



DATE: 1-30-13
REQUEST: 35 lot preliminary plat application
ZONING: MDRL and MDRH, City of Sherwood
SIZE: 6.13 acres
PROPERTY OWNER: Columbia State Bank
DEVELOPER: DR Horton
CIVIL ENGINEER & SURVEYOR: Harper, Houf, Peterson, Righellis
LEGAL DESCRIPTION: Tax Lots 300 and 500, Tax Map 2S1-30CC

INTRODUCTION

This application is a request to develop a 35 lot subdivision with an average lot size of 5000 square feet and a minimum lot width of 50 feet. The main access is off Copper Terrace directly across from the elementary school access. DR Horton is the developer and builder. They plan to build houses on all of the lots rather than selling the lots. The subdivision is planned to accommodate future development of vacant property to the north and south and therefore, qualifies to be reviewed by the Sherwood Hearings Officer. No variances or adjustments to the code are requested with this application. A 65 lot subdivision was approved for this property in 2008 which also included Tax Lots 700, 400 and 600 to the south. These Tax lots are not included in this new subdivision application. The previous approved year 2008 subdivision plan is shown by Exhibit "D". The following are the list of exhibits included with this application.

LIST OF EXHIBITS

- A** - Preliminary Plat Plans, Sheets 1 to 8
- B** - Sherwood Zoning Map
- C** - Tax Maps
- D** - Previous approved Daybreak Subdivision Plat (City Case File SUB-07-02)
- E** - ALTA Survey
- F** - Washington County Arterial Street Standards
- G** - Sherwood Parks Master Plan (Potential Future Acquisition Map)
- H** - Pre-Application Meeting notes 11-13-12
- I** - Neighborhood Meeting Notes and Notice
- J** - Tualatin Valley Fire District Requirements
- K** - Wetland Delineation Report by Martin Schott
- L** - Clean Water Services (SPL) Service Provider Letter
- M** - Arborist Report by Gaston Porterie
- N** - Traffic Report by Kittleson and Associates
- O** - Drainage Report by Harper, Houf, Peterson, Righellis (HHPR)
- P** - Geotechnical soils Report by Northwest GEO Consultants

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.

D. Medium Density Residential High (MDRH)

The MDRH zoning district provides for a variety of medium density housing, including single-family, two-family housing, manufactured housing multi-family housing, and other related uses with a density of 5.5 to 11 dwelling units per acre. Minor land partitions shall be exempt from the minimum density requirement.

COMMENT: The subject property contains 2 different residential zones: MDRL and MDRH. The net area of the MDRL portion is 2.68 acres. The minimum density is 15 units at 5.6 units per acre and the maximum density is 21 units at 8 units per acre. The net area of the MDRH portion is 1.51 acres. The minimum density is 8 units at 5.5 units per acre and the maximum density is 16 units at 11 units per acre. The total combined minimum density is 23 units and the maximum combined density is 37 units. A total of 35 units are proposed which falls within these density limits. Density is defined in the Definitions section of the Sherwood code as the number of dwelling units per Net Buildable Acre. Net Buildable Acre is defined as 43,560 sf after excluding right-of-way, public use and environmentally constrained areas.

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

3. Where no setbacks are required, buildings may be constructed within the clear vision area.

COMMENT: This subdivision complies with all of the above vision clearance standards. The minimum lot width is 50 feet and the driveway will be 16 to 18 feet in width and located 6 to 7 feet from the property line leaving 26 feet of clearance on the street facing side yard. The house front yard setback is 20 feet and the street side yard is 15 feet. These setbacks will automatically protect the required vision clearance area.

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.

COMMENT: The code allows a 20 foot front yard setback and all buildings will be out of the required vision clearance area.

16.94.020 - Off-Street Parking Standards

- A. Single family homes - 1 parking space per dwelling.

COMMENT: All of the houses will have 2 car garages with 2 parking spaces in front of the garage which exceeds the requirement of one parking space per unit.

16.106.010 – Transportation Facilities

- 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 TSP Map and

in Figure 1, of Chapter 6 of the Community Development Plan, and other applicable City standards. The following table depicts the guidelines for the street characteristics.

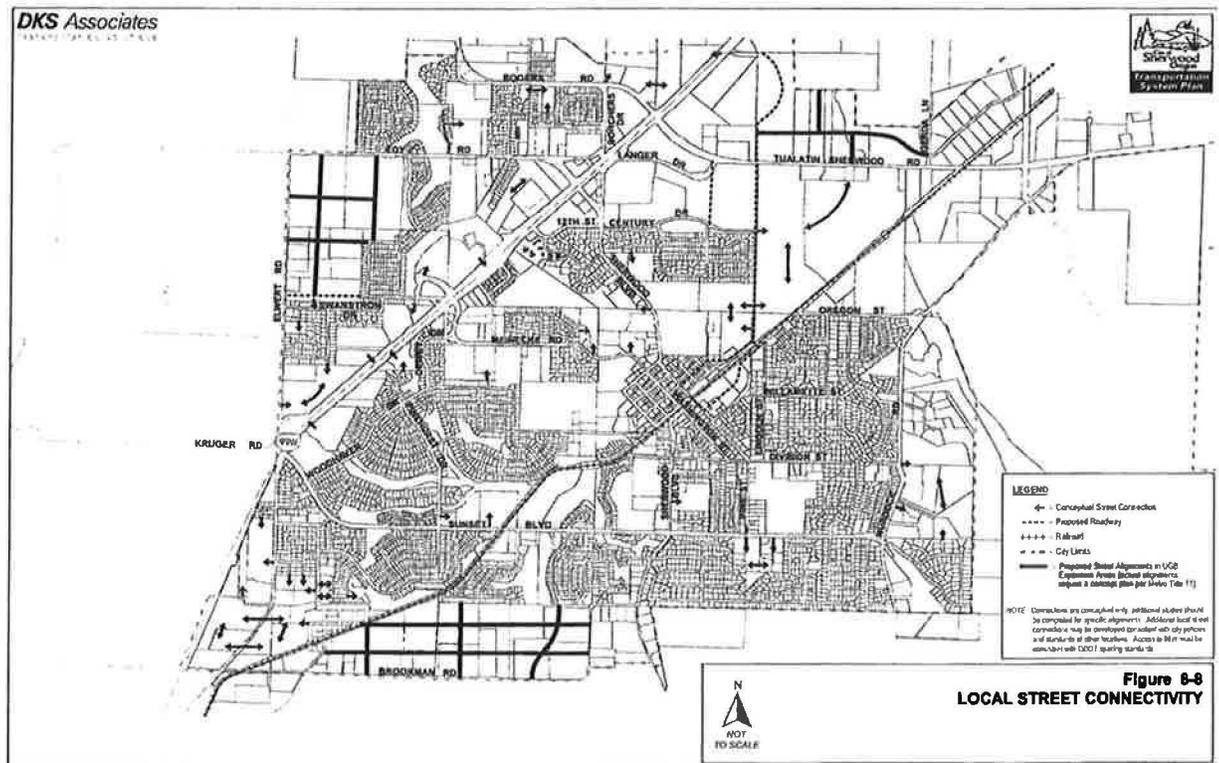
Type of Street	Right of Way Width	Number of Lanes	Minimum Lane Width	On Street Parking Width	Bike Lane Width	Sidewalk Width	Landscape Strip (exclusive of Curb)	Median Width
Principal Arterial (99W)	122'	4-6	12'	Prohibited	6'	6'	5'	14'
Arterial	60-102'	2-5	12'	Limited	6 feet	6-8'	5'	14' if required
Collector	58-92'	2-3	11'	8' optional	6'	6-8'	5'	14' median turn lane
40' Commercial/Industrial Not Exceeding 3000 vehicles per day	64'	2	20'	8'	none	6'	5'	none
50' Commercial/Industrial Exceeding 3000 vehicles per day	64'	2	12'	8'	5'	6'	5'	none
Neighborhood 1,000 vehicles per day	64'	2	18'	8'	None	8'	5' with 1' buffer	none
Local	52'	2	14'	8' on one side only	None	6'	5' with 1' buffer	none
Alley	16-25'	1-2	10-12'	One side if 20'	none	none	none	none
Downtown Street Standard	60'	2	11'	7'	none	12' pedestrian zone	4' (included in pedestrian zone)	none

16.106.030 - Location

- A. 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.

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 8-8).



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.
2. 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.
3. 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.
4. 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.
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.
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.

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

COMMENT: 17 of the 35 lots are oriented in a north/south direction to take advantage of solar heat and light. As many lots as possible are oriented in this direction in compliance with Chapter 16.156. Because of existing development in the area, property lines and other constraints, additional solar lots are not possible without losing lots or changing to a less efficient street pattern. All the lots and streets are laid out in compliance with Sherwood code requirements. This subdivision complies with the above Figure 8.8. Street stubs are provided to the north and south and to Copper Terrace directly across from the Edy Ridge Elementary school entrance. The Kittleson traffic report indicates access to Copper Terrace will operate at "D" level of service. Two other interceptions were also studied. The Edy Road and Copper Terrace intersection will operate with a "C" level of service and the Handley Street and Copper Terrace intersection will operate with an "A" level of service. The traffic engineer did not recommend mitigation improvements. When property to the south and north develop, addition connections to Copper Terrace will occur.

The block length along Copper Terrace will not exceed 530 feet in length. A master plan showing development of surrounding property is attached by Sheet 7 of the preliminary plat plans. The distance between the proposed "B" Street and Cereghino Lane entrances on Copper Terrace to about 590 feet. One additional access can be provided between these two

accesses when property to the south is developed if determined to be necessary by the City of Sherwood. Sheet 7 also shows potential development to the north with 2 accesses on Copper Terrace; one at Nursery Way and the other half way between proposed Street "B" and Nursery Way. The distance between Nursery Way and the proposed "B" Street is about 1040 feet.

Sidewalks along Copper Terrace will be 8 feet in width to provide adequate pedestrian access. A pedestrian and emergency access tract is provided between lots 20 and 21 along Elwert Road. This pedestrian access will be extended from the sidewalk on the east side of Elwert Road to a proposed pedestrian path in the 50 foot wetland buffer next to lot 18. In the future, this pathway will extend along the full length of the wetland buffer to Edy Road.

No additional setbacks are required in accordance with Subsection "D" above because full right-of-way dedication will occur with this subdivision application.

16.106.040 - Design

Standard cross sections showing street design and pavement dimensions are located in the City of Sherwood Transportation System Plan, and 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.

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.

C. Future Extension

Where necessary to access or permit future subdivision or development of adjoining land, streets shall extend to the boundary of the proposed development and provide the required roadway width.

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.

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

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 shall be provided and through and local traffic shall be separated and traffic conflicts minimized. In addition, visual corridors pursuant to Section 16.142.030, and all applicable access provisions of Chapter 16.96, shall 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.

K. Traffic Controls

1.

An application for a proposed residential development that will generate more than an estimated 200 average daily vehicle trips (ADT) 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.

M.

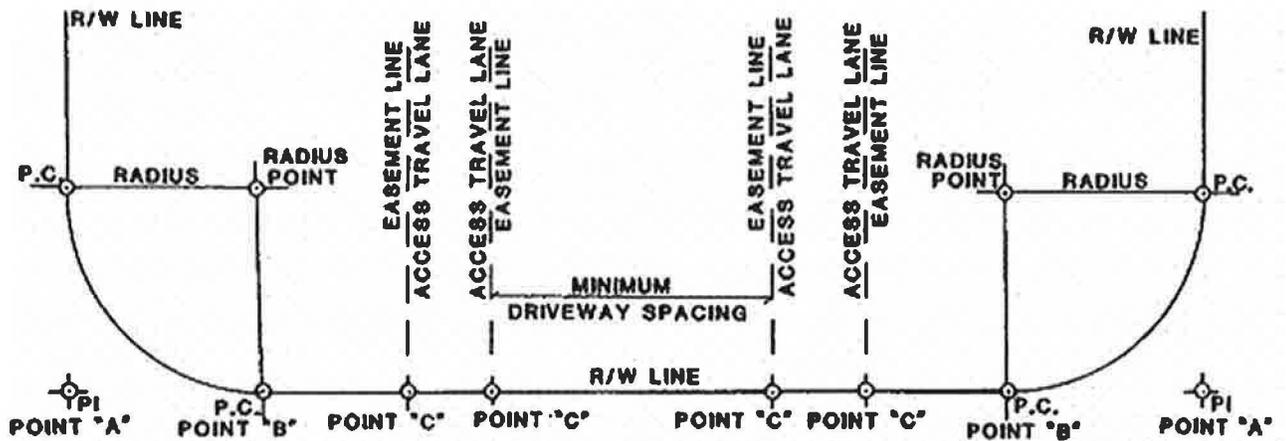
Vehicular Access Management

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.

COMMENT: No reserve strips are proposed. All of the streets are properly aligned. The centerline off-set for "A" Street north of the Copper Terrace access (Street "B") is 126 feet with a curb offset of 98 feet. The centerline off-set for Street "C" south of the Cooper Terrace access is 120 feet with a curb offset of 92 feet. This meets the 100 foot spacing requirement in the code. The Sherwood code does not indicate where the 100 foot spacing is measured. The centerline of the streets is generally used in most of the codes. No dangerous situation will be created and spacing conflicts were not identified by the traffic engineer. If the city believes the location of "B" Street is an unsafe situation in relation to Street "A" and "C", the Copper Terrace access could be moved to the south property line adjacent to Lot 1. This would provide a center line off-set of 160 feet from the street to the north and a curb offset of 132 feet. Lining up the Copper Terrace access directly across the two east/west Streets "A" and "C" in this subdivision would not be possible because it would conflict with the school entrance.

The street curb radius is 15 feet and all of the house driveways will comply with the above spacing standards. No lots front on Cooper Terrace, a Neighborhood Route. Therefore, the minimum 50 foot driveway spacing is not necessary.

Stub streets are provided to the north and south to accommodate future development of adjacent property as shown by the Sheet 7 of the preliminary plat plans. The traffic report

indicates no adverse traffic impact will occur from this development and no improvement or traffic mitigation measures are recommended.

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.

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.

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.

COMMENT: The city requires an 8 foot sidewalks along both Elwert Road and Cooper Terrace. However, Washington County only requires a 5 foot sidewalk along Elwert Road. All interior streets will have 5 foot sidewalks on both side of the road. Pedestrian access is less than 330 feet on both Elwert Road and Copper Terrace. When properties to the south and north develop, additional pedestrian access will be provided to these two streets.

16.110.010 - Required Improvements

Sanitary sewers shall be installed to serve all new developments and shall connect to existing sanitary sewer mains.

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.

16.114.010 - 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.

COMMENT: Sanitary sewer, storm drainage and water line facilities will be extended from Copper Terrace. The sanitary sewer line is 15" in diameter, the water line is 16" in diameter and the storm sewer line is 18" in diameter. The storm water outfalls into a large water quality facility located to the north which serves the Daybreak Subdivision and other property on both sides of Copper Terrace. As a result, a separate water quality facility is not required on the subject property.

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.

COMMENT: Adequate fire hydrants will be provided in accordance with fire department requirements.

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.

COMMENT: All dry utilities will be provided.

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.

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

- 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.

- 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.

F. Required Setbacks

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

G. Property Sales

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

COMMENT: This preliminary plat complies with ORS 92. No future resubdivision is anticipated. The smallest lot is 4500 square feet, which is 90% of the minimum lot size of 5,000 square feet. Lots are allowed to be reduced to 4500 square feet in area. The average lot size for the Daybreak Subdivision is 5,203 square feet.

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.

COMMENT: The subdivision is between 11 and 50 lots and can be reviewed by the Hearings Officer.

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 § 16.44.B.8 (Townhome- Standards) or §16.142.020 (Parks, Open Spaces and Trees-Single-Family Residential Subdivisions), if applicable.

COMMENT: Street and utility systems are designed to comply with city standards. The plat complies with all zoning ordinance requirements. The land is under one ownership. The master plan shows adjacent property can developed independently and proper access to those sites have been provided. A tree inventory has been submitted by a certified arborist with a

recommendation that all the trees on the site should be removed. The tree location map shows that most of the trees are located in proposed right-of-ways or within the building envelopes. Mitigation will occur for the trees removed. The lot numbers, setbacks, dedications and easements are shown on the preliminary plat. The net buildable area is about 185,080 square feet. The open space is required to be 5% of the net buildable which equals 9,254 square feet. The open space provided is slightly larger at 10,120 square feet in area.

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.

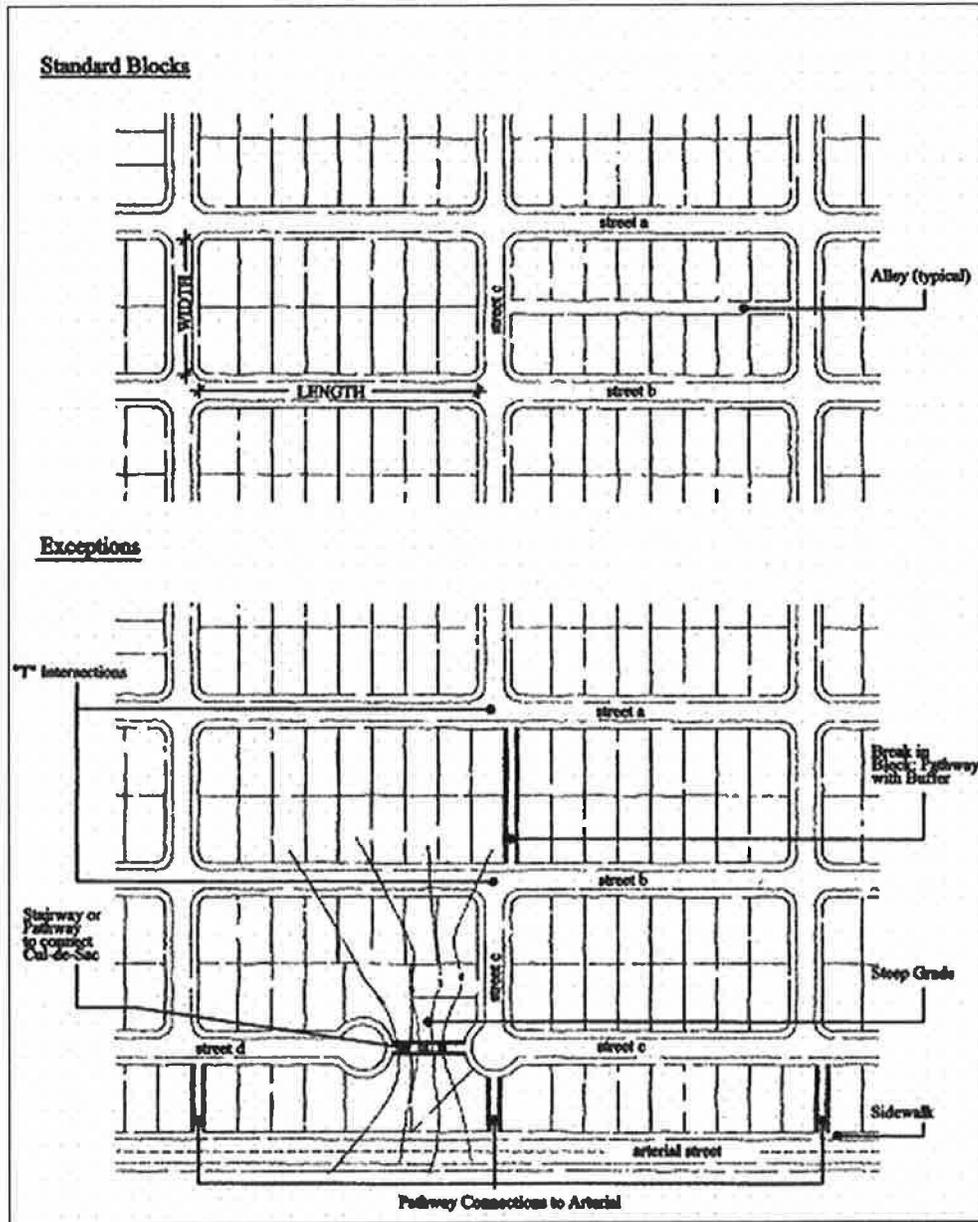
2. Block Length

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.

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



- 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.
- 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.

COMMENT: The block length along Copper Terrace will not exceed 530 feet in length. A master plan showing development of surrounding property is attached by Sheet 7 of the preliminary plat plans. The distance between the proposed “B” Street entrances on Copper Terrace to Cereghino Lane is about 590 feet. One additional access can be provided between these two accesses when property to the south develops if determined to be necessary by the City of Sherwood. Sheet 7 also shows potential development to the north with 2 accesses on Copper Terrace; one at Nursery Way and the other half way between proposed Street “B” and Nursery Way. The distance between Nursery Way and the proposed “B” Street is about 1040 feet. The interior perimeter block length in the Daybreak subdivision is 1,080 feet.

A 20 foot wide access easement crosses the south portion of Lots 1 and 35. This easement is intended to be vacated before the final plat is recorded. Both of the lots are wider to properly accommodate houses in the event these easements cannot be vacated. A 15 foot sanitary sewer easement is proposed along the north side of Lot 9. The drainage channel buffer is contained in Tract “B”. The emergency and pedestrian access is contained in Tract “C” with the property turning radius for fire trucks. All pedestrian access will be paved with concrete or asphalt.

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.

COMMENT: No odd shaped blocks or cul-de-sacs are proposed with the Daybreak subdivision. However, a cul-de-sac will probably be developed to the north as shown on Sheet 7 of the subdivision plans. The location of the drainage way and wetland buffer prevents proper street access to the north which necessitates a short cul-de-sac. The cul-de-sac will be connected to the future wetland buffer pathway and the Elwert Road sidewalk to provide bicycle and pedestrian access to the Daybreak subdivision.

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.

B. Access

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

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.

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.

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.

COMMENT: The lots are designed to follow the contours of the land. Development of the lots will not create excessive grading. Cuts and fills will not exceed the requirements of Section 16.128.030.E. This property is relatively flat and suitable for 5,000 sq. ft. lots. All lots have 25 feet of frontage on a public street. Lots 1 to 9 are double frontage lots because of the 50 foot spacing requirement between driveways on Copper Terrace, a Neighborhood Route. This spacing would require 70 foot wide lots. Because of anticipated traffic from the schools, DR Horton believes it is better for the future home owners of Lots 1 to 9 to back up to rather than front on Cooper Terrace. This will eliminate cars backing up into school traffic. This will be a better situation for both the owners of Lots 1 to 9 and the patrons of the schools. The Copper Terrace street section on sheet 4 of the plans shows an 8 foot sidewalk and a 5 foot planter for street trees. The spacing of these trees can be closer to provide a buffer as identified in Section 16.128.030.C above. A screening fence will be provided along the full length of the Copper Terrace frontage to separate the street from the rear yards of the lots.

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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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*.

COMMENT: A minimum of 5% of the net developable area is designated Open Space (Tract "A"). The total net developable area in lots is 182,108 sq. ft. and Tract "A" is 10,037 sq. ft. for a total of 192,145 sq. ft. 5% of this area is 9,607 sq. ft. Tract "A" will be developed as a park. The development master plan on Sheet 7 of the preliminary plans shows additional land can be added to Tract "A" to make it larger and more functional park when Street "C" is extended in the future. DR Horton is exploring options of paying a fee for a public park to the north in lieu of developing Tract "A" as a park. If this alternative is successful, then Tract "A" will be reserved for 3 additional subdivision lots when property to the south develops.

Since the city requires 50 foot wide lots and an average lot size of 5000 sf, no opportunity to capture the 5% loss of density is available unless a Planned Development is proposed. The square footage of Tract "A" was excluded from the density calculation on Sheet 3 of the

preliminary plans. If Tact "A" is included in the density calculation, the minimum density would increase from 23 to 24 units and the maximum density would increase from 37 to 39 units.

The subject property does not contain land designated as a "park" on the Potential Future Acquisition Map of the Parks Master Plan. However, property to the north and property around the 2 school sites are identified on the Parks Master Plan for future acquisition. A copy of the Parks Master Plan is included in this application.

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.

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).

COMMENT: The landscaped visual corridor along Elwert Road will include a 4 foot planter and a 10.5 foot landscape area between the sidewalk and the property lines of Lots 18 to 22. A screening fence will be constructed along the street r-of-w. Street trees will be planted along with other landscaping which will be determined at a later date. The plant material will be drought resistant in accordance with Section 16.142.060. The minimum visual corridor is 15 feet. In this case, the landscaped visual corridor is 19.5 feet if the 5 foot sidewalk is included which exceeds the 15 foot requirement. All of the visual corridor is in public right-of-way.

The original Washington County street standard for Elwert Road was A-8. This standard has been replaced by County standard A-4. A copy of this standard is included in this report.

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.

COMMENT: The Tract "B" can be dedicated to the city if requested by the city.

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.

COMMENT: Street trees will be provided in accordance with the above standards.

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.

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.

D. Retention requirements

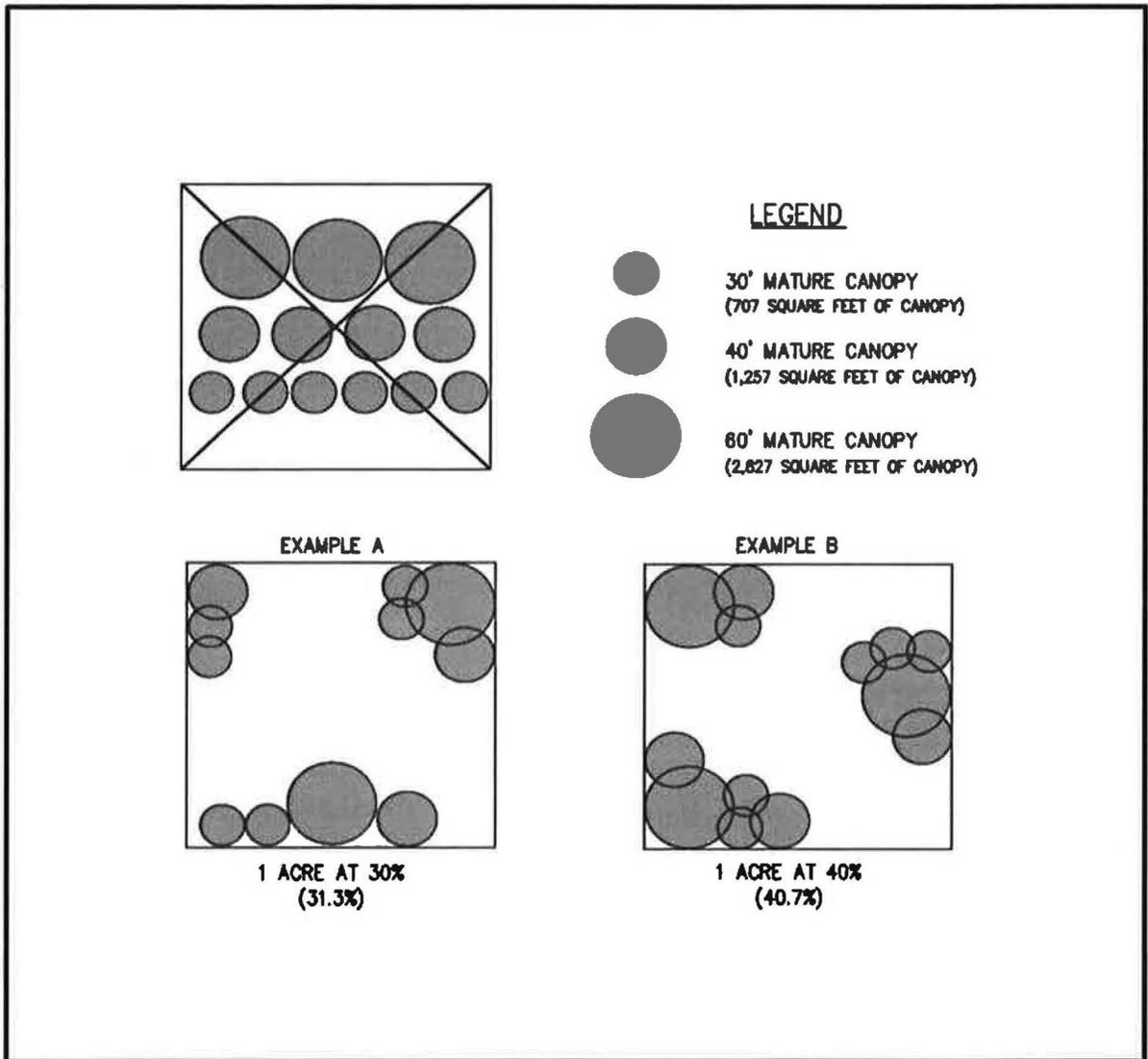
- 1. Trees may be considered for removal to accommodate the development including buildings, parking, walkways, grading etc., provided the development satisfies of D.2 or D.3, below.

- 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)	Old Town & Infill developments	Commercial, Industrial, Institutional Public and Multi-family
Canopy Requirement	40%	N/A	30%
Counted Toward the Canopy Requirement			
Street trees included in canopy requirement	Yes	N/A	No
Landscaping requirements included in canopy requirement	N/A	N/A	Yes
Existing trees onsite	Yes x2	N/A	Yes x2
Planting new trees onsite	Yes	N/A	Yes
<p>Mature Canopy in Square Feet Equation πr^2 or $(3.14159 * \text{radius}^2)$ (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.</p>			
<p>Canopy Calculation Example: Pin Oak Mature canopy = 35' $(3.14159 * 17.5^2) = 962$ square feet</p>			



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.
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.
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.
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.

COMMENT: The required 40% tree canopy requirement will be provided by future trees in the park, in lot front yard parkways of the lots and along Copper Terrace and Elwert Road. None of the existing trees on the site can be saved as identified in the first paragraph on page 2 of the attached arborist report prepared by Gaston Porterie. The existing trees fall in the “D” Street

right-of-way and in the building envelopes of the lots. Most of the trees are located at the southeast corner of the site.

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.

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.

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.

COMMENT: Martin Schott, wetland consultant, prepared the attached wetland report which indicates that no wetlands exist on the site. This determination is located on pages 2 and 3 of the attached wetland report. One perennial drainage swale enters the site at the northwest corner from a culvert under Elwert Road and flows in a northeast direction. This stream channel is an unnamed tributary of Chicken Creek. A previous wetland was identified in 2007 at the northeast corner of the site around Lots 7 to 9, but this wetland is no longer exists.

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.

- 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.

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.

COMMENT: As many lots as possible are oriented in a north south direction without losing lots or making the street pattern non-functional. No variances are requested to provide proper functioning of solar systems.



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 _____)
- Variance(list standard(s) to be varied in description)
- Site Plan (Sq. footage of building and parking area)
- Planned Unit Development
- Conditional Use
- Partition (# of lots _____)
- Subdivision (# of lots 35)
- 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 Departments/Planning/Fee Schedule.

Owner/Applicant Information:

Applicant: D.R. Horton, Inc.-Portland (Ryan O'Brien) Phone: 503-222-4151 ext 1115
 Applicant Address: 4380 SW Macadam Ave, Ste 100 Portland, OR 97239 Email: RMO'Brien@drhorton.com
 Owner: Columbia State Bank Phone: 360-823-4530
 Owner Address: 17800 SE Mill Plain Boulevard, Ste 100 Vancouver, WA 98683 Email: _____
 Contact for Additional Information: _____

Property Information:

Street Location: 21730 SW Elwert Rd and 21500 SW Elwert Rd Sherwood, OR 97140
 Tax Lot and Map No: 2S1-30CC Tax Lots 300 and 500
 Existing Structures/Use: 1 Single Family Residential House
 Existing Plan/Zone Designation: MDRL & MDRH
 Size of Property(ies) 6.38 Acres

Proposed Action:

Purpose and Description of Proposed Action: 35 lot subdivision with an average lot size of 5,000 sq. ft. and a minimum lot width of 50 ft.

Proposed Use: Single family detached houses

Proposed No. of Phases (one year each): one

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.

Ryan O'Brien (DR. HAZARD) 1-30-13
Applicant's Signature Date
[Signature] Vice President 1/30/13
Owner's Signature Date
AL JACK

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.

- 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 * sets 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)
- Signed checklist verifying submittal includes specific materials necessary for the application process

* 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.

LIST OF EXHIBITS

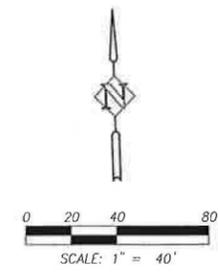
- A** - Preliminary Plat Plans, Sheets 1 to 8 & Overall Concept Plan to the North and South
- B** - Sherwood Zoning Map
- C** - Minimum and Maximum Density Calculations and Tax Maps
- D** - Previous approved Daybreak Subdivision Plat (City Case File SUB-07-02)
- E** - Title Report
- F** - Washington County Arterial Street Standards
- G** - Sherwood Parks Master Plan (Potential Future Acquisition Map)
- H** - Pre-Application Meeting notes 11-13-12
- I** - Neighborhood Meeting Notes and Notice
- J** - Tualatin Valley Fire District Requirements
- K** - Wetland Delineation Report by Martin Schott
- L** - Clean Water Services (SPL) Service Provider Letter and Sensitive Lands Report
- M** - Arborist Report by Gaston Porterie
- N** - Traffic Report by Kittleson and Associates
- O** - Drainage Report by Harper, Houf, Peterson, Righellis (HHPR)
- P** - Geotechnical soils Report by Northwest GEO Consultants
- Q** - Request to CWS to Pay a Fee in Lieu for the Elwert Road Half Street Improvement

EXISTING CONDITIONS AND DEMOLITION PLAN
DAYBREAK SUBDIVISION
 SHERWOOD, OREGON

Harper Houf Peterson Righellis Inc.
 ENGINEERS, PLANNERS, LANDSCAPE ARCHITECTS & SURVEYORS
 205 SE Spokane Street, Suite 200, Portland, OR 97202
 phone: 503.221.1131 www.hhrp.com fax: 503.221.1171

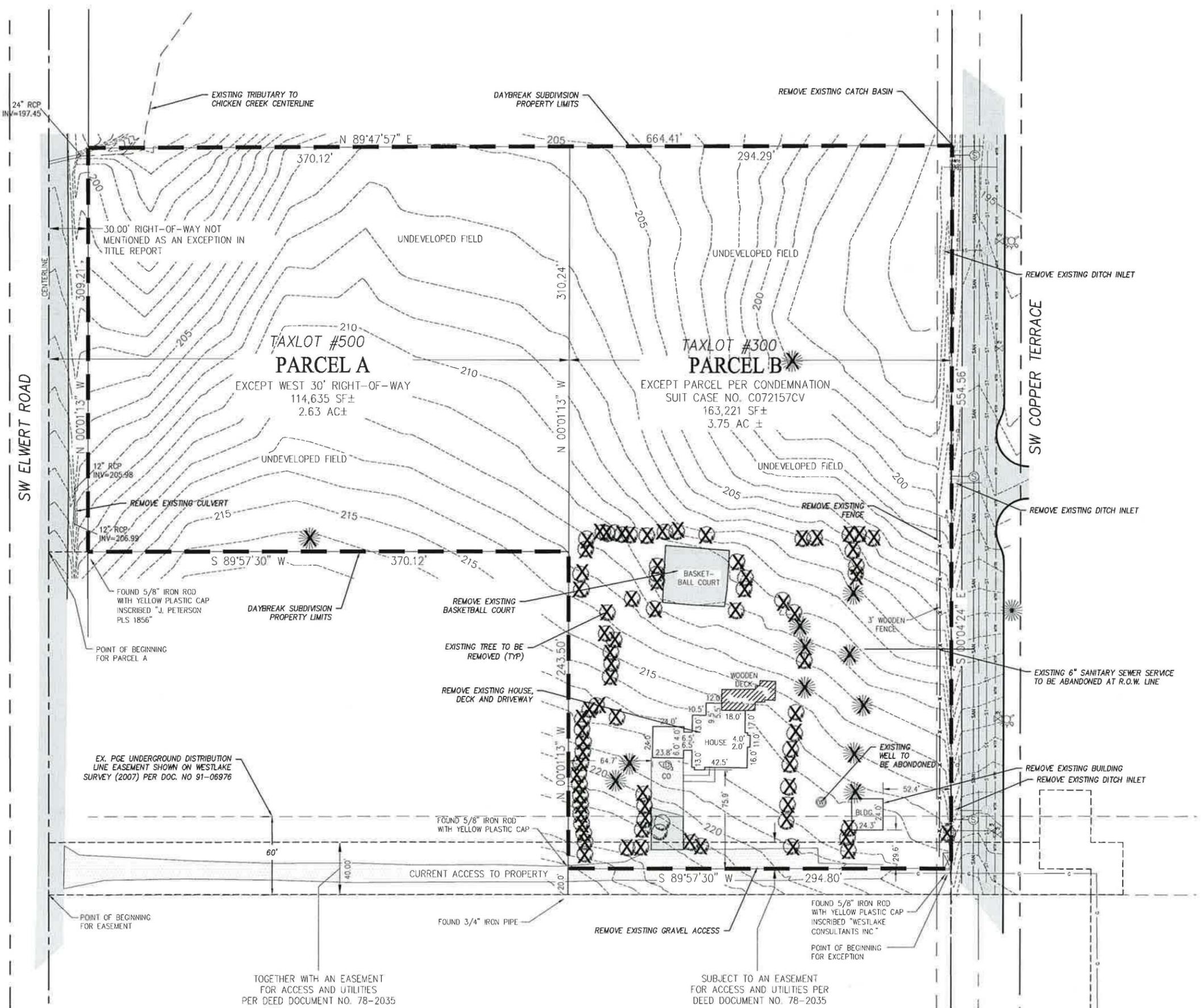
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JOB NO. DRH-64		



LEGEND

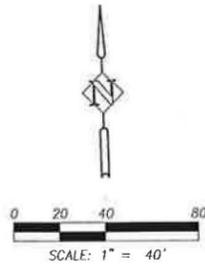
- FOUND 5/8" IRON ROD WITH YELLOW PLASTIC CAP INSCRIBED "WESTLAKE CONSULTANTS, INC." EXCEPT AS NOTED
- SET WOODEN STAKE AT APPROX. PROP. COR.
- DECIDUOUS TREE
- CONIFEROUS TREE
- BRUSH
- ASPHALT PAVED AREA
- GRAVEL AREA
- SIGN
- FENCE
- GAS LINE
- ELECTRICAL UTILITY VAULT
- ELECTRICAL POWER LINE
- TELEPHONE PEDESTAL
- TELEPHONE LINE
- SANITARY SEWER MANHOLE
- SANITARY SEWER LINE
- CLEANOUT
- FIELD STORM DRAIN
- STORM DRAIN MANHOLE
- STORM DRAIN LINE
- 12" RCP INV=205.98
STORM DRAIN CULVERT NOTE
RCP=REINFORCED CONCRETE PIPE
INV=INVERT
- WATER VALVE
- FIRE HYDRANT
- WATER LINE
- WATER WELL
- REMOVE EXISTING TREE



EXISTING CONDITIONS PLAN BASED ON SURVEY BY CMT SURVEYING AND CONSULTING DATED 12/26/2012

LANDUSE SUBMITTAL

P:\DRH\DRH-64\DRH-64-DIV\SS\DRH-64-2-EX COND.dwg



SITE INFORMATION

SITE AREAS:

PROPOSED PUBLIC R.O.W. = 71,026 SF (1.63 AC)
 AREA IN LOTS = 180,500 SF (4.14 AC)
 LOT 31 "PARK" = 10,316 SF (0.24 AC)
 TRACT "A" EMERGENCY ACCESS/PUBLIC UTILITY EASEMENT = 1,896 SF (0.04 AC)
 TRACT "B" VEGETATED CORRIDOR = 3,319 SF (0.08 AC)
 AVERAGE LOT SIZE = 180,500 / 35 LOTS = 5,157 SF
 TOTAL SITE AREA = 267,057 SF (6.13 AC)

BUILDING SETBACKS:

FRONT YARD = 20'
 SIDE YARD = 5'
 CORNER LOT SIDE YARD = 15'
 REAR YARD = 20'

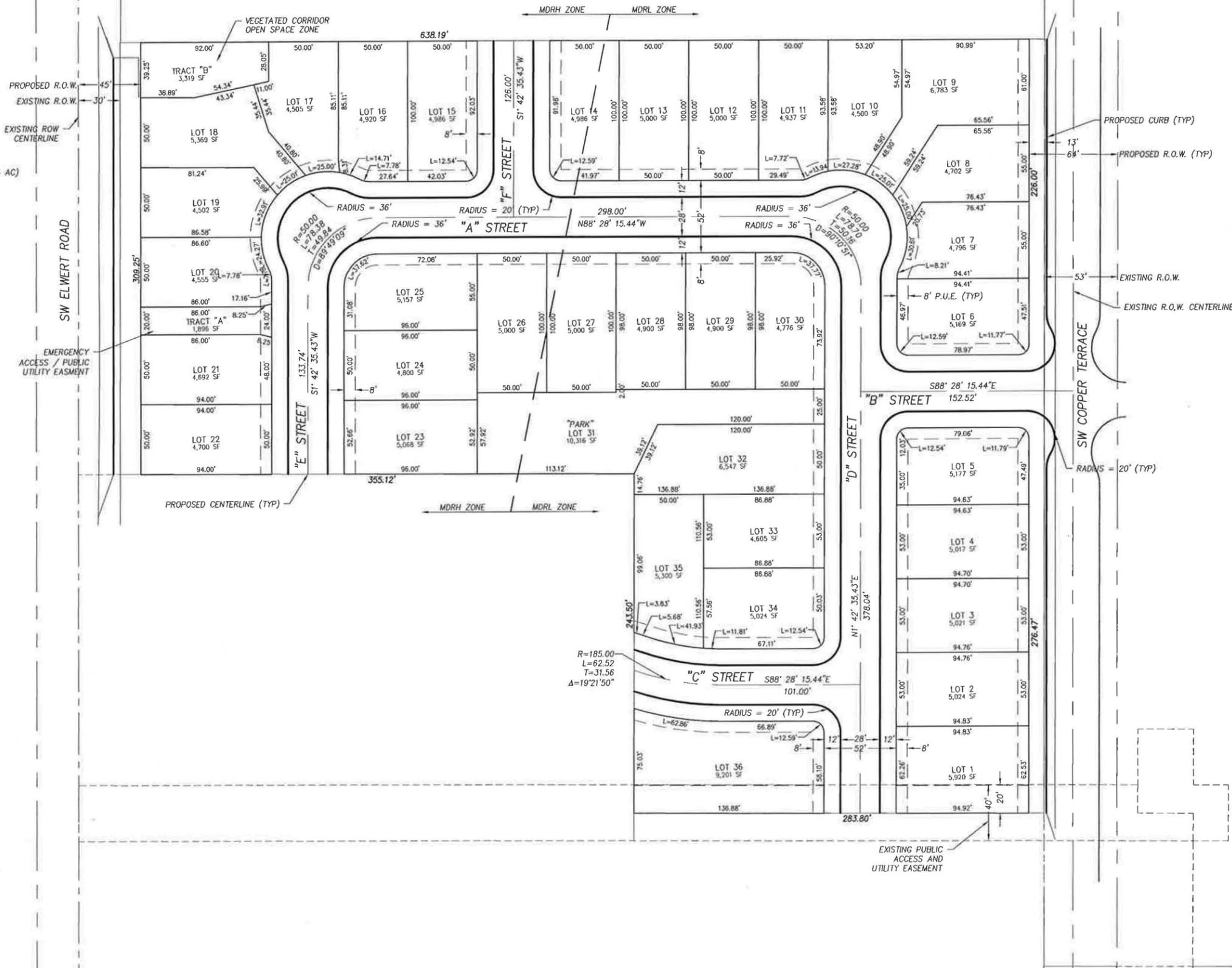
MDRL ZONING - 119,250 SF (2.74 ACRES):

MINIMUM DENSITY = 5.6 UNIT/AC = 15 UNITS
 MAXIMUM DENSITY = 8 UNIT/AC = 22 UNITS

MDRH ZONING - 61,250 SF (1.41 ACRES):

MINIMUM DENSITY = 5.5 UNIT/AC = 8 UNITS
 MAXIMUM DENSITY = 11 UNIT/AC = 15 UNITS

COMBINED MINIMUM DENSITY = 23 UNITS
 COMBINED MAXIMUM DENSITY = 37 UNITS



PRELIMINARY SUBDIVISION PLAT
DAYBREAK SUBDIVISION
 SHERWOOD, OREGON

Harper Houf Peterson Righellis Inc.
 ENGINEERS • PLANNERS
 LANDSCAPE ARCHITECTS • SURVEYORS
 205 SE Spokane Street, Suite 200, Portland, OR 97202
 phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

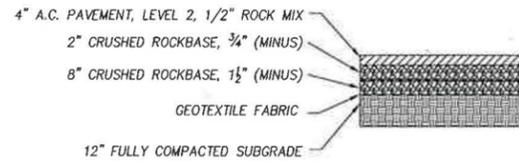
DESIGNED	HHPR
DRAWN	BUB
CHECKED	KAS
DATE	MARCH 2013

DATE	NO	DESCRIPTION

SHEET NO. **3**
 JOB NO. DRH-64

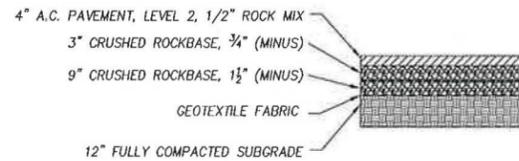
LANDUSE SUBMITTAL

P:\DRH\DRH-64 (Daybreak)\DRH64-DWG\SS\SSHEET(S).DRH64-3-PLAT.dwg



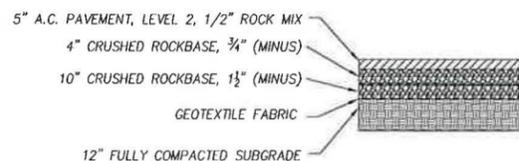
DAYBREAK SUBDIVISION PAVEMENT SECTION

N.T.S.



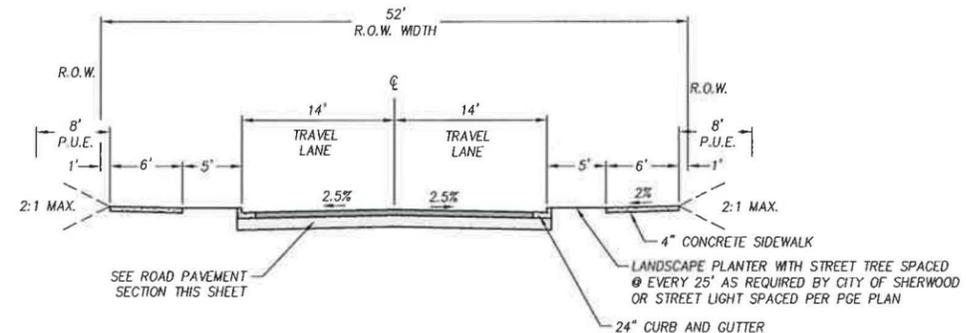
COPPER TERRACE PAVEMENT SECTION

N.T.S.



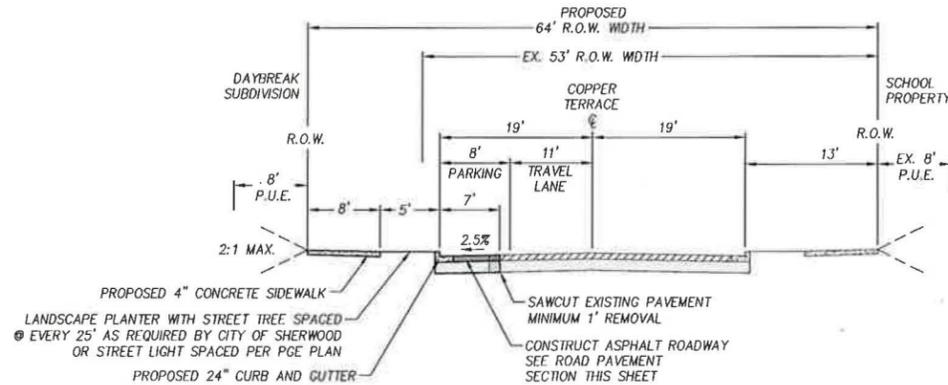
ELWERT ROAD PAVEMENT SECTION

N.T.S.



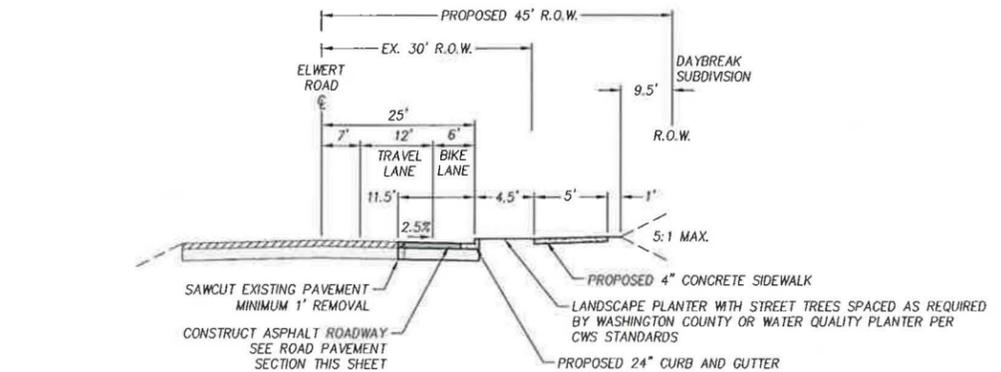
"A","B","C","D","E","F" STREET (DAYBREAK SUBDIVISION) TYPICAL SECTION

CITY OF SHERWOOD 28' STANDARD RESIDENTIAL N.T.S.



COPPER TERRACE HALF-STREET TYPICAL SECTION

CITY OF SHERWOOD 38' NEIGHBORHOOD ROUTE LOOKING NORTH N.T.S.



ELWERT ROAD HALF-STREET TYPICAL SECTION

WASHINGTON COUNTY ARTERIAL ROAD LOOKING NORTH N.T.S.

TYPICAL STREET SECTIONS
DAYBREAK SUBDIVISION
SHERWOOD, OREGON



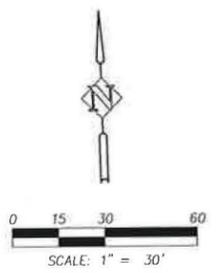
ENGINEERS • PLANNERS
LANDSCAPE ARCHITECTS • SURVEYORS
205 SE Spokane Street, Suite 200, Portland, OR 97202
phone: 503.221.1131 www.hhpr.com

DESIGNED:	HHPR
DRAWN:	BJB
CHECKED:	KAS
DATE:	MARCH 2013

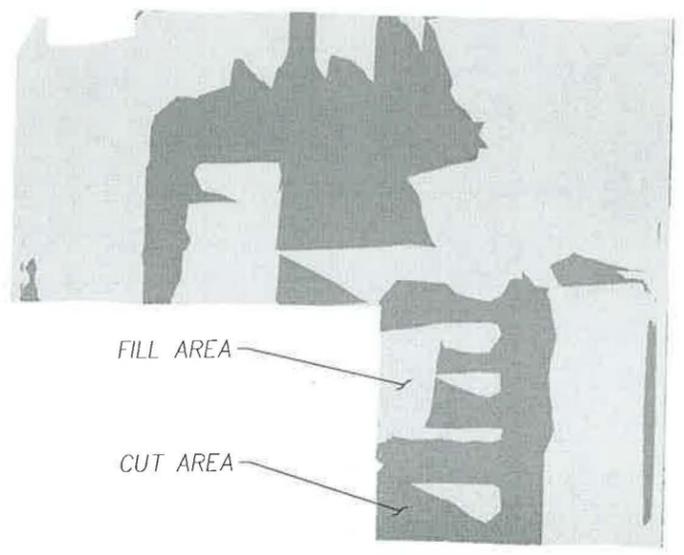
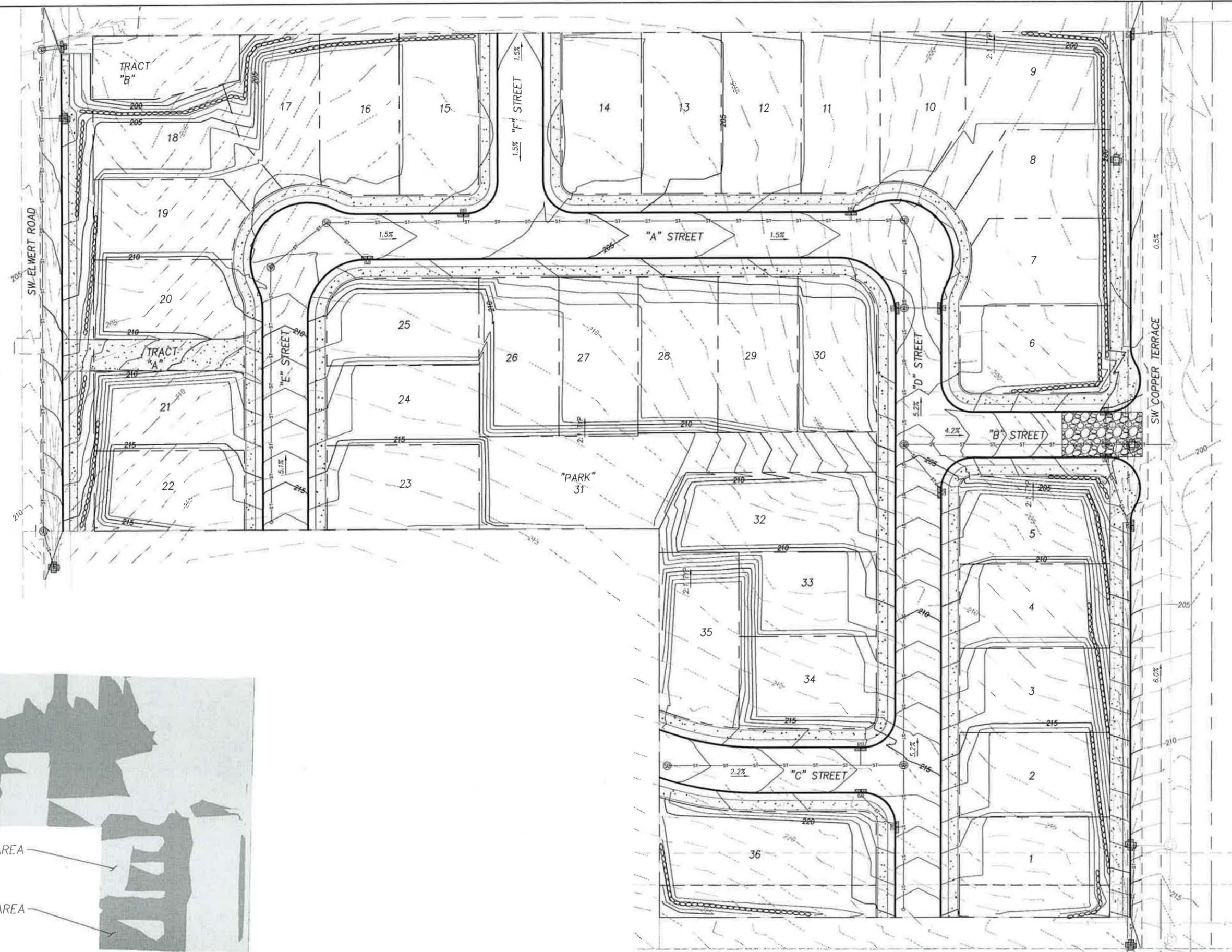
SHEET NO.	4
JOB NO.	DRH-64

P:\DRH (D.R. Horton)\DRH-64 (Daybreak)\DWG\SS(SHEETS)\DRH-64-TYP-SEC.dwg

LANDUSE SUBMITTAL



- LEGEND**
- SEDIMENT FENCE
 - INLET PROTECTION
 - GRAVEL CONSTRUCTION ENTRANCE
 - EXISTING CONTOUR
 - PROPOSED CONTOUR
 - APPROX. SLOPE OF FINISH SURFACE



CUT / FILL DIAGRAM

P:\DRH\ID.R - Horizon\DRH-64 - (Central)\DRH-64-DWG\SHEETS\DRH-64-GRADING.dwg

GRADING AND EROSION CONTROL PLAN
DAYBREAK SUBDIVISION
 SHERWOOD, OREGON

Harper Houf Peterson
Righellis Inc.

HHPR

ENGINEERS, PLANNERS
 LANDSCAPE ARCHITECTS & SURVEYORS
 205 SE Spokane Street, Suite 200, Portland, OR 97202
 phone: 503.221.1131 www.ahpr.com fax: 503.221.1171

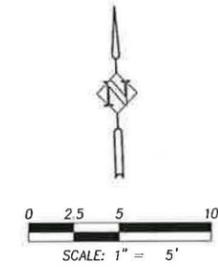
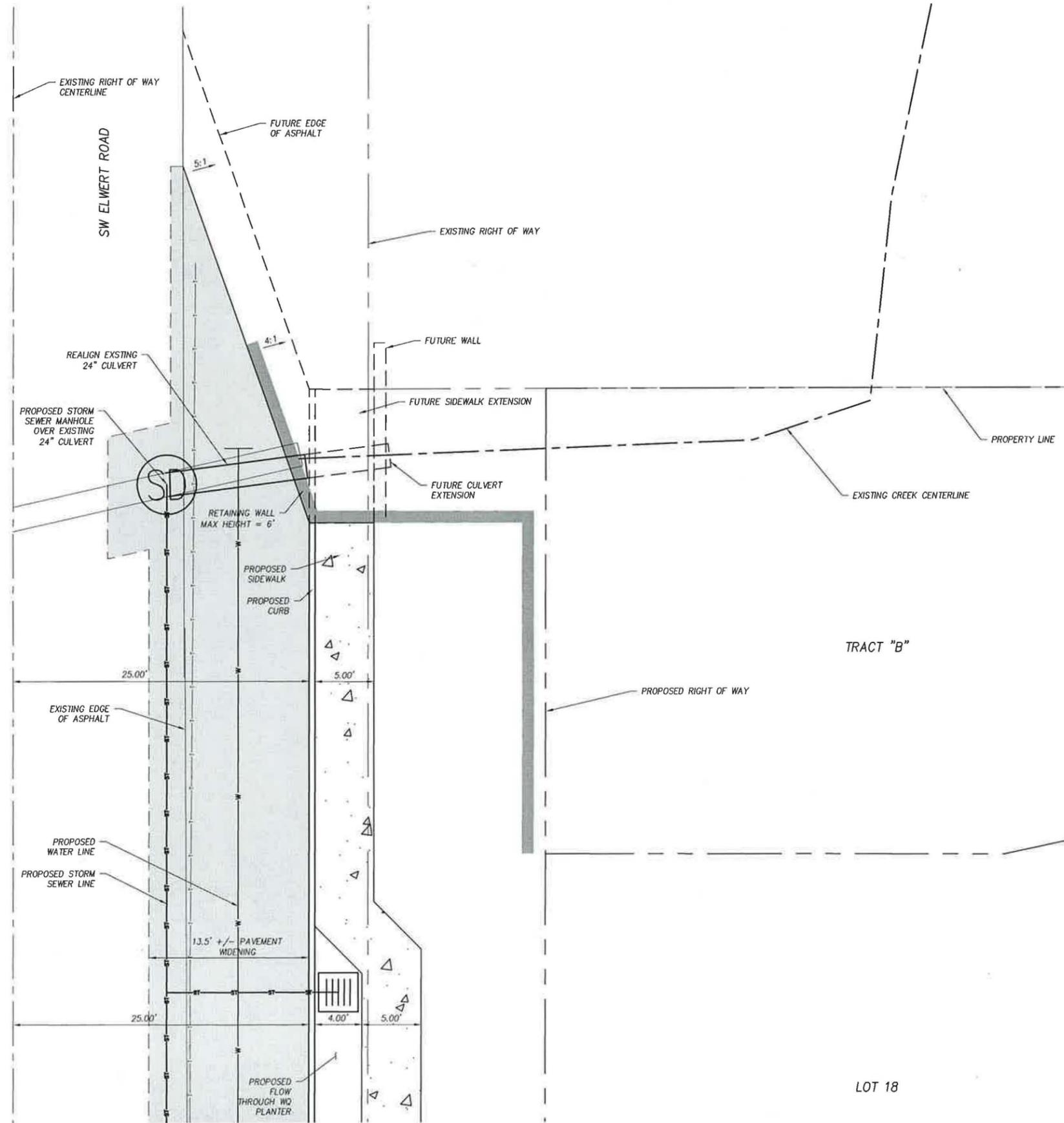
DESIGNED	HHPR	DRAWN	BUB
CHECKED	KAS	DATE	MARCH 2013
DATE	NO.	DESCRIPTION	R E V I S I O N S

SHEET NO.
5

JOB NO.
 DRH-64

LANDUSE SUBMITTAL

P:\DRH\DRH-64\Daybreak\DRH-64-DWG\SHEET.S1\DRH-64-S1-CULVERT.dwg



ELWERT ROAD CULVERT PLAN
DAYBREAK SUBDIVISION
 SHERWOOD, OREGON

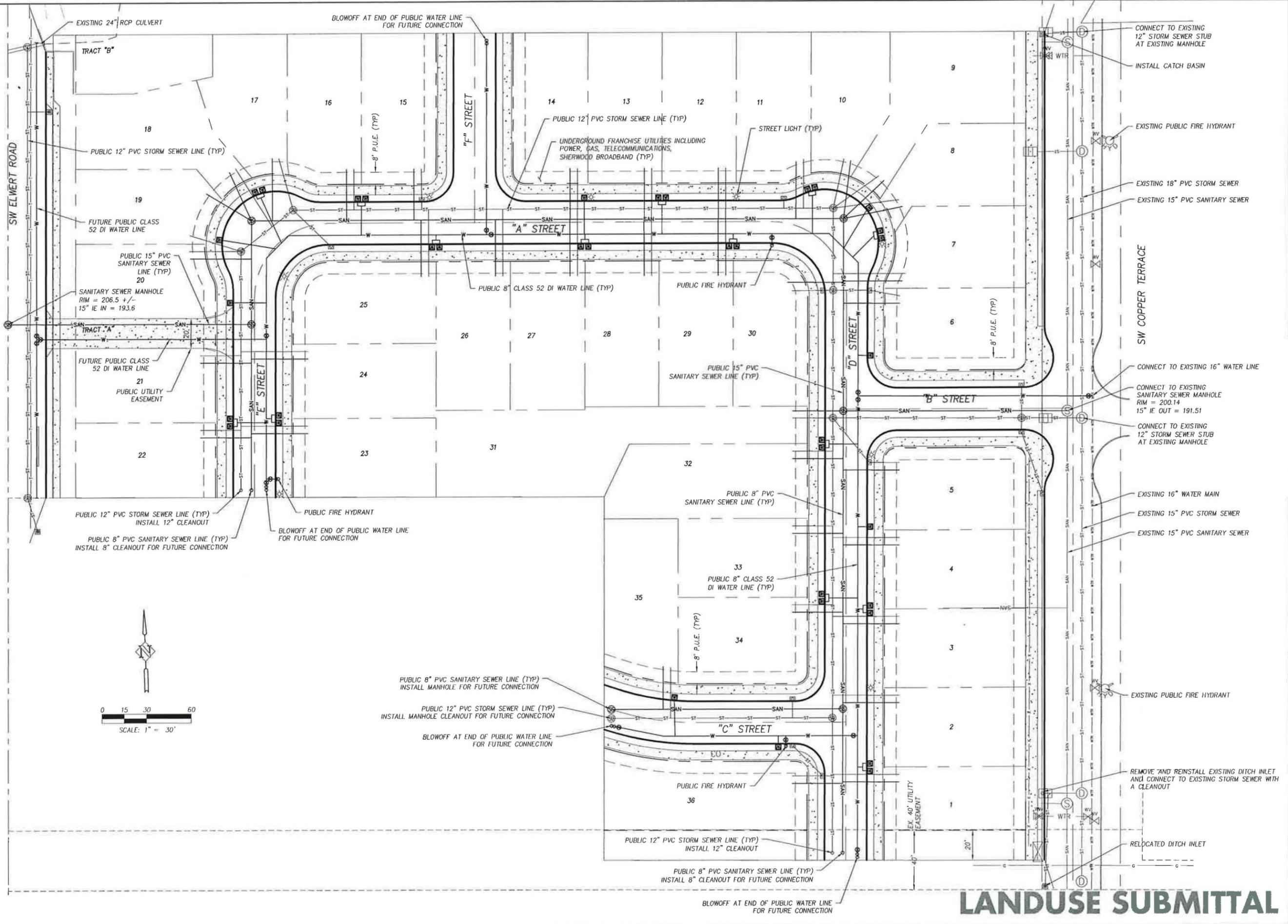
Harper Houf Peterson
Righellis Inc.
 ENGINEERS • PLANNERS
 LANDSCAPE ARCHITECTS • SURVEYORS
 205 SE Spokane Street, Suite 200, Portland, OR 97202
 phone: 503.221.1131 www.hhpri.com fax: 503.221.1171

DESIGNED:	HHPR
DRAWN:	BUB
CHECKED:	KAS
DATE:	MARCH 2013

SHEET NO.
5.1
 JOB NO.
 DRH-64

LANDUSE SUBMITTAL

P:\DRH (O.R. Harbor)\DRH-64 (Daybreak)\DRH64\DWG\SHEETS\DRH64-6-UTILITY.dwg

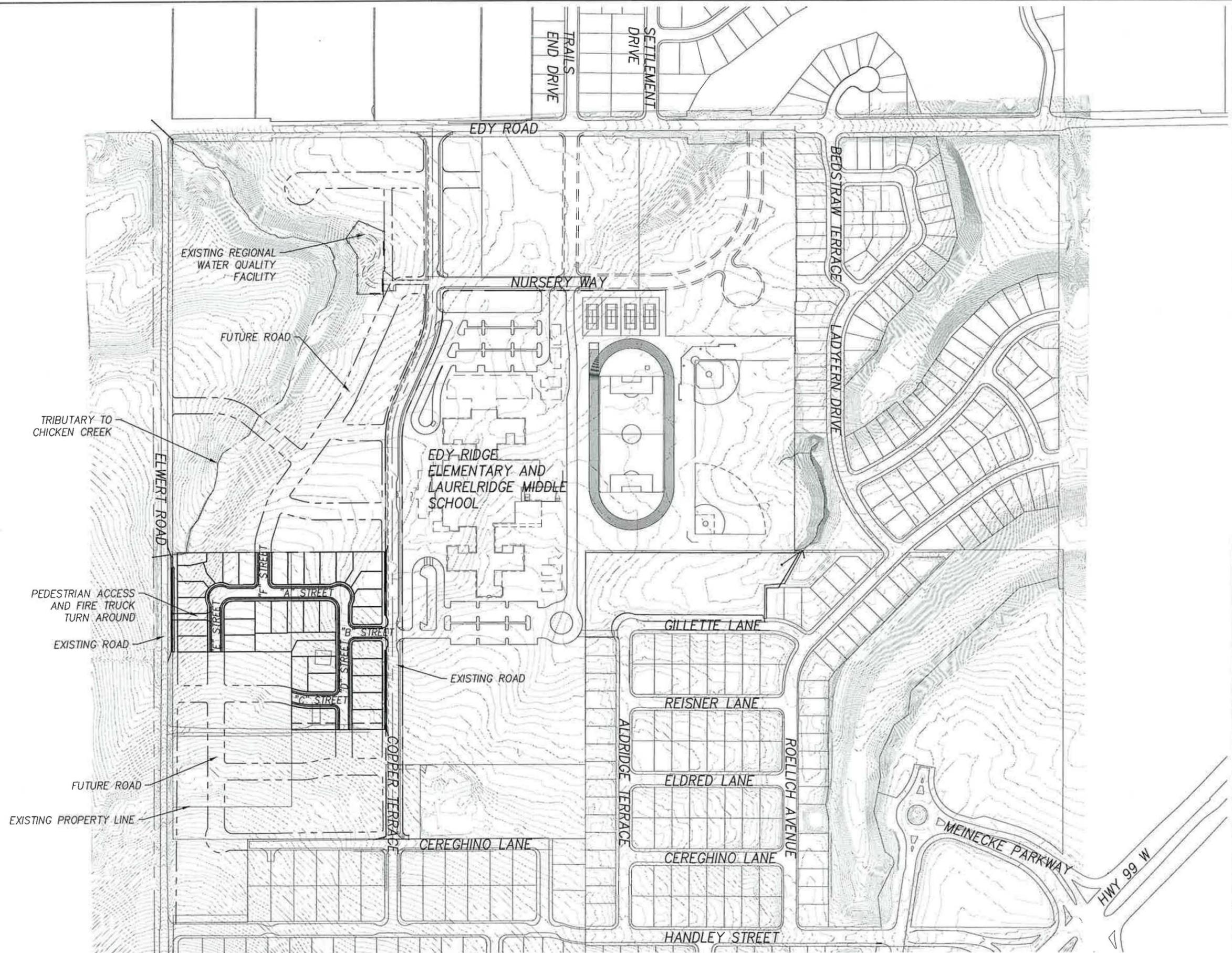
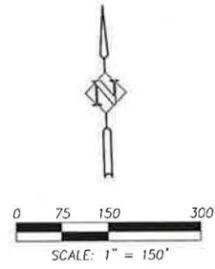


LANDUSE SUBMITTAL

UTILITY PLAN
DAYBREAK SUBDIVISION
 SHERWOOD, OREGON

Harper Houf Peterson
HHPR Righellis Inc.
 LANDSCAPE ARCHITECTS & SURVEYORS
 205 SE Spokane Street, Suite 200, Portland, OR 97202
 phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

DESIGNED:	HHPR							
DRAWN:	BUB							
CHECKED:	KAS							
DATE:	MARCH 2013							
DATE	NO	DESCRIPTION						
R	E	V	I	S	I	O	N	S
SHEET NO.		6						
JOB NO.		DRH-64						



P:\DRH\DRH-64 Daybreak\DRH64-DWG\SHEET5.DRW64-7.CIRC.dwg

SITE CIRCULATION PLAN
DAYBREAK SUBDIVISION
 SHERWOOD, OREGON

Harper Houf Peterson
HHPR Righellis Inc.
ENGINEERS • PLANNERS
 LANDSCAPE ARCHITECTS • SURVEYORS
 205 SB Spokane Street, Suite 200, Portland, OR 97202
 phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

DESIGNED	HHPR
DRAWN	BUB
CHECKED	KAS
DATE	MARCH 2013

SHEET NO	7
JOB NO	DRH-64

LANDUSE SUBMITTAL



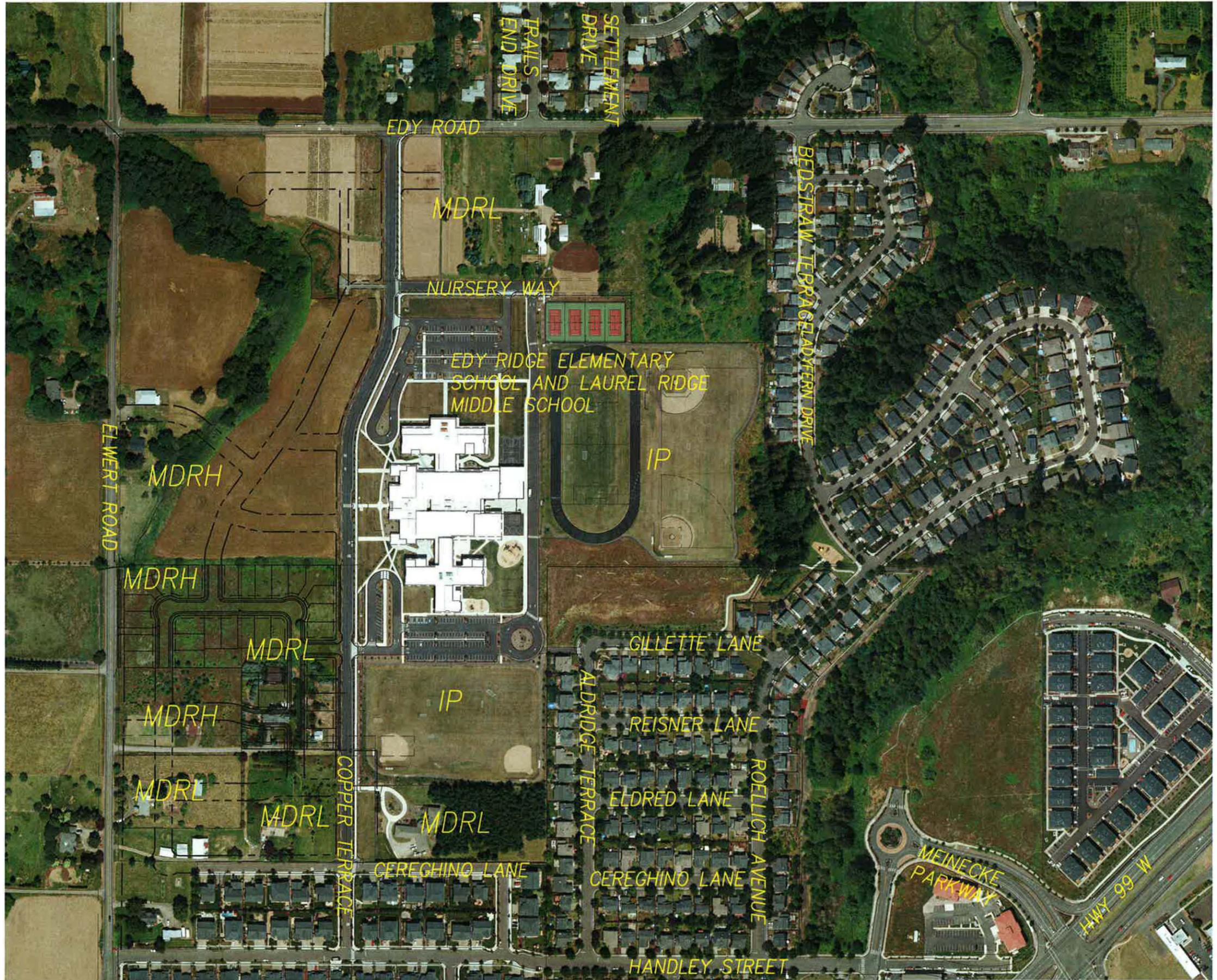
0 75 150 300
SCALE: 1" = 150'

SURROUNDING LAND USE LEGEND

MDRH = MEDIUM DENSITY RESIDENTIAL HIGH

MDRL = MEDIUM DENSITY RESIDENTIAL LOW

IP = INSTITUTIONAL AND PUBLIC



P:\DRH (D.R. Heron)\DRH-64 (Daybreak)\DRH64-DV\SS(SHEETS)\DRH64-8-LAND USE.dwg

SURROUNDING LAND USE PLAN
DAYBREAK SUBDIVISION
SHERWOOD, OREGON



ENGINEERS & PLANNERS
LANDSCAPE ARCHITECTS & SURVEYORS
205 SE Spokane Street, Suite 200, Portland, OR 97202
phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

DESIGNED	HHPR	BUB	KAS	DATE
DRAWN				MARCH 2013
CHECKED				

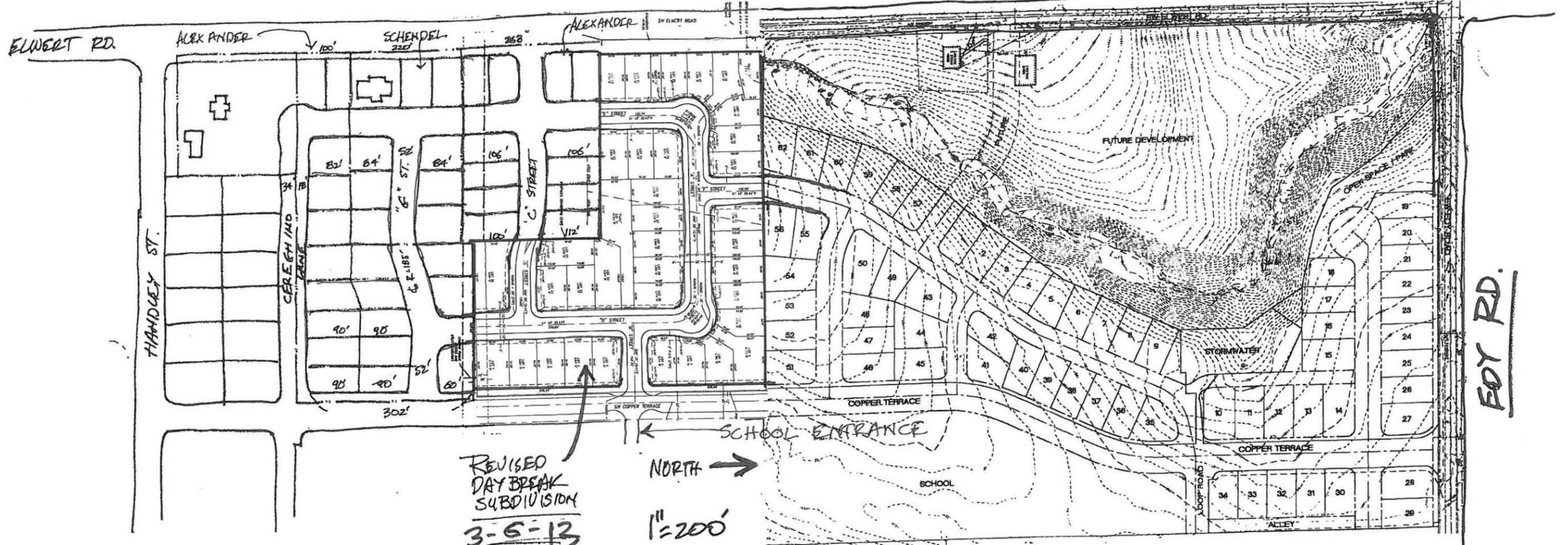
DATE	NO	DESCRIPTION	R	E	V	I	S	I	O	N	S

JOB NO. DRH-64

LANDUSE SUBMITTAL

SHEET NO.
8

ELWERT ROAD

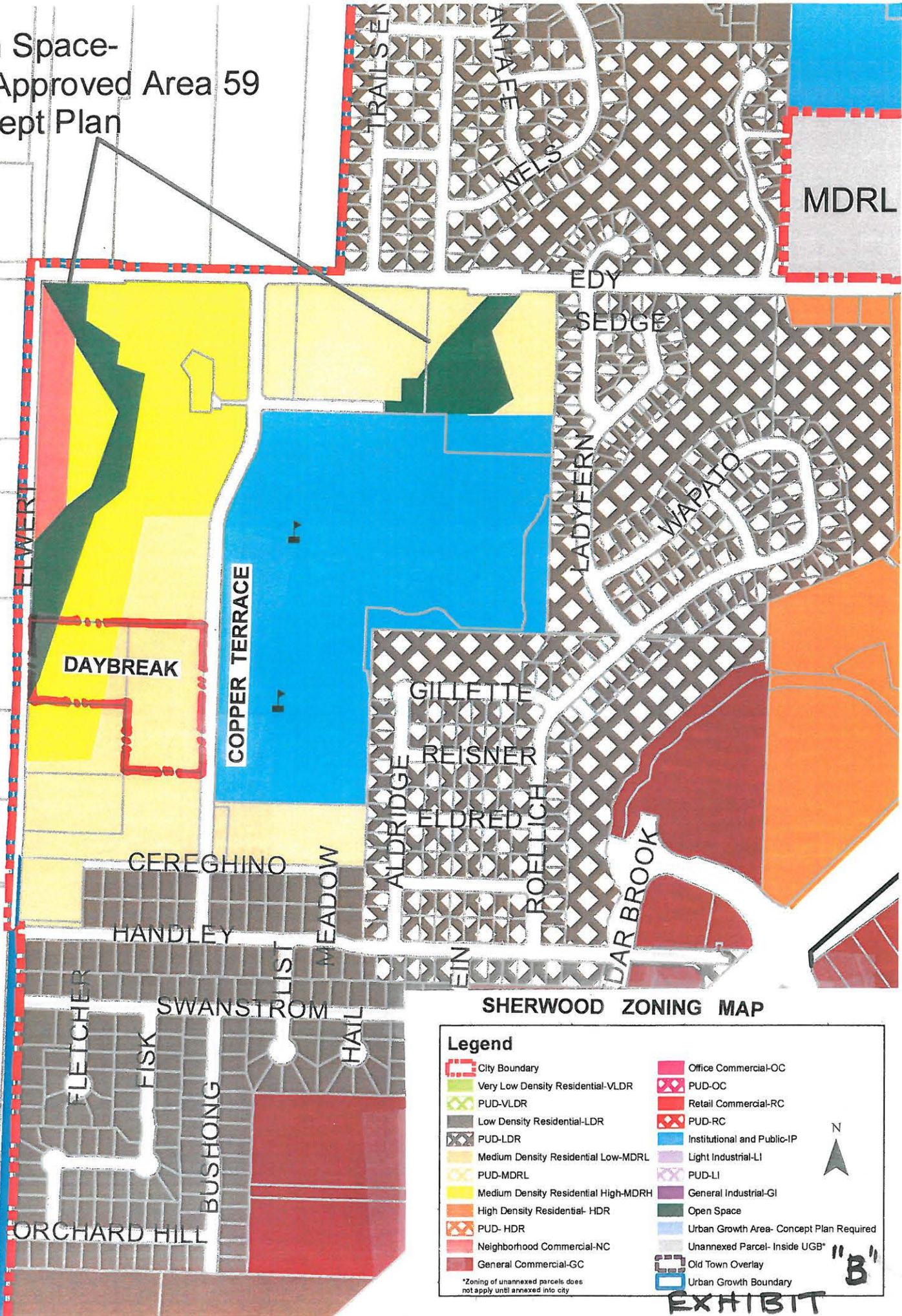


REVISED
DAY BREAK
SUBDIVISION
3-5-13

NORTH →
1" = 200'

EDY RD.

Open Space-
See Approved Area 59
Concept Plan



SHERWOOD ZONING MAP

Legend

City Boundary	Office Commercial-OC
Very Low Density Residential-VLDR	PUD-OC
PUD-VLDR	Retail Commercial-RC
Low Density Residential-LDR	PUD-RC
PUD-LDR	Institutional and Public-IP
Medium Density Residential Low-MDRL	Light Industrial-LI
PUD-MDRL	PUD-LI
Medium Density Residential High-MDRH	General Industrial-GI
High Density Residential- HDR	Open Space
PUD- HDR	Urban Growth Area- Concept Plan Required
Neighborhood Commercial-NC	Unannexed Parcel- Inside UGB
General Commercial-GC	Old Town Overlay
<small>*Zoning of unannexed parcels does not apply until annexed into city.</small>	Urban Growth Boundary



"B"

EXHIBIT

MDRL DENSITY FOR DAYBREAK 3-1-13

<u>Lot No.</u>	
1	5920
2	5024
3	5021
4	5017
5	5177
6	5169
7	4756
8	4702
9	6967
10	4317
11	4937
12	5000
13	5000
14	2100 Excludes 2886 sf of Lot 14 that is in the MRL zone
27	4890 Excludes 308 sf of Lot 27 in the MDRH & includes 198 sf of Lot 26 in MDRL
28	4900
29	4900
30	4776
32	6547
33	4605
34	5024
35	5300
36	9201
Total Area	119250
Total Acres	2.74

Minimum density for MDRL at 5.6 units per acre = 2.74 acres x 5.6 = 15.33 units

Maximum density for MDRL at 8 units per acre = 2.74 acres x 8 = 21.90 units

Minimum density for both zones: 15.33 + 7.74 = 23 units

Maximum density for both zones: 21.90 + 15.47 = 37 units

EXHIBT "C"

MDRH DENSITY FOR DAYBREAK 3-1-13

<u>Lot No.</u>	
14	2886
15	4986
16	4924
17	4454
18	5528
19	4390
20	4555
21	4692
22	4700
23	5068
24	4800
25	5157
26	5110 Included 308 sf of Lot 27 and excluded 198 sf of Lot 26 that is in the MDRL Zone
Total Area	61250
Total Acres	1.41

Minimum density at 5.5 units per acre = $1.41 \times 1.41 = 7.73$ units

Maximum density at 11 units per acre = $1.41 \times 11 = 15.47$ units

LOT SIZES FOR DAYBREAK 3-1-13

Lot No.

1	5920
2	5024
3	5021
4	5017
5	5177
6	5169
7	4756
8	4702
9	6967
10	4317
11	4937
12	5000
13	5000
14	4986
15	4986
16	4924
17	4454
18	5528
19	4390
20	4555
21	4692
22	4700
23	5068
24	4800
25	5157
26	5000
27	5000
28	4900
29	4900
30	4776
32	6547
33	4605
34	5024
35	5300
36	9201
Total	180500

Ave. Lot SF 5157

PROJ. NO. 07038	TEC DESIGN YOUR SITE SPECIALIST TECHNICAL ENGINEERING CONCEPTS & DESIGN 584 ADRIAT. CANY. 6410 GARRETT WAY, SUITE 100 PORTLAND, OR 97215 PHONE: 503.253.2330 FAX: 503.253.2332 WWW.TECDESIGN.COM TEC DESIGN, INC.	SURROUNDING AREAS MAP EXHIBIT 4	DAYBREAK DEVELOPMENT PRIMELAN PROPERTIES CITY OF SHERWOOD, OREGON	Exhibits 07038 EXIST LOC DATE 1/25/08	4
PROJ. NO. 07038 TECHNICAL ENGINEERING CONCEPTS & DESIGN					

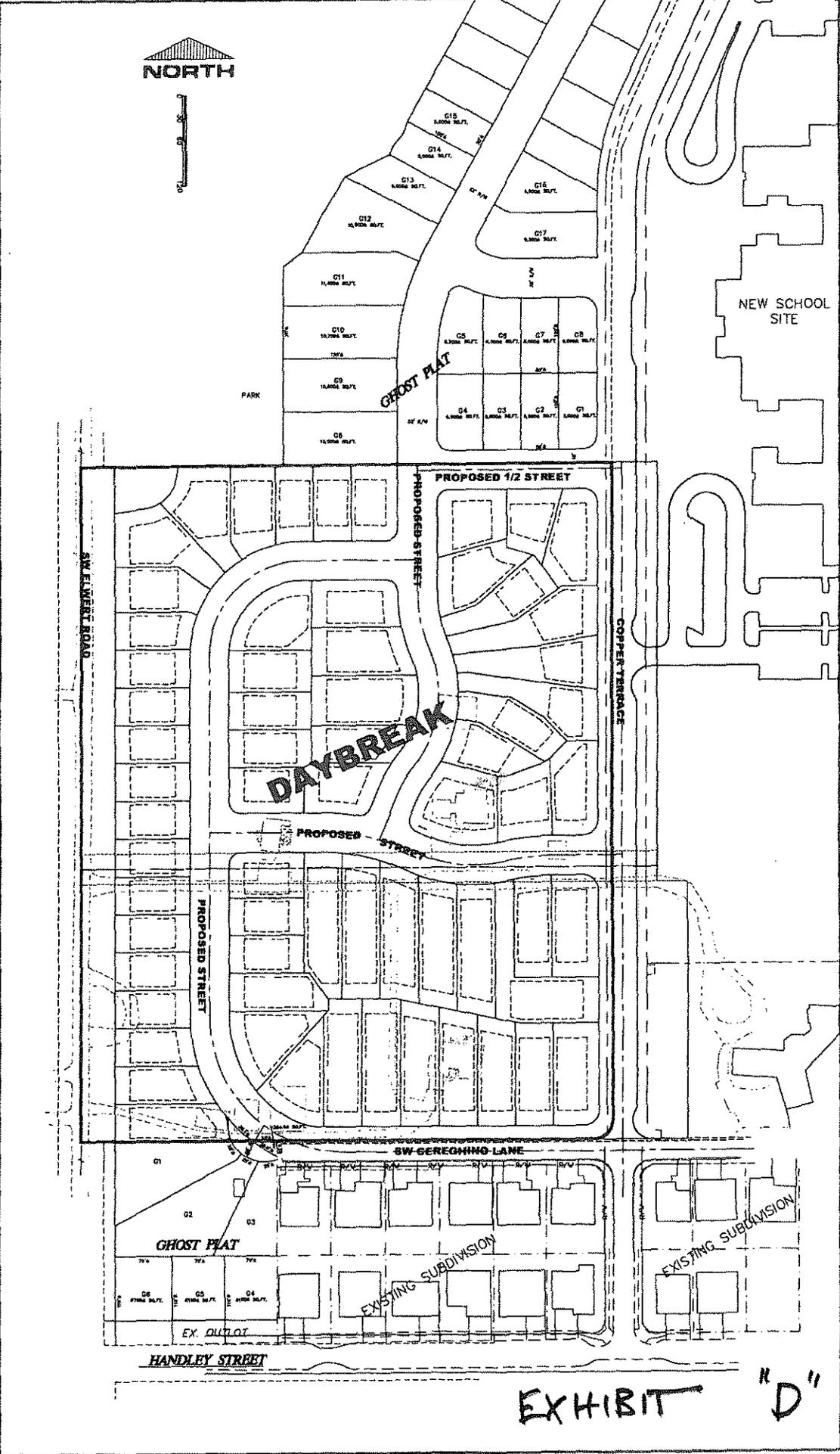


EXHIBIT "D"



First American

First American Title Company of Oregon
121 SW Morrison St, FL 3
Portland, OR 97204
Phn - (503)222-3651 (800)929-3651
Fax - (877)242-3513

Order No.: 7000-1992727
March 07, 2013

FOR QUESTIONS REGARDING YOUR CLOSING, PLEASE CONTACT:

KELLIE CREASEY, Escrow Officer/Closer
Phone: (503)350-5005 - Fax: (866)656-1602- Email:kcreasey@firstam.com
First American Title Company of Oregon
5335 SW Meadows Rd #100, Lake Oswego, OR 97035

FOR ALL QUESTIONS REGARDING THIS PRELIMINARY REPORT, PLEASE CONTACT:

Tom Bergstrom, Title Officer
Toll Free: (800)929-3651 - Direct: (503)219-8772 - Fax: (877)242-2396 - Email: tbergstrom@firstam.com

5th Supplemental Preliminary Title Report

County Tax Roll Situs Address: 21730 and 21500 SW Elwert Road, Sherwood, OR 97140

Proposed Insured Lender: TBD

2006 ALTA Owners Standard Coverage	Liability \$	1,375,000.00	Premium \$	1,997.00	STR
2006 ALTA Owners Extended Coverage	Liability \$		Premium \$	1,731.00	
2006 ALTA Lenders Standard Coverage	Liability \$		Premium \$		
2006 ALTA Lenders Extended Coverage	Liability \$		Premium \$		
Endorsement			Premium \$		
Govt Service Charge			Cost \$		
City Lien/Service District Search			Cost \$		
Other			Cost \$		

We are prepared to issue Title Insurance Policy or Policies in the form and amount shown above, insuring title to the following described land:

The land referred to in this report is described in Exhibit A attached hereto.

and as of February 27, 2013 at 8:00 a.m., title to the fee simple estate is vested in:

Columbia State Bank

Subject to the exceptions, exclusions, and stipulations which are ordinarily part of such Policy form and 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; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.

This report is for the exclusive use of the parties herein shown and is preliminary to the issuance of a title insurance policy and shall become void unless a policy is issued, and the full premium paid.

EXHIBIT "E"

2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.
5. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.

The exceptions to coverage 1-5 inclusive as set forth above will remain on any subsequently issued Standard Coverage Title Insurance Policy.

In order to remove these exceptions to coverage in the issuance of an Extended Coverage Policy the following items are required to be furnished to the Company; additional exceptions to coverage may be added upon review of such information:

- A. Survey or alternative acceptable to the company
 - B. Affidavit regarding possession
 - C. Proof that there is no new construction or remodeling of any improvement located on the premises. In the event of new construction or remodeling the following is required:
 - i. Satisfactory evidence that no construction liens will be filed; or
 - ii. Adequate security to protect against actual or potential construction liens;
 - iii. Payment of additional premiums as required by the Industry Rate Filing approved by the Insurance Division of the State of Oregon
6. Taxes for the year 2012-2013

Tax Amount	\$	7,802.54
Unpaid Balance:	\$	5,271.05 , plus interest and penalties, if any
Code No.:		088.10
Map & Tax Lot No.:		2S130CC-00300
Property ID No.:		R2000053
 7. Taxes for the year 2012-2013

Tax Amount	\$	2,192.76
Unpaid Balance:	\$	1,481.33, plus interest and penalties, if any.
Code No.:		088.10
Map & Tax Lot No.:		2S130CC-00500
Property ID No.:		R2000055
 8. City liens, if any, of the City of Sherwood.

Note: There are no liens as of November 05, 2012. All outstanding utility and user fees are not liens and therefore are excluded from coverage.

- 9. Statutory powers and assessments of Clean Water Services.
- 10. The rights of the public in and to that portion of the premises herein described lying within the limits of streets, roads and highways.
- 11. Easement, including terms and provisions contained therein:
 - Recording Information: February 27, 1981 as Fee No. 81006976
 - In Favor of: Portland General Electric Company
 - For: Underground Distribution Line
 - Affects: South 40 feet of Parcel B
- 12. Easement, Road Construction and Road Maintenance Agreement, including terms and provisions thereof.
 - Recorded: October 14, 1988 as Fee No. 88046039
- 13. Restrictive Covenant to Waive Remonstrance, pertaining to Customarily (commonly) accepted farm or forestry practices including the terms and provisions thereof
 - Recorded: October 5, 1988 as Fee No. 88-44451
- 14. Restrictive Covenant to Waive Remonstrance, pertaining to Road improvement and maintenance including the terms and provisions thereof
 - Recorded: October 6, 1988 as Fee No. 88-44605

- END OF EXCEPTIONS -

NOTE: We find no matters of public record against D.R. Horton, Inc - Portland that will take priority over any trust deed, mortgage or other security instrument given to purchase the subject real property as established by ORS 18.165.

NOTE: According to the public record, the following deed(s) affecting the property herein described have been recorded within 24 months of the effective date of this report: Sheriff's Deed recorded March 1, 2013 as Fee No. 2013-019340, Pat Garrett, Sheriff of Washington County, Oregon, conveys to Columbia State Bank

NOTE: Washington County Ordinance No. 267, filed August 5, 1982 in Washington County, Oregon, imposes a tax of \$1.00 per \$1,000.00 or fraction thereof on the transfer of real property located within Washington County.

Certain conveyances may be exempt from said ordinance, in which case, Washington County will require a correct and timely filing of an Affidavit of Exemption. For all deeds/conveyance documents which are recorded (including situations to meet lender requirements) either the transfer tax must be paid or affidavit acceptable to the County must be filed.

**THANK YOU FOR CHOOSING FIRST AMERICAN TITLE!
WE KNOW YOU HAVE A CHOICE!**

RECORDING INFORMATION

Filing Address: **Washington County**
 155 North 1st Avenue
 Hillsboro, OR 97124-3087

Recording Fees: \$ **5.00** E-Recording per document
 \$ **5.00** per page
 \$ **5.00** per document (Public Land Corner Preservation Fund)
 \$ **11.00** per document (OLIS assessment & Taxation Fee)
 \$ **15.00** per document (Oregon Housing Alliance Fee)
 \$ **5.00** for each additional document title
 \$ **20.00** non-standard fee



First American Title Insurance Company

SCHEDULE OF EXCLUSIONS FROM COVERAGE

ALTA LOAN POLICY (06/17/06)

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
 - (i) the occupancy, use, or enjoyment of the Land;
 - (ii) the character, dimensions, or location of any improvement erected on the Land;
 - (iii) the subdivision of land; or
 - (iv) environmental protection;
 or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
- (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
 - (a) created, suffered, assumed, or agreed to by the Insured Claimant;
 - (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
 - (c) resulting in no loss or damage to the Insured Claimant;
 - (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
 - (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
 - (a) a fraudulent conveyance or fraudulent transfer, or
 - (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

ALTA OWNER'S POLICY (06/17/06)

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
 - (i) the occupancy, use, or enjoyment of the Land;
 - (ii) the character, dimensions, or location of any improvement erected on the Land;
 - (iii) the subdivision of land; or
 - (iv) environmental protection;
 or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
- (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
 - (a) created, suffered, assumed, or agreed to by the Insured Claimant;
 - (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
 - (c) resulting in no loss or damage to the Insured Claimant;
 - (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risks 9 and 10); or
 - (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
 - (a) a fraudulent conveyance or fraudulent transfer; or
 - (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

SCHEDULE OF STANDARD EXCEPTIONS

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.
5. Any lien" or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.

Exhibit "A"

Real property in the County of Washington, State of Oregon, described as follows:

PARCEL A:

A PORTION OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 30, TOWNSHIP 2 SOUTH, RANGE 1 WEST, OF THE WILLAMETTE MERIDIAN, IN THE COUNTY OF WASHINGTON AND STATE OF OREGON, (BEING AN UNNUMBERED GOVERNMENT LOT), DESCRIBED IN DEED TO L.J. PAPE RECORDED IN BOOK 69, PAGE 239, DEED RECORDS OF WASHINGTON COUNTY, OREGON, SAID PORTION BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WEST LINE OF SAID SECTION 30, WHICH POINT BEARS NORTH 00°01' 13" WEST 1006.32 FEET FROM THE WASHINGTON COUNTY MONUMENT AT THE SOUTHWEST CORNER OF SAID SECTION 30, AND RUNNING THENCE NORTH 89°57'30" EAST 400.00 FEET TO AN IRON ROD; THENCE NORTH 00°01' 13" WEST 310.24 FEET TO AN IRON ROD ON THE NORTH LINE OF SAID PAPE TRACT; THENCE SOUTH 89°47'57" WEST, ALONG SAID NORTH LINE 400.00 FEET TO A POINT ON THE WEST LINE OF SAID SECTION 30; THENCE SOUTH 00°01' 13" EAST ALONG SAID WEST LINE, 309.13 FEET TO THE POINT OF BEGINNING.

PARCEL B:

A PORTION OF THE SOUTHWEST ONE-QUARTER OF THE SOUTHWEST ONE-QUARTER OF SECTION 30, TOWNSHIP 2 SOUTH, RANGE 1 WEST OF THE WILLAMETTE MERIDIAN, IN THE COUNTY OF WASHINGTON AND STATE OF OREGON, (BEING AN UNNUMBERED GOVERNMENT LOT) DESCRIBED IN DEED TO L.J. PAPE, RECORDED IN BOOK 69, PAGE 239, DEED RECORDS OF WASHINGTON COUNTY, OREGON, SAID PORTION BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT AN IRON ROD THAT BEARS NORTH 00°01'13" WEST 763.08 FEET AND NORTH 89°57'30" EAST 763.00 FEET FROM THE WASHINGTON COUNTY MONUMENT AT THE SOUTHWEST CORNER OF SAID SECTION 30; AND RUNNING THENCE NORTH 00°01'13" WEST 554.49 FEET TO AN IRON ROD ON THE NORTH LINE OF THE SOUTH ONE-HALF OF THE SOUTHWEST ONE-QUARTER OF SAID SECTION 30; THENCE SOUTH 89°47'57" WEST ALONG SAID NORTH LINE, 363.00 FEET TO AN IRON ROD; THENCE SOUTH 00°01' 13" EAST 553.48 FEET TO AN IRON ROD; THENCE NORTH 89°57'30" EAST 363.00 FEET TO THE POINT OF BEGINNING.

TOGETHER WITH AND SUBJECT TO AN EASEMENT FOR ACCESS AND UTILITIES OVER THE FOLLOWING DESCRIBED TRACT: BEGINNING AT THE NORTHWEST CORNER OF THAT CERTAIN TRACT CONVEYED TO ERNEST R. BILLER BY DEED RECORDED AS FEE NO. 78-2035, SAID DEED RECORDS, SAID CORNER BEING ON THE WEST LINE OF SAID SECTION 30, AND BEARING NORTH 00°01' 13" WEST 743.08 FEET FROM THE SOUTHWEST CORNER THEREOF; AND RUNNING THENCE NORTH 89°57'20" EAST, ALONG THE NORTH LINE OF SAID BILLER TRACT AND THE EASTERLY PROLONGATION THEREOF, 828.00 FEET; THENCE NORTH 00°01' 13" WEST 40.00 FEET; THENCE SOUTH 89°57'30" WEST 25.00 FEET; THENCE NORTH 00°01' 13" WEST 40.00 FEET; THENCE SOUTH 89°57'30" WEST 40.00 FEET; THENCE SOUTH 00°01'13" EAST 40.00 FEET; THENCE SOUTH 89°57'30" WEST 763.00 FEET TO A POINT ON THE WEST LINE OF SAID SECTION 30; THENCE SOUTH 00°01' 13" EAST ALONG SAID WEST LINE, 40.00 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PARCEL DESCRIBED IN WASHINGTON COUNTY CONDEMNATION SUIT CASE NO.C072157CV MORE PARTICULARLY DESCRIBED AS FOLLOWS:

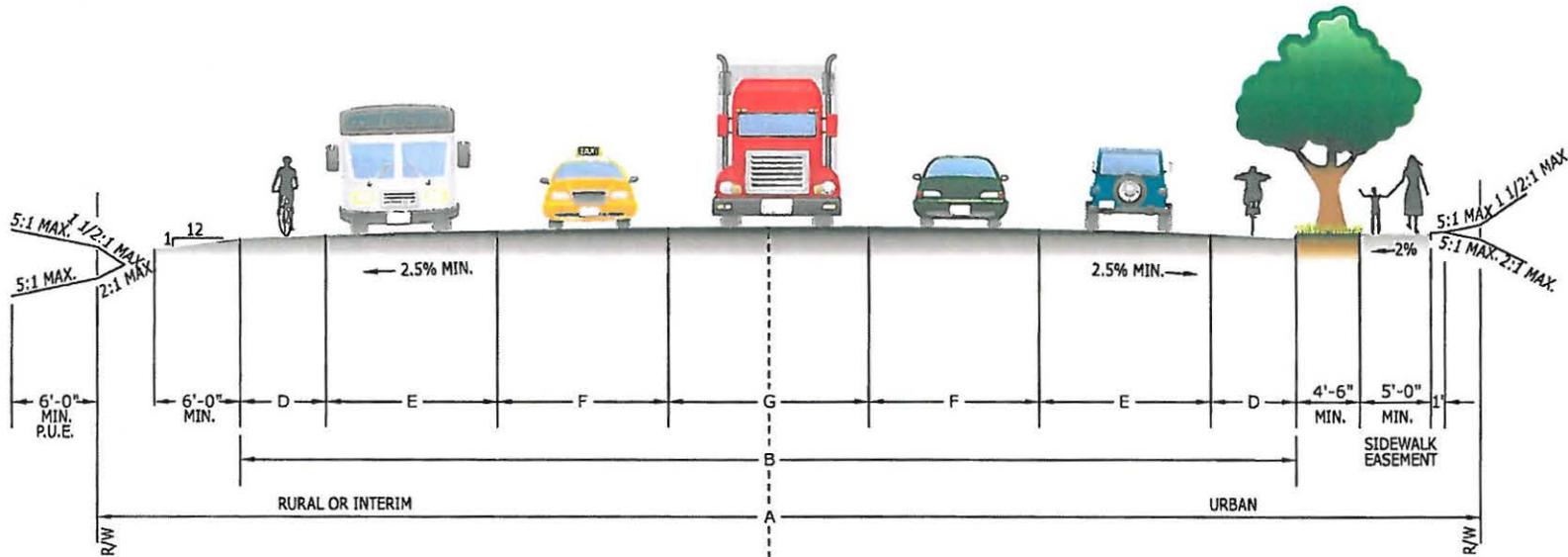
A TRACT OF LAND LOCATED IN THE SOUTHWEST ONE-QUARTER OF SECTION 30, TOWNSHIP 2 SOUTH, RANGE 1 WEST OF THE WILLAMETTE MERIDIAN, IN THE COUNTY OF WASHINGTON AND STATE OF OREGON; BEING A PORTION OF THAT PROPERTY CONVEYED BY DOCUMENT NO. 91-13656 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID PROPERTY, BEING A POINT ON THE SOUTH LINE OF THAT PROPERTY CONVEYED BY DOCUMENTS NO. 90-66876 AND NO. 2001-71926, WHICH BEARS NORTH 30°02' 17" EAST 1,522.99 FEET FROM THE SOUTHWEST CORNER OF SAID SECTION 30 AND BEING AT THE INTERSECTION OF SAID SOUTH LINE AND THE WEST LINE OF THAT PROPERTY CONVEYED BY DOCUMENT NO. 2005-05907; THENCE, ALONG SAID WEST LINE, SOUTH 00°01' 13" EAST 554.75 FEET, TO THE NORTH LINE OF SAID PROPERTY CONVEYED AS "PARCEL A", BY DOCUMENT NO. 91-08926; THENCE ALONG SAID NORTH LINE, SOUTH 89°57'30" WEST 68.18 FEET TO A POINT WHICH BEARS NORTH 42°16'50" EAST 1,032.15 FEET FROM THE SOUTHWEST CORNER OF SAID SECTION 30; THENCE NORTH 00°04'24" WEST 554.56 FEET TO A POINT ON SAID SOUTH LINE OF THAT PROPERTY CONVEYED BY DOCUMENTS NO. 90-66876 AND NO. 2001-71926 WHICH BEARS NORTH 27°45'17" EAST 1,489.57 FEET FROM THE SOUTHWEST CORNER OF SAID SECTION 30; THENCE, ALONG SAID SOUTH LINE NORTH 89°47'57" EAST 68.69 FEET TO THE POINT OF BEGINNING.

NOTE: This legal description was created prior to January 1, 2008.

Tax Parcel Number: R2000053 and R2000055

Arterial Road Section



NOT DRAWN TO SCALE
DESIGN SPEED 45 MILES PER HOUR

Road Classification	Washington County Designation	Right of Way (Feet)	Paved Width (Feet)	Number of Lanes	Bike Lane / Paved Shoulder	Curb Travel Lane	Travel Lane(s)	Center Turn Lane	Parking Allowed
Arterials		A	B		D	E	F	G	
	A-1	122	98	7	6	12 + 12	12	14	NONE
	A-2	98	74	5	6	12	12	14	NONE
	A-3	90	60 *±	4	6	12	12	0	NONE
	A-4	90	50 *	3	6	0	12	14	NONE

*GRAVEL SHOULDERS AND DITCHES ALLOWED FOR THESE WIDTH ONLY. STANDARD INTERIM SECTION
 † P.U.E.'S REQUIRED OUTSIDE OF R/W IF SHOULDERS AND DITCHES ARE USED.

The applied "Washington County Designation" is determined by the county's transportation plan and the land use decision. See Appendices A and B for maps of County arterial roads.

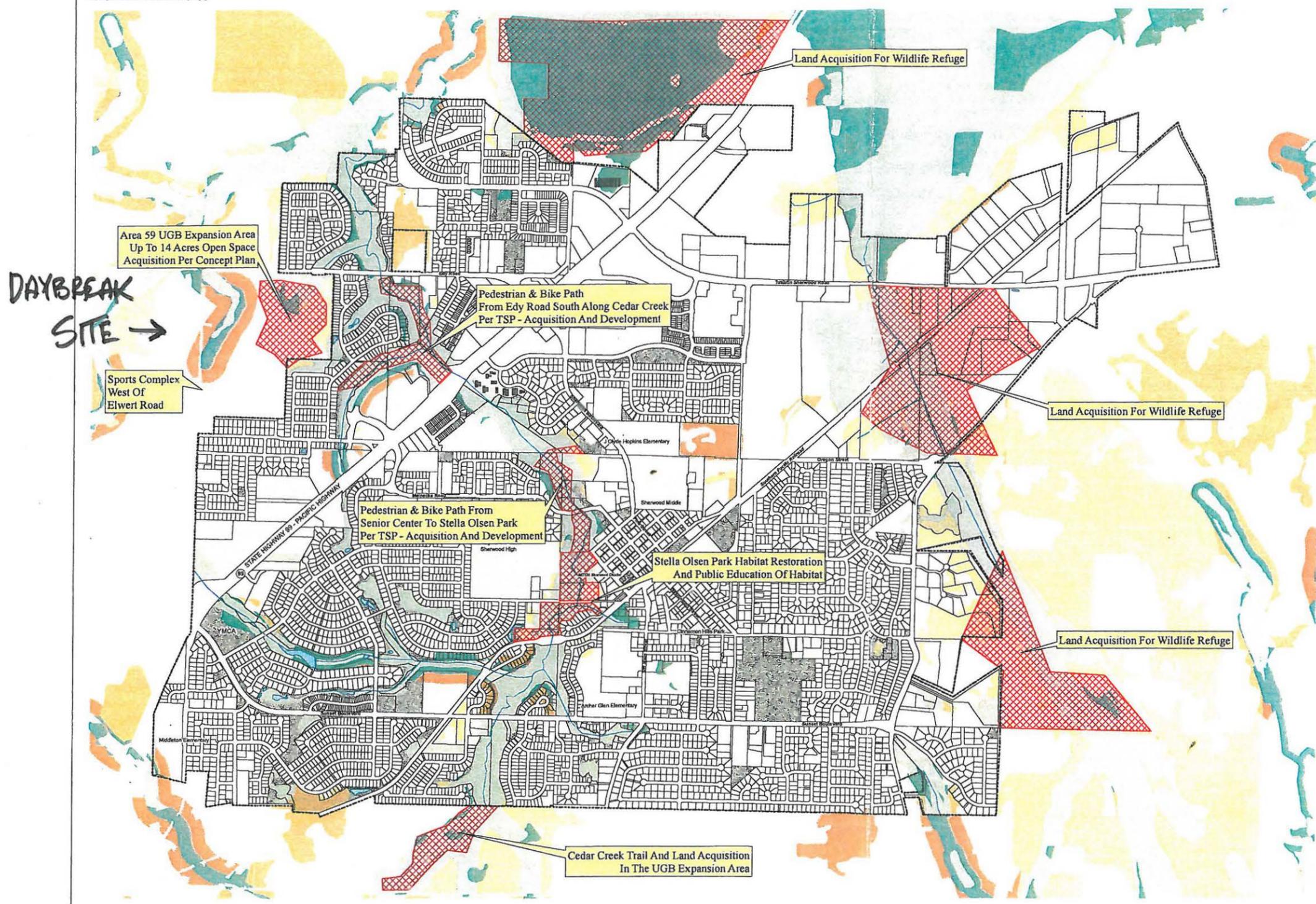
EXHIBIT



11'



FUTURE ACQUISITIONS Potential Future Acquisitions



LEGEND

- Potential 2006 Bond Measure Project Areas
 - Goal 5 Areas - 40% Transparency
 - Classification *, **
 - Riparian Wildlife Habitat Class I
 - Riparian Wildlife Habitat Class II
 - Riparian Wildlife Habitat Class III
 - Upland Wildlife Habitat Class A
 - Upland Wildlife Habitat Class B
 - Upland Wildlife Habitat Class C
 - Public Owned Properties - City Of Sherwood
 - Lakes, Ponds, Rivers
 - Rivers, Streams, Irrigation
- * Metro Regional Government Goal 5 designations are assigned values based on a fish and wildlife habitat inventory completed in 2002. Future acquisition of all lands depicted will be dependent on available funding and regulatory conditions and requirements.
- ** Class I, II and III refers to regionally significant riparian habitat areas. Class I is the highest value riparian habitat and generally consists of the highest quality wetlands, floodplains and buffers. Class III is the lowest value riparian habitat and generally consists of degraded wetlands and floodplains that still provide significant habitat value for fish and wildlife.
- Class A, B and C refers to regionally significant upland wildlife habitat areas. Class A is the highest value which includes the larger patches that are in close proximity to other patches and have access to water. Class C is the lowest value and generally consists of smaller isolated patches.
- Areas Identified For Acquisition Are Conceptual And To Be Used As A Tool For Policy Discussions Regarding Acquisitions As Funds Become Available Or Comprehensive Plan Amendments Are Considered.

Map Series Produced For The City Of Sherwood, Oregon. This Map Is Intended For Planning & Discussion Purposes Only. Please Refer To The Parks Master Plan Document For Map Details. Data Sources - City of Sherwood, METRO, GRASP™ Team. Revised - December 2006

EXHIBIT
"G"



Home of the Tualatin River National Wildlife Refuge

Pre-Application Conference Notes

PAC 12-11

Meeting Date: 11/13/2012

Meeting Time: 2:00 PM

Planning Staff Contact: Brad Kilby

Residential

PLEASE NOTE: The conference and notes cannot cover all Code requirements and aspects related to site planning that should apply to the development of your site plan. Failure of the staff to provide information required by the Code shall not constitute a waiver of the applicable standards or requirements. It is recommended that a prospective applicant either obtain and read the Community Development Code or ask any questions of City staff relative to Code requirements prior to submitting an application.

Proposed project name: Unknown

PROPOSAL DESCRIPTION: Proposal to replat the previously approved Daybreak Subdivision (SUB07-02) into 33 single family lots with proposed lot sizes of 5,000 square feet each.

APPLICANT:

DR Horton
Attn: Ryan O'brien
4380 SW Macadam, Suite 100
Portland, OR 97239

OWNER:

Columbia State Bank
Attn: Gregg Weakley
17800 SE Mill Plain Blvd. Suite 100
Vancouver, WA 98683

PROPERTY LOCATION:

ADDRESS/GENERAL LOCATION: Property between SW Elwert Road and SW Copper Terrace Street.

TAX MAP(S)/LOT #(S): WCTM 2S130CC, tax lots 300 and 500

Identified potential constraints/issues (wetlands, steep slopes, easements, etc?) The original subdivision suggested the presence of wetlands in the northwest portion of the property. The applicant will be required to either update the original reports or prepare new reports identifying the locations of the wetlands, if any, and indicate how they would be impacted and mitigated for.

ased on the information provided, NECESSARY APPLICATIONS: Type III subdivision

EXHIBIT "H"

ZONING DISTRICT DIMENSIONAL REQUIREMENTS Tax lot 300 is Medium Density Residential Low (MDRL), Tax Lot 500 has split zoning including Medium Density Residential High (MDRH) and MDRL. (Refer to Code Section 16.12)

MINIMUM LOT SIZE: 5,000 sq. ft. MINIMUM LOT WIDTH AT BUILDING LINE: 50 ft.

MINIMUM LOT WIDTH AT FRONT PROPERTY LINE: 25 ft. MINIMUM LOT DEPTH: 80 ft.

MAXIMUM BUILDING HEIGHT: MDRL (30 ft. or 2 stories) MDRH (35 ft. or 2.5 stories) -whichever is less in either zone.

Setbacks: Front 20 ft. Side 5 ft. Rear 20 ft. Corner 15 ft. from street.

NARRATIVE

The applicant shall submit a narrative which provides findings based on the applicable approval standards. Failure to provide a narrative or adequately address criteria would be reason to consider an application incomplete and delay review of the proposal. The applicant should review the code for applicable criteria.

CLEAN WATER SERVICES SERVICE PROVIDER LETTER

The applicant shall submit a CWS Service Provider Letter at time of application submittal. An application will not be deemed complete without a CWS Service Provider Letter.

RESIDENTIAL DENSITY CALCULATION

The NET DENSITY on a particular site may be calculated by removing present and future rights-of-way, environmentally constrained areas, public parks and other public uses from the total site area.

PLANNED UNIT DEVELOPMENT (PUD)

Section 16.40 of the Sherwood Zoning and Community Development Code provides information regarding PUDs. If this Pre-Application includes a PUD, this section of the Code will be included as an attachment to these notes.

TOWNHOMES (16.44)

ACCESSORY STRUCTURES (16.50)

16.50.010 - Standards and Definition

16.50.040 - Accessory Structure Exemptions

16.50.050 - Architectural Features

16.50.060 - Decks

ACCESSORY DWELLING UNITS (16.52)

SUBDIVISION (16.120)

16.120.020 - General Subdivision Provisions

16.120.030 - Approval Procedure-Preliminary Plat

16.120.040 - Approval Criteria: Preliminary Plat

16.120.050 - Final Subdivision Plat

16.120.060 - Improvement Agreement

16.120.070 - Bond

16.120.080 - Filing and Recording of Final Subdivision Plat

PARTITION (16.122)

- 16.122.020 - Approval Criteria: Preliminary Plat
- 16.122.030 - Final Partition Plat
- 16.122.040 - Future Subdivision Compliance
- 16.122.050 - Filing and Recording Requirements

LAND DIVISION DESIGN STANDARDS (16.128)

- 16.128.010 – Blocks
- 16.128.020 – Pedestrian and Bicycle Ways
- 16.128.030 - Lots

PUBLIC IMPROVEMENTS (16.104 - 16.118)

- 16.104 – General Provisions
- 16.106.020 - Required Improvements
- 16.106.030 - Location
- 16.106.040 - Design
- 16.106.060 - Sidewalks
- 16.106.080 - Bike Paths
- 16.110 - Sanitary Sewer
- 16.112 – Water Supply
- 16.114 - Storm Water
- 16.116 – Fire Protection
- 16.118. - Public and Private Utilities
- ENVIRONMENTAL RESOURCES (16.132- 16.156)
- 16.142.010 - Purpose
- 16.142.030 - Single-Family or Duplex Residential Subdivisions
- 16.142.040 - Visual Corridors
- 16.142.050 - Park Reservation
- 16.142.060 - Street Trees
- 16.142.070 - Trees on Property Subject to Certain Land Use Applications
- 16.142.090 - Recommended Street Trees

HISTORIC RESOURCES (16.158- 16.170)

- 16.162 – Old Town (OT) Overlay District
- 16.164 – Landmark Review
- 16.168 – Landmark Alteration

APPLICABLE CODE CRITERIA

(These sections *must* be addressed in the narrative submitted with the land use application)

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Division II (Zoning Districts) | <input type="checkbox"/> 16.92 (Landscaping) | <input type="checkbox"/> 16.122 (Land Partitions) |
| <input type="checkbox"/> 16.40 (Planned Unit Development) | <input checked="" type="checkbox"/> 16.94 (Off-Street Parking and Loading) | <input type="checkbox"/> 16.124 (Property Line Adjustments) |

- | | | |
|--|--|---|
| <input type="checkbox"/> 16.44 (Townhomes) | <input type="checkbox"/> 16.96 (On-Site Circulation) | <input type="checkbox"/> 16.134 (Flood Plain Overlay) |
| <input type="checkbox"/> 16.46 (Manufactured Homes) | <input type="checkbox"/> 16.98 (On-Site Storage) | <input checked="" type="checkbox"/> 16.142 (Parks and Open Space) |
| <input type="checkbox"/> 16.48 (Non-Conforming Uses) | <input type="checkbox"/> 16.102 (Signs) | <input checked="" type="checkbox"/> 16.146 (Noise) |
| <input type="checkbox"/> 16.50 (Accessory Uses) | <input checked="" type="checkbox"/> 16.106 (Transportation Facilities) | <input checked="" type="checkbox"/> 16.148 (Vibrations) |
| <input checked="" type="checkbox"/> 16.58.010 (Clear Vision Areas) | <input type="checkbox"/> ? 16.108.040.D(Additional Setbacks) | <input checked="" type="checkbox"/> 16.150 (Air Quality) |
| <input type="checkbox"/> 16.80 (Plan Amendments) | <input checked="" type="checkbox"/> 16.110 (Sanitary Sewers) | <input checked="" type="checkbox"/> 16.152 (Odors) |
| <input type="checkbox"/> 16.82 (Conditional Uses) | <input checked="" type="checkbox"/> 16.112 (Water Supply) | <input checked="" type="checkbox"/> 16.154 (Heat and Glare) |
| <input type="checkbox"/> ? 16.86 (Variances) | <input checked="" type="checkbox"/> 16.114 (Storm Water) | <input type="checkbox"/> 16.162 (Old Town Overlay District) |
| <input type="checkbox"/> 16.86 (Temporary Uses) | <input checked="" type="checkbox"/> 16.116 (Fire Protection) | <input type="checkbox"/> 16.166 (Landmark Designation) |
| <input type="checkbox"/> 16.88 (Interpretation of Similar Uses) | <input checked="" type="checkbox"/> 16.118 (Private Improvements) | |
| <input type="checkbox"/> 16.90 (Site Planning) | <input checked="" type="checkbox"/> 16.120 (Subdivisions) | |

ADDITIONAL CONCERNS OR COMMENTS:

1. Lot widths can only be varied through the PUD process. PUD requires 15% open space. The Council and Planning Commission would not likely entertain less than 5% provided an argument could be made that the schools provide the needed open space. It is not specifically listed in the code. Review section 16.40.020(2). Variances to lot standards within subdivisions are not allowed.
2. Through the PUD process; however, certain architectural features are permitted to encroach into required yards. Review section 16.50
- 3.4-foot side yards may be possible through individual adjustments. See section 16.84.030.A
- 4.The minimum lot dimensions are the same for both zones. Density is calculated after removing existing and future rights of way and protected environmentally sensitive areas.
- 5.Yes, driveway access to Copper Terrace is possible provided they meet the spacing standards.
6. Elwert Road is an Arterial and requires a 15-foot wide visual corridor. Visual corridors must be landscaped and maintained according to section 16.142.040. In this case, it could be located within the public right of-way.
7. No, lot density and minimum lot areas are calculated differently. You can make the argument, but density is an expression of a minimum and maximum that could be permitted on the parent parcel, but you still must meet the minimum standards unless approved through a Planned Unit Development, or some other method.
- 8.Yes, the existing and proposed right of way is removed from the gross area. See section 16.142.030.A.
9. Off site open space is potentially allowed. See 16.142.030.G. (Propose something?)
10. Neighborhood meetings. While not specifically spelled out, two weeks notice is preferred to allow people to adjust their schedules.
- 11.The existing subdivision approval is good until December 2013.

PROCEDURE

- Type II - Administrative Staff Review, Planning Commission for any appeals.
- Type III- Public hearing before the Hearings Officer, Planning Commission for any appeals.
- Type IV- Public hearing before the Planning Commission, City Council for any appeals.
- Type V- Public hearing before the Planning Commission with the Commission making a recommendation on the proposal to the City Council. An additional public hearing shall be held by the City Council. Any appeals shall be heard by the Land Use Board of Appeals (LUBA).

APPLICATION SUBMITTAL PROCESS

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.

- 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 * sets** of narrative addressing application criteria
- Fee** (along with calculations utilized to determine fee if applicable)
- Signed checklist** verifying submittal includes specific materials necessary for the application process

*** Note** that required number of copies must be submitted 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 and one full electronic copy will be required to be submitted.

The Planning Department will perform a preliminary review of the application and will determine whether an application is complete within 30 days of the counter submittal. Staff will notify the applicant if additional information or additional copies of the submitted materials are required.

The administrative decision or public hearing will typically occur approximately 45 to 60 days after an application is deemed complete by the Planning Department. Applications involving difficult or protracted issues or requiring review by other jurisdictions may take additional time to review. Written recommendations from the Planning staff are issued seven (7) days prior to the public hearing. A 14-day public appeal period follows all land use decisions.

Information/Handouts provided at Pre-app:

- Application form
- Neighborhood Meeting Packet
- Subdivision Packet
- Other _____

Prepared by Brad Kilby, (503)625-4206

D.R. Horton's Proposed Daybreak Estates Subdivision (Sherwood, Oregon)
Neighborhood Meeting Minutes

January 22, 2013

Present: See attached sign in sheet (8 neighbors attended the meeting)

I. Presentation

Ryan O'Brien of D.R. Horton explained the proposal to develop the subject property into a 35 lot single family detached residential subdivision. Ryan opened the floor for Question/Comments regarding the subdivision.

II. Discussion

Question/Comment: Will the site's frontage of Elwert Rd. be improved?

Response: Yes, Horton plans to improve the Elwert Frontage.

Question/Comment: How does access align to the Mandel property (located north of the subject site)

Response: Horton has provided a street stub to the Mandel property in its layout.

Question/Comment: Will future development (excluding Daybreak) access Elwert?

Response: We aren't sure at this time what would be proposed with future development but it is possible.

Question/Comment: When do you plan to start site work?

Response: We plan to start infrastructure construction in the summer of 2013 and homes somewhere around November 2013.

Question/Comment: Will Horton or the City build a sidewalk from the intersection of Edy/Copper Terrace to the site and along the site?

Response: Horton will build a sidewalk along its frontage of Copper Terrace but we don't expect a sidewalk to be built from the intersection of Edy/Copper Terrace to Daybreak's northern boundary until development on the adjacent properties occurs.

Question/Comment: Is there a wetland on-site?

Response: Yes and a buffer. We are impacting the buffer and proposing mitigation.

Question/Comment: How do you plan to sewer the site?

Response: from the mainline in Copper Terrace

Question/Comment: Will you stub utilities to Mandel property?

Response: We'll explore it but Mandel may connect to utilities in Copper Terrace.

Question/Comment: Mandel's would like a street stub and storm/sewer/water between lot 16/17 of Daybreak to their property.

Response: Ryan and John Rankin, the Mandel's representative, will meet at a later time and review that.

EXHIBIT "I"

Question/Comment: Where is the water quality facility for the site?

Response: At the City's regional water quality facility north of the property.

Question/Comment: There is a park on site however Horton may work with the City to improve other park facilities or pay a fee to eliminate the park in Daybreak.

Response: None.

Question/Comment: John Rankin requested a copy of the pre-application meeting notes.

Response: Ryan O'Brien sent him a copy by email on 1/23/13.

Question/Comment: Concerns were expressed regarding the quality of the homes to be constructed.

Response: Horton – Portland is in at least the top 10 in the nation for customer service scores

Question/Comment: Will the site be similar to the homes at the Greens in Newberg and is the spec level the same?

Response: We have changed our product substantially so it will not be the same product product. Spec level of the finishes is a bit higher at the Greens.

Question/Comment: Where will construction traffic access, off Elwert?

Response: It will be up to the City and determined during plan approval but likely not on Elwert.

Question/Comment: What is the County's plan on Elwert frontage from Edy Rd. to 99W?

Response: We believe they have developer's install frontage improvements as each property develops but it is possible that the County could initiate a project to complete it all at one time.

Question/Comment: What type of street lights will be installed? Neighbors would like downward facing lamps to preserve the night sky.

Response: We will look into the standard.

NOTICE OF NEIGHBORHOOD MEETING

DATE: 1-14-13

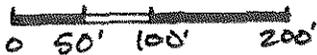
TO: Property Owners in Sherwood

FROM: Ryan O'Brien, Entitlement Manager
DR Horton
4380 SW Macadam Avenue, Suite 100
Portland, OR 97239
office: 503-222-4151, ex. 1115 cell: 503-502-7546 fax: 1-866-640-0447
rmobrien@drhorton.com

SUBJECT: Neighborhood Meeting form 7 pm to 9 pm to review a 35 lot subdivision on Tuesday, 1-22-13 at the loaves and Fishes Senior Center located at 21907 SW Sherwood Blvd., Sherwood, Oregon 97140.

The purpose of this neighborhood meeting is to present a 35 lot subdivision to surrounding property owners before the subdivision application is submitted to the City of Sherwood for review. We encourage you to attend this meeting, ask questions about the subdivision and present your comments. The subdivision lots will be a minimum of 50 feet in width and average 5000 square feet in area. The developer and home builder will be DR Horton. All of the lots will be developed with single family detached houses. This subdivision will be developed in one phase in the summer of 2013. A subdivision plan and a map showing the location of the property are enclosed.

DAYBREAK SUBDIVISION



T.L. 250

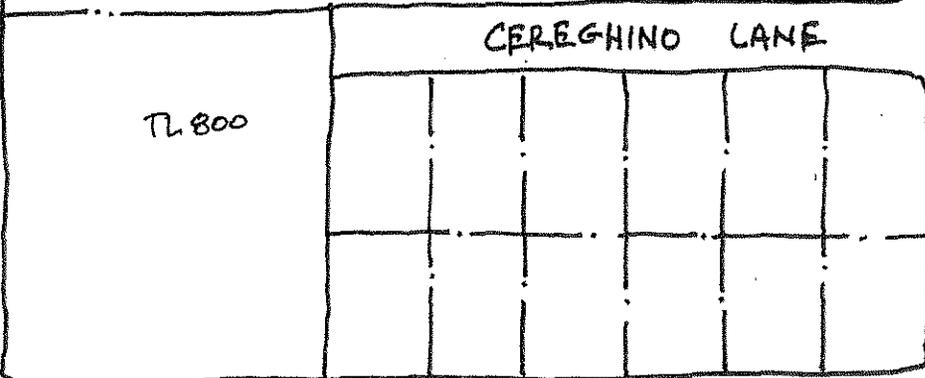
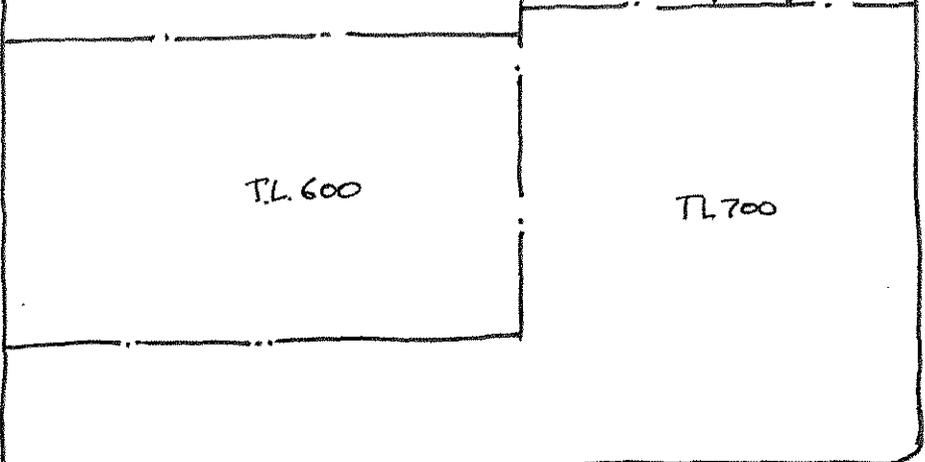
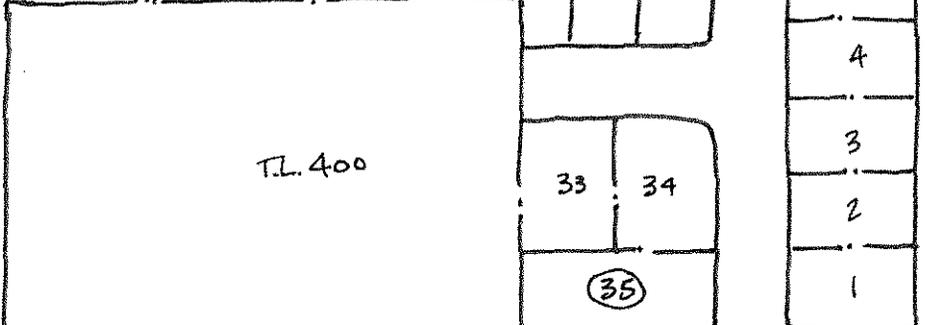
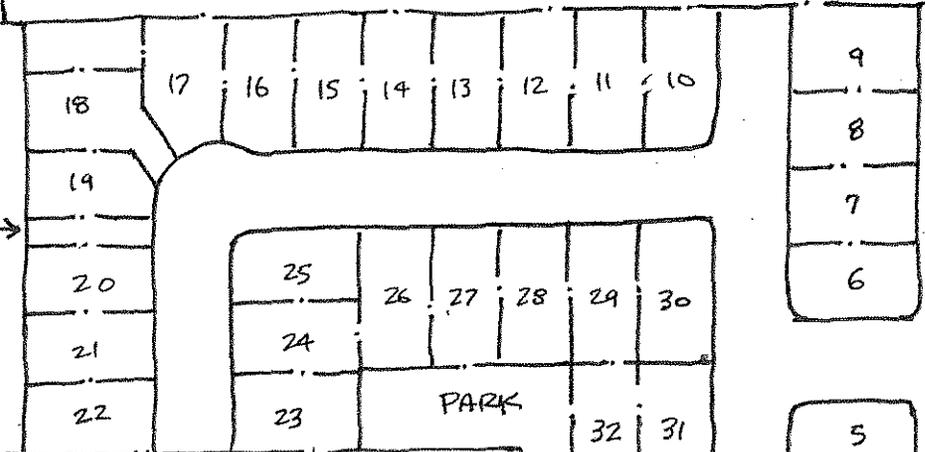
ELWERT ROAD
PED & EMERGENCY ACCESS

ELWERT ROAD

LAUREL RIDGE MIDDLE SCHOOL SITE

SCHOOL ENTRANCE

COPPER TERRACE



HANDLEY DRIVE



November 7, 2012

Ryan O'Brian
DR Horton
4380 SW Macadam Ave, Suite 100
Portland OR 97239

Re: Daybreak Subdivision

Dear Ryan,

Thank you for the opportunity to review the proposed site plan surrounding the above named development project. Tualatin Valley Fire & Rescue endorses this proposal predicated on the following criteria and conditions of approval:

- 1) **DEAD END ROADS:** Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. (OFC 503.2.5) ***"D" Street exceeds 150 feet in length and is a dead end. Provide an approved fire department turn around for "D" Street.***
- 2) **FIRE APPARATUS ACCESS ROAD EXCEPTION FOR AUTOMATIC SPRINKLER PROTECTION:** When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access may be modified as approved by the fire code official. (OFC 503.1.1) ***Note: If residential fire sprinklers are elected as an alternate means of protection and the system will be supported by a municipal water supply, please contact the local water purveyor for information surrounding water meter sizing.***
- 3) **AERIAL FIRE APPARATUS ACCESS:** Buildings or portions of buildings or facilities exceeding 30 feet in height above the lowest level of fire department vehicle access shall be provided with approved fire apparatus access roads capable of accommodating fire department aerial apparatus. Overhead utility and power lines shall not be located within the aerial fire apparatus access roadway. Fire apparatus access roads shall have a minimum unobstructed width of 26 feet in the immediate vicinity of any building or portion of building more than 30 feet in height. At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet and a maximum of 30 feet from the building, and shall be positioned parallel to one entire side of the building. (OFC D105)
- 4) **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 & D103.1)
- 5) **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. (OFC D103.1)
- 6) **NO PARKING SIGNS:** Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Roads 26 feet wide or less shall be posted on both sides as a fire lane. Roads more than 26 feet wide to 32 feet wide shall be posted on one side as a fire lane. Signs shall read "NO PARKING - FIRE LANE" and shall be installed with a clear space above grade

EXHIBIT "J"

level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)

- 7) **SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 12,500 pounds point load (wheel load) and 60,000 pounds live load (gross vehicle weight). You may need to provide documentation from a registered engineer that the design will be capable of supporting such loading. (OFC D102.1)
- 8) **TURNING RADIUS:** The inside turning radius and outside turning radius shall be not less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & 103.3)
- 9) **PAINTED CURBS:** Where required, fire apparatus access roadway curbs shall be painted red and marked "NO PARKING FIRE LANE" at approved intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background. (OFC 503.3)
- 10) **GRADE:** Fire apparatus access roadway grades shall not exceed 10 percent. Intersections and turnarounds shall be level (maximum 5%) with the exception of crowning for water run-off. When fire sprinklers are installed, a maximum grade of 15% may be allowed. The approval of fire sprinklers as an alternate shall be accomplished in accordance with the provisions of ORS 455.610(5). (OFC 503.2.7 & D103.2)
- 11) **SINGLE FAMILY DWELLINGS - REQUIRED FIRE FLOW:** The minimum available fire flow for single family dwellings and duplexes 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 IFC Appendix B. (OFC B105.2) ***Prior to issuance of a building permit, provide evidence of a current fire flow test of the nearest fire hydrant demonstrating available flow at 20 PSI residual pressure.***
- 12) **FIRE HYDRANTS – ONE- AND TWO-FAMILY DWELLINGS & ACCESSORY STRUCTURES:** Where a 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)
- 13) **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 Appendix C, Table C 105.1.

Considerations for placing fire hydrants may be as follows:

- 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.
 - 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 code official.
 - 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 only as approved by the fire code official.
 - 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 code official.
- 14) **PRIVATE FIRE HYDRANTS:** To distinguish private fire hydrants from public fire hydrants, private fire hydrants shall be painted red. (OFC 507.2.1, NFPA 24 & 291)
 - 15) **FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD:** Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway. (OFC C102.1)

- 16) **REFLECTIVE HYDRANT MARKERS:** Fire hydrant locations shall be identified by the installation of reflective markers. The markers shall be blue. They shall be located adjacent and to the side of the centerline of the access road way that the fire hydrant is located on. In case that there is no center line, then assume a centerline, and place the reflectors accordingly. (OFC 510.1)
- 17) **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)
- 18) **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)
- 19) **FIRE HYDRANT/FIRE DEPARTMENT CONNECTION:** A fire hydrant shall be located within 100 feet of a fire department connection (FDC). Fire hydrants and FDCs shall be located on the same side of the fire apparatus access roadway and or drive aisle. FDCs shall normally be remote except when approved by the fire code official. Fire sprinkler FDCs shall be plumbed to the fire sprinkler riser downstream of all control valves. Each FDC shall be equipped with a metal sign with 1 inch raised letters and shall read, "AUTOMATIC SPRINKLERS OR STANDPIPES" or a combination there of as applicable. (OFC 912.2)
- 20) **ACCESS AND FIRE FIGHTING WATER SUPPLY DURING CONSTRUCTION:** Approved fire apparatus access roadways and fire fighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 1410.1 & 1412.1)
- 21) **PREMISES IDENTIFICATION:** 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. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet numbers. Numbers shall be a minimum of 4 inches high with a ½ inch stroke. (OFC 505.1)
- 22) **ANGLE OF APPROACH AND DEPARTURE:** The angles of approach and departure for fire apparatus roads shall not exceed 8 Degrees. (OFC 503.2.8, NFPA 1901)

ADDITIONAL COMMENTS:

23)

If you have questions or need further clarification, please feel free to contact me at 503.259.1504.

Sincerely,

John Wolff

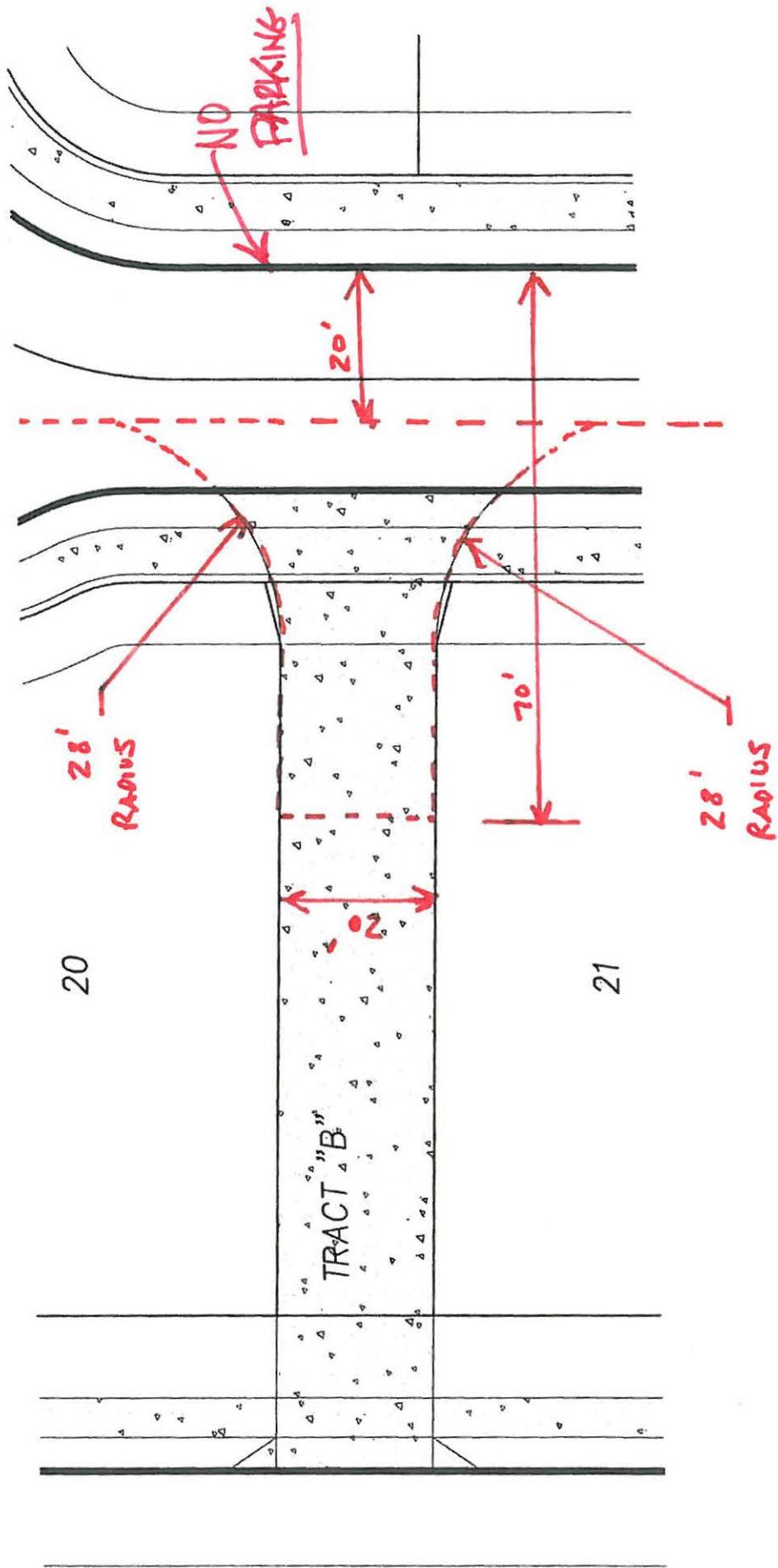
John Wolff
Deputy Fire Marshal

Copy:
City of Sherwood
TVFR File

FIRE TRUCK TURNAROUND



1" = 20'



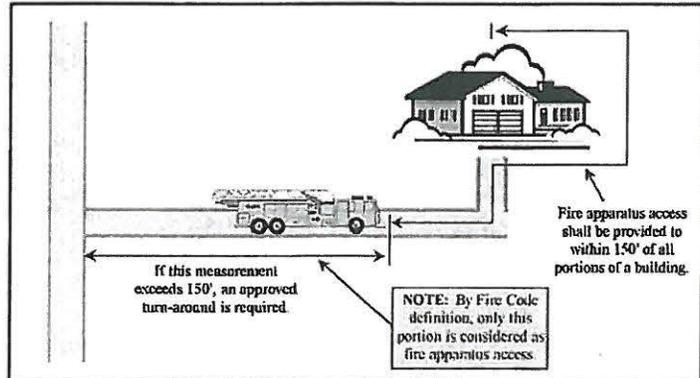
Fire Apparatus Access

FIRE APPARATUS ACCESS ROAD EXCEPTIONS: The requirements for fire apparatus access may be modified as approved by the fire code official where any of the following apply: (OFC 503.1.1 Exception)

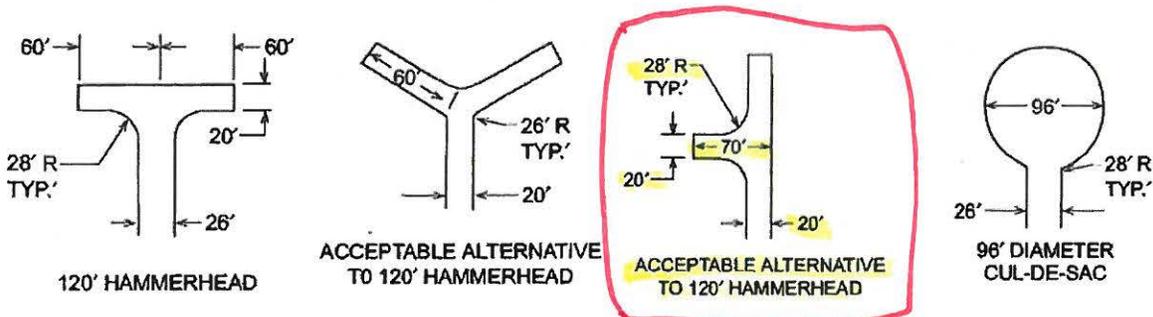
- 1) Buildings are equipped throughout with an approved automatic fire sprinkler system (the approval of this alternate method of construction shall be accomplished in accordance with the provisions of ORS 455.610(5)).

FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDING AND TURNAROUNDS:

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. 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)

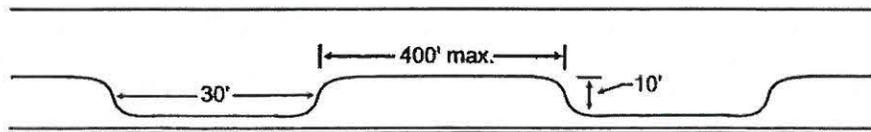


DEAD END ROADS AND TURNAROUNDS: Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams of approved turnarounds are shown below: (OFC 503.2.5)



TURNING RADIUS: The inside turning radius and outside turning radius shall be not less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & 103.3)

TURNOUTS: When a fire apparatus access road exceeds 400 feet in length, turnouts 10 feet wide and 30 feet long shall be provided in addition to the required road width and shall be placed no more than 400 feet apart, unless otherwise approved by the fire code official. These distances may be adjusted based on visibility and sight distances. (OFC 503.2.2)



MULTIPLE ACCESS ROADS: Developments of one- and two-family dwellings where the number of dwelling units exceeds 30, multiple-family residential projects having more than 100 dwelling units and where vehicle congestion, adverse terrain conditions or other factors that could limit access, as determined by the fire code official, shall be provided with not less than two approved means of access. Exceptions may be allowed for approved automatic sprinkler system. The approval of fire sprinklers as an alternate shall be accomplished in accordance with the provisions of ORS 455.610(5). (OFC D106 & OFC D107)

Wetland Delineation Detail

Some Wetland Delineation files are PDFs or require Adobe Acrobat for printing 

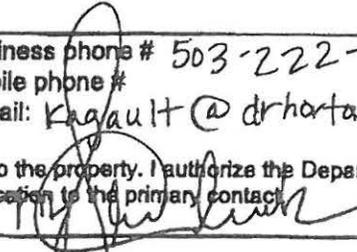
Applicant	Horton DR
Wetland Delineation Number	WD2013-0046 View Scanned WD
Type	Wetland Delineation
County	Washington
Location	02S01W30CC
Date Received	January 29, 2013
Current Status	Review Pending
DSL Wetland Specialist Phone Fax	Peter Ryan 503 986-5232 503-378-4844

[Home](#) | [Agency Site](#)

EXHIBIT - "K"

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

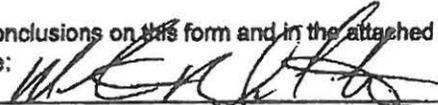
This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report and submit to: Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1278. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

<input checked="" type="checkbox"/> Applicant <input type="checkbox"/> Owner Name, Firm and Address: DR.Horton, Inc. - Portland 4380 SW Macadam Suite 100 Portland, OR, 97239	Business phone # 503.222.4151 ext 1145 Mobile phone # (optional) 503-577-7900 E-mail: KAGault@drhorton.com
<input checked="" type="checkbox"/> Authorized Legal Agent, Name and Address: D.R. Horton, Inc. - Portland Attn: M. Scott Clark 4380 SW Macadam Ste 100 Portland, OR 97239	Business phone # 503-222-4151 Mobile phone # E-mail: Kagault@drhorton.com
I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact. Typed/Printed Name: <u>M. Scott Clark, City Manager</u> Signature:  Date: _____ Special instructions regarding site access: _____	

Project and Site Information (using decimal degree format for lat/long., enter centroid of site or start & end points of linear project)

Project Name: Daybreak Estates LLC	Latitude: 45.3638	Longitude: -122.8663
Proposed Use: Residential	Tax Map # 2S 1 30CC	
Project Street Address (or other descriptive location): 21500 & 21730 SW Elwert Road	Township 2S Range 1W Section 30 QQ CC	Tax Lot(s) 300, 500
City: Sherwood County: Washington	Waterway: trib to Chicken Cr. River Mile: unk. NW1 Quad(s): _____	

Wetland Delineation Information

Wetland Consultant Name, Firm and Address: Schott and Associates Attn: Martin Schott/Juniper Tagliabue PO Box 589 Aurora, OR 97002	Phone # 503.876.6007 Mobile phone # E-mail: martin@schottandassociates.com
The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge. Consultant Signature:  Date: 1/17/13	
Primary Contact for report review and site access is <input checked="" type="checkbox"/> Consultant <input type="checkbox"/> Applicant/Owner <input type="checkbox"/> Authorized Agent	
Wetland/Waters Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Study Area size: 6.38 Total Wetland Acreage: 0	

Check Box Below if Applicable:

Fees:

<input type="checkbox"/> R-F permit application submitted <input type="checkbox"/> Mitigation bank site <input type="checkbox"/> Wetland restoration/enhancement project (not mitigation) <input type="checkbox"/> Industrial Land Certification Program Site <input type="checkbox"/> Reissuance of a recently expired delineation Previous DSL # _____ Expiration date _____	<input checked="" type="checkbox"/> Fee payment submitted \$ 386. <input type="checkbox"/> Fee (\$100) for resubmittal of rejected report <input type="checkbox"/> No fee for request for reissuance of an expired report
---	--

Other Information:	Y	N	
Has previous delineation/application been made on parcel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If known, previous DSL # 07-0617
Does LWI, if any, show wetland or waters on parcel?	<input type="checkbox"/>	<input type="checkbox"/>	

For Office Use Only

DSL Reviewer: _____	Fee Paid Date: ____/____/____	DSL WD # _____
Date Delineation Received: ____/____/____	DSL Project # _____	DSL Site # _____
Scanned: <input type="checkbox"/> Final Scan: <input type="checkbox"/>	DSL WN # _____	DSL App. # _____

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(A) Landscape Setting and Land Use

The 6.38 acre subject property was located east of SW Elwert Road and south of SW Edy Road in Sherwood, Oregon (T2S R1W Sec.30CC TL#300, 500). The property was bound to the west by SW Elwert Road and to the east by SW Copper Terrace. To the south is a gravel driveway with a planted field in the southwest corner adjacent to Elwert Road. To the north is rural residential and agricultural. Surrounding land use was residential and agricultural. Across the street to the east was a school.

The site is north and east sloping. Lot 300 is developed with a residential home as well as outbuildings, a basketball court and landscaping. A gravel driveway running east to west between SW Elwert Road and SW Copper Terrace provides access and defines the southern property boundary. Tax Lot 500 was an undeveloped north sloping lot sandwiched between the northern half of Lot 300 and SW Elwert road. The ground layer was vegetated with a mix of grasses including colonial bentgrass (*Agrostis tenuis*), orchard grass (*Dactylis glomerata*) and tall fescue (*Festuca arundinacea*). Himalayan blackberry (*Rubus discolor*) grew across the entire undeveloped portion of the site.

An unnamed tributary to Chicken Creek entered the site through a culvert under SW Elwert Road at the northwest corner of the property. West of Elwert Road the stream flows north through a roadside ditch. The onsite portion of the drainage consisted of a ditched perennial stream flowing east approximately 15 feet onsite before continuing northeast offsite. Vegetation along the creek was predominantly thick blackberry with a few willow (*Salix lasiandra*).

(B) Site Alterations

Lot 300 is developed with a residential home, outbuildings, a sports court and landscaping. A gravel driveway running east to west between SW Elwert Road and SW Copper Terrace provides access and defines the southern property boundary. Development in 2008 for construction of a school to the east included creation of SW Copper Terrace defining the eastern property boundary.

(C) Precipitation Data and Analysis

The site was visited on December 3rd, 2012. The Sherwood weather station (accuweather.com) recorded 0.52" of precipitation on that day. Total precipitation recorded in the two weeks prior to the site visit was 4.96". No WETS table is available for Sherwood. Precipitation for September was well below average according to the Beaverton WETS table. Precipitation for October and November were well above average. On December 3rd, the day of the site visit, 25% of average rainfall had already been recorded. Between October 1st, 2012 and December 3rd, 2012 a total of 16.72 inches of rain was recorded. This is over 100 percent of the water year average through the entire month of December.

Schott & Associates

Ecologists and Wetland Specialists

PO Box 589, Aurora, OR. 97002 • (503) 678-6007 • Fax (503) 678-6011

Page 1

S&A#:2242

Table 1. Precipitation Summary and WETS Averages

Month	2012 Precipitation	WETS Average	WETS Range	Percent of Average
September	0.12"	1.54"	0.68"-1.94"	0.08%
October	6.74"	3.01"	1.64"-3.67"	224%
November	8.42"	5.88"	4.06"-7.00"	143%
December**	1.56"	6.19"	4.34"-7.35"	25%
Water Year*	16.72"	10.43"		160%
Water Year**		16.62"		101%

*Precipitation through December 3rd, compared with average through November

** Precipitation through December 3rd, compared with average through entire month of December

(D) Site Specific Methods

A previous delineation had been conducted in 2007 (WD#07-0617). Schott and Associates walked the subject property to assess the presence or absence of onsite wetlands and waters. The 1987 Manual and Regional Supplement for Mountains and Valleys West Region were used to determine presence or absence of State of Oregon wetland boundaries and the Federal jurisdictional wetlands. Sample plots were placed in the lowest topographic locations and where the previous wetland delineation indicated the presence of wetlands or where wetland indicators were observed. The onsite portion of the drainage was flagged at the ordinary high water (OHW) line. For each sample plot, data on vegetation, hydrology and soils was collected, recorded in the field and later transferred to data forms (Appendix B).

(E) Description of All Wetlands and Other Non-Wetland Waters

Based on soil, vegetation and hydrology data taken in the field no wetlands were present on the site. One perennial drainage entered at the northwest corner of the property, flowing from a culvert under SW Elwert Road east approximately 15 feet before turning north off property.

(F) Deviation from LWI or NWI

No wetlands are indicated on the web version of the National Wetland Inventory (NWI). The property does not lie within the Local Wetland Inventory (LWI) for the City of Sherwood. This is consistent with what was found onsite.

(G) Mapping Method

The site was surveyed by CTM Surveying/Consulting, a Professional Land Surveyor (PLS).

(H) Additional Information

A wetland delineation of the site was conducted by another firm in 2007. The map from this delineation was used as a base map for identifying potential wetland areas. The presence and location of a perennial drainage in the northwest corner of the site was confirmed. A sample plot was placed just south of the drainage at the lowest point (SP3) to determine whether associated wetlands were present. Soils were 10YR3/2-3 silt loam and did not meet any hydric soil indicators. Vegetation was dominated by Himalayan blackberry and a mix of sweet vernal grass and colonial bentgrass and did not meet the vegetation criterion. Water was observed 7" from the surface but was likely influenced by higher than average precipitation for the past two months. The wider wetland swale identified in the previous delineation could not be confirmed.

A wetland had been mapped by ESA in a delineation of the school property to the east, a portion of which was located on the subject property. This wetland area was confirmed by PHS and concurred with by DSL in 2007. Three sample plots (SP6, SP7, SP8) were placed in this area to document current conditions. Soils were 10YR3/2 or 10YR3/3 and did not meet any hydric soil indicators. Vegetation was dominated by reed canary grass (*Phalaris arundinacea*) (SP6, SP8) or colonial bentgrass (SP7) and hydrology was observed 3 to 5 inches from the surface, likely due to recent heavy rainfall. Construction of the road to the east likely cut off hydrology to the low area in the northeast corner of the site delineated as wetland in 2007 changing conditions in this area. Soil criterion was not met and this area was not determined to be a wetland.

(I) Results and Conclusions

Based on soil, vegetation and hydrology data taken in the field no wetlands were present on the site. One perennial drainage entered at the northwest corner of the property, flowing from a culvert under SW Elwert Road east approximately 15 feet before turning north off property.

The Washington County Soil Survey mapped Woodburn silt loam on 0-3% slopes through the central portion of the site. Huberly silt loam, a hydric soil series, was mapped along the western edge of the property and in a swale in the northeast part of the property. Aloha silt loam was mapped in the southern, developed, part of the property.

No wetlands are indicated on the NWI. The LWI for Sherwood does not include the subject property. The topographic map showed a gently north and east sloping site with a perennial drainage flowing east and then north in the northwest corner of the site.

(J) Disclaimer

This report documents the investigation, best professional judgment and the conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and

used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State lands in accordance with OAR 141-090-0005 through 141-090-0055.

Schott & Associates

Ecologists and Wetland Specialists

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Page 4

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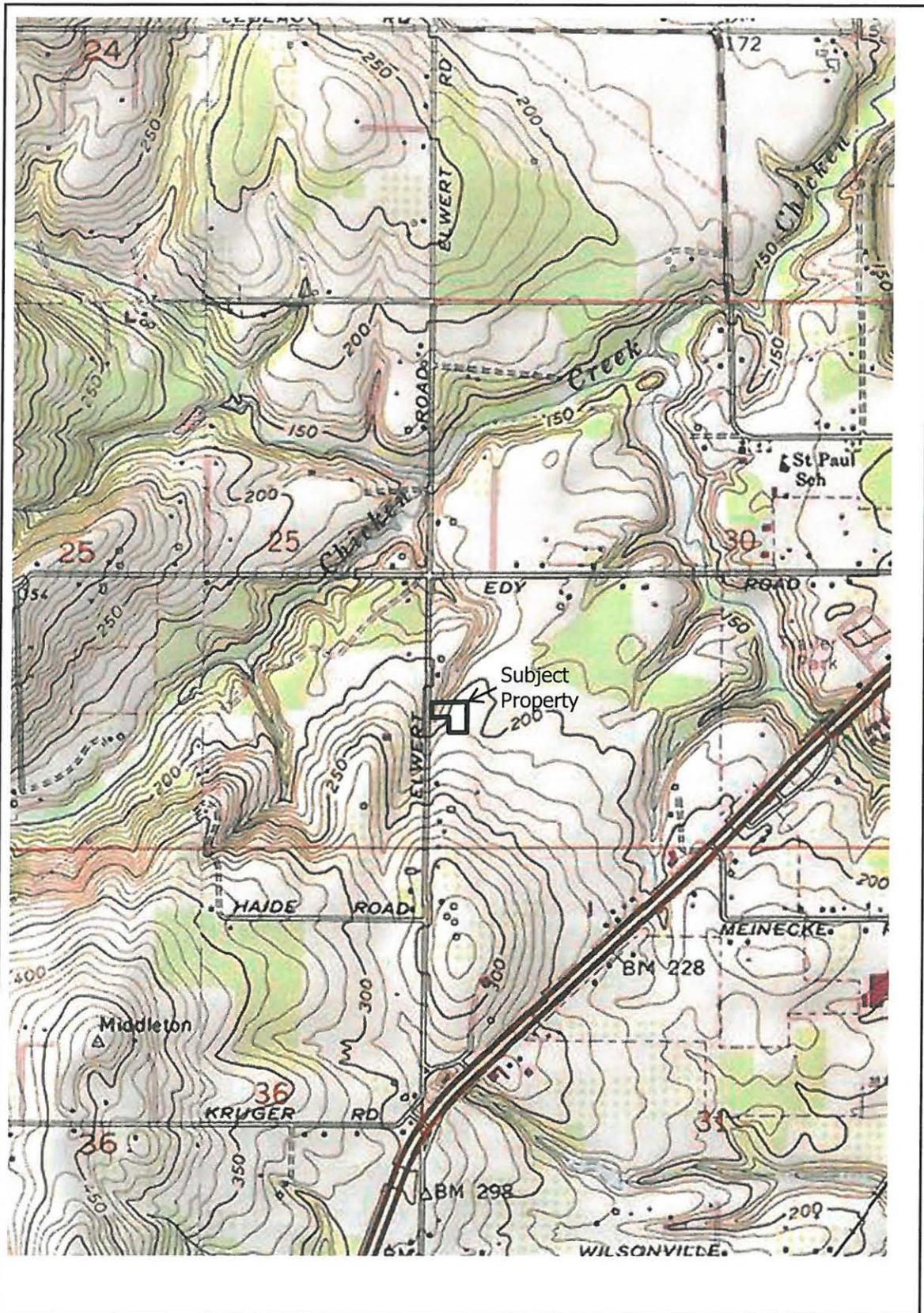


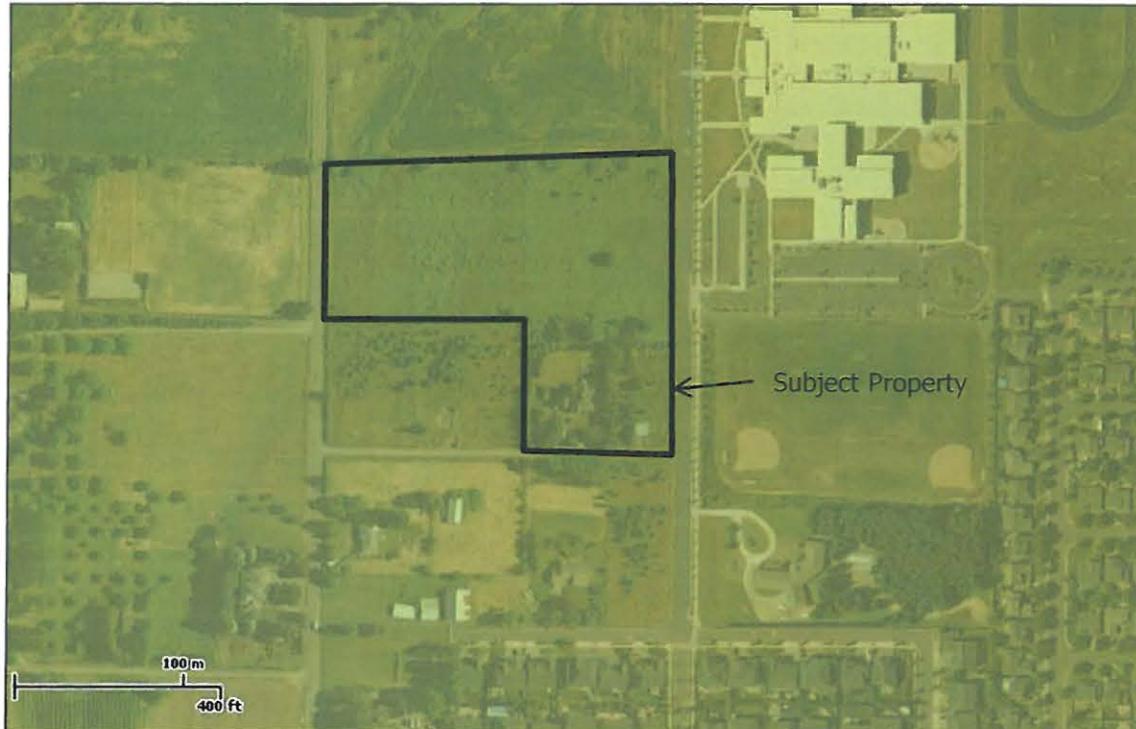
Figure 1. Site Location Map – Topographic Map
Daybreak Estates
S&A#2242

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Aurora, OR. 97002
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U.S. Fish and Wildlife Service

National Wetlands Inventory



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riveline
- Other

Status

- Digital
- Scan
- Non-Digital
- No Data

Figure 3. National Wetland Inventory Map
Daybreak Estates
S&A#2242

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Map Unit Symbol	Map Unit Name
1	Aloha silt loam
22	Huberty silt loam
45A	Woodburn silt loam, 0 to 3 percent slopes

Figure 4. Washington County Soil Survey – Web Survey
 Daybreak Estates
 S&A#2242

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 503.678.6007



Figure 5. Aerial Photograph – Google Earth 2012
Daybreak Estates
S&A#2242

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Photo Point 1. Facing east at onsite tributary



Photo Point 1. Facing south along SW Elwert road

Appendix C. Site Photographs
Daybreak Eatates
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Photo Point 2. Facing East to SP3



Photo Point 3. Facing Northeast from SP8

Appendix C. Site Photographs
Daybreak Eatates
S&A#2242

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Aurora, OR. 97002
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Photo Point 3. Facing West-Northwest



Photo Point 3. Facing South

Appendix C. Site Photographs
Daybreak Estates
S&A#2242

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Photo Point 3. Facing Southwest



Photo Point 4. Facing North from drain grate along SW Copper Terrace

Appendix C. Site Photographs
Daybreak Estates
S&A#2242

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Photo Point 4. Facing South



Photo Point 5. Facing South

Appendix C. Site Photographs
Daybreak Estates
S&A#2242

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503.678.6007



Appendix D, Historical Aerial Photograph – Google Earth 2007
Daybreak Estates
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503.678.6007



Appendix D. Historical Aerial Photographs – Google Earth 2008
Daybreak Estates
S&A#2242

Schott & Associates
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Aurora, OR. 97002
503.678.6007

Appendix E: References

- Environmental Laboratory, 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.
- Environmental Laboratory, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0)*, Wetlands Regulatory Assistance Program ERDC/EL TR-10-3 U.S. Army Engineer Research and Development Center. Vicksburg, MS.
- Federal Interagency Committee for Wetland Delineation, 1989. *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication. 138 pp.
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- Federal Register, 1982. Title 33, *Navigation and Navigable Waters; Chapter II, Regulatory Programs of the Corps of Engineers*. Vol. 47, No. 138, p. 31810, U.S. Govt. Printing Office, Washington, D.C.
- Federal Register, 1986. 33 CFR Parts 320 through 330, *Regulatory Programs of the Corps of Engineers; Final Rule*, Vol. 51, No. 219 pp. 41206-41259, U.S. Govt. Printing Office, Washington, D.C.
- Kollmorgen Corporation, 1975. *Munsell Soil Color Charts*. Macbeth Division of Kollmorgen Corporation, Baltimore, MD.
- U.S. Army Corps of Engineers – Cold Regions Research and Engineering Laboratory (CRREL). 2012. *State of Oregon NWPL – Final Draft Ratings*
- U.S. Department of Agriculture, Web Soil Survey *Soil Survey of Washington County, Oregon*. U.S.D.A. Soil Conservation Service, Washington, D.C.,

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	10YR3/2	100					SIL	
5-16	10YR3/2-3	100					SIL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Dark Surface (F6)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Depleted Dark Surface (F7)	
	<input type="checkbox"/> Redox Depressions (F8)	

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): 3"	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes 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.

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <i>Rubus discolor</i>	1		FACU	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 = _____
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Phalaris arundinacea</i>	100		FACW	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.
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____				Yes <input type="checkbox"/> No <input type="checkbox"/>
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum 0				

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the Indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR3/2	100					SIL	
6-16	10YR3/2	100					SICL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Indicators for Problematic Hydric Soils³:

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			

Field Observations:

Surface Water Present? Yes No Depth (Inches): _____

Water Table Present? Yes No Depth (Inches): 4"

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: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ State: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Yes No
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? Yes No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				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 = _____
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	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.
1. <i>Agrostis tenuis</i>	90		FAC	
2. <i>Holcus lanatus</i>	5		FAC	
3. <i>Cirsium vulgare</i>	T		FAC	
4. <i>Epiobium sp.</i>	T		FAC	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
95 = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input type="checkbox"/>
1. _____				
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum 5				
Remarks:				

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR3/3	100					SIL	
6-14	10YR3/2	100					SIL	
14-16	10YR3/2	98	10YR3/4	2	C	M	SIL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- 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 Soils³:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- 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): 5"
 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: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ State: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? Yes No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				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 = _____
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Phalaris arundinacea</i>	100		FACW	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.
2. <i>Cirsium vulgare</i>	T		FAC	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
100 = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____				Yes <input type="checkbox"/> No <input type="checkbox"/>
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum 0				
Remarks:				

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR3/2	100					SiL	
6-8	10YR3/2	100					GrSiL	
8-16	10YR3/2	100					SiL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): surface	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ State: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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.



Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. Unk. Ornamental	25	<input checked="" type="checkbox"/>	NOL	Number of Dominant Species That Are OBL, FACW, or FAC: <input checked="" type="checkbox"/> (A)
2. _____		<input type="checkbox"/>		Total Number of Dominant Species Across All Strata: <input checked="" type="checkbox"/> (B)
3. _____		<input type="checkbox"/>		Percent of Dominant Species That Are OBL, FACW, or FAC: <input checked="" type="checkbox"/> (A/B)
4. _____		<input type="checkbox"/>		
	25	= Total Cover		
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____		<input type="checkbox"/>		Total % Cover of: Multiply by:
2. _____		<input type="checkbox"/>		OBL species <input checked="" type="checkbox"/> x 1 = <input checked="" type="checkbox"/>
3. _____		<input type="checkbox"/>		FACW species <input checked="" type="checkbox"/> x 2 = <input checked="" type="checkbox"/>
4. _____		<input type="checkbox"/>		FAC species <input checked="" type="checkbox"/> x 3 = <input checked="" type="checkbox"/>
5. _____		<input type="checkbox"/>		FACU species <input checked="" type="checkbox"/> x 4 = <input checked="" type="checkbox"/>
		= Total Cover		UPL species <input checked="" type="checkbox"/> x 5 = <input checked="" type="checkbox"/>
				Column Totals: <input checked="" type="checkbox"/> (A) <input checked="" type="checkbox"/> (B)
				Prevalence Index = B/A = <input checked="" type="checkbox"/>
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Agrostis tenuis</i>	70	<input checked="" type="checkbox"/>	FAC	<input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
2. <i>Festuca arundinacea</i>	15	<input checked="" type="checkbox"/>	FAC	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%
3. <i>Cirsium vulgare</i>	10	<input checked="" type="checkbox"/>	FAC	<input checked="" type="checkbox"/> 3 - Prevalence Index is =3.0 ¹
4. <i>Juncus effusus</i>	5	<input checked="" type="checkbox"/>	FACW	<input checked="" type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5. <i>Holcus lanatus</i>	T	<input checked="" type="checkbox"/>	FAC	<input checked="" type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹
6. _____		<input type="checkbox"/>		Problematic Hydrophytic Vegetation ¹ (Explain)
7. _____		<input type="checkbox"/>		
8. _____		<input type="checkbox"/>		
9. _____		<input type="checkbox"/>		
10. _____		<input type="checkbox"/>		
11. _____		<input type="checkbox"/>		
	100	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____		<input type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____		<input type="checkbox"/>		
		= Total Cover		
% Bare Ground in Herb Stratum <u>0</u>				

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR3/3	100					SIL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Restrictive Layer (if present):
 Type: _____
 Depth (Inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): _____	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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.

Remarks:

VEGETATION – Use scientific names of plants.

Stratum	Plot size	Absolute % Cover	Dominant Species?	Indicator Status	Notes
Tree Stratum (Plot size: _____)					
1. <i>Picea pungens</i>		5	<input checked="" type="checkbox"/>	NOL	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____			<input type="checkbox"/>		
3. _____			<input type="checkbox"/>		
4. _____			<input type="checkbox"/>		
		5	= Total Cover		
Sapling/Shrub Stratum (Plot size: _____)					
1. _____			<input type="checkbox"/>		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 = _____
2. _____			<input type="checkbox"/>		
3. _____			<input type="checkbox"/>		
4. _____			<input type="checkbox"/>		
5. _____			<input type="checkbox"/>		
Herb Stratum (Plot size: _____)					
1. <i>Agrostis tenuis</i>		75	<input checked="" type="checkbox"/>	FAC	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input checked="" type="checkbox"/> 3 - Prevalence Index is >3.0 ¹ <input checked="" type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain)
2. <i>Dactylis glomerata</i>		5	<input checked="" type="checkbox"/>	FACU	
3. <i>Trifolium pratense</i>		1	<input checked="" type="checkbox"/>	FACU	
4. <i>Taraxicum officinale</i>		T	<input checked="" type="checkbox"/>	FACU	
5. <i>Daucus carota</i>		T	<input checked="" type="checkbox"/>	NOL	
6. <i>Cirsium arvense</i>		1	<input checked="" type="checkbox"/>	FAC	
7. _____			<input type="checkbox"/>		
8. _____			<input type="checkbox"/>		
9. _____			<input type="checkbox"/>		
10. _____			<input type="checkbox"/>		
11. _____			<input type="checkbox"/>		
		82	= Total Cover		
Woody Vine Stratum (Plot size: _____)					
1. _____			<input type="checkbox"/>		Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. _____			<input type="checkbox"/>		
% Bare Ground in Herb Stratum 8			= Total Cover		

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features			Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹		
0-16	10YR3/2-3	100				SIL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- 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)

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____
Depth (Inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- 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)

- 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): 7"
 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: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ State: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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.



Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				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 = _____
Sapling/Shrub Stratum (Plot size: _____)				
1. <i>Rubus discolor</i>	80		FACU	
2. _____				
3. _____				
4. _____				
5. _____				
80 = Total Cover				
Herb Stratum (Plot size: _____)				
1. <i>Agrostis tenuis</i>	40		FAC	
2. <i>Anthoxanthum odoratum</i>	20		FACU	
3. <i>Epilobium sp</i>	10		FAC	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
70 = Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum	10			Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input type="checkbox"/>

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the Indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9	10YR3/2	100					SIL	
9-16	2.5Y4/2	100					SiCL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): 18"	
Saturation Present?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	
(includes capillary fringe)	Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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.

Remarks: _____

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	<input checked="" type="checkbox"/>	_____	Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <i>Rosa pisocarpa</i>	25	<input checked="" type="checkbox"/>	FAC	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 = _____
2. <i>Rubus discolor</i>	T	<input checked="" type="checkbox"/>	FACU	
3. <i>Rubus laciniatus</i>	T	<input checked="" type="checkbox"/>	FACU	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
25 = Total Cover				
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <i>Agrostis tenuis</i>	40	<input checked="" type="checkbox"/>	FAC	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.
2. <i>Festuca arundinacea</i>	5	<input checked="" type="checkbox"/>	FAC	
3. <i>Juncus effusus</i>	15	<input checked="" type="checkbox"/>	FACW	
4. <i>Plantago lanceolata</i>	5	<input checked="" type="checkbox"/>	FAC	
5. <i>Cirsium vulgare</i>	T	<input checked="" type="checkbox"/>	FAC	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
65 = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	<input type="checkbox"/>	_____	Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	<input type="checkbox"/>	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>10</u>				

Remarks: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR3/3	100					SIL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

<p>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</p> <p><input type="checkbox"/> Histic Epipedon (A2)</p> <p><input type="checkbox"/> Black Histic (A3)</p> <p><input type="checkbox"/> Hydrogen Sulfide (A4)</p> <p><input type="checkbox"/> Depleted Below Dark Surface (A11)</p> <p><input type="checkbox"/> Thick Dark Surface (A12)</p> <p><input type="checkbox"/> Sandy Mucky Mineral (S1)</p> <p><input type="checkbox"/> Sandy Gleyed Matrix (S4)</p>	<p><input type="checkbox"/> Sandy Redox (S5)</p> <p><input type="checkbox"/> Stripped Matrix (S6)</p> <p><input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)</p> <p><input type="checkbox"/> Loamy Gleyed Matrix (F2)</p> <p><input type="checkbox"/> Depleted Matrix (F3)</p> <p><input type="checkbox"/> Redox Dark Surface (F6)</p> <p><input type="checkbox"/> Depleted Dark Surface (F7)</p> <p><input type="checkbox"/> Redox Depressions (F8)</p>	<p>Indicators for Problematic Hydric Soils³:</p> <p><input type="checkbox"/> 2 cm Muck (A10)</p> <p><input type="checkbox"/> Red Parent Material (TF2)</p> <p><input type="checkbox"/> Very Shallow Dark Surface (TF12)</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p> <p>³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic</p>
---	--	---

Restrictive Layer (if present):
 Type: _____
 Depth (Inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

<p>Primary Indicators (minimum of one required; check all that apply)</p> <p><input type="checkbox"/> Surface Water (A1)</p> <p><input type="checkbox"/> High Water Table (A2)</p> <p><input type="checkbox"/> Saturation (A3)</p> <p><input type="checkbox"/> Water Marks (B1)</p> <p><input type="checkbox"/> Sediment Deposits (B2)</p> <p><input type="checkbox"/> Drift Deposits (B3)</p> <p><input type="checkbox"/> Algal Mat or Crust (B4)</p> <p><input type="checkbox"/> Iron Deposits (B5)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6)</p> <p><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</p> <p><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</p>	<p><input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)</p> <p><input type="checkbox"/> Salt Crust (B11)</p> <p><input type="checkbox"/> Aquatic Invertebrates (B13)</p> <p><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</p> <p><input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</p> <p><input type="checkbox"/> Presence of Reduced Iron (C4)</p> <p><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</p> <p><input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>	<p>Secondary Indicators (2 or more required)</p> <p><input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)</p> <p><input type="checkbox"/> Drainage Patterns (B10)</p> <p><input type="checkbox"/> Dry-Season Water Table (C2)</p> <p><input type="checkbox"/> Saturation Visible on Aerial Imagery (C8)</p> <p><input type="checkbox"/> Geomorphic Position (D2)</p> <p><input type="checkbox"/> Shallow Aquitard (D3)</p> <p><input type="checkbox"/> FAC-Neutral Test (D5)</p> <p><input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)</p> <p><input type="checkbox"/> Frost-Heave Hummocks (D7)</p>
---	--	---

Field Observations:

<p>Surface Water Present? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Water Table Present? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Depth (Inches): _____</p> <p>Depth (inches): 14"</p> <p>Depth (inches): _____</p>	<p>Wetland Hydrology Present? Yes <input type="checkbox"/> No <input type="checkbox"/></p>
---	--	---

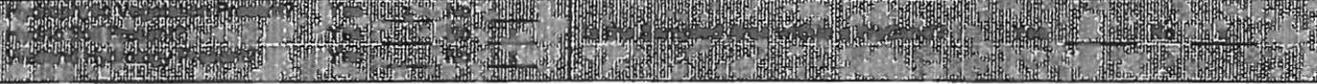
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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.



Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Abies sp.</u>	5	<input checked="" type="checkbox"/>	NOL	Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5 = Total Cover				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 = _____
Sapling/Shrub Stratum (Plot size: _____)	5	<input checked="" type="checkbox"/>	FAC	
1. <u>Umbellularia californica</u>	5	<input checked="" type="checkbox"/>	FAC	
2. <u>Rubus discolor</u>	T	<input checked="" type="checkbox"/>	FACU	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
5 = Total Cover				
Herb Stratum (Plot size: _____)	30	<input checked="" type="checkbox"/>	FACU	
1. <u>Dactylis glomerata</u>	30	<input checked="" type="checkbox"/>	FAC	
2. <u>Festuca arundinacea</u>	30	<input checked="" type="checkbox"/>	FAC	
3. <u>Agrostis tenuis</u>	30	<input checked="" type="checkbox"/>	FAC	
4. <u>Holcus lanatus</u>	5	<input checked="" type="checkbox"/>	FAC	
5. <u>Anthoxanthum odoratum</u>	5	<input checked="" type="checkbox"/>	FACU	
6. <u>Cirsium arvense</u>	T	<input checked="" type="checkbox"/>	FAC	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
100 = Total Cover				
Woody Vine Stratum (Plot size: _____)	_____	<input checked="" type="checkbox"/>	_____	
1. _____	_____	<input type="checkbox"/>	_____	
2. _____	_____	<input type="checkbox"/>	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum 0				
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 <input checked="" type="checkbox"/> No <input type="checkbox"/>				

Remarks: Old Christmas tree plantation

Ryan M O'brien

From: Amber Wierck <WierckA@CleanWaterServices.org>
Sent: Thursday, February 28, 2013 5:07 PM
To: 'Juniper'
Cc: Kati A Gault
Subject: RE: CWS File No. 13-000287; Daybreak Estates 1

Thank you Juniper. We have entered this into our queue.

Amber

From: Juniper [mailto:juniper@schottandassociates.com]
Sent: Thursday, February 28, 2013 1:24 PM
To: Amber Wierck
Cc: 'Kati A Gault'
Subject: RE: CWS File No. 13-000287; Daybreak Estates 1

Good Afternoon Amber,

See below for responses to your comments regarding the Daybreak application. Attached with this e-mail are the first referenced figures. Tier 2 Memo and Functional Analysis will follow.



SCHOTT & ASSOCIATES, Inc.

Juniper Tagliabue

21018 NE Hwy 99E

PO Box 589

Aurora, OR 97002

503-678-6007-Office

503-678-6011-Fax

www.SchottandAssociates.com

From: Amber Wierck [mailto:WierckA@CleanWaterServices.org]
Sent: Tuesday, February 26, 2013 5:14 PM
To: 'Juniper'
Subject: CWS File No. 13-000287; Daybreak Estates

Good evening, Juniper.

I have reviewed the application for the proposed development. The following items/questions shall be addressed prior to review continuance.

- 1) Please provide a more detailed zoomed in picture of where the data/photo points were taken. It is very difficult to see this points on the existing conditions figure. Attached 50 scale figure of this area (Figure 1a).
- 2) Did you take any additional data points further south on the property? From our map review it looks like the hydric soil and lowest contour of the site continues to the south from the northern property limits. It looks like there might be a slight depression/swale in this area. Photos of this area may be helpful as well. Plot 3 was taken at the lowest onsite point of this swale and Plot 2 was taken in an area with wetland vegetation. Neither plot met wetland criteria and no additional plots were taken in this area. Attached is a copy of the DSL map

showing the locations of all sample plots and photo points taken (Figure 6). A wetland swale continues offsite to the north.

- 3) It looks like the Buffer Impact and Mitigation Areas Figure is not at the correct scale or full 50 ft buffer has not been depicted on the figure. Please scale or revise the figure accordingly. There may be additional temporary or permanent impacts if the buffer was not drawn correctly. The referenced figure is to scale with the entire onsite portion of the 50' buffer shown. I have relabeled a few things to clarify the figure (Appendix E).
- 4) Additionally on the Buffer Impact and Mitigation Areas Figure, it looks like the development is proposed all the way up to the OHW or top of bank line. This would constitute a Tier 2 level of impact. Therefore, the applicant will need to address all of the criteria listed in Section 3.07.4.c. Each criterion shall be addressed so that this can be included in the Service Provider Letter. I have attached two examples of this for your review. See attached Memo.
- 5) What is the proposed water quality treatment? Will there be additional temporary encroachments for stormwater pipe construction, etc.? The subdivision will be designed to discharge to an existing city owned regional water quality facility. For the Elwert Road half street improvements we have requested exemption of water quality treatment for 5,720 sf of impervious surface. In the event exemption is not allowed, storm water will either be treated at the regional facility or with a mechanical catch basin or Low Impact Development Approach facility along Elwert Road.
- 6) Please provide a site plan of the entire proposed development. This was included in the original submittal – a handsketched figure showing the entire proposed 35-lot development. Attached is an additional development plan created for the land use submittal.
This will give context for the proposed development and the responses to the Tier 2 Criteria. It would be helpful to see the master plan associated with Elwert Road. No greater master plan is available. Attached are two figures from the Draft Transportation Plan showing Elwert Road as a Minor Arterial and the lack of sidewalks in this location. As described in the Plan sidewalks are to be built in the context of new development as well as part of a major road expansion or interim improvement funded by the County. Also, what is proposed for the future sidewalk area once it meets/crosses the stream? Unknown at this time. Future development will likely incur the need for crossing the stream and extending north along Elwert Road however this is not part of this application.

Please let me know if you have any questions.

Thank you,

Amber Wierck, PWS
Environmental Review Project Manager
Clean Water Services
2550 SW Hillsboro Highway
Hillsboro, Oregon 97123
Phone: (503) 681-3653
Fax: (503) 681-4439



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Environmental Review Status

The following table contains the status of Environmental Reviews for a Service Provider Letter (SPL). Each Environmental Review will have the following information (if available):

- Project Number
- Project Name (Project Name, Address, or Taxlot ID)
- Taxlot ID
- Applicant
- Status
 - In Review and date we expect to complete review on/before
 - Pre-Screen
 - Site Certification
 - Site Assessment
 - Amendment
 - "Complete" and Reason SPL was issued
 - "Fee Payment Required"
 - "Info Requested"
 - "Site Certification Required"
- As-Of Date (Date project entered into current Status)

Find: 13-000287

Project Number	Project Name	Taxlot ID	Applicant	Status	As-Of Date
13-000287	Daybreak Estates		Dr Horton Inc	Site Assessment Review on/before 26-FEB-13	2/5/2013



Environmental Plan Review Completeness Check

Project Name:

CWS File Number:

Applicant Name:

Date reviewed:

Date of submittal:

- Yes Complete Certification Form (2 pages)
- Yes Site Assessment Application Base Review Fee... \$500.00 due at submittal
- Yes Written description per Design and Construction Standards 07-20 section 3.13.3 b.1
- Yes Wetland Data sheets
- Yes Vegetated Corridor Data sheets
- Yes Existing Site Condition Figures
- Yes Proposed Development Figures

Please refer to Design and Construction Standards 07-20 chapter 3 for application requirements at www.cleanwaterservices.org.

Comments:

Project is accepted; will be reviewed within 15 working days from the submittal date

Clean Water Services has performed a completeness check on the submitted materials for the above referenced activity on your site and found it complete.

If you desire to meet with our engineering and environmental staff to discuss these issues, please contact Laurie Harris at Harrisl@cleanwaterservices.org to set up a pre-design meeting.

Sincerely,
Environmental Plan Review



SCHOTT & ASSOCIATES

Ecologists & Wetlands Specialists

21018 NE Hwy 99E • P.O. Box 589 • Aurora, OR 97002 • (503) 678-6007 • FAX: (503) 678-6011

Memo to Respond to Tier 2 Regulations

- 1. The proposed encroachment area is mitigated in accordance with Section 3.08.**
 - As per 3.08.2 and Table 3-2 onsite mitigation is required at a ratio of 1:1 for impacts to a Degraded Corridor. The proposed project results in a total of 1,051sf of impacts in the Degraded onsite Corridor. The edge of Lot 18 has been adjusted to allow creation of 1,054sf of mitigation. The mitigation area shall be directly adjacent to and continuous with the existing Corridor. Total mitigation area is 1,054sf and is slightly greater than 1:1 ratio. The existing condition of the proposed mitigation area is in Degraded condition and will be brought up to Good condition.

- 2. The replacement mitigation protects the functions and values of the Vegetated Corridor and Sensitive Area.**
 - The proposed mitigation is located in upland adjacent to the existing onsite Corridor. The mitigation area and existing Vegetated Corridor will be enhanced to Good condition. This will improve protection to the onsite Sensitive Area through providing a wider and higher quality buffer between the resource and the adjacent development. In addition, the Corridor functions and values will be improved by removal of invasive and non-native species and replacement with a diverse assemblage of native trees, shrubs and grasses. This will protect and improve water quality functions as well as habitat functions for the Sensitive Area as well as the Vegetated Corridor. The final corridor will range in width from 40' to 80' wide providing a higher average buffer width than what is required. A fence will be installed to separate the protected area from the development and the entire area will be placed into a separate tract.

- 3. Enhancement of the replacement area, if not already in Good Condition, and either the remaining Vegetated Corridor on the site or the first 50 feet of width closest to the resource, whichever is less, to a Good Corridor Condition.**
 - The 1,054sf mitigation area, as well as the remaining 2,354sf of existing Degraded Corridor shall be enhanced to Good Condition. This includes 392sf of temporary impacts within the existing Corridor which shall be restored in place and enhanced to Good Condition. Species and planting specifications are in accordance with Appendix A of CWS's Construction Standards.

- 4. A District Stormwater Connection Permit is likely to be issued based on proposed plans.**
 - The applicant reasonably expects to receive District Stormwater Connection Permit based on the plans submitted for the project.

- 5. Location of development and site planning minimizes incursion into the Vegetated Corridor.**

- The proposed development is a 35 lot residential development with a 5000sf average lot size and 50ft minimum width. The development was designed to maximize lot density in order to minimize financial risk for the developer. The shape of lot 18 was reconfigured and size was minimized as much as possible while still meeting the lot size requirements. The western lot width was reduced to the minimum 50ft width, cutting off approximately 30ft along the western part of the Corridor. The lot line then tapers out to the northeast resulting in a wider eastern edge, guided by the curve of the onsite Corridor. The remaining lots to the south are also at the minimum 50' width and cannot be further reduced.

Proposed impacts to the Vegetated Corridor have been minimized to the extent possible while still developing all the lots onsite. The site is zoned MDRH. The lots have to average 5,000 sq ft, and have to have a minimum width of 50'. In order to meet the lot size standards for the site including the 50' width, Lot 18 has been reduced to the minimum width of 50' resulting in the minimum possible impact in the Vegetated Corridor.

The City is requiring widening of Elwert Road including construction of a sidewalk adjacent to the east edge of the roadway. In order to minimize impacts the road has been narrowed down at the north end of the site to avoid any wetland impacts. However, the City is requiring the sidewalk to continue to approximately 10 feet from the northern property boundary. Sidewalk construction including grading will result in additional impacts, extending all the way to the ordinary high water mark of the drainage. Road and sidewalk improvements are a condition of the City and cannot be avoided or further minimized while still meeting development standards and required transportation improvements.

Utilities placed along the back of the lot will result in 392sf of temporary impacts. Soil removed in this location will be replaced and the area restored to native conditions. Existing vegetation is dominated by non-native species which will be replaced as part of the enhancement area.

Total permanent impact area is 1,051sf. Total temporary impact area is 392sf.

6. No practicable alternative to the location of the development exists that will not disturb the Sensitive Area or Vegetated Corridor.

- As previously discussed, the proposed development is a 35 lot residential development with a 5000sf average lot size and 50ft minimum width. The development was designed to maximize lot density in order to minimize financial risk for the developer. The development plan was re-configured to minimize impacts from lot development to the greatest extent possible while still retaining the lot (Lot 18). This minimized impacts to less than 30% of the depth of the corridor and resulted in a Tier 1 Alternatives Analysis. However, the City is requiring the improvements to Elwert Road with its adjacent sidewalk to extend to approximately 10' from the northern

property boundary. Grading for sidewalk construction will extend all the way to the edge of the Sensitive Area resulting in permanent impacts. This is per City requirements and cannot be avoided. No impacts to the Sensitive Area are proposed as part of this development.

No Build Alternative

The only alternative completely avoiding Corridor impacts would be a no build alternative. Removal of impacts from Lot 18 would not minimize Corridor impacts. It is the sidewalk improvements that result in the majority of the proposed impacts. These improvement area part of the City transportation requirements and cannot be avoided. No build is not an option.

Alternative 1

The first design for Lot 18 maintained the 55ft width across the lot and resulted in greater impacts to the Vegetated Corridor. The lot was reconfigured as described above in order to minimize impacts as much as possible.

Alternative 2

The second alternative, which was originally proposed, meets the minimum lot requirements and minimizes impacts to the Vegetated Corridor as much as possible while still fully developing the site. A 20ft wide pedestrian and emergency access lane, required by the City, is to be located just south of the next lot, Lot 19, to the south. This limits any flexibility in positioning the lot. Proposed impacts are a total of 221sf in the southwest part of the corridor for Lot 18. Additional impacts for the sidewalk were minimized to 656sf by not extending them all the way to the Sensitive Area boundary. Based on subsequent meetings with the City the sidewalk extension was expanded as required. This alternative was not feasible while still meeting City development standards.

Proposed Alternative

The proposed alternative minimized lot encroachment to the greatest extent possible but resulted in greater overall impacts based on City requirements for improvement of the adjacent Elwert Road. Both the roadway and proposed sidewalk were moved slightly west to minimize impacts into the Vegetated Corridor. However, associated grading combined with the impacts from the lot result in a total of 1,051sf of impact. As per 3.07.3c1 all encroachment shall be mitigated onsite in accordance with Section 3.08. All remaining Vegetated Corridor onsite shall be enhanced to Good condition.

7. The proposed encroachment provides public benefits.

- The proposed impacts are to a Degraded Corridor adjacent to a ditched perennial drainage along a roadway. Impacts have been minimized to the greatest extent possible while still meeting City standards for roads and sidewalks. The road improvement and associated sidewalk construction are to meet public safety requirements and as such, provide this public benefit. Impacts for roads through Vegetated Corridors are

considered an allowed use as per 3.05.7. Mitigation for the proposed impacts will be slightly greater than the proposed impact area and the combined mitigation and enhanced Corridor area will result in a significantly higher quality buffer than what is currently present.

As required for Tier 2 Analysis, a Functional Assessment was conducted for the onsite Sensitive Area. The HGM for the Willamette Valley was used. The Judgmental Method was used. The method is designed for wetlands and the onsite resource is a perennial waterway, so assessed functions are not necessarily relevant. As shown on the attached data forms functions as assessed were very low scoring or not present. Enhancement of the adjacent Vegetated Corridor will increase species diversity and structure, improve habitat and provide greater erosion and nutrient retention from vegetation.

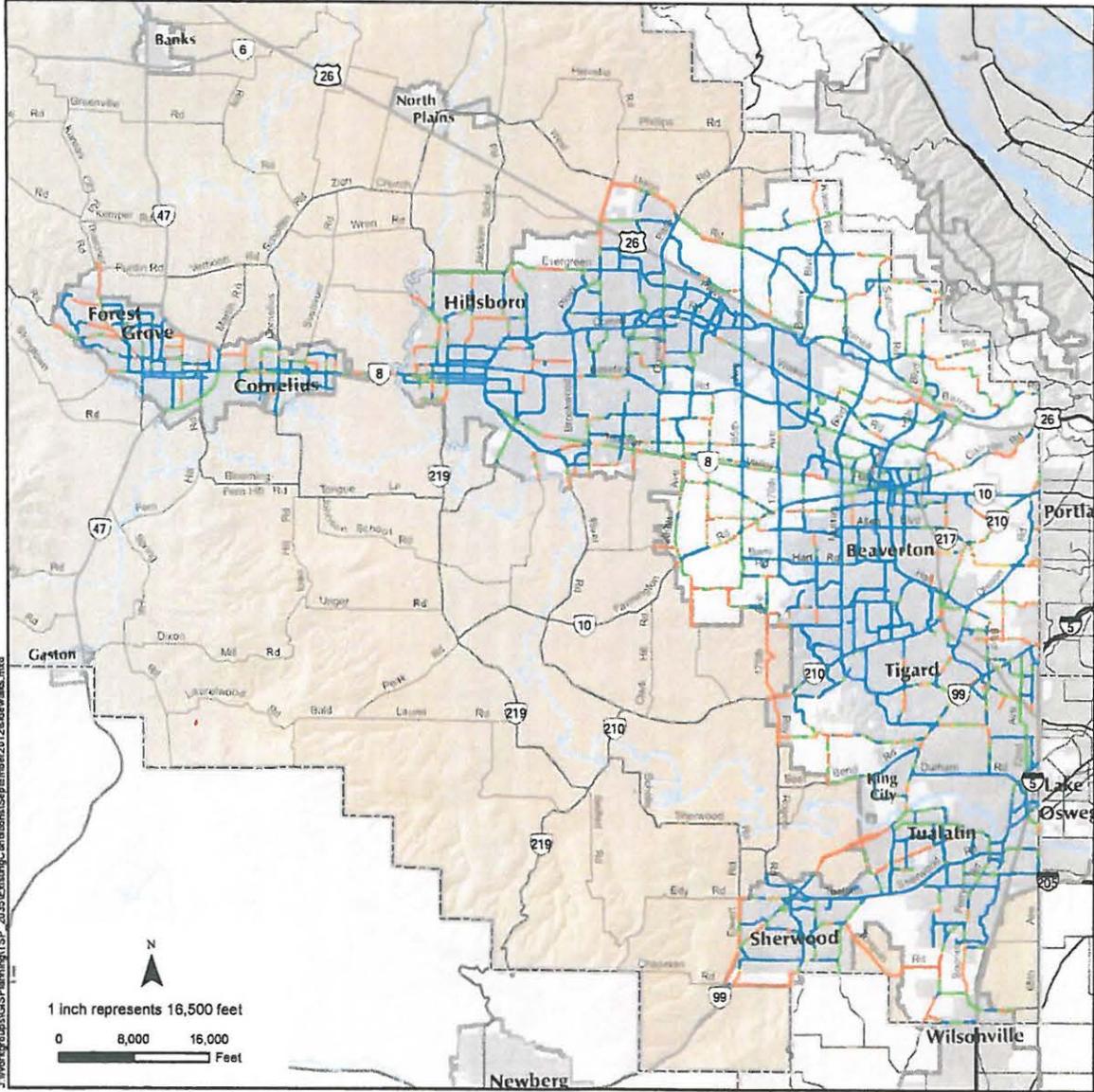
Sidewalk Inventory

- Both Sides of Road Standard
- One Side of Road Standard
- Both Sides Substandard
- One Side Substandard
- No Sidewalk Both Sides

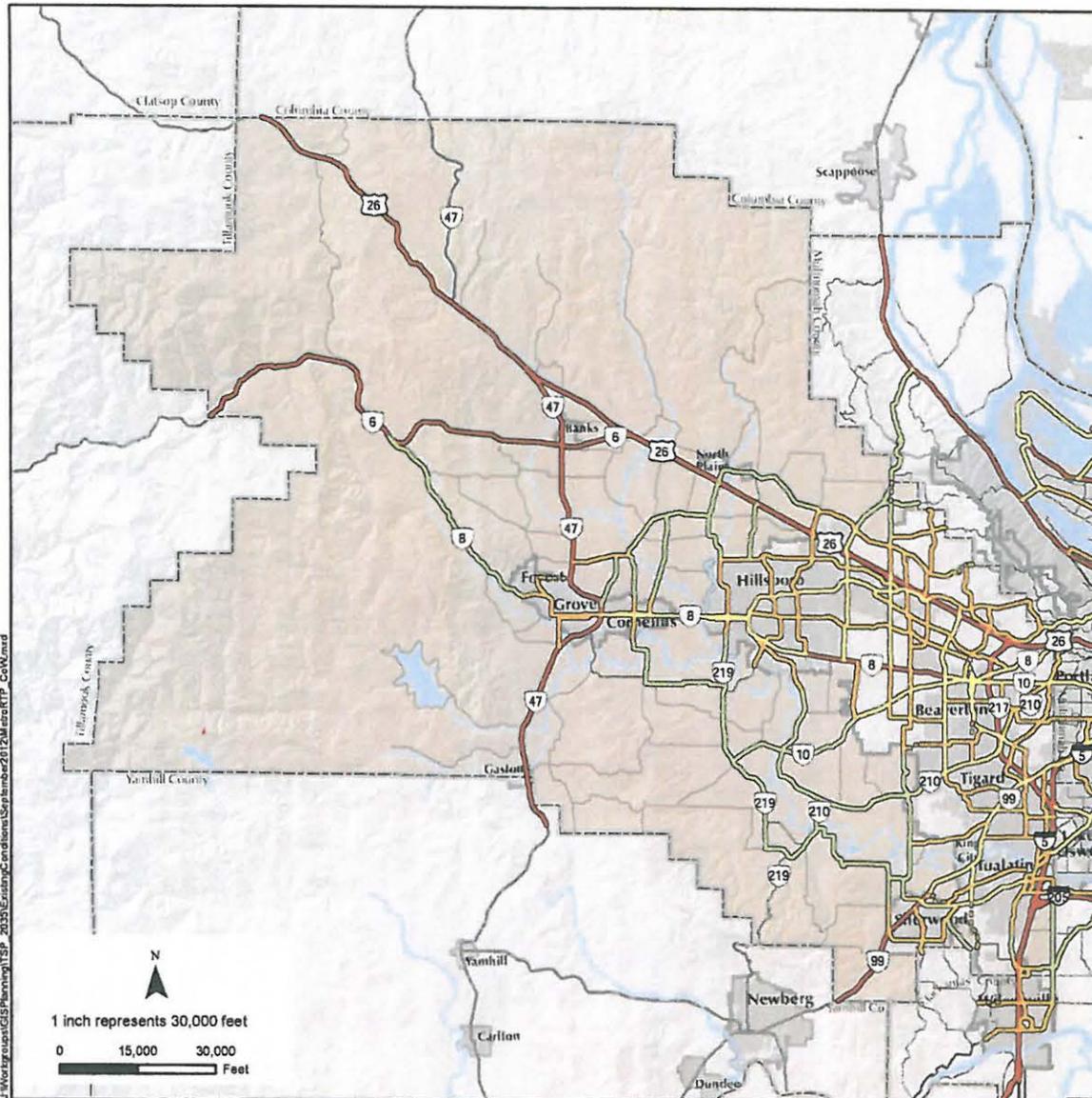
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. Care was taken in the mapping but there are no warranties for this product. However, notification of any errors will be appreciated.

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Figure 4-5



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Metro RTP Arterial & Throughway Network

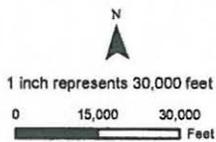
- Principal arterial
- Principal arterial (proposed)
- Major arterial
- Major arterial (proposed)
- Minor arterial
- Minor arterial (proposed)
- Rural arterial
- Rural arterial (proposed)
- Rural Washington County

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Department of Land Use and Transportation
Planning and Development Services

Figure 2-5

J:\Workspaces\GIS\Planning\TSP_2035\ErdsbyC\endpoints\September2012\MetroRTP_CoW.mxd



Appendix B. Assessment of Function Capacity: Judgmental Method

Complete the following “qualitative assessments” of function only if you chose not to complete the reference-based assessments” that began on page 20.

Instructions: In each row, indicate with a checkmark if your site looks more like the “highest capacity” condition or the “minimal capacity” condition. Then circle a number on the scoring line below this table, based on your overall impression of the site’s capacity to support this function. Alternatively, instead of checkmarks, you can assign a score to each row by placing a number in the center column of each row, e.g., 0 (minimal capacity) -to- 1.0 (highest capacity), and then combine the row scores in a manner of your choosing, perhaps weighting some rows more than others if you believe those indicators to have greater influence on a function. Whether based on mathematical operations or another way of synthesizing, be sure to circle your final score for the function on either or both of the shaded “Judgment Lines” at the bottom. Definitions of many of the terms are provided in Appendix A.

Function Capacity (Judgmental Assessment of): Water Storage and Delay

Highest Functioning	Suggested Score:	Minimal Functioning
<p><input type="checkbox"/> The proportion of the site that is inundated only seasonally is large. The seasonally-inundated parts are defined by flood marks on trees and shrubs, stunted plants, and/or distinctive assemblages of plant species.</p>		<p><input checked="" type="checkbox"/> None of the site is inundated only seasonally. The site is always comprised only of permanent water or a high water table without surface water.</p>
<p><input type="checkbox"/> Most of the surface water in the seasonally-inundated zone remains for a few days after each rain event, but not less or more.</p>		<p><input type="checkbox"/> Water added from rain events empties quickly from all of the site, via outlets or percolation. This often is evidenced by:</p> <ul style="list-style-type: none"> <input type="checkbox"/> lack of flood marks on trees and shrubs <input type="checkbox"/> scarcity of wetland plants (few FAC or wetter) <input type="checkbox"/> little or no mottling of soils throughout the seasonally-inundated zone. <input type="checkbox"/> site is located on slope <input type="checkbox"/> site is flat (few or no puddles, etc.) <input checked="" type="checkbox"/> presence of outlet channels

Your Judgments:

Function Capacity score = 0, *site is a channel* or circle one of the following:



Function Capacity (Judgmental Assessment of): Sediment Stabilization and Phosphorus Retention

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> High score was assigned to Water Storage & Delay function (inundation is long, frequent, deep, extensive).		<input checked="" type="checkbox"/> Low score was assigned to Water Storage & Delay function (water levels barely fluctuate).
<input type="checkbox"/> Texture of the predominant substrate in the upper 12 inches of the seasonal zone is mostly clay, silty clay, sandy clay, clay loam, or native organic. See p. 83 for key to soil textures.	—	<input type="checkbox"/> Upper 12 inches of the predominant substrate in the seasonal zone is mostly sand or gravel.
<input type="checkbox"/> Herbs, shrubs, and/or vines together always occupy a large percent of the ground cover in the seasonal zone. Very little soil is bare.	—	<input type="checkbox"/> All or nearly all of the substrate in the seasonal zone is unvegetated.
<input type="checkbox"/> Shallow pools and puddles are present and well-interspersed with herbaceous vegetation		<input checked="" type="checkbox"/> Shallow pools are absent at all times of the year
<input type="checkbox"/> Substrates have never been recontoured or otherwise subjected to compaction, excavation, plowing, disking, leveling. No evidence of severe erosion within the site.	✓	<input type="checkbox"/> Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, plowing, disking, leveling. Extensive evidence of severe scour or erosion may be present within the site. No sediment marks on trees or other plants.
<input type="checkbox"/> Most of the site has complex microtopography (hummocks, puddles, etc.)	—	<input type="checkbox"/> The substrate is uniformly flat, with no noticeable microtopography (no hummocks, etc.)

Your Judgments:

Function Capacity score = 0.1, or circle one of the following:



Function Capacity (Judgmental Assessment of): Nitrogen Removal

Highest Functioning	Suggested Score:	Minimal Functioning
Note: Proceed with assessing this function only if mottling and/or other features that indicate oxygen deficits in soils/ sediments are found in at least part of the site.		
<input type="checkbox"/> High score was assigned to Water Storage & Delay function (inundation is long, frequent, extensive)		<input checked="" type="checkbox"/> Low score was assigned to Water Storage & Delay function (water levels barely fluctuate)
<input type="checkbox"/> Some surface water or saturation remains year-round or nearly so, and is dispersed around the site such that water flow paths and residence times are long.	channel	<input checked="" type="checkbox"/> No surface water or saturation remains year-round. If seasonal flooding occurs, the surface water is concentrated in one part of the site, e.g., channel or pond, and does not remain for long.
<input type="checkbox"/> Soil microbial processes are fairly mature, as possibly suggested by abundance of dead wood, thick and extensive soil organic layer, and many large-diameter trees		<input checked="" type="checkbox"/> Soil microbial processes are not well-developed, as possibly suggested by lack of dead wood, thick soil organic layer, and/or large-diameter trees

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site. None of the site was constructed from upland.	<input checked="" type="checkbox"/>	<input type="checkbox"/> Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling.
<input type="checkbox"/> Most of the site has complex microtopography (hummocks, puddles, etc.)	<input type="checkbox"/>	<input type="checkbox"/> Most of the site has no noticeable microtopography (no hummocks, puddles, etc.)
<input type="checkbox"/> Site is burned annually or biennially	<input type="checkbox"/>	<input type="checkbox"/> Site has not been burned in recent years

Your Judgments:

Function Capacity score = 0, or circle one of the following:



**Function Capacity (Judgmental Assessment of):
Primary Production**

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> All of the site has vascular plants and/or water with algae.	<input type="checkbox"/>	<input checked="" type="checkbox"/> Much of the site is devoid of vascular plants and/or algae.
<input type="checkbox"/> A variety of plant forms is present in about equal proportions (trees, shrubs, and herbs) and is well-distributed throughout the site	<input type="checkbox"/>	<input type="checkbox"/> Whatever plants are present are mainly of a single form (trees, shrubs, or herbs)
<input type="checkbox"/> Some shallow (<3 ft) surface water remains year-round or nearly so, and in summer is dispersed around the site, e.g., many puddles	<input checked="" type="checkbox"/>	<input type="checkbox"/> The site is entirely dry during much of the year.
<input type="checkbox"/> Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	<input type="checkbox"/>	<input type="checkbox"/> Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling. Severe erosion may be evident within the site.
<input type="checkbox"/> The site's contributing watershed contains no cropland, paved surface, buildings, or lawns – especially in the parts closest to the site.	<input checked="" type="checkbox"/>	<input type="checkbox"/> The site's contributing watershed is almost entirely cropland, paved surface, buildings, and lawns – especially the parts closest to the site.

Your Judgments:

Function Capacity score = 0, or circle one of the following:

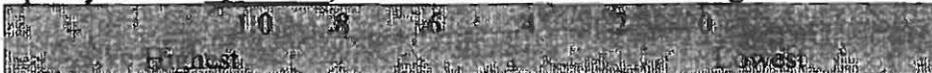


Function Capacity (Judgmental Assessment of): Anadromous Fish Habitat Support

Highest Functioning	Suggested Score:	Minimal Functioning
Note: Proceed with assessing this function only if part of the site is accessible to anadromous fish during seasonal inundation		
<input type="checkbox"/> Floodwaters spill into the site across a broad bank or through a wide (unconstricted) mouth	/	<input type="checkbox"/> Floodwaters spill into the site across a broad bank or through a wide (unconstricted) mouth
<input type="checkbox"/> Floodwaters remain in the site for more than a few days	/	<input type="checkbox"/> No surface water remains in the site for more than a few days
<input type="checkbox"/> Non-native fish species are generally absent	/	<input checked="" type="checkbox"/> Non-native fish species predominate
<input type="checkbox"/> Substrates suitable for spawning or feeding are extensively present	/	<input checked="" type="checkbox"/> Substrates suitable for spawning or feeding are scarce or absent
<input type="checkbox"/> Cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides shelter from currents and predators is abundant, at least in the seasonal zone	/	<input checked="" type="checkbox"/> Cover that provides shelter from currents and predators is scarce or lacking from all parts of the site
<input type="checkbox"/> Water quality (especially dissolved oxygen) is excellent	/	<input checked="" type="checkbox"/> Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits
<input type="checkbox"/> Summertime temperature maxima do not exceed preferred range of anadromous fish	/	<input checked="" type="checkbox"/> Summertime temperature maxima exceed limits lethal to anadromous fish

Your Judgments:

Function Capacity score = 0, or circle one of the following:



Function Capacity (Judgmental Assessment of): Invertebrate Habitat Support

Highest Functioning	Suggested Score:	Minimal Functioning
<input checked="" type="checkbox"/> Surface water is permanent or nearly permanent, AND all of the water is shallower than 2 feet during May-September*	/	<input type="checkbox"/> Surface water is present only briefly (RI sites) or not at all (SF sites), OR nearly all of the water remains deeper than 6 ft during May-September
<input checked="" type="checkbox"/> Cover (especially aquatic plants, woody debris) that supports algae and provides shelter from currents and predators is abundant in both the seasonal and permanent zone	/	<input checked="" type="checkbox"/> Cover (aquatic plants, woody debris.) that could support algae and provide shelter from currents and predators is lacking
<input type="checkbox"/> Plant forms and species are highly diverse	/	<input type="checkbox"/> Only one plant form is present, and plant species richness is very low
<input type="checkbox"/> Vegetation is well-interspersed with pools	/	<input type="checkbox"/> Vegetation and pools (if any) are in 2 separate areas or zones
<input type="checkbox"/> Water quality (especially dissolved oxygen) is excellent	/	<input checked="" type="checkbox"/> Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	✓	<input type="checkbox"/> Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling, or the site was entirely constructed from upland.
<input type="checkbox"/> Surrounding landscape contains large acreage of wetlands, including some with a different water regime than the assessed site.	✓	<input type="checkbox"/> Surrounding landscape contains no wetlands or ponds

* Areas likely to retain water well into the growing season may have many of these characteristics:

- prevalence of wetland plants (FAC or wetter, and especially OBL)
- intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
- site is located in flatland terrain (not on slopes)
- site is large relative to its contributing watershed (>4% of total area)
- extensive microtopographic variation (many hummocks, puddles, etc.)
- absence of outlet channels, and/or site is managed for water storage.

Your Judgments:

Function Capacity score = 0.1, or circle one of the following:



Function Capacity (Judgmental Assessment of): Amphibian & Turtle Habitat

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> Permanent water is absent, but shallow surface water that contains extensive partly-submerged fine-stemmed herbs ¹ is extensive, and recedes very gradually during the months of January – May ² (i.e., during this period, there are at least 30 days when water levels are stable or have a vertical fluctuation of <2 inches). OR: <input type="checkbox"/> Permanent water is extensive and contains (a) abundant underwater cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides shelter from predation, and (b) partly-submerged fine-stemmed herbs ¹		<input type="checkbox"/> Site never contains surface water OR <input checked="" type="checkbox"/> Site is entirely surface water, which either (a) never fluctuates vertically (i.e., no seasonal zone is present), or (b) fluctuates too much – more than 2 inches during all 10-day periods, or (c) is devoid of any emergent herbs that are partly-submerged during the springtime, or (d) flows faster than 4 inches/second during the entire springtime, everywhere in the site, or (e) is mostly deeper than 40 inches and is bordered by a shoreline with a very steep slope
<input type="checkbox"/> Bullfrogs and other non-native predators are absent	✓	<input type="checkbox"/> Bullfrogs and other non-native predators are abundant
<input type="checkbox"/> If surface water everywhere in the site is flowing during springtime, there are at least 30 days when current velocities are slow (<4 inches/second)		<input checked="" type="checkbox"/> If surface water everywhere in the site is flowing during springtime, there are never more than 30 days when current velocities are slow (<4 inches/second)
<input type="checkbox"/> There is extensive and varied woody debris in the seasonal zone		<input checked="" type="checkbox"/> There is no woody debris in the seasonal zone

Highest Functioning	Suggested Score:	Minimal Functioning
___ Either vegetation and pools are well-interspersed during high water level, or any woody vegetation bordering the larger pools is located mostly on their north end. ³ Microtopography is quite varied.	—	___ Vegetation and pools are in separate areas of the site during high water level, and any woody vegetation bordering the larger pools is located mostly on their south end. Microtopography is too flat to allow many puddles to form (no hummocks, etc.)
___ Suitable basking sites for turtles and calling sites for frogs are present	—	___ There are no basking sites for turtles or calling sites for frogs
___ Land cover in adjoining uplands is a mix of natural grassland and woodland; woodlands have extensive and varied woody debris	✓	___ Land cover in adjoining uplands largely contains impervious surface, bare ground, lawns, and row crops
___ Shorelines are gently sloping	—	___ Shorelines, if present, are mostly steep
___ Busy roads are distant from the site	—	___ Busy roads adjoin the site
___ Many other wetlands (excluding flowing water) are present nearby	—	___ There are no other wetlands (excluding flowing water) nearby
___ Water quality is excellent	✓	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	✓	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling, or the entire site was constructed from upland.
___ Soils and submerged sediments contain a moderately thick organic layer (leaf litter, peat, decomposed organics, etc.)	—	___ Soils and submerged sediments contain no organic layer, and are mostly hard-packed clay; or organic layer is so thick that water is chronically anoxic.

¹ Emergent herbs with stem diameter of <3 mm (measured 2 inches below springtime water surface); this includes nearly all perennial herbs except cattail.

² Areas likely to retain water well into the growing season may have many of these characteristics:

- ___ prevalence of wetland plants (FAC or wetter, and especially OBL)
- ___ intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
- ___ site is located in flatland terrain (not on slopes)
- ___ extensive microtopographic variation (many hummocks, puddles, etc.)
- ___ absence of outlet channels, and/or site is managed for water storage.

During the January-May period, 30 days of stable water levels are required for some aquatic amphibian eggs to mature, and during this time fluctuations of greater than 2 inches are lethal (Richter 1997).

³ Vegetation located north of pools is less likely to block sunlight important to developing aquatic amphibians (Richter 1997).

Your Judgments:

Function Capacity score = 0.1 , or circle one of the following:



Function Capacity (Judgmental Assessment of):
Breeding Waterbird Support

N/A

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> The site contains many acres of permanent or nearly permanent surface water, or a large permanent wetland (excluding streams) is located nearby AND <input type="checkbox"/> Water depths are predominantly shallow (2 to 24 inches) in April-August* <input type="checkbox"/> Most of the shoreline is not steep		<input type="checkbox"/> Surface water is present for only a few weeks during April-June, OR <input type="checkbox"/> Nearly all of the water remains deeper than 6 ft during May-September AND <input type="checkbox"/> No permanent wetlands are located nearby.
<input type="checkbox"/> Larger pools of water are bordered by a wide, dense band of tall herbs and/or shrubs in April-August.		<input type="checkbox"/> Larger pools, if present, are bordered by only a narrow band of sparse vegetation
<input type="checkbox"/> About equal proportions of water and vegetation are present, and are well-interspersed during the April - August period		<input type="checkbox"/> Vegetation and pools (if any) are in 2 separate areas or zones, not interspersed
<input type="checkbox"/> Water levels do not abruptly rise a foot or more during April-June		<input type="checkbox"/> Water levels are prone to quickly rise at least 1 foot during April-June
<input type="checkbox"/> A large variety of herbs is present; the site is actively managed to control the spread of non-native or invasive species		<input type="checkbox"/> Vegetation cover is mostly comprised of one or a few non-native or highly invasive native species
<input type="checkbox"/> Land cover in surrounding buffer zones is mainly a mix of natural grassland, woodland, and water <input type="checkbox"/> Busy roads are distant from the site <input type="checkbox"/> Water quality is excellent		<input type="checkbox"/> Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops. <input type="checkbox"/> Busy roads border the site <input type="checkbox"/> Water is heavily contaminated with pollutants
<input type="checkbox"/> Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling.		<input type="checkbox"/> Substrates have recently been recontoured or otherwise subjected to compaction, excavation, or leveling (unless such activities were done in connection with restoring a site to its historical condition)
<input type="checkbox"/> Surrounding landscape contains large acreage of wetlands, including some with a different water regime than the assessed site.		<input type="checkbox"/> Surrounding landscape contains no wetlands or ponds
<input type="checkbox"/> Nest boxes, nest platforms, and other artificial structures intended to assist waterbird nesting are extensive and are regularly maintained.		<input type="checkbox"/> No nest boxes, nest platforms, or other artificial structures intended to assist waterbird nesting are present, or they aren't well-maintained.
<input type="checkbox"/> Part of the site is visited infrequently in April-June by humans on foot		<input type="checkbox"/> None of the site is visited frequently by humans on foot during April-June

* Areas likely to retain water well into the waterbird breeding season may have many of these characteristics:

- prevalence of wetland plants (FAC or wetter, and especially OBL)
- intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
- site is located in flatland terrain (not on slopes)
- extensive microtopographic variation (many hummocks, puddles, etc.)
- absence of outlet channels, and/or site is managed for water storage.

Your Judgments:

Function Capacity score = 0, or circle one of the following:



Function Capacity (Judgmental Assessment of): Wintering & Migratory Waterbird Support

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> The site contains extensive surface water during all or most of the fall-winter-spring period	✓	<input type="checkbox"/> The site contains very little surface water during all or most of the fall-winter-spring period
<input type="checkbox"/> Water depths in most of the site during most of the fall-winter-spring period are shallow (<24 inches)	—	<input type="checkbox"/> If forested, water depths during the fall-winter-spring period are always shallower than 24 inches in all of the site (shallower depths are permissible than in unforested wetlands).
<input type="checkbox"/> A large portion of the site is inundated only seasonally	—	<input checked="" type="checkbox"/> Of the water that is present, nearly all is present year-round.
<input type="checkbox"/> The acreage of various depth categories is about equal during peak annual inundation	—	<input checked="" type="checkbox"/> A single water depth category predominates.
<input type="checkbox"/> Microtopographic variation (hummocks, puddles, etc.) is extensive	—	<input checked="" type="checkbox"/> The substrate is very flat, essentially prohibiting the formation of puddles.
<input type="checkbox"/> None of the site is visited frequently by humans on foot during September-April.	✓	<input type="checkbox"/> Water is heavily contaminated with pollutants
<input type="checkbox"/> A large variety of herbs is present. The site is actively managed to control the spread of non-native or invasive species	—	<input type="checkbox"/> Vegetation cover (except in farmed wetlands) is mostly comprised of one or a few non-native or highly invasive native species
<input type="checkbox"/> Water quality is excellent	✓	<input type="checkbox"/> Virtually all of the site is visited frequently by humans on foot during April-June
<input type="checkbox"/> Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling.	✓	<input type="checkbox"/> Substrates have recently been recontoured or otherwise subjected to compaction, excavation, or leveling (unless such activities were done in connection with restoring a site to its historical condition)
<input type="checkbox"/> Land cover in surrounding buffer zones is mainly a mix of natural grassland, woodland, agricultural lands, and water	✓	<input type="checkbox"/> Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
<input type="checkbox"/> Surrounding landscape contains large acreage of hydric soil, wetlands, and water, including some with a different water regime than the assessed site.	✓	<input type="checkbox"/> Surrounding landscape contains no wetlands, ponds, or hydric soil.

Your Judgments:

Function Capacity score = 0 , or circle one of the following:



Function Capacity (Judgmental Assessment of): Songbird Habitat Support

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> Some part of the site contains surface water during all (or nearly all) of the year.	✓	<input type="checkbox"/> Surface water is never present at any time of the year.
<input type="checkbox"/> The site contains a <u>large</u> acreage of closed-canopy forest, native shrubland, wet prairie, and/or emergent wetland.	✓	<input checked="" type="checkbox"/> Acreage of these is very small.
<input type="checkbox"/> If the site is mostly native shrubland and/or forest, then (a) large-diameter trees are numerous, (b) snags of various sizes are abundant, (c) under-canopy shrub cover is extensive, and (d) a large variety of trees, shrubs and vines is present.	✓	<input type="checkbox"/> If the site is mostly shrubland and/or forest, then (a) trees are very small, (b) snags are absent, (c) under-canopy shrub cover is lacking, and (d) the variety of trees, shrubs, and vines is small, and comprised almost entirely of non-native species.
<input type="checkbox"/> If the site is mostly wet prairie and/or emergent wetland, then (a) a large variety of herbs is present, (b) the site is actively managed to control the spread of non-native or invasive herb species, (c) trees and shrubs, if present, are concentrated in one or a few parts of the site.	✓	<input type="checkbox"/> If the site is mostly prairie and/or emergent wetland, then (a) the variety of herbs is small, (b) the site is not actively managed to control the spread of non-native or invasive herb species, (c) trees and shrubs, if present, are scattered widely throughout the site.
<input type="checkbox"/> Land cover in surrounding buffer zones is predominantly a mix of natural grassland, native shrubland, woodland, wetlands, and water	✓	<input type="checkbox"/> Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
<input type="checkbox"/> None of the site is visited frequently by humans on foot	✓	<input type="checkbox"/> Every part of the site is visited frequently by humans on foot
<input type="checkbox"/> Busy roads are distant from the site	✓	<input type="checkbox"/> Busy roads adjoin the site.

Your Judgments:

Function Capacity score = 0.1, or circle one of the following:



Function Capacity (Judgmental Assessment of): Support of Characteristic Vegetation

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> Trees, shrubs, and herbs are all present, and are well-interspersed throughout the site	✓	<input type="checkbox"/> Only one plant form (tree, shrub, herb) is present
<input type="checkbox"/> If trees are present, many are very old and large, with abundant evidence of regeneration	✓	<input type="checkbox"/> If trees are present, all are young
<input type="checkbox"/> If shrubs are present, all of the significantly present shrub species are natives	✓	<input type="checkbox"/> If shrubs are present, they are comprised of just one species, and it is non-native
<input type="checkbox"/> If herbs are present, all of the significantly present herb species are natives	✓	<input type="checkbox"/> If herbs are present, they are comprised of just one species, and it is non-native
<input type="checkbox"/> Microtopographic relief is great (hummocks, puddles, etc.)	✓	<input checked="" type="checkbox"/> The substrate is very flat, essentially prohibiting the formation of puddles.
<input type="checkbox"/> Springtime surface water levels drop very slowly (< 2 vertical inches per 30 days, average)	✓	<input type="checkbox"/> Springtime water levels fluctuate or drop rapidly (>2 inches per 10 days, average)

Highest Functioning	Suggested Score:	Minimal Functioning
<input type="checkbox"/> None of the site is visited frequently by humans on foot.	✓	<input type="checkbox"/> Every part of the site is visited frequently by humans on foot.
<input type="checkbox"/> Busy roads are distant from the site.	✓	<input type="checkbox"/> Busy roads adjoin the site.
<input type="checkbox"/> Land cover in the contributing watershed is predominantly "natural"	✓	<input type="checkbox"/> Land cover in the contributing watershed largely contains impervious surface, bare ground, lawns, and row crops.
<input type="checkbox"/> Land cover in surrounding buffer zones is predominantly a mix of natural grassland, native shrubland, woodland, wetlands, and water.	✓	<input type="checkbox"/> Land cover in surrounding buffer largely contains impervious surface, bare ground, lawns, and row crops.

Your Judgments:

Function Capacity score = 0 *channel*, or circle one of the following:



Now, summarize your function capacity assessments by recording them on the Assessment Summary Form (p. 59). Be sure to indicate that you used the Judgmental Method.

Assessment Summary Form

(page 1 of 2)

Site Name: Daybreak Estates County: Washington
 Assessed by: IJT Date: Feb. 28, 2013
 Area of Site: 29 sf onsite ~~acres~~ Mapped Soil Series: Haberly Sil
 HGM subclass(es)*: riverine

* if site contains multiple subclasses, estimate percent of each

Complete column 2 ("score" – Present Time) of the table below. All other columns are *optional*. Do not mathematically combine scores from different functions, or functions and values.

Functions	Function Capacity Score (standardized)				Value Score (standardized)
	Present Time		Time 2 (optional)		
	score	acres	score	acres	
Water Storage & Delay	0 (p.21)				(p.47)
Sediment Stabilization & Phosphorus Retention	0.1 (p.23)				(p.48)
Nitrogen Removal	0 (p.Error! Bookmark not defined.)				(p.50)
Thermoregulation	0.1 (p.26)				(p.51)
Primary Production	0 (p.28)				(p.52)
Resident Fish Habitat Support	0 (p.29)				(p.54)
Anadromous Fish Habitat Support	0 (p.31)				(p.54)
Invertebrate Habitat Support	0.1 (p.33)				(p.53)
Amphibian & Turtle Habitat	0.1 (p.36)				(p.55)
Breeding Waterbird Support	0 (p.38)				(p.55)
Wintering & Migratory Waterbird Support	0 (p.40)				(p.56)
Songbird Habitat Support	0.1 (p.43)				(p.57)
Support of Characteristic Vegetation	0 (p.46)				(p.57)

Assessment Summary Form

(page 2 of 2)

In the preceding table, were the column-2 scores for Function Capacity from (check one):

- the Reference-based Method, standardized to "highest functioning"?
 the Reference-based Method, standardized to "least altered"?
 the Judgmental Method (Appendix B)?

Do you consider the site to historically have been mostly wooded? yes no

Is the site part of a larger contiguous wetland or riparian area? Yes No

If yes, describe how it is connected (permanent/ seasonal channel, etc.): site is a perennial channel continuing offsite in both directions

Describe the basis for boundaries you used to define the "site": ohw of onsite portion of channel

Elaborate, if you wish, on assumptions you made when estimating particular indicators, and additional factors related to this site's importance (see p. 5 of guidebook for listing of these). Use additional pages if necessary.

The following 3 items are optional, but you are encouraged to complete these in order to provide a fuller context for understanding the assessment scores.

1. Make your best estimate of relative dominance of the direct sources of water inputs to this site during each of the two seasonal periods during an average year:

	April 1 – October 31 (dry)	November 1- March 30 (wet)
Channel flow (including overbank flooding)	%	%
Overland runoff (not in channels)	%	%
Subsurface flow & groundwater	%	%
Direct precipitation	%	%
Artificial water imports (stormwater pipes, etc.)	%	%
TOTAL	100 %	100 %

2. How much of the site is upland inclusions? _____ %

3. Exact coordinates of the site, from GPS reading or digital map:
 latitude: _____ N longitude: _____ W

Other Comments: _____



Clean Water Services File Number

[Empty box for File Number]

Sensitive Areas Certification Form

1. Property Information (example 1S234AB01400)
 Tax lot ID(s): 2S1W30CC00300, 00500

Site Address: 21500 & 21730 SW Elwert Road
 City, State, Zip: Sherwood
 Nearest Cross Street: Cerghino Lane

2. Owner Information
 Name: Al Jeck
 Company: Columbia State Bank
 Address: 17800 SE Mill Plain Blvd, Suite 100
 City, State, Zip: Vancouver, WA 98683
 Phone/Fax: 360.823.4582
 E-Mail: ajeck@columbiabank.com

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: Katie Gault
 Company: DR Horton
 Address: 4380 SW Macadam Ave Suite 100
 City, State, Zip: Portland, OR 97219
 Phone/Fax: 503.222.4151
 E-Mail: KAGault@drhorton.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: _____
 Company: _____
 Address: _____
 City, State, Zip: _____
 Phone/Fax: _____
 E-Mail: _____

7. Will the project involve any off-site work? Yes No Unknown (check appropriate box)
 If yes, location and description of off-site work _____
Widening of adjacent Elwert Road.

8. Additional comments or information that may be needed to understand your project _____

Sensitive Areas Certification Form (continued)

9. An on-site, water quality sensitive area reconnaissance was completed on:

Date	By	Title	Company
12/3/12	Juniper Tagliabue/Martin Schott	Wetland Specialists	Schott and Associates

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 (3,405 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 07-20 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 07-20 section 3.02.2 for application requirements.

- Complete Certification Form (2 pages)
- Written description per Design and Construction Standards 07-20 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.

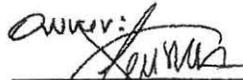
Applicant:

Kati Gault

Print/Type Name

Kati Gault

Signature

OWNER:  Vice President

Print/Type Title

2/1/13

Date

**SENSATIVE LANDS REPORT
FOR
DAYBREAK ESTATES
SHERWOOD, OREGON
WASHINGTON COUNTY**

Prepared for:
DR Horton, Inc
4380 SW Macadam Avenue
Suite 100
Portland, Oregon 97239

Prepared by:
Juniper Tagliabue
Schott & Associates

January 2013
Project #2242

INTRODUCTION

Site Location

The 6.38 acre subject property was located east of SW Elwert Road and south of SW Edy Road in Sherwood, Oregon (T2S R1W Sec.30CC TL#300, 500). The property was bound to the west by SW Elwert Road and to the east by SW Copper Terrace. To the south is a gravel driveway with a planted field in the southwest corner adjacent to Elwert Road. To the north is rural residential and agricultural. Surrounding land use was residential and agricultural. Across the street to the east was a school.

Site Description

The subject property is north sloping. Lot 300 was developed with a residential home as well as outbuildings, a basketball court and landscaping. A gravel driveway running east to west between SW Elwert Road and SW Copper Terrace provides access and defines the southern property boundary. Tax Lot 500 was an undeveloped north sloping lot sandwiched between the northern half of Lot 300 and SW Elwert road. The ground layer was vegetated with a mix of grasses including colonial bentgrass (*Agrostis tenuis*), orchard grass (*Dactylis glomerata*) and tall fescue (*Festuca arundinacea*). Himalayan blackberry (*Rubus discolor*) grew across the entire undeveloped portion of the site.

An unnamed tributary to Chicken Creek entered the site through a culvert under SW Elwert Road at the northwest corner of the property. West of Elwert Road the stream flowed north through a roadside ditch. The onsite portion of the drainage consisted of a ditched perennial stream flowing east approximately 15 feet onsite before continuing northeast offsite. Vegetation along the creek was predominantly thick blackberry with a few pacific willow (*Salix lasiandra*).

Project Objectives

The proposed project is a residential development. The project will include 35 lots and associated streets, parking and utilities.

The purposes of this report are to determine the impacts of the proposed construction within any onsite wetland or waterway Vegetated Corridors and assess current conditions to determine an appropriate restoration/enhancement plan.

METHODS

The analysis of the sensitive areas on the project site was conducted using the Standard Site Assessment method outlined in Clean Water Services (CWS) Manual Chapter 3 and Appendix C. The analysis of wetlands conducted on the site was based on published methods for implementing Section 404 of the Clean Water Act. The Routine Onsite Determination Method (1987 manual, pp 52-69) and Western Regional Supplement were used to determine any wetland boundaries.

SENSITIVE AREAS

A wetland delineation and natural resource assessment was conducted in December 2012 by Schott and Associates.

Wetlands/Waters

Based on soil, vegetation and hydrology data taken in the field no wetlands were present on the site. One apparently perennial drainage entered at the northwest corner of the property, flowing from a culvert under SW Elwert Road east approximately 15 feet before turning north off property.

Vegetated Corridor

As required by CWS regulations, a sensitive area assessment was performed for the Vegetated Corridor adjacent to the onsite wetlands and waterway (Table 1). This portion of the site was flat to very gently sloping and no slope analysis was conducted. As required per 3.03.1c of CWS regulations, a 50 foot Vegetated Corridor is required as measured from the ordinary high water line of the creek. Total onsite Corridor area is 3,405sf

The onsite Corridor was predominantly vegetated by a thick hedge of Himalayan blackberry. Grass species in the understory were colonial bentgrass and sweet vernal grass (Table 1). A couple of willow trees were observed directly adjacent to the creek. The onsite buffer had low canopy cover and was dominated by non-native and invasive species. The entire Corridor was in Degraded condition.

Table 1: Community 1

Scientific Name	Common Name	Layer	% Cover
<i>Rubus discolor</i>	Himalayan blackberry	Shrub	80
<i>Agrostis tenuis</i>	Colonial bentgrass	Forb	40
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	Forb	20
<i>Epilobium sp.</i>	Willowherb	Forb	10
% cover by natives			0
% tree canopy			0
% invasive/noxious			80
Corridor conditions			Degraded

Sensitive Areas Requirements and Conditions

As per 3.03.1c and Table 3-1 slopes are less than 25% and the onsite vegetated corridors shall extend 50 feet from the delineated waterway boundaries. Total onsite Corridor area is 3,405sf.

According to CWS regulations Vegetated Corridors for onsite wetlands that are degraded or marginal require enhancement to "Good" corridor conditions. Removal of invasive species is required for the vegetated corridor followed by replacement of native species per CWS standards. The onsite Vegetated Corridor is in Degraded condition and shall be

replanted. Native plants will be installed per CWS standards throughout the enhanced onsite Corridors.

IMPACTS

Impacts to Sensitive Areas

No impacts to Sensitive Areas are proposed.

Impacts to the Vegetated Corridor

Proposed impacts to the Vegetated Corridor have been minimized to the extent possible while still developing all the lots onsite. The site is zoned MDRH. The lots have to average 5,000 sq ft, and have to have a minimum width of 50'. In order to meet the lot size standards for the site including the 50' width, Lot 18 has been reduced to the minimum width of 50' resulting in a total of 221sf of impact in the Vegetated Corridor. Proposed impacts are 36% of the length of the site and 28% of the depth and as per 3.07.3a the design meets the criteria for a Tier 1 Alternatives Analysis.

The City is requiring widening of Elwert Road. In order to minimize impacts the road has been narrowed down at the north end of the site in order to avoid any wetland impacts. However, the City is requiring the sidewalk to continue to approximately 15 feet from the northern property boundary. Sidewalk construction including grading will result in an additional 656sf of impacts within the Vegetated Corridor.

Utilities placed along the back of the lot will result in 392sf of temporary impacts. Soil removed in this location will be replaced and the area restored to native conditions. Existing vegetation is dominated by non-native species which will be replaced as part of the enhancement area.

Total permanent impact area is 877sf. Total temporary impact area is 392sf.

TIER 1 ALTERNATIVES ANALYSIS

The proposed development is a 35 lot residential development with a 5000sf average lot size and 50ft minimum width. The development was designed to maximize lot density in order to minimize financial risk for the developer. The shape of lot 18 was reconfigured and size was minimized as much as possible while still meeting the lot size requirements. The western lot width was reduced to the minimum 50ft width, cutting off approximately 30ft along the western part of the Corridor. The lot line then tapers out to the northeast resulting in a wider eastern edge, guided by the curve of the onsite Corridor. The remaining lots to the south are also at the minimum 50' width and cannot be further reduced.

No Build Alternative

The only alternative completely avoiding Corridor impacts would be a no build alternative. This is not an option as the loss of that lot would increase the risk to a degree not tolerable to the developer.

Alternative 1

The first design for Lot 18 maintained the 55ft width across the lot and resulted in greater impacts to the Vegetated Corridor. The lot was reconfigured as described above in order to minimize impacts as much as possible.

Proposed Alternative

The proposed alternative meets the minimum lot requirements and minimizes impacts to the Vegetated Corridor as much as possible while still fully developing the site. A 20ft wide pedestrian and emergency access lane, required by the City, is to be located just south of the next lot, Lot 19, to the south. This limits any flexibility in positioning the lot. Proposed impacts are a total of 221sf in the southwest part of the corridor for Lot 18. Additional impacts for the sidewalk are 656sf. As per 3.07.3c1 all encroachment shall be mitigated onsite in accordance with Section 3.08. All remaining Vegetated Corridor onsite shall be enhanced to Good condition.

ENHANCEMENT

As per CWS regulations, enhancement of the portions of the Vegetated Corridor not already in 'Good' condition is required. The entire 50 foot Corridor is 3,405sf. The enhancement plan calls for the removal and control of non-native grasses and Himalayan blackberry for the 2,528sf to remain. The control method will be compatible with CWS requirements.

Invasive and non-native species will be replaced by a mix of native trees and shrubs to create a riparian forest community. Pacific willow (*Salix lasiandra*) and Sitka willow (*Salix sitchensis*) shall be planted adjacent to the creek. The portion of the site closer to the stream shall include red alder (*Alnus rubra*), Douglas hawthorn (*Crataegus douglasii*), Indian plum (*Oemleria cerasiformis*) and small fruited rose (*Rosa pisocarpa*). Native grasses such as spike bentgrass (*Agrostis exarata*) and tall manna grass (*Glyceria elata*) shall be planted where bare areas remain. Further from the stream Douglas fir (*Pseudotsuga menziesii*), snowberry (*Symphoricarpos albus*) and tall Oregon grape (*Mahonia aquifolium*) shall be planted. Native grasses such as native California brome (*Bromus carinatus*) and blue wildrye (*Elymus glaucus*) will be planted where areas are bare. (See Planting Plan).

The proposed enhancement plan was designed to meet CWS landscape requirements. Maintenance and monitoring of the Vegetated Corridor enhancement will be in accordance with CWS regulations.

MITIGATION

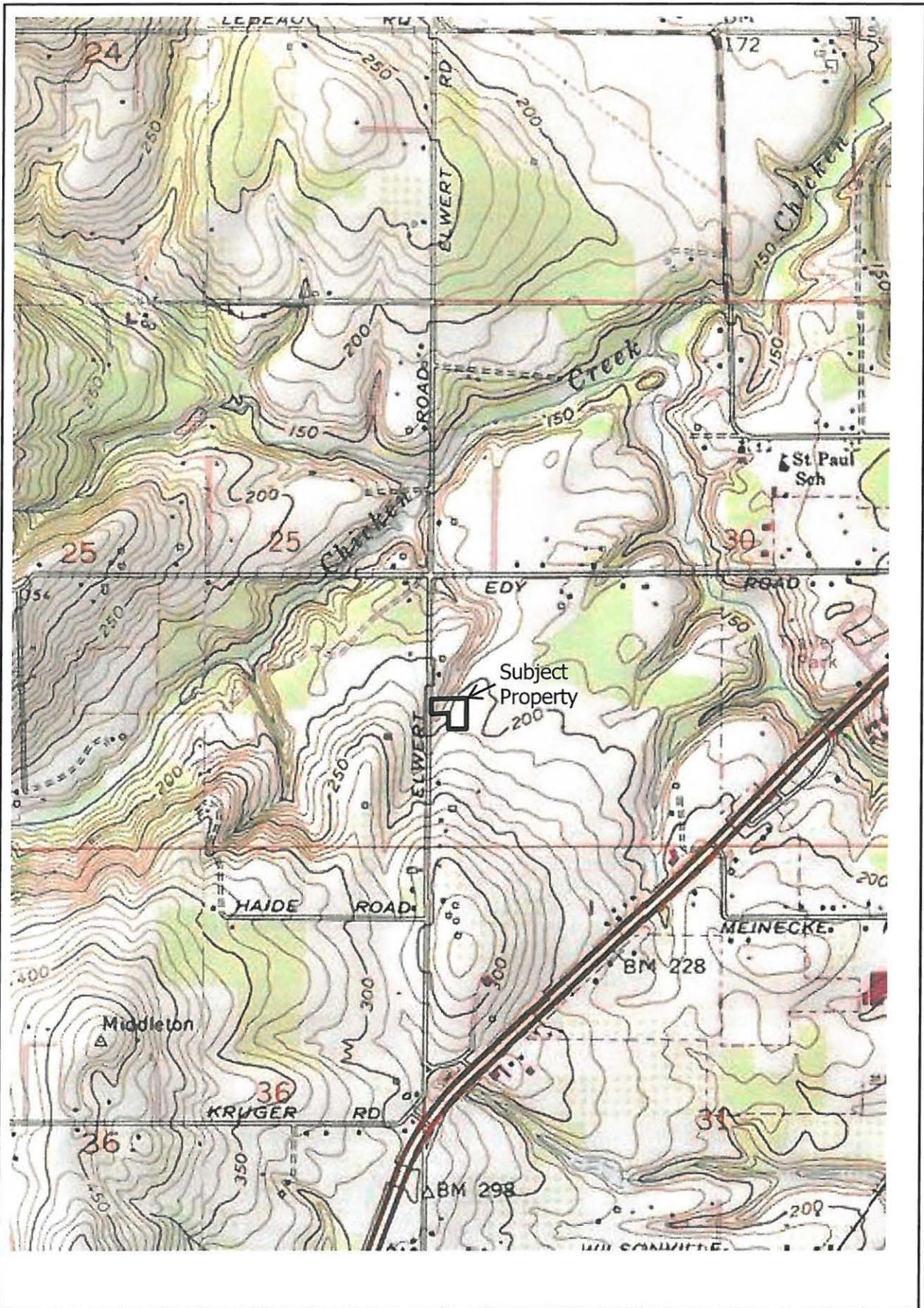
As per 3.08.2 and Table 3-2 onsite mitigation is required at a ratio of 1:1 for impacts to a Degraded Corridor. The applicant proposes to provide mitigation through the entire area between the edge of Lot 18 and the Vegetated Corridor buffer. This area is 910sf and would be a greater than 1:1 ratio. Additionally, it would result in a wider Corridor in this location and an overall average Corridor width of greater than 50 feet.

The mitigation plan shall include the removal and control of non-native grasses and Himalayan blackberry in a manner compatible with CWS requirements.

Invasive and non-native species will be replaced by a mix of native trees and shrubs to complement the adjacent riparian forest community. Douglas fir, snowberry and tall Oregon grape shall be planted. Native grasses such as native California brome and blue wildrye will be planted where areas are bare. (See Planting Plan).

APPENDICES

- A: Site Vicinity Map**
- B: Existing Conditions Map with Vegetated Corridor Conditions and Photo Points**
- C: Vegetated Corridor Photographs**
- D: Overall Site Development Plan**
- E: Buffer Impact and Mitigation Area Detail**
- F: Aerial view**
- G: Mitigation/Enhancement Planting Table**
- H: Wetland/Upland Data Sheets**



Appendix A. Site Location Map – Topographic Map
Daybreak Estates
S&A#2242

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007



Photo Point 1. Facing east at onsite tributary



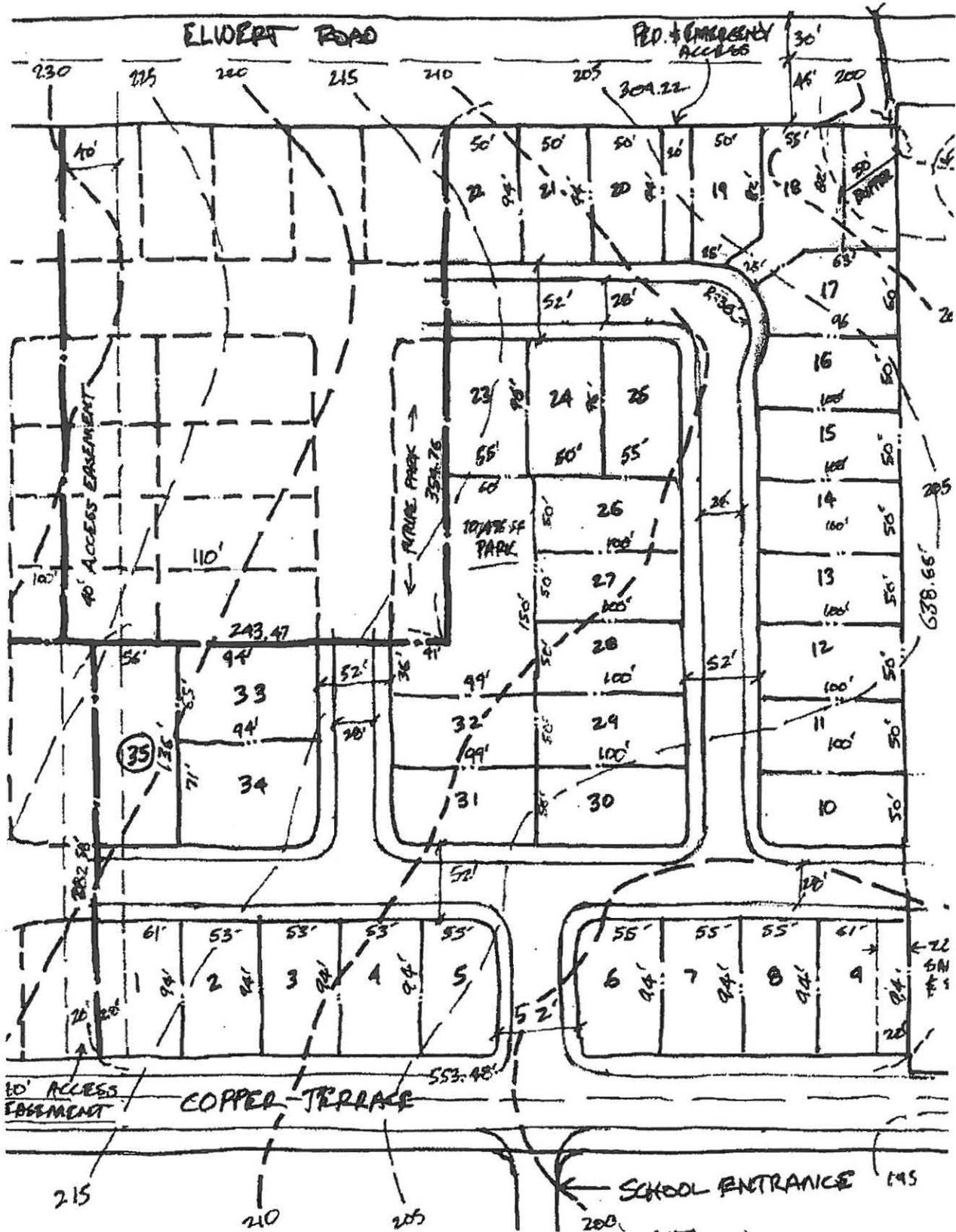
Photo Point 1. Facing south along SW Elwert road

Appendix C. Site Photographs
Daybreak Eatates
S&A#2242

Schott & Associates
P.O. Box 589
Aurora, OR, 97002
503.678.6007



Photo Point 2. Facing East to SP3

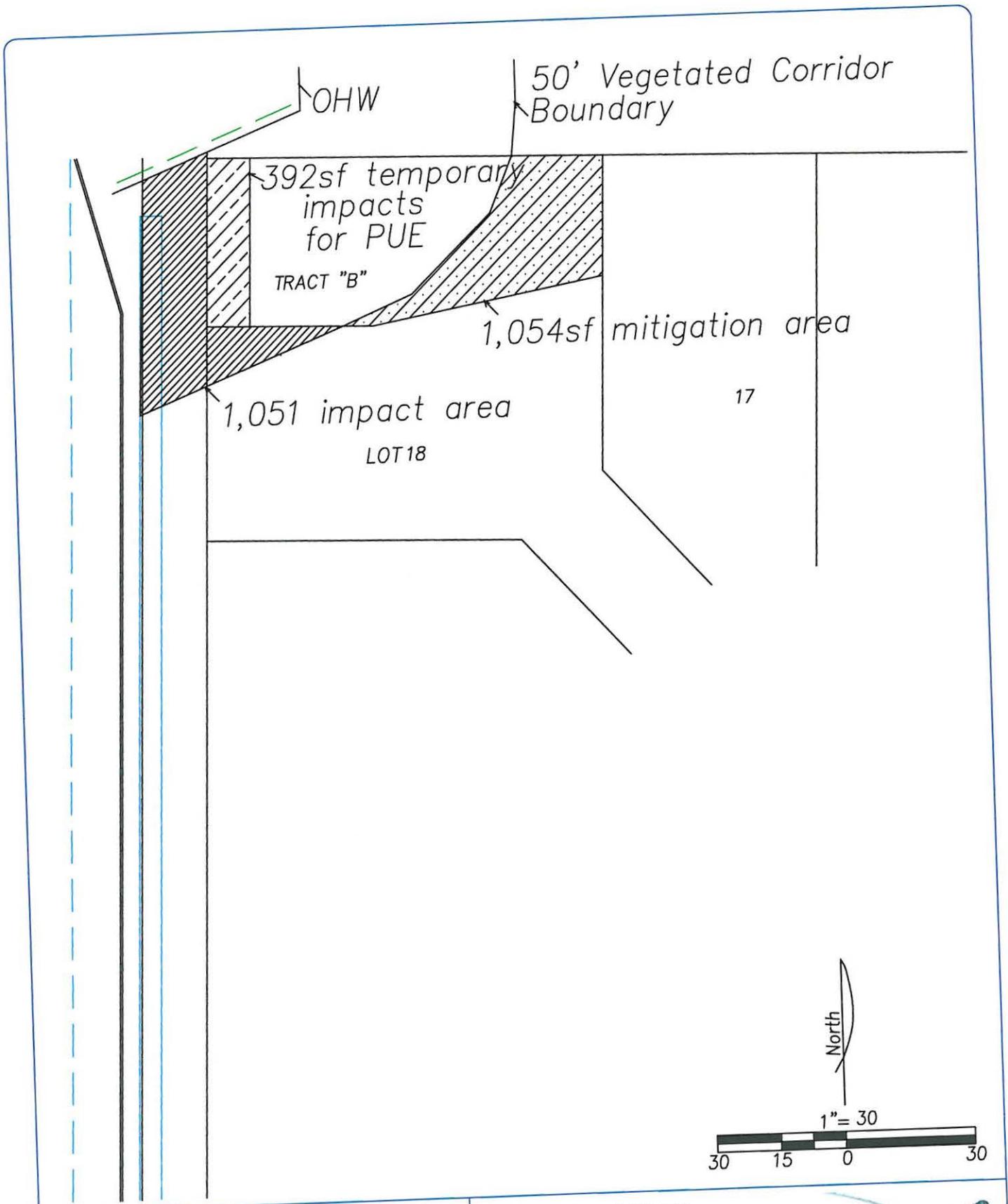


APPENDIX D.
Overall Development Plan

DAYBREAK
35 LOTS

NORTH
11:00
12-24-12





02-13-13
 JJT
 Job #: 2242
 Sheet 1 of 1

APPENDIX E.
 BUFFER IMPACT &
 MITIGATION AREAS

SCHOTT & ASSOCIATES
 21018 NE HWY 99E
 PO BOX 589
 AURORA, OREGON 97002

p: 503.678.6007
 f: 503.678.6011





Subject Property

Appendix F. Aerial Photograph – Google Earth 2012
Daybreak Estates
S&A#2242

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

APPENDIX G: MITIGATION/ENHANCEMENT PLANTING TABLE

Plant Communities	Plant Category	Water Requirements	Light Requirements	Minimum Rooting Size	Minimum Plant Height	On Center/ Seeding rate	Spacing Format	Qty.
Riparian Upland Forest Mitigation and Enhancement Planting Plan 3,582sf								
Pacific willow* (<i>Salix lasiandra</i>)	Tree	Wet	Sun	1 gal.	3'	10'	Single	4
Sitka willow* (<i>Salix sitchensis</i>)	Tree	Moist	Sun	1 gal.	3'	10'	Cluster	5
Douglas hawthorn** (<i>Crataegus douglasii</i>)	Tree	Moist	Part	2 gal.	2'	10'	Cluster	7
Red alder** (<i>Alnus rubra</i>)	Tree	Moist	Sun	1 gal.	3'	10'	Single	6
Douglas fir (<i>Pseudotsuga menziesii</i>)	Tree	Dry	Sun	2 gal.	3'	10'	Single	13
Indian Plum** (<i>Oemleria cerasiformis</i>)	Shrub	Moist	Shade	2 gal.	2'	4'	Cluster	43
Small fruited rose** (<i>Rosa pisocarpa</i>)	Shrub	Moist	Part	1 gal.	1.5'	4'	Cluster	43
Tall Oregon grape (<i>Mahonia aquifolium</i>)	Shrub	Dry	Sun	1 gal.	6"	4'	Single	46
Snowberry (<i>Symphoricarpos albus</i>)	Shrub	Dry	Part	1 gal.	1.5'	4'	Cluster	47
Native California brome (<i>Bromus carinatus</i>)	Grass	Dry	Part	Seed	n/a		10lbs. pls	
Blue Wildrye (<i>Elymus glaucus</i>)	Grass	Dry	Part	Seed	n/a			
Spike bentgrass** (<i>Agrostis exarata</i>)	Grass	Moist	Part	Seed	n/a			
Tall manna grass** (<i>Glyceria elata</i>)	Grass	Moist	Part	Seed	n/a			

* To be planted directly adjacent to stream.

** To be planted in half of Corridor closer to the stream.

Remaining plants to be located in the half of the Corridor farther from the stream.

**APPENDIX H:
WETLAND/UPLAND DATA SHEETS**

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Day Creek Estates City/County: Shasta/Butte Sampling Date: December 3, 2012
 Applicant/Owner: DR. H. G. State: OR Sampling Point: 2
 Investigator(s): MRS. J. Section, Township, Range: 12S RTW 540 000
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 2
 Subregion (LRR): A Lat: 43.3626 Long: -122.8653 Datum:
 Soil Map Unit Name: Liberty S1 NWI classification: 1A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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.

Synoptic Vegetation Present? Yes No
 Hydric Soil Present? Yes No Is the Site in a Wetland? Yes No
 Wetland Hydrology Present? Yes No

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>100</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>5</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>Rosa pisocarpa</u>	25	<input checked="" type="checkbox"/>	FAC	Total % Cover of: Multiply by: OBL species <input type="checkbox"/> x 1 = <input type="checkbox"/> FACW species <input type="checkbox"/> x 2 = <input type="checkbox"/> FAC species <input type="checkbox"/> x 3 = <input type="checkbox"/> FACU species <input type="checkbox"/> x 4 = <input type="checkbox"/> UPL species <input type="checkbox"/> x 5 = <input type="checkbox"/> Column Totals: <input type="checkbox"/> (A) <input type="checkbox"/> (B) Prevalence Index = B/A = <input type="checkbox"/>
2. <u>Rubus discolor</u>	T		FACU	
3. <u>Rubus laciniatus</u>	T		FACU	
4. _____				
5. _____				
25 = Total Cover				
Herb Stratum (Plot size: <u>5</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Agrostis tenuis</u>	40	<input checked="" type="checkbox"/>	FAC	1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input checked="" type="checkbox"/> 3 - Prevalence Index is =3.0 ¹ <input checked="" type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) <input type="checkbox"/> ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Festuca arundinacea</u>	5		FAC	
3. <u>Juncus effusus</u>	15		FACW	
4. <u>Plantago lanceolata</u>	5		FAC	
5. <u>Cirsium vulgare</u>	T		FAC	
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
65 = Total Cover				
Woody Vine Stratum (Plot size: <u>10</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____				Yes <input type="checkbox"/> No <input type="checkbox"/>
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>10</u>				

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9	10YR3/2	100					SIL	
9-16	2.5Y4/2	100					SiCL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- | | | |
|--|---|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> 2 cm Muck (A10) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Redox Depressions (F8) | |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- | | | |
|--|---|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) | <input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Shallow Aquitard (D3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) | <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Frost-Heave Hummocks (D7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | |

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): 16"
 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: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Onyiah Falls City/County: Shelton, Washington Sampling Date: December 3, 2012
 Applicant/Owner: DR Horton State: OR Sampling Point: 3
 Investigator(s): NRS, JJJ Section, Township, Range: T2S, R11E, S30CC
 Landform (hillslope, terrace, etc.): plateau Local relief (concave, convex, none): none Slope (%): 3
 Subregion (LRR): A Lat: 43.3624 Long: -122.8963 Datum: _____
 Soil Map Unit Name: H10c1/S1 NWI classification: 1A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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 <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the Sampled Area Wetland?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Remarks:					

VEGETATION – Use scientific names of plants.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				
Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				Total % Cover of: Multiply by: OBL species <input type="checkbox"/> x 1 = _____ FACW species <input type="checkbox"/> x 2 = _____ FAC species <input type="checkbox"/> x 3 = _____ FACU species <input type="checkbox"/> x 4 = _____ UPL species <input type="checkbox"/> x 5 = _____ Column Totals: <u>_____</u> (A) <u>_____</u> (B) Prevalence Index = B/A = <u>_____</u>
2. <u>Rubus discolor</u>	80	<input checked="" type="checkbox"/>	FACU	
3. _____				
4. _____				
5. _____				
80 = Total Cover				
Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input checked="" type="checkbox"/> 3 - Prevalence Index is =3.0 ¹ <input checked="" type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> 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.
1. <u>Agrostis tenuis</u>	40	<input checked="" type="checkbox"/>	FAC	
2. <u>Anthoxanthum odoratum</u>	20	<input checked="" type="checkbox"/>	FACU	
3. <u>Epilobium sp</u>	10	<input checked="" type="checkbox"/>	FAC	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
70 = Total Cover				
Woody Vine Stratum	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>10</u>				
Remarks:				

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR3/2-3	100					SIL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- | | | |
|--|---|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> 2 cm Muck (A10) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Redox Depressions (F8) | |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- | | | |
|--|---|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) | <input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Shallow Aquitard (D3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) | <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Frost-Heave Hummocks (D7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | |

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): 7"
 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: Rainfall for October and November nearly 2 times average. Over 1.5" of rain already in December.

Updated Arborist Report
Daybreak Sherwood



Updated Arborist Report

Prepared March 5th, 2013 for:

Steve Ellis
ellis.steve44@yahoo.com
Trademark Landscapes, Inc.
P.O. Box 2410
Oregon City, OR
97045 and

Ryan M O'Brien
RMObrien@drhorton.com
DR Horton, Inc.
4380 SW Macadam Av. Suite 100
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Prepared by:

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International Society of Arboriculture ISA
Certified Arborist #PN-1105
Pacific Northwest ISA
Certified Tree Risk Assessor #452
Society of American Foresters
Certified Forester #585

*Gaston Porterie Certified Forester SAF #585 Certified Arborist ISA #PN-1105
7000 NE 294th St. Battle Ground, WA 98604 Phone 360-904-9613 FAX 360-263-5427*

EXHIBIT
"M"

Updated Arborist Report Daybreak Sherwood

Location

This arborist report addresses a 6.13-acre site proposed for about 34 single family homes located west of Sherwood, Oregon at 21500 & 21730 SW Elwert Road (parcels #2S130CC00500 and #2S130CC00700).

Purpose & Background

The purpose of this report is to confirm mapping locations of 30 inventoried trees, identify groups of tree species, approximate sizes, and make recommendations about tree retention or removal. Ryan O'Brien provided me with updated site plans with elevation contours, planned lot lines, streets and symbols indicating existing trees.

Topography and environment

The slope varies from about 0% to 5%. Based on the Washington County GIS mapping, it does not appear to have much area in environmentally sensitive soils, wetlands, habitats, buffers, geological hazards or unstable slopes. Based on observations made during a August 17th, 2007 field visit to the subject property, the area has some rows of trees, small groves of trees, scattered landscape trees, fruit trees, and former Christmas trees (Douglas-fir), ranging from seedling and sapling to medium size. There is also open lawn and pasture grass. It is surrounded on three sides by existing rural residential properties, with a newer subdivision to the south.

Existing Trees

Please see the site plan provided by Ryan O'Brien (separate file "New Plans for Daybreak 2-25-13.pdf") with existing buildings and circles with symbols indicating tree group locations for inventoried trees. Also see 2nd page of that file for planned lot lines, streets and other site plan features.

Another separately attached file "Daybreak Sherwood Tree Count 030513.pdf" shows a spreadsheet listing groups of trees by Tree Map ID, location within the parcel, numbers counted, their sizes and species and other field observation data. The total count is 30 inventoried trees (per Sherwood Code 16.142.070).

The existing trees are generally healthy and none are recommended for immediate removal due to hazard to life or property. There are no very large or ecologically significant existing trees, and all 30 inventoried trees are relatively young and appear to have been planted within the last 35 years or so. According to Mr. Alexander (the resident who has been near the site the longest) all of the trees on his properties were planted by him or his family, using landscape stock from a nursery owned by a family member.

Tree Retention and Removal Strategy

The proposed development of 34 single family homes precludes the retention of any existing trees, due to specific tree locations within proposed building envelopes, streets, sidewalks, driveways and utility corridors, along with grading cuts of three to twelve feet deep. Because there are no large or

Updated Arborist Report Daybreak Sherwood

ecologically significant existing trees, and all 30 inventoried trees (per Sherwood Code 16.142.060) are relatively young and appear to have been planted within the last 30 years. Ryan O'Brien advised me that removal of these 30 trees no longer needs to be mitigated.

Vegetation Management Strategy

A number of street trees may need to be planted and they may include the following trees, which are commonly available, colorful and hardy:

- Kwanzan flowering cherry (*Prunus serrulata* 'Kwanzan'), or Thundercloud Plum, or Krauter's Vesuvius Plum
- Raywood ash (*Fraxinus oxycarpa* 'Raywood')
- In tighter spaces: Cleveland Select pear (*Pyrus calleryana*) may be substituted.

(recommended spacing = 12 to 25 lineal feet apart)

The planting holes should be the same depth as the root balls, but three times the diameter. A mulch of wood chips should be applied in the largest affordable radius. Blackberries, grass and other competing vegetation should be kept away from the root zones of the planted trees. Other standard protection and maintenance should be followed, under the supervision of a Certified Arborist. Please see the DR Horton landscaping plan (not provided to me) for street tree planting locations.

Future Review of the Management Strategy

Future changes in ownership objectives, forest inventory, zoning, technology, and/or the business climate can all result in the need for modification of this tree plan. Periodic review and update is suggested every 10 to 20 years by a certified arborist or forester.

Summary

- 30 inventoried trees (per Sherwood Code 16.142.060) were observed during an August 17th, 2007 field visit to the subject property. The spreadsheets and site plan show the tree counts and other tree information by parcel, and by location within the parcel.
- The currently proposed development of 34 single family homes precludes the retention of any of the existing trees, due to specific tree locations within proposed building envelopes, streets, sidewalks, driveways and utility corridors, along with grading cuts of three to twelve feet deep.
- There are no large or ecologically significant existing trees, and all 30 inventoried trees are relatively young and appear to have been planted within the last 30 years or so.

/s/ Gaston Porterie
GASTON PORTERIE

This timber management plan is limited to the conditions observed as of the field dates the evaluation was made, and no assumptions or predictions are made about any human activities, tree decline, or acts of nature that may occur anytime after the date of the field evaluation. This

Updated Arborist Report Daybreak Sherwood

forester does not accept any liability for any future events, human activities, tree decline, or acts of nature that may occur.

Enclosures

(separate electronic files)

- New Plans for Daybreak 2-25-13.pdf
- Daybreak Sherwood Tree Count 030513.pdf
- Washington County Assessors parcels #2S130CC00500 & 2S130CC00700.jpg
- Aerial photo of parcel #2S130CC00500 - Google Maps.jpg
- Aerial photo of parcel #2S130CC00700 - Google Maps.jpg

Updated Arborist Report Daybreak Sherwood

Arborist/Forester Qualifications

Experience

- 40+ years experience as a forester for private companies and the U.S.D.A. Forest Service in Louisiana, California, Nevada, Oregon and Washington

Accomplishments

- Completed many tree evaluations, tree plans and timber management plans in Beaverton, Hillsboro, Durham, Portland, Sherwood, Tigard, and Tillamook, Oregon; Camas, La Center, Vancouver, Washougal and Clark County, Washington

Education

- B.S. Forestry: Louisiana State University, 1973
- M.F.R. Ecology and Silviculture University of Washington, 1984

Professional Affiliations

- Certified Arborist #PN-1105, International Society of Arboriculture (ISA)
- Pacific Northwest ISA Certified Tree Risk Assessor #452
- Certified Forester #585, Society of American Foresters
- formerly a Certified Silviculturist, U.S.D.A. Forest Service, on several National Forests of the Pacific Northwest Region (for 22 years, from 1981 thru 2003)
- formerly Forester and Budget Coordinator, U.S.D.A. Forest Service, Pacific Northwest Research Station (for 13 years, from 1999 thru 2012)

Tree Plans Northwest
Daybreak Sherwood
Trees INVENTORIED on August 17th, 2007

<u>Tree Map ID</u>	<u>Location</u>	<u>Types of trees</u>	<u>number of INVENTORIED trees</u>	<u>approximate trunk diameters (inches)</u>	<u>approximate tree height (feet)</u>	<u>grouping</u>	<u>mitigation required? Why or why not?</u>	<u>number of INVENTORIED trees to be mitigated</u>
a	west of driveway	Scots pine	6	12	25	in a row	no = middle of a proposed R-O-W	0
b	southwest of house	sycamore	2	6			partial = 1 tree is in proposed R-O-W (other tree is in a section of a 1-3 ft. cut)	1
e	backyard, northwest of house	Scots pine	8	12	25	scattered	no = middle of a proposed R-O-W	0
h	backyard, northeast of house	paper birch	6	8	35	in a row	yes = not in R-O-W (2 trees are in a 3-6 ft. fill area; 4 trees are in the middle of a building envelope)	6
i	backyard, & east of house	Scots pine	8	12	25		partial = 4 in a proposed R-O-W (1 tree is in 1-3 ft. cut area on grading plan; 3 trees are in building pad on Lot 20)	4
		totals for DR Horton 6 acre parcel:	30	10	6		(see next tab for calculation of how many trees need to be planted or transplanted to achieve this mitigation)	11



January 30, 2013

Project #: 13204

Bob Galati, PE
City of Sherwood
22560 SW Pine Street
Sherwood, Oregon 97140

RE: *Transportation Assessment for the Proposed Daybreak Subdivision – Sherwood, Oregon*

Dear Bob,

This letter presents the results of our transportation assessment for the proposed Daybreak Subdivision to be located in Sherwood. This study concludes that the proposed single-family homes can be developed while maintaining acceptable traffic operations and safety on the surrounding street system. No off-site improvement measures are recommended in conjunction with site development. Additional details of the methodology, findings, and recommendations are provided herein.

Introduction

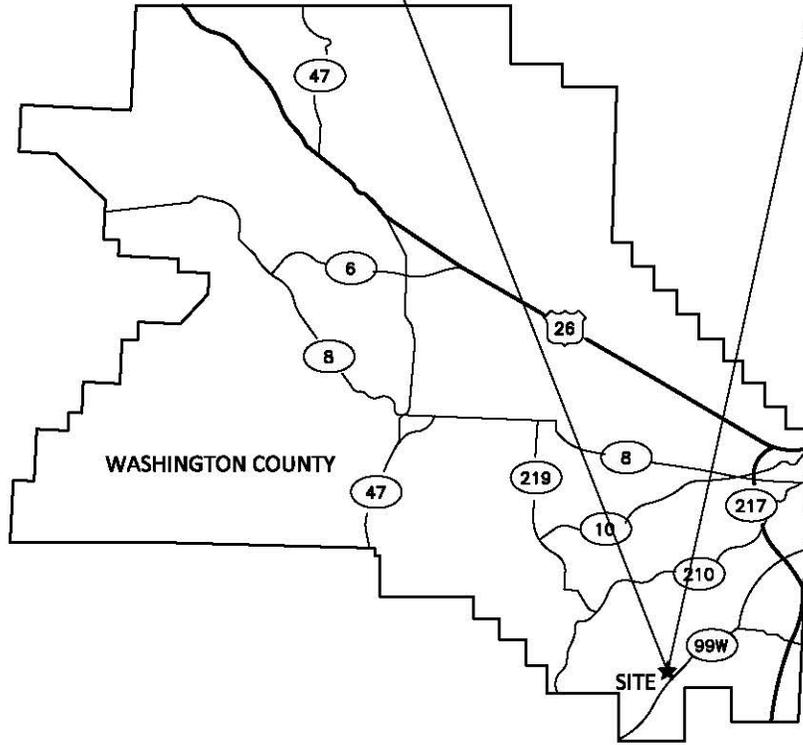
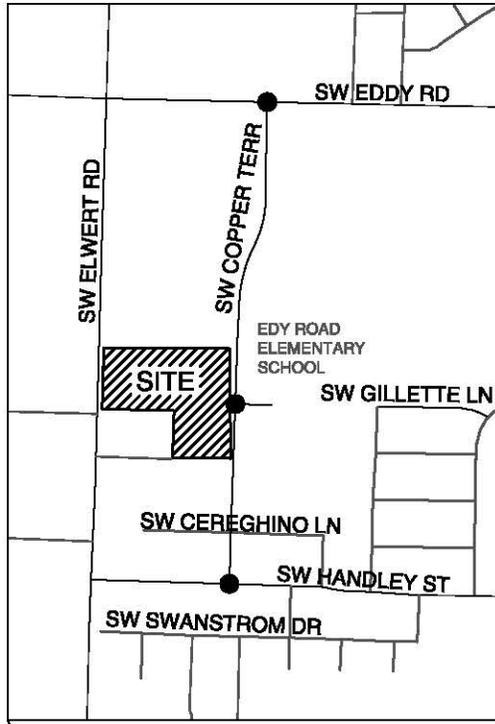
DR Horton, Inc. is proposing to construct up to 36 single-family homes in a residential subdivision located between SW Copper Terrace and SW Elwert Road near the existing Edy Ridge Elementary School. The site will initially be accessible via a public street connection to SW Copper Terrace. The proposed site plan also includes one roadway stub connection to the north and three stub roadway connections to the south that will connect with other future residential developments. The site is currently vacant. Figure 1 offers a site vicinity map while Figure 2 presents the proposed site plan.

Methodology

The scope for this project was identified in consultation with City staff and based on a review of the local transportation system and trip-generating characteristics of the site.

Operations of three study intersections were examined. The study intersections include:

- SW Handley Street/SW Copper Terrace;



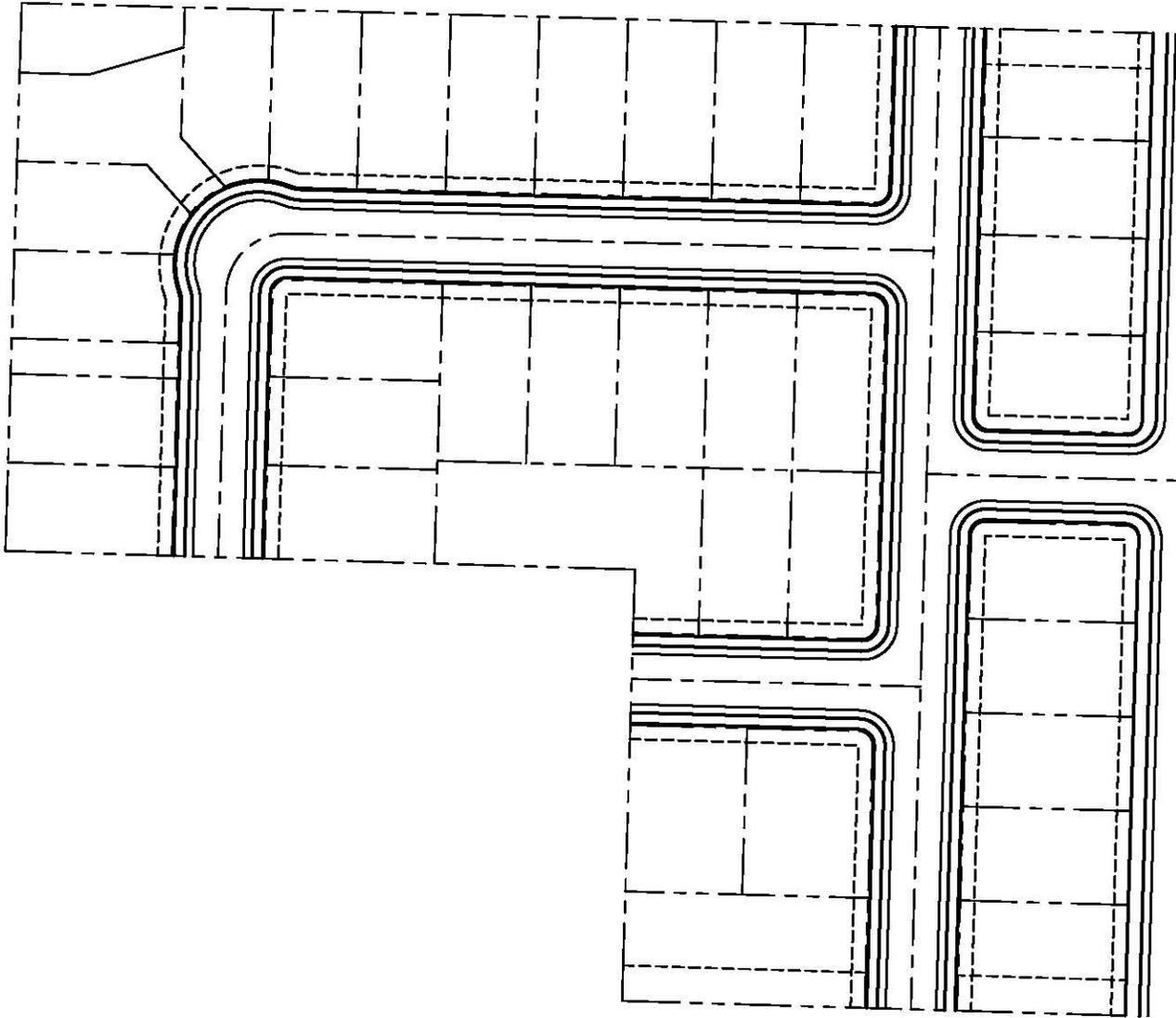
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LEGEND

● - STUDY INTERSECTIONS

**SITE VICINITY MAP
SHERWOOD, OREGON**

**FIGURE
1**



SW COPPER TERRACE

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**PROPOSED SITE PLAN
SHERWOOD, OREGON**

**FIGURE
2**

- Edy Ridge Elementary School Southern Driveway/SW Copper Terrace; and
- SW Edy Road/SW Copper Terrace

This report addresses the following transportation issues:

- Trip generation and distribution estimates for the proposed development;
- Study intersection operations during the weekday AM, school PM and weekday PM peak hours under existing conditions;
- Forecast year 2014 future traffic conditions at the study intersections without and with site development during the critical AM peak hour; and
- Conclusions and recommendations.

Future year operational analyses were only performed for the weekday AM peak hour because that period was found to represent worst-case traffic conditions, as will be described later in this report.

ANALYSIS METHODOLOGY AND OPERATING STANDARDS

The level of service (LOS) analysis described in this report was performed in accordance with the procedures stated in the *2000 Highway Capacity Manual* (HCM, Reference 1). To ensure that the analyses were based on a reasonable worst-case scenario, the peak 15-minute flow rates were used in the evaluation of the study intersections. Thus, the analysis reflects conditions that are likely to occur for only 15 minutes out of each average peak hour. Traffic conditions during typical weekday hours are expected to operate under better conditions than those described in this report. *A description of LOS and the criteria by which it is determined is presented in Attachment "A." Attachment "B" also indicates how LOS is measured and what is generally considered the acceptable range of LOS.*

The City of Sherwood defines acceptable intersection operations as LOS "D" or better. The City makes no distinction in operating standards between signalized and unsignalized intersections.

Trip Generation Estimate

Up to 36 new single-family homes are proposed on the site. Estimates of daily and weekday peak hour vehicle trips generated by the proposed single-family homes were calculated using the standard trip rates from the Institute of Transportation Engineers (ITE) *Trip Generation, 9th Edition* (Reference 2). Table 1 shows the estimated trip generation of the proposed development, rounded to the nearest 10 daily trips.

Table 1 Trip Generation Estimate

Land Use Category	ITE Code	Dwelling Units	Daily Trips	Weekday AM Peak Hour			School PM Peak Hour*			Weekday PM Peak Hour		
				Total Trips	In	Out	Total Trips	In	Out	Total Trips	In	Out
Single-Family Detached Homes	210	36	340	27	7	20	15	8	7	36	23	13

*Data is not provided by ITE. Estimate is based on one mid-day peak hour trip study of a site in 2007.

As noted in Table 1, ITE does not provide data for the school PM peak hour time period. Trips during this period are expected to be less than those experienced during the AM or PM peak hours given that typical home-to-work commute trips do not occur during the weekday school PM peak period.

Intersection Operations Analysis

This section of the report presents an analysis of traffic conditions at the three study intersections under existing and future year 2014 traffic conditions. The year 2014 analysis horizon was selected to reflect the anticipated year of build-out of the proposed development. Figure 3 illustrates the existing lane configurations and traffic control devices at the three study intersections. The derivation of traffic volumes at the study intersections for analysis are described below.

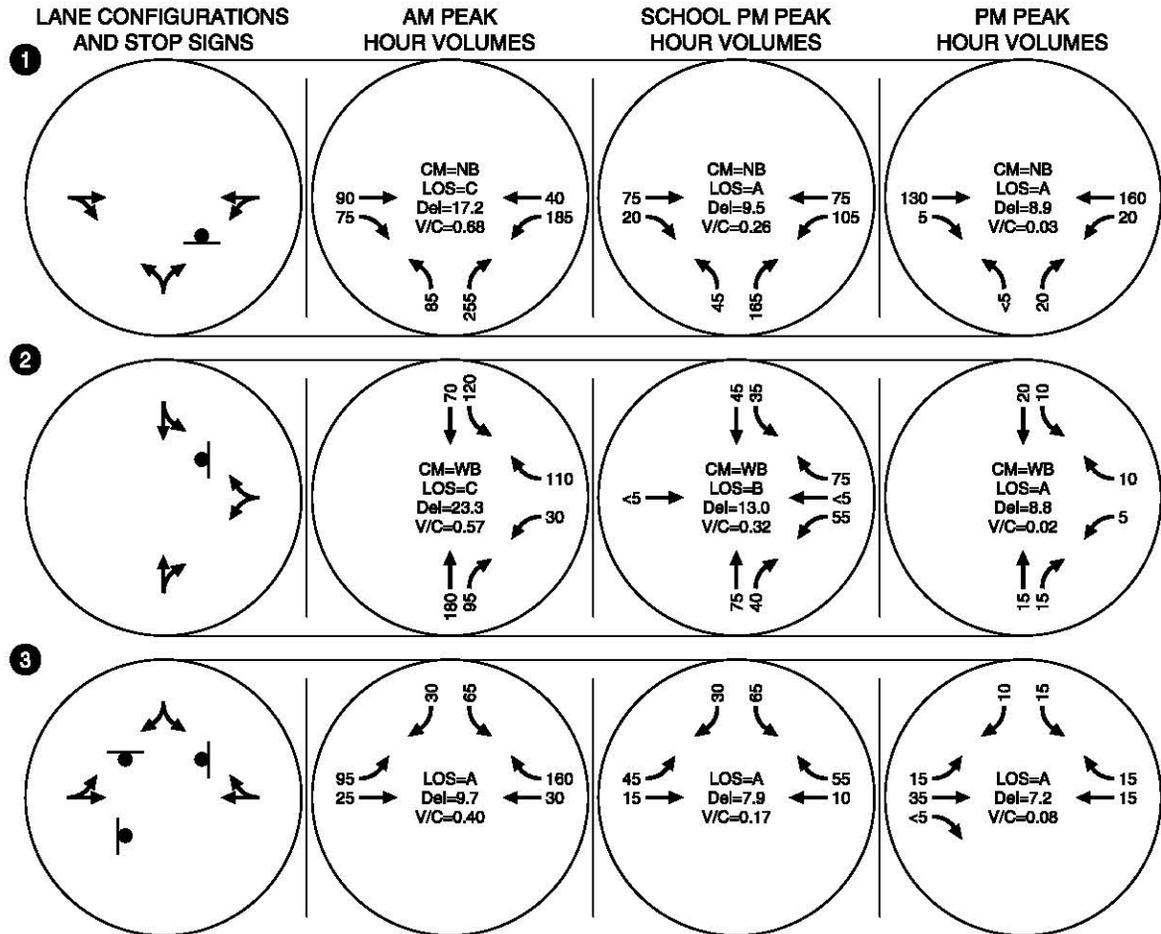
As summarized below and in the figures, the analysis determined that all of the study intersections operate acceptably under existing conditions. Weekday AM peak hour conditions were found to reflect the highest delay and were selected for analysis under future conditions. Given that the future site-generated traffic is accommodated during the critical AM peak hour, it can be concluded that the weekday school PM and PM peak hours should operate acceptably as well.

EXISTING CONDITIONS

The existing conditions analysis identifies current site conditions and the operational and geometric characteristics of the study intersections. This analysis provides a basis of comparison to future conditions. Manual turning movement counts were conducted at the study intersections in December 2012 during the weekday morning (7:00 to 9:00 AM), school PM (1:45-3:45 PM) and evening (4:00 to 6:00 p.m.) time periods on a typical mid-week day. Edy Ridge Elementary School classes begin at 8:00 AM and end for the day at 2:15 PM.

Figure 3 shows the existing volumes at the study intersections during the peak periods as well as the existing lane configurations and traffic control devices at each location. The traffic counts are provided in Attachment "B". Figure 3 also illustrates the operational analysis results for each of the

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LEGEND

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

**EXISTING CONDITIONS
SHERWOOD, OREGON**

**FIGURE
3**

three analysis periods. As shown in the figure, the study intersections operate acceptably today during all periods. Peak delay at the study intersections was found to occur during the weekday AM peak hour (consistent with peak travel demand at the adjacent Edy Ridge Elementary School).

In reviewing the existing elementary school driveway, it was noted that the school driveway is posted with a sign that prohibits left-turns out of the driveway between 7:30 and 8:00 AM and between 2:00 and 2:30 PM. Despite the sign, left-turns were observed out of the driveway during both 30-minute time periods as well as throughout the count periods.

Given that the intersections all operate acceptably today and that peak delay occurred during the morning peak hour, the future conditions analysis focused only on the weekday AM peak hour period. Attachment "C" includes the LOS worksheets for each of the analysis conditions.

YEAR 2014 BACKGROUND TRAFFIC CONDITIONS

The background traffic analysis identifies how the study area's transportation system will operate without the single-family homes proposed as part of the Daybreak Subdivision. To account for general growth in the region, the analysis assumes a 1.5 percent annual growth rate for through traffic on SW Edy Road and SW Handley Street based on Washington County travel demand forecast. No growth was assumed along SW Copper Terrace itself given the school is complete and no other approved development was identified by City staff in the site vicinity.

Trip Distribution/Assignment

Site traffic was distributed based on existing traffic patterns at the three study intersections and review of local and regional destinations. Figure 4 shows the estimated trip distribution pattern.

YEAR 2014 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts the turning movement volumes and operation of the three study intersections with the inclusion of traffic generated by the proposed site development. Total traffic conditions are the sum of estimated site-generated traffic and the year 2014 background volumes.

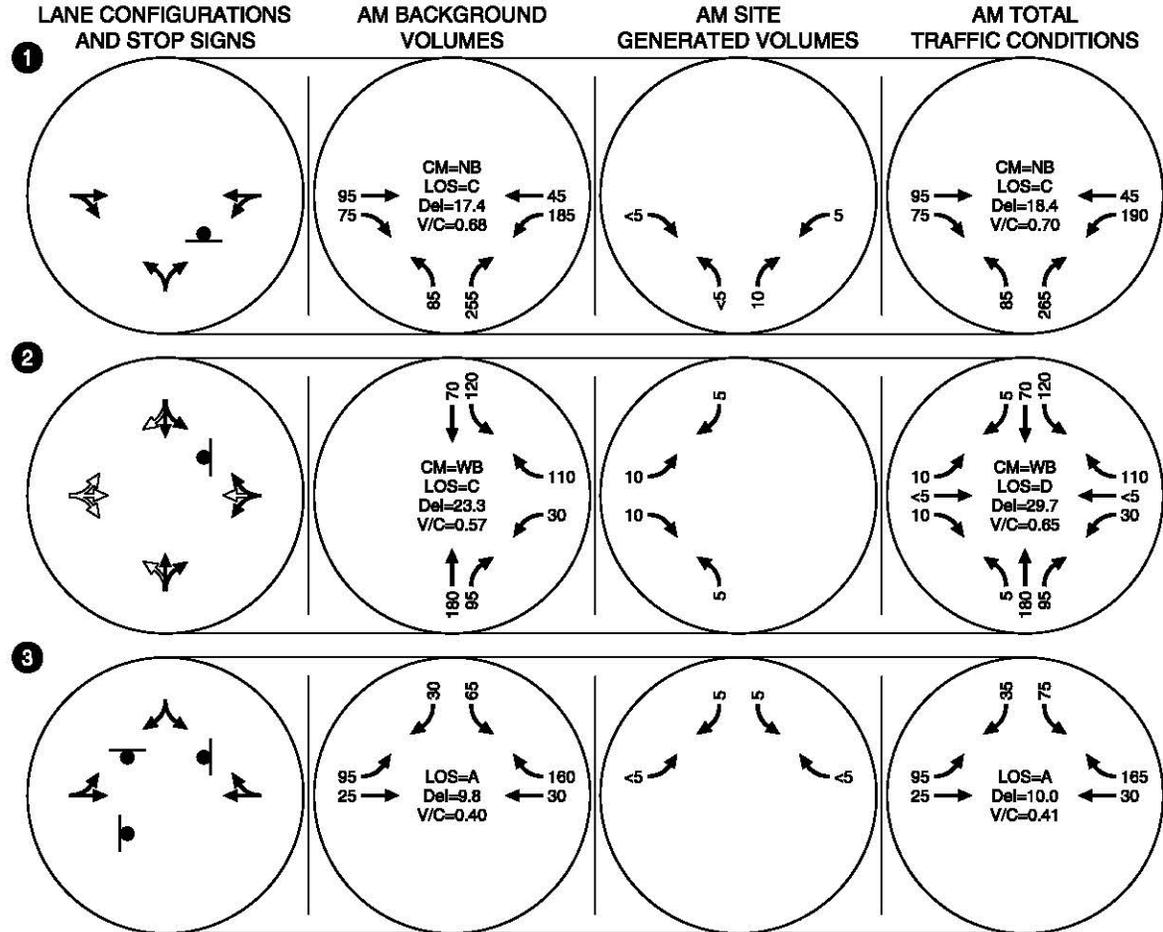
Based on the analysis results, the study intersections continue to operate acceptably with site development and no capacity mitigation needs were identified in conjunction with site development.

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LEGEND

- STOP SIGN
- ADDED DRIVEWAY MOVEMENTS
- CM = CRITICAL MOVEMENT (TWSC)
- LOS = INTERSECTION LEVEL OF SERVICE (AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
- Del = INTERSECTION AVERAGE CONTROL DELAY (AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- TWSC = TWO-WAY STOP CONTROL
- AWSC = ALL-WAY STOP CONTROL



**2014 FUTURE CONDITIONS
SHERWOOD, OREGON**

**FIGURE
4**

Other Considerations

A half-street frontage improvement will be provided along SW Copper Terrace in conjunction with site development. The improvement will complete the roadway along the site frontage, constructing the roadway to the City's 36-foot wide neighborhood route design standard. A new western approach will be constructed to the Edy Ridge Elementary School Driveway/SW Copper Terrace intersection and will serve as the initial link between the new homes and the roadway network.

The new eastbound approach to the Edy Ridge Elementary School Driveway/SW Copper Terrace intersection should be stop controlled and intersection sight distance on the new approach should be maintained on-site as per City Code. Landscaping, above ground utilities, and signing should be located and maintained in a manner that preserves adequate intersection sight distance at the intersection and throughout the site.

Findings and Recommendations

Based on the results of this access report, the proposed Daybreak Subdivision can be constructed while maintaining acceptable operations and safety at the study intersections. This study's findings and recommendations are summarized below.

FINDINGS

- The three study intersections were found to operate acceptably during the weekday AM, school PM and PM peak hours under existing conditions.
- The proposed development is estimated to generate approximately 340 new daily trips during a typical weekday, including 27 trips during the AM peak hour, 15 trips during the school PM peak hour and 36 trips during the PM peak hour.
- The study intersections were all found to operate acceptably during the critical weekday AM peak hour in the future year 2014 both prior to and with site development. Given the AM peak hour operations are acceptable, weekday school PM and PM conditions should also be acceptable.

RECOMMENDATIONS

- Standard half-street frontage road improvements should be completed in conjunction with site development as per City of Sherwood requirements.

- Intersection sight distance should be maintained on-site as per City Code. Landscaping, above ground utilities, and signing should be located and maintained in a manner that preserves adequate intersection sight distance.

We trust that this letter adequately addresses the traffic impacts associated with the proposed Daybreak Subdivision. Please contact us if you have any questions or comments regarding the contents of this letter or the analyses performed.

Sincerely,

KITTELSON & ASSOCIATES, INC.



Chris Brehmer, P.E.
Principal Engineer

Cc: Kati Gault, D.R. Horton, Inc. - Portland



References

1. Transportation Research Board. *Highway Capacity Manual*. 2000.
2. Institute of Transportation Engineers. *Trip Generation, 9th Edition*. 2012.

Attachments

- A) Description of Level-of-Service and Volume-to-Capacity Methods and Criteria
- B) Traffic Count Data
- C) Operational Analysis Worksheets

Attachment A Description of Level-of-Service and Volume-to-Capacity Methods and Criteria

ATTACHMENT A LEVEL-OF-SERVICE AND VOLUME-TO-CAPACITY CONCEPTS

Level-of-Service Concept

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from “A” to “F.”¹

SIGNALIZED INTERSECTIONS

The six level-of-service grades are described qualitatively for signalized intersections in Table A1. Additionally, Table A2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service “D” is generally considered to represent the minimum acceptable design standard.

Table A1 Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

¹Most of the material in this appendix is adapted from the Transportation Research Board, *Highway Capacity Manual*, 2000.

Table A2 Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The *2000 Highway Capacity Manual* (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table A3. A quantitative definition of level of service for unsignalized intersections is presented in Table A4. Using this definition, Level of Service “E” is generally considered to represent the minimum acceptable design standard.

Table A3 Level-of-Service Definitions (Unsignalized Intersections)

Level of Service	Average Delay per Vehicle to Minor Street
A	<ul style="list-style-type: none"> Nearly all drivers find freedom of operation. Very seldom is there more than one vehicle in queue.
B	<ul style="list-style-type: none"> Some drivers begin to consider the delay an inconvenience. Occasionally there is more than one vehicle in queue.
C	<ul style="list-style-type: none"> Many times there is more than one vehicle in queue. Most drivers feel restricted, but not objectionably so.
D	<ul style="list-style-type: none"> Often there is more than one vehicle in queue. Drivers feel quite restricted.
E	<ul style="list-style-type: none"> Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. There is almost always more than one vehicle in queue. Drivers find the delays approaching intolerable levels.
F	<ul style="list-style-type: none"> Forced flow. Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table A4 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

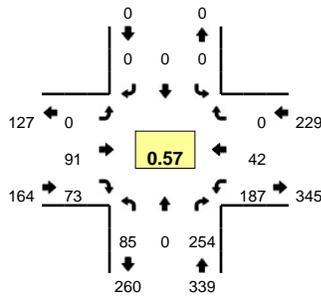
It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

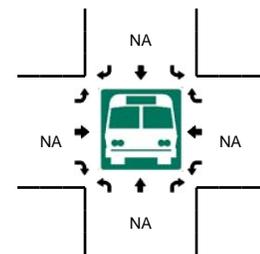
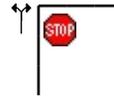
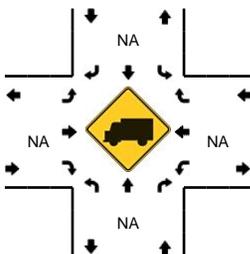
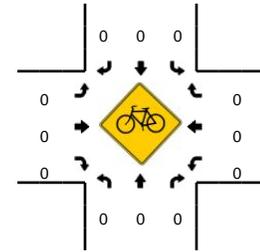
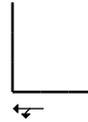
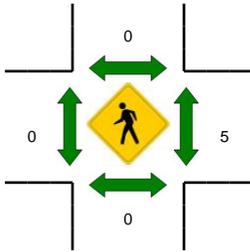
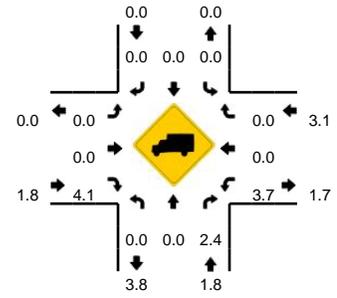
Attachment B Traffic Count Data

LOCATION: SW Copper Terr -- SW Edy Rd
CITY/STATE: Sherwood, OR

QC JOB #: 10871805
DATE: Thu, Dec 20 2012



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

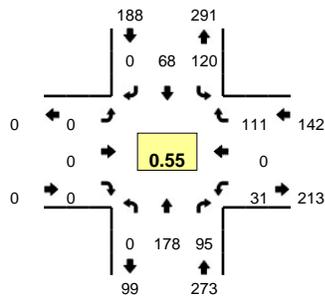


5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				SW Edy Rd (Eastbound)				SW Edy Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	2	5	0	0	13	
7:05 AM	0	0	0	0	0	0	0	0	0	6	0	0	1	1	0	0	8	
7:10 AM	0	0	0	0	0	0	0	0	0	8	0	0	1	2	0	0	11	
7:15 AM	1	0	1	0	0	0	0	0	0	5	3	0	2	0	0	0	12	
7:20 AM	2	0	5	0	0	0	0	0	0	8	4	0	12	3	0	0	34	
7:25 AM	4	0	7	0	0	0	0	0	0	10	4	0	12	3	0	0	40	
7:30 AM	4	0	15	0	0	0	0	0	0	8	1	0	16	5	0	0	49	
7:35 AM	10	0	16	0	0	0	0	0	0	4	13	0	12	3	0	0	58	
7:40 AM	7	0	28	0	0	0	0	0	0	10	12	0	35	4	0	0	96	
7:45 AM	10	0	26	0	0	0	0	0	0	7	16	0	41	5	0	0	105	
7:50 AM	13	0	40	0	0	0	0	0	0	8	12	0	27	3	0	0	103	
7:55 AM	27	0	56	0	0	0	0	0	0	6	4	0	15	4	0	0	112	641
8:00 AM	4	0	45	0	0	0	0	0	0	11	3	0	3	1	0	0	67	695
8:05 AM	2	0	11	0	0	0	0	0	0	4	0	0	10	6	0	0	33	720
8:10 AM	1	0	4	0	0	0	0	0	0	10	1	0	2	5	0	0	23	732
8:15 AM	2	0	5	0	0	0	0	0	0	3	0	0	3	3	0	0	16	736
8:20 AM	0	0	4	0	0	0	0	0	0	5	0	0	2	2	0	0	13	715
8:25 AM	0	0	0	0	0	0	0	0	0	6	0	0	1	4	0	0	11	686
8:30 AM	0	0	3	0	0	0	0	0	0	7	2	0	3	4	0	0	19	656
8:35 AM	0	0	3	0	0	0	0	0	0	8	0	0	0	4	0	0	15	613
8:40 AM	0	0	2	0	0	0	0	0	0	5	1	0	0	4	0	0	12	529
8:45 AM	1	0	2	0	0	0	0	0	0	5	0	0	1	3	0	0	12	436
8:50 AM	1	0	5	0	0	0	0	0	0	6	0	0	1	1	0	0	14	347
8:55 AM	0	0	5	0	0	0	0	0	0	2	0	0	2	7	0	0	16	251
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	200	0	488	0	0	0	0	0	0	84	128	0	332	48	0	0	1280	
Heavy Trucks	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	20	
Pedestrians		0			0					0				12			12	
Bicycles	0	0	0		0	0	0			0	0	0		0	0	0	0	
Railroad																		
Stopped Buses																		

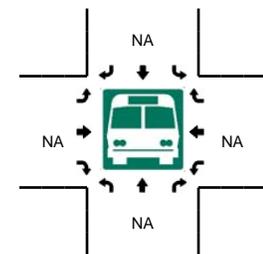
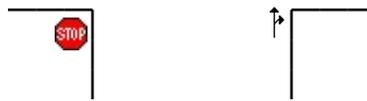
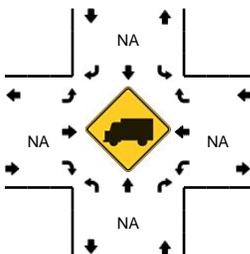
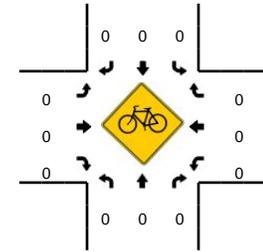
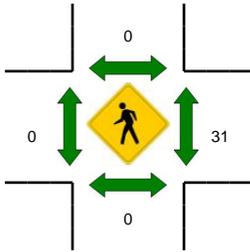
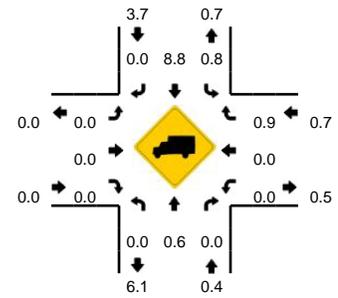
Comments:

LOCATION: SW Copper Terr -- Laurel Ridge Middle School Dwy
CITY/STATE: Sherwood, OR

QC JOB #: 10871803
DATE: Thu, Dec 20 2012



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

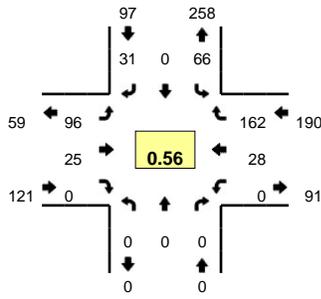


5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				Laurel Ridge Middle School Dwy (Eastbound)				Laurel Ridge Middle School Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	3	
7:05 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	
7:10 AM	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
7:15 AM	0	5	1	0	1	1	0	0	0	0	0	0	1	0	0	0	9	
7:20 AM	0	9	4	0	4	5	0	0	0	0	0	0	1	0	0	0	23	
7:25 AM	0	16	0	0	11	3	0	0	0	0	0	0	0	0	0	0	30	
7:30 AM	0	14	8	0	4	5	0	0	0	0	0	0	0	0	3	0	34	
7:35 AM	0	24	8	0	10	5	0	0	0	0	0	0	3	0	6	0	56	
7:40 AM	0	25	13	0	17	10	0	0	0	0	0	0	0	0	10	0	75	
7:45 AM	0	29	23	0	20	5	0	0	0	0	0	0	0	0	19	0	96	
7:50 AM	0	21	12	0	21	5	0	0	0	0	0	0	0	0	18	0	77	
7:55 AM	0	22	15	0	14	23	0	0	0	0	0	0	3	0	23	0	100	509
8:00 AM	0	9	7	0	5	4	0	0	0	0	0	0	17	0	23	0	65	571
8:05 AM	0	2	2	0	9	2	0	2	0	0	0	0	2	0	7	0	26	595
8:10 AM	0	2	2	0	2	0	0	0	0	0	0	0	4	0	2	0	12	603
8:15 AM	0	1	1	0	0	0	0	1	0	0	0	0	0	0	2	0	5	599
8:20 AM	0	2	0	0	1	0	0	0	0	0	0	0	0	0	1	0	4	580
8:25 AM	0	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	4	554
8:30 AM	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	4	524
8:35 AM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	1	0	4	472
8:40 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3	400
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	304
8:50 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0	4	231
8:55 AM	0	1	1	0	1	1	0	0	0	0	0	0	2	0	2	0	8	139
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	288	200	0	220	132	0	0	0	0	0	0	12	0	240	0	1092	
Heavy Trucks	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	80	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

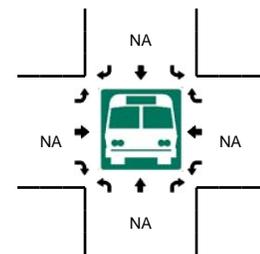
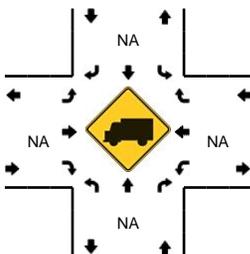
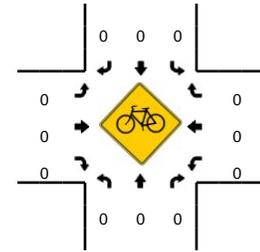
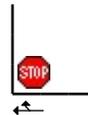
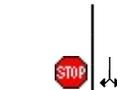
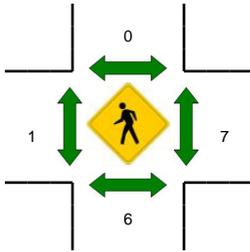
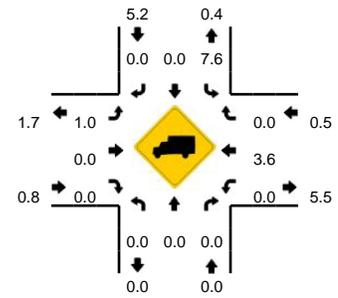
Comments:

LOCATION: SW Copper Terr -- SW Handley St
CITY/STATE: Sherwood, OR

QC JOB #: 10871801
DATE: Thu, Dec 20 2012



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

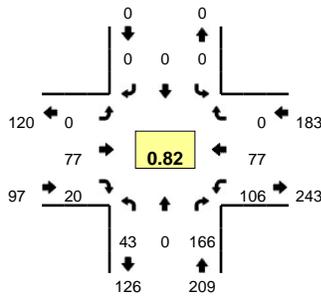


5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				SW Handley St (Eastbound)				SW Handley St (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	4	
7:05 AM	0	0	0	0	0	0	2	0	1	0	0	0	0	0	4	1	0	8	
7:10 AM	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	2	0	5	
7:15 AM	0	0	0	0	2	0	0	0	1	3	0	0	0	0	2	5	0	13	
7:20 AM	0	0	0	0	5	0	1	0	6	0	0	0	0	0	2	4	0	18	
7:25 AM	0	0	0	0	1	0	2	0	11	2	0	0	0	0	2	8	0	26	
7:30 AM	0	0	0	0	5	0	0	0	10	1	0	0	0	0	1	12	0	29	
7:35 AM	0	0	0	0	6	0	1	0	10	2	0	0	0	0	4	20	0	43	
7:40 AM	0	0	0	0	7	0	4	0	15	3	0	0	0	0	3	26	0	58	
7:45 AM	0	0	0	0	5	0	0	0	25	6	0	0	0	0	1	31	0	68	
7:50 AM	0	0	0	0	5	0	2	0	5	2	0	0	0	0	4	39	0	57	
7:55 AM	0	0	0	0	11	0	7	0	3	2	0	0	0	0	1	11	0	35	364
8:00 AM	0	0	0	0	14	0	10	0	6	4	0	0	0	0	5	4	0	43	403
8:05 AM	0	0	0	0	3	0	2	0	2	0	0	0	0	0	1	0	0	8	403
8:10 AM	0	0	0	0	2	0	2	0	2	0	0	0	0	0	2	2	0	10	408
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	4	399
8:20 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	3	384
8:25 AM	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	1	0	5	363
8:30 AM	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3	337
8:35 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	1	0	4	298
8:40 AM	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	242
8:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	176
8:50 AM	0	0	0	0	2	0	1	0	0	3	0	0	0	0	2	0	0	8	127
8:55 AM	0	0	0	0	1	0	2	0	2	0	0	0	0	0	1	1	0	7	99
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	0	0	0	0	68	0	24	0	180	44	0	0	0	32	384	0	732		
Heavy Trucks	0	0	0	0	8	0	0	0	4	0	0	0	0	4	0	0	16		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Railroad																			
Stopped Buses																			

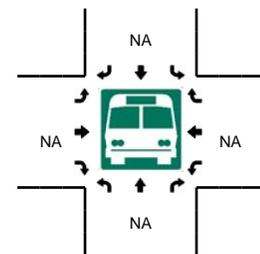
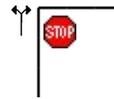
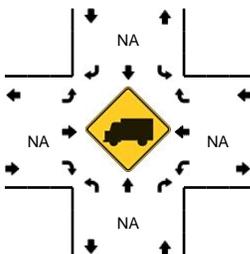
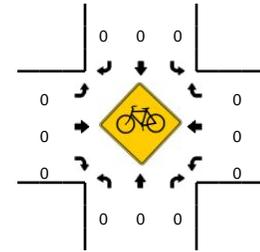
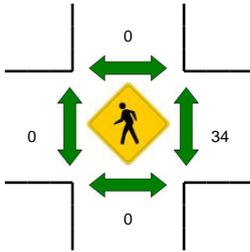
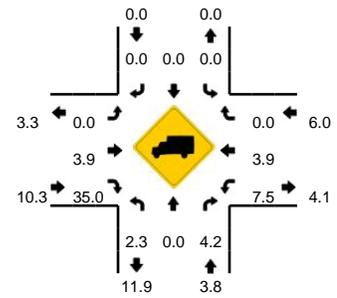
Comments:

LOCATION: SW Copper Terr -- SW Edy Rd
CITY/STATE: Sherwood, OR

QC JOB #: 10871809
DATE: Wed, Dec 19 2012



Peak-Hour: 2:05 PM -- 3:05 PM
Peak 15-Min: 2:15 PM -- 2:30 PM

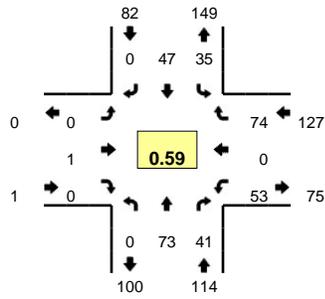


5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				SW Edy Rd (Eastbound)				SW Edy Rd (Westbound)				Total	Hourly Totals		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U				
1:45 PM	1	0	0	0	0	0	0	0	0	0	9	0	0	0	0	10	0	0	20	
1:50 PM	0	0	4	0	0	0	0	0	0	0	5	0	0	0	4	5	0	0	18	
1:55 PM	1	0	4	0	0	0	0	0	0	0	5	0	0	0	2	8	0	0	20	
2:00 PM	0	0	2	0	0	0	0	0	0	0	4	0	0	0	8	4	0	0	18	
2:05 PM	1	0	0	0	0	0	0	0	0	0	4	0	0	0	21	5	0	0	31	
2:10 PM	0	0	4	0	0	0	0	0	0	0	4	1	0	0	12	5	0	0	26	
2:15 PM	3	0	3	0	0	0	0	0	0	0	3	2	0	0	13	3	0	0	27	
2:20 PM	9	0	39	0	0	0	0	0	0	0	8	1	0	0	4	6	0	0	67	
2:25 PM	5	0	40	0	0	0	0	0	0	0	3	0	0	0	4	3	0	0	55	
2:30 PM	1	0	18	0	0	0	0	0	0	0	4	0	0	0	1	8	0	0	32	
2:35 PM	0	0	3	0	0	0	0	0	0	0	12	0	0	0	5	10	0	0	30	
2:40 PM	0	0	4	0	0	0	0	0	0	0	7	3	0	0	5	6	0	0	25	369
2:45 PM	0	0	3	0	0	0	0	0	0	0	10	2	0	0	8	7	0	0	30	379
2:50 PM	5	0	10	0	0	0	0	0	0	0	4	6	0	0	18	7	0	0	50	411
2:55 PM	11	0	26	0	0	0	0	0	0	0	10	3	0	0	11	7	0	0	68	459
3:00 PM	8	0	16	0	0	0	0	0	0	0	8	2	0	0	4	10	0	0	48	489
3:05 PM	5	0	9	0	0	0	0	0	0	0	9	0	0	0	2	9	0	0	34	492
3:10 PM	1	0	3	0	0	0	0	0	0	0	6	0	0	0	2	12	0	0	24	490
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	463
3:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	396
3:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	341
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	309
3:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	279
3:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	254
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	68	0	328	0	0	0	0	0	0	0	56	12	0	84	48	0	0	596		
Heavy Trucks	4	0	28	0	0	0	0	0	0	0	0	0	0	4	0	0	0	36		
Pedestrians		0				0					0				40			40		
Bicycles	0	0	0		0	0	0			0	0	0		0	0	0		0		
Railroad																				
Stopped Buses																				

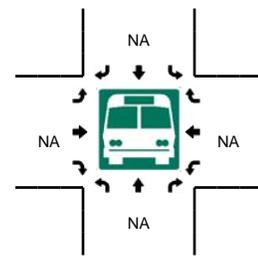
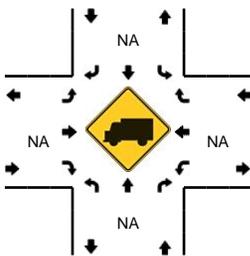
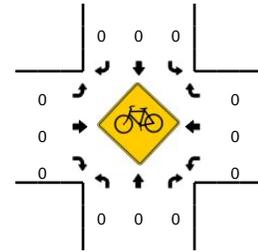
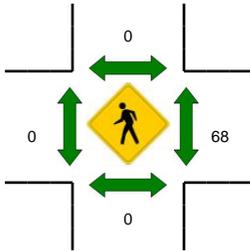
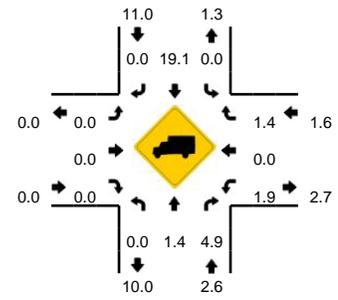
Comments:

LOCATION: SW Copper Terr -- Laurel Ridge Middle School Dwy
CITY/STATE: Sherwood, OR

QC JOB #: 10871807
DATE: Wed, Dec 19 2012



Peak-Hour: 2:05 PM -- 3:05 PM
Peak 15-Min: 2:15 PM -- 2:30 PM

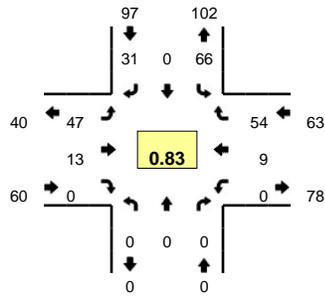


5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				Laurel Ridge Middle School Dwy (Eastbound)				Laurel Ridge Middle School Dwy (Westbound)				Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
1:45 PM	0	2	1	0	1	0	0	0	0	0	0	0	1	0	0	0	5	
1:50 PM	0	3	1	0	3	0	0	0	0	0	0	0	1	0	2	0	10	
1:55 PM	0	4	1	0	1	0	0	2	0	0	0	0	1	0	2	0	11	
2:00 PM	0	2	4	0	4	0	0	0	0	0	0	0	0	0	1	0	11	
2:05 PM	0	4	9	0	11	1	0	0	0	0	0	0	0	0	0	0	25	
2:10 PM	0	4	10	0	6	2	0	0	0	0	0	0	1	0	2	0	25	
2:15 PM	0	3	11	0	9	4	0	0	0	0	0	0	2	0	9	0	38	
2:20 PM	0	7	2	0	2	1	0	0	0	0	0	0	7	0	25	0	44	
2:25 PM	0	3	1	0	2	4	0	0	0	0	0	0	27	0	19	0	56	
2:30 PM	0	2	2	0	0	1	0	0	0	0	0	0	5	0	13	0	23	
2:35 PM	0	4	0	0	1	0	0	0	0	0	0	0	1	0	1	0	7	
2:40 PM	0	4	0	0	1	3	0	0	0	0	0	0	3	0	2	0	13	
2:45 PM	0	8	1	0	1	0	0	2	0	0	0	0	0	0	2	0	14	
2:50 PM	0	15	1	0	0	4	0	0	0	0	0	0	3	0	0	0	23	
2:55 PM	0	8	2	0	0	14	0	0	0	0	0	0	2	0	1	0	27	
3:00 PM	0	11	2	0	0	13	0	0	0	1	0	0	2	0	0	0	29	
3:05 PM	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6	
3:10 PM	0	5	1	0	0	2	0	0	0	0	0	0	1	0	0	0	9	
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	52	56	0	52	36	0	0	0	0	0	0	144	0	212	0	552	
Heavy Trucks	0	0	8		0	8	0		0	0	0		4	0	4		24	
Pedestrians		0				0				0				164				164
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		0
Stopped Buses																		0

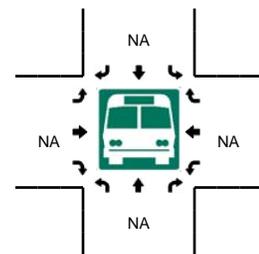
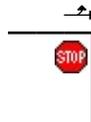
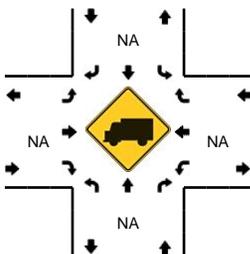
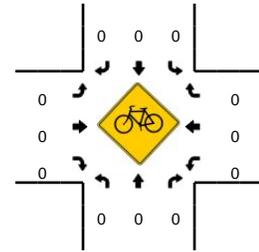
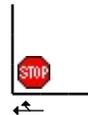
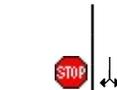
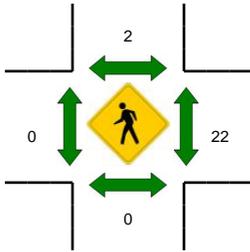
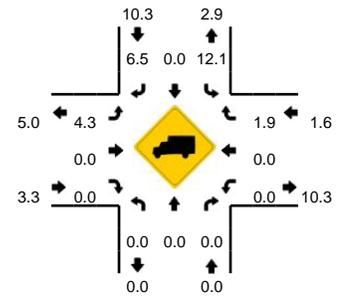
Comments:

LOCATION: SW Copper Terr -- SW Handley St
CITY/STATE: Sherwood, OR

QC JOB #: 10871804
DATE: Wed, Dec 19 2012



Peak-Hour: 2:05 PM -- 3:05 PM
Peak 15-Min: 2:15 PM -- 2:30 PM

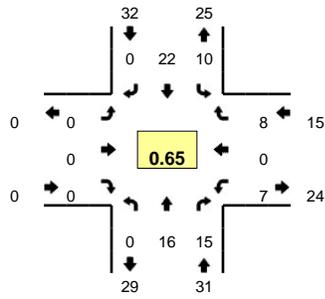


5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				SW Handley St (Eastbound)				SW Handley St (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
1:45 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	3	0	7	
1:50 PM	0	0	0	0	2	0	0	0	1	0	0	0	0	1	1	1	0	5	
1:55 PM	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	4	0	8	
2:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	7	0	10	
2:05 PM	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	10	0	14	
2:10 PM	0	0	0	0	1	0	1	0	4	0	0	0	0	0	0	10	0	16	
2:15 PM	0	0	0	0	3	0	1	0	6	0	0	0	0	0	2	6	0	18	
2:20 PM	0	0	0	0	6	0	4	1	2	1	0	0	0	0	0	2	0	16	
2:25 PM	0	0	0	0	15	0	10	0	3	3	0	0	0	0	1	0	0	32	
2:30 PM	0	0	0	0	9	0	2	0	3	0	0	0	0	0	1	0	0	15	
2:35 PM	0	0	0	0	2	0	1	0	2	1	0	0	0	0	0	1	0	7	
2:40 PM	0	0	0	0	1	0	4	0	2	3	0	0	0	0	0	4	0	14	162
2:45 PM	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	4	0	9	164
2:50 PM	0	0	0	0	5	0	0	0	11	2	0	0	0	0	0	4	0	22	181
2:55 PM	0	0	0	0	14	0	3	0	5	0	0	0	0	0	4	5	0	31	204
3:00 PM	0	0	0	0	9	0	5	0	3	0	0	0	0	0	1	8	0	26	220
3:05 PM	0	0	0	0	2	0	0	0	2	1	0	0	0	0	4	6	0	15	221
3:10 PM	0	0	0	0	1	0	0	0	2	2	0	0	0	0	6	1	0	12	217
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	199
3:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	183
3:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136
3:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129
3:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	0	0	0	0	96	0	60	4	44	16	0	0	0	12	32	0	264		
Heavy Trucks	0	0	0	0	8	0	4	0	4	0	0	0	0	0	4	0	20		
Pedestrians	0	0	0	0	4	0	0	0	0	0	0	0	0	32	0	0	36		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Railroad																			
Stopped Buses																			

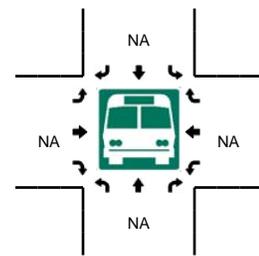
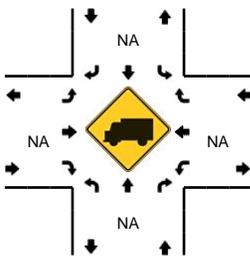
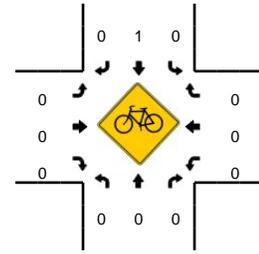
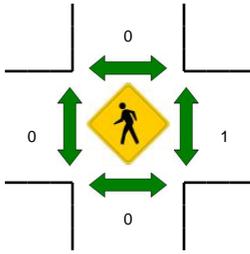
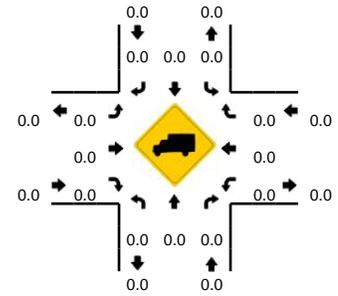
Comments:

LOCATION: SW Copper Terr -- Laurel Ridge Middle School Dwy
CITY/STATE: Sherwood, OR

QC JOB #: 10871806
DATE: Wed, Dec 19 2012



Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:25 PM -- 5:40 PM

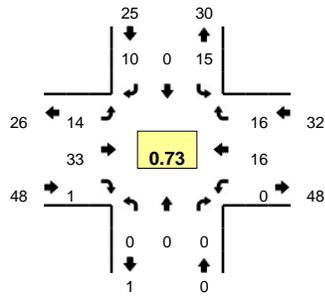


5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				Laurel Ridge Middle School Dwy (Eastbound)				Laurel Ridge Middle School Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	1	1	0	0	1	0	0	0	0	0	0	0	0	2	0	5	
4:05 PM	0	1	0	0	0	2	0	0	0	0	0	0	1	0	2	0	6	
4:10 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	2	0	5	
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
4:20 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	
4:25 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	2	0	4	
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
4:35 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	2	0	6	
4:40 PM	0	3	0	0	0	0	0	0	0	0	0	0	1	0	1	0	5	
4:45 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	2	0	5	
4:50 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	
4:55 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	46
5:00 PM	0	2	0	0	0	2	0	0	0	0	0	0	1	0	1	0	6	47
5:05 PM	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	4	45
5:10 PM	0	3	0	0	3	2	0	0	0	0	0	0	0	0	0	0	8	48
5:15 PM	0	0	0	0	1	3	0	1	0	0	0	0	0	0	0	0	5	51
5:20 PM	0	1	5	0	1	1	0	0	0	0	0	0	2	0	0	0	10	59
5:25 PM	0	4	3	0	0	1	0	0	0	0	0	0	0	0	2	0	10	65
5:30 PM	0	3	3	0	0	0	0	0	0	0	0	0	2	0	0	0	8	72
5:35 PM	0	1	2	0	2	5	0	0	0	0	0	0	1	0	1	0	12	78
5:40 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	3	76
5:45 PM	0	1	0	0	0	2	0	0	0	0	0	0	1	0	1	0	5	76
5:50 PM	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	4	78
5:55 PM	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	78
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	32	32	0	8	24	0	0	0	0	0	0	12	0	12	0	120	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

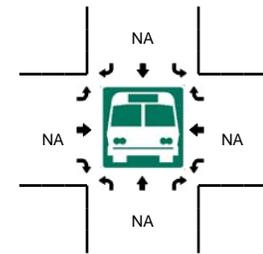
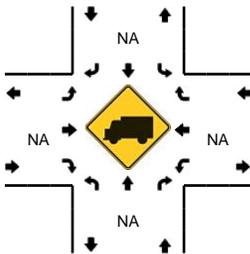
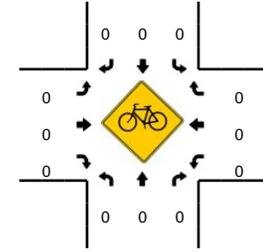
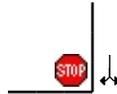
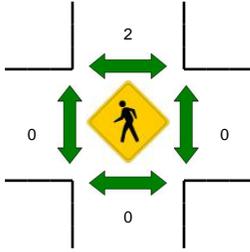
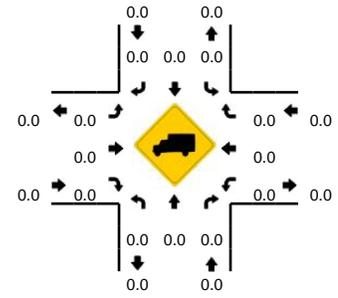
Comments:

LOCATION: SW Copper Terr -- SW Handley St
CITY/STATE: Sherwood, OR

QC JOB #: 10871802
DATE: Wed, Dec 19 2012



Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:20 PM -- 5:35 PM



5-Min Count Period Beginning At	SW Copper Terr (Northbound)				SW Copper Terr (Southbound)				SW Handley St (Eastbound)				SW Handley St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	4	
4:05 PM	0	0	0	0	2	1	0	0	1	1	0	0	0	0	0	1	6	
4:10 PM	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	1	5	
4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2	
4:20 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2	
4:25 PM	0	0	0	0	0	0	1	0	1	3	0	0	0	0	0	0	5	
4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2	
4:35 PM	0	0	0	0	2	0	0	0	0	2	0	0	0	0	1	2	7	
4:40 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	6	
4:45 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	0	3	0	7	
4:50 PM	0	0	0	0	1	0	1	0	0	4	0	0	0	0	4	0	10	
4:55 PM	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	1	4	60
5:00 PM	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0	1	5	61
5:05 PM	0	0	0	0	1	0	1	0	1	2	0	0	0	0	2	1	8	63
5:10 PM	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	1	5	63
5:15 PM	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0	0	4	65
5:20 PM	0	0	0	0	1	0	2	0	3	1	0	0	0	0	3	3	13	76
5:25 PM	0	0	0	0	0	0	0	0	4	3	0	0	0	0	1	3	11	82
5:30 PM	0	0	0	0	2	0	1	0	3	3	0	0	0	0	0	3	12	92
5:35 PM	0	0	0	0	3	0	3	0	0	2	0	0	0	0	2	3	13	98
5:40 PM	0	0	0	0	1	0	0	0	0	7	0	0	0	0	3	0	11	103
5:45 PM	0	0	0	0	2	0	0	0	0	4	0	0	0	0	1	1	8	104
5:50 PM	0	0	0	0	1	0	1	0	1	3	0	0	0	0	2	0	8	102
5:55 PM	0	0	0	0	0	0	0	0	0	4	1	0	0	0	2	0	7	105
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	12	0	12	0	40	28	0	0	0	0	16	36	144	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	8	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:

Attachment C Level-of-Service Worksheets

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday AM Peak Hour

Scenario: Default Scenario
Command: Default Command
Volume: Default Volume
Geometry: Default Geometry
Impact Fee: Default Impact Fee
Trip Generation: Default Trip Generation
Trip Distribution: Default Trip Distribution
Paths: Default Path
Routes: Default Route
Configuration: Default Configuration

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)
Intersection #1 SW Copper Terr/SW Edy Rd
Average Delay (sec/veh): 10.2 Worst Case Level Of Service: C[17.2]
Street Name: SW Copper Terr SW Edy Rd
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R
Control: Stop Sign Stop Sign Uncontrolled Uncontrolled
Rights: Include Include Include Include
Lanes: 0 0 1! 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0
Volume Module: >> Count Date: 20 Dec 2012 << 7:15 AM to 8:15 AM
Base Vol: 85 0 254 0 0 0 0 91 73 187 42 0
Growth 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
Initial Bse: 85 0 254 0 0 0 0 91 73 187 42 0
User 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
PHF Adj: 0.57 0.57 0.57 0.57 0.57 0.57 0.57 0.57 0.57 0.57 0.57 0.57
PHF Volume: 149 0 446 0 0 0 0 160 128 328 74 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 149 0 446 0 0 0 0 160 128 328 74 0
Critical Gap Module:
Critical Gp: 6.4 6.5 6.2 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 4.1 xxxxx xxxxx
FollowUpTim: 3.5 4.0 3.3 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 2.2 xxxxx xxxxx
Capacity Module:
Conflict Vol: 959 959 229 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 293 xxxxx xxxxx
Potent Cap.: 286 258 813 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 1263 xxxxx xxxxx
Move Cap.: 215 175 810 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 1258 xxxxx xxxxx
Volume/Cap: 0.69 0.00 0.55 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.26 xxxxx xxxxx
Level Of Service Module:
2Way95thQ: xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 1.0 xxxxx xxxxx
Control Del: xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 8.9 xxxxx xxxxx
LOS by Move: * * * * * * * * * * A * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxxx 880 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
SharedQueue: xxxxx 5.4 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 1.0 xxxxx xxxxx
Shrd ConDel: xxxxx 17.2 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 8.9 xxxxx xxxxx
Shared LOS: * C * * * * * * * * * * A * *
ApproachDel: 17.2 xxxxxxx xxxxxxx xxxxxxx
ApproachLOS: C * * *
Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday AM Peak Hour

Level Of Service Detailed Computation Report
2000 HCM Unsignalized Method
Base Volume Alternative

Intersection #1 SW Copper Terr/SW Edy Rd

Table with columns: Approach, Movement, North Bound, South Bound, East Bound, West Bound. Rows include HevVeh, Grade, Peds/Hour, Pedestrian Walk Speed, LaneWidth, Time Period.

Flared Lane Approach Module table with columns for DelaySep, VolumeSep, QueueSep, QueueMax, CapShare, CapacitySum, Queue, Capacity across various movements.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy

Table with columns: Approach, Movement, North Bound, South Bound, East Bound, West Bound. Rows include Average Delay, Street Name, Control, Rights, Lanes.

Volume Module table with columns: Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Final Volume.

Critical Gap Module table with columns: Critical Gp, FollowUpTim.

Capacity Module table with columns: Cnflct Vol, Potent Cap., Move Cap., Volume/Cap.

Level Of Service Module table with columns: 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS.

Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday AM Peak Hour

Level Of Service Detailed Computation Report
2000 HCM Unsignalized Method
Base Volume Alternative

Table with 5 columns: Approach, North Bound, South Bound, East Bound, West Bound. Rows include Movement, HevVeh, Grade, Peds/Hour, Pedestrian Walk Speed, LaneWidth, and Time Period.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Table with 12 columns for traffic flow analysis. Rows include Intersection #3 SW Copper Terr/SW Handley St, Cycle, Loss Time, Optimal Cycle, Street Name, Approach, Movement, Control, Rights, Min. Green, Lanes, Volume Module, Saturation Flow Module, and Capacity Analysis Module.

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2012 Existing Traffic Conditions, Weekday AM Peak Hour

Level Of Service Detailed Computation Report
 2000 HCM 4-Way Stop Method
 Base Volume Alternative

 Intersection #3 SW Copper Terr/SW Handley St

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Time Period:	0.25 hour			
HevVeh:	0%	5%	1%	1%
Alpha Value:	0.01			

GroupType:	X	1	1	1
P[C1]:	x.xxxx	0.4347	0.4641	0.5362
P[C2]:	x.xxxx	0.0000	0.2925	0.2204
P[C3]:	x.xxxx	0.4527	0.1493	0.1725
P[C4]:	x.xxxx	0.1126	0.0941	0.0709
P[C5]:	x.xxxx	0.0000	0.0000	0.0000
Padj[C1]:	xx.xxxxx	0.01243	0.00873	0.00778
Padj[C2]:	xx.xxxxx	0.00678	0.00045	0.00094
Padj[C3]:	xx.xxxxx	-0.01245	-0.00354	-0.00447
Padj[C4]:	xx.xxxxx	-0.00676	-0.00565	-0.00425
Padj[C5]:	xx.xxxxx	-0.00000	-0.00000	-0.00000

Lane:	L1	L1	L1	L1
LaneType:	NOLANE	LEFTTHRURITE	LEFTTHRURITE	LEFTTHRURITE
HeadwayAdj:	xx.xxx	0.029	0.176	-0.495
Volume:	xxxxxx	173	216	339
Capacity:	xxxxxx	662	716	849
DegOfUtil:	x.xx	0.24	0.29	0.39
DepHeadway:	xx.xx	5.07	4.86	4.11
ServiceTime:	xx.x	3.1	2.9	2.1
Delay:	xxx.x	9.7	9.9	9.7
Queue:	xxx.x	0.3	0.4	0.6

Approach:	North Bound	South Bound	East Bound	West Bound
ApproachDel:	xxx.x	9.7	9.9	9.7
Delay Adj:	x.xx	1.00	1.00	1.00
ApprAdjDel:	xxx.x	9.7	9.9	9.7
LOS by Appr:	*	A	A	A
OverallDel:		9.7		
OverallLOS:		A		

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2012 Existing Traffic Conditions, Weekday School PM Peak Hour

Scenario Report

Scenario:	Default Scenario
Command:	Default Command
Volume:	Default Volume
Geometry:	Default Geometry
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday School PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 SW Copper Terr/SW Edy Rd
Average Delay (sec/veh): 5.8 Worst Case Level Of Service: A[9.5]

Table with columns for Street Name, Approach, Movement, Control, Rights, Lanes. Rows for SW Copper Terr and SW Edy Rd.

Table with columns for Volume Module, Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Final Volume. Rows for SW Copper Terr and SW Edy Rd.

Table for Critical Gap Module with columns for Critical Gp, FollowUpTim.

Table for Capacity Module with columns for Cnflct Vol, Potent Cap., Move Cap., Volume/Cap.

Table for Level Of Service Module with columns for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., Shared Queue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS.

Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday School PM Peak Hour

Level Of Service Detailed Computation Report
2000 HCM Unsignalized Method
Base Volume Alternative

Intersection #1 SW Copper Terr/SW Edy Rd

Table with columns for Approach, Movement, HevVeh, Grade, Peds/Hour, Pedestrian Walk Speed, LaneWidth, Time Period.

Table for Flared Lane Approach Module with columns for DelaySep, VolumeSep, QueueSep, QueueMax, CapShare, CapacitySum, Queue, Capacity.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday School PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy
Average Delay (sec/veh): 6.0 Worst Case Level Of Service: B[13.0]
Street Name: SW Copper Terr Laurel Ridge Middle School Dwy
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R
Control: Uncontrolled Uncontrolled Stop Sign Stop Sign
Rights: Include Include Include Include
Lanes: 0 0 0 1 0 0 1 0 0 0 0 0 1 0 0 0
Volume Module: >> Count Date: 19 Dec 2012 << 2:05 PM to 3:05 PM
Base Vol: 0 73 41 35 47 0 0 1 0 0 53 0 74
Growth 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
Initial Bse: 0 73 41 35 47 0 0 1 0 0 53 0 74
User 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
PHF Adj: 0.59 0.59 0.59 0.59 0.59 0.59 0.59 0.59 0.59 0.59 0.59 0.59
PHF Volume: 0 124 69 59 80 0 0 2 0 90 0 125
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 0 124 69 59 80 0 0 2 0 90 0 125

Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx 4.2 xxxxx xxxxx xxxxx 6.5 xxxxx 7.1 6.5 6.2
FollowUpTim:xxxxx xxxx xxxxx 2.3 xxxxx xxxxx xxxxx 4.0 xxxxx 3.5 4.0 3.3

Capacity Module:
Conflict Vol: xxxxx xxxxx xxxxx 193 xxxxx xxxxx xxxxx 392 xxxxx 426 357 158
Potent Cap.: xxxxx xxxxx xxxxx 1328 xxxxx xxxxx xxxxx 547 xxxxx 541 571 889
Move Cap.: xxxxx xxxxx xxxxx 1328 xxxxx xxxxx xxxxx 522 xxxxx 491 544 889
Volume/Cap: xxxxx xxxxx xxxxx 0.04 xxxxx xxxxx xxxxx 0.00 xxxxx 0.18 0.00 0.14

Level Of Service Module:
2Way95thQ: xxxxx xxxxx xxxxx 0.1 xxxxx xxxxx xxxxx 0.0 xxxxx xxxxx xxxxx xxxxx
Control Del:xxxxx xxxx xxxxx 7.8 xxxxx xxxxx xxxxx 11.9 xxxxx xxxxx xxxxx xxxxx
LOS by Move: * * * A * * * B * * * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 664 xxxxx
SharedQueue:xxxxx xxxx xxxxx 0.1 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 1.4 xxxxx
Shrd ConDel:xxxxx xxxxx xxxxx 7.8 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 13.0 xxxxx
Shared LOS: * * * A * * * * * * B *
ApproachDel: xxxxxx xxxxxx 11.9 13.0
ApproachLOS: * * B B

Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday School PM Peak Hour

Level Of Service Detailed Computation Report
2000 HCM Unsignalized Method
Base Volume Alternative

Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R
HevVeh: 2% 11% 0% 1%
Grade: 0% 0% 0% 0%
Peds/Hour: 68 0 0 0
Pedestrian Walk Speed: 4.00 feet/sec
LaneWidth: 12 feet 12 feet 12 feet 12 feet
Time Period: 0.25 hour

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2012 Existing Traffic Conditions, Weekday School PM Peak Hour

Level Of Service Computation Report
 2000 HCM 4-Way Stop Method (Base Volume Alternative)

 Intersection #3 SW Copper Terr/SW Handley St

Cycle (sec): 100 Critical Vol./Cap. (X): 0.173
 Loss Time (sec): 0 Average Delay (sec/veh): 7.9
 Optimal Cycle: 0 Level Of Service: A

Street Name: SW Copper Terr SW Handley St
 Approach: North Bound South Bound East Bound West Bound
 Movement: L - T - R L - T - R L - T - R L - T - R

Control: Stop Sign Stop Sign Stop Sign Stop Sign
 Rights: Include Include Include Include
 Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
 Lanes: 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0

Volume Module: >> Count Date: 19 Dec 2012 << 2:05 PM to 3:05 PM
 Base Vol: 0 0 0 66 0 31 47 13 0 0 9 54
 Growth 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
 Initial Bse: 0 0 0 66 0 31 47 13 0 0 9 54
 User 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
 PHF Adj: 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70
 PHF Volume: 0 0 0 94 0 44 67 19 0 0 13 77
 Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
 Reduced Vol: 0 0 0 94 0 44 67 19 0 0 13 77
 PCE 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
 MLF 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
 FinalVolume: 0 0 0 94 0 44 67 19 0 0 13 77

Saturation Flow Module:
 Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
 Lanes: 0.00 0.00 0.00 0.68 0.00 0.32 0.78 0.22 0.00 0.00 0.14 0.86
 Final Sat.: 0 0 0 544 0 255 609 169 0 0 130 781

Capacity Analysis Module:
 Vol/Sat: xxxx xxxx xxxx 0.17 xxxx 0.17 0.11 0.11 xxxx xxxx 0.10 0.10
 Crit Moves: **** **** ****
 Delay/Veh: 0.0 0.0 0.0 8.3 0.0 8.3 8.0 8.0 0.0 0.0 7.2 7.2
 Delay 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
 AdjDel/Veh: 0.0 0.0 0.0 8.3 0.0 8.3 8.0 8.0 0.0 0.0 7.2 7.2
 LOS by Move: * * A * A A * * A A
 ApproachDel: xxxxxx 8.3 8.0 7.2
 Delay Adj: xxxxxx 1.00 1.00 1.00
 ApprAdjDel: xxxxxx 8.3 8.0 7.2
 LOS by Appr: * A A A
 AllWayAvgQ: 0.0 0.0 0.0 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1

 Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2012 Existing Traffic Conditions, Weekday School PM Peak Hour

Level Of Service Detailed Computation Report
 2000 HCM 4-Way Stop Method
 Base Volume Alternative

 Intersection #3 SW Copper Terr/SW Handley St

Approach: North Bound South Bound East Bound West Bound
 Movement: L - T - R L - T - R L - T - R L - T - R

Time Period: 0.25 hour
 HevVeh: 0% 10% 3% 2%
 Alpha Value: 0.01

GroupType: X 1 1 1
 P[C1]: x.xxxx 0.8079 0.7527 0.7431
 P[C2]: x.xxxx 0.0000 0.0793 0.0890
 P[C3]: x.xxxx 0.1819 0.1519 0.1500
 P[C4]: x.xxxx 0.0102 0.0160 0.0180
 P[C5]: x.xxxx 0.0000 0.0000 0.0000
 Padj[C1]: xx.xxxxxx 0.00394 0.00431 0.00443
 Padj[C2]: xx.xxxxxx 0.00202 0.00105 0.00097
 Padj[C3]: xx.xxxxxx -0.00535 -0.00440 -0.00432
 Padj[C4]: xx.xxxxxx -0.00061 -0.00096 -0.00108
 Padj[C5]: xx.xxxxxx -0.00000 -0.00000 -0.00000

Lane: L1 L1 L1 L1
 LaneType: NOLANE LEFTTHRURITE LEFTTHRURITE LEFTTHRURITE

HeadwayAdj: xx.xxx 0.114 0.208 -0.480
 Volume: xxxxxx 139 86 90
 Capacity: xxxxxx 799 778 911
 DegOfUtil: x.xx 0.17 0.11 0.10
 DepHeadway: xx.xx 4.37 4.50 3.82
 ServiceTime: xx.x 2.4 2.5 1.8
 Delay: xxx.x 8.3 8.0 7.2
 Queue: xxx.x 0.2 0.1 0.1

Approach: North Bound South Bound East Bound West Bound

ApproachDel: xxx.x 8.3 8.0 7.2
 Delay Adj: x.xx 1.00 1.00 1.00
 ApprAdjDel: xxx.x 8.3 8.0 7.2
 LOS by Appr: * A A A
 OverallDel: 7.9
 OverallLOS: A

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday PM Peak Hour

Scenario: Default Scenario
Scenario Report
Command: Default Command
Volume: Default Volume
Geometry: Default Geometry
Impact Fee: Default Impact Fee
Trip Generation: Default Trip Generation
Trip Distribution: Default Trip Distribution
Paths: Default Path
Routes: Default Route
Configuration: Default Configuration

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)
Intersection #1 SW Copper Terr/SW Edy Rd
Average Delay (sec/veh): 1.1 Worst Case Level Of Service: A[8.9]
Street Name: SW Copper Terr SW Edy Rd
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R
Control: Stop Sign Stop Sign Uncontrolled Uncontrolled
Rights: Include Include Include Include
Lanes: 0 0 1! 0 0 0 0 0 0 0 0 0 0 1 0 0 0
Volume Module: >> Count Date: 19 Dec 2012 << 5:00 PM to 6:00 PM
Base Vol: 2 0 20 0 0 0 0 129 6 22 158 0
Growth 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
Initial Bse: 2 0 20 0 0 0 0 129 6 22 158 0
User 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
PHF Adj: 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75
PHF Volume: 3 0 27 0 0 0 0 172 8 29 211 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 3 0 27 0 0 0 0 172 8 29 211 0
Critical Gap Module:
Critical Gp: 6.4 6.5 6.2 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 4.1 xxxxx xxxxx
FollowUpTim: 3.5 4.0 3.3 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 2.2 xxxxx xxxxx
Capacity Module:
Conflict Vol: 445 445 176 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 180 xxxxx xxxxx
Potent Cap.: 574 511 872 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 1402 xxxxx xxxxx
Move Cap.: 565 500 872 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 1402 xxxxx xxxxx
Volume/Cap: 0.00 0.00 0.03 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.02 xxxxx xxxxx
Level Of Service Module:
2Way95thQ: xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.1 xxxxx xxxxx
Control Del: xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 7.6 xxxxx xxxxx
LOS by Move: * * * * * * * * * * * * * * * * A * * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxxx 960 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
SharedQueue: xxxxx 0.1 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.1 xxxxx xxxxx
Shrd ConDel: xxxxx 8.9 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 7.6 xxxxx xxxxx
Shared LOS: * A * * * * * * * * * * * * * * * * A * * *
ApproachDel: 8.9 xxxxxxx xxxxxxx xxxxxxx
ApproachLOS: A * * *
Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday PM Peak Hour

Level Of Service Detailed Computation Report
2000 HCM Unsignalized Method
Base Volume Alternative

Table with columns for Approach, Movement, North Bound, South Bound, East Bound, West Bound. Rows include HevVeh, Grade, Peds/Hour, Pedestrian Walk Speed, LaneWidth, Time Period, Flared Lane Approach Module, DelaySep, VolumeSep, QueueSep, QueueMax, CapShare, CapacitySum, Queue, Capacity.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2012 Existing Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Table with columns for Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy, Average Delay, Street Name, Approach, Movement, Control, Rights, Lanes, Volume Module, Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Final Volume, Critical Gap Module, FollowUpTim, Capacity Module, Cnflct Vol, Potent Cap, Move Cap, Volume/Cap, Level Of Service Module, 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap, SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS. Includes a note: Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2012 Existing Traffic Conditions, Weekday PM Peak Hour

Level Of Service Detailed Computation Report
 2000 HCM Unsignalized Method
 Base Volume Alternative

 Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy

 Approach: North Bound South Bound East Bound West Bound
 Movement: L - T - R L - T - R L - T - R L - T - R
 -----|-----|-----|-----|
 HevVeh: 0% 0% 0% 0%
 Grade: 0% 0% 0% 0%
 Peds/Hour: 1 0 0 0
 Pedestrian Walk Speed: 4.00 feet/sec
 LaneWidth: 12 feet 12 feet 12 feet 12 feet
 Time Period: 0.25 hour

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2012 Existing Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
 2000 HCM 4-Way Stop Method (Base Volume Alternative)

 Intersection #3 SW Copper Terr/SW Handley St

 Cycle (sec): 100 Critical Vol./Cap. (X): 0.075
 Loss Time (sec): 0 Average Delay (sec/veh): 7.2
 Optimal Cycle: 0 Level Of Service: A

 Street Name: SW Copper Terr SW Handley St
 Approach: North Bound South Bound East Bound West Bound
 Movement: L - T - R L - T - R L - T - R L - T - R
 -----|-----|-----|-----|
 Control: Stop Sign Stop Sign Stop Sign Stop Sign
 Rights: Include Include Include Include
 Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
 Lanes: 0 0 0 0 0 0 0 1! 0 0 0 0 0 0 0 1 0
 -----|-----|-----|-----|
 Volume Module: >> Count Date: 19 Dec 2012 << 5:00 PM to 6:00 PM
 Base Vol: 0 0 0 15 0 10 14 33 1 0 16 16
 Growth 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
 Initial Bse: 0 0 0 15 0 10 14 33 1 0 16 16
 User 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
 PHF Adj: 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73
 PHF Volume: 0 0 0 21 0 14 19 45 1 0 22 22
 Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
 Reduced Vol: 0 0 0 21 0 14 19 45 1 0 22 22
 PCE 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
 MLF 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
 FinalVolume: 0 0 0 21 0 14 19 45 1 0 22 22
 -----|-----|-----|-----|
 Saturation Flow Module:
 Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
 Lanes: 0.00 0.00 0.00 0.60 0.00 0.40 0.29 0.69 0.02 0.00 0.50 0.50
 Final Sat.: 0 0 0 528 0 352 257 605 18 0 477 477
 -----|-----|-----|-----|
 Capacity Analysis Module:
 Vol/Sat: xxxx xxxx xxxx 0.04 xxxx 0.04 0.07 0.07 0.07 xxxx 0.05 0.05
 Crit Moves: ****
 Delay/Veh: 0.0 0.0 0.0 7.2 0.0 7.2 7.4 7.4 7.4 0.0 6.9 6.9
 Delay 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
 AdjDel/Veh: 0.0 0.0 0.0 7.2 0.0 7.2 7.4 7.4 7.4 0.0 6.9 6.9
 LOS by Move: * * * A * A A A * A A
 ApproachDel: xxxxxx 7.2 7.4 6.9
 Delay Adj: xxxxxx 1.00 1.00 1.00
 ApprAdjDel: xxxxxx 7.2 7.4 6.9
 LOS by Appr: * A A A
 AllWayAvgQ: 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.0 0.0 0.0

 Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2012 Existing Traffic Conditions, Weekday PM Peak Hour

Level Of Service Detailed Computation Report
 2000 HCM 4-Way Stop Method
 Base Volume Alternative

 Intersection #3 SW Copper Terr/SW Handley St

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Time Period:	0.25 hour			
HevVeh:	0%	0%	0%	0%
Alpha Value:	0.01			

GroupType:	X	1	1	1
P[C1]:	x.xxxx	0.8840	0.9183	0.8908
P[C2]:	x.xxxx	0.0000	0.0437	0.0712
P[C3]:	x.xxxx	0.1127	0.0363	0.0352
P[C4]:	x.xxxx	0.0034	0.0017	0.0028
P[C5]:	x.xxxx	0.0000	0.0000	0.0000
Padj[C1]:	xx.xxxxx	0.00235	0.00121	0.00150
Padj[C2]:	xx.xxxxx	0.00119	-0.00004	-0.00030
Padj[C3]:	xx.xxxxx	-0.00335	-0.00107	-0.00103
Padj[C4]:	xx.xxxxx	-0.00020	-0.00010	-0.00017
Padj[C5]:	xx.xxxxx	-0.00000	-0.00000	-0.00000

Lane:	L1	L1	L1	L1
LaneType:	NOLANE	LEFTTHRURITE	LEFTTHRURITE	LEFTTHRURITE
HeadwayAdj:	xx.xxx	-0.120	0.046	-0.300
Volume:	xxxxxx	34	66	44
Capacity:	xxxxxx	880	880	954
DegOfUtil:	x.xx	0.04	0.07	0.05
DepHeadway:	xx.xx	3.99	4.05	3.73
ServiceTime:	xx.x	2.0	2.1	1.7
Delay:	xxx.x	7.2	7.4	6.9
Queue:	xxx.x	0.0	0.1	0.0

Approach:	North Bound	South Bound	East Bound	West Bound
ApproachDel:	xxx.x	7.2	7.4	6.9
Delay Adj:	x.xx	1.00	1.00	1.00
ApprAdjDel:	xxx.x	7.2	7.4	6.9
LOS by Appr:	*	A	A	A
OverallDel:		7.2		
OverallLOS:		A		

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2014 Background Traffic Conditions, Weekday AM Peak Hour

Scenario Report

Scenario:	Default Scenario
Command:	Default Command
Volume:	Default Volume
Geometry:	Default Geometry
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Kittelston & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Background Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 SW Copper Terr/SW Edy Rd
Average Delay (sec/veh): 10.3 Worst Case Level Of Service: C[17.4]

Table with columns: Street Name, Approach, Movement, Control, Rights, Lanes. Rows for SW Copper Terr and SW Edy Rd.

Table with columns: Volume Module, Count, Date, Base Vol, Growth Adj, Initial Bse, Added Vol, In-Process, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, FinalVolume.

Table with columns: Critical Gap Module, Critical Gp, FollowUpTim.

Table with columns: Capacity Module, Cnflct Vol, Potent Cap., Move Cap., Volume/Cap.

Table with columns: Level Of Service Module, 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., Shared Queue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS.

Note: Queue reported is the number of cars per lane.

Kittelston & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Background Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy
Average Delay (sec/veh): 7.3 Worst Case Level Of Service: C[23.3]

Table with columns: Street Name, Approach, Movement, Control, Rights, Lanes. Rows for SW Copper Terr and Laurel Ridge Middle School Dwy.

Table with columns: Volume Module, Count, Date, Base Vol, Growth Adj, Initial Bse, Added Vol, In-Process, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, FinalVolume.

Table with columns: Critical Gap Module, Critical Gp, FollowUpTim.

Table with columns: Capacity Module, Cnflct Vol, Potent Cap., Move Cap., Volume/Cap.

Table with columns: Level Of Service Module, 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., Shared Queue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS.

Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Background Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #3 SW Copper Terr/SW Handley St

Cycle (sec): 100 Critical Vol./Cap. (X): 0.402
Loss Time (sec): 0 Average Delay (sec/veh): 9.8
Optimal Cycle: 0 Level Of Service: A

Table with columns for Street Name, Approach, Movement, Control, Rights, Min. Green, and Lanes for SW Copper Terr and SW Handley St.

Table with columns for Volume Module, Count, Date, and various traffic volume metrics like Base Vol, Growth Adj, etc.

Table with columns for Saturation Flow Module, Adjustment, Lanes, and Final Sat.

Table with columns for Capacity Analysis Module, Vol/Sat, Crit Moves, Delay/Veh, etc.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Background Traffic Conditions, Weekday AM Peak Hour

Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Scenario Report
 Scenario: Default Scenario

Command: Default Command
 Volume: Default Volume
 Geometry: Default Geometry
 Impact Fee: Default Impact Fee
 Trip Generation: Default Trip Generation
 Trip Distribution: Default Trip Distribution
 Paths: Default Path
 Routes: Default Route
 Configuration: Default Configuration

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Trip Generation Report

Forecast for Peak Hour Trip Generation

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1		1.00	Single Family	7.00	20.00	7	20	27	100.0
	Zone 1 Subtotal					7	20	27	100.0
TOTAL						7	20	27	100.0

Kittelston & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 SW Copper Terr/SW Edy Rd
Average Delay (sec/veh): 10.8 Worst Case Level Of Service: C [18.4]

Table with columns for Street Name, Approach, Movement, Control, Rights, Lanes. Rows for SW Copper Terr and SW Edy Rd.

Table with columns for Volume Module, Base Vol, Growth Adj, Initial Bse, Added Vol, In-Process, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Final Volume. Rows for 20 Dec 2012 and 7:15 AM to 8:15 AM.

Table for Critical Gap Module with columns for Critical Gp, FollowUpTim.

Table for Capacity Module with columns for Cnflct Vol, Potent Cap., Move Cap., Volume/Cap.

Table for Level Of Service Module with columns for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., Shared Queue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS.

Note: Queue reported is the number of cars per lane.

Kittelston & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Level Of Service Detailed Computation Report
2000 HCM Unsignalized Method
Future Volume Alternative

Intersection #1 SW Copper Terr/SW Edy Rd

Table with columns for Approach, Movement, HevVeh, Grade, Peds/Hour, Pedestrian Walk Speed, LaneWidth, Time Period. Rows for North, South, East, West bounds.

Table for Flared Lane Approach Module with columns for DelaySep, VolumeSep, QueueSep, QueueMax, CapShare, CapacitySum, Queue, Capacity.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy
Average Delay (sec/veh): 9.4 Worst Case Level Of Service: D[29.7]

Table with columns for Street Name, Approach, Movement, Control, Rights, Lanes. Rows include SW Copper Terr, Laurel Ridge Middle School Dwy with details on North and South bound movements.

Table with columns for Volume Module, Count, Date, Base Vol, Growth Adj, Initial Bse, Added Vol, In-Process, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Final Volume.

Table for Critical Gap Module with columns for Critical Gp, FollowUpTim.

Table for Capacity Module with columns for Cnflct Vol, Potent Cap., Move Cap., Volume/Cap.

Table for Level Of Service Module with columns for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS.

Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Level Of Service Detailed Computation Report
2000 HCM Unsignalized Method
Future Volume Alternative

Intersection #2 SW Copper Terr/Laurel Ridge Middle School Dwy

Table with columns for Approach, Movement, North Bound, South Bound, East Bound, West Bound. Rows include HevVeh, Grade, Peds/Hour, Pedestrian Walk Speed, LaneWidth, Time Period.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #3 SW Copper Terr/SW Handley St

Cycle (sec): 100 Critical Vol./Cap. (X): 0.412
Loss Time (sec): 0 Average Delay (sec/veh): 10.0
Optimal Cycle: 0 Level Of Service: A

Table with columns for Street Name, Approach, Movement, Control, Rights, Min. Green, and Lanes. Rows include SW Copper Terr and SW Handley St with North and South Bound movements.

Volume Module: >> Count Date: 20 Dec 2012 << 7:15 AM to 8:15 AM. Table showing Base Vol, Growth Adj, Initial Bse, Added Vol, In-Process, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module: Table showing Adjustment, Lanes, and Final Sat. values for different movements.

Capacity Analysis Module: Table showing Vol/Sat, Crit Moves, Delay/Veh, Delay Adj, AdjDel/Veh, LOS by Move, ApproachDel, Delay Adj, ApprAdjDel, LOS by Appr, and AllWayAvgQ.

Kittelton & Associates, Inc. - Project #13204
Daybreak Subdivision - Sherwood, Oregon
Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Note: Queue reported is the number of cars per lane.

Kittelton & Associates, Inc. - Project #13204
 Daybreak Subdivision - Sherwood, Oregon
 Year 2014 Total Traffic Conditions, Weekday AM Peak Hour

Level Of Service Detailed Computation Report
 2000 HCM 4-Way Stop Method
 Future Volume Alternative

 Intersection #3 SW Copper Terr/SW Handley St

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Time Period:	0.25 hour											
HevVeh:	0%			5%			1%			1%		
Alpha Value:	0.01											

GroupType:	X	1	1	1
P[C1]:	x.xxxx	0.4219	0.4394	0.5115
P[C2]:	x.xxxx	0.0000	0.2905	0.2184
P[C3]:	x.xxxx	0.4590	0.1626	0.1893
P[C4]:	x.xxxx	0.1191	0.1075	0.0808
P[C5]:	x.xxxx	0.0000	0.0000	0.0000
Padj[C1]:	xx.xxxxx	0.01275	0.00938	0.00839
Padj[C2]:	xx.xxxxx	0.00697	0.00087	0.00133
Padj[C3]:	xx.xxxxx	-0.01258	-0.00380	-0.00487
Padj[C4]:	xx.xxxxx	-0.00714	-0.00645	-0.00485
Padj[C5]:	xx.xxxxx	-0.00000	-0.00000	-0.00000

Lane:	L1	L1	L1	L1
LaneType:	NOLANE	LEFTTHRURITE	LEFTTHRURITE	LEFTTHRURITE
HeadwayAdj:	xx.xxx	0.031	0.175	-0.493
Volume:	xxxxxx	191	219	344
Capacity:	xxxxxx	659	705	836
DegOfUtil:	x.xx	0.27	0.30	0.40
DepHeadway:	xx.xx	5.10	4.92	4.17
ServiceTime:	xx.x	3.1	2.9	2.2
Delay:	xxx.x	10.0	10.0	9.9
Queue:	xxx.x	0.3	0.4	0.6

Approach:	North Bound	South Bound	East Bound	West Bound
ApproachDel:	xxx.x	10.0	10.0	9.9
Delay Adj:	x.xx	1.00	1.00	1.00
ApprAdjDel:	xxx.x	10.0	10.0	9.9
LOS by Appr:	*	A	B	A
OverallDel:		10.0		
OverallLOS:		A		



Harper
Houf Peterson
Righellis Inc.

Daybreak Subdivision

Preliminary Stormwater Management Report

Prepared For:

March 5, 2013

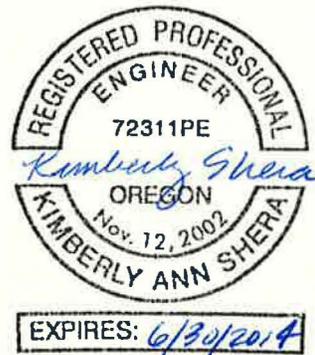
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HHPR

ENGINEERS ♦ PLANNERS
LANDSCAPE ARCHITECTS ♦ SURVEYORS

Table of Contents

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Water Quantity and Downstream Analysis	2
Water Quality	3

Appendices

Appendix A

Soils Data

Appendix B

Daybreak Subdivision Basin Maps

Appendix C

Conveyance

Appendix D

Area 59 Basin Maps

Water Quality Calculations

Project Description

The site is approximately 6 acres located on taxlots 300 and 500 in Township 2 South, Range 1 West, Section 30 in Washington County. The property address is 21500 and 21730 SW Elwert Road. The property is located between SW Copper Terrace and SW Elwert Road and directly west of the Edy Ridge Elementary School.

The proposed project is a 36 lot single-family residential subdivision. The site is part of a larger area known as Study Area 59.

Existing Conditions

The existing site consists of farm fields and open pasture. The site has an existing house and trees that are to be removed to construct the subdivision. The site generally slopes from the south to the northeast and northwest corners of the site. The northeast corner of the site drains to a lowpoint with a ditch inlet connection to the storm sewer system in Copper Terrace. The northwest corner of the site drains to the creek that is a tributary to Chicken Creek.

The Natural Resource Conservation Service (NRCS) Soil Survey of Washington County, Oregon describes the majority of the soils within the site as Hydrologic Soil Type C (Woodburn silt loam). Soils at the northwest corner of the site near the creek are Hydrologic Soil Type D (Huberly silt loam). A soils map and additional information is included in Appendix A.

Proposed Conditions

A storm sewer conveyance system will be constructed with the subdivision that includes catch basins, storm sewer laterals for roof drain connections, storm sewer manholes and storm sewer mains. The new system will convey the stormwater runoff from the houses, driveways, streets and sidewalks to the existing storm sewer system in Copper Terrace. The subdivision storm sewer system will have a single point of connection to the existing 18" storm sewer in Copper Terrace at the existing manhole located at the street entrance to the Daybreak Subdivision. The storm sewer system in Copper Terrace was sized to convey the runoff from the future development of adjacent parcels within Study Area 59 including the proposed project area for the Daybreak Subdivision.

An Overall Basin Map for the Daybreak Subdivision is included in Appendix B for reference. The map shows the outline of the Daybreak Subdivision and also the off-site basins that are located uphill from the Daybreak Subdivision. The storm sewer conveyance system for the Daybreak Subdivision was sized for the developed flows of these off-site areas. A Pipe Conveyance Exhibit for the subdivision is included in Appendix B for reference.

Storm Sewer Conveyance

The Santa Barbara Urban Hydrograph (SBUH) method was used along with the rainfall distribution listed in the CWS Design and Construction Standards in order to calculate the peak flows for the storm sewer design. Hydrographs were generated for the Type 1A, 25-year, 24 hour storm event (3.90 inches). A time of concentration of 5 minutes was used in the calculations.

A curve number of 74 was assigned to the landscape and open space areas and 98 was used for streets, sidewalks, roofs, and driveways. Composite curve numbers were calculated for each basin area. The Runoff Curve Number Table is included in Appendix C.

The proposed storm sewer system includes 12" and 15" diameter storm sewer. A Manning's Coefficient "n" of 0.013 was used in the Manning's Equation to determine pipe capacity and velocity. A pipe sizing spreadsheet is included in Appendix C for reference. The spreadsheet lists the 25-year peak flows for each pipe segment as determined from the hydrographs which are also included in Appendix C for reference.

Water Quantity and Downstream Analysis

The stormwater from the Daybreak Subdivision will flow through the storm sewer in Copper Terrace to the 60" flow splitter manhole upstream of the water quality swale. The flow splitter manhole will divert the water quality flows produced from the total contributing basin to the water quality manhole while allowing the remaining 25-year flow to bypass directly into the proposed water quality swale. The water quality swale was designed to convey the 25-year storm event for the total contributing basin which includes the Daybreak Subdivision.

The storm report for the new school included a downstream analysis for the unnamed tributary to Chicken Creek which is where the regional water quality facility discharges. The analysis was conducted for multiple scenarios for the future development of Area 59 including existing conditions, proposed school development only, and proposed full build out conditions. The Basin Map which represents the full build out conditions is included in Appendix D for reference.

25-year flows were generated for the three scenarios and were used to analyze the existing culvert located at the intersection of SW Elwert Road and SW Edy Road. The purpose of the analysis was to determine any backwater effects due to existing downstream deficiencies which would potentially cause areas of inundation during the 25-year storm event. Nomographs were used to determine the existing capacity of the 24" culvert and the elevation head for each scenario. The existing culvert has the following characteristics:

Existing Culvert Characteristics

Size	24"
Type	Circular concrete
Length	102 ft
Slope	1.85%
Inlet Configuration	Projecting barrel

The following table outlines the depth, spread of flow, and water surface elevation for the three development scenarios.

Flow Characteristics					
Development Scenario	25-Year Flow	Depth of Flow	Spread of Flow	Water Surface Elev.	Freeboard to Road (Elev. = 161.0')
Existing Conditions (Scenario 1)	27 cfs	3.6 ft	18 ft	154.4	6.6 ft
School Development (Scenario 2)	43 cfs	7.0 ft	32 ft	157.8	3.2 ft
Full Build Out (Scenario 3)	52 cfs	9.8 ft	N/A	160.6	0.4 ft

As indicated in the table, full build out conditions exceed the minimum requirement of maintaining at least 1-foot of freeboard from a permanent structure to the free surface. Therefore, under full build out conditions, the culvert will have to be upsized to a minimum diameter of 30-inches. It is anticipated that this culvert will be replaced with intersection improvements which will be required with future development of the adjacent property.

The existing 24" culvert has a capacity of 49 cfs while maintaining 1 foot of freeboard below the roadway. The proposed school development and public roadway improvements had increased the 25 year flow from 27 cfs to 43 cfs. The 25 year peak flow from the Daybreak Subdivision development is 4.4 cfs which is still within the existing capacity of the downstream culvert; therefore onsite detention is not required.

Water Quality

Clean Water Services requires that storm water quality facilities be designed to remove 65 percent of the total phosphorous from the runoff of 100 percent of the newly constructed impervious surfaces during a dry weather storm event totaling 0.36 inches of precipitation falling in 4-hours with an average storm return period of 96 hours.

The regional water quality facility in Area 59 was designed to treat the proposed impervious surfaces created with the school construction as well as 100 percent of the impervious areas generated by surrounding developments. The regional water quality swale is 230 feet long and 10 feet wide with a water quality depth of 6 inches and a bottom slope of 1.5%. The regional water quality swale can treat an impervious area of 27 acres and a water quality flow rate of 2.5 cfs.

The water quality (WQ) facility is sized to treat runoff from future development on the adjacent parcels within Study Area 59. The approximate treatment basin boundary of

the regional water quality facility is shown on the "Regional WQ & Storm Sewer Service Basin" Drawing in Appendix D. The impervious area for future development was based on the zoning and 2640 square feet of impervious area was used per single family dwelling unit within future residential areas.

A water quality manhole installed upstream of the regional water quality swale provides pretreatment for the entire water quality basin. The water quality manhole was designed for full build out conditions so that future development would not be required to provide an additional pretreatment method prior to connecting into the public storm line.

The total impervious area for the Daybreak Subdivision development is 3.8 acres. The total impervious area includes the public street and sidewalk areas and also 2640 SF of impervious area for each of the proposed 36 lots. The existing regional water quality facility has the capacity to provide water quality treatment for the new impervious area from the Daybreak Subdivision Development.

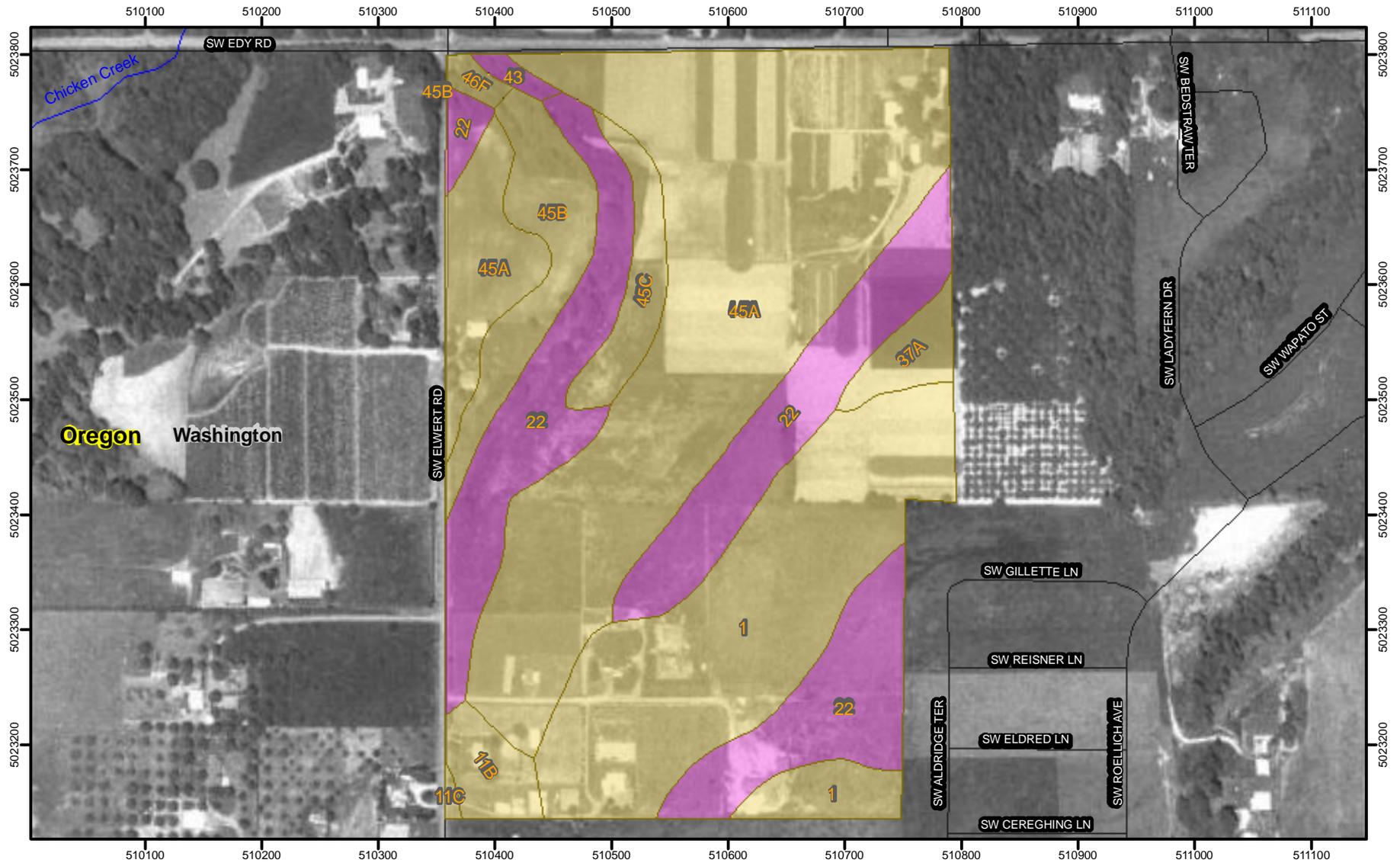
The residence time in the Regional Water Quality Swale was checked for a Water Quality Flow of 1.2 cfs. This Water Quality Flow was calculated for the existing public roadways, existing school site and proposed Daybreak Subdivision. The residence time calculated in the swale for a flow of 1.2 cfs was 11 minutes which is greater than the minimum requirement of 9 minutes, therefore meets CWS Standards. See Appendix D for detailed calculations.

The half-street improvements for Elwert Road will have a separate water quality and conveyance system from the Daybreak Subdivision conveyance system. The impervious area will be treated in a flow through planter and the stormwater system for Elwert Road will connect to the existing 24" RCP culvert that crosses Elwert Road and discharges to the creek near the northwest corner of the Daybreak Subdivision.

APPENDIX A
Soil Data

HYDROLOGIC GROUP RATING FOR WASHINGTON COUNTY, OREGON

Study Area 59



HYDROLOGIC GROUP RATING FOR WASHINGTON COUNTY, OREGON

Study Area 59

MAP LEGEND

Hydrologic Group

{Dominant Condition, <}>

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available
-  Soil Map Units
-  Cities
-  Detailed Counties
-  Detailed States
-  Interstate Highways
-  Roads
-  Rails
-  Water
-  Hydrography
-  Oceans

MAP INFORMATION

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: UTM Zone 10

Soil Survey Area: Washington County, Oregon
Spatial Version of Data: 2
Soil Map Compilation Scale: 1:20000

Map comprised of aerial images photographed on these dates:
7/24/2000; 8/5/2000

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.

Tables - Hydrologic Group

Summary by Map Unit - Washington County, Oregon

Soil Survey Area Map Unit Symbol	Map Unit Name	Rating	Total Acres in AOI	Percent of AOI
1	Aloha silt loam	C	15.5	22.2
11B	Cornelius and Kinton silt loams, 2 to 7 percent slopes	C	1.5	2.1
11C	Cornelius and Kinton silt loams, 7 to 12 percent slopes	C	0.1	0.2
22	Huberly silt loam	D	17.0	24.3
37A	Quatama loam, 0 to 3 percent slopes	C	1.3	1.9
43	Wapato silty clay loam	D	0.3	0.5
45A	Woodburn silt loam, 0 to 3 percent slopes	C	28.0	40.0
45B	Woodburn silt loam, 3 to 7 percent slopes	C	3.8	5.4
45C	Woodburn silt loam, 7 to 12 percent slopes	C	2.1	3.0
46F	Xerochrepts and Haploxerolls, very steep	C	0.4	0.5

Description - Hydrologic Group

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 placed into four groups A, B, C, and D, and three dual classes, A/D, B/D, and C/D. Definitions of the classes are as follows:

The four hydrologic soil groups are:

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 soils that are rated D in their natural condition are assigned to dual classes.

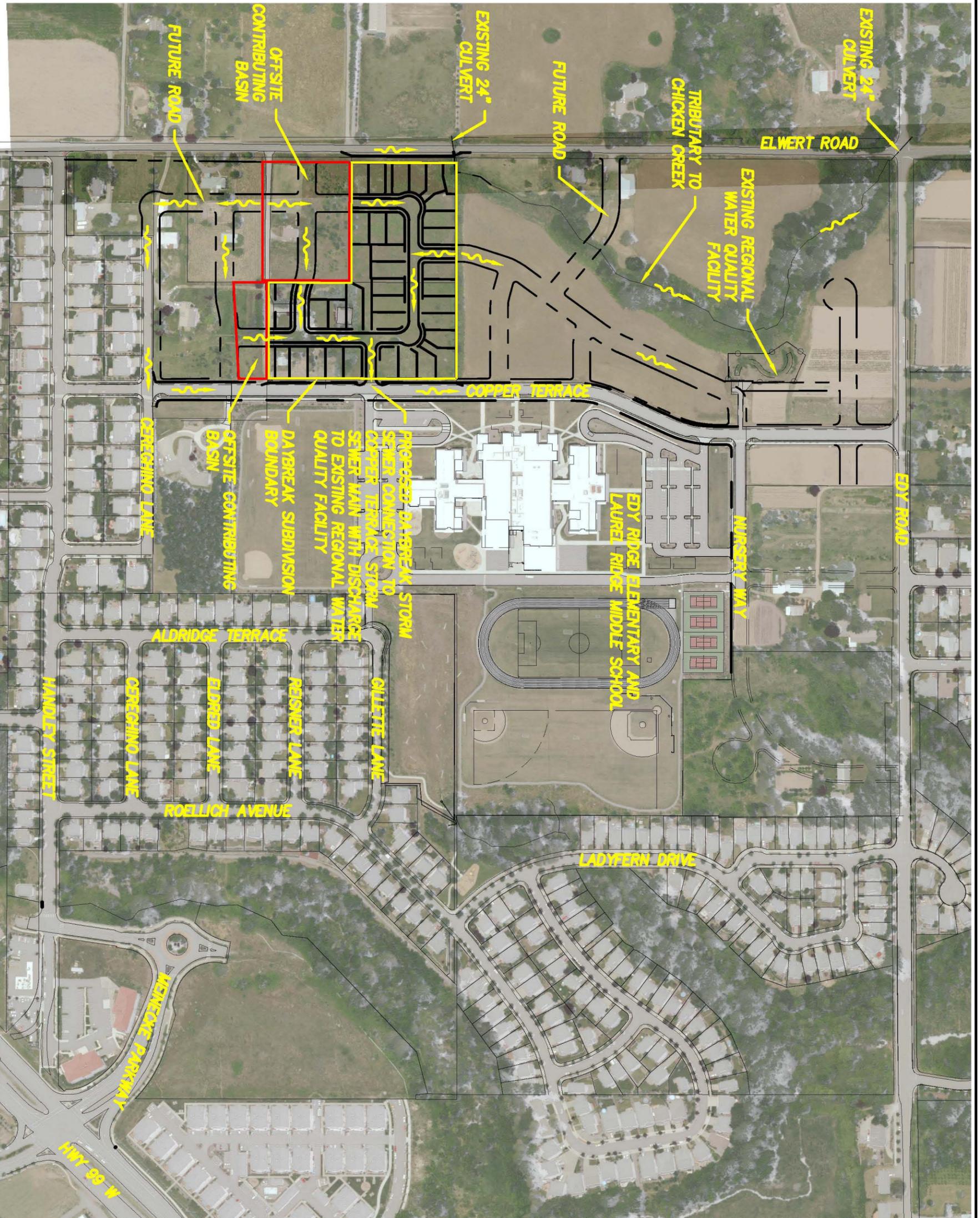
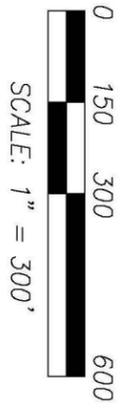
Parameter Summary - Hydrologic Group

Aggregation Method: Dominant Condition

Component Percent Cutoff:

Tie-break Rule: Lower

APPENDIX B
Daybreak Subdivision Basin Maps



JOB NO.
DRH-64

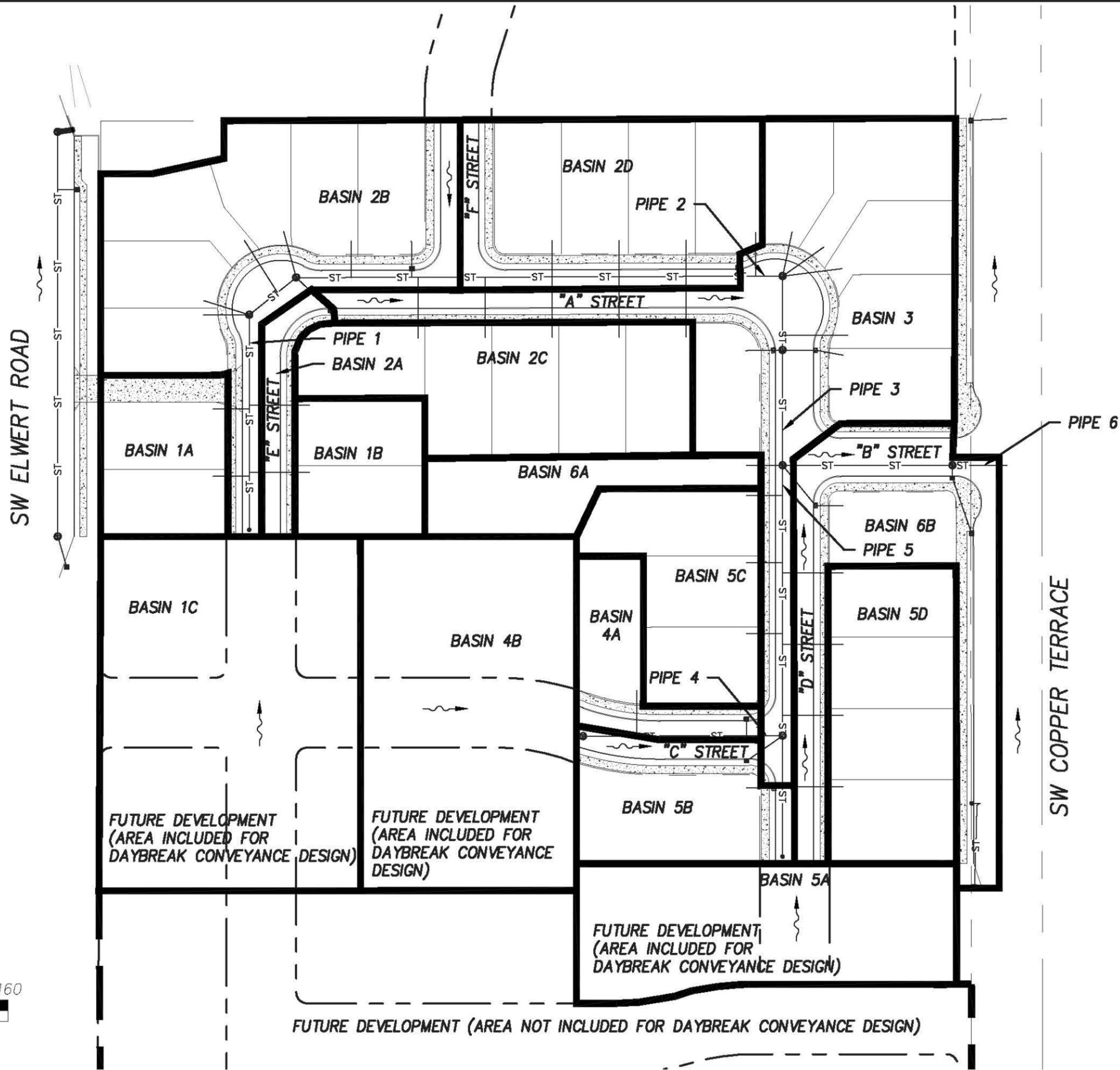
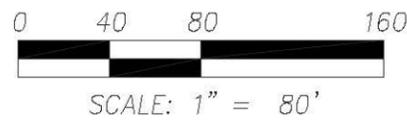
SHEET NO.
1

DATE	NO.	DESCRIPTION
R E V I S I O N S		

DESIGNED: HHPR
DRAWN: BJB
CHECKED: KAS
DATE: MARCH 2013

HHPR Harper Houf Peterson Righellis Inc.
ENGINEERS • PLANNERS
LANDSCAPE ARCHITECTS • SURVEYORS
205 SE Spokane Street, Suite 200, Portland, OR 97202
phone: 503.221.1131 www.hhpr.com fax: 503.221.1171

OVERALL BASIN MAP
DAYBREAK SUBDIVISION
SHERWOOD, OREGON



Harper Houf Peterson
Righellis Inc.
 ENGINEERS & PLANNERS
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 phone: 503.221.1131 www.hhp.com fax: 503.221.1171

PIPE CONVEYANCE EXHIBIT
DAYBREAK SUBDIVISION
 SHERWOOD, OREGON

DESIGNED:	HHPR
DRAWN:	BJB
CHECKED:	KAS
DATE:	MARCH 2013

DATE	NO.	DESCRIPTION

APPENDIX C
Conveyance

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
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
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Daybreak Subdivision

Pipe Conveyance Calculations

Prepared by Harper Houf Peterson Righellis, Inc.

Job No. DRH-64

March 6, 2013

Pipe Sizing Summary Table:

Pipe Segment	Contributing Basin(s)	Pipe Size (in)	Q25 (cfs)	Slope (%)	Q _{CAPACITY} (cfs)	Min. Slope (%)	Velocity Full (fps)	Capacity Met?
1	1A, 1B, 1C	12	1.25	5.10%	8.05	0.12%	10.25	YES
2	1A, 1B, 1C, 2A, 2B, 2C, 2D	12	2.84	1.50%	4.37	0.63%	5.56	YES
3	1A, 1B, 1C, 2A, 2B, 2C, 2D, 3	12	3.73	1.50%	4.37	1.10%	5.56	YES
4	4A, 4B	12	0.78	1.10%	3.74	0.05%	4.76	YES
5	4A, 4B, 5A, 5B, 5C, 5D	12	1.83	5.20%	8.13	0.26%	10.35	YES
6	1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4A, 4B, 5A, 5B, 5C, 5D, 6A, 6B	15	6.27	1.00%	6.46	0.94%	5.27	YES

Basin Summary Table:

Basin	Total Impervious Area (SF)	Total Pervious Area (SF)
1A	7200	4206
1B	5280	4632
1C (Future offsite)	38740	12526
Basin 1 Total	51220	21364
2A	4840	0
2B	26865	14771
2C	13200	11574
2D	18960	9029
Basin 2 Total	63865	35374
Basin 3 Total	35565	17726
4A	6115	2590
4B (Future offsite)	23990	18488
Basin 4 Total	30105	21078
5A (Future offsite)	9780	16850
5B	7590	6894
5C	7920	7959
5D	10560	10422
Basin 5 Total	35850	42125
6A	2640	7650
6B	25531	2682
Basin 6 Total	28171	10332
Total Basin Area	244776	147999
Offsite Total	72510	47864
Daybreak Total	172266	100135

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SBUH Runoff	1.251	2	476	17,606	-----	-----	-----	Basin 1
2	SBUH Runoff	1.592	2	476	22,589	-----	-----	-----	Basin 2
3	Combine	2.843	2	476	40,194	1, 2	-----	-----	Pipe 2
4	SBUH Runoff	0.893	2	476	12,611	-----	-----	-----	Basin 3
5	Combine	3.737	2	476	52,805	3, 4	-----	-----	Pipe 3
6	SBUH Runoff	0.784	2	476	11,196	-----	-----	-----	Basin 4
7	SBUH Runoff	1.051	2	478	15,391	-----	-----	-----	Basin 5
8	Combine	1.835	2	476	26,587	6, 7	-----	-----	Pipe 5
9	SBUH Runoff	0.695	2	474	9,760	-----	-----	-----	Basin 6
10	Combine	2.530	2	476	36,347	8, 9	-----	-----	Basin 4, 5, and 6
11	Combine	6.267	2	476	89,152	5, 10	-----	-----	Pipe 6
12	SBUH Runoff	4.364	2	476	61,921	-----	-----	-----	Daybreak Subdivision
13	SBUH Runoff	1.850	2	476	26,412	-----	-----	-----	Future offsite
daybreak 03 06 2013.gpw					Return Period: 25 Year			Wednesday, Mar 6, 2013	

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

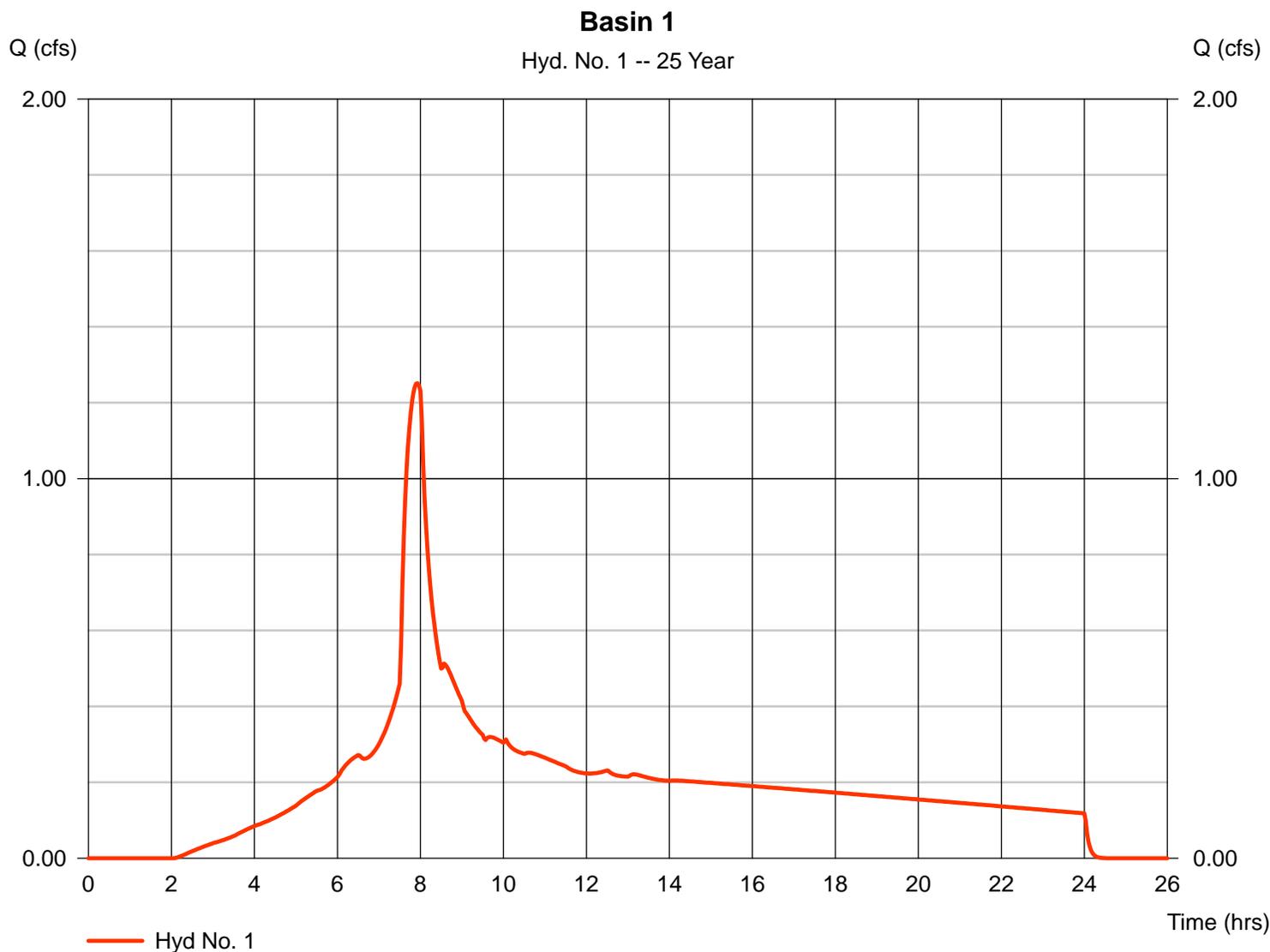
Hyd. No. 1

Basin 1

Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 1.660 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

Peak discharge = 1.251 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 17,606 cuft
 Curve number = 91*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = $[(1.170 \times 98) + (0.490 \times 74)] / 1.660$



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

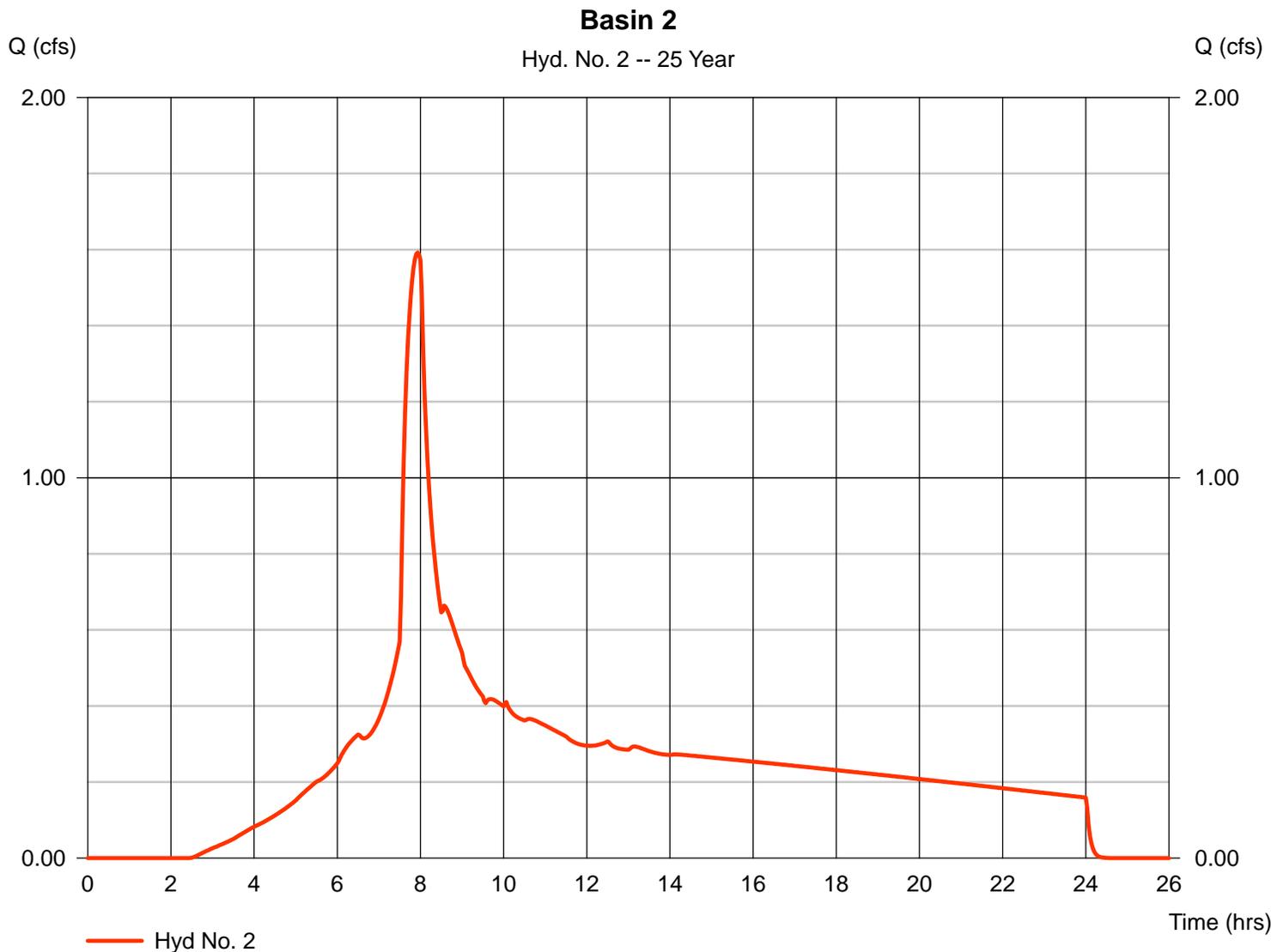
Hyd. No. 2

Basin 2

Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 2.280 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

Peak discharge = 1.592 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 22,589 cuft
 Curve number = 89*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = [(1.470 x 98) + (0.810 x 74)] / 2.280



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

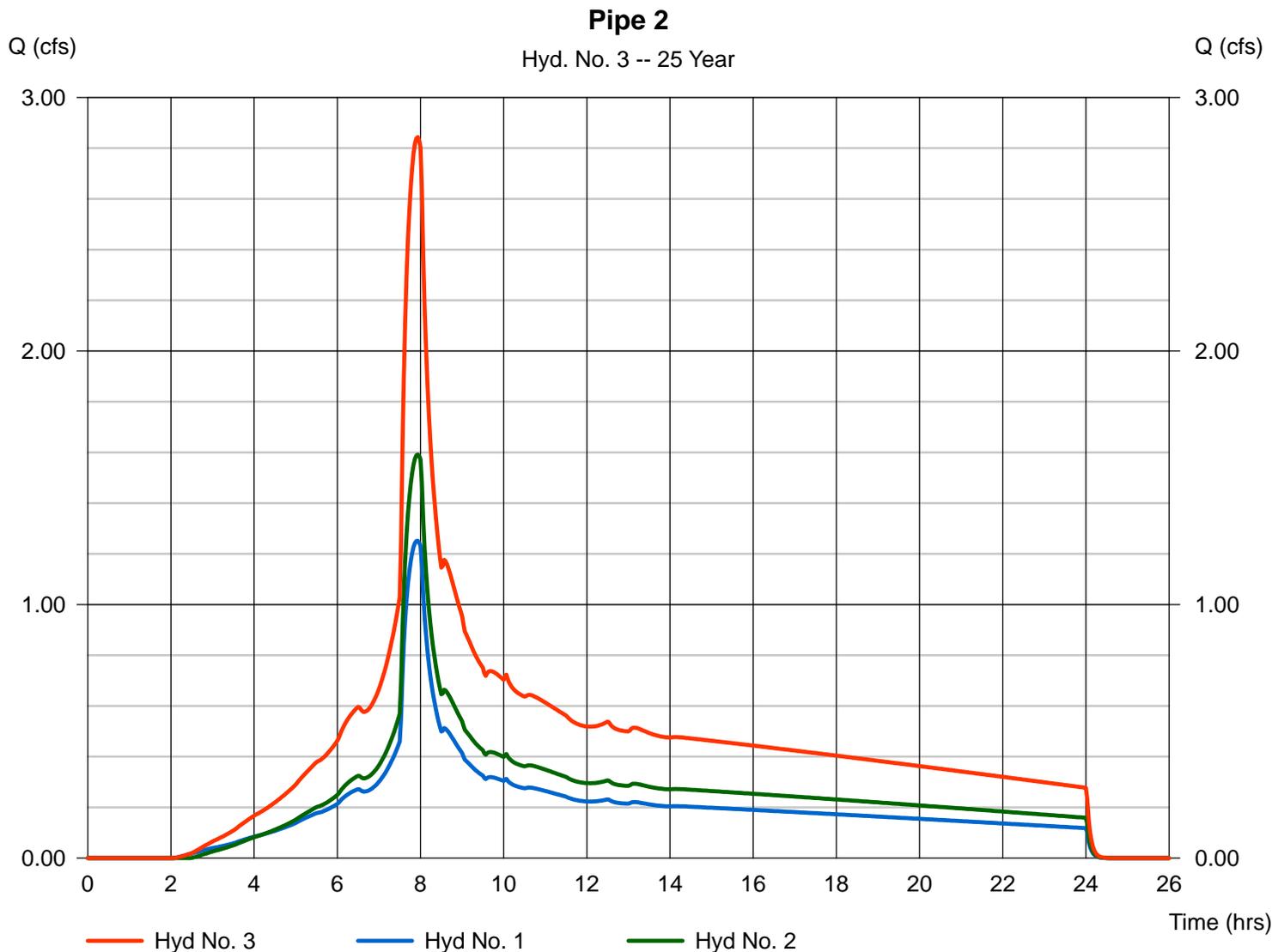
Wednesday, Mar 6, 2013

Hyd. No. 3

Pipe 2

Hydrograph type = Combine
 Storm frequency = 25 yrs
 Time interval = 2 min
 Inflow hyds. = 1, 2

Peak discharge = 2.843 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 40,194 cuft
 Contrib. drain. area = 3.940 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

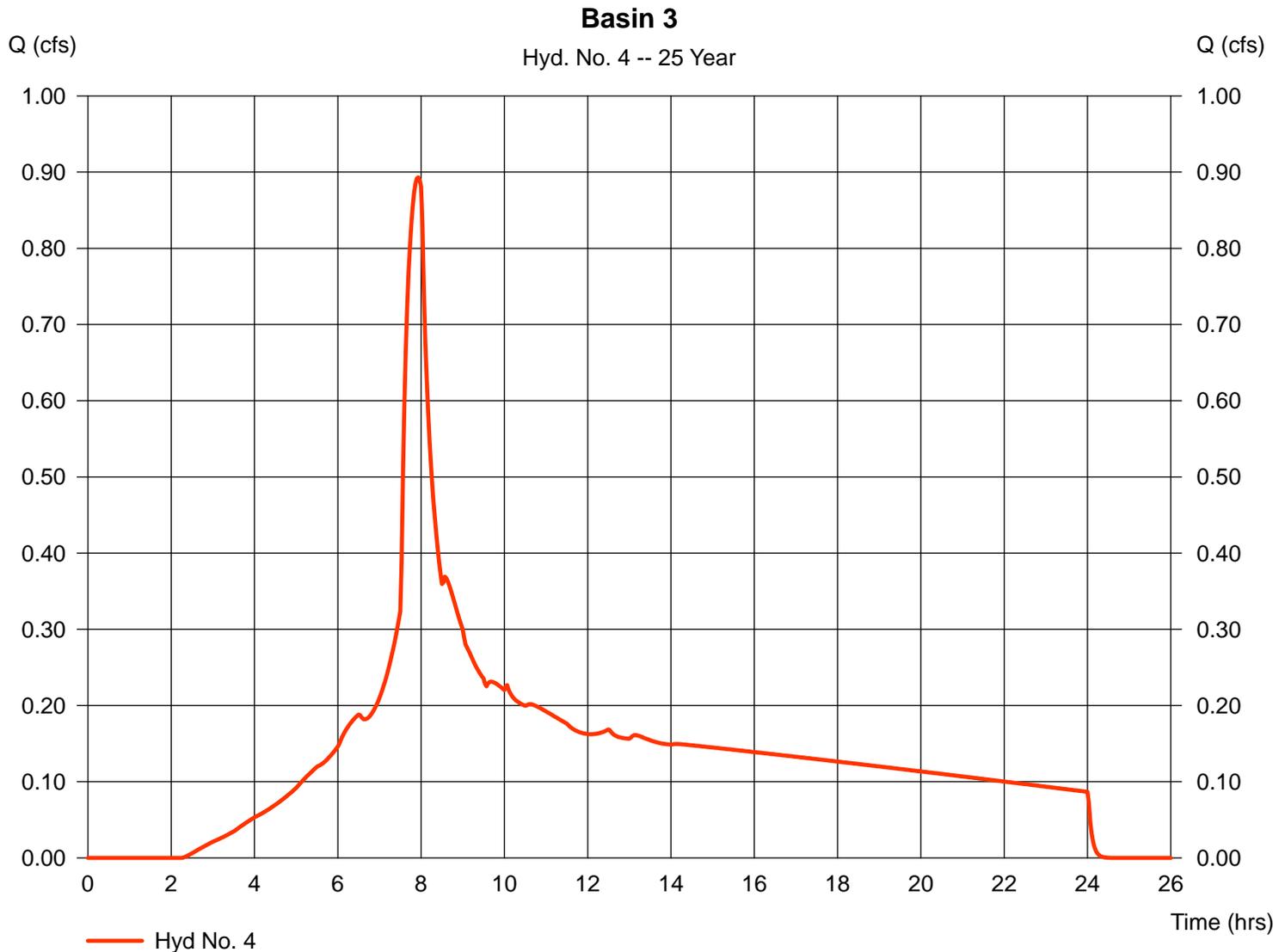
Hyd. No. 4

Basin 3

Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 1.230 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

Peak discharge = 0.893 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 12,611 cuft
 Curve number = 90*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = [(0.820 x 98) + (0.410 x 74)] / 1.230



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

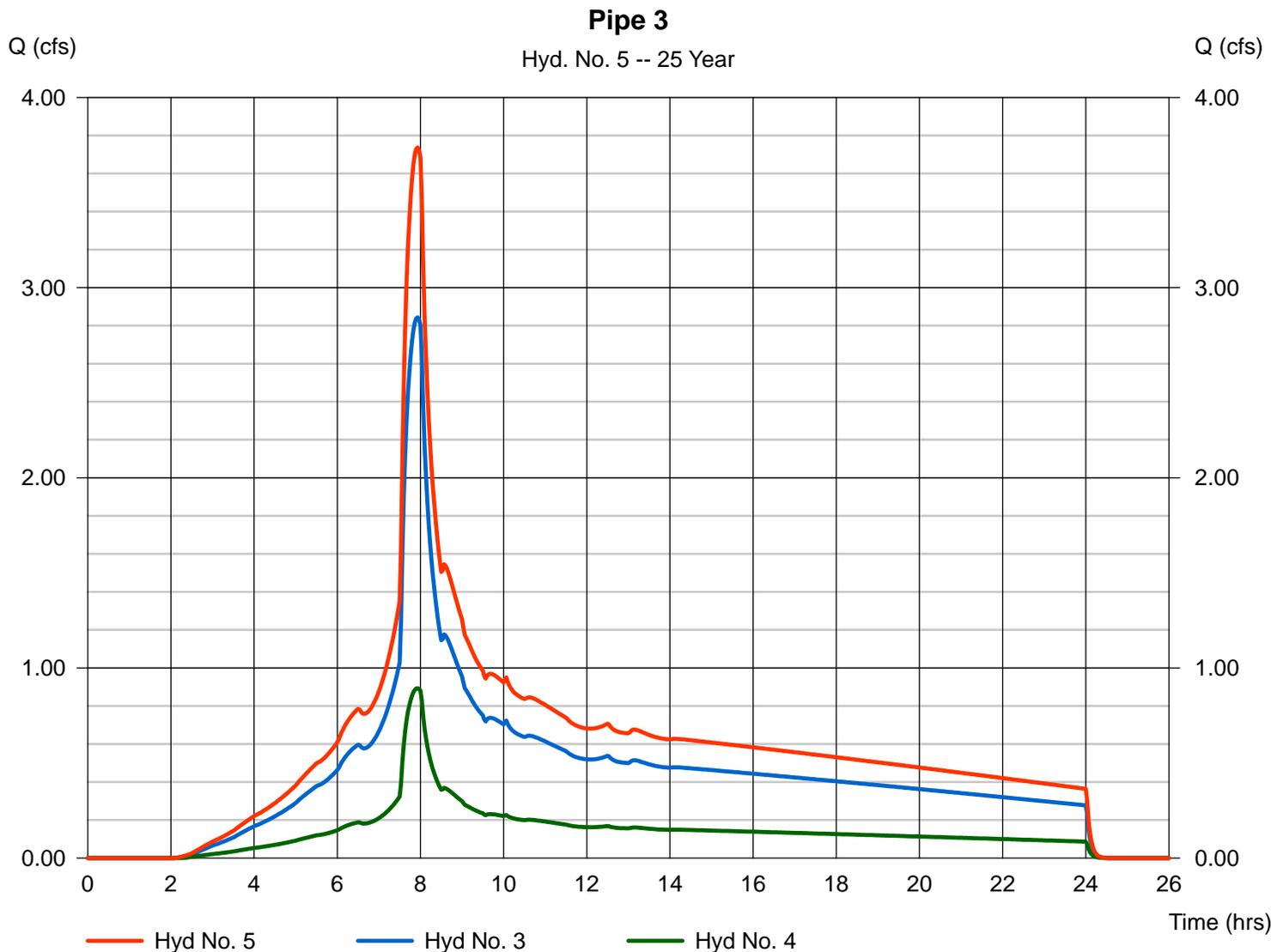
Wednesday, Mar 6, 2013

Hyd. No. 5

Pipe 3

Hydrograph type = Combine
 Storm frequency = 25 yrs
 Time interval = 2 min
 Inflow hyds. = 3, 4

Peak discharge = 3.737 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 52,805 cuft
 Contrib. drain. area = 1.230 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

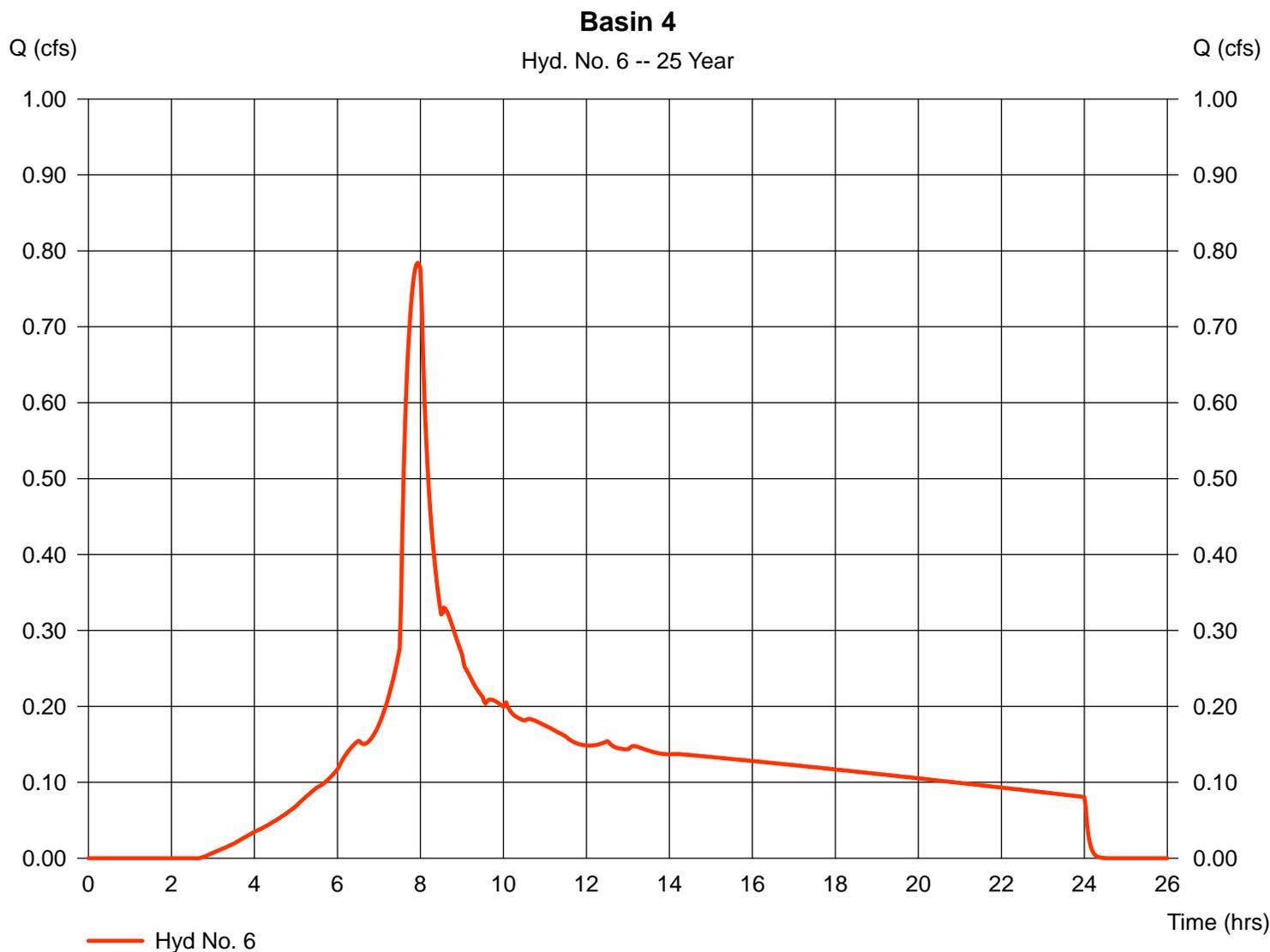
Hyd. No. 6

Basin 4

Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 1.170 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

Peak discharge = 0.784 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 11,196 cuft
 Curve number = 88*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = $[(0.690 \times 98) + (0.480 \times 74)] / 1.170$



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

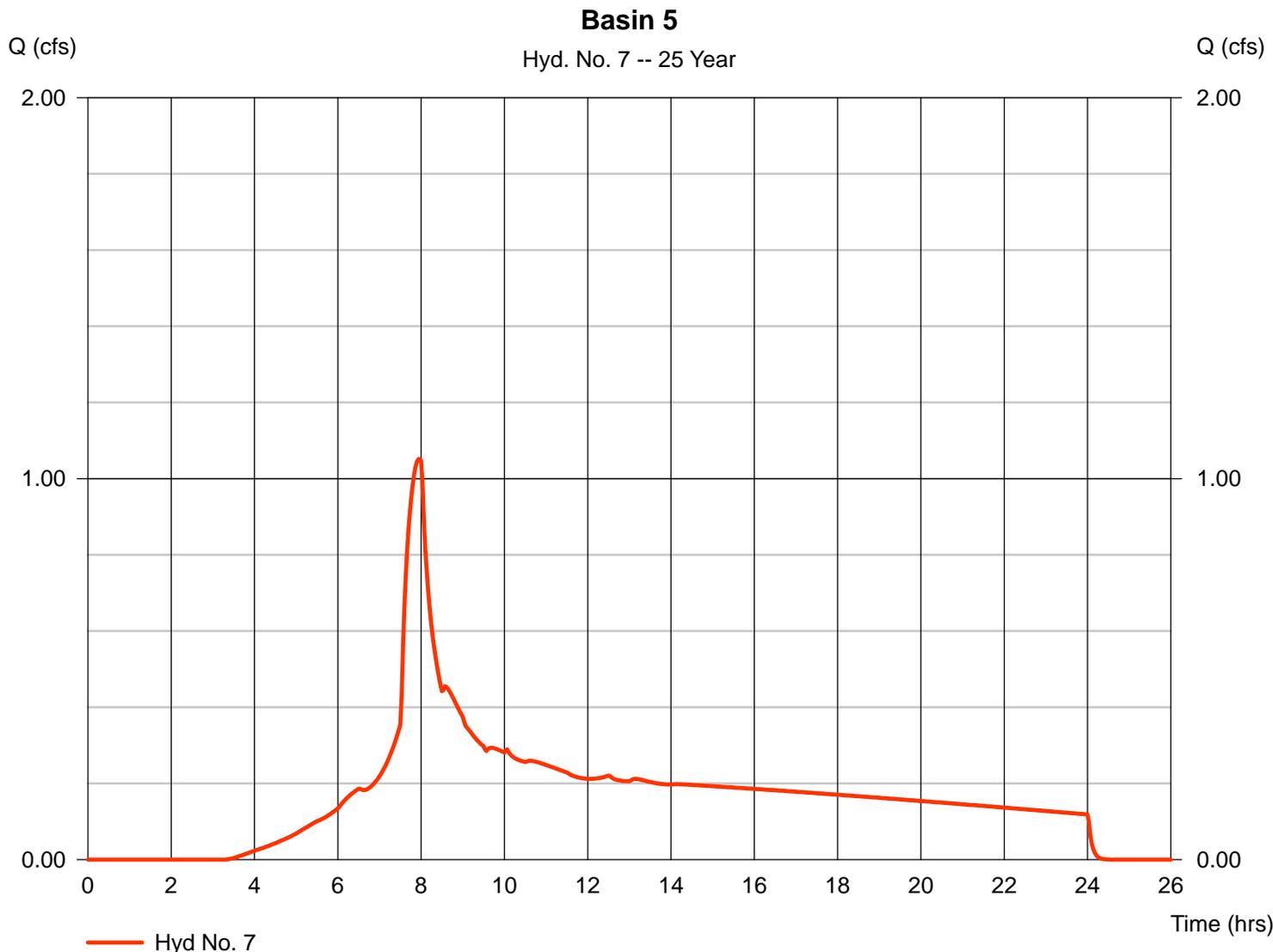
Hyd. No. 7

Basin 5

Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 1.790 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

Peak discharge = 1.051 cfs
 Time to peak = 7.97 hrs
 Hyd. volume = 15,391 cuft
 Curve number = 85*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = [(0.820 x 98) + (0.970 x 74)] / 1.790



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

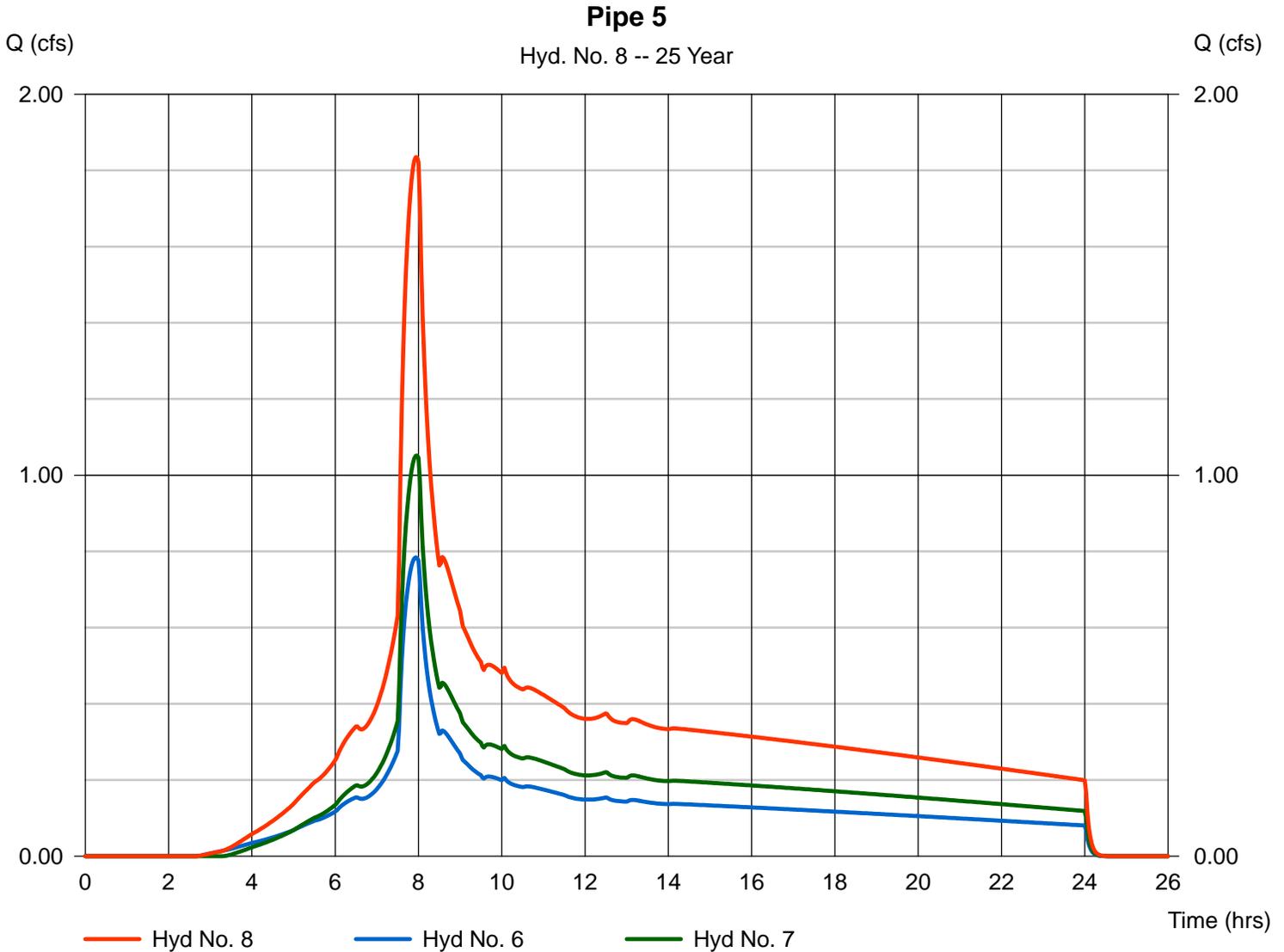
Wednesday, Mar 6, 2013

Hyd. No. 8

Pipe 5

Hydrograph type = Combine
Storm frequency = 25 yrs
Time interval = 2 min
Inflow hyds. = 6, 7

Peak discharge = 1.835 cfs
Time to peak = 7.93 hrs
Hyd. volume = 26,587 cuft
Contrib. drain. area = 2.960 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

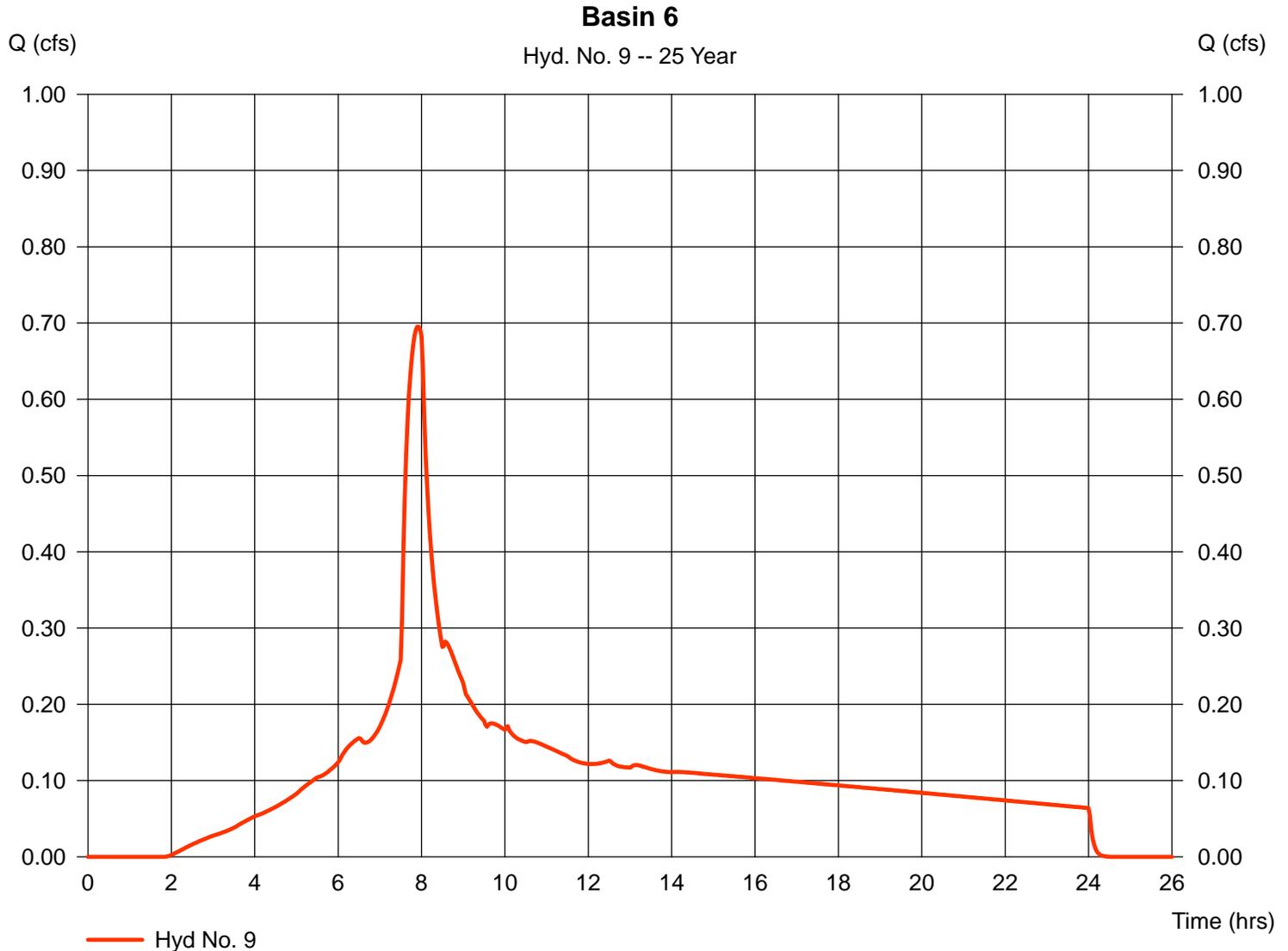
Hyd. No. 9

Basin 6

Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 0.890 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

Peak discharge = 0.695 cfs
 Time to peak = 7.90 hrs
 Hyd. volume = 9,760 cuft
 Curve number = 92*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = [(0.650 x 98) + (0.240 x 74)] / 0.890



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

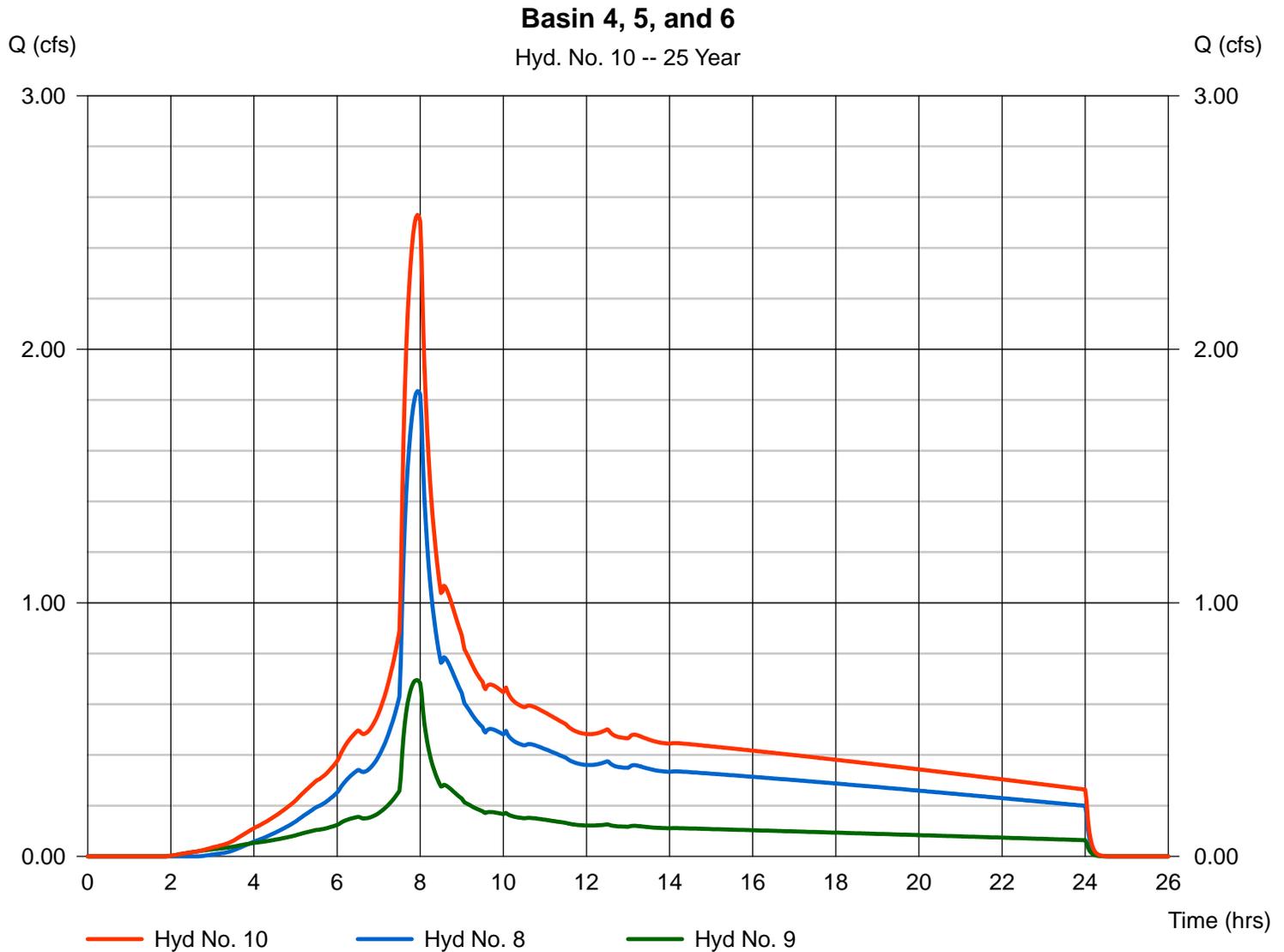
Wednesday, Mar 6, 2013

Hyd. No. 10

Basin 4, 5, and 6

Hydrograph type = Combine
 Storm frequency = 25 yrs
 Time interval = 2 min
 Inflow hyds. = 8, 9

Peak discharge = 2.530 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 36,347 cuft
 Contrib. drain. area = 0.890 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

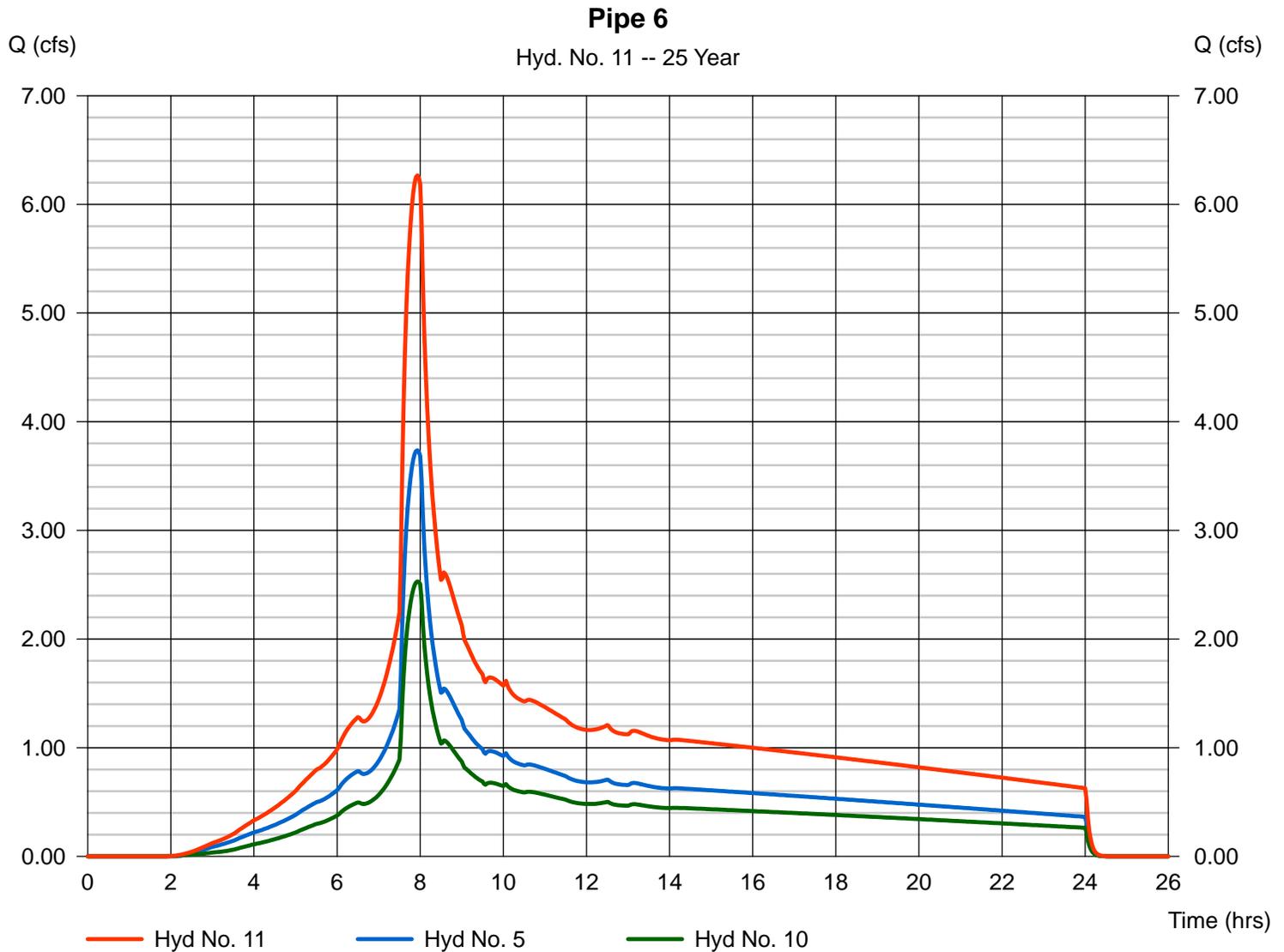
Wednesday, Mar 6, 2013

Hyd. No. 11

Pipe 6

Hydrograph type = Combine
 Storm frequency = 25 yrs
 Time interval = 2 min
 Inflow hyds. = 5, 10

Peak discharge = 6.267 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 89,152 cuft
 Contrib. drain. area = 0.000 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

Hyd. No. 12

Daybreak Subdivision

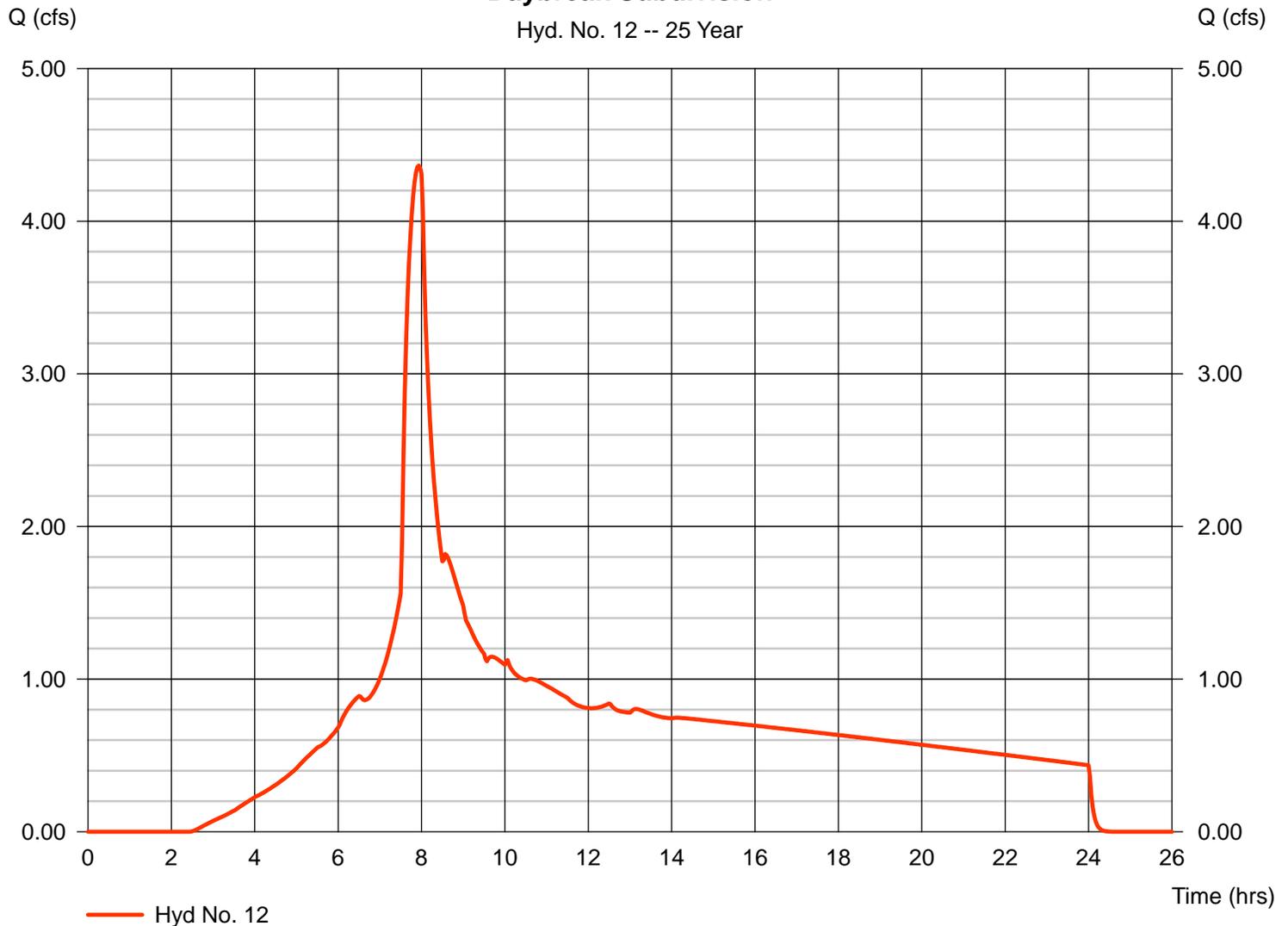
Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 6.250 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

Peak discharge = 4.364 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 61,921 cuft
 Curve number = 89*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = [(3.950 x 98) + (2.300 x 74)] / 6.250

Daybreak Subdivision

Hyd. No. 12 -- 25 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Wednesday, Mar 6, 2013

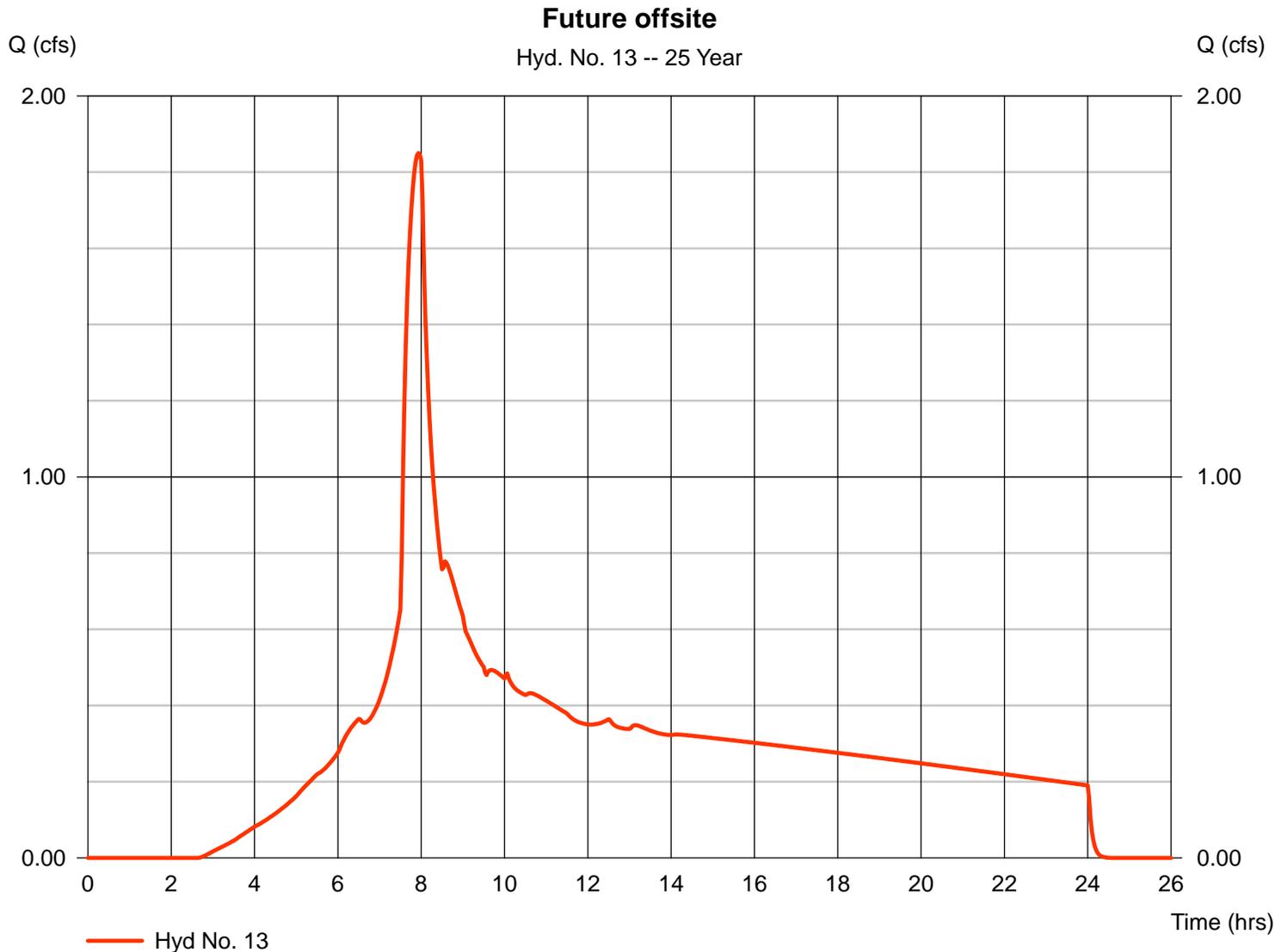
Hyd. No. 13

Future offsite

Hydrograph type = SBUH Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 2.760 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 3.90 in
 Storm duration = 24 hrs

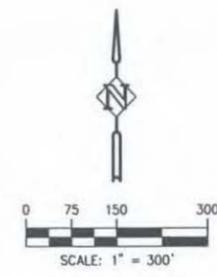
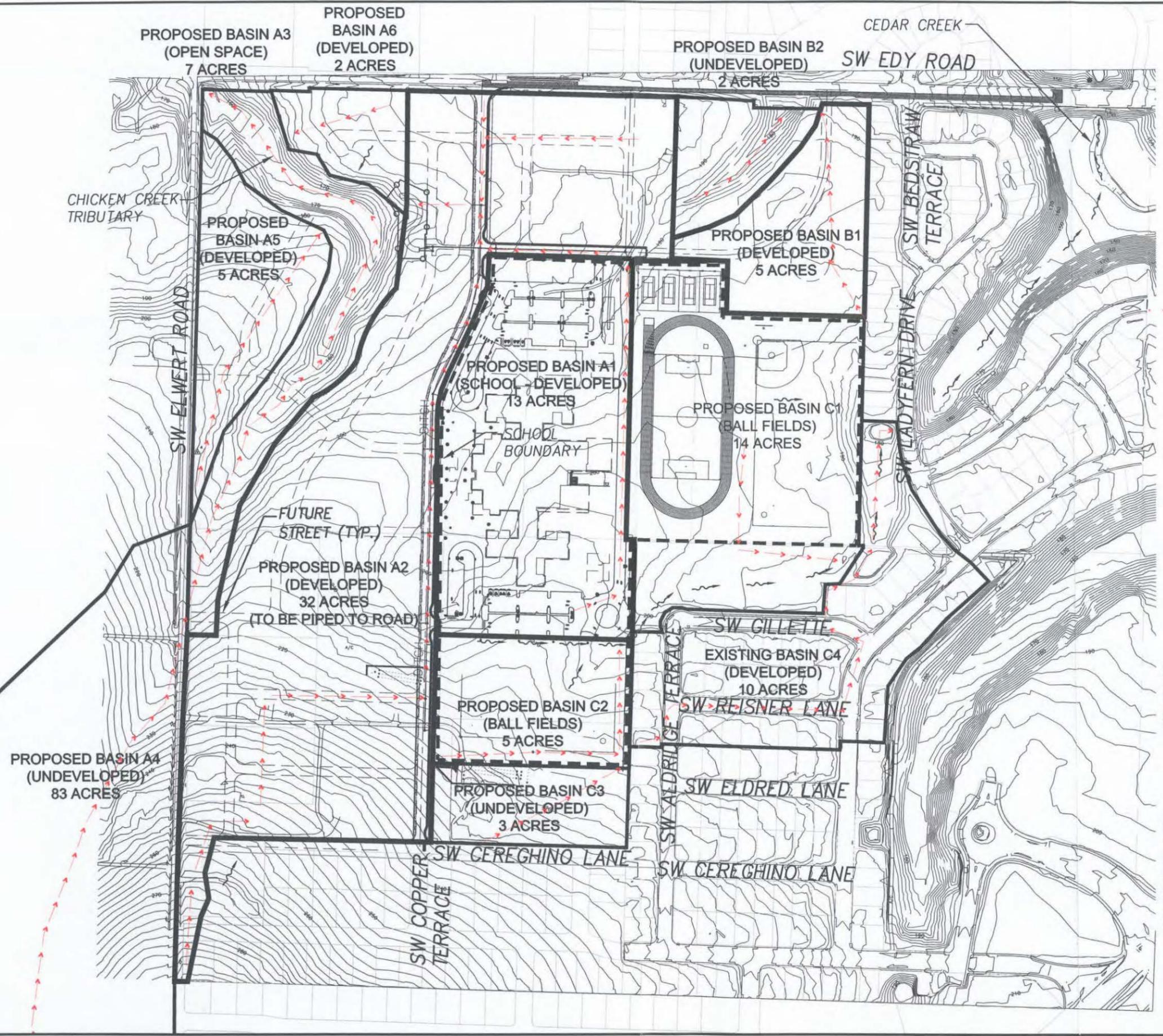
Peak discharge = 1.850 cfs
 Time to peak = 7.93 hrs
 Hyd. volume = 26,412 cuft
 Curve number = 88*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 5.00 min
 Distribution = Type IA
 Shape factor = N/A

* Composite (Area/CN) = [(1.660 x 98) + (1.100 x 74)] / 2.760



APPENDIX D
Area 59 Basin Maps
Water Quality Calculations

P:\DOW-08\DOW08-DWGS\STORMWATER\DSAI DOW08-PROP BASIN MAP.dwg



- TIME OF CONCENTRATION
- DRAINAGE FLOW ARROWS
- SCHOOL BOUNDARY
- BASIN LINE

SEE PROPOSED BASIN MAP IN APPENDIX A FOR UPSTREAM BASIN BOUNDARIES AND T_c FLOW PATTERNS

NOTE:
FUTURE STREETS SHOWN ARE FROM AREA 59 CONCEPT PLAN

PROPOSED CONDITIONS
NW DRAINAGE BASIN = BASINS A1-A6
NE DRAINAGE BASIN = BASINS B1 & B2
EAST DRAINAGE BASIN = BASINS C1-C4

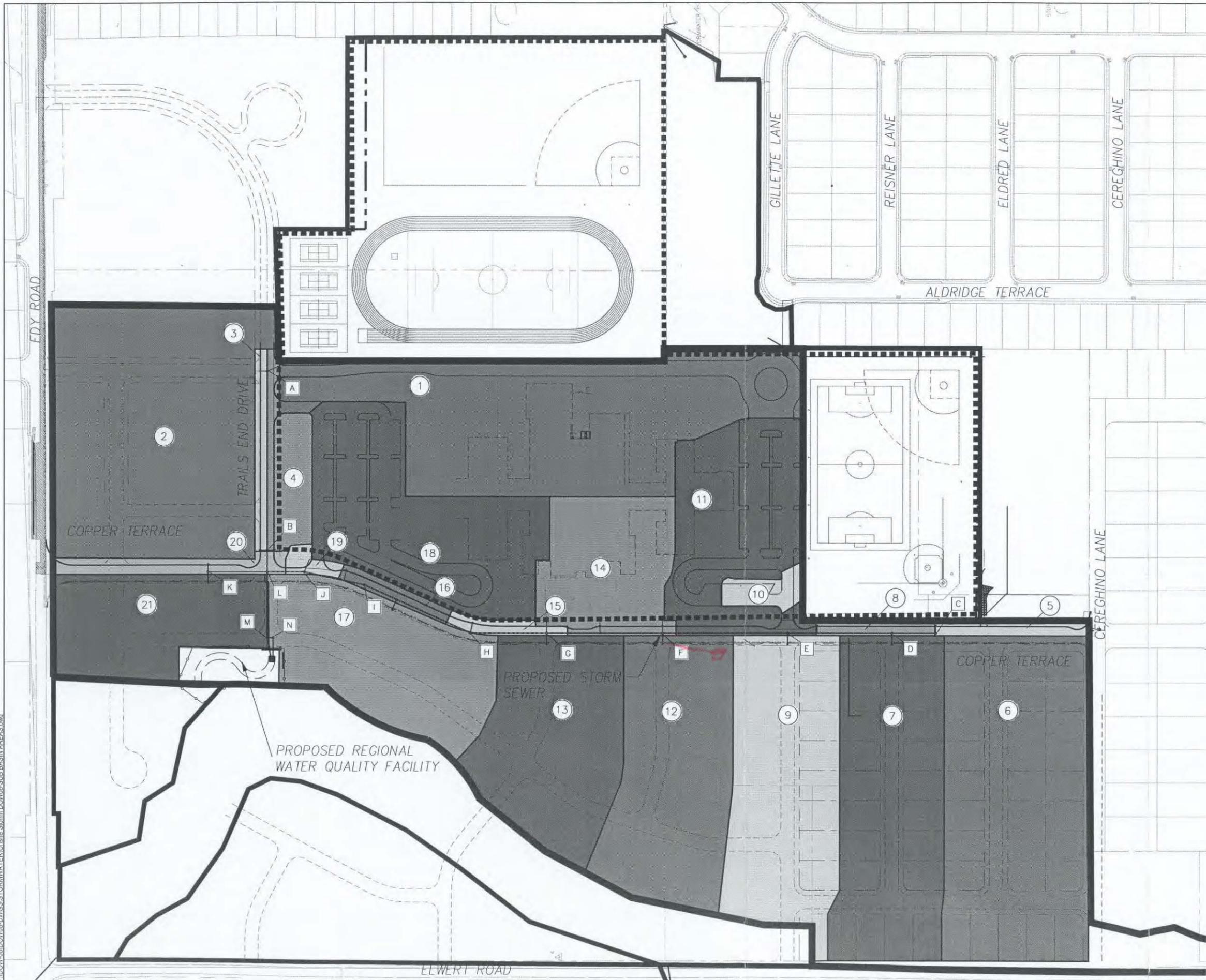
SCENARIO 3 - FULL BUILD OUT BASIN MAP
NEW ELEMENTARY AND MIDDLE SCHOOL
SHERWOOD, OREGON

Harper Houf Peterson Righellis Inc.
LANDSCAPE ARCHITECTS & ENGINEERS
5200 SW Macadam Avenue, Suite 500, Portland, OR 97239
Phone: 503.221.1131 www.hhpri.com

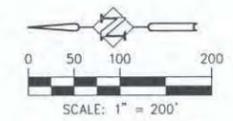
DESIGNED:	HHPR	DATE:	5-25-07
DRAWN:	HHPR	CHECKED:	KAS
R E V I S I O N S			
DATE	NO.	DESCRIPTION	

SHEET NO.
3.0
JOB NO. DOW-08

P:\DOW-08\DWG\SS\STORMWATER\Onsite Storm DOW08-SUB BASIN AREAS.dwg



SCHOOL SITE INCLUDES
BASINS 1, 3, 4, 5, 8, 10,
11, 14-16, 18, 19 AND 20.



LEGEND	
	EXISTING PROPERTY LINE
	PROPOSED PROPERTY LINE
	PROPOSED SERVICE BOUNDARY
	PROPOSED STORM SEWER
	PROPOSED SUB-BASINS
	DENOTES PROPOSED NODE
	DENOTES PROPOSED BASIN

REGIONAL WQ & STORM SEWER SERVICE BASIN
NEW ELEMENTARY AND MIDDLE SCHOOL
SHERWOOD, OREGON

Harper Houf Peterson
Righellis Inc.
ENGINEERS-PLANNERS
LANDSCAPE ARCHITECTS + SURVEYORS
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DESIGNED:		DRAWN:		CHECKED:		DATE:	
	HHPR		HHPR		KAS		5-25-07

DATE	NO.	DESCRIPTION

SHEET NO.	1.0
JOB NO.	DOW-08

PROJECT:

Daybreak Subdivision

RE:

Regional Water Quality Swale Capacity

Existing Impervious Area to Swale -

School site including ex. roadways (Copper Terrace:
Nursery Way) Impervious Area = 9.73 acresDaybreak Subdivision Impervious Area = 3.8 acresTotal impervious area to swale = $9.73 + 3.8 = 13.5$ acres
= 589369 SF

$$WQ \text{ Volume} = \frac{0.36" \times 589369 SF}{12 \text{ in/ft}} = 17,681 \text{ CF}$$

$$WQ \text{ Flow} = \frac{17681 \text{ CF}}{(4 \text{ hr})(60 \text{ min/hr})(60 \text{ s/min})} = \underline{\underline{1.2 \text{ cfs}}}$$

Regional water quality swale designed for WQ Flow = 2.5 cfs
 \therefore Swale has capacity for WQ Flow = 1.2 cfsChecked residence time in swale using manning's
equation for WQ Flow = 1.2 cfs, using 10' bottom width,
4:1 side slopes, 1.5% longitudinal slope.

$$Q = 1.2 \text{ cfs}$$

$$V = 0.33 \text{ fps}$$

$$\text{Length of swale} = 230 \text{ LF}$$

$$\text{Residence time} = \frac{230 \text{ LF}}{0.33 \text{ ft/s} \times 60 \text{ s/min}} = 11.6 \text{ min} > 9 \text{ minutes}$$

 \therefore Meets CWS
Requirements

COMMUNICATION RECORD

MEMO TO FILE PHONE CALL: MEETING: TO FROM

PHONE NO: _____

Study Area 59
SCS Curve Number Analysis
 Scenario 3 - Future Zoning Build-out

Total Basin Area = 43 acres

Hydrologic Group C

SCS Base Curve Numbers

Meadow, pasture or grasses 79

Impervious 98

SCS Curve Numbers used:

Ref.: (SCS TR-55, USDA, June 1986)

- 1 MDRL (8 DUA Max.)
- 2 MDRH (11 DUA Max.)

Pervious CN	% Impervious	Composite CN
79	68%	92
79	87%	96

Notes:

1. One DUA is assumed to contribute 2640 sq. ft.
2. DUA is defined per net acres, less 20% for roads.

** Refer to "Regional WQ : Storm Sewer Service Basin" Map Sheet 1.0*

*Sub-Basin	Total Area	ST Imp.	Lot Imp. MDRL	Lot Imp. MDRH	Site Imp. School	Total Impervious Area (AC)	Total Pervious Area (AC)	Comp. CN	Time of Conc (min)	Q ₂₅ (CFS)
1	5.32	n/a	n/a	n/a	3.02	3.02	2.29	90	10	3.65
2	5.04	1.01	1.95	n/a	n/a	2.96	2.08	90	10	3.46
3	0.25	0.25	n/a	n/a	n/a	0.25	0.00	98	5	0.23
4	0.68	n/a	n/a	n/a	0.35	0.35	0.33	89	5	0.47
5	0.24	0.24	n/a	n/a	n/a	0.24	0.00	98	5	0.22
6	4.83	0.97	1.87	n/a	n/a	2.84	1.99	90	10	3.31
7	3.52	0.70	1.37	n/a	n/a	2.07	1.45	90	10	2.41
8	0.18	0.18	n/a	n/a	n/a	0.18	0.00	98	5	0.17
9	3.27	0.65	n/a	1.75	n/a	2.40	0.87	93	10	2.50
10	0.25	n/a	n/a	n/a	0.17	0.17	0.08	92	5	0.19
11	2.54	n/a	n/a	n/a	1.60	1.60	0.94	91	10	1.81
12	3.15	0.63	0.69	0.95	n/a	2.26	0.89	93	10	2.41
13	2.86	0.57	n/a	1.52	n/a	2.10	0.76	93	10	2.19
14	1.81	n/a	n/a	n/a	0.90	0.90	0.90	88	10	1.14
15	0.17	0.17	n/a	n/a	n/a	0.17	0.00	98	5	0.16
16	0.18	0.18	n/a	n/a	n/a	0.18	0.00	98	5	0.15
17	2.71	0.54	n/a	1.44	n/a	1.98	0.72	93	10	2.07
18	3.16	n/a	n/a	n/a	2.15	2.15	1.01	92	10	2.33
19	0.10	0.10	n/a	n/a	n/a	0.10	0.00	98	5	0.09
20	0.42	0.42	n/a	n/a	n/a	0.42	0.00	98	5	0.38
21	2.01	0.40	0.78	n/a	n/a	1.18	0.83	90	10	1.38

TOTAL IMPERVIOUS AREA TO WQ FACILITY = 27.54

*School Site Basin Total Impervious Area = 9.73 acres
 (includes Copper Terrace : Nursery Way)*

WQ Facility

Project No.
DOW-08

Sherwood Elementary and Middle School

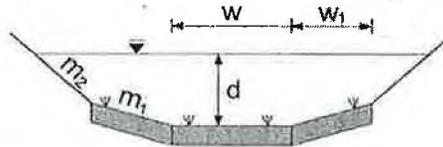
Water Quality Area

Total Impervious = 27.54 ac = *Impervious Area that can be treated by regional swale with bottom width = 10 feet length = 230 LF and Slope = 1.5% with 9 minute residence time*

Water Quality Flow

$$\begin{aligned} \text{WQ Volume (cf)} &= \frac{0.36 \text{ in} \times \text{Impervious Area (sf)}}{12 \text{ (in/ft)}} \\ \text{WQ Flow (cfs)} &= \frac{\text{WQ Volume (cf)}}{(4 \text{ hr})(60 \text{ min/hr})(60 \text{ sec/min)}} \\ &= \frac{\text{Impervious Area (sf)}}{480,000 \text{ sec/ft}} \\ &= \frac{\text{ac} \times 43,560 \text{ sf/ac}}{480,000 \text{ sec/ft}} \\ &= 2.50 \text{ cfs} \end{aligned}$$

Biofilter Swale



Water Quality Event

Transverse Properties	X-Sectional Properties
Q = 2.50 cfs	w = 10.0' ✓
s = 1.50% ✓	w ₁ = 2.0'
n = 0.240	m ₁ = 4:1
L = 230 LF ✓	m ₂ = 2.5:1
v = 0.42 fps	d = 0.49' ✓
t = 9.03 min ✓	

25-Year Event

Transverse Properties	X-Sectional Properties
Q = 30.55 cfs	w = 10.0'
s = 1.50%	w ₁ = 2.0'
n = 0.240	m ₁ = 4:1
L = 230 LF	m ₂ = 2.5:1
v = 1.03 fps ✓	d = 1.86'
t = 3.72 min	

Regional Water Quality Swale

Velocity for WQF in swale using Mannings

Man-Made Channels

CIVIL TOOLS PRO

English Units

03-05-2013 14:44:29

Results

Flow Depth	=	0.32 ft
<u>Flowrate</u>	=	1.20 cfs ←
Bottom Width	=	10.00 ft
Side Slope (H:V)	=	4.0000 H:V
Channel Slope (V:H)	=	0.0150 V:H
Manning's N	=	0.240
Wetted Area	=	3.64 sq ft
Wetted Perimeter	=	12.66 ft
<u>Velocity</u>	=	0.33 fps ←
Froude No.	=	0.11
Flow Regime	=	Sub-Critical

January 10, 2013

D R Horton, Inc.
4380 SW Macadam Avenue, Suite 100
Portland, Oregon 97239

Subject: Geotechnical Evaluation
Daybreak Subdivision
Sherwood, Oregon

Attn: Kati Gault

Northwest GEO Consultants is pleased to submit our Geotechnical Evaluation for the Daybreak subdivision in Sherwood, Oregon. This report was prepared in accordance with Contract Number 200223 OF dated December 27, 2012. The report summarizes the work accomplished and provides our recommendations for site development.

PROJECT INFORMATION

We understand that D R Horton plans to construct 34 single family homes underground utilities and roadways at the Daybreak Subdivision. Homes on the project are expected to be up to two stories tall, supported on both continuous and isolated spread footings. The site is currently undeveloped land. The site relative to surrounding features is shown in Figure 1.

DHI provided us with a sketch of the tentative project layout dated December 18, 2012. The proposed site layout is shown in Figure 2.

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 NGC staff.
- Complete 10 test pits up to 10 feet below the existing ground surface. The test pits were generally located on the property lines that separated two of the building lots.
- Maintain a log of soil, rock, and groundwater conditions encountered during the explorations. We will classify the soil in general accordance with the Unified Soil classification System (USCS) using ASTM D2488 (Visual-Manual Procedure).
- Obtain grab samples from the sides of the test pits or excavator bucket for field classifications. We returned the samples to our laboratory for additional evaluation and testing.
- Determine the moisture content of all soil samples and the dry unit weight of samples obtained from the Shelby tubes in general accordance with guidelines provided in ASTM D-2216 and ASTM D1587 respectively.

- Provide a written Geotechnical Evaluation Report summarizing our explorations, geotechnical analysis, conclusions, and recommendations. Our report will include figures showing the site location and the location of explorations on the site. Our specific recommendations and opinions will include:
 - A professional opinion stating whether or not each lot meets Form HUD-92541 (4/2001) regarding Foreseeable Hazards and FHA Data Sheet 79G as it relates to Controlled Earthwork requirements.
 - A discussion on the regional geology and the seismic setting of the site that will include the general geologic features of the surface and underlying deposits and tectonic faulting in the area.
 - An evaluation of the seismic hazards that may be present at the site and provide seismic design criteria in accordance with the Oregon Structural Specialty Code.
 - Recommendations for site preparation, grading and drainage, use and reuse of onsite soil and imported material for structural fill, compaction criteria, cut-and-fill slope criteria, and wet-weather earthwork procedures.
 - Recommendations for utility trench excavation, 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.
 - A discussion of groundwater conditions on the site and recommendations for subsurface drainage of foundations, floor slabs, and pavement.

SITE CONDITIONS

The project site is located on a broad, gentle slope area on the southern margin of the Tualatin Valley in the City of Sherwood, Washington County, Oregon. The site relative to surrounding features is shown in Figure 1. The following paragraphs describe the area geology, surface, and subsurface features.

SITE GEOLOGY

The site is located in the Tualatin Basin, a structural basin filled with a thick sequence of sediment (Yeats et al., 1996)¹. The upper portion of the sediment is the Quaternary age (last 1.6 million years) Willamette Silt, a catastrophic flood deposit associated with repeated glacial outburst flooding of the Willamette Valley, the last of which occurred about 10, 000 years ago. Regionally, these deposits consists of horizontally layered, micaceous silt to coarse sand forming poorly-defined to distinct

¹Yeats, R.S., Graven, E.P., Werner, K.S., Goldfinger, T. and Popowski, 1996, Tectonics of the Willamette Valley, Oregon: in Assessing earthquake hazards and reducing risk in the Pacific Northwest, v. 1, U.S. Geological Survey Professional Paper 1560, p. 183-222, 5 plates, map scale 1:100,000.

beds up to 3 feet thick². Locally, the flood deposits are mantled by a thin layer of windblown silt (loess) that is difficult to distinguish from the water deposited silt. Based on regional geologic mapping, we estimate the thickness of Willamette Silt in the vicinity of the subject site is on the order of less than 30 feet.

The Willamette Silt is underlain by an unnamed sequence of continental, fine-grained strata including moderately- to poorly-lithified siltstone, sandstone, mudstone and claystone with common wood fragments and minor volcanic ash and pumice (Yeats et al., 1996; Gannett and Caldwell, 1998). These rocks are tentatively correlated with the Sandy River Mudstone, and the Troutdale and Helvetia Formations.

Underlying the unnamed sedimentary strata is Miocene (about 14.5 to 16.5 million year old) Columbia River Basalt Group (CRBG), a thick sequence of lava flows which forms the crystalline basement of the Tualatin Basin (Yeats et al., 1996). These basalts are a dense, finely crystalline rock that is commonly fractured along blocky and columnar joints. Where highly weathered, the upper surface of the basalt is altered to a distinctive, red-brown, clayey silt known as laterite or residual soil. Structure contour mapping indicates that the top of the CRBG lies about 150 feet below the ground surface.

SEISMIC SETTING

Seismic Sources

The Tualatin Basin is subject to seismic events stemming from three possible sources: the Cascadia Subduction Zone (CSZ) at the interface between the Juan de Fuca plate and the North American plate; intraslab faults within the Juan de Fuca plate; and crustal faults in the North American plate.

Maximum magnitude for a CSZ event is expected to be in the range of Moment Magnitude (MW) 9.0. Intraslab events have occurred on a frequent basis in the Puget Sound, contributing small magnitude ground motions in Western Oregon.

There are no mapped faults that pass directly through the site. Quaternary faults within 10 miles of the site are the Canby-Molalla Fault about 5.5 miles to the east, Beaverton Fault about 7.4 miles to the north, and the Newberg Fault about 6.9 miles to the southwest.

Seismic Design Factors

The contribution of potential earthquake-induced ground motion from all known sources, including the fault described above, are included in the probabilistic ground motion maps developed by the USGS. Seismic site characterization and design recommendations based on USGS mapping and analysis are implemented in the International Building Code. Seismic design parameters for the project site are provided in Figure 3.

SURFACE CONDITIONS

The project site encompasses an area of about 7.5 acres, the southern portion of which is developed as a single-family home site. The property is bordered by Copper Terrace on the east, Elwert Road

² Gannett and Caldwell, 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington; U.S. Geological Society Professional Paper 1424-A, 32 pages, 8 plates.

on the west, and agricultural land on the south and north. Based on the site plan provided, the ground surface elevation varies between about 195 and 232 feet above mean sea level. The site relative to surrounding features is shown in Figure 1. The site layout is shown in Figure 2.

The majority of ground surface is currently vegetated with low grass, dense brush and sparse trees.

SUBSURFACE CONDITIONS

We explored subsurface conditions at the site by excavating 10 test pits (TP-1 through TP-10) to depths up to 11-1/2 feet below the existing ground surface. The test pits were excavated on December 21, 2012 using a small trackhoe owned and operated by Parker Concrete of Forest Grover, Oregon. Descriptions of the field explorations, exploration logs, and laboratory procedures are included in Attachment A. The approximate locations of the test pits are shown in Figure 2.

Till Zone

We encountered a 12- to 24- inch thick till zone at the ground surface from that suggests prior agricultural activity on the site. A 4-inch thick heavily rooted zone is present immediately below the ground surface.

Isolated Fill Areas

Isolated fill areas associated with prior agricultural, logging or residential uses may be present on the site. We encountered medium-stiff silt fill in TP-9 that extended to a depth of 4 feet bgs. The fill and sides of the test pit suggest the fill is associated with an old tree stump. We expect that shallow fills are likely to be present around the margins of the existing single-family home and other improvements on property.

Native Soil

Native soil was encountered directly below the till zone in 9 of the 10 test pits excavated at the site. The native soil is medium stiff to very stiff silt. Moisture content of the native silt varied from 36 to 42 percent of the dry soil content.

Details of the soil layers encountered and the results of laboratory testing are provided in the test pit logs included in Attachment A.

GROUNDWATER CONDITIONS

We explored the site in mid December in the first third of the wet season. In general, we encountered moderate to rapid groundwater seepage in the explorations at depths ranging between 1 and 11 feet below the ground surface. The estimated total inflow rate to the tests pits was on the order of 1 to 4 gallons per minute (gpm). In TP-09, very rapid seepage on the order of 6 to 8 gpm occurred accompanied by moderate sidewall caving of fill in the upper 5 feet.

Rapid seepage of perched groundwater should be expected at the site in the winter and spring months. In addition, there appears to be a year round shallow groundwater table at the site on the lower elevation portions of the property. Shallow groundwater was encountered at a depth of 9 feet in test pits TP-1 and TP-4.

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. Expected building loads can be supported on the medium stiff to very stiff undisturbed native silt that underlies the site or on newly placed structural fill supported on undisturbed native silt.

An approximate 12- to 24-inch-thick till zone overlies the entire site. The zone consists of soft to medium stiff silt with a heavily rooted zone extending to approximately 4 inches below the ground surface. We recommend that after stripping the heavily rooted zone, the site surface should be scarified to a depth of 24 inches and compacted as structural fill.

We encountered moderate to rapid groundwater flow in all of the ten test pit explorations made on the Daybreak site. It should be expected that springs and seeps will occur in the wet season. Fill slopes and retaining structures should be constructed with drains. Trench drains should be placed at the toe of cut slopes to intercept water that could inundate back yard areas add large amounts of water behind embedded building walls.

Specific recommendations for project design and construction are provided in the paragraphs that follow.

SITE PREPARATION

The existing heavily rooted zone of grass and organics should be stripped and removed from the site in all proposed building and pavement areas and for a 5-foot margin around such areas. Based on our explorations, the depth of stripping will be about 4 inches although greater stripping depths may be required to remove localized zones of loose or organic soil. 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 landscaped areas.

An approximate 1-to 2- foot thick zone of soft soil was observed in the explorations. We recommend removing or scarifying the stripped ground surface to the depth of the tilled zone within building and paved fill areas prior to placing structural fill. The scarified soil should be compacted as recommended for structural fill.

The on-site silt can be sensitive to small changes in moisture content and may be difficult to compact adequately 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.

After stripping, scarification and required site cutting have been completed, we recommend proofrolling the subgrade with a fully loaded dump truck or similar size, rubber-tire construction equipment to identify areas of excessive yielding. The proofrolling should be observed by a member of our geotechnical staff, who will evaluate the subgrade. If areas of excessive yielding are identified, the material should be excavated and replaced with compacted materials recommended for structural fill. Areas that appear to be too wet and soft to support proofrolling equipment should be prepared in accordance with the recommendations for wet weather construction presented in the following section of this report.

The test pits excavations were backfilled using relatively minimal compactive effort. Therefore, soft spots can be expected at these locations. We recommend that these relatively uncompacted soils be

removed from the test pits 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.

WET WEATHER CONSTRUCTION

Near surface soil on the site can become disturbed during the wet season. Earthwork should be planned and executed to minimize subgrade disturbance.

We recommend that a minimum of 3-inch thickness of granular material be placed at the base of footing excavations in wet weather conditions. The granular material reduces water softening of subgrade soils, reduces subgrade disturbance during placement of forms and reinforcement, and provides a clean environment for reinforcing steel.

PERMANENT SLOPES

Permanent cut and fill slopes constructed using on-site soil 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 appropriate 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.

UTILITY TRENCH EXCAVATION AND BACKFILL

Trench construction and maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. All applicable 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.

We encountered groundwater in our test pit explorations and it should be expected that dewatering of utility trenches could be required during construction. A sump located within the trench excavation likely will be sufficient to remove the accumulated water, depending on the amount and persistence of water seepage and the length of time the trench is left open. Flow rates for dewatering are likely to vary depending on location, and the season during which the excavation occurs. The dewatering systems should be capable of adapting to variable flows.

If groundwater is present in the base of the excavation, we recommend over excavating the trench by 1-foot and placing trench stabilization material in the base. Trench stabilization material should consist of well-graded crushed rock or crushed gravel with a maximum particle size of 4 inches and with less than 5% fines (percent passing the U.S. Standard No. 200 Sieve). The contractor should be responsible for selecting the excavation and dewatering methods, monitoring the trench excavations for safety, and providing shoring as required to protect personnel and adjacent improvements.

Trench backfill in structural areas should consist of well-graded granular material with a maximum particle size of $\frac{3}{4}$ -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 D1557, the modified proctor test or as recommended by the pipe manufacturer.

STRUCTURAL FILL

The term "structural fill" refers to any material used for building pads, roadway embankments, detention pond berms, foundations, retaining walls, slab-on-grade floors, sidewalks, pavements, and other similar features. The on-site silt is suitable for use as structural fill provided it can be moisture-conditioned, separated from unsuitable material, and compacted to the specified density. The on-site silt should be placed in lifts with a maximum uncompacted thickness of 8 inches and compacted to not less than 92 percent of the maximum dry density as determined by ASTM D 1557.

We recommend using imported granular material for structural fill if the on-site material cannot be moisture conditioned. Imported granular material for structural fill should be pit-run or quarry-run rock, crushed rock, crushed gravel, or sand. It should be fairly well-graded between coarse and fine material and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve. The material should be placed in lifts with a maximum uncompacted thickness of 12 inches and compacted to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.

Regardless of material or location, structural fill should be placed over firm, unyielding subgrade prepared in accordance with the "Site Preparation" section of this report. The condition of the subgrade should be verified by a NGC representative before filling or construction begins. Fill soil compaction should be verified by in-place density tests performed during fill placement so that adequacy of soil compaction efforts may be evaluated as earthwork progresses.

SHALLOW FOUNDATIONS

In our opinion, the proposed structures can be supported on continuous or isolated column footings founded on existing compacted structural fill, new structural fill, or on undisturbed native soil.

Continuous wall and spread 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 12 inches wide or 12 inches in diameter. The base of the foundations should be at least 12 inches below the lowest adjacent final grade.

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.

Lateral loads of the proposed buildings founded on undisturbed native soil or on structural fill can be resisted by passive earth pressure on the sides of footings and 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 1.

TABLE 1: LATERAL RESISTANCE FACTORS

SOIL TYPE	EQUIVALENT FLUID PRESSURE (γ_A - PCF)	FRICTION COEFFICIENT (μ_A - %)
ON-SITE SILT/SAND	350	.41
IMPORTED CRUSHED ROCK	820	.61

The tabulated values above are ultimate values. The project structural engineer should apply appropriate factors of safety for static and dynamic conditions. Typical factors of safety values for static conditions are 2 to 3 for equivalent fluid pressure and 1.5 to 2 for friction coefficients. Factors of safety for dynamic conditions are usually 1.1.

In order to develop the tabulated capacities concrete must be poured neatly in excavations, or the adjacent confining structural fill must consist of granular soil compacted to not less than 95% of the dry density as determined by ASTM D 1557. Footing backfill should extend a minimum horizontal distance of two times the footing embedment from base of the footing to bottom of the slab. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

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 6-inch-thick layer of imported granular material should be placed and compacted over the prepared subgrade to assist as a capillary break. A subgrade modulus of 100 pounds per cubic inch may be used to design the floor slab.

Imported granular material should be crushed rock or crushed gravel and sand that is fairly well-graded between coarse and fine, contain no deleterious materials, have a maximum particle size of 1½ inches, and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve. The imported granular material should be placed in one lift and compacted until well-keyed, about 85percent of the maximum dry density as determined by ASTM D 1557.

Vapor retarders are often required by flooring manufacturers to protect flooring and flooring adhesives. Many flooring manufacturers will warrant their product only if a vapor retarder is installed according to their recommendations. However, vapor barriers can trap and hold excess moisture when installed in rainy weather. We recommend following ACI 302.1, Chapter 3 with regard to installing a vapor retarder in spaces with floor coverings or coatings.

RETAINING WALLS AND EMBEDDED BUILDING WALLS

The following recommendations assume that the walls consist of conventional, cantilevered retaining walls or embedded building walls, the walls are less than 10 feet in height, the backfill is drained, and the wall backfill consists of free-draining, imported angular crushed quarry rock. Re-evaluation 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 4.

TABLE 2: EQUIVALENT FLUID DENSITY (G) ACTING ON RETAINING WALLS

WALL TYPE	BACKFILL COMPONENT (PCF)	SURCHARGE COMPONENT (PSF)	SEISMIC COMPONENT (PCF)
YIELDING WALL	20	NA	18
NON-YIELDING WALL	43	NA	12

Retaining wall drains should consist of a perforated drainpipe embedded in a minimum 1-foot-wide zone of drain rock that is wrapped 360 degrees around by a geotextile filter fabric. The fabric should be overlapped a minimum of 6 inches. The drain should outlet an approved outfall.

The drain rock should consist of coarse sand or gravel containing not more than 3% fines (material by weight passing the U.S. Standard No. 200 Sieve by washed analysis). The geotextile filter should be a non-woven fabric with an AOS between the U.S. Standard No. 70 and No. 100 Sieve size and a water permittivity of greater than 1.5 sec⁻¹.

Backfill for retaining walls should extend a horizontal distance of H, where H is the wall height, and should consist of medium sand, sand and gravel, or well-graded sand or gravel, with not more than 5% fines. Geotextile filter fabric should be placed between the granular materials and the native soil to prevent movement of fines into the clean granular material.

Backfill should be placed and compacted as recommended for structural fill, with the exception of backfill placed immediately adjacent to walls. To reduce pressure on the walls, backfill located within a horizontal distance of 3 feet from the retaining walls should be compacted to approximately 90% of the maximum dry density, as determined by ASTM D 1557. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as a jumping jack or vibratory plate compactor).

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.

BUILDING AND SITE DRAINAGE

We recommend that all roof drains be connected to a tightline leading to storm drain 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.

As a matter of good construction practice, we recommend that perimeter drains be installed for all buildings. Perimeter drains should consist of perforated drainpipe embedded in a zone of coarse

sand or gravel containing not more than 2% passing the U.S. Standard No. 200 Sieve (washed analysis) that is wrapped in a non woven geotextile filter. The pipe should be connected to a tightline leading to storm drain facilities.

French drains and or trench should be installed in slopes if groundwater seepage is encountered during construction. The drains should consist of a 4-inch diameter perforated pipe within an envelope of uniformly graded drain rock with a maximum particle size of 3 inches, and less than 2 percent passing the U.S. Standard No. 200 Sieve. The drain rock should extend at least 4 inches on all sides of the pipe.

The gravel envelope should extend upward to the top of the slope and should be wrapped with filter fabric to reduce the migration of fines from the surrounding soil. The geotextile filter should be a non-woven fabric with an AOS between the U.S. Standard No. 70 and No. 100 Sieve size and a water permittivity of greater than 1.5 sec-1. Design details for French /Trench Drains are provided in Figure 5.

ASPHALT PAVEMENT

The pavement subgrade should be prepared in accordance with the previously described recommendations described in the "Site Preparation," "Wet Weather Construction," and "Structural Fill" sections of this report.

Our pavement recommendations are based on a subgrade stiffness using a California Bearing Ratio value of 4. We do not have specific information on the frequency and type of vehicles that will use the area; however, we have assumed that post construction traffic conditions will consist of no more than five heavy trucks per day.

Our analysis shows that a pavement section consisting of a minimum of 4 inches of AC pavement underlain by a minimum of 10.0 inches of crushed rock base will be required to support anticipated traffic loads over a design life of 20 years.

These thicknesses are intended to be the minimum acceptable and are based on the assumption that construction will be completed during an extended period of dry weather. Construction of pavement when subgrade soils are wet will require an increased thickness of crushed rock base.

The AC pavement should conform to Section 0074 of the Standard Specification for Highway Construction, Oregon Highway Specifications. We recommend half inch dense graded Hot Mix Asphalt Concrete for Design Level 2 using Performance Grade Asphalt PG-70-22 for the Sherwood area. The aggregate base should conform to Section 02630 of the specifications with the addition that no more than 5 percent of the material by dry weight passes a U.S. Standard No. 200 Sieve.

Aggregate base should be placed in one lift and compacted to not less than 95% of the modified Proctor maximum dry density (ASTM D1557). Aggregate base should be placed in one lift and compacted to not less than 95 percent of the maximum dry density as determined by ASTM D 1557. Aggregate base contaminated with soil during construction should be removed and replaced before paving.

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 process. Consequently, we recommend that NGC 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 footing and floor slab subgrade before granular fill material or concrete is placed, in order to verify the soil bearing capacity.
- Observe the installation of floor slab base rock to verify conformance with the construction plans.
- 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 D R Horton 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 presented in the discussions of the subsurface conditions included in this report.

The recommendations contained in this report are preliminary. They are based on information derived through subsurface sampling. No matter how effective subsurface sampling may be performed, variations between exploration location and the presence of unsuitable materials are possible and cannot be determined until exposed during construction. Accordingly, NGC's recommendations can be finalized only through NGC's observation of the project's earthwork construction. NGC accepts no responsibility or liability for any party's reliance on NGC's preliminary recommendations.

During construction observation NGC will assign persons qualified to recognize unanticipated conditions and observe and report on the contractor's quality of work in order to reduce the risk of problems arising during construction. Note however that construction observation is not insurance, nor does it constitute a warranty or guaranty of any type. NGC's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client.

It is our expectation that D R Horton will retain competent contractors who are knowledgeable and experienced in completing the work they are contracted to perform and that contractors will perform irrespective of the presence of our representative or any testing we may conduct. In all cases contractors are assumed to be fully responsible for quality control and quality assurance. Failure by NGC or our client to detect deficiencies in the work or to inform contractor of any deficiencies

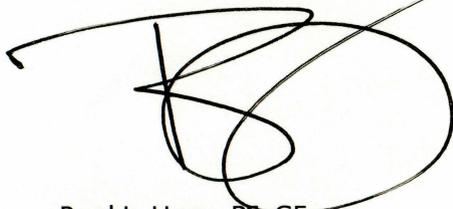
which may be discovered, shall not relieve any contractor from their responsibility for performance of the end product.

Within the limitations of the scope, 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.

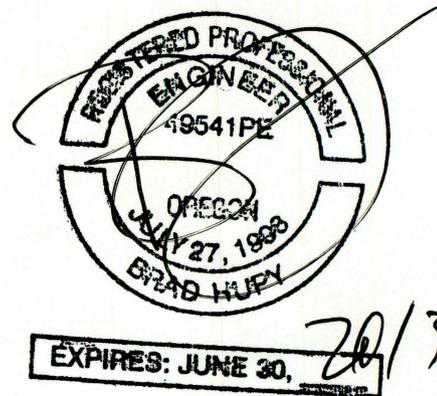


We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,



Brad L. Hupy, PE, GE
Principal Engineer



- Attachments:
- Figure 1 - Site Location
 - Figure 2 - Site Layout
 - Figure 3 - Seismic Site Response
 - Figure 4 - Retaining Wall Pressures
 - Figure 5 - French/Trench Drains

- A - Field Exploration and Laboratory Testing
- Field Exploration Program
 - Laboratory Testing Program
 - Key to Boring and Test Pit Logs (4 pages)
 - Test Pit Logs

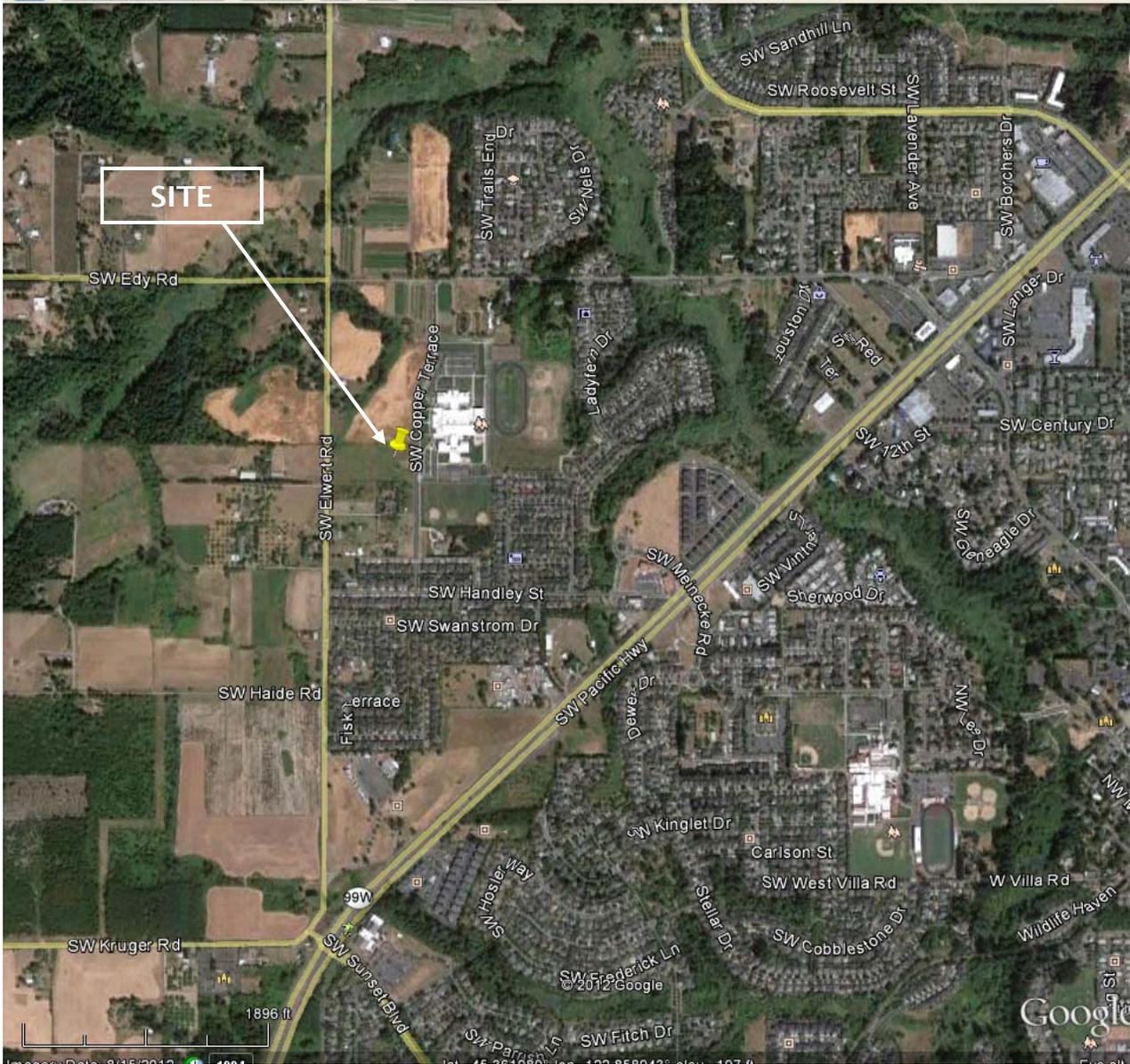
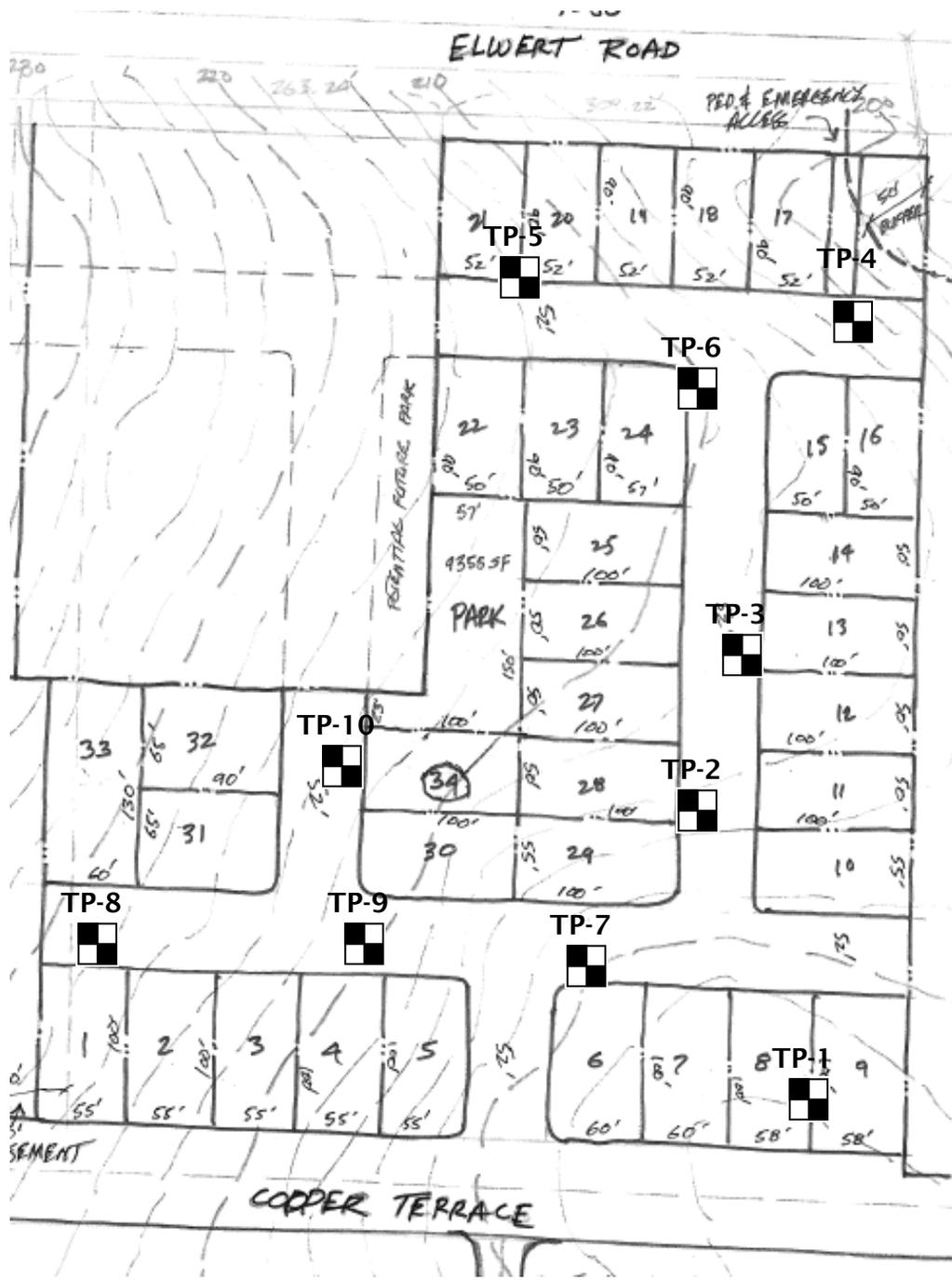


Image August 15, 2012 - Google Earth Pro - Used by permission

45.364N/122.866W - Township 2S, Range 1W, Section 30CC



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<p>1411 SE 30th AVE, STE. 6 Portland, OR 97214</p>	<p>Drawn By: TAC</p>	<p>SITE VICINITY</p>	<p>FIGURE 1</p>



APPROXIMATE LOCATION

PARTITION PLAT FROM DR HORTON,
DATE UNKNOWN, SCALE: N.T.S.



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JAN
2013

**DR HORTON
DAYBREAK**

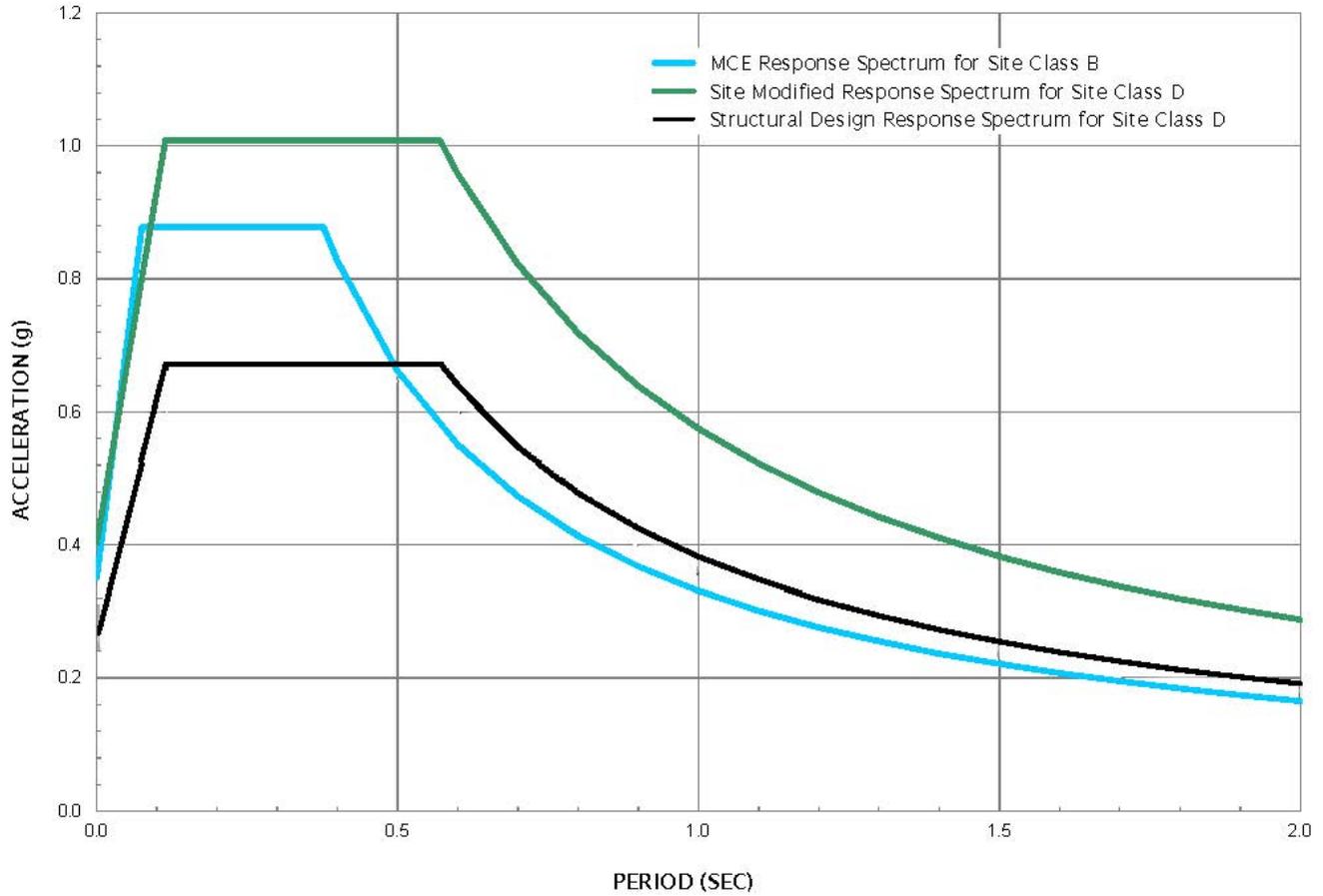
1411 SE 30th AVE, STE. 6
Portland, OR 97214

Drawn
By:
TAC

**SITE LAYOUT &
EXPLORATIONS**

FIGURE 2

**2009 IBC Code Based Response Spectrum
MCE Ground Motion - 5% Damping
2% Probability of Recurrence in 50 Years**

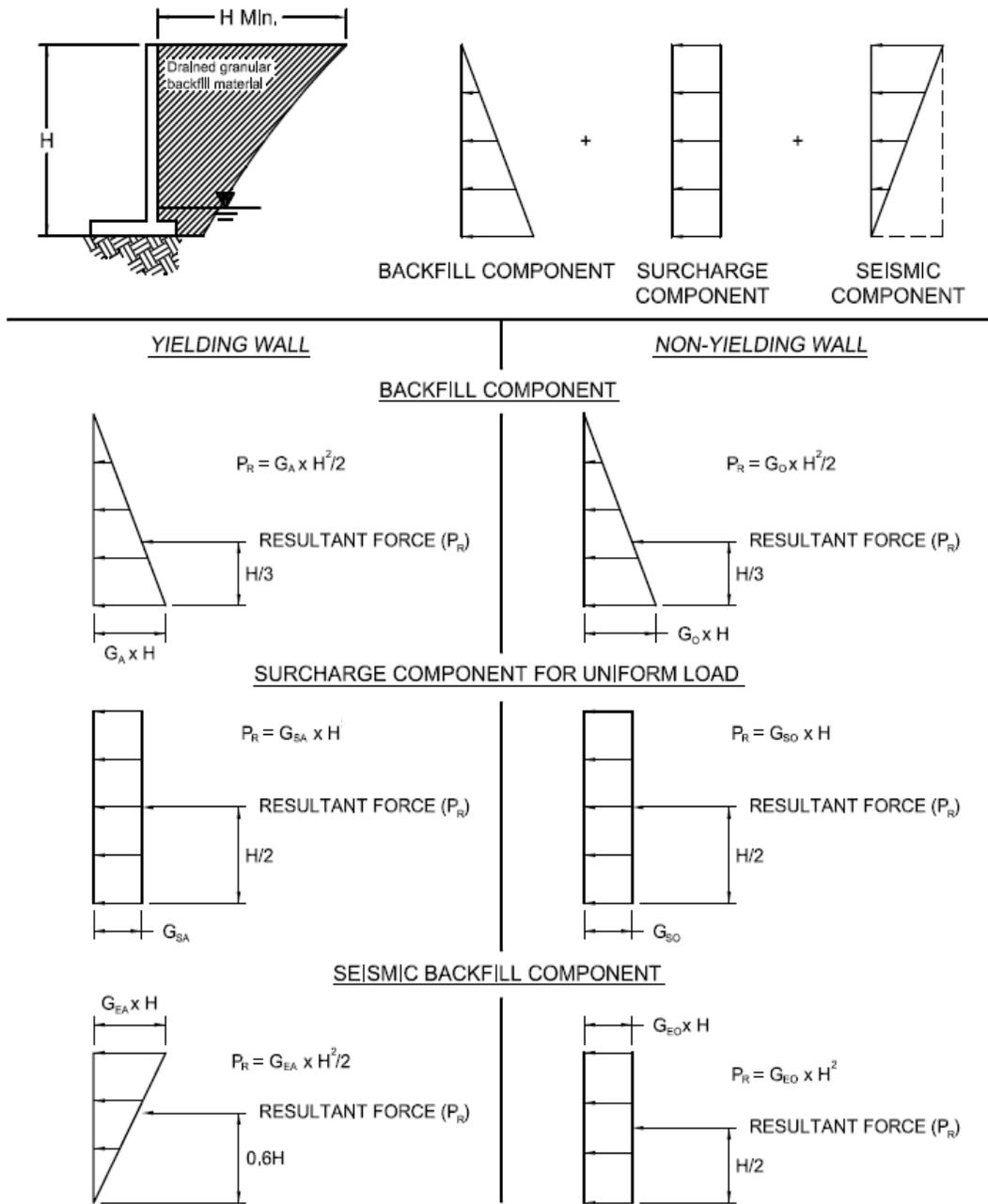


S_s	S1	F_a	F_v	SM_s	SM1	SD_s	SD1
0.878	0.331	1.149	1.738	1.009	0.575	0.673	0.383

Latitude	Longitude	Seismic Site Class	PGA Structural	PGA Geotechnical
45.364 N	122.866 W	D	0.269	0.404

STRUCTURAL PGA FROM NEHRP DESIGN SPECTRUM FOR STRUCTURAL ELEMENTS - GEOTECHNICAL PGA REQUIRES ADDITIONAL MODIFICATION - SEE NCHRP REPORT 611 (2008)

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	<p>Drawn By: BLH</p>	<p>SEISMIC SITE RESPONSE</p>	<p>FIGURE 3</p>

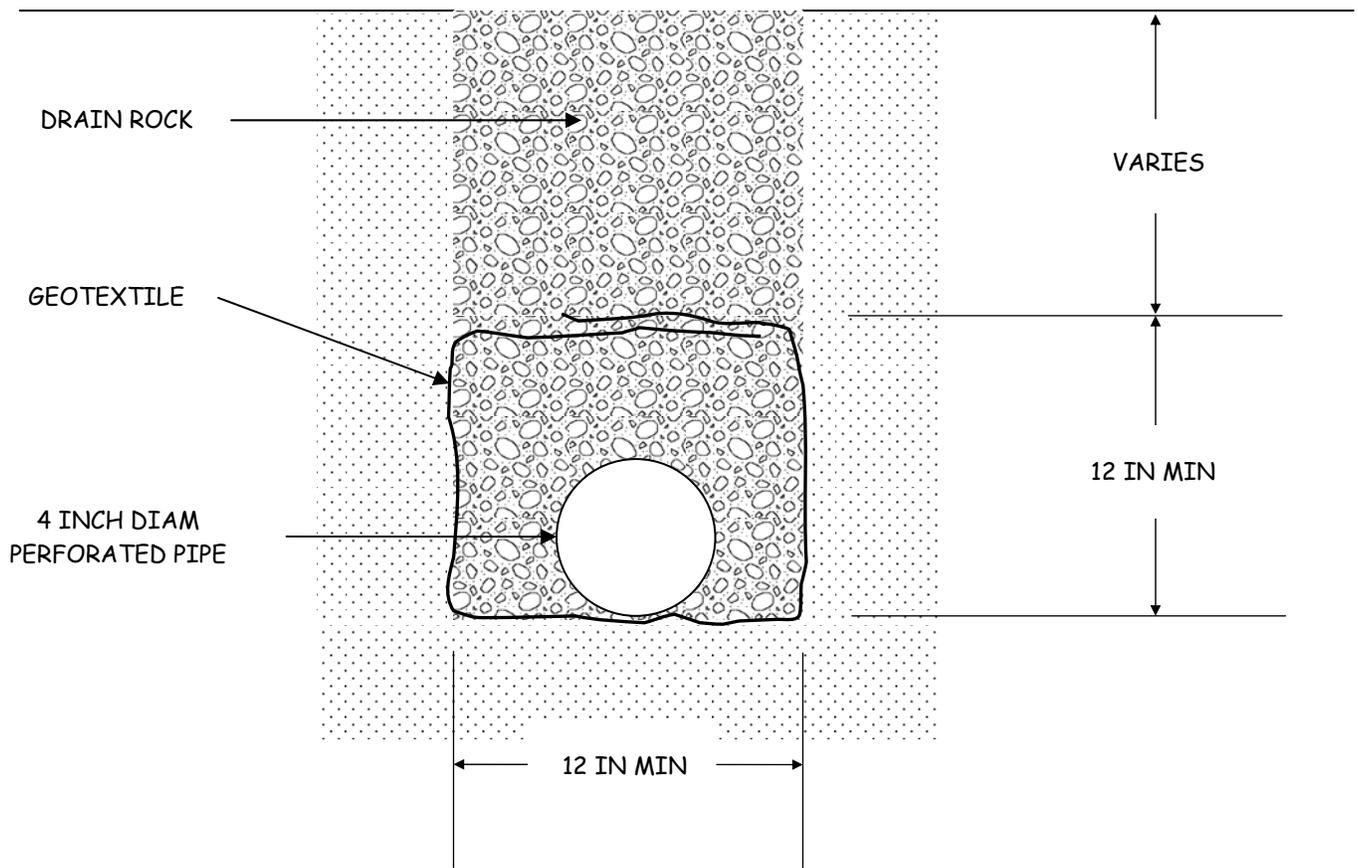


Note:

See report text for values of G.

A: Active Pressure O: At Rest Pressure S: Surcharge Pressure E: Earthquake Pressure

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1. Install geotextile filter fabric in trench to wrap drain rock with overlap at the top as shown.
2. Drain rock shall be pea gravel or washed drain rock. Extend to ground surface above geotextile to design subgrade elevation.
3. Install non-woven geotextile filter fabric with an apparent opening size (AOS) equal to the U.S. Standard No. 70 Sieve and a water permittivity of greater than 1.5 sec-1. Fabric meeting ODOT 2008 Standard Specifications - Section 02320 is acceptable.

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<p>1411 SE 130th Avenue-Suite 6 Portland Oregon 97214</p>	<p>Drawn By: BLH</p>	<p>FRENCH/TRENCH DRAIN DETAIL</p>	<p>FIGURE 5</p>

ATTACHMENT A
FIELD EXPLORATION PROGRAM
LABORATORY TESTING PROGRAM
KEY TO BORING AND TEST PIT LOGS
TEST PIT LOGS: TP-1 TO TP-10

FIELD EXPLORATION PROGRAM

General

NGC explored subsurface conditions at the site by observing 10 shallow test pits to depths up to 10 feet below the ground surface (bgs) at the locations shown in Figure 2. The test pits were excavated on December 21, 2012 using a Yanmar E24 tracked excavator owned and operated by Parker Concrete of Forest Grove, Oregon.

A member of NGC's geotechnical staff was present during the explorations to record soil, rock, and groundwater conditions encountered in our boring 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. Samples obtained in the exploration were sealed in airtight, plastic bags 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 in the soil and rock classifications and other modifiers are defined in the General Notes in this Appendix.

Field Testing

We estimated the undrained shear strength of fine grained soil (silt and clay) using a Pocket Penetrometer (PP) applied to the sidewalls of the test pits. The PP 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. The results of the tests are presented in the logs included in this appendix.

Exploration Log

Summary test pit logs follow in this attachment. The left-hand portion of the boring log provides our interpretation of the soil encountered in the boring, sample depths, and groundwater information. The right-hand, graphic portion of the logs shows the results of laboratory testing.

Soil descriptions and interfaces between soil types shown in the logs are interpretive, and actual changes may be gradual.

LABORATORY TESTING PROGRAM

General

The soil samples obtained during the field explorations were examined in our laboratory. The physical characteristics of the samples were noted and the field classifications were modified where necessary in accordance with terminology presented in the "Key to Boring and Test Pit Logs".

Representative samples were selected during the course of the examination for further testing. The testing program included visual-manual classification, moisture content, and dry unit weight determination. The testing procedures and results of the tests are summarized in the following paragraphs. The phrase "In general accordance with guidelines presented in..." means that certain local and common descriptive practices and methodologies have been followed.

Visual-Manual Classification

The soil samples were classified in general accordance with guidelines presented in ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Certain terminology incorporating current local engineering practice may be used in lieu of ASTM terminology. The term which best described the major portion of the sample was used in determining the soil type. Terminology used is provided in the "Key to Test Pit and Boring Logs" that follows.

Natural Moisture Content

Natural moisture content of selected samples was determined in general accordance with guidelines presented in ASTM D 2216. 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. The results of these tests are shown on the exploration logs.

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 Unified Soil Classification (USCS) presented in ASTM D 2488 "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.

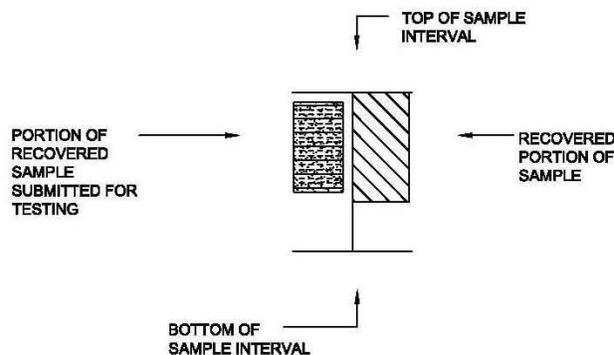
VARIATION OF SOIL BETWEEN EXPLORATIONS

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 OR 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



<b style="color: green;">Northwest GEO Consultants, LLC	2013	KEY TO BORING AND TEST PIT LOGS	
1411 SE 130th Avenue-Suite 6 Portland Oregon 97214	Drawn By: BLH	GENERAL INFORMATION	1/4

EXPLORATION LOG SYMBOLS

	Sample Location with No Sample Recovery		Sample Location Using Thin-Walled Tube Sampler (ASTM D 1587)
	Sample Location Using Direct Push Sampler (ASTM D 6282)		Rock Core Interval
	Sample Location Using Ring-Lined Barrel Sampler (ASTM D 3550)		Grab Sample Location
	Sample Location Using Split-Barrel Sampler (ASTM D 1586)		Soil Sample Submitted for Chemical Testing
			Soil Sample Submitted for Physical Property Testing
			Water Sample Screened Interval
			Water Sample Submitted for Chemical Testing
			Water Sample Tested in the Field
			Groundwater Level Encountered While Drilling
			Static Groundwater Level
			Perched Groundwater
			Groundwater Level at Time of Sampling

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	

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KEY TO BORING AND TEST PIT LOGS

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SYMBOLS

2/4

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS		
			GRAPH	LETTER			
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		
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES		
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES		
	SAND AND SANDY SOILS	CLEAN SANDS	(LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
			(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES	
		SANDS WITH FINES	(APPRECIABLE AMOUNT OF 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		
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		

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KEY TO BORING AND TEST PIT LOGS

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SOIL CLASSIFICATION
CHART

3/4

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

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2013

KEY TO BORING AND TEST PIT LOGS

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ROCK CLASSIFICATION

4/4

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (24-inch thick till zone); wet. Grades to very stiff, gray mottled orange brown at 2 feet. WILLAMETTE SILT	1 2 3 4	▼ PW	38 37 34 40	PP=0.5 PP=0.5 PP=4.0 PP=4.0 PP=4.0	
10			Becomes stiff, gray-blue at 9 feet End at 10 feet in stiff native silt. No caving observed to the depth explored. Rapid seepage of perched groundwater at depths of 1 to 4 feet with flow of 2 to 4 gpm.					

Station: SEE FIGURE 2

Logged By: PAC

Approximate Elevation:

**LOG OF TEST PIT
TP-01**

Excavation Started: 12/21/12

Excavation Completed: 12/21/12

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (12-inch thick till zone); wet. Grades to very stiff, gray mottled orange brown at 1 foot. WILLAMETTE SILT		▼ PW		PP=0.75 PP=3.5 PP=4.0 PP=4.0	
10			End at 11 feet in stiff native silt. No caving observed to the depth explored. Moderate seepage of perched groundwater at depths of 1 to 5 feet with flow of 1 gpm.					

Station: SEE FIGURE 2

Logged By: PAC

Approximate Elevation:

**LOG OF TEST PIT
TP-02**

Excavation Started: 12/21/12

Excavation Completed: 12/21/12

TESTPIT 2 PER PAGE REV1 DAYBREAK TEST PIT LOGS.GPJ NGC.GDT 01/10/13

D R Horton

Daybreak Subdivision

Northwest GEO Consultants
1411 SE 30th Avenue - Suite 6
Portland, Oregon 97214
Tel 503-702 8437
Fax

NGC, LLC

**LOGS OF
TEST PITS**

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (18-inch thick till zone); wet. Grades to medium stiff, gray mottled orange brown at 1-1/2 feet. Grades to stiff, brown mottled orange gray at 1 foot.	1	▼ PW	37	PP=0.5 PP=0.75	
				2		35	PP=3.5 PP=4.0	
			WILLAMETTE SILT	3		37		
				4		42		
10			End at 11 feet in stiff native silt. No caving observed to the depth explored. Rapid seepage of perched groundwater at depths of 1 to 5 feet with flow of 3 gpm.					
Station: SEE FIGURE 2				Logged By: PAC		LOG OF TEST PIT TP-03		
Approximate Elevation:								
Excavation Started: 12/21/12				Excavation Completed: 12/21/12				

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (18-inch thick till zone); wet. Grades to very stiff, gray mottled orange brown at 1-1/2 feet.				PP=0.5 PP=1.5 PP=3.5 PP=4.0	
			WILLAMETTE SILT					
10			Becomes stiff, gray-blue at 10 feet End at 10-1/2 feet in stiff native silt. No caving observed to the depth explored. Moderate seepage of perched groundwater at 9 feet with flow of 1 gpm.		▼ TS			
Station: SEE FIGURE 2				Logged By: PAC		LOG OF TEST PIT TP-04		
Approximate Elevation:								
Excavation Started: 12/21/12				Excavation Completed: 12/21/12				

TESTPIT 2 PER PAGE REV1 DAYBREAK TEST PIT LOGS.GPJ NGC.GDT 01/10/13

D R Horton Daybreak Subdivision	Northwest GEO Consultants 1411 SE 30th Avenue - Suite 6 Portland, Oregon 97214 Tel 503-702 8437 Fax		LOGS OF TEST PITS
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DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA	
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (18-inch thick till zone); wet. Grades to very stiff, gray mottled orange brown at 1-1/2 feet.	1	▼ PW	37	PP=0.5		
			WILLAMETTE SILT	2		37	PP=2.0		
				3		38	PP=3.5		
				4		38	PP=3.5		
10			End at 11 feet in stiff native silt. No caving observed to the depth explored. Moderate seepage of perched groundwater at 4-1/2 feet with flow of 1 gpm.						
Station: SEE FIGURE 2				Logged By: PAC				LOG OF TEST PIT TP-05	
Approximate Elevation:									
Excavation Started: 12/21/12				Excavation Completed: 12/21/12					

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA	
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (24-inch thick till zone); wet. Grades to very stiff, brown mottled orange gray at 2 feet.		▼ PW		PP=0.75		
			WILLAMETTE SILT				PP=1.5		
							PP=3.5		
							PP=4.0		
10			End at 10 feet in stiff native silt. No caving observed to the depth explored. Raid seepage of perched groundwater at 2 to 5 feet with flow of 2 gpm.						
Station: SEE FIGURE 2				Logged By: PAC				LOG OF TEST PIT TP-06	
Approximate Elevation:									
Excavation Started: 12/21/12				Excavation Completed: 12/21/12					

TESTPIT 2 PER PAGE REV1 DAYBREAK TEST PIT LOGS.GPJ NGC.GDT 01/10/13

D R Horton Daybreak Subdivision	Northwest GEO Consultants 1411 SE 30th Avenue - Suite 6 Portland, Oregon 97214 Tel 503-702 8437 Fax		LOGS OF TEST PITS
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DEPTH (feet.bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (12-inch thick till zone); wet. Grades to very stiff, brown mottled orange gray at 1 foot. WILLAMETTE SILT	1	▼ PW	33	PP=0.75 PP=1.5 PP=4.0 PP=4.0	
10			End at 10 feet in stiff native silt. No caving observed to the depth explored. Raid seepage of perched groundwater at 1 to 7 feet with flow of 2 gpm.	2 3		35 29		

Station: SEE FIGURE 2

Logged By: PAC

Approximate Elevation:

Excavation Started: 12/21/12

Excavation Completed: 12/21/12

**LOG OF TEST PIT
TP-07**

DEPTH (feet.bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (12-inch thick till zone); wet. Grades to very stiff, brown mottled orange gray at 1 foot. WILLAMETTE SILT		▼ PW		PP=1.5 PP=1.5 PP=4.0 PP=4.0	
10			End at 10 feet in stiff native silt. No caving observed to the depth explored. Moderate seepage of perched groundwater at 2 to 10 feet with flow of 1 gpm.					

Station: SEE FIGURE 2

Logged By: PAC

Approximate Elevation:

Excavation Started: 12/21/12

Excavation Completed: 12/21/12

**LOG OF TEST PIT
TP-08**

TESTPIT 2 PER PAGE REV1 DAYBREAK TEST PIT LOGS.GPJ NGC.GDT 01/10/13

<p>D R Horton Daybreak Subdivision</p>	<p>Northwest GEO Consultants 1411 SE 30th Avenue - Suite 6 Portland, Oregon 97214 Tel 503-702 8437 Fax</p> <p style="font-size: 2em; color: green; text-align: center;">NGC, LLC</p>	<p style="text-align: center;">LOGS OF TEST PITS</p>
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DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT FILL with trace organics (4-inch thick heavily rooted zone at the ground surface) (18-inch thick till zone); wet.	1	PW	28	PP=0.5	
		ML	Medium stiff, gray mottled orange-brown SILT FILL (apparent stump hole backfill); wet.	2		34	PP=0.5 PP=1.5 PP=1.5	
		ML	Stiff, brown mottled orange-gray SILT ; moist.	3		36		
			WILLAMETTE SILT	4		41		
10			End at 10 feet in stiff native silt. Minor sidewall caving observed during exploration. Rapid seepage of perched groundwater at 2 to 10 feet with flow of 6 to 8 gpm.					

Station: SEE FIGURE 2

Logged By: PAC

Approximate Elevation:

**LOG OF TEST PIT
TP-09**

Excavation Started: 12/21/12

Excavation Completed: 12/21/12

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
5		ML	Soft, brown SILT with trace organics (4-inch thick heavily rooted zone at the ground surface) (12-inch thick till zone); wet. Grades to very stiff, brown mottled orange gray at 1 foot.		PW		PP=0.75	
			WILLAMETTE SILT				PP=1.5 PP=2.5 PP=3.0	
10			End at 10 feet in stiff native silt. No caving observed to the depth explored. Moderate seepage of perched groundwater at 2 to 10 feet with flow of 1 gpm.					

Station: SEE FIGURE 2

Logged By: PAC

Approximate Elevation:

**LOG OF TEST PIT
TP-10**

Excavation Started: 12/21/12

Excavation Completed: 12/21/12

TESTPIT 2 PER PAGE REV1 DAYBREAK TEST PIT LOGS.GPJ NGC.GDT 01/10/13

D R Horton
Daybreak Subdivision

Northwest GEO Consultants
1411 SE 30th Avenue - Suite 6
Portland, Oregon 97214
Tel 503-702 8437
Fax

NGC, LLC

**LOGS OF
TEST PITS**

Ryan M O'brien

From: Ryan M O'brien
Sent: Tuesday, February 26, 2013 4:51 PM
To: Marvin Spiering
Cc: Andrew E Tiemann; Janelle Brannan; Kim Shera
Subject: Daybreak Subdivision
Attachments: Impervious Surface of Elwert Road.pdf; Plan N & S of Daybreak 2-26-13.pdf

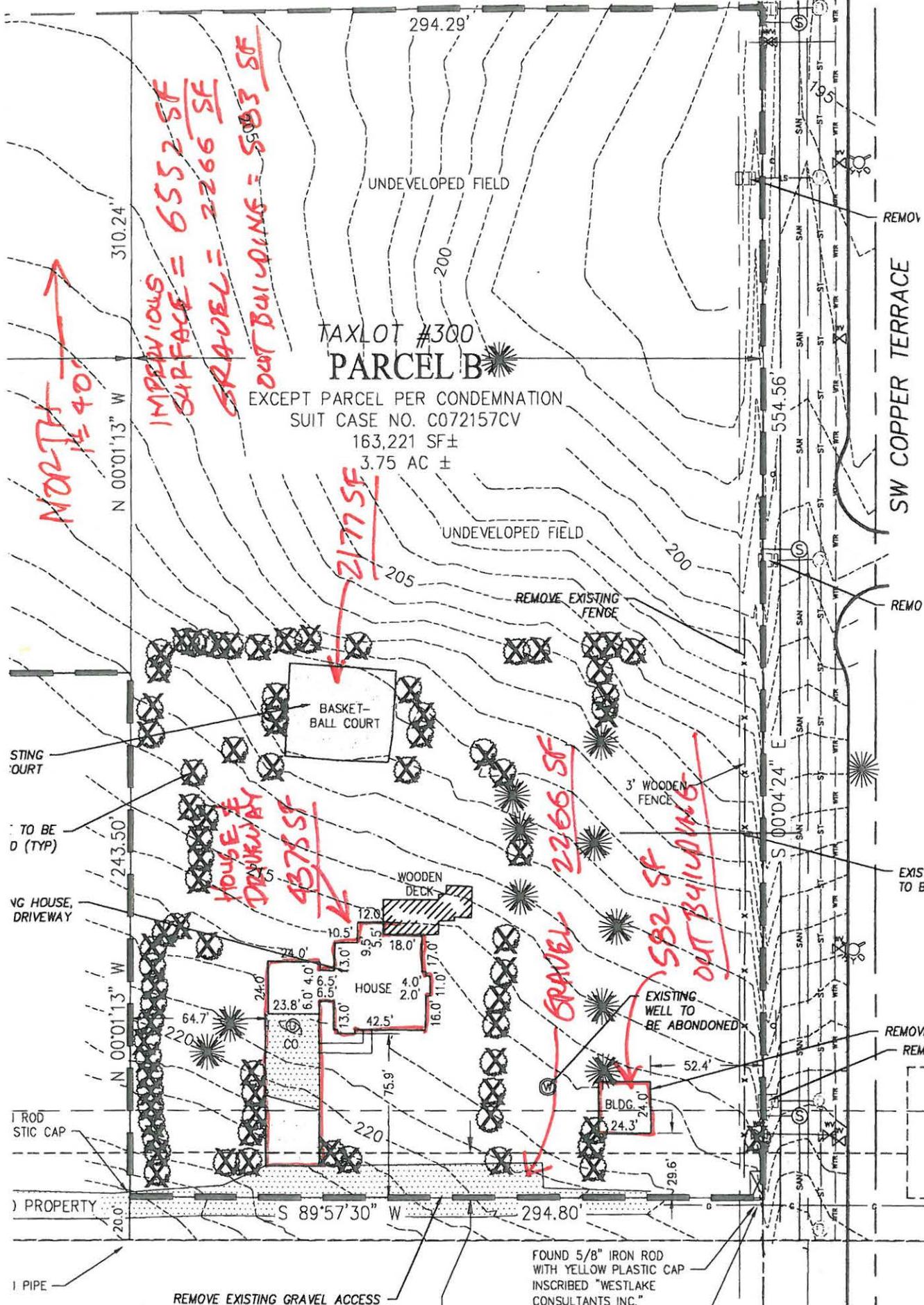
Marvin,

SHERWOOD

Attached is a new subdivision we are processing through the City of Tigard and the existing conditions map showing the existing impervious surface on the site. Sherwood city staff is requesting comments from CWS regarding treatment of storm water from the half street improvement along Elwert Road. We request exemption of water quality treatment for this half street improvement because 7,135 square feet of impervious surface and 2266 square feet of gravel surface will be removed from the site. The total new impervious surface from the half street improvement and the emergency access combined is 5,720 sf. Let me know if this is possible. Storm water from the Daybreak subdivision flows into a region water quality facility which is located north of this site on the west side of Copper Terrace.

Ryan O'Brien, DR Horton Entitlement Manager
4380 SW Macadam Avenue, Suite 100
Portland, Oregon 97239
503-502-7546 - cell 503-222-4151 ex. 1115 - off
1-866-840-0447 - fax
rmobrien@drhorton.com

EXHIBIT "Q"



TAXLOT #300
PARCEL B

EXCEPT PARCEL PER CONDEMNATION
 SUIT CASE NO. C072157CV
 163,221 SF±
 3.75 AC ±

NORTH
 1/4 40'

IMPERVIOUS SURFACE = 6552 SF
 GRAVEL = 2266 SF
 OUT BUILDING = 5003 SF

2177 SF

HOUSE DRIVWAY
 4375 SF

GRAVEL 2266 SF
 OUT BUILDING 582 SF

FOUND 5/8" IRON ROD WITH YELLOW PLASTIC CAP INSCRIBED "WESTLAKE CONSULTANTS INC."

POINT OF BEGINNING FOR EXCEPTION

REMOVE EXISTING GRAVEL ACCESS

1" = 40'

SUBJECT TO AN EASEMENT FOR ACCESS AND UTILITIES PER DEED DOCUMENT NO. 78-2035

REMOVE
 SW COPPER TERRACE

REMOVE

EXIST TO B

REMOVE
 REMOVE