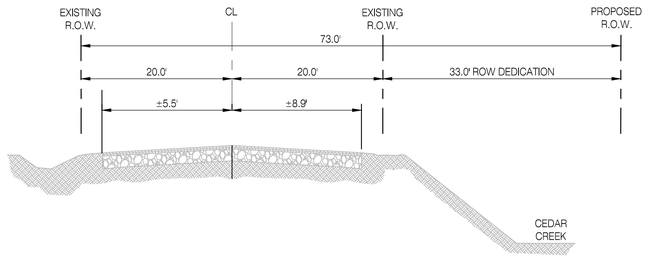
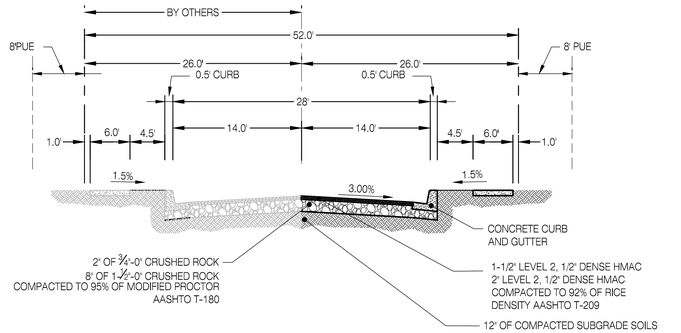
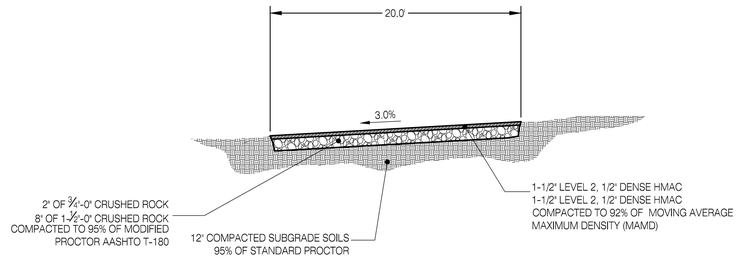


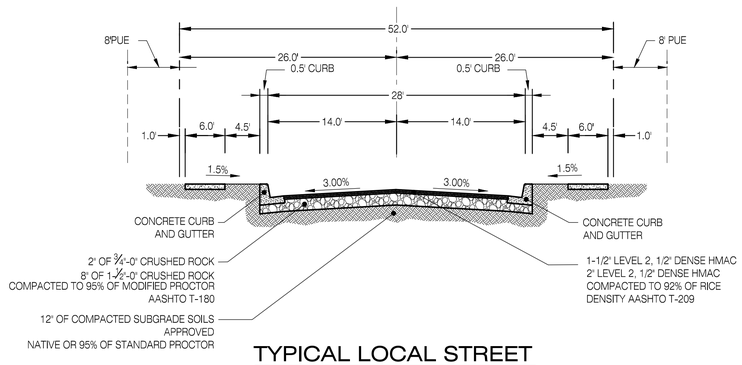
EXISTING ARTERIAL STREET
SW BROOKMAN ROAD
N.T.S.



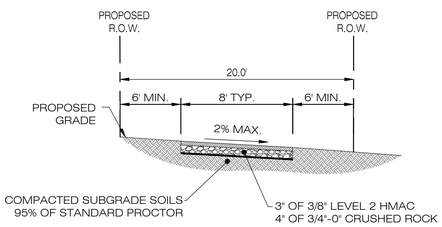
TYPICAL LOCAL STREET
SW TRILLIUM LN
N.T.S.



TYPICAL PRIVATE STREET
TRACT A
N.T.S.



TYPICAL LOCAL STREET
SW WAPATO LAKE DR.
N.T.S.



COMMUNITY TRAIL
N.T.S

SHERWOOD CASEFILE # _____

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TYPICAL STREET SECTIONS

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
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Project No.	131-025	REF.	
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No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
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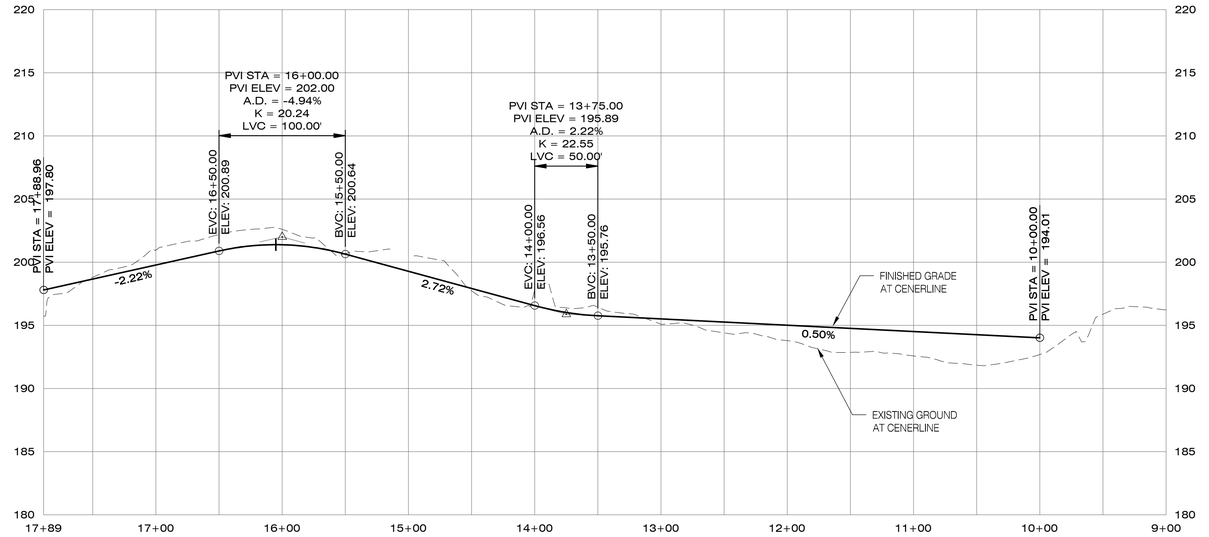
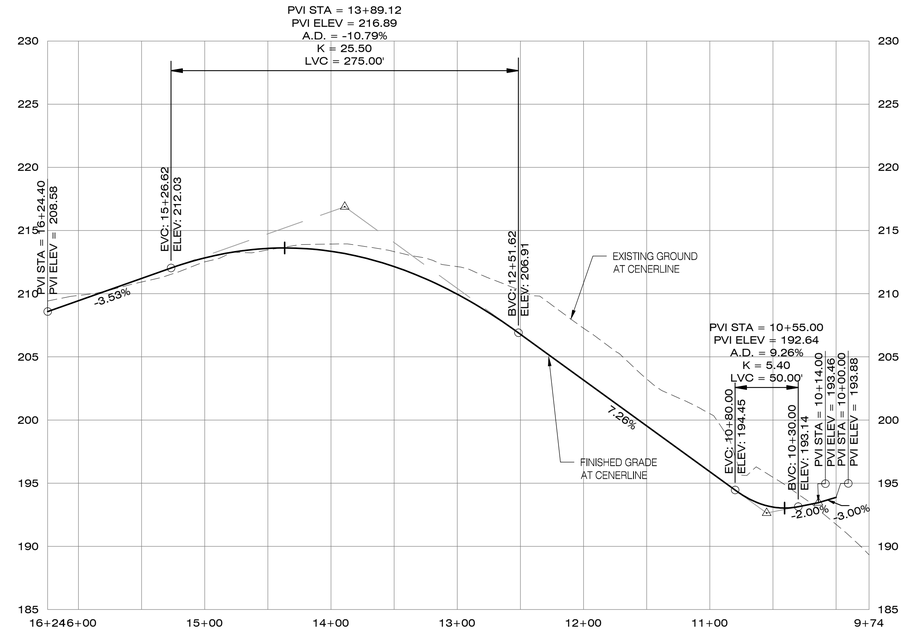


SW WAPATO LAKE DRIVE (PUBLIC) PROFILE
SCALE: 1"=60' (H), 1"=12' (V)



SW TRILLIUM LANE (PUBLIC) PROFILE
SCALE: 1"=60' (H), 1"=12' (V)

SHERWOOD CASEFILE # _____

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PRELIMINARY STREET PROFILES

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
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No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
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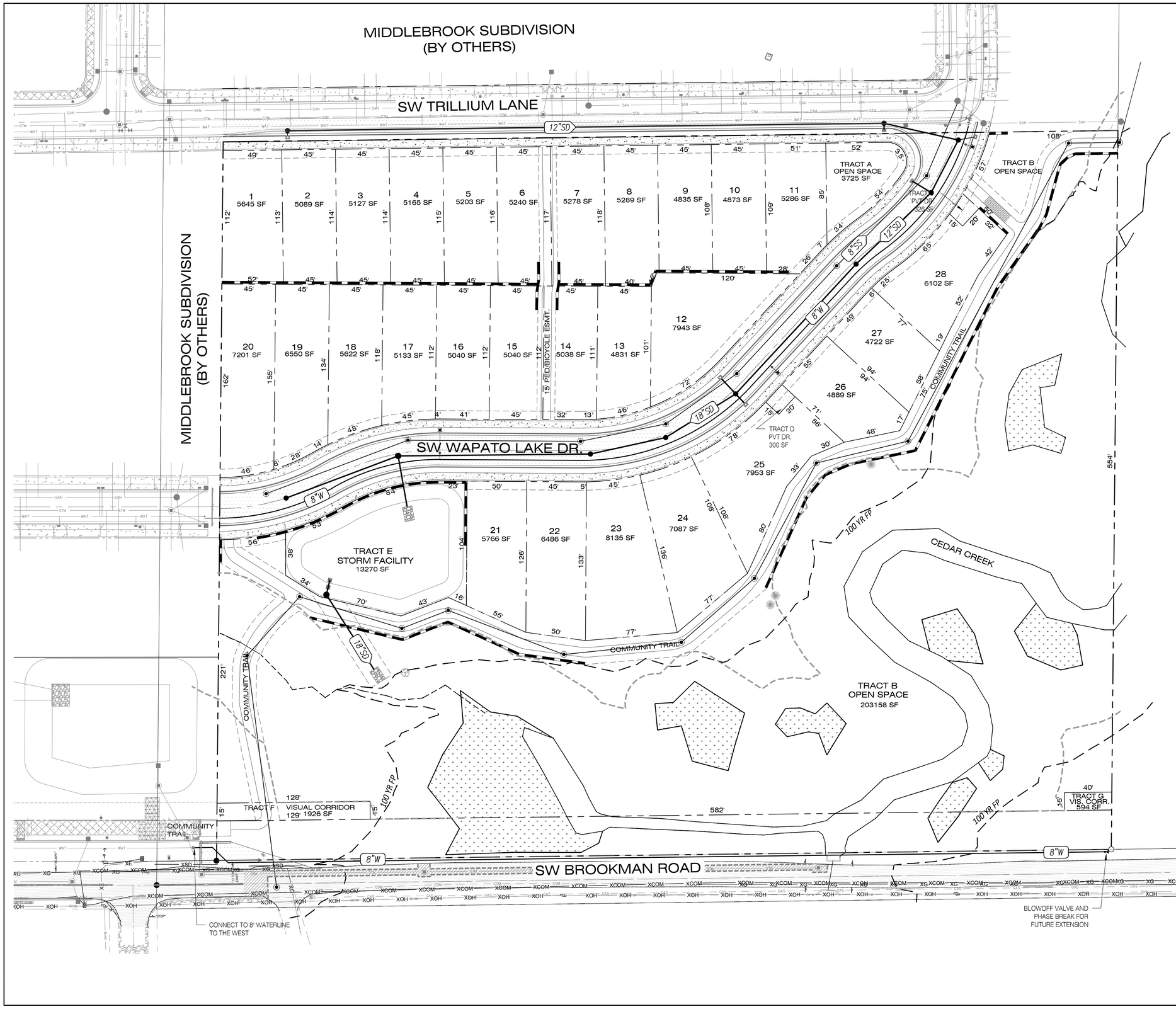
P9

Exhibit A15



LEGEND

- PROPOSED EASEMENT LINE
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- BOUNDARY LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED PAVEMENT
- PROPOSED STANDARD CURB
- PROPOSED STORM LINE & MANHOLE
- PROPOSED SANITARY LINE & MANHOLE
- PROPOSED 1" WATER SERVICE & METER
- PRELIMINARY STREET LIGHT LOCATIONS

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

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PRELIMINARY COMPOSITE UTILITY PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025	REF.	
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Vert. Scale:			

No.	Date	Revision	By

Project
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131-025
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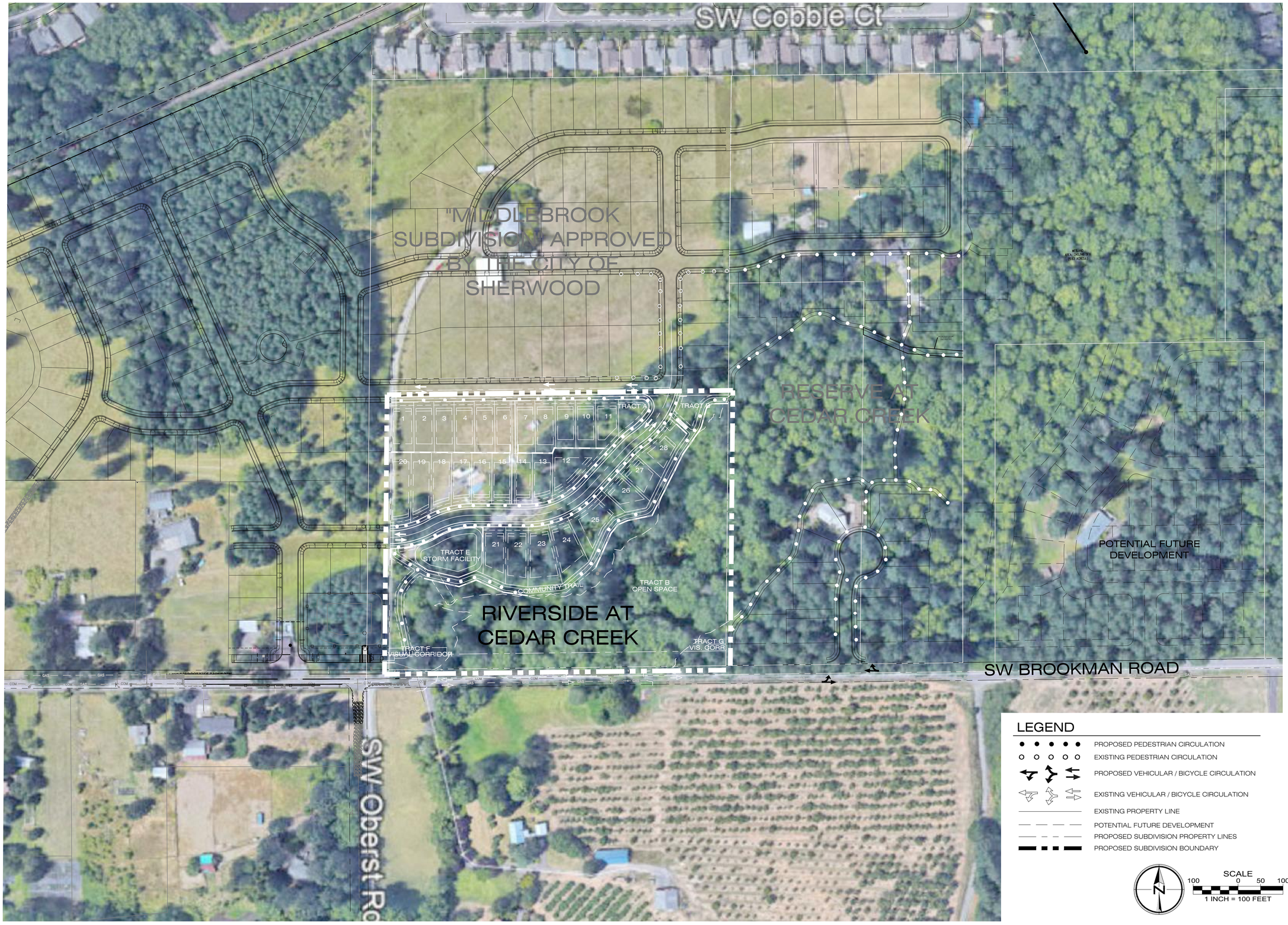

LEGEND

- PROPOSED PEDESTRIAN CIRCULATION
- EXISTING PEDESTRIAN CIRCULATION
- PROPOSED VEHICULAR / BICYCLE CIRCULATION
- EXISTING VEHICULAR / BICYCLE CIRCULATION
- EXISTING PROPERTY LINE
- POTENTIAL FUTURE DEVELOPMENT
- PROPOSED SUBDIVISION PROPERTY LINES
- PROPOSED SUBDIVISION BOUNDARY

N

SCALE
100 0 50 100
1 INCH = 100 FEET

SHERWOOD CASEFILE # _____

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CIRCULATION & FUTURE DEVELOPMENT PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	6/2020
Drawn by	BDH	Date	6/2020
Reviewed by	MLS	Date	6/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
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131-025
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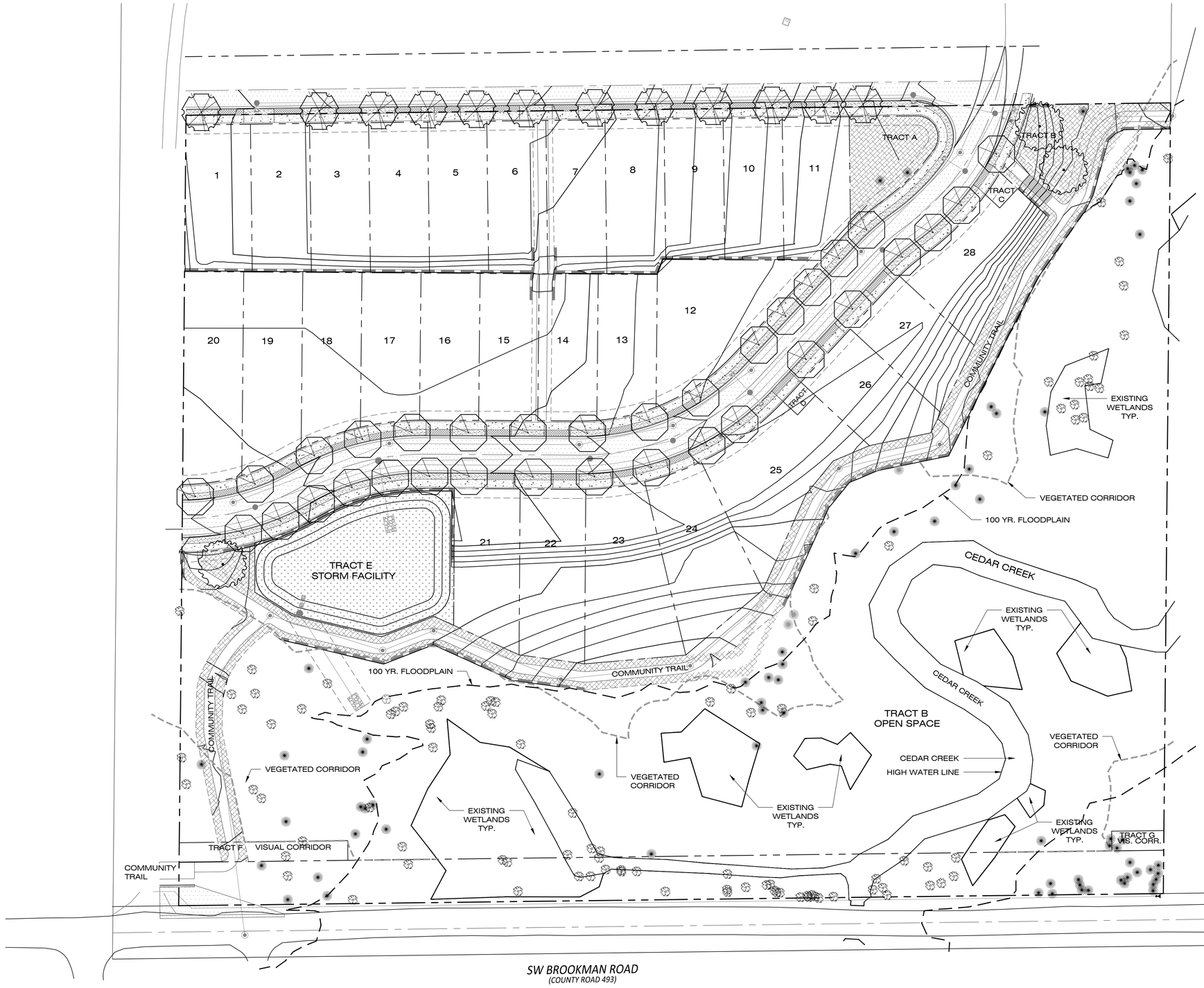

NOTES:

1. SEE SHEET L2 FOR LANDSCAPE PLANTING LEGENDS, NOTES & DETAILS
2. SEE CITY OF SHERWOOD STREET TREE DETAIL SHEET L2 FOR ALL STREET TREES.
3. A PERMANENT UNDERGROUND IRRIGATION SYSTEM WILL BE PROVIDED FOR ALL STREET TREE LAWN AREAS. TO BE DESIGN BUILD BY LANDSCAPE CONTRACTOR.
4. ALL STREET TREES ARE TO BE INSTALLED WITH A GEO TEXTILE ROOT CONTROL SYSTEM PER CITY OF SHERWOOD DETAIL SHEET L2.
5. SEE CIVIL PLANS FOR TREE PRESERVATION & REMOVAL PLAN.
6. CONTOURS SHOWN AT 2' AND 10' INTERVALS.

LEGEND:

SEE SHEET L2 FOR OPENSPACE PROPOSED PLANTING LEGEND

EXISTING TREES TO REMAIN - SEE TREE PRESERVATION AND REMOVAL PLANS

GENERAL NOTES: LANDSCAPE PLAN:

1. THE CONTRACTOR SHALL VERIFY WITH OWNER AND UTILITY COMPANIES THE LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL DETERMINE IN THE FIELD THE ACTUAL LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL CALL UTILITY PROTECTION SERVICE 72 HOURS PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR SHALL EXAMINE FINISH SURFACE, GRADES, TOPSOIL QUALITY AND DEPTH. DO NOT START ANY WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED. VERIFY LIMITS OF WORK BEFORE STARTING.
3. CONTRACTOR TO REPORT ALL DAMAGES TO EXISTING CONDITIONS AND INCONSISTENCIES WITH PLANS TO ODR.
4. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE IN ALL LANDSCAPED AREAS.
5. CONTRACTOR TO FINE GRADE AND ROCK-HOUND ALL TURF AREAS PRIOR TO SEEDING, TO PROVIDE A SMOOTH AND CONTINUAL SURFACE, FREE OF IRREGULARITIES (BUMPS OR DEPRESSIONS) & EXTRANEOUS MATERIAL OR DEBRIS.
6. QUANTITIES SHOWN ARE INTENDED TO ASSIST CONTRACTOR IN EVALUATING THEIR OWN TAKE-OFFS AND ARE NOT GUARANTEED AS ACCURATE REPRESENTATIONS OF REQUIRED MATERIALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS BID QUANTITIES AS REQUIRED BY THE PLANS AND SPECIFICATIONS. IF THERE IS A DISCREPANCY BETWEEN THE NUMBER LABELED ON THE PLANT TAG AND THE QUANTITY OF GRAPHIC SYMBOLS SHOWN, THE GRAPHIC SYMBOL QUANTITY SHALL GOVERN.
7. COORDINATE LANDSCAPE INSTALLATION WITH INSTALLATION OF UNDERGROUND SPRINKLER AND DRAINAGE SYSTEMS.
8. WITH THE EXCEPTION OF THOSE TREES INDICATED ON THE TREE REMOVAL PLAN, CONTRACTOR SHALL NOT REMOVE ANY TREES DURING CONSTRUCTION WITHOUT THE EXPRESS WRITTEN CONSENT OF THE ODR. EXISTING VEGETATION TO REMAIN SHALL BE PROTECTED AS DIRECTED BY THE ODR.
9. WHERE PROPOSED TREE LOCATIONS OCCUR UNDER EXISTING OVERHEAD UTILITIES OR CROWD EXISTING TREES, NOTIFY ODR TO ADJUST TREE LOCATIONS.
10. LANDSCAPE MAINTENANCE PERIOD BEGINS IMMEDIATELY AFTER THE COMPLETION OF ALL PLANTING OPERATIONS AND WRITTEN NOTIFICATION TO THE ODR. MAINTAIN TREES, SHRUBS, LAWNS AND OTHER PLANTS UNTIL FINAL ACCEPTANCE OR 90 DAYS AFTER NOTIFICATION AND ACCEPTANCE, WHICHEVER IS LONGER.
11. REMOVE EXISTING WEEDS FROM PROJECT SITE PRIOR TO THE ADDITION OF ORGANIC AMENDMENTS AND FERTILIZER. APPLY AMENDMENTS AND FERTILIZER PER THE RECOMMENDATIONS OF THE SOIL ANALYSIS FROM THE SITE.
12. BACK FILL MATERIAL FOR TREE AND SHRUB PLANTING SHALL CONTAIN: ONE PART FINE GRADE COMPOST TO ONE PART TOPSOIL BY VOLUME, BONE MEAL PER MANUFACTURE'S RECOMMENDATION, AND SLOW RELEASE FERTILIZER PER MANUFACTURER'S RECOMMENDATION.
13. CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FOR ALL PLANT MATERIAL SUBSTITUTIONS FROM THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. PLANT SUBSTITUTIONS WITHOUT PRIOR WRITTEN APPROVAL THAT DO NOT COMPLY WITH THE DRAWINGS AND SPECIFICATIONS MAY BE REJECTED BY THE LANDSCAPE ARCHITECT AT NO COST TO THE OWNER. THESE ITEMS MAY BE REQUIRED TO BE REPLACED WITH PLANT MATERIALS THAT ARE IN COMPLIANCE WITH THE DRAWINGS.
14. ALL PLANT MATERIALS SHALL BE NURSERY GROWN WITH HEALTHY ROOT SYSTEMS AND FULL BRANCHING, DISEASE AND INSECT FREE AND WITHOUT DEFECTS SUCH AS SUN SCALD, ABRASIONS, INJURIES AND DISFIGUREMENT.
15. ALL PLANT MATERIAL SHALL BE INSTALLED AT THE SIZE AND QUANTITY SPECIFIED. THE LANDSCAPE ARCHITECT IS NOT RESPONSIBLE FOR SUB-STANDARD RESULTS CAUSED BY REDUCTION IN SIZE AND/OR QUANTITY OF PLANT MATERIALS.

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASEFILE # _____

PIONEER DESIGN GROUP
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PRELIMINARY STREET TREE & OPEN SPACE PLANTING PLAN

SW BROOKMAN RD
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	2/2020
Drawn by	BDH	Date	2/2020
Reviewed by	MLS	Date	2/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project
RIVERSIDE AT CEDAR CREEK
No.
131-025
Type
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PLANTING LEGEND
PROPOSED STREET / OPENSPACE TREES

SYMBOL	QTY	COMMON NAME / BOTANICAL NAME	SIZE	CANOPY AREA	TOTAL CANOPY AREA
	33	PYRAMIDAL HORNBEAM / CARPINUS BETULUS PYRAMIDALIS	2" CAL., B&B - MIN. 6' HT.	1,256 S.F.	41,448 S.F.
	12	AMERICAN LINDEN / TILIA AMERICANA	2" CAL., B&B - MIN. 6' HT.	1,256 S.F.	15,072 S.F.
	3	OREGON WHITE OAK / QUERCUS GARYANNA	2" CAL., B&B - MIN. 6' HT.	1,963 S.F.	5,889 S.F.
					62,409 S.F.
	6,840 S.F	LAWN / SOD			

OPENSPACE PROPOSED PLANTING LEGEND
TREES

SYMBOL	COMMON NAME / BOTANICAL NAME	SIZE
	CHINESE KOUSA DOGWOOD / CORNUS KOUSA CHINESIS	2" CAL., B&B - MIN. 6' HT.
	DOUGLAS FIR / PSEUDOTSUGA MENZIESII	2" CAL., B&B - MIN. 6' HT.
	TULIP TREE / LIRIODENDRON TULIPIFERA	2" CAL., B&B - MIN. 6' HT.
	WESETERN RED CEDAR / THUJA PLICATA	2" CAL., B&B - MIN. 6' HT.
	BIG LEAF MAPLE / ACER MACROPHYLLUM	2" CAL., B&B - MIN. 6' HT.
	OREGON WHITE OAK / QUERCUS GARRYANA	6'-8' HT., B&B
	INCENSE CEDAR / CALOCEDRUS DECURRENS	8'-10' HT., B&B

SHRUBS

COMMON NAME / BOTANICAL NAME	SIZE
ANTHONY WATERER SPIREA / SPIREA BUMALDA 'ANTHONY WATERER'	2 GAL.
'CRIMSON PYGMY' BARBERRY / BERBERIS THUNBERGII 'CRIMSON PYGMY'	2 GAL.
DAVID VIBURNUM / VIBURNUM DAVIDII:	2 GAL.
DWARF BURNING BUSH / EUONYMUS ALATA 'COMPACTA'	2 GAL.
DOUBLFILE VIBURNUM / VIBURNUM P. TOMENTOSUM	2 GAL.
FOREST FLAME PIERIS / PIERIS JAPONICA 'FOREST FLAME'	2 GAL.
KELSEY'S DWARF RED-OSIER / DOGWOOD CORNUS SERICEA 'KELSEYI'	2 GAL.
OTTO LUYKEN CHERRY LAUREL / PRUNUS LAUROCERASUS 'OTTO LUYKEN'	2 GAL.
REDTWIG DOGWOOD /CORNUS STOLONIFERA	2 GAL.
RENAISSANCE SPIREA / SPIREA VANHOUTTEI 'RENAISSANCE'	2 GAL.
RHODODENDRON 'JEAN MARIE DE MONTEGUE'	2 GAL.

LAWN AND GROUNDCOVER

COMMON NAME / BOTANICAL NAME: SIZE AND DESCRIPTION
PRO-TIME 309 (SUPREME MIX) GRASS SEED BY HOBBS AND HOPKINS, LTD. AT A RATE OF 8 LBS/1000 SQUARE FEET.

GRASS SEED

CLEAN WATER "LOWGROW" SEED MIX: 120 LB PER ACRE	
DWARF TALL FESCUE / FESTUCA ARUNDINACEA	40%
PR8820 DWARF PERENNIAL RYEGRASS / LOLIUM PERENNE 'PR8820'	30%
CREEPING RED FESCUE / FESTUCA RUBRA	25%
HIGHLAND COLONIAL BENTGRASS / AGROSTIS TENUIS 'HIGHLAND'	05%

*APPLY WITH ¾" THICK COVER OF GREEN DUED FINE GROUND WOOD CELLULOSE MULCH. PROVIDE 100% EROSION AND WEED FREE COVERAGE. RE-SEED AND WEED AS NEEDED.

NOTE:

1. LANDSCAPE AREAS WILL BE PROVIDED WITH AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM DESIGNED BY CONTRACTOR. CONTRACTOR WILL PROVIDE MATERIALS AND INSTALL ALL IRRIGATION DOWNSTREAM OF THE WATER METER.

PROPOSED STORMWATER FACILITIES - PLANTING LEGEND TRACTS 'B' & 'D'
TREES

SYMBOL	COMMON NAME / BOTANICAL NAME: SIZE AND DESCRIPTION	CONDITION
	OREGON ASH / FRAXINUS LATIFOLIA: 2 GAL. / 3' HT.	MOIST
	BITTER CHERRY / PRUNUS EMARGINATA 'MOLLIS': 2 GAL. / 3' HT.	MOIST
	VINE MAPLE / ACER CIRCINATUM: 2 GAL. / 3' HT.	MOIST

SHRUBS

COMMON NAME / BOTANICAL NAME: SIZE AND DESCRIPTION	CONDITION
MOCK ORANGE / PHILADELPHUS LEWISII: 1 GAL. / 2' HT. / CLUSTER	WET/DRY
RED TWIG DOGWOOD / CORNUS SERICEA: 1 GAL. / 2' HT. / CLUSTER	WET/DRY
PACIFIC NINEBARK / PHYSOCARPUS CAPITATUS: 1 GAL. / 2' HT. / SINGLE	MOIST
CLUSTER ROSE / ROSA PISOCARPA: 1 GAL. / 1.5' HT. / CLUSTER	MOIST
DOUGLAS SPIREA / SPIREA DOUGLASII: 1 GAL. / 1.5' HT. / CLUSTER	WET

HERBACEOUS PLANTS

COMMON NAME / BOTANICAL NAME: SIZE AND DESCRIPTION	CONDITION
SPREADING RUSH / JUNCUS PATENS: PLUGS 1"X6"	MOIST
SLOUGH SEDGE / CAREX OBNUPTA: PLUGS 1"X6"	MOIST

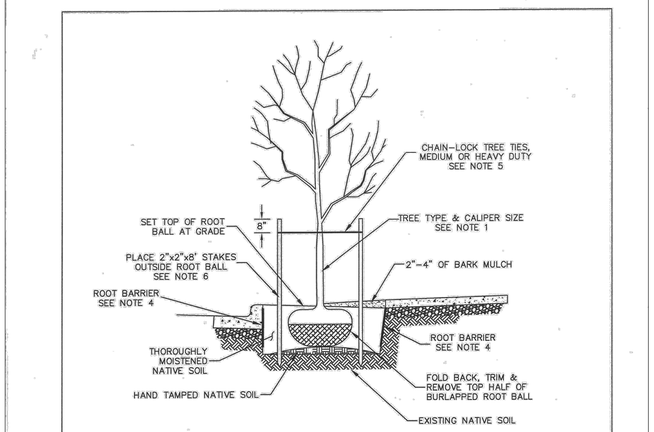
GRASS SEED

COMMON NAME / BOTANICAL NAME: SIZE AND DESCRIPTION	
CLEAN WATER "LOWGROW" SEED MIX: 120 LB PER ACRE	
DWARF TALL FESCUE / FESTUCA ARUNDINACEA	40%
PR8820 DWARF PERENNIAL RYEGRASS / LOLIUM PERENNE 'PR8820'	30%
CREEPING RED FESCUE / FESTUCA RUBRA	25%
HIGHLAND COLONIAL BENTGRASS / AGROSTIS TENUIS 'HIGHLAND'	05%

*APPLY WITH ¾" THICK COVER OF GREEN DUED FINE GROUND WOOD CELLULOSE MULCH. PROVIDE 100% EROSION AND WEED FREE COVERAGE. RE-SEED AND WEED AS NEEDED.

NOTES:

1. ALL STORMWATER REQUIREMENTS INDICATED ARE IN ACCORDANCE WITH CLEAN WATER SERVICES (CWS) R&O 17-05; APPENDIX A - PLANTING REQUIREMENTS.
2. CONTOURS SHOWN AT 2' & 10' INTERVALS
3. WATER QUALITY FACILITY PLANT MATERIAL SHALL BE PROVIDED WITH A TEMPORARY AUTOMATIC IRRIGATION SYSTEM DESIGNED BY CONTRACTOR. CONTRACTOR WILL PROVIDE MATERIALS AND INSTALL ALL IRRIGATION DOWNSTREAM OF THE WATER METER. TEMPORARY IRRIGATION SYSTEM SHALL BE MAINTAINED A MINIMUM OF THREE (3) GROWING SEASONS.



CROSS SECTION

NOTES:

1. TREE SPECIES AND CALIPER SIZE ARE TO BE APPROVED BY THE CITY PLANNING DEPARTMENT.
2. ADJUST PLANTING LOCATIONS SO THAT TREE CROWN OR ROOT BALL DOES NOT CONFLICT WITH ABOVE OR BELOW - GROUND UTILITIES.
3. DO NOT UNDERMINE CURB OR SIDEWALK WHEN EXCAVATING.
4. ALL TREES WITH TRUNKS CLOSER THAN 4' TO ASPHALT OR CONCRETE SURFACE SHALL HAVE A MINIMUM OF AN 18" ROOT BARRIER INSTALLED AT 10' IN LENGTH AND CENTERED ON TREE.
5. PROVIDE A LOOP IN CHAIN-LOCK LARGE ENOUGH TO ALLOW FOR TRUNK GROWTH.
6. TREE STAKES ARE TO BE REMOVED FOLLOWING THE REQUIRED ESTABLISHMENT PERIOD.

	STANDARD DRAWING TITLE	DRAWING NUMBER
City of Sherwood Oregon	STREET TREE DETAIL	RD-80
Any alteration of this drawing may not be associated in any way with the City of Sherwood Standard Drawings.	SCALE: N.T.S.	DATE: MAR '16

C.W.S. CONDITIONS FOR STORMWATER FACILITY:

1. CLEAN WATER SERVICES SHALL BE NOTIFIED 72 HOURS PRIOR TO THE START AND COMPLETION OF ENHANCEMENT/RESTORATION ACTIVITIES. ENHANCEMENT/RESTORATION ACTIVITIES SHALL COMPLY WITH THE GUIDELINES PROVIDED IN APPENDIX A: LANDSCAPE REQUIREMENTS (R&O 17-05: APPENDIX A).
2. PRIOR TO INSTALLATION OF PLANT MATERIALS, ALL INVASIVE VEGETATION SUCH AS HIMALAYAN BLACKBERRY, ENGLISH IVY, AND ENGLISH HAWTHORN, WITHIN THE VEGETATED CORRIDOR SHALL BE REMOVED. DURING REMOVAL OF INVASIVE VEGETATION CARE SHALL BE TAKEN TO MINIMIZE IMPACTS TO EXISTING NATIVE TREES AND SHRUB SPECIES.
3. PLANTINGS SHALL BE TAGGED FOR DORMANT SEASON IDENTIFICATION. TAGS TO REMAIN ON PLANT MATERIAL AFTER PLANTING FOR MONITORING PURPOSES.
4. AN APPROVED OREGON DEPARTMENT OF FORESTRY NOTIFICATION IS REQUIRED FOR ONE OR MORE TREES HARVESTED FOR SALE, TRADE, OR BARTER, ON ANY NON-FEDERAL LANDS WITHIN THE STATE OF OREGON.
5. APPROPRIATE BEST MANAGEMENT PRACTICES (BMPs) FOR EROSION CONTROL, IN ACCORDANCE WITH THE CWS EROSION CONTROL TECHNICAL GUIDANCE MANUAL SHALL BE USED PRIOR TO, DURING, AND FOLLOWING EARTH DISTURBING ACTIVITIES.
6. PRIOR TO CONSTRUCTION, A STORM WATER CONNECTION PERMIT FROM THE DISTRICT OR ITS DESIGNEE IS REQUIRED PURSUANT TO ORDINANCE 27, SECTION 4.B.
7. REMOVAL OF NATIVE, WOODY VEGETATION SHALL BE LIMITED TO THE GREATEST EXTENT PRACTICABLE.
8. SHOULD FINAL DEVELOPMENT PLANS DIFFER SIGNIFICANTLY FROM THOSE SUBMITTED FOR REVIEW BY THE DISTRICT, THE APPLICANT SHALL PROVIDE UPDATED DRAWINGS, AND IF NECESSARY, OBTAIN A REVISED SERVICE PROVIDER LETTER.
9. MAINTENANCE AND MONITORING REQUIREMENTS SHALL COMPLY WITH SECTION 2.11.2 OF R&O 17-05. IF AT ANY TIME DURING THE WARRANTY PERIOD THE LANDSCAPING FALLS BELOW THE 80% SURVIVAL LEVEL, THE OWNER SHALL REINSTALL ALL DEFICIENT PLANTING AT THE NEXT APPROPRIATE PLANTING OPPORTUNITY AND THE TWO YEAR MAINTENANCE PERIOD SHALL BEGIN AGAIN FROM THE DATE OF REPLANTING.
10. THE WATER QUALITY SWALE SHALL BE PLANTED WITH DISTRICT APPROVED NATIVE SPECIES, AND DESIGNED TO BLEND INTO THE NATURAL SURROUNDINGS.
11. SITE PREPARATIONS: REMOVE ALL NONNATIVE PLANT MATERIALS, INCLUDING PLANTS, ROOTS, AND SEEDS PRIOR TO ADDING TOPSOIL. (SEE IVAM GUIDELINES) TILL THE SUB-GRADE IN THESES AREAS TO A DEPTH OF AT LEAST 4" AND ADD AT LEAST 12" OF CLEAN COMPOST-AMENDED TOPSOIL. THE COMPOST AMENDED TOPSOIL SHALL HAVE THE FOLLOWING CHARACTERISTICS TO ENSURE A GOOD GROWING MEDIUM:
    A) TEXTURE - MATERIAL PASSES THROUGH ONE-INCH SCREEN
    B) FERTILITY - 35% ORGANIC MATTER.
12. SOIL PREPARATION: TO ENSURE ORGANIC MATTER, LEAF COMPOST MAYBE PLACED UNIFORMLY ON TOPSOIL. OTHER AMENDMENT, CONDITIONERS, BIO-AMENDMENTS MAY BE ADDED AS NEEDED TO SUPPORT THE SPECIFIED PLANTS OR ADJUST THE SOIL PH. TRADITIONAL FERTILIZATION TECHNIQUES (APPLYING N-P-K) ARE NOT NECESSARY FOR NATIVE PLANTS AND SHOULD NOT BE USED.
13. TIMING: CONTAINER STOCK SHALL BE INSTALLED ONLY FROM FEBRUARY 1 THROUGH MAY 1 AND OCTOBER 1 THROUGH NOVEMBER 15. BARE ROOT STOCK SHALL BE INSTALLED ONLY FROM DECEMBER 15 THOUGH APRIL 15. PLANTINGS OUTSIDE THESE TIMES MAY REQUIRE, ADDITIONAL MEASURES TO ENSURE SURVIVAL.
14. EROSION CONTROL: GRADING, SOIL PREPARATION, AND SEEDING SHALL BE PERFORMED DURING OPTIMAL WEATHER CONDITIONS AND AT LOW FLOW LEVELS TO MINIMIZE SEDIMENT IMPACTS. SITE DISTURBANCE SHALL BE MINIMIZED AND DESIRABLE VEGETATION RETAINED, WHERE POSSIBLE. SLOPES SHALL BE GRADED TO SUPPORT THE ESTABLISHMENT OF VEGETATION. WHERE SEEDING IS USED FOR EROSION CONTROL, AN APPROPRIATE NATIVE GRASS, REGREEN (OR ITS EQUIVALENT), OR STERILE WHEAT SHALL BE USED TO STABILIZE SLOPES UNTIL PERMANENT VEGETATION IS ESTABLISHED. BIODEGRADABLE FABRICS (COIR, COCONUT OR APPROVED JUTE MATTING (MINIMUM 1/4" SQUARE HOLES) MAY BE USED TO STABILIZE SLOPES AND CHANNELS. FABRICS SUCH AS BURLAP MAY BE USED TO SECURE PLANT PLUGS IN PLACE AND TO DISCOURAGE FLOATING UPON INUNDATION. NO PLASTIC MESH THAT CAN ENTANGLE WILDLIFE IS PERMITTED. CONSULT CHAPTER 6 - EROSION PREVENTION AND SEDIMENT CONTROL FOR ADDITIONAL INFORMATION.
15. MULCHING: TREES, SHRUBS, AND GROUNDCOVERS PLANTED IN UPLAND AREAS SHALL BE MULCHED A MINIMUM OF THREE INCHES IN DEPTH AND 18 INCHES IN DIAMETER, TO RETAIN MOISTURE AND DISCOURAGE WEED GROWTH AROUND NEWLY INSTALLED PLANT MATERIAL. APPROPRIATE MULCHES ARE MADE FROM COMPOSTED BARK OR LEAVES THAT HAVE NOT BEEN CHEMICALLY TREATED. THE USE OF MULCH IN FREQUENTLY INUNDATED AREAS SHALL BE LIMITED, TO AVOID ANY POSSIBLE WATER QUALITY IMPACTS INCLUDING THE LEACHING OF TANNINS AND NUTRIENTS, AND THE MIGRATION OF MULCH INTO WATERWAYS.
16. PLANT PROTECTION FROM WILDLIFE: DEPENDING ON SITE CONDITIONS, APPROPRIATE MEASURES SHALL BE TAKEN TO LIMIT WILDLIFE-RELATED DAMAGE (SEE IVAM GUIDANCE).
17. IRRIGATION: APPROPRIATE PLANT SELECTION, ALONG WITH ADEQUATE SITE PREPARATION AND MAINTENANCE, REDUCES THE NEED FOR IRRIGATION. HOWEVER, UNLESS SITE HYDROLOGY IS CURRENTLY ADEQUATE, A DISTRICT/CITY APPROVED IRRIGATION SYSTEM OR EQUIVALENT (I.E., POLYMER, PLUS WATERING) SHALL BE USED DURING THE TWO-YEAR PLANT ESTABLISHMENT PERIOD. WATERING SHALL BE AT A MINIMUM RATE OF AT LEAST ONE INCH PER WEEK FROM JUNE 15 THROUGH OCTOBER 15. OTHER IRRIGATION TECHNIQUES, SUCH AS DEEP WATERING, MAY BE ALLOWED WITH PRIOR APPROVAL BY DISTRICT STAFF.
18. ACCESS: MAINTENANCE ACCESS FOR PLANT MAINTENANCE SHALL BE PROVIDED FOR SENSITIVE AREAS AND VEGETATED CORRIDORS VIA A FIVE-FOOT EASEMENT OR SHARED BOUNDARY WITH STORMWATER FACILITIES. STORMWATER FACILITIES ACCESS REQUIREMENTS ARE PROVIDED IN CHAPTER 4 OF CWS DESIGN AND CONSTRUCTION STANDARDS MANUAL.

SHERWOOD CASEFILE # _____

PIONEER DESIGN GROUP
CIVIL ENGINEERING • LAND USE PLANNING • LAND SURVEYING • LANDSCAPE ARCHITECTURE
PORTLAND, OREGON | HONOLULU, HAWAII
PH: 808.753.2176
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PRELIMINARY PLANTING LEGENDS, DETAILS & NOTES

SW BROOKMAN RD
CITY OF SHERWOOD, OREGON

Designed by	MLS	Date	2/2020
Drawn by	BDH	Date	2/2020
Reviewed by	MLS	Date	2/2020
Project No.	131-025	REF.	
Horiz. Scale:			
Vert. Scale:			

No.	Date	Revision	By

Project: RIVERSIDE AT CEDAR CREEK
No. 131-025
Type: PLANNING
Sheet: **L2**

Engineering Department
Land Use Application
Review Comments & Conditions

City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

To:	Eric Rutledge, Associate Planner
From:	Bob Galati P.E., City Engineer
Project:	Riverside at Cedar Creek Subdivision (LU 2020-05 SUB)
Date:	July 23, 2020

Engineering staff has reviewed the information provided for the above referenced private development project. Final construction plans will need to meet the standards established by the City of Sherwood Engineering Department and Public Works Department, Clean Water Services (CWS), Washington County Department of Land Use and Transportation (WACO), Oregon Department of Transportation (ODOT), and Tualatin Valley Fire & Rescue (TVF&R), in addition to requirements established by other jurisdictional agencies providing land use comments. City of Sherwood Engineering Department comments are as follows:

General Information

The proposed Riverside at Cedar Creek Subdivision is located at 17433 SW Brookman Road (Tax Lot No. 3S1060000106). The site is located on the north side of SW Brookman Road approximately 60 feet east of SW Oberst Road. Approximately ½ of the site includes a stream corridor (Cedar Creek) with associated wetlands and vegetated corridors.

Transportation

The proposed site development extends the residential road network constructed as part of the Middlebrook Subdivision. Include with the subdivision is completion of SW Trillium Lane half street improvement, and extension of SW Wapato Lake Drive.

SW Wapato Lake Drive is shown as a 28-foot paved width within a 52-foot right-of-way width. SW Trillium Lane will complete the existing ¾ street section to a full street section of 28-foot paved width within a 52-foot right-of-way width.

Both of these proposed street sections will meet the City's standards for a residential street with parking limited to one side of the street.

The development area fronts SW Brookman Road, and will require dedication of 33-feet of right-of-way to meet WACO's standards for half of a 5-lane arterial right-of-way section width of 53-feet as measured from the existing right-of-way centerline.

Per City MC Section 16.118.020.(B), a minimum 8-foot wide public utility easement shall be provided on private property along all public street frontages.

Frontage improvements along SW Brookman Road are required per City standards. However, to meet WACO standards for a 5-lane arterial, significant grading of the existing road section would need to take place. The cost of reconstructing SW Brookman Road to meet WACO design standards would be very expensive and not proportional to the impacts of a 28 lot subdivision. Given the significant grade differences required to meet WACO design standards, City required frontage improvements along SW Brookman Road are being deferred until such time that SW Brookman Road is improved as a WACO capital improvement project. The City required deferred frontage improvement items include 1) road asphalt pavement section conforming to City standards, 2) standard road base rock section conforming to City standards,

3) curb and gutter, 4) sidewalks/multi-use path, 5) planter strip plantings, 6) street trees, 7) street lighting systems, 8) irrigation systems, 9) required street signage, 10) storm drainage collection and conveyance system, and 11) undergrounding of any overhead private utilities.

Given the improvement deferment, a fee in-lieu-of construction for the City required frontage improvements will be required. The in-lieu fee amount will be based on the estimated cost of the deferred items with a 125% multiplying factor to account for difference in the value of the improvements over time, as approved by the City Engineer.

A TIA has been submitted and results identified 4 intersection impacts where proportionate share cost fee in-lieu-of construction amounts are recommended. The 4 listed intersections are:

1) SW Sunset Boulevard/SW Woodhaven Drive - $7,897.92 for proportionate share cost of signalized intersection improvements.
2) SW Sunset Boulevard/SW Timbrel Lane - $5,887.85 for proportionate share cost of traffic mini-roundabout improvements.
3) SW Ladd Hill Road-SW Main Street/SW Sunset Boulevard - $7,812.50 for proportionate share cost of signalized intersection improvements.
4) SW Baker Road/SW Murdock Road/SW Sunset Boulevard - $26,627.22 for proportionate share cost of addition of future intersection turn lanes improvements.

Given the current transportation planning efforts for SW Brookman Road, ODOT, WACO and the City feel that conditioning full improvement to the intersection of SW Brookman Road and Hwy 99W would not be in the best interest of ODOT, WACO and City or the applicant. If build-out intersection improvements were required to the SW Brookman Road/Hwy 99W intersection, it is viewed that a fully signalized intersection would possibly be required by ODOT. The cost of this level of improvement would probably not be proportional to the impacts that the development would create.

The applicant's TIA indicates that the SW Brookman Road/Hwy 99W intersection currently fails to meet capacity and mobility requirements. The TIA notes that the additional trips generated by the proposed development does not significantly increase the deficit capacity issue. The TIA did not identify any corrective action other than to say the future ODOT/WACO improvements to the intersection would alleviate the issue. However, the TIA performed for the adjacent Middlebrook Subdivision did identify a temporary mitigation measure of a right-turn lane would be appropriate to mitigate development impacts.

As part of the Middlebrook Subdivision land use process, ODOT conditioned that the intersection of SW Brookman Road and Hwy 99W be converted into a right-in/right-out configuration, with a proportionate share fee in-lieu-of construction for a right turn lane being paid to the City in a set aside fund strictly dedicated to a future signalized intersection improvement. For comparison, the Middlebrook Subdivision was require to pay a fee in-lieu amount of $109,430. The Middlebrook Subdivision is comprised of 145 single family lots, which means that a per lot fee in-lieu amount of $754.69. Applying this per lot amount to the Riverside at Cedar Creek's 28 lots results in a proportionate share fee in-lieu amount of $21,131.32.

Since the time of the Middlebrook Subdivision land use approval process, ODOT Region 2 modified the SW Brookman Road & Hwy 99W intersection requirements from right-in/right-out, to right-in/right-out with southbound left-in and east bound through movements. In a letter from ODOT Region 1 dated January 30th, 2020, six items of concern have been described with a

conclusion that the TIA be revised to take into account the change in access requirements, and to assign mitigation requirements and proportional fee in-lieu-of construction payments accordingly. The January 30th ODOT letter is attached to these review comments for reference (Exhibit A).

ODOT has also submitted a letter dated July 16, 2020 reaffirming the requirements for proportionate share fee-in-lieu payment for the future signalized configuration of SW Brookman Road and Hwy 99W intersection (Exhibit B).

WACO submitted a letter dated July 16, 2020 listing several conditions and requirements. The applicant will be required to comply with all the requirements of the letter.

Condition: WACO Transportation Development Tax (TDT) credit eligible offsets will be based on requirements and limitations established by WACO Ordinance Mo. 691A, as modified by Ordinances 729, 741, 746-A, 751 and 793-A, and as described in WACO's *Countywide Transportation Development Tax Procedures Manual*, dated July 2019. City Transportation SDC credit eligible off-sets will be based on requirements and limitations established by City of Sherwood Municipal Code Chapter 15.16 – System Development Charges and Chapter 15.20 – Park and Recreation System Development Charges on New Development.

Condition: Prior to Final Approval of Plat, applicant shall show a 33-foot wide right-of-way dedication to WACO along the SW Brookman Road frontage.

Condition: Prior to Final Approval of Plat, show clear vision easements on all corner lots fronting public streets. The clear vision easement shall be to the City of Sherwood and conform with MC Section 16.58.010.

Condition: Prior to Final Approval of Plat, applicant shall show a minimum 8-foot wide public utility easement (PUE) on private property along all public street frontages.

Condition: Prior to Final Approval of Plat, all proposed private streets shall comply with all the standards stated in the City MC Section 16.118.050 (Private Streets).

Condition: Prior to Final Approval of Engineering Plans, applicant shall submit a separate design modification request for each non-conforming public infrastructure design element, to the City Engineer for review and approval.

Condition: Prior to Final Approval of Engineering Plans, applicant shall pay fee in-lieu-of construction amounts as follows:

a. SW Sunset Boulevard/SW Woodhaven Drive - $7,897.92 for proportionate share cost of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Woodhaven Drive & SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards Washington County (WACO) TDT and/or City Transportation SDC fee assessments on the developments single family residential units.

b. SW Sunset Boulevard/SW Timbrel Lane - $5,882.85 for proportionate share cost of traffic mini-roundabout improvements. Funds to be deposited into City funds account and dedicated strictly for a suture SW Timbrel Lane & SW Sunset Boulevard traffic roundabout improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards WACO TDT and/or 54% credit eligible towards City Transportation SDC fee assessments on the developments single family residential units.

c. SW Ladd Hill Road-SW Main Street/SW Sunset Boulevard - $7,812.50 for proportionate share cost of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Ladd Hill Road-SW Main Street & SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards WACO TDT and/or City Transportation SDC fee assessments on the developments single family residential units.

d. SW Baker Road/SW Murdock Road/SW Sunset Boulevard - $26,627.22 for proportionate share cost of addition of future intersection turn lanes improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Baker Road-SW Murdock Road/SW Sunset Boulevard signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 75% credit eligible towards WACO TDT and/or 100% credit eligible towards City Transportation SDC fee assessments on the developments single family residential units.

e. SW Brookman Road/Hwy 99W - $21,131.32 for proportionate share cost of addition of signalized intersection improvements. Funds to be deposited into City funds account and dedicated strictly for a future SW Brookman Road & Hwy 99W signalized intersection improvements project. This fee in-lieu-of construction payment shall be treated as 100% credit eligible towards Washington County (WACO) TDT fee assessments on the developments single family residential units.

Condition: Prior to Final Approval of Engineering Plans, the applicant shall pay a fee in-lieu-of construction for deferred City required frontage improvements along SW Brookman Road. The fee in-lieu-of construction amount will be set at 125% of the estimated City required deferred frontage improvements construction cost, as approved by the City Engineer. The deferred City required frontage improvements are identified as being;

1) Asphalt Pavement section conforming to the City Engineering Design and Standard Details Manual, Section 210.2.2 for asphalt thickness requirements for arterial road sections.
2) Standard Base Rock section conforming to the City Engineering Design and Standard Details Manual, Section 210.2.1 for leveling course rock and base rock thickness requirements for arterial roads.
3) Concrete curb and cutter
4) Concrete sidewalk/multi-use path
5) Street planter strip plantings
6) Street lighting system (including lights, foundations and conduits)
7) Street trees
8) Street signage and striping conforming to the City Engineering Design and Standard Details Manual, Section 340.
9) Irrigation system (including piping, valves, controllers, sprinkler heads)
10) Stormwater drainage collection, conveyance, and treatment systems for public roadway.
11) Undergrounding of existing overhead utilities.

Funds are to be deposited into City managed WACO TDT funds account and dedicated strictly to a future WACO SW Brookman Road capital improvement project.

Condition: Prior to Final Approval of Engineering Plans, the street lighting design shall include a photometric analysis report for review and approval by City Engineering. City lighting standards require Westbrooke fixtures on all internal streets to the subdivision.

Condition: Prior to Final Acceptance of Constructed Public Improvements, connection of the development area to the public transportation improvements being constructed by the adjacent Middlebrook Subdivision, will not be permitted until such time as the public transportation improvements being constructed by the Middlebrook Subdivision have been constructed, have received final inspection approval, and have been accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the Riverside at Cedar Creek site development public transportation infrastructure improvements and the adjacent Middlebrook Subdivision public transportation infrastructure improvements shall be maintained.

Condition: Prior to Final Acceptance of Constructed Public Improvements, all private street shall comply with all the standards stated in the City MC Section 16.118.050 (Private Streets).

Condition: Prior to Final Acceptance of Constructed Public Improvements, all conditions and requirements listing in a letter submitted by WACO, dated July 16, 2020 shall be complied with.

Condition: Prior to Final Grant of Occupancy, all TDT and SDC credit requests on credit eligible public improvements must be submitted in accordance with WACO Ordinance Mo. 691A, as modified by Ordinances 729, 741, 746-A, 751 and 793-A, and City of Sherwood Municipal Code Chapter 15.16 – System Development Charges and Chapter 15.20 – Park and Recreation System Development Charges on New Development, and conform and comply with the standards and requirements stated therein.

City Engineer's Comment: Discussion with City Transportation Engineering (DKS Associates) requesting feedback on any potential safety concerns for SW Brookman Road. Two potential safety concerns were identified are; 1) narrow roadway width, and 2) edge drop-off conditions. SW Brookman Road generally has a narrow paved width section (18 to 20 feet), much narrower than what is typically found on City residential streets. The drop–off edge condition is most concerning in that driver reaction to right side tires falling off the road, result in overcorrection, then driving off the left side of the road. The narrow road pavement section width does not allow for much maneuvering room. This is a physical condition of the road that the City identifies as a potential safety issue, and that the City does not have the funds to correct for in the near future, and that the City cannot condition the developer to correct for as the cost of the needed improvements are not proportional to the impacts generated by the development. It is recommended that at a minimum, pavement edgelines/foglines be re-established along the project frontage along SW Brookman Road prior to Grant of Occupancy.

Sanitary Sewer

The submitted plans show the proposed public sanitary sewer main system connecting to the existing sanitary sewer main system constructed as part of the adjacent Middlebrook subdivision. The construction of the Middlebrook public sanitary sewer must be completed, inspected, approved and accepted by the City before the proposed development may connect to the existing public system. Until such time as the City gives final acceptance of the public sanitary sewer being constructed with the Middlebrook Subdivision, the proposed Riverside Subdivision shall maintain a 10-foot physical separation between the two systems.

A regional sanitary sewer trunk line extension (Brookman Sanitary Sewer Trunk Line Extension Project) is currently being designed by Clean Water Services (CWS). The alignment of the proposed trunk line is shown on the submitted plans.

To allow for further extension of the Brookman Sanitary Sewer Trunk Extension Project the applicant will be conditioned to dedicate a 20-foot wide public sanitary sewer easement across the entirety of the applicants property in alignment with the proposed Brookman Sanitary Sewer Trunk Extension Project as defined by CWS.

Condition: Prior to Final Approval of Engineering Plans applicant shall provide a letter from CWS indicating that the alignment of the future Brookman Sanitary Sewer Trunk Extension is in conformance with approved CWS design.

Condition: Prior to Final Acceptance of Constructed Public Improvements, connection to that portion of the adjacent Middlebrook Subdivision system, will not be permitted until such time as that sanitary sewer main line has been constructed, received final inspection approval, and accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the Riverside at Cedar Creek site development public sanitary infrastructure improvements and the adjacent Middlebrook Subdivision public sanitary infrastructure improvements shall be maintained.

Condition: Prior to Final Acceptance of Constructed Public Improvements, all private sanitary laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.

Condition: Prior to Final Acceptance of Constructed Public Improvements, any public sanitary sewer to be located on private property shall have a recorded public sanitary sewer easement encompassing the related public sanitary sewer improvement meeting Sherwood Engineering standards.

Condition: Prior to Final Acceptance of Constructed Public Improvements, a 20-foot wide public sanitary sewer easement across the entirety of the applicants property in alignment with the proposed Brookman Sanitary Sewer Trunk Line Extension project as specified by CWS, shall be dedicated to the City.

Storm Sewer

The proposed development submittal includes a Service Provider Letter issued by CWS (File No. 20-000663), dated May 11, 2020. The SPL lists 24 specific conditions which are to be completed and adhered to as part of the proposed project approval.

A preliminary stormwater drainage report prepared by PDG, dated February 8, 2020 has been submitted. Within the preliminary drainage report the following important items are noted:

1) Cedar Creek runs through the site commencing at a culvert crossing of Brookman Road located approximately 250-feet west of the east property line, then meandering north and east to the east property line.
2) There are no identified downstream conveyance system deficiencies within 1/4 mile of the site, hence no on-site detention is required.
3) The proposed system storm water drainage system is required to meet current CWS regulations for hydromodification.
4) A single regional storm water treatment facility is proposed for the subdivision.

5) The total lot area is approximately 10.47 acre. The total disturbed area is more than half the total area (estimated at > 5 acres), therefore a NPDES 1200C permit is required.

Condition: Prior to Final Plat Approval, the stormwater treatment facilities shall be shown as being located in individual tracts of land dedicated to the City of Sherwood.

Condition: Prior to Final Plat Approval, an easement over the vegetated corridors tracts of land granting access to CWS shall be recorded with the plat.

Condition: Prior to Final Engineering Plan Approval, submitted site development plans shall provide for compliance with all 24 requirements and conditions stated in the CWS issued Service Provider Letter (File No. 20-000663).

Condition: Prior to Finale Engineering Plan Approval, submitted site development stormwater improvement plans shall provide for City access to stormwater outfall/outlet structures for maintenance purposes.

Condition: Prior to Finale Engineering Plan Approval, a Final Stormwater Drainage Report shall be provided to City Engineering for review and approval.

Condition: Prior to Final Engineering Plan Approval, a Stormwater Connection Permit shall be obtained from CWS.

Condition: Prior to Final Engineering Plan Approval, applicant shall obtain an NPDES 1200C permit from CWS and submit it to the City Engineering Department for their records.

Condition: Prior to Final Engineering Plan Approval, obtain and submit to Engineer a concurrence letter from DSL for the wetlands on the site or submit documentation from DSL that concurrence is not required.

Condition: Prior to Final Acceptance of Constructed Public Improvements, the proposed development shall provide stormwater improvements as needed to serve new street and lot improvements meeting CWS and City of Sherwood standards.

Condition: Prior to Final Acceptance of Constructed Public Improvements, any public stormwater system that is located on private property shall have a recorded public stormwater easement encompassing the related public stormwater sewer improvement meeting Sherwood Engineering standards.

Condition: Prior to Grant of Occupancy for any building, the proposed development shall provide storm sewer improvements as needed to serve new street improvements and service all parcels within the subject development meeting CWS and City standards.

Condition: Prior to Final Acceptance of Constructed Public Improvements, all private stormwater laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.

Water

The proposed development submittal indicates the extension of the public water system previously construction by the Middlebrook Subdivision. The project will extend an 8-inch public water main along SW Wapato Lake Drive, and provide a looped system between SW Wapato Lake Drive and SW Trillium Lane

The City of Sherwood Water System Master Plan shows the need for construction of 12-inch waterline within Brookman Road. The public water line will extend the proposed water main

constructed with the Middlebrook Subdivision, across the entire SW Brookman Road frontage of the Reserve at Cedar Creek subdivision. Because the line is sized larger than the residential standard of 8-inches, the construction cost of this line will be eligible for water system SDC credits on that portion greater than 8-inches.

Condition: Prior to Final Approval of Engineering Plans, the Engineering Department shall provide review and approval of related public water improvement plans and reports. Public water system plans shall meet City standards. All public water pipe shall have joint restraints.

Condition: Prior to Final Approval of Engineering Plans, the applicant shall obtain any necessary Right-of-Way Permits and/or Utility Facilities Permits from WACO for constructing public improvements within the SW Brookman Road right-of-way.

Condition: Prior to Final Approval of Engineering Plans, applicant shall obtain and provide letter from Sherwood Public Works Department, that existing public water system has the capacity and pressure to provide appropriate public water and fire service to the proposed development.

Condition: Prior to Final Acceptance of Constructed Public Improvements, connection to that portion of the public water system being constructed by the adjacent Middlebrook Subdivision, will not be permitted until such time as that portion of the public water system is constructed, has received final inspection approval, and is accepted as public infrastructure by the City. Until that time, a minimum 10-foot physical separation between the proposed site development public water system and the Middlebrook Subdivision public water systems, shall be maintained.

Condition: Prior to Final Acceptance of Constructed Public Improvements, the installation of the 12-inch waterline running down SW Brookman Road, shall extend the entire length of the property frontage right-of-way line. The oversizing cost of construction (greater than 8") shall be eligible for water system SDC credits.

Condition: Prior to Issuance of Occupancy of any residential lot structures, all service laterals shall be installed in compliance with the current Oregon Plumbing Specialty Code.

Grading and Erosion Control

An environmental assessment report prepared by ESA, dated April 5, 2020 has been included in the submittal.

The site abuts wetlands that include a FEMA defined 100-year flood plain limit. The plans identify the flood plain limits which indicates a flood plain elevation between 166 and 168. The applicant submittal indicates that each residential structure built in the subdivision shall meet FEMA requirements for the ground finished floor elevation being 1.5-feet above the 100-year flood plain elevation.

Condition: Prior to Final Approval of Engineering Plans, a Flood Plain Certificate for the site flood plain elevation shall be submitted to the City for its records.

Condition: Prior to Final Approval of Engineering Plans, a finalized NPDES 1200-C Permit issued by CWS shall be submitted to the City for its records.

Condition: Prior to Final Acceptance of Constructed Public Improvements, all conditions of the CWS Service Provider Letter (CWS File No. 20-000663) shall have been constructed and received final inspection approval by the City, in conformance with the conditions and requirements of the SPL.

Condition: Prior to Grant of Occupancy, for each residential structure constructed within the subdivision and abutting the Flood Plain corridor, a completed FEMA Elevation Certificate Form shall be submitted to the City for its records.

Other Engineering Issues

Condition: Prior to Issuance of an Engineering Compliance Agreement, final engineering plan approval by the Engineering Department is required, performance and payment bonds and insurance riders must be submitted to the City.

Condition: Per City Municipal Code Chapter 16.118, all new utilities shall be placed underground unless covered by exceptions noted under Section 16.118.040, and as approved by the City Engineer.

Condition: Prior to Grant of Occupancy for the building, Sherwood Broadband utilities (vaults and conduit) shall be installed along the subject properties frontage per requirements set forth in City Ordinance 2005-017 and City Resolution 2005-074.

Condition: Prior to Final Acceptance of Public Improvements, all vegetated corridors shall be dedicated to the City in recorded tracts of land.

END OF ENGINEERING CONDITIONS OF APPROVAL

WASHINGTON COUNTY
OREGON

July 16, 2020

To: **Eric Rutledge – Associate Planner**

From: **Naomi Vogel – Associate Planner**

RE: **Riverside @ Cedar Creek Subdivision**
City File Number: LU 2020-005 SUB
County File Number: CP 20-914
Tax Map and Lot Number(s): 3S1060000104
Location: 17433 SW Brookman Road

Washington County Department of Land Use and Transportation has reviewed this development application to subdivide approximately 10.47 acres into 28 individual lots for single family detached homes. The site will obtain access via White Oak Terrace, a City public street

A Traffic Impact Analysis and supplemental information by Lancaster/Mobley (March 31, 2020) was submitted in accordance with Washington County R&O 86-95, "Determining Traffic Safety Improvements" for developments. County staff has reviewed the TIA and concurs with the findings/recommendations of the analysis.

I. PRIOR TO ISSUANCE OF A SITE DEVELOPMENT PERMIT BY THE CITY OF SHERWOOD, THE APPLICANT SHALL OBTAIN A WASHINGTON COUNTY FACILITY PERMIT FOR CONSTRUCTION OF THE FOLLOWING PUBLIC IMPROVEMENTS ON SW BROOKMAN ROAD:

A. Submit the following to **Washington County** Public Assurance Staff (503-846-3843):

1. Completed "Design Option" form (original signed copy).

2. **$10,000.00** Administration Deposit.

NOTE: The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field

Department of Land Use & Transportation
Operations and Maintenance
1400 SW Walnut Street, MS 51, Hillsboro, OR 97123-5625
phone: 503-846-7623 • fax: 503-846-7620
www.co.washington.or.us/lut • lutops@co.washington.or.us

inspections, as-built approval, and project administration. The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is falls below County approved level, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.

3. Copy of the City's Notice of Decision (NOD) and the County's letter dated July 16, 2020.

4. Engineering plans and Geotech/Pavement report via ProjectDox for construction of the following public improvements to County standards:

   a. Closure of all existing access from the subject tax lot to SW Brookman Road.

   b. Pavement widening taper to match Middlebrook Subdivision to the west and the Reserve @ Cedar Creek to the east per the County Engineer.

   c. All work within the ROW of SW Brookman Road, including the Community Trail to County Standards.

II. PRIOR TO APPROVAL OF THE PLAT RECORDATION BY THE CITY OF SHERWOOD AND WASHINGTON COUNTY:

A. The following shall be shown on the plat and recorded with Washington County Survey Division (503.846.8723):

   1. Dedication of additional 33 feet right-of-way to provide 53 feet from the centerline of SW Brookman Road, including an 8 foot PUE.

III. PRIOR TO OCCUPANCY OF A DWELLING:

A. The road improvements required in condition **I.A.4.** above shall be completed and approved by Washington County.

B. Pay a proportional share of the fee in-lieu of constructing 5 lanes (half-width) on SW Brookman Road to the County. The engineer's estimate shall include the following items:

   1. Asphalt (known standards for materials, width and thickness),
   2. Standard base rock (known standards for materials and thickness),
   3. Sidewalks (known standards for material, thickness and width),

4. Curb and gutter,
5. Striping,
6. Street trees,
7. Street lighting (including lights and conduits),
8. Planter strip plantings,
9. Irrigation system,
10. Stormwater drainage collection, conveyance, and treatment,
11. Floodplain and Natural Resources alterations.

If you have any questions, please contact me at 503-846-7639.

Cc: Road Engineering Services
Traffic Engineering Services
Assurances Section
Transportation File

Exhibit B3

Oregon
Kate Brown, Governor

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

July 16, 2020 ODOT #11735

ODOT Response

Project Name: Riverside at Cedar Creek Subdivision	**Applicant:** Niki Munson
Jurisdiction: City of Sherwood	**Jurisdiction Case #:** LU 2020-005 SUB
Site Address: 17433 SW Brookman Road, Sherwood, OR	**Legal Description:** 03S 01W 06 **Tax Lot(s):** 00104
State Highway: OR 99W/Brookman Rd	

The site of this proposed land use action is in the vicinity of OR 99W. ODOT has permitting authority for this facility and an interest in ensuring that this proposed land use is compatible with its safe and efficient operation.

COMMENTS/FINDINGS

The applicant proposes to construct a 28 lot subdivision within the Brookman Road Concept Area. The intersection of Brookman Rd and OR 99W was included in the traffic analysis for the proposed development. ODOT has the following comments:

OR 99W/SW Chapman/SW Brookman Intersection

a. This intersection does not meet the Oregon Highway Plan mobility target under existing conditions as well as with the proposed development. Therefore, the performance standard is no further degradation. The city's Transportation System Plan identifies a project to signalize this intersection to address the capacity deficiencies. While the project to install a signal at this intersection would mitigate the proposed development, it is a high cost improvement. Therefore, ODOT recommends that the applicant be required to contribute a proportionate share contribution towards the signalization of the intersection based on the critical movement at the intersection.

b. This intersection is located within the ODOT Region 2 boundary. Attached is a letter from Region 2 which addresses safety and operational issues at the intersection and supporting the recommendation for proportionate share contribution towards the TSP project to signalize the intersection for the Reserve at Cedar Creek development. Because conditions have not changed at the intersection, this letter is applicable to the current land use application.

Please send a copy of the Notice of Decision including conditions of approval to:

ODOT Region 1 Planning
Development Review
123 NW Flanders St
Portland, OR 97209

ODOT_R1_DevRev@odot.state.or.us

Development Review Planner: Marah Danielson	503.731.8258, marah.b.danielson@odot.state.or.us
Region 1 Traffic Contact: Avi Tayar, P.E.	503.731.822121 Abraham.tayar@odot.state.or.us
Region 2 Access Management Engineer: Scott Nelson, P.E.	503.986.2882 Brian.S.NELSON@odot.state.or.us

Oregon
Kate Brown, Governor

Department of Transportation
ODOT Region 2 HQ
455 Airport Rd SE,

March 6, 2020

Bob Galati, P.E. and Joy Chang
City of Sherwood
22560 SW Pine Street
Sherwood, OR 97140

SUBJECT: ODOT Region 2 Comments for Potential Mitigation at OR 99W and Brookman/Chapman (M.P. 17.47)

Dear Bob and Joy,

This letter is intended to document discussions regarding the operations of the OR99W and Brookman Rd/Chapman Rd intersection. The intersection's most recent Safety Priority Index System (SPIS) rating is approximately a 50, which classifies it as a top 10% site. The SPIS is a method ODOT uses for identifying potential safety problems on state highways. Due to its top 10% status ODOT's Region 2 All Roads Transportation Safety (ARTS) Program has reviewed the site for mitigation options and identified a J-Turn Intersection as a preferred option. The J-Turn Intersection would restrict left-outs for both Brookman and Chapman and provide downstream median u-turn crossovers. Planning level scoping has estimated this project in the 1-2 million dollar price range. ARTS projects are selected on an expected cost-benefit analysis system. In the last cycle the project did not make the cut for more detailed scoping. The ARTS Program has stated that as long as the site remains a top 10% SPIS site they intend to propose the J-Turn Intersection treatment. As the project competes with other high priority sites, it is unknown if the project will receive funding.

ODOT is currently working with the developer of the Middlebrook Subdivision to install features restricting turn movements at the Brookman leg of the intersection. This feature is intended to improve operations; ODOT will continue to monitor the site for safety improvements or degradation.

Regarding the proposed 59 lot subdivision, The Reserve at Cedar Creek, ODOT does not recommend any safety mitigation requirements. No feasible and proportional improvements have been identified. The development shall be responsible for a proportional share of future improvements at OR99W and Brookman Rd. identified in the City of Sherwood TSP.

Sincerely,

B. Scott Nelson, P.E.
Region 2 Access Management Engineer

Tualatin Valley Fire & Rescue

April 24, 2020

Eric Rutledge
Associate Planner
City of Sherwood
22560 SW Pine Street
Sherwood, Oregon 97140

Re: Riverside at Cedar Creek
Tax Lot I.D: 3S1060000104

Dear Eric,

Thank you for the opportunity to review the proposed site plan surrounding the above named development project. These notes are provided in regards to the plans received April 23, 2020. There may be more or less requirements needed based upon the final project design, however, Tualatin Valley Fire & Rescue will endorse this proposal predicated on the following criteria and conditions of approval.

FIRE APPARATUS ACCESS:

1. **FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDINGS AND FACILITIES:** Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)

2. **FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE:** Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1)

3. **FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS:** Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)

4. **SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced as to provide all-weather driving capabilities. (OFC 503.2.3)

5. **TURNING RADIUS:** The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

6. **ACCESS ROAD GRADE:** Fire apparatus access roadway grades shall not exceed 15%.

7. **ANGLE OF APPROACH/GRADE FOR INTERSECTIONS:** Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)

8. **AERIAL APPARATUS OPERATING GRADES:** Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%.

9. **ACCESS DURING CONSTRUCTION:** Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3309 and 3310.1)

10. **TRAFFIC CALMING DEVICES:** Shall be prohibited on fire access routes unless approved by the Fire Marshal. (OFC 503.4.1). Traffic calming measures linked here: http://www.tvfr.com/DocumentCenter/View/1578

FIREFIGHTING WATER SUPPLIES:

11. **FIREFIGHTING WATER SUPPLY FOR INDIVIDUAL ONE- AND TWO-FAMILY DWELLINGS:** The minimum available fire flow for one and two-family dwellings served by a municipal water supply shall be 1,000 gallons per minute. If the structure(s) is (are) 3,600 square feet or larger, the required fire flow shall be determined according to OFC Appendix B. (OFC B105.2)

    A construction type of Type VB requires a minimum fire flow of 1,000 GPM.

12. **FIRE FLOW WATER AVAILABILITY:** Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

    Provide documentation of fire flow test or modeling.

13. **WATER SUPPLY DURING CONSTRUCTION IN MUNICIPAL AREAS:** In areas with fixed and reliable water supply, approved firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

FIRE HYDRANTS:

14. **FIRE HYDRANTS – ONE- AND TWO-FAMILY DWELLINGS & ACCESSORY STRUCTURES:** Where the most remote portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided. (OFC 507.5.1)

15. **FIRE HYDRANT NUMBER AND DISTRIBUTION:** The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 105.1. (OFC Appendix C)

16. **FIRE HYDRANT(S) PLACEMENT:** (OFC C104)
    - Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
    - Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the Fire Marshal.
    - Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the Fire Marshal.
    - Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the Fire Marshal.

The distance from the proposed hydrant near lot 25 and the proposed hydrant near lot 17 in the Middlebrook subdivision exceeds the spacing requirements of 500ft as per OFC Table C102.1. Install an additional hydrant near lot 18 or 19 along SW Wapato Dr. See attached Middlebrook water plan sheet C401 (proposed hydrant H2 near Lot 17).

17. **PRIVATE FIRE HYDRANT IDENTIFICATION:** Private fire hydrants shall be painted red in color. Exception: Private fire hydrants within the City of Tualatin shall be yellow in color. (OFC 507)

18. **FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD:** Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the Fire Marshal. (OFC C102.1)

19. **REFLECTIVE HYDRANT MARKERS:** Fire hydrant locations shall be identified by the installation of blue reflective markers. They shall be located adjacent and to the side of the center line of the access roadway that the fire hydrant is located on. In the case that there is no center line, then assume a center line and place the reflectors accordingly. (OFC 507)

20. **PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6 & OFC 312)

21. **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

BUILDING ACCESS AND FIRE SERVICE FEATURES

22. **PREMISES IDENTIFICATION:** New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

If you have questions or need further clarification or would like to discuss any alternate methods and/or materials, please feel free to contact me at **503-259-1419.**

Sincerely,

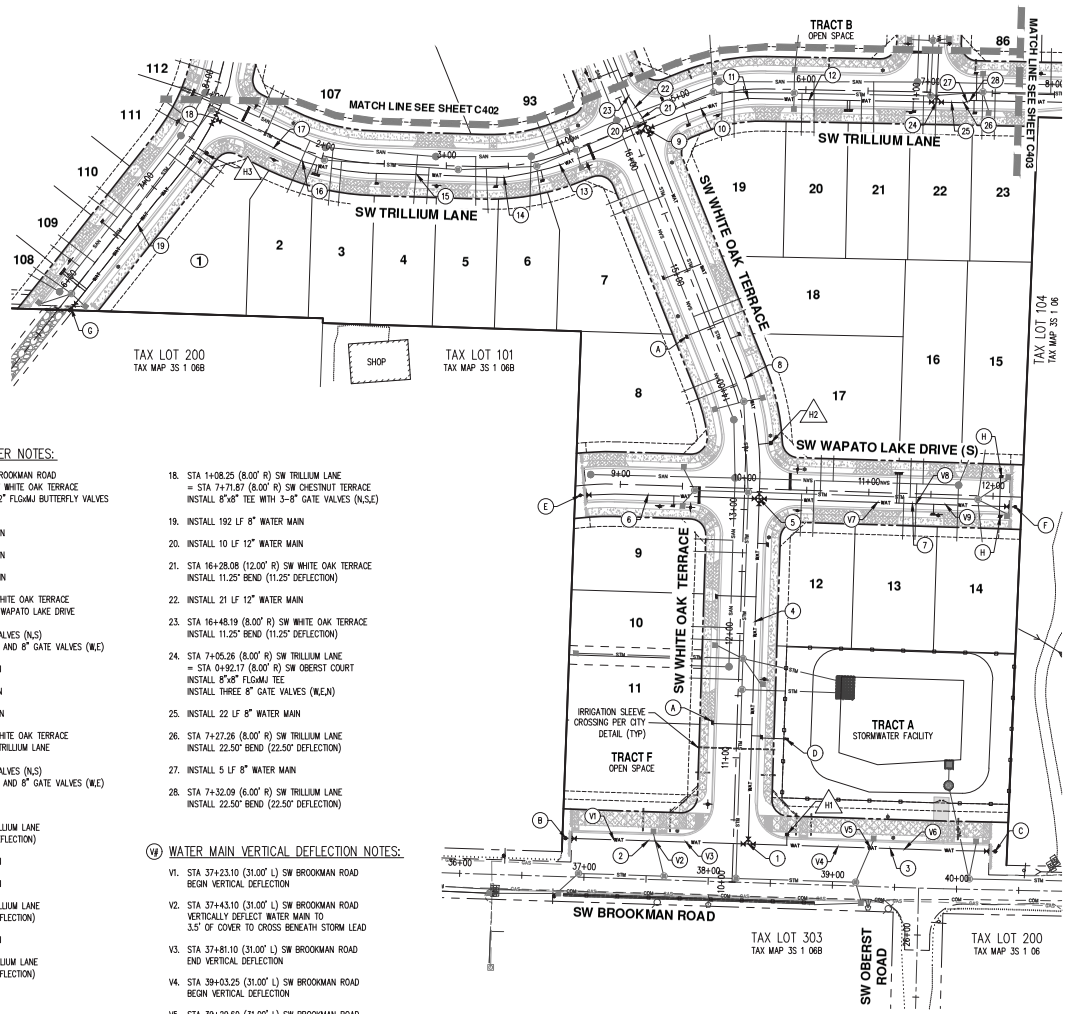
Tom Mooney

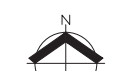
Tom Mooney
Deputy Fire Marshal II

Thomas.mooney@tvfr.com

Cc: File
City of Sherwood

A full copy of the New Construction Fire Code Applications Guide for Residential Development is available at http://www.tvfr.com/DocumentCenter/View/1438





(F) HORIZONTAL KEYED WATER NOTES:

1. STA 38+31.25 (31.00' L) SW BROOKMAN ROAD = STA 10+31.00 (12.00' R) SW WHITE OAK TERRACE INSTALL 12"x12" TEE WITH 3-12" FLGxMJ BUTTERFLY VALVES (E,W,N)
2. INSTALL 147 LF 12" WATER MAIN
3. INSTALL 199 LF 12" WATER MAIN
4. INSTALL 278 LF 12" WATER MAIN
5. STA 13+09.04 (12.00' R) SW WHITE OAK TERRACE = STA 10+12.00 (8.00' R) SW WAPATO LAKE DRIVE INSTALL 12"x12" FLGxMJ CROSS INSTALL TWO 12" BUTTERFLY VALVES (N,S) INSTALL TWO 12"x8" REDUCERS AND 8" GATE VALVES (W,E)
6. INSTALL 144 LF 8" WATER MAIN
7. INSTALL 206 LF 8" WATER MAIN
8. INSTALL 311 LF 12" WATER MAIN
9. STA 16+18.08 (12.00' R) SW WHITE OAK TERRACE = STA 4+65.24 (6.69' R) SW TRILLIUM LANE INSTALL 12"x12" FLGxMJ CROSS INSTALL TWO 12" BUTTERFLY VALVES (N,S) INSTALL TWO 12"x8" REDUCERS AND 8" GATE VALVES (W,E)
10. INSTALL 85 LF 8" WATER MAIN
11. STA 5+52.87 (7.32' R) SW TRILLIUM LANE INSTALL 11.25° BEND (10.90° DEFLECTION)
12. INSTALL 152 LF 8" WATER MAIN
13. INSTALL 122 LF 8" WATER MAIN
14. STA 3+45.89 (8.84' R) SW TRILLIUM LANE INSTALL 11.25° BEND (11.60° DEFLECTION)
15. INSTALL 163 LF 8" WATER MAIN
16. STA 1+86.25 (9.19' R) SW TRILLIUM LANE INSTALL 11.25° BEND (11.25° DEFLECTION)
17. INSTALL 79 LF 8" WATER MAIN
18. STA 1+08.25 (8.00' R) SW TRILLIUM LANE = STA 7+71.87 (8.00' R) SW CHESTNUT TERRACE INSTALL 8"x8" TEE WITH 3-8" GATE VALVES (N,S,E)
19. INSTALL 192 LF 8" WATER MAIN
20. INSTALL 10 LF 12" WATER MAIN
21. STA 16+28.08 (12.00' R) SW WHITE OAK TERRACE INSTALL 11.25° BEND (11.25° DEFLECTION)
22. INSTALL 21 LF 12" WATER MAIN
23. STA 16+48.19 (8.00' R) SW WHITE OAK TERRACE INSTALL 11.25° BEND (11.25° DEFLECTION)
24. STA 7+05.26 (8.00' R) SW TRILLIUM LANE = STA 0+92.17 (8.00' R) SW OBERST COURT INSTALL 8"x8" FLGxMJ TEE INSTALL THREE 8" GATE VALVES (W,E,N)
25. INSTALL 22 LF 8" WATER MAIN
26. STA 7+27.26 (8.00' R) SW TRILLIUM LANE INSTALL 22.50° BEND (22.50° DEFLECTION)
27. INSTALL 5 LF 8" WATER MAIN
28. STA 7+32.09 (6.00' R) SW TRILLIUM LANE INSTALL 22.50° BEND (22.50° DEFLECTION)

(V#) WATER MAIN VERTICAL DEFLECTION NOTES:

V1. STA 37+23.10 (31.00' L) SW BROOKMAN ROAD BEGIN VERTICAL DEFLECTION

V2. STA 37+43.10 (31.00' L) SW BROOKMAN ROAD VERTICALLY DEFLECT WATER MAIN TO 3.5' OF COVER TO CROSS BENEATH STORM LEAD

V3. STA 37+81.10 (31.00' L) SW BROOKMAN ROAD END VERTICAL DEFLECTION

V4. STA 39+03.25 (31.00' L) SW BROOKMAN ROAD BEGIN VERTICAL DEFLECTION

V5. STA 39+29.60 (31.00' L) SW BROOKMAN ROAD VERTICALLY DEFLECT WATER MAIN TO 4.2' OF COVER TO CROSS BENEATH STORM LEAD

V6. STA 39+57.25 (31.00' L) SW BROOKMAN ROAD END VERTICAL DEFLECTION

V7. STA 11+07.18 (8.00' R) SW WAPATO LAKE DRIVE BEGIN VERTICAL DEFLECTION

V8. STA 11+38.33 (8.00' R) SW WAPATO LAKE DRIVE VERTICALLY DEFLECT WATER MAIN TO 4.5' OF COVER TO CROSS BENEATH SANITARY LATERAL

V9. STA 11+62.18 (8.00' R) SW WAPATO LAKE DRIVE END VERTICAL DEFLECTION

HX INSTALL FIRE HYDRANT ASSEMBLY PER DETAIL.

FIRE HYDRANT TABLE

HYDRANT #	STATION	ALIGNMENT	TOP OF CURB ELEV
H1	38+62.25	SW BROOKMAN ROAD	200.68
H2	13+52.18	SW WHITE OAK TERRACE	203.44
H3	7+46.48	SW CHESTNUT TERRACE	218.16

(X) WATER STRUCTURES KEYED NOTES:

A. INSTALL 1" SINGLE WATER SERVICE--PLANTER STRIP PER CITY OF SHERWOOD STANDARD DETAIL (TYP)

B. STA 36+84.25 (31.00' L) SW BROOKMAN ROAD INSTALL PHASE BREAK END WITH 12" MJxMJ BUTTERFLY VALVE AND 2" STANDARD BLOW-OFF PER CITY OF SHERWOOD DETAILS

C. STA 40+30.54 (31.00' L) SW BROOKMAN ROAD INSTALL PHASE BREAK END WITH 12" MJxMJ BUTTERFLY VALVE AND 2" STANDARD BLOW-OFF PER CITY OF SHERWOOD DETAILS

D. STA 11+18.19 SW WHITE OAK TERRACE INSTALL SINGLE 1" SERVICE AND DOUBLE CHECK VALVE ASSEMBLY FOR IRRIGATION

E. STA 8+66.96 (7.88' R) SW WAPATO LAKE DRIVE INSTALL PHASE BREAK END WITH 8" MJxMJ GATE VALVE AND 2" STANDARD BLOW-OFF PER CITY OF SHERWOOD DETAILS

F. STA 12+18.28 (8.00' R) SW WAPATO LAKE DRIVE INSTALL PHASE BREAK END WITH 8" MJxMJ GATE VALVE AND 2" STANDARD BLOW-OFF PER CITY OF SHERWOOD DETAILS

G. STA 5+82.26 (8.00' R) SW CHESTNUT TERRACE INSTALL PHASE BREAK END WITH 8" MJxMJ GATE VALVE AND 2" STANDARD BLOW-OFF PER CITY OF SHERWOOD DETAILS

H. INSTALL 1" SINGLE WATER SERVICE PER CITY DETAIL FOR FIRE SPRINKLERED HOMES. CONTRACTOR TO COORDINATE & CONFIRM ANGLE STOP SIZE WITH DEVELOPER PRIOR TO ORDERING MATERIALS

NOTES

1. ALL RESIDENTIAL SERVICES SHALL BE 1" SERVICES. CONTRACTOR TO CONFIRM ANGLE STOP SIZES WITH CITY AND DEVELOPER PRIOR TO ORDERING MATERIALS (1"x 1" ANGLE STOPS MAY BE REQUIRED FOR SPRINKLERED HOME).
2. WATER METERS TO BE INSTALLED IN LANDSCAPED AREA UNLESS SPECIFIED ON PLAN.
3. TRENCH BACKFILL SHALL BE CLASS B GRANULAR BACKFILL PER CITY OF SHERWOOD DETAIL.
4. ALL INSTALLED WATER MAIN SHALL BE INSTALLED AS RESTRAINED PIPE. THRUST RESTRAINT SYSTEMS SHALL BE CAPABLE OF RESTRAINING A MINIMUM OF 150 PSI MAXIMUM LINE PRESSURE. THRUST RESTRAINT SHALL BE BY MECHANICAL THRUST RESTRAINT DEVICES.
5. MECHANICAL THRUST RESTRAINT DEVICES SHALL BE THE TYPE DESIGNED FOR USE WITH DUCTILE IRON PIPE. THE DEVICES SHOULD MEET THE TEST REQUIREMENTS OF THE UNI-BELL'S SPECIFICATIONS AND TO ACCOMMODATE 150 PSI LINE PRESSURE AND BE APPROVED BY THE PROJECT ENGINEER.
6. PIPE DEFLECTION SHALL NOT EXCEED EITHER THE VALUES STATED BY THE CITY OF SHERWOOD PUBLIC WORKS STANDARDS OR THE MANUFACTURER'S RECOMMENDATIONS. DESIGN ASSUMES MAXIMUM DEFLECTION OF 4 DEGREES.
7. WATER METER BOXES TO HAVE A MINIMUM CLEARANCE OF 3' WITH LIGHT POLES, TREES AND OTHER UTILITIES.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING • SURVEYING • NATURAL RESOURCES
FORESTRY • PLANNING • LANDSCAPE ARCHITECTURE

MIDDLEBROOK SUBDIVISION

SHERWOOD OREGON

WASHINGTON COUNTY TAX MAP 3S 1 06/06B

TAX LOTS 103 AND 101 (ADJUSTED)

WATER PLAN

DESIGNED BY:	DRS
DRAWN BY:	DRS
MANAGED BY:	PAS
CHECKED BY:	AHH

DATE: 02/20/2020

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 13, 2007
ANDREW H. HIBBARD
RENEWAL DATE: 6/30/20

PRELIMINARY NOT FOR CONSTRUCTION

REVISIONS

JOB NUMBER
3591

SHEET
C401

AKS DRAWING FILE: 3591 C401 WATERNG | LAYOUT: C401

M E M O R A N D U M

Date: July 17, 2020

To: Eric Rutledge, Associate Planner, City of Sherwood

From: Jackie Sue Humphreys, Clean Water Services (CWS)

Subject: Riverside at Cedar Creek, LU 2020-005, 3S1060000104

Please include the following comments when writing your conditions of approval:

The subject site is currently outside the jurisdictional boundary of Clean Water Services. Site must complete the annexation process in order for public sanitary or storm sewer services to be provided by the City.

PRIOR TO ANY WORK ON THE SITE AND PLAT RECORDING

A Clean Water Services (CWS) Storm Water Connection Permit Authorization must be obtained prior to plat approval and recordation. Application for CWS Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order No. 19-5 as amended by R&O 19-22, or prior standards as meeting the implementation policy of R&O 18-28, and is to include:

a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.

b. Detailed grading and erosion control plan. An Erosion Control Permit will be required. Area of Disturbance must be clearly identified on submitted construction plans. If site area and any offsite improvements required for this development exceed one-acre of disturbance, project will require a 1200-CN Erosion Control Permit. If site area and any offsite improvements required for this development exceed five-acres of disturbance, project will require a 1200-C Erosion Control Permit.

c. Detailed plans showing each lot within the development having direct access by gravity to public storm and sanitary sewer.

d. Provisions for water quality in accordance with the requirements of the above named design standards. Water Quality is required for all new development and redevelopment areas per R&O 19-5, Section 4.04. Access shall be provided for maintenance of facility per R&O 19-5, Section 4.07.6.

e. If use of an existing offsite or regional Water Quality Facility is proposed, it must be clearly identified on plans, showing its location, condition, capacity to treat this site and, any additional improvements and/or upgrades that may be needed to utilize that facility.

f. If private lot LIDA systems proposed, must comply with the current CWS Design and Construction Standards. A private maintenance agreement, for the proposed private lot LIDA systems, needs to be provided to the City for review and acceptance.

g. Show all existing and proposed easements on plans. Any required storm sewer, sanitary sewer, and water quality related easements must be granted to the City.

h. Applicant shall comply with the conditions as set forth in the Service Provider Letter No. 20-000663, dated May 11, 2020.

i. Developer may be required to preserve a corridor separating the sensitive area from the impact of development. The corridor must be set aside in a separate tract, not part of any buildable lot and, shall be subject to a "Storm Sewer, Surface Water, Drainage and Detention Easement over its entirety", or its equivalent.

j. Detailed plans showing the sensitive area and corridor delineated, along with restoration and enhancement of the corridor.

k. If there is any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.

l. Any proposed offsite construction activities will require an update or amendment to the current Service Provider Letter for this project.

CONCLUSION

This Land Use Review does not constitute CWS approval of storm or sanitary sewer compliance to the NPDES permit held by CWS. CWS, prior to issuance of any connection permits, must approve final construction plans and drainage calculations.

Exhibit B7

RE: Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

BROWN Jevra <jevra.brown@state.or.us>

Thu 7/2/2020 5:01 PM

To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: STEVENSON Christine <christine.stevenson@state.or.us>; TAYLOR Clara <clara.taylor@state.or.us>

RE City of Sherwood, TL 03S 01W 06 #104

Hi Eric,

The easiest way for us to access site records are via the tax map and lot numbers. We have no previous records regarding this tax lot. Materials attached to the notice suggest that there are wetlands on site, therefore:
1) a WLUN should be submitted from Sherwood to DSL
2) (the response to which will probably say words to the effect of) A delineation report needs to be submitted to DSL and approved to be valid for permitting (or to support avoidance).
Thank you for this notice,
Stay home, stay healthy,

Jevra Brown, Aquatic Resource Planner
Department of State Lands
Office (M-W) 503-986-5297; **cell** (Th-F) 503-580-3172; fax 503-378-4844

Have you heard about the Statewide Wetlands Inventory update? Learn More!

Most of the Department of State Lands staff is currently teleworking to help prevent the spread of COVID-19.

Customer Satisfaction Survey open until Monday June 29th
Agencywide: https://www.surveymonkey.com/r/OregonDSL
ARM: https://www.surveymonkey.com/r/DSL_waters

From: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Sent: Monday, June 29, 2020 2:40 PM
To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: d5b@nwnatural.com; r2g@nwnatural.com; henry.english@pgn.com; Travis Smallwood <Travis.Smallwood@pgn.com>; Jose Marquez <Jose.Marquez@pgn.com>; humphreysj@CleanWaterServices.org; spieringm@CleanWaterServices.org; Rolph, Kevin <Kevin_Rolph@kindermorgan.com>; Kristen Tabscott <kTabscott@pridedisposal.com>; raindrops2refuge@gmail.com; Larry_Klimek@fws.gov; mwerner@gwrr.com; Clark,James L (BPA) - TERR-CHEMAWA <jlclark@bpa.gov>; jerose@sherwood.k12.or.us; pjohanson@sherwood.k12.or.us; tumpj@trimet.org; baldwinb@trimet.org; DevelopmentReview@trimet.org; michaela.skiles@oregonmetro.gov; landusenotifications@oregonmetro.gov; kurt.A.MOHS@odot.state.or.us; HENDRICKSON Jill M <Jill.M.HENDRICKSON@odot.state.or.us>; ODOT_R1_DevRev <ODOT_R1_DevRev@odot.state.or.us>; Naomi Vogel <Naomi_Vogel@co.washington.or.us>; stephen_roberts@co.washington.or.us; Theresa Cherniak <Theresa_Cherniak@co.washington.or.us>; Tom Mooney <thomas.mooney@tvfr.com>; Bob Galati <GalatiB@SherwoodOregon.gov>; Brad Crawford <CrawfordB@SherwoodOregon.gov>; Richard Sattler <SattlerR@SherwoodOregon.gov>; Jason Waters <WatersJ@SherwoodOregon.gov>; Craig Christensen <ChristensenC@SherwoodOregon.gov>; Craig Sheldon <SheldonC@SherwoodOregon.gov>; Jo Guediri <GuediriJ@sherwoodoregon.gov>; Andrew Stirling <StirlingA@SherwoodOregon.gov>; Colleen Resch <ReschC@SherwoodOregon.gov>; Scott McKie <McKieS@SherwoodOregon.gov>; Jeff Groth <GrothJ@SherwoodOregon.gov>; Jon Carlson <CarlsonJ@SherwoodOregon.gov>; hoon.choe@USPS.gov; BROWN Jevra <jevra.brown@dsl.state.or.us>; dkampfer@wm.com
Subject: Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

Exhibit B7

Hi Partner Agencies:

The Sherwood Planning Department is requesting agency comments on the following proposal within the City of Sherwood:

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- **Proposal:** The applicant is proposing a 28-lot residential subdivision on a 10.47-acre site in the City of Sherwood. The subject site is located in the Brookman Road Concept Plan area and is zoned Medium Density Residential Low (MDRL). The proposed lot sizes range from 4,722 SF to 8,135 SF with an average lot size of 5,914 SF. Cedar Creek intersects the southeast corner of the site. The applicant is proposing to preserve approximately 203,158 SF (4.66 acres) of open space including the Cedar Creek vegetated corridor and associated floodplain / wetlands. Street improvements will include a through connection of SW Wapato Lake Drive (local street) to connect the site with the surrounding Middlebrook Subdivision and half street improvements to SW Brookman Road (County arterial) along the site frontage.
- **Applicable code criteria:** Sherwood Zoning & Community Development Code Chapter 16.12 - Residential Land Use Districts; Chapter 16.58 - Clear Vision and Fence Standards; Chapter 16.72 - Procedures for Processing Development Permits; Chapter 16.92 – Landscaping; Chapter 16.94 - Off-Street Parking and Loading; Chapter 16.96 - On-Site Circulation; Chapter 16.98 - On-Site Storage; Chapter 16.104 - General Provisions; Chapter 16.106 - Transportation Facilities; Chapter 16.108 - Improvement Plan Review; Chapter 16.110 - Sanitary Sewers; Chapter 16.112 - Water Supply; Chapter 16.114 - Storm Water; Chapter 16.116 - Fire Protection; Chapter 16.118 - Public and Private Utilities; Chapter 16.120 – Subdivisions; Chapter 16.128 - Land Division Design Standards; Chapter 16.134 - Floodplain (FP) Overlay; Chapter 16.142 - Parks, Trees and Open Space; Chapter 16.144 - Wetland, Habitat and Natural Areas; Chapter 16.156 - Energy Conservation
- **Application materials:** https://www.sherwoodoregon.gov/planning/project/riverside-cedar-creek-subdivision

Thank you,

Eric Rutledge

City of Sherwood

Associate Planner

Exhibit B7

rutledgee@sherwoodoregon.gov

Desk 503.625.4242

Cell 971-979-2315

Covid-19 Update: The City's Planning Department is fully operational, however, with limited face to face contact. We are processing permits via email/phone where possible and by appointment when "in person" interaction is required. Please stay safe and healthy.

Wetland Land Use Notification

OREGON DEPARTMENT OF STATE LANDS
775 Summer Street NE, Suite 100, Salem, OR 97301-1279
Phone: (503) 986-5200

This form is to be completed by planning department staff for mapped wetlands and waterways.

Responsible Jurisdiction

*	**Municipality** *	**Date** *
(•) City of ( ) County of	Sherwood	7/20/2020

Staff Contact

First Name *	**Last Name** *
Eric	Rutledge
Phone *	**Email** *
503-625-4242	rutledgee@sherwoodoregon.gov

Applicant

First Name *	**Last Name** *
Eric	Rutledge

Mailing Address *

Street Address
22560 SW Pine St.
Address Line 2
Planning Department

City	State
Sherwood	OR
Postal / Zip Code	Country
97140	USA

Phone	**Email** (?)

Is the Property Owner name and address the same as the Applicant? *

( ) No (•) Yes

Activity Location

Township * (?)	**Range** * (?)	**Section** * (?)
03S	01W	06

Quarter-quarter Section (?)

Tax Lot(s) *

104

You can enter multiple tax lot numbers within this field. i.e. 100, 200, 300, etc.

To add additional tax map and lot information, please click the "add" button below.

Address

Street Address

17433 SW Brookman Rd

Address Line 2

City

Sherwood

State

OR

Postal / Zip Code

97140

Country

County *

Washington

Adjacent Waterbody

Proposed Activity

Local Case File # *

LU 2020-005 SUB

Zoning

MDRL

Proposed

- ☐ Building Permit (new structures)
- ☐ Grading Permit
- ☐ Site Plan Approval
- ☐ Other (please describe)
- ☐ Conditional use Permit
- ☐ Planned Unit Development
- ☑ Subdivision

Project *

The applicant is proposing a 28-lot single-family detached residential subdivision on a 10.37-acre site. The subject site is located in the City of Sherwood within the Brookman Road Concept Plan area and is zoned Medium Density Residential Low (MDRL). The proposed lot sizes range from 4,722 SF to 8,135 SF with an average lot size of 5,914 SF. The applicant is proposing to preserve approximately 203,158 SF (4.66 acres) of open space including the Cedar Creek vegetated corridor, wetlands, and floodplain. A new community trail will be constructed along the north side of the creek and provide a pedestrian connection to SW Brookman Road. Street improvements will include a through connection of SW Wapato Lake Drive (local street) and half street improvements SW Trillium Lane (local street) to complete the street system that aligns with the surrounding Middlebrook Subdivision which was approved in 2018.

Required attachments with site marked: Tax map and site plan(s). (?)

TaxMap Lot 106.jpg	694.52KB
17 - Riverside at Cedar Creek - Riverside at Cedar Creek Plan Set 061220.pdf	14.02MB

Additional Attachments

03 - Riverside at Cedar Creek - Signed Application Form.pdf	1.34MB
07 - Riverside at Cedar Creek - CWS SPL.pdf	739.68KB
08 - Riverside at Cedar Creek - Biologists Supplemental Memo.pdf	3.11MB
09 - Riverside at Cedar Creek - Biologists Site Assessment.pdf	7.13MB

Date

7/20/2020

Exhibit B8

P★R★I★D★E
DISPOSAL COMPANY
P.O. Box 820 Sherwood, OR 97140
Phone: (503) 625-6177 Fax: (503) 625-6179

July 13, 2020

Eric Rutledge
Associate Planner
City of Sherwood
22560 SW Pine St
Sherwood, OR 97140

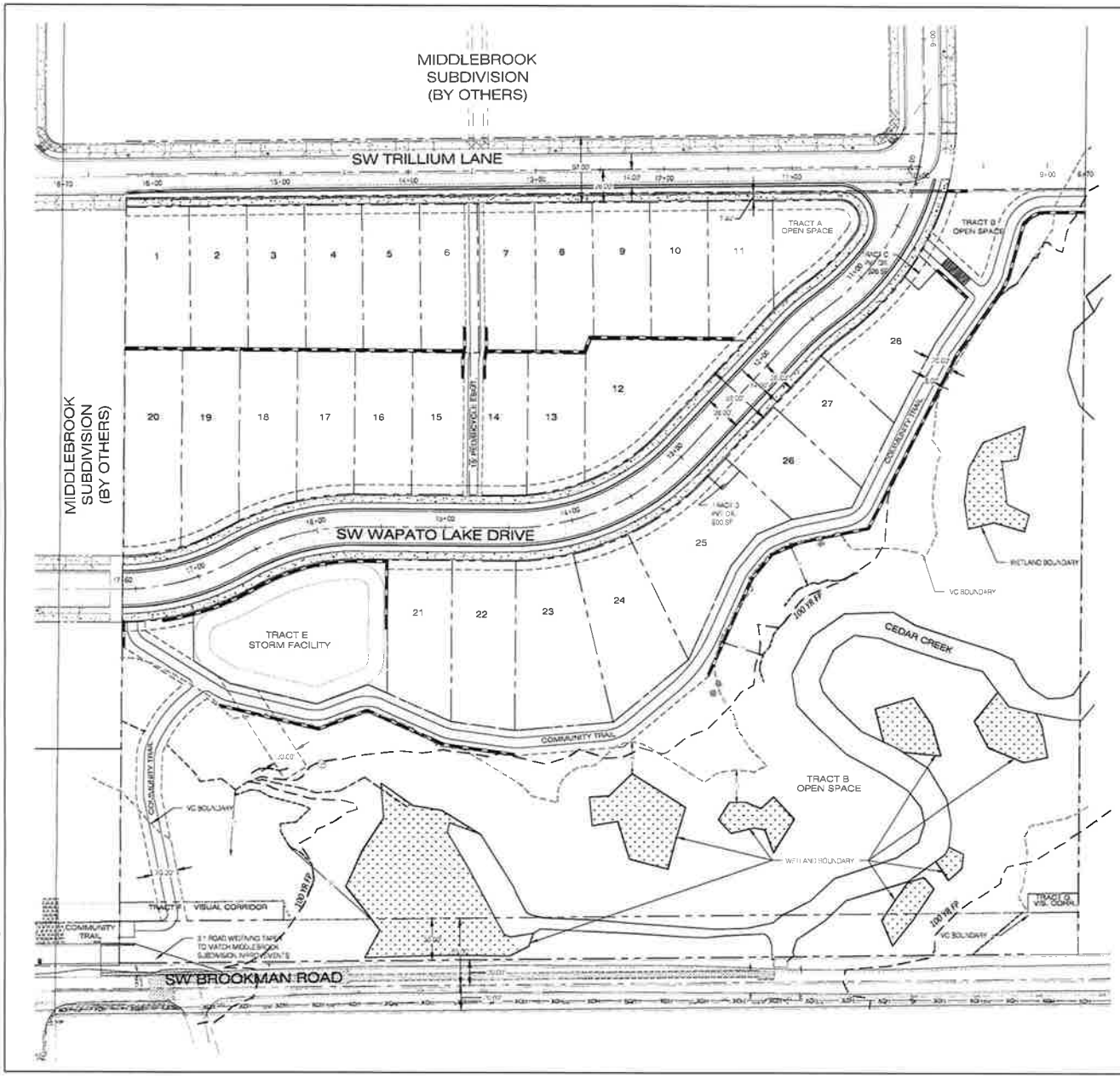
Re: 17433 SW Brookman Rd – 28 lot subdivision

We have reviewed the site plan for the above-mentioned partition. We will be able to service the lots as they've been laid out. Each resident will be responsible for placing their totes curbside in front of their homes on SW Trillium Lane and SW Wapato Lake Drive on collection day.

If you have any additional questions, feel free to contact me.

Sincerely,

Kristen Tabscott
Pride Disposal Company
ktabscott@pridedisposal.com
(503) 625-6177



LEGEND

- PROPOSED EASEMENT LINE
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- BOUNDARY LINE
- PROPOSED SIDEWALK
- PROPOSED PAVEMENT

SCALE
40 0 20 40
1 INCH = 40 FEET

SHERWOOD CASTYLE #

PIONEER DESIGN GROUP
ENGINEERING • PLANNING • SURVEYING
PORTLAND, OREGON | HONOLULU, HAWAII
PH 503.643.3286
WWW.PDX-GHI.COM

OVERALL STREET PLAN

RIVERSIDE AT CEDAR CREEK
CITY OF SHERWOOD, OREGON

Designed by MS Date 5/2020
Drawn by JS Date 5/2020
Reviewed by VS Date 5/2020
Project No. 13102-5
Horiz. Scale:
Vert. Scale:

No. Date Revision By

Project RIVERSIDE AT CEDAR CREEK
No. 13102-05
Type PLANNING
Sheet P7

Exhibit B8

B:\Projects\13102-05\Planning\13102_07sht.dwg 5/11/2020 12:32:32 PM

Exhibit B9

RE: Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

Jose Marquez <Jose.Marquez@pgn.com>

Mon 7/6/2020 3:34 PM

To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>

Good afternoon Eric:

We will need to bring 3 phases to the site development.

Currently there is only 1 phase service that runs along Brookman Rd.

There is a another development that will bring 3 phase to SW Oberst Rd & Brookman (MiddleBrook Subdivision). The developer for Cedar Creek will need to extend 3phase past SW Oberst a few spans going East.

Let me know if you have any questions.

Jose Marquez | Service & Design Project Manager
Portland General Electric
2213 SW 153rd Drive | Beaverton | OR | 97003
503-672-5452 | Jose.Marquez@pgn.com

From: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Sent: Monday, June 29, 2020 2:40 PM
To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: d5b@nwnatural.com; r2g@nwnatural.com; Hap English <Henry.English@pgn.com>; Travis Smallwood <Travis.Smallwood@pgn.com>; Jose Marquez <Jose.Marquez@pgn.com>; humphreysj@CleanWaterServices.org; spieringm@CleanWaterServices.org; Rolph, Kevin <Kevin_Rolph@kindermorgan.com>; Kristen Tabscott <kTabscott@pridedisposal.com>; raindrops2refuge@gmail.com; Larry_Klimek@fws.gov; mwerner@gwrr.com; Clark,James L (BPA) - TERR-CHEMAWA <jlclark@bpa.gov>; jerose@sherwood.k12.or.us; pjohanson@sherwood.k12.or.us; tumpj@trimet.org; baldwinb@trimet.org; DevelopmentReview@trimet.org; michaela.skiles@oregonmetro.gov; landusenotifications@oregonmetro.gov; kurt.A.MOHS@odot.state.or.us; HENDRICKSON Jill M <Jill.M.HENDRICKSON@odot.state.or.us>; ODOT_R1_DevRev <ODOT_R1_DevRev@odot.state.or.us>; Naomi Vogel <Naomi_Vogel@co.washington.or.us>; stephen_roberts@co.washington.or.us; Theresa Cherniak <Theresa_Cherniak@co.washington.or.us>; Tom Mooney <thomas.mooney@tvfr.com>; Bob Galati <GalatiB@SherwoodOregon.gov>; Brad Crawford <CrawfordB@SherwoodOregon.gov>; Richard Sattler <SattlerR@SherwoodOregon.gov>; Jason Waters <WatersJ@SherwoodOregon.gov>; Craig Christensen <ChristensenC@SherwoodOregon.gov>; Craig Sheldon <SheldonC@SherwoodOregon.gov>; Jo Guediri <GuediriJ@sherwoodoregon.gov>; Andrew Stirling <StirlingA@SherwoodOregon.gov>; Colleen Resch <ReschC@SherwoodOregon.gov>; Scott McKie <McKieS@SherwoodOregon.gov>; Jeff Groth <GrothJ@SherwoodOregon.gov>; Jon Carlson <CarlsonJ@SherwoodOregon.gov>; hoon.choe@USPS.gov; jevra.brown@state.or.us; dkampfer@wm.com
Subject: Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

Exhibit B9

Hi Partner Agencies:

The Sherwood Planning Department is requesting agency comments on the following proposal within the City of Sherwood:

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- **Application materials:** https://www.sherwoodoregon.gov/planning/project/riverside-cedar-creek-subdivision [sherwoodoregon.gov]

Thank you,

Eric Rutledge

City of Sherwood

Exhibit B9

Associate Planner

rutledgee@sherwoodoregon.gov

Desk 503.625.4242

Cell 971-979-2315

Covid-19 Update: The City's Planning Department is fully operational, however, with limited face to face contact. We are processing permits via email/phone where possible and by appointment when "in person" interaction is required. Please stay safe and healthy.

Exhibit B10

RE: Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

HENDRICKSON Jill M <Jill.M.HENDRICKSON@odot.state.or.us>

Mon 7/6/2020 9:43 AM

To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>

Good Morning Eric,

I didn't see any reference to any signs, with the exception of street signage. If there are any signs, with the exception of standard street and traffic control signs, that are on private property and will be visible to a state highway, they would need to meet all of the requirements of Oregon Revised Statute (ORS) Chapter 377. (ORS Chapter 377 can be accessed at: https://www.oregonlegislature.gov/bills_laws/ors/ors377.html)

If you have any questions or need any additional information, or if the applicant requires further information, please let me know.

Best,

Jill Hendrickson | Program Coordinator | Outdoor Advertising Sign Program | Right of Way Section
Oregon Dept of Transportation | 4040 Fairview Industrial Drive SE, MS-2 | Salem, OR 97302
Voice: 503.986.3635 | Alt: 503.986.3656 | Fax: 503.986.3625

From: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Sent: Monday, June 29, 2020 2:40 PM
To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: d5b@nwnatural.com; r2g@nwnatural.com; henry.english@pgn.com; Travis Smallwood <Travis.Smallwood@pgn.com>; Jose Marquez <Jose.Marquez@pgn.com>; humphreysj@CleanWaterServices.org; spieringm@CleanWaterServices.org; Rolph, Kevin <Kevin_Rolph@kindermorgan.com>; Kristen Tabscott <kTabscott@pridedisposal.com>; raindrops2refuge@gmail.com; Larry_Klimek@fws.gov; mwerner@gwrr.com; Clark,James L (BPA) - TERR-CHEMAWA <jlclark@bpa.gov>; jerose@sherwood.k12.or.us; pjohanson@sherwood.k12.or.us; tumpj@trimet.org; baldwinb@trimet.org; DevelopmentReview@trimet.org; michaela.skiles@oregonmetro.gov; landusenotifications@oregonmetro.gov; MOHS Kurt A <Kurt.A.MOHS@odot.state.or.us>; HENDRICKSON Jill M <Jill.M.HENDRICKSON@odot.state.or.us>; ODOT_R1_DevRev <ODOT_R1_DevRev@odot.state.or.us>; Naomi Vogel <Naomi_Vogel@co.washington.or.us>; stephen_roberts@co.washington.or.us; Theresa Cherniak <Theresa_Cherniak@co.washington.or.us>; Tom Mooney <thomas.mooney@tvfr.com>; Bob Galati <GalatiB@SherwoodOregon.gov>; Brad Crawford <CrawfordB@SherwoodOregon.gov>; Richard Sattler <SattlerR@SherwoodOregon.gov>; Jason Waters <WatersJ@SherwoodOregon.gov>; Craig Christensen <ChristensenC@SherwoodOregon.gov>; Craig Sheldon <SheldonC@SherwoodOregon.gov>; Jo Guediri <GuediriJ@sherwoodoregon.gov>; Andrew Stirling <StirlingA@SherwoodOregon.gov>; Colleen Resch <ReschC@SherwoodOregon.gov>; Scott McKie <McKieS@SherwoodOregon.gov>; Jeff Groth <GrothJ@SherwoodOregon.gov>; Jon Carlson <CarlsonJ@SherwoodOregon.gov>; hoon.choe@USPS.gov; BROWN Jevra <jevra.brown@state.or.us>; dkampfer@wm.com
Subject: Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

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Exhibit B10

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Thank you,

Eric Rutledge
City of Sherwood
Associate Planner
rutledgee@sherwoodoregon.gov
Desk 503.625.4242
Cell 971-979-2315

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Exhibit B10

Exhibit B11

Re: [EXTERNAL] Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

Klimek, Larry <larry_klimek@fws.gov>

Wed 7/1/2020 12:00 PM

To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: Mykut, Richard C <richard_mykut@fws.gov>; Kristofik, Eva <eva_kristofik@fws.gov>

Eric,

We are in the process of restoring the lower approximately 2 mile reach of Chicken Creek before it flows into the Tualatin River. This restoration will connect the Creek to its historic floodplain, provide unimpeded fish passage through the Refuge, improve water quality and significantly reduce sediment load into the River. The long-term protection of Chicken Creek and its primary tributary Cedar Creek above the Refuge is important and a goal we would like to pursue further with the City. I would like to propose a meeting with the City and any other interested partners to discuss options and/or strategies that could be implemented to protect this watershed. A holistic versus a case-by-case approach I think would be beneficial.

Let me know if you have any questions and if the City would be interested in this approach.

Thank-you,

Larry

Larry Klimek
Project Leader
Tualatin River NWR Complex
19255 SW Pacific Hwy
Sherwood, OR 97140
503-625-5944
503-816-1227 (Cell)

From: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Sent: Monday, June 29, 2020 2:39 PM
To: Eric Rutledge <RutledgeE@SherwoodOregon.gov>
Cc: d5b@nwnatural.com <d5b@nwnatural.com>; r2g@nwnatural.com <r2g@nwnatural.com>; henry.english@pgn.com <henry.english@pgn.com>; Travis Smallwood <Travis.Smallwood@pgn.com>; Jose Marquez <Jose.Marquez@pgn.com>; humphreysj@CleanWaterServices.org <humphreysj@CleanWaterServices.org>; spieringm@CleanWaterServices.org <spieringm@CleanWaterServices.org>; Rolph, Kevin <Kevin_Rolph@kindermorgan.com>; Kristen Tabscott <kTabscott@pridedisposal.com>; raindrops2refuge@gmail.com <raindrops2refuge@gmail.com>; Klimek, Larry <larry_klimek@fws.gov>; mwerner@gwrr.com <mwerner@gwrr.com>; Clark,James L (BPA) - TERR-CHEMAWA <jlclark@bpa.gov>; jerose@sherwood.k12.or.us <jerose@sherwood.k12.or.us>; pjohanson@sherwood.k12.or.us <pjohanson@sherwood.k12.or.us>; tumpj@trimet.org <tumpj@trimet.org>; baldwinb@trimet.org <baldwinb@trimet.org>; DevelopmentReview@trimet.org <DevelopmentReview@trimet.org>; michaela.skiles@oregonmetro.gov <michaela.skiles@oregonmetro.gov>; landusenotifications@oregonmetro.gov

Exhibit B11

<landusenotifications@oregonmetro.gov>; kurt.A.MOHS@odot.state.or.us <kurt.A.MOHS@odot.state.or.us>; HENDRICKSON Jill M <Jill.M.HENDRICKSON@odot.state.or.us>; ODOT_R1_DevRev <ODOT_R1_DevRev@odot.state.or.us>; Naomi Vogel <Naomi_Vogel@co.washington.or.us>; stephen_roberts@co.washington.or.us <stephen_roberts@co.washington.or.us>; Theresa Cherniak <Theresa_Cherniak@co.washington.or.us>; Tom Mooney <thomas.mooney@tvfr.com>; Bob Galati <GalatiB@SherwoodOregon.gov>; Brad Crawford <CrawfordB@SherwoodOregon.gov>; Richard Sattler <SattlerR@SherwoodOregon.gov>; Jason Waters <WatersJ@SherwoodOregon.gov>; Craig Christensen <ChristensenC@SherwoodOregon.gov>; Craig Sheldon <SheldonC@SherwoodOregon.gov>; Jo Guediri <GuediriJ@sherwoodoregon.gov>; Andrew Stirling <StirlingA@SherwoodOregon.gov>; Colleen Resch <ReschC@SherwoodOregon.gov>; Scott McKie <McKieS@SherwoodOregon.gov>; Jeff Groth <GrothJ@SherwoodOregon.gov>; Jon Carlson <CarlsonJ@SherwoodOregon.gov>; hoon.choe@USPS.gov <hoon.choe@USPS.gov>; jevra.brown@state.or.us <jevra.brown@state.or.us>; dkampfer@wm.com <dkampfer@wm.com>

Subject: [EXTERNAL] Notice of Land Use Application (LU 2020-005 SUBDIVISION) - Request for Comment

Hi Partner Agencies:

The Sherwood Planning Department is requesting agency comments on the following proposal within the City of Sherwood:

- **Comment Deadline:** Thursday, July 16, 2020 for consideration in the staff report. Virtual Hearing date is Thursday, July 30, 2020. Agencies impacted by the proposal are welcome to attend online, however, all testimony must be submitted in writing prior to the hearing.

- **Location:** 17433 SW Brookman Road – link to property on Portland Maps.

- **Proposal:** The applicant is proposing a 28-lot residential subdivision on a 10.47-acre site in the City of Sherwood. The subject site is located in the Brookman Road Concept Plan area and is zoned Medium Density Residential Low (MDRL). The proposed lot sizes range from 4,722 SF to 8,135 SF with an average lot size of 5,914 SF. Cedar Creek intersects the southeast corner of the site. The applicant is proposing to preserve approximately 203,158 SF (4.66 acres) of open space including the Cedar Creek vegetated corridor and associated floodplain / wetlands. Street improvements will include a through connection of SW Wapato Lake Drive (local street) to connect the site with the surrounding Middlebrook Subdivision and half street improvements to SW Brookman Road (County arterial) along the site frontage.

- **Applicable code criteria:** Sherwood Zoning & Community Development Code Chapter 16.12 - Residential Land Use Districts; Chapter 16.58 - Clear Vision and Fence Standards; Chapter 16.72 - Procedures for Processing Development Permits; Chapter 16.92 – Landscaping; Chapter 16.94 - Off-Street Parking and Loading; Chapter 16.96 - On-Site Circulation; Chapter 16.98 - On-Site Storage; Chapter 16.104 - General Provisions; Chapter 16.106 - Transportation Facilities; Chapter 16.108 - Improvement Plan Review; Chapter 16.110 - Sanitary Sewers; Chapter 16.112 - Water Supply; Chapter 16.114 - Storm Water; Chapter 16.116 - Fire Protection; Chapter 16.118 - Public and Private Utilities; Chapter 16.120 – Subdivisions; Chapter 16.128 - Land Division Design Standards; Chapter 16.134 - Floodplain (FP) Overlay; Chapter 16.142 - Parks, Trees and Open Space; Chapter 16.144 - Wetland, Habitat and Natural Areas; Chapter 16.156 - Energy Conservation

- **Application materials:** https://www.sherwoodoregon.gov/planning/project/riverside-cedar-creek-subdivision

Exhibit B11

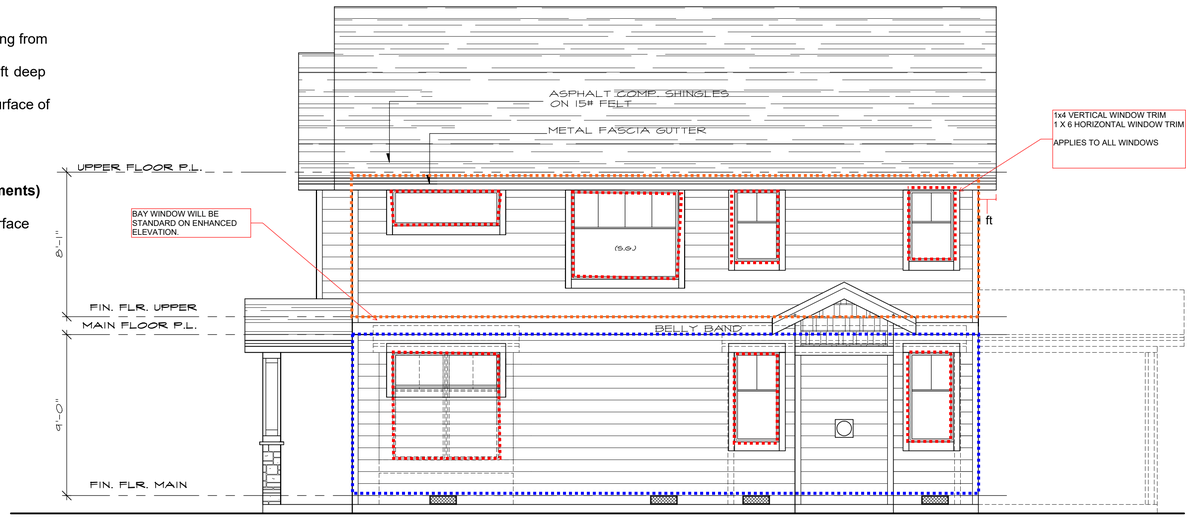
Thank you,

Eric Rutledge
City of Sherwood
Associate Planner
rutledgee@sherwoodoregon.gov
Desk 503.625.4242
Cell 971-979-2315

Covid-19 Update: The City's Planning Department is fully operational, however, with limited face to face contact. We are processing permits via email/phone where possible and by appointment when "in person" interaction is required. Please stay safe and healthy.

12.50.710.C.4 Articulation Non-Garage Façade (4 or more elements)
c. A bay window at least 6' wide, bumped out by at least 2'; and extending from the top of the foundation to the top of the main façade wall
e. A section of the façade 6 ft wide that is bumped out or recessed by 2 ft deep from the front wall plane
h. Roof line offset of at least 2 ft from top surface of 1 room to the top surface of the other
i. Other architectural features: additional roof line offset

12.50.710.C.5 Detailed Design Elements Non-Garage Façade (9 elements)
b. Roof eaves min. 12"
d. Roof line offset of min. 2 ft. from one roof surface to another roof surface
f. Decorative shingles in gable
h. Horizontal lap siding between 3 and 7" wide
j. Window trim min 3" wide and 5/8" thick
q. Other architectural feature: Window Grids
q. Other architectural feature: additional roof line offset
q. Other architectural feature: Full belly band to provide visual break
q. Other architectural feature: Shed roof over bay window



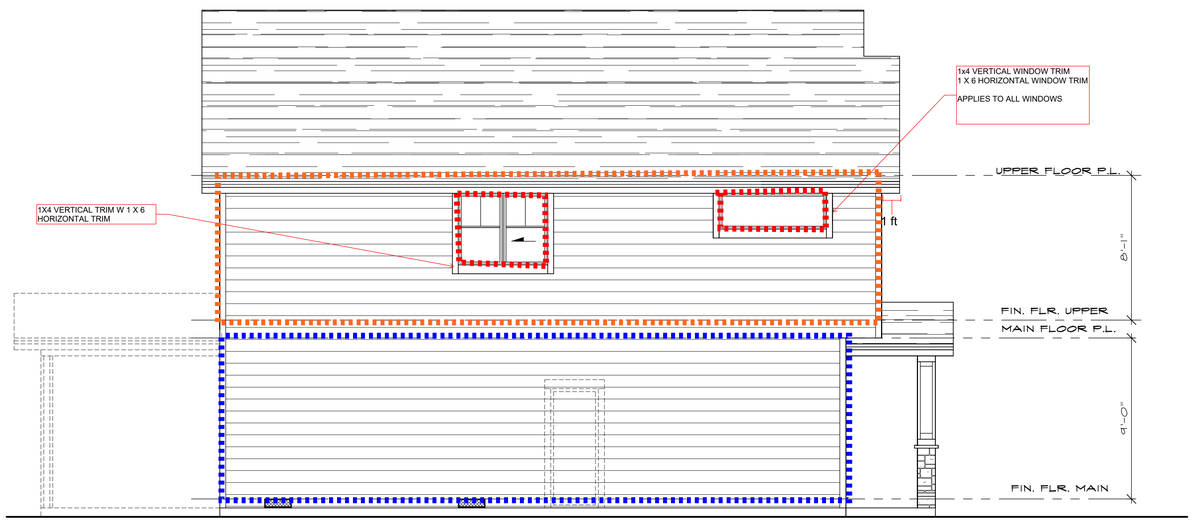
RIGHT ELEVATION "A"
SEE GENERAL NOTES SCALE: 1/4" = 1'-0"

ENHANCED ELEVATION - STREET OR OPEN SPACE FACING

GLAZING TABLE

2054	Front Elevation	Left Elevation	Right Elevation	Rear Elevation
Ground Floor Elevation (Sq. Ft.)	270	315	315	270
Glazing Ground Floor (Sq. Ft.)	63.875	0	66	115
% Ground Floor Windows	**24%**	**0%**	**21%**	**43%**
% Ground Floor Required	20%	20%	20%	20%
Total Elevation (Sq. Ft.)	510	603	595	510
Glazing Total (Sq. Ft.)	126.875	32	128	165
% Total Glazing	**25%**	**5%**	**22%**	**32%**
% Total Glazing Required	15%	15%	15%	15%

12.50.710.C.5 Detailed Design Elements Garage Façade (4 elements)
b. Roof eaves min. 12"
h. Horizontal lap siding between 3 and 7" wide
j. Window trim min 3" wide and 5/8" thick
q. Other architectural feature: Window Grids



LEFT ELEVATION "A"
SEE GENERAL NOTES SCALE: 1/4" = 1'-0"

STANDARD ELEVATION - NOT STREET OR OPEN SPACE FACING

NASH & ASSOCIATES
8003 119TH AVE NE • KIRKLAND, WA • 98033 •
425-828-4117
www.nash-architects.com

Riverside Homes

project:
PLAN 2054
ELEVATION A
ENHANCED RIGHT ELEVATION
STANDARD LEFT ELEVATION

date: 06-14-17
permit:
revisions:

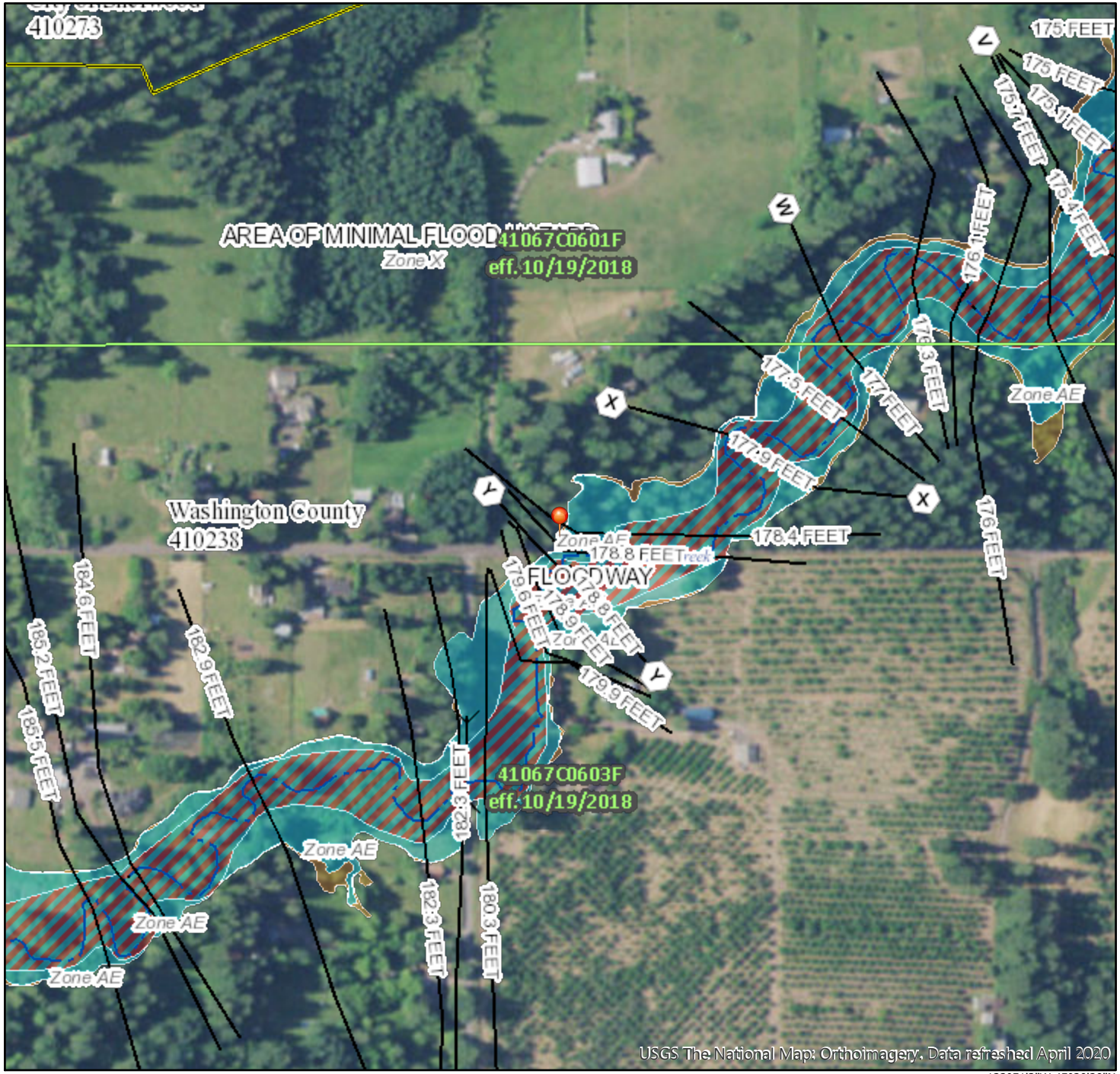
drawn by: MWJ
checked by:

SHEET A2
OF A10

National Flood Hazard Layer FIRMette

FEMA

122°51'40"W 45°20'46"N



122°51'3"W 45°20'20"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

Exhibit C2

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

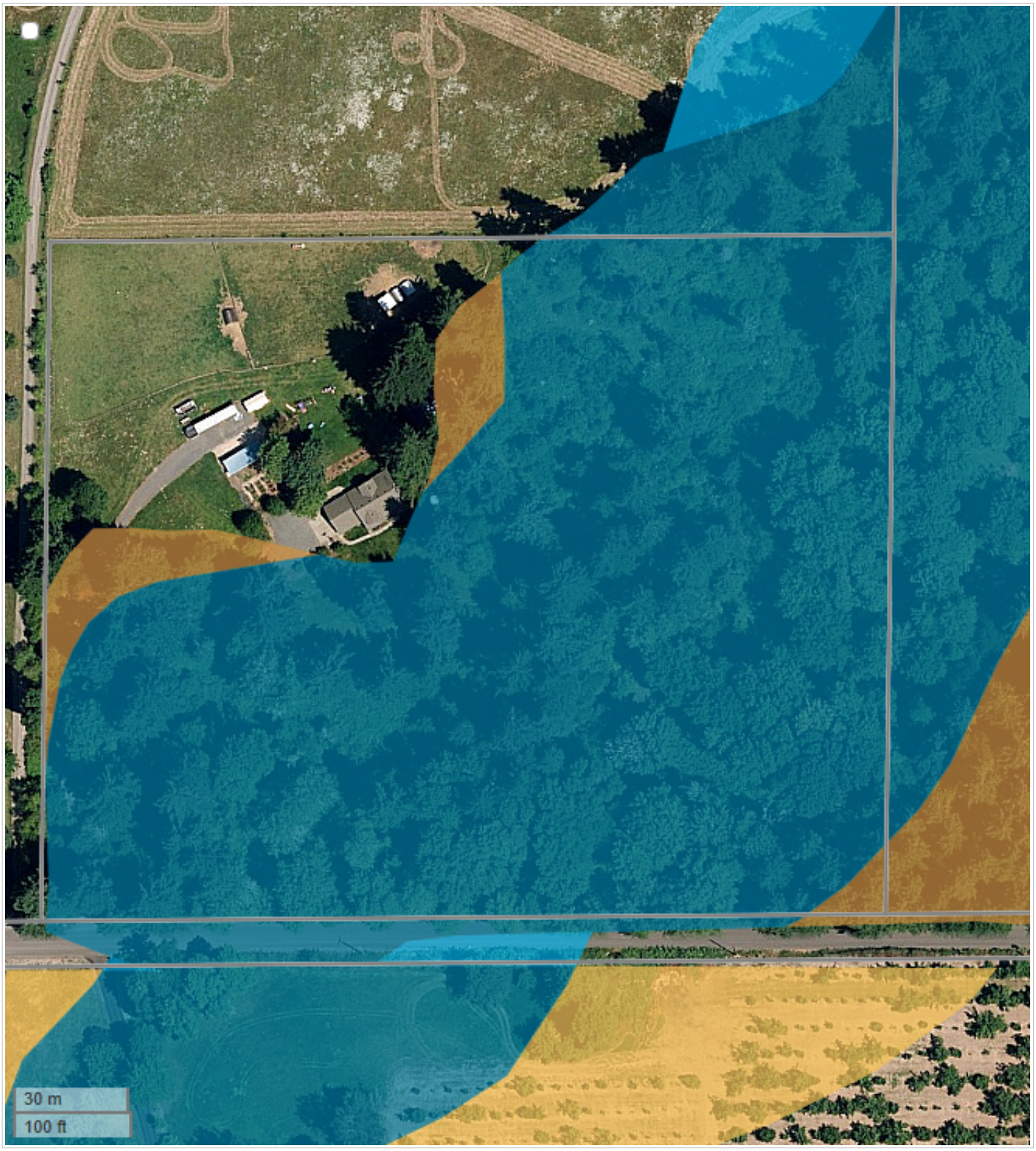
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/23/2020 at 4:41 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Metro

Data Resource Center
600 NE Grand Ave, Portland, OR 97232
503.797.1742 – drc@oregonmetro.gov

Exhibit C4

SW INKSTER DRIVE

TAX LOT 15400
TAX MAP 2S 1 31D

TAX LOT 15500

TAX LOT 15600

TAX LOT 15700
TAX MAP 2S 1 30D

SW COBBLE COURT

TAX LOT 10600
TAX MAP 2S 1 31DC

TAX LOT 10500

TAX LOT 10400

TAX LOT 10300

TAX LOT 10200

TAX LOT 10100

TAX LOT 10000

TAX LOT 9900

TAX LOT 9800

TAX LOT 9700

TAX LOT 9600

TAX LOT 9500

TAX LOT 9400

TAX LOT 9300

TAX LOT 9200

TAX LOT 9100

TAX LOT 9000

TAX LOT 8900
TAX MAP 2S 1 31DC

SW HARRISON STREET

TAX LOT 7000
TAX MAP 2S 1 31CD
OWNER: CITY OF SHERWOOD

15.00' PUBLIC PEDESTRIAN ACCESS EASEMENT

TRACT H
OPEN SPACE

15.00' PUBLIC STORM DRAINAGE EASEMENT TO CITY OF SHERWOOD

TAX LOT 100
TAX MAP 3S 1 06BB

TRACT D
NATURAL RESOURCE

PORTLAND AND WESTERN RAILROAD (PNWR)

15.00' PUBLIC PEDESTRIAN ACCESS EASEMENT (TYP)

SW OBERST COURT

CL–CL INTERSECTION
STA 24+86.90 SW OBERST COURT
= STA 6+12.34 SW WHITE OAK TERRACE

TRACT E
NATURAL RESOURCE

CL–CL INTERSECTION
STA 24+32.10 SW WAPATO LAKE DRIVE
= STA 7+03.94 SW ATFALATI LANE

END STREET IMPROVEMENTS
STA 8+31.50 SW ATFALATI LANE

BEGIN PEDESTRIAN PATH
MATCH PROPOSED SIDEWALK
STA 1+06.55 PATH 1

SW ATFALATI LANE

SW WAPATO LAKE DRIVE

CL–CL INTERSECTION
STA 27+28.90 SW OBERST COURT
= STA 11+78.92 SW CHESTNUT TERRACE

SW CHESTNUT TERRACE

SW WHITE OAK TERRACE

TAX LOT 100
TAX MAP 3S 1 06

END STREET IMPROVEMENTS
STA 9+30.00 SW KALAPUYA LANE

TYPE III BARRICADE (TYP)

CL–CL INTERSECTION
STA 8+19.45 SW KALAPUYA LANE
= STA 21+60.10 SW WAPATO LAKE DRIVE

RETAINING WALL

TRACT B
OPEN SPACE

CL–CL INTERSECTION
STA 18+74.92 SW OBERST ROAD
= STA 1+00.00 SW KALAPUYA LANE

CL–CL INTERSECTION
STA 3+89.25 SW KALAPUYA LANE
= STA 1+00.00 SW ATFALATI LANE

SW KALAPUYA LANE

END PEDESTRIAN PATH
MATCH PROPOSED SIDEWALK
STA 16+00.36 PATH 1

CENTER OF CUL–DE–SAC
STA 31+92.91 SW OBERST COURT

TRACT G
OPEN SPACE

15.00' PUBLIC PEDESTRIAN ACCESS EASEMENT

15.00' PUBLIC PEDESTRIAN ACCESS EASEMENT

SW TRILLIUM LANE

CL–CL INTERSECTION
STA 16+42.17 SW OBERST ROAD
= STA 6+97.85 SW TRILLIUM LANE

TAX LOT 1100
TAX MAP 3S 1 06BB

BEGIN PEDESTRIAN PATH
MATCH PROPOSED SIDEWALK
STA 1+00.00 PATH 2

CL–CL INTERSECTION
STA 1+00.00 SW TRILLIUM LANE
= STA 7+79.88 SW CHESTNUT TERRACE

TAX LOT 101
TAX MAP 3S 1 06

TRACT C
NATURAL RESOURCE

CL–CL INTERSECTION
STA 4+51.47 SW TRILLIUM LANE
= STA 1+00.00 SW WHITE OAK TERRACE

TAX LOT 104
TAX MAP 3S 1 06

RETAINING WALL

CL–CL INTERSECTION
STA 14+06.93 SW TRILLIUM LANE
= STA 18+81.27 SW WAPATO LAKE DRIVE

SW TRILLIUM LANE

SW OBERST ROAD

TAX LOT 2590
TAX MAP 3S 1 06BB

END PEDESTRIAN PATH
MATCH PROPOSED SIDEWALK
STA 9+29.91 PATH 2

GATE WITH KNOX LOCK

END TEMPORARY ACCESS ROAD
BEGIN STREET IMPROVEMENTS
STA 5+78.24 SW CHESTNUT TERRACE

CL–CL INTERSECTION
STA 13+17.53 SW OBERST ROAD
= STA 10+00.00 SW WAPATO LAKE DRIVE

TYPE III BARRICADE (TYP)

CONCEPTUAL FUTURE ROAD ALIGNMENT

BEGIN STREET IMPROVEMENTS
STA 7+39.46 SW WAPATO LAKE DRIVE

END STREET IMPROVEMENTS
STA 10+80.00 SW WAPATO LAKE DRIVE

CONCEPTUAL FUTURE ROAD ALIGNMENT

SW WAPATO LAKE DRIVE

TAX LOT 2502
TAX MAP 3S 1 06BB

TAX LOT 200
TAX MAP 3S 1 06B

TAX LOT 101
TAX MAP 3S 1 06B

20.00' TEMPORARY EMERGENCY ACCESS EASEMENT

TRACT A
STORMWATER FACILITY

TRACT F
OPEN SPACE

RETAINING WALL

GATE WITH KNOX LOCK

BEGIN STREET IMPROVEMENTS
STA 6+44.67 SW BROOKMAN ROAD

END STREET IMPROVEMENTS
STA 10+57.37 SW BROOKMAN ROAD

CL–CL INTERSECTION
STA 1+85.01 SW BROOKMAN ROAD
= STA 1+00.00 TEMPORARY ACCESS ROAD

SW BROOKMAN ROAD

RETAINING WALL

CL–CL INTERSECTION
BEGIN STREET IMPROVEMENTS
STA 10+00.00 SW OBERST ROAD
= STA 10+00.00 SW BROOKMAN ROAD

SW OBERST ROAD

N

SCALE: 1"= 80 FEET
80 0 32 48 64 80

LEGEND

- CONCRETE SIDEWALK BY CONTRACTOR
- CONCRETE SIDEWALK BY HOMEBUILDER
- NEW AC PAVEMENT
- SAWCUT

AKS DRAWING FILE: 3591 P08 STREET PLAN.DWG | LAYOUT: P14

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

MIDDLEBROOK SUBDIVISION

SHERWOOD OREGON
TAX LOT 103 AND 100 (ADJUSTED)
WASHINGTON COUNTY TAX MAP 3S 1 06/06B

PRELIMINARY STREET PLAN

DESIGNED BY:	ARS/PAS
DRAWN BY:	ARS/CTS
CHECKED BY:	AHH
SCALE:	AS NOTED
DATE: 12-18-2018	

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 09, 2001
PAUL A. SELLKE
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/20

REVISIONS

JOB NUMBER
3591

SHEET
P14