BergerABAM

CRITICAL AREAS REPORT

Cowlitz Tribe Reservation Development and I-5/La Center Interchange Improvements

Prepared for
Cowlitz Indian Tribe
Longview, Washington

A13.0098.01

December 2015;
Revised January 2016

Critical Areas Report

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Prepared for

Cowlitz Indian Tribe
1055 9th Avenue
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CRITICAL AREAS REPORT
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1.0 INTRODUCTION

The Cowlitz Indian Tribe (the Tribe) is proposing to develop a casino-resort complex with associated parking facilities and a recreational vehicle park, and to pursue improvements to the Interstate 5 (I-5) interchange with NW La Center Road (I-5/La Center interchange improvements) adjacent to and within the city of La Center (City), Washington (Figure 1; all figures are included in Appendix A). The proposed Cowlitz Reservation Development is located on 151.87 acres of land along the west side of I-5. This acreage is held in trust by the U.S. Department of the Interior for the Tribe and is not a component of this application. The proposed I-5/La Center interchange improvements are located at milepost 16.8 on I-5 and cover approximately 78 acres on the east side of I-5. This acreage includes a Washington State Department of Transportation (WSDOT) right of way, a NW La Center Road right of way, portions of four tax lots adjacent to Paradise Park Road south of NW La Center Road, and four tax lots north of NW La Center Road up to NW 324th Street (Figure 2). The legal description of the project falls within portions of sections 4, 5, 8, and 9 of Township 04 North, Range 01 East, of the Willamette Meridian.

The project has been designed to minimize or avoid, to the greatest extent possible, impacts to critical areas within the jurisdiction of the City. This critical areas report documents the measures that the project has implemented to avoid and minimize impacts to critical areas within the City's jurisdiction; the report also documents the activities that are proposed as mitigation for impacts that are unavoidable for project elements within the City's jurisdiction. This critical areas report is being prepared and submitted as required by La Center Municipal Code (LCMC) 18.300 – Critical Areas.

1.1 Project Summary

The purpose of the Cowlitz Reservation Development is to improve the long-term economic vitality and self-governance of Tribal members through the creation of a source of employment and revenue. The I-5/La Center interchange improvements are needed to (1) implement the recommended mitigation to offset the traffic impacts that would occur as a result of the Cowlitz Reservation Development, and (2) allow the associated intersections to operate at acceptable levels of service. Only the portion of the project within the City is described below and shown by Figure 3.

The I-5/La Center interchange improvements will include the following components:

- The construction of a new overpass structure located immediately south of the existing structure; the new structure will accommodate four travel lanes and pedestrian and bicycle facilities.

- The modification of the existing northbound and southbound interchange ramp terminals to include multiple-lane roundabouts.
- A modified (lengthened) northbound off-ramp that includes a second exit lane.
- A modified southbound on-ramp that includes two receiving lanes off the ramp terminal that transition to a single lane prior to merging with I-5 mainline traffic.
- A partial relocation of Paradise Park Road and the development of a new intersection with NW La Center Road. This new intersection would be located approximately 450 feet (centerline to centerline) east of the northbound roundabout terminal to meet WSDOT guidelines for intersection spacing of 350 or more feet. The new intersection will operate as a two-way stop-control intersection in the near term and, with future development, will be converted to a roundabout or traffic signal. Additional improvements will be needed to portions of NW 324th Street, NW 31st Avenue, and NW Paradise Park Road to facilitate this relocation.
- The relocation of NW 319th Street approximately 350 feet south of the current alignment to accommodate the new overpass and provide an enhanced east-west circulation network that is more compatible with the Cowlitz Reservation Development.
- A partial relocation of NW 31st Avenue and the development of a new intersection with NW 319th Street. This new intersection would be located approximately 600 feet (centerline-to-centerline) west of the southbound roundabout terminal to meet WSDOT intersection spacing guidelines. The new intersection will operate as a roundabout to accommodate near-term and future development.

The proposed project will provide stormwater facilities to treat all newly created pollution-generating impervious surfaces (PGIS). The drainage associated with the casino site, the bridge overpass, and the NW La Center Road and City and Cowlitz County road modifications is being designed separately from the drainage associated with the ramp and highway improvements. This is due to the division of work between WSDOT facilities and facilities belonging to the trust, the City, and the County. Stormwater design for these components has been coordinated carefully because of their proximity and potential design conflicts.

- All new PGIS within the WSDOT right of way and City frontage road improvements will receive treatment and flow control that will meet the requirements of the 2014 Highway Runoff Manual. Enhanced treatment will be provided for all newly created impervious surface in the WSDOT right of way.
- All new PGIS created in the City by the frontage road improvements will receive treatment and flow control that meet the requirements of the Washington State Department of Ecology (Ecology) *2012 Stormwater Management Manual for Western Washington*.

- All new PGIS created by the frontage road improvements in the County will receive treatment and flow control that meet the requirements of Ecology's *2012 Stormwater Management Manual for Western Washington*.

Stormwater treatment for all newly created impervious surfaces in the City and County will be provided through Basic treatment with some small portions of Enhanced treatment. Stormwater treatment on the trust properties will also be provided through Basic treatment in accordance with County code requirements.

1.1.1 La Center Road

Approximately 500 linear feet of NW La Center Road will be realigned to tie into the new roundabout and overpass, east of the I-5 interchange, and to accommodate the new intersection with the realigned Paradise Park Road. The installation of approximately 11,838 square feet (0.27 acre) of new impervious surfaces and the removal of approximately 7,335 square feet (0.17 acre) of impervious surfaces will result in a net gain of approximately 4,503 square feet (0.10 acre) of impervious surfaces from the realignment of NW La Center Road.

1.1.2 Paradise Park Road

The proposed action will also relocate Paradise Park Road and develop a new intersection with NW La Center Road. To meet WSDOT guidelines for intersection spacing of 350 or more feet, this new intersection will be located approximately 450 feet (centerline to centerline) east of the northbound roundabout terminal. The new intersection will operate as a two-way stop-control intersection in the near term and, with eventual future development, will need to be converted to a roundabout or traffic signal. Moving the intersection to the east will result in the demolition of one single-family residential structure and three associated outbuildings. Demolition will involve jackhammers, excavators, loaders, and dump trucks to remove materials. Debris from the demolition will be taken to an approved upland disposal site.

A new alignment will be constructed for Paradise Park Road north of NW La Center Road. From the proposed intersection, Paradise Park Road will extend 950 feet north to NW 324th Street. It will then proceed 900 feet west and tie into the existing Paradise Park Road. The existing Paradise Park Road will be converted into a dead end north of NW La Center Road. Approximately 200 feet (7,750 square feet of impervious surface) of the existing road will be removed by the conversion to a dead end.

1.1.3 Temporary Highway Access Ramps

The interchange improvements project will require the installation of temporary northbound off- and southbound on-ramps for traffic control and staging during the construction of the new interchange. Both temporary ramps will occur within the City and WSDOT right of way. Upon completion, the temporary ramps will be removed and all applicable best management practices for erosion and sediment control will be employed. The disturbed areas will be landscaped in accordance with landscape plans approved by WSDOT. Treatment of runoff from the temporary access ramps during

construction is controlled under the jurisdiction of the Construction Stormwater General Permit authorized by Ecology, and all requirements of the permit will be met for the temporary facilities.

1.2 Critical Areas Report Methods

As part of developing this critical areas report, BergerABAM biologists and planners completed several site visits. Biologist Dustin Day, who prepared this critical areas report, is an Environmental Scientist and Professional Wetland Scientist with a Bachelor's in Biology and a Master's in Environmental Management. He has 15 years of experience conducting wetland delineations and habitat assessments, designing mitigation plans, and preparing technical documents.

Resources used during the critical areas investigation included:

- County GIS MapsOnline database
- StreamNet GIS online database
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) on the Web GIS online database
- U.S. Fish and Wildlife Service (USFWS) Wetland Mapper online GIS database
- U.S. Geological Survey (USGS), Ridgefield Quadrangle Topographic Map, USGS Denver Colorado, 1990

1.3 Regulated Activities and Required Permits

The project proposes development within critical areas and their associated buffers that are regulated under the critical areas protection section (Chapter 18.300) of the City of La Center code. The applicant is applying for a critical areas permit as part of the City of La Center application package.

The site contains critical aquifer recharge areas (CARAs) regulated under LCMC 18.300.090(1), fish and wildlife habitat conservation areas (LCMC 18.300.090(2)), geological hazard areas (i.e., landslide hazard areas) (LCMC 18.300.090(4)), and wetlands (LCMC 18.300.090(6)). Frequently flooded areas regulated under LCMC 18.300.090(3) and slopes with a gradient of 25 percent or greater, as regulated under LCMC 18.300.090(5), are not found within the area of the transportation improvements project.

1.4 Construction Schedule

The project is scheduled to begin construction in early 2016 and to be completed in mid-2017. The project components will occur with some overlap.

2.0 EXISTING CONDITIONS

The existing interchange is a diamond interchange with a two-lane structure over the freeway and stop-controlled access at the ramp terminals. Closely spaced frontage road intersections exist just outside each of the I-5 ramp terminals, posing access management

challenges to the operations of the interchange. From a functional standpoint, the existing interchange supports existing development within the City and surrounding rural areas. However, the interchange has been the subject of recent planning studies that examined the impacts of enhancing development opportunities along NW La Center Road on the east side of I-5 and NW 319th Street on its west side.

The current and past uses of the project site include agricultural, commercial, and residential with several areas not in use. The surrounding properties are used for single-family residential, agricultural, and commercial uses. The project is located within the East Fork Lewis River watershed.

Starting in January 2013 and ending in May 2014, the project team conducted a wetland delineation and assessment that identified several wetlands, two streams, and several ditch features within the project site (BergerABAM 2014). The City pre-application conference report (2015-003-PAC) dated November 16, 2015 states that "a wetland delineation consistent with City standards is required to be technically completed." Therefore, the wetland delineation and assessment and U.S. Army Corps of Engineers (USACE) Section 404 permit that verifies the wetland boundaries is included in Appendix B. The features identified within the City's jurisdiction are discussed below. The names of these wetlands include subscripts which refer to the geographic location of the wetland within the project site. An "E" subscript refers to wetlands delineated east of the trust property within the City. The delineation and assessments used the subscripts to be consistent with the nomenclature used in the documentation prepared for the 2007 National Environmental Protection Act (NEPA) environmental impact statement (EIS).

2.1 Wetlands

2.1.1 Wetland A_E

Wetland A_E is a palustrine emergent (PEM) wetland located within the WSDOT right of way, east of the northbound on-ramp. The southern portion of the wetland is a swale feature that follows the on-ramp and conveys water to the north. The northern portion has formed on a cut slope and was delineated using the 2012 WSDOT Guidance on Cut Slopes and Wetlands document (2012 WSDOT guidance document). This wetland is hydrologically influenced by precipitation/runoff and hillside seeps. Because of its long sloping nature, this wetland meets the hydrogeomorphic (HGM) classification of a slope wetland. The emergent wetland vegetation is dominated by tall false ryegrass (*Schedonorus arundinaceaus*, FAC), velvetgrass (*Holcus lanatus*, FAC), bird's-foot trefoil (*Lotus corniculatus*, FAC), and soft rush (*Juncus effusus*, FACW). Soils within Wetland A_E samples display hydric soil characteristics, which include grayish-brown (10YR 5/2) matrix color with dark yellowish-brown (10 YR 4/6) mottles starting within the upper 10 inches. This soil profile meets the description of a depleted matrix (indicator F3 in the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* [Version 2.0] [the regional supplement; USACE 2010]). Primary indicators of wetland hydrology include saturation (hydrology indicator

A3 in the regional supplement), a high water table (A2), and oxidized rhizospheres along living roots (C3).

2.1.2 Wetland B_E

Wetland B_E is a PEM wetland located south of NW La Center Road, in the eastern portion of tax lot 211230-000. The wetland is located within a sloped vegetated swale and meets the HGM classification for a sloped wetland. The emergent wetland vegetation is dominated by reed canarygrass (*Phalaris arundinacea,* FACW) and soft rush. Soils within Wetland B_E samples display hydric soil characteristics, which include very dark grayish-brown (10YR 3/2) matrix color with dark yellowish-brown (10 YR 3/4) mottles found entirely within or starting within the upper 10 inches (redox dark surface F6). Primary indicators of wetland hydrology include saturation (A3), geomorphic position (D2), and oxidized rhizospheres along living roots (C3).

2.1.3 Wetland C_E

Wetland C_E is a PEM wetland found in the northwestern corner of tax lot 211215000 and extends off site to the east. This wetland is hydrologically influenced by precipitation and a high groundwater table. Wetland C_E sits in a topographic depression environment and meets the HGM classification of a depressional wetland. The emergent wetland vegetation is dominated by tall false ryegrass, velvetgrass, Kentucky bluegrass (*Poa pratensis*, FAC), and colonial bentgrass (*Agrostis capillaris*, FAC). Soils within the wetland samples display hydric soil characteristics, which include dark grayish-brown (10YR 4/2) matrix color with dark brown (7.5 YR 3/4) mottles found entirely within or starting within the upper 10 inches (Depleted Matrix: Indicator F3). Primary indicators of wetland hydrology include saturation (A3), a high water table (A2), and oxidized rhizospheres along living roots (C3).

2.1.4 Wetland D_E

Wetland D_E is a PEM wetland located within the WSDOT right of way, east of the northbound lane, starting north of the existing overpass. Wetland D_E has also formed on a cut slope and was delineated using the 2012 WSDOT guidance document. This wetland also meets the HGM classification of a slope wetland. The emergent wetland vegetation is dominated by tall false ryegrass, velvetgrass, bird's-foot trefoil, cattails (*Typha latifolia,* FACW), and soft rush. Soils within Wetland D_E samples display hydric soil characteristics, which include very dark gray (10YR 3/1) matrix color with dark yellowish-brown (10 YR 4/6) mottles found entirely within or starting within the upper 10 inches (depleted matrix F3). Primary indicators of wetland hydrology include saturation (A3), a high water table (A2), and oxidized rhizospheres along living roots (C3).

2.1.5 Wetland E_E

Wetland E_E is a palustrine wetland with more than 30 percent cover of trees taller than 20 feet, meeting the Cowardin definition of a forested wetland (PFO). This wetland is located in the southwest corner of tax lot 211215000, south of Wetland C_E, and extends off site to the east. This wetland is hydrologically influenced by precipitation and a high

groundwater table. Wetland C_E sits in a topographic depression environment and meets the HGM classification of a depressional wetland. Forested wetland vegetation consists of balsam poplar with a shrub understory of Nootka rose (*Rosa nutkana*, FAC). The emergent wetland vegetation is dominated by tall false ryegrass, velvetgrass, Kentucky bluegrass, and colonial bentgrass. Soils within the wetland samples display hydric soil characteristics, which include dark gray (10 YR 4/1) matrix color with dark yellowish-brown (10 YR 4/6) mottles found entirely within or starting within the upper 10 inches (depleted matrix F3). Primary indicators of wetland hydrology include saturation (A3), a high water table (A2), and oxidized rhizospheres along living roots (C3).

2.1.6 Ditches

The numerous drainage ditches labeled wet ditch 2 and wet ditch 4 through wet ditch 13 in the City exhibit the three wetland characteristics needed to make a wetland determination. These drainage ditches are similar in structure, function, hydrology, and soil and vegetation composition, and as such are described and discussed as a group for purposes of this report. Drainage ditches within the study area are influenced by direct precipitation and stormwater runoff from the adjacent roads. These ditches were intentionally constructed adjacent to the existing roads to convey stormwater runoff. They meet the HGM classification of slope wetlands and PEM wetlands using the Cowardin classification. The dominant vegetation within the ditches varies but includes reed canarygrass, velvetgrass, tall false ryegrass, bird's-foot trefoil, and soft rush.

The soil profiles in the ditches contained dark grayish brown (10YR 4/2) soil colors with dark yellowish brown (10YR 4/6) redox concentrations as both soft masses and pore linings within the upper 12 inches of the soil, which meets the depleted matrix (F3) field indicator for hydric soils. Hydrologic indicators include oxidized rhizospheres along living roots (C3), geomorphic position (D2), and drainage patterns (B10).

2.2 Riparian – McCormick Creek Tributary

According to the Washington Department of Natural Resources (DNR) Forest Practices Application Review System GIS database, the McCormick Creek tributary within the project vicinity is a Type Np stream.[1] The stream is less than 5 feet wide on average and is located east of the project; the stream flows north, crosses under La Center Road, and heads northeast to its confluence with McCormick Creek. No impacts are proposed for the McCormick Creek tributary.

3.0 REGULATED CRITICAL AREAS

Based on a review of existing available information, project reports, and several site visits, the site contains four types of critical areas that are subject to regulation by the City. They include CARAs, fish and wildlife habitat conservation areas, geological hazard areas, and wetlands. Each type is addressed below. No frequently flooded areas or slopes greater than 25 percent are present on or near the limits of the proposed

[1] As defined under the water typing system discussed in WAC 222-16-030.

transportation improvements project and these critical areas are not addressed in this report.

3.1 Critical Aquifer Recharge Area

CARAs are defined in Section 18.300.090(1) of the LCMC as Category I Aquifer Recharge Areas (CARA I). Because of the exceptional susceptibility and/or vulnerability of ground waters underlying aquifer recharge areas to contamination, and the importance of such ground waters as sources of public water supply, LCMC Section 18.300.090(1) safeguards ground water resources by mitigating or precluding future discharges of contaminants from new land use activities. Clark County MapsOnline indicates the presence of a CARA I in the northeast quadrant of the existing intersection of NW Paradise Park Road and NW La Center Road (Figure 4). While a portion of the proposed interchange improvements project will occur within the CARA I, according to Section 18.300.090(1)(v), only the following uses are prohibited:

- Landfills
- Class V injection wells; agricultural drainage wells; untreated sewage waste disposal wells; cesspools; industrial process water and disposal wells; and radioactive waste disposal
- Radioactive disposal sites
- Surface mining operations

Therefore, the proposed interchange improvements are an allowed use and are not prohibited by City code. Furthermore, the proposed improvements include the capture and treatment of resulting stormwater and will not have any adverse impacts on groundwater.

The City pre-application conference report (2015-003-PAC) dated November 16, 2015 states that "the applicant is not proposing a prohibited use in a CARA 1 or to impact a CARA 2. Therefore, the City does not require critical areas review for CARA impacts." Critical Aquifer Recharge Areas are not discussed further in this report.

3.2 Fish and Wildlife Habitat Conservation Areas

Fish and wildlife habitat conservation areas are defined in Section 18.300.090(2) of the LCMC as follows:

- Riparian
- Endangered or Threatened
- Local Habitat Areas
- Priority Habitat Species Areas
- Buffers

3.2.1 Riparian

Riparian habitat areas are those areas immediately adjacent to waterways that contain elements of both aquatic and terrestrial ecosystems that mutually influence each other.

There are four seasonal non-fish bearing (Type Ns) tributaries to McCormick Creek mapped within and adjacent to the project area within the City (Clark County 2015) (Figure 5). However, a site investigations determined that the Type Ns stream mapped on Parcel No. 211230000 was mapped incorrectly and the actual headwaters to the stream occurs west of the project area, as shown in Figure 6. The headwaters were determined through visual observation of the stream water seeping from the ground and was surveyed through a professional land survey conducted by Olson Engineering, Inc., which is shown in Figure 6. The riparian buffer associated with the stream is described in section 3.2.5 below.

3.2.2 Endangered or Threatened

Endangered or threatened areas are defined as areas that have a primary association with federally listed endangered or threatened species of fish or wildlife, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term. As part of the NEPA process, the interchange improvements project was reviewed by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS), known as the Services, through the Section 7 Endangered Species Act (ESA) consultation process. As part of this process, a biological evaluation was prepared that detailed the project effects on ESA-listed species. This report determined that there are no ESA-listed species or suitable habitat within the project footprint and there would be no direct effect to endangered or threatened species or their habitat. The biological evaluation also analyzed the potential effects of increased impervious surfaces and the resulting stormwater on ESA-listed species. The results of this analysis found that resulting stormwater from new pollution-generating imperious surfaces would dilute to background level before reaching a stream that supported ESA-listed species. The Services concurred with the results of the biological evaluation and issued letters of concurrence (Appendix C).

3.2.3 Local Habitat Areas

According to LCMC 18.300.090(2)(a)(iii), local habitat areas include:

- **Species of local importance** – those species that are of local concern because of their population status or their sensitivity to habitat manipulation or that are game species.
- **Habitats of local importance** – a seasonal range or habitat element with which a given species has a primary association, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term. These habitats might include areas of high relative density or species richness, breeding habitat, winter range, and movement corridors. They might also include habitats that are of limited availability or high vulnerability to alteration, such as cliffs, talus, and wetlands.
- **Local habitat areas** – areas specifically identified as local habitat areas on the City's adopted critical areas map and the background maps used to prepare the critical areas map.

There are no known local habitats that occur within the project area.

3.2.4 Priority Habitat and Species Areas

WDFW recognizes priority habitats as having unique or significant value to many species, and that priority species, such as particular fish and wildlife species, require protective measures and/or management guidelines to ensure their perpetuation (Knutson and Naef 1997). A review of WDFW's PHS on the Web (http://wdfw.wa.gov/mapping/phs/) indicates that no priority areas or species are mapped as occurring within the site.

3.2.5 Buffers and Habitat Buffers

The critical lands ordinance specifies buffers for PHS (LCMC 18.300.090(1)(a)(v)) as well as fish and wildlife habitat conservation areas (LCMC 18.300.090(2)(f)). The McCormick Creek tributary, a Type Ns stream, is mapped within the project site (Figure 5). However, the site investigations determined that the stream headwaters occur off site to the west, as shown in Figure 6. As mentioned above, the headwaters were determined through visual observation of water seeping from the ground and forming a stream channel. The headwaters were surveyed and area shown in figures 6 and 9.

LCMC 18.300.090(2)(f) designates minimum riparian buffer widths for stream types in accordance with the DNR Stream Typing System. The Type Ns stream is protected by a 75-foot buffer riparian buffer (Figure 6). This base riparian buffer is dominated by sloping, agricultural hillsides adjacent to the project.

No project activities are proposed to occur below the ordinary high water mark of the McCormick Creek tributary or within the 75-foot riparian buffer (figures 6 and 9). Clearing, grading, and filling activities will not occur within 15 feet of the buffer setback and no native vegetation within the buffer will be damaged. Therefore, the proposed project will not affect any fish and wildlife habitat conservation area or buffer.

The City pre-application conference report (2015-003-PAC) dated November 16, 2015 states that "if the applicant can demonstrates that project activities and soil disturbance will occur outside the riparian buffer, then critical area review for riparian habitat is not required." Based on the evidence provided above and shown in figures 6 and 9, no project activities or soils disturbance will occur to the riparian buffers and fish and wildlife habitat conservation areas are not discussed further within this report.

3.3 Geologic Hazard Areas

Within the category of geologic hazard areas, the critical areas ordinance (LCMC 18.300.090(4)) designates erosion hazard areas, landslide hazard areas, and seismic hazard areas. Portions of the project corridor are mapped as landslide hazard and seismic hazard areas by the County GIS database (Clark County 2015).

According to the landslide hazard areas section of LCMC 18.300.090(4)(b), landslide hazard areas are areas potentially subject to risk of mass movement due to a

combination of geologic, topographic, and hydrologic factors. The County GIS database indicates the presence of areas of potential instability within the WSDOT right of way and north of NW La Center Road, at the east end of the project (Figure 7).

According to the seismic hazard areas section of LCMC 18.300.090(4)(c), seismic hazard areas are subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, or soil liquefaction. The County GIS database indicates the presence of liquefaction (mapped very low to low) and ground shaking amplification (mapped NEHRP class C) within project boundary.[2] Site class C represents increasingly soft soil conditions, which result in the progressively increasing amplification of ground shaking.

LCMC 18.300.090(4)(d) prohibits development on lands classified as "erosion hazards," "landslide hazards," or "seismic hazards" unless the applicant provides a report prepared and signed by a licensed engineer who specializes in geotechnical engineering, which provides construction methodologies based upon best available science, and quality assurances that the site can be developed without significant risk to public safety. CH2M HILL has prepared several geotechnical reports that provide information concerning existing geologic conditions and construction methodologies for the project. These reports are included as Appendix D. Based on these reports, the proposed project will not result in a loss of geological hazardous areas. According to the City pre-application conference report and no loss of geological hazardous areas, critical rea review for geologically hazardous areas is not required and is not discussed further in this report (La Center 2015).

3.4 Wetlands

According to LCMC 18.300.030(78), wetlands are areas identified in accordance with the *Washington State Wetlands Identification and Delineation Manual* (1997, or as revised by Ecology). However, to maintain consistency between state and federal wetland delineations, Ecology has replaced the manual (WAC 173-22-080) with a revision (WAC 173-22-035) that states delineations should be done according to the currently approved federal manual and supplements.

LCMC 18.300.030(76) defines regulated wetlands as:

> *... areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands*

[2] NEHRP=National Earthquake Hazards Reduction Program

created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from non-wetland areas created to mitigate conversion of wetlands.

As discussed in section 2.1, a wetland delineation conducted in accordance with the regional supplement identified five wetlands and several drainage ditches within the City's jurisdiction, as shown in Figure 8 (USACE 2010; BergerABAM 2014). All five wetlands contained wetland characteristics and would be regulated by the City. However, as stated in the definition above, wetlands do not include wetlands artificially created from non-wetland sites; these include, but are not limited to, drainage ditches, grass-lined swales, and detention facilities. The drainage ditches are artificial wetlands intentionally created from upland (e.g., Gee silt loam soils). Based on this definition, the drainage ditches would not be regulated by the City.

In accordance with LCMC 18.300.090(6)(g), wetlands were rated according to the Ecology wetland rating system found in 2014 update to the *Washington State Wetlands Rating System for Western Washington*, publication number 14-06-029 (Hruby 2014). Wetland categories were assigned to each wetland based on the rating form and LCMC 18.300.090(6)(g)(iv).

3.5 Wetland Buffers

BergerABAM assigned buffer widths to wetlands based on LCMC 18.300.090(6)(h). The widths are based on the wetland category, its wetland characteristics, and the project's land use intensity. The LCMC does not specifically identify utility land uses as low, moderate or high, but defers to *Wetlands in Washington State – Volume 2: Guidance for Protecting and Managing Wetlands*. According to Table 8C-3 in Appendix 8-C of this Ecology document, transportation uses are classified as a high intensity land use impact (Granger et al. 2005). Therefore, the high intensity buffer width was assigned to wetlands within the City. Table 1 summarizes the character, category, and buffer width of wetlands identified within the City portion of the interchange improvement project.

Table 1. Summary of Wetlands within La Center Portion of the Interchange Improvements Project

Wetland	Wetland Classification				Base Buffer Width (ft)
	Cowardin	HGM	Wetland Rating	Jurisdiction	
Wetland A_E	PEMC	Slope	IV	USACE, Ecology, & City	50
Wetland B_E	PEMC	Slope	IV	USACE, Ecology, & City	50
Wetland C_E	PEMC	Depressional	IV	USACE, Ecology, & City	50
Wetland D_E	PEMC	Slope	IV	Ecology & City	50
Wetland E_E	PFOC	Slope	IV	USACE, Ecology, & City	50

4.0 WETLAND BUFFER REDUCTION ACTIVITIES

This section discusses the ability to reduce buffer widths based on applicable City code.

4.1 Functionally Isolated Buffers

LCMC 18.300.090(6)(i) states that areas which are functionally separated from a wetland and do not protect the wetland from adverse impacts due to pre-existing roads, structures, or vertical separation shall be excluded from buffers otherwise required by this chapter.

The buffers adjacent to portions of wetlands A_E and D_E are functionally isolated by the existing I-5 northbound on-ramp and to Wetland D_E from north bound I-5. The western portion of the wetland buffer of Wetland E_E is also functionally isolated due to the existing impervious surface of NW Paradise Park Road.

4.2 Low Impact Development

LCMC 18.300.090(6)(i)(vi) Low Impact Development states that if the development of the site has a low impact upon the critical area, the applicant may reduce the buffer width. Specifically, LCMC 18.300.090(6)(i)(vi)(B) allows for the reduction of high land use intensity buffers (i.e. 50 feet) to moderate land use intensity buffers (i.e., 40 feet) for implementation of stormwater treatment measures that exceed adopted city standards. For example, the code states that stormwater facilities designed to the Western Washington Manual rather than the Puget Sound Manual would meet the criteria for low impact development. This could include measures such as pretreatment or tertiary treatment of runoff and limiting discharge from the site to predevelopment runoff flow and volume.

The proposed stormwater treatment for collecting and treating stormwater resulting from the proposed surface streets has been designed in accordance with the Western Washington Manual. Therefore, the buffer reductions to wetlands B_E, C_E, and E_E have been reduced from 50 feet to 40 feet. Reduced wetland buffer widths are shown in Figure 9.

Additionally, the proposed stormwater treatment within the WSDOT right-of-way has been designed in accordance with the WSDOT Highway Runoff Manual and would meet the criteria for low impact development, effectively reducing the buffers of wetlands A_E and D_E.

5.0 CRITICAL AREA IMPACTS

This section of the report assesses the potential for the project to affect the functions and/or values of the critical areas identified in section 3.0. There are no frequently flooded areas or slopes with a gradient of 25 percent or greater within the project corridor and, therefore, they are not discussed below. As discussed in section 3.1, the proposed interchange improvements are an allowed use and the proposed

improvements include the capture and treatment of resulting stormwater and will not have any adverse impacts on groundwater, so this critical aquifer recharge areas are not discussed further. Additionally, section 3.2 states that the project will not impact any fish and wildlife habitat conservation area, so this topic is not discussed further.

The proposed project has been designed to avoid permanent impacts to wetlands A_E, B_E, C_E, D_E, and E_E to the greatest extent practicable. However, the project will include approximately 2,315 square feet of buffer impacts to the buffers of wetlands C_E and E_E resulting from the realignment of NW Paradise Park Road (Figure 9). LCMC 18.300.090(6)(e)(iii) allows the disturbance of Category III and IV wetlands or wetland buffers for public purposes if the disturbance directly advances the provision of infrastructure facilities and services. Public purposes include streets, potable water, sanitary sewer, stormwater facilities, schools, and utilities. The LCMC also stipulates that impacts should first be minimized and that mitigation must be conducted for any unavoidable impact to functions. The proposed road advances the provision of infrastructure facilities and minimizes impacts to buffers by only impacting the outer edge of the reduced buffer.

6.0 TEMPORARY WETLAND AND WETLAND BUFFER IMPACTS

The interchange improvements project will require the installation of temporary northbound off- and southbound on-ramps for traffic control and staging during the construction of the new interchange. Both temporary ramps will occur within the City and WSDOT right of way. The proposed temporary highway access ramps will temporarily impact approximately 0.03 acre of Wetland D_E located adjacent to I-5, as well as, approximately 0.3 acre of Wetland D_E buffer (Figure 10). Upon completion, the temporary ramps will be removed, the wetland and wetland buffer will be restored to original contours and conditions, and all applicable best management practices for erosion and sediment control will be employed. Finally, the disturbed areas will be seeded with a native seed mixture (Table 2) and landscaped in accordance with landscape plans approved by WSDOT. The native mixture will rehabilitate the wetland and wetland buffer from a non-native grass/herbaceous vegetative cover to a native cover, providing an overall increase in wetland functions.

The project will also result in approximately 29 square feet of temporary impacts to the Wetland B_E buffer from the level spreader installation. Upon completion, the wetland buffer will be restored to original contours and conditions, and the disturbed areas will be seeded with a native seed mixture shown in Table 2. The native mixture will rehabilitate the wetland buffer from a non-native grass/herbaceous vegetative cover to a native cover, providing an overall increase in wetland functions.

Other portions of the wetland buffers in the project area may be disturbed temporarily by construction activities, but will be restored to their original contours and conditions as discussed. No other temporary wetland impacts are anticipated.

Table 2. Native Swale Seed Mixture

Seed Mix Ingredients	Percentage	Application Rate
Blue wildrye (*Elymus glaucus*)	50	1 lb/1,000 sq ft
Native red fescue *(Festuca rubra rubra)*	15	
Meadow barley *(Hordeum brahyantherum)*	10	
Western mannagrass *(Glyceria occidentallis)*	10	
American sloughgrass *(Beckmannia syzigachne)*	10	
Tufted hairgrass *(Deschampsia caespitosa)*	5	

Because the temporary impacts will be restored to original contours and conditions, and because the proposed seeding of the disturbed areas will rehabilitate the wetland and wetland buffer from a non-native grass/herbaceous vegetative cover to a native cover, providing an overall increase in wetland functions no additional wetland and/or wetland buffer mitigation is proposed for the temporary impacts.

7.0 COMPLIANCE WITH DEVELOPMENT STANDARDS

The following paragraphs discuss how the interchange improvements project complies with the applicable review criteria for wetland areas consistent with subtitle 18.300.110 subsections (1) through (4) of the LCMC. Specifically, the applicable standards of subsection (2) are addressed below. Within critical areas, the city shall prohibit soil excavation, grading, removal of native vegetation species, draining, intentional burning, planting of invasive or nuisance vegetation, placement of structures and new construction on critical areas unless otherwise authorized in this chapter.

7.1 Avoid Impacts – LCMC 18.300.110(2)(a)

Project proponents are counseled to first avoid impacts to critical areas that may degrade their functions and values (LCMC 18.300.110(2)(a)). Avoidance may include siting developments away from critical areas or redesigning the proposal. This project has been designed to avoid impacts to critical areas to the greatest extent practicable as the sections that follow demonstrate.

In addition, as discussed above, the design avoids direct permanent impacts to all of the wetlands within the City's jurisdiction, and impacts to wetland buffers impacts have been avoided to the greatest extent practicable, limiting impacts to one wetland buffer that has been previously disturbed for the construction of the existing NW Paradise Park Road.

7.2 Minimize Impacts – LCMC 18.300.110(2)(a)

LCMC 18.300.110(2)(a) further states that if avoidance is not practicable, development must minimize adverse impacts to critical areas and buffers consistent with the mitigation sequencing measures and mitigation and enhancement measures prescribed

in the chapter. The design avoids direct permanent impacts to all wetlands, but avoidance of wetland buffers entirely was not feasible given the location of critical areas throughout the project corridor. The design of the project further minimizes the impacts of the project to the greatest extent practicable by utilizing low impact development and includes a comprehensive set of best management practices (BMPs) that will prevent incidental impacts to the sensitive areas on the site during construction and by mitigating for the loss of functions.

7.2.1 Temporary Impact Minimization Measures

As described in Section 6.0, the project will result in 1,100 square feet (0.03 acre) temporary wetland and 7,000-square feet (0.3 acre) of temporary wetland buffer impacts to Wetlands D_E from the installation of temporary highway loop access ramps during construction of the new interchange. The project will also result in 29 square feet of temporary impacts to the Wetland B_E buffer from the level spreader installation. To minimize impacts, these areas will be identified with high visibility fencing when possible and, where areas cannot be fenced, they will be restored by maintaining their existing contours and conditions and by reseeding them with the native seed mixture shown in Table 2. The native mixture will rehabilitate the wetland from a non-native grass/herbaceous vegetative cover to a native cover, providing an overall increase in wetland functions.

7.2.2 Construction Minimization Measures

The project also includes the following typical construction BMPs for working near water and wetlands. These BMPs include activities such as:

- Checking equipment for leaks and other problems that could result in the discharge of petroleum-based products or other material into wetlands or waters.
- Taking corrective actions in the event of any discharge of oil, fuel, or chemicals into the water, including:
  - In the event of a spill, beginning containment and cleanup efforts immediately and completing them expeditiously according to all local, state, and federal regulations, and ensuring they take precedence over ordinary work. Cleanup will include proper disposal of any spilled material and used cleanup material.
  - Ascertaining the cause of the spill and taking appropriate action to prevent further incidents or environmental damage.
  - Reporting spills to Ecology's Southwest Regional Spill Response Office at 360-407-6300.
- Preventing the disposal or abandonment of excess or waste materials into wetlands or allowing these materials to enter waters of the state.
- Disposing of waste materials in an appropriate landfill.

- Keeping oil-absorbent materials present on site for use in the event of a spill or if any oil product is observed in wetlands or waters.

7.3 Vegetation Removal – LCMC 18.300.110(2)(b)

For the lands subject to this chapter, construction will occur within the wetland buffer that has been disturbed in the past from the construction of NW Paradise Park Road. The vegetation within this buffer is limited to mostly non-native herbaceous species and limited native grasses and rushes. No woody native trees or shrubs will be removed.

7.4 Impacts Fully Mitigated – LCMC 18.300.110(2)(c)

As described in section 6.1 and 6.2 the project has avoided and minimized the impacts to critical areas and critical area buffers to the greatest extent practicable. Unavoidable wetland buffer impacts will be fully mitigated in accordance with LCMC 18.300.120 and is detailed below in Section 7.0 – Mitigation Plan.

7.5 Cut and Fill Minimization – LCMC 18.300.110(2)(d)

The proposed plan minimizes cut and fill activities and is only required where needed to obtain appropriate grades needed to develop the road system in accordance with the road standards of LCMC Chapter 12 – Streets, Sidewalks, and Public Ways.

7.6 Rainy Season Construction – LCMC 18.300.110(2)(e)

This development standard limits construction activities to the dry season (May 1st through October 31st). The applicant would like to construct the project starting in early 2016 during the rainy season. The City pre-application conference report (2015-003-PAC) dated November 16, 2015 states that "the applicant may provide clear and convincing evidence as to why a variance is not necessary." The only portion of the project that includes lands subject to this chapter is limited to the 2,315 square feet of wetland buffer impacted from the realignment of NW Paradise Park Road. This is a disproportionately small portion of the overall 78-acre interchange project.

Additionally, the minor work within critical areas is located within existing or proposed public right-of-way and would be subject to Section 12.10.070, which also limits construction to the dry season. However, the pre-application report indicates that this requirement is being waived provided contingencies are in place before construction begins. The awarded contractor is developing a contingency plan that will be submitted to the City prior to construction.

The applicant has also developed a series of construction BMPs specific to this location that includes but is not limited to (not in any particular order):

- Construction phasing/scheduling to minimize the quantity of disturbed area open at any time.
- Identification of construction limits (high visibility fencing)
- Erosion control fence/silt fence
- Nets and Blankets

- Biodegradable check dams
- Channel protection
- Straw wattles
- Early application of rock in areas to be paved
- Stabilized construction entrance
- Stabilized parking and access roads
- Sediment trap or pond where practical
- Mulch
- Temporary seeding
- Materials on Hand
- Storm Drain Inlet Protection
- Plastic Covering
- Surface Roughening
- Outlet protection

There also will be full time inspectors monitoring the erosion control and construction activity to prevent any impacts during the wet season, which can request additional mitigation measures from the contractor if necessary.

The intent of the rainy season restriction is to eliminate any water quality issues associated with construction that may impact downstream receiving waters. With the BMPs designed specifically for this site and the full time inspectors that will ensure proper working order of the BMPs, the potential for water quality impacts to critical areas is minimal. The variance will not change the design of the project and would not result in a different project, the only difference is that it would occur at a different time of year. The timing restriction on 0.07 percent of the entire project puts a burden on the overall project because these impacts are associated with key elements of the overall project that need to be completed to be able to fulfill stormwater release requirements and to limit traffic detour patterns that could negatively affect traffic flow patterns. Based on this information, it is apparent that a variance is not necessary and the timing restriction should be waived as with Section 12.10.070 with contingencies.

7.7 Review and Approval of Appropriate Plans – LCMC 18.300.110(2)(f)

The City has or will review and approve the erosion control plans, grading plans, and vegetation removal and landscaping plans prior to construction activities.

7.8 Applicable State and Federal Permits – LCMC 18.300.110(2)(g)

The proposed project has received a Section 404 permit from the USACE, which pre-authorized the Section 401 water quality certification. The project has adopted the NEPA decision as part of the SEPA process.

7.9 Hydraulic Permits – LCMC 18.300.110(2)(h)

The project does not include work within, over, or under any state-regulated streams and no hydraulic permit approval is required.

7.10 Compliance with State and Federal Standards – LCMC 18.300.110(2)(i)

The applicant has demonstrated compliance with state and federal environmental standards as mentioned above and has fulfilled this development standard.

8.0 MITIGATION PLAN

8.1 Mitigation Goal

The overall goal of this plan is to ensure no net loss of critical area functions and values and to satisfy the regulatory requirements of the City (i.e., LCMC 18.300.110(2)(c) and LCMC 18.300.120).

8.2 Critical Areas Mitigation Measures

LCMC 18.300.110(2)(c) specifies that all adverse impacts to affected critical areas and buffers are either avoided or fully mitigated. For the proposed project, 0.05 acre (2,315 square feet) of wetland buffers will be permanently impacted by the construction of the NW Paradise Park Road realignment. The impacts to wetlands C_E and E_E buffers will occur within the proposed City right-of-way and the applicant does not own the right-of-way or the land adjacent to the impact. Therefore, on-site buffer enhancements and buffer averaging are not feasible in accordance with LCMC 18.300.120(2)(c)(i).

LCMC 18.300.120(2)(c)(ii) states that "where the applicant can demonstrate that an off-site location is in the same drainage basin, and that greater biological and hydrological values will be achieved, the city may approve such off-site mitigation." The code requires off-site mitigation to be within the same drainage basin, however the City code does not define what constitutes a basin. The code does rely on best available science (LCMC 18.300.100). The United States Geological Survey (USGS) defines a drainage basin as "a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water." The Washington Administrative Code (WAC) or Revised Code of Washington (RCW) do not define a basin specifically, but in chapter 173-500 of the WAC, the state of Washington identifies 62 water resource inventories (WRIA) that cover the entire state of Washington. One of the 62 WRIAs is the Lewis River watershed, which includes the East Fork Lewis River, McCormick Creek, and the project site. The WAC and USGS definition would indicate that that a basin is comprised of a larger drainage system, not the smaller subbasins and the proposed use of the mitigation bank would occur within the same basin. Furthermore, the definition of a "service area" as defined by the WACs for mitigation banks is defined as "the designated geographic area in which a bank can reasonably be expected to provide appropriate compensation for unavoidable impacts (WAC 173-700-104)." The service area as determined by Ecology, USACE, and the Environmental Protection Agency for the East Fork Lewis River mitigation bank includes McCormick Creek. Therefore, it is reasonable to assume that the use of the East Fork Lewis River Mitigation Bank would be within the same basin.

The permanent impacts to the wetland buffer will result in a loss of water quality functions. The existing vegetation consists mostly of a dense stand of grass species. These communities slow the downhill movement of water from precipitation events and provide limited nutrient uptake functions (biological functions). The portion of the bank that has been released by the governing agencies for the sale of buffer credits has been planted with native trees and shrubs and been maintained and monitored for at least a full year if not longer. The biological value of the bank credits have had at least a year to become established and provide greater biological functions to the ecosystem than that of the project area. Hydrologically, the bank sits within the Fargher Lake area, which was once a peat bog and still serves as a water storage area. This area displays greater hydrologic value than the project site, which is sloped and cannot store precipitation. Therefore, the bank provides greater biological and hydrological values than could be achieved at the project site.

To compensate for the loss of wetland buffer functions, the applicant proposes to purchase credits from the agency-approved East Fork Lewis River Mitigation Bank (bank). The applicant proposes to purchase 0.01 acre (0.2:1 ratio) of buffer credit from the bank. Typically, the mitigation ratio is recommended by the habitat bank and approved by the local jurisdiction on a case-by-case basis. Because the same ratio has been proposed in the past for similar critical area buffer mitigation projects, it was proposed for this project. Table 3 shows the buffer mitigation bank credit calculations.

Table 3. Buffer Mitigation Bank Credits Proposed for Use by Project

Critical Area	Permanent Impacts (acres)	Ecology Wetland Rating	Credit Needed per Buffer Impact Acre	Credits Proposed for Use
Wetland C_E Buffer	0.002	IV	0.2	0.0004
Wetland E_E Buffer	0.05	IV	0.2	0.01
Total	**0.052**			**0.0104**

8.3 Objectives and Performance Standards

Performance standards are a basis for evaluating whether the project's goals and objectives are being met. This plan establishes the following objective and performance standard as the basis for evaluating mitigation compliance and success.

Objective No. 1. Replace lost critical area functions upon completion of the interchange improvements (mid- to late 2017).

> **Performance Standard No. 1.** Purchase 0.01 acre of credits from the East Fork Lewis River Mitigation Bank and provide documentation to the permitting agencies.

8.4 Monitoring Program

LCMC 18.300.120(1)(f) requires a monitoring program for the construction of the mitigation project and for assessing a completed project. However, because the project will be using the bank to compensate for critical area buffer impacts, the applicant will not be responsible for implementing a mitigation project. The bank owner will be responsible for conducting and reporting the annual monitoring that is intended to measure the success of the bank. Therefore, no monitoring program is proposed for this project.

8.5 No Net Loss

LCMC 18.300.120(2) requires that projects protect the critical area's functions and values and result in no net loss of critical area functions and values. No net loss of critical area functions and values will occur, because project activities have avoided, minimized, and mitigated proposed impacts. The project has avoided direct, permanent impacts to all of the on-site wetlands. The project has minimized impacts to the greatest extent practicable, and will mitigate for permanent critical area buffer impacts by purchasing credits at an agency-approved mitigation bank. The credits purchased from the bank provide habitat, water quality, and hydrologic functions that will replace the functions lost from the proposed stormwater facilities associated with interchange improvements. Based on these measures, the project will not result in a net loss in critical area functions and values.

LCMC 18.300.120(2)(C)(i) states that wherever possible, replacement or enhancement should occur on site. However, LCMC 18.300.120(2)(C)(ii) states that, where the applicant can demonstrate that an off-site location is in the same drainage basin, and that greater biological and hydrological values will be achieved, the City may approve off-site mitigation. As mentioned previously, the bank proposed for use is in the same drainage basin (i.e., East Fork Lewis River) and would provide greater biological and hydrological values. The portion of the bank that has been released by the governing agencies for the sale of buffer credits has been planted with native trees and shrubs and been maintained and monitored for at least a full year, and is improving hydrologic and habitat functions. The biological value of the bank credits have had at least a year to become established and provide biological functions to the ecosystem. The mitigation bank provides a greater biological value than that of the project area, given its size, species diversity, and position in the landscape. Hydrologically, the bank sits within the Fargher Lake area, which provides greater hydrologic value than the project site, which is sloped and cannot store precipitation.

8.6 Specific Wetland Critical Area Development Standards

This section addresses the performance standards specific to wetlands that have not been addressed above.

8.6.1 Approved Mitigation Plan

LCMC 18.300.090(6)(j)(i) states that any development proposal that impacts a wetland or wetland buffer will not be allowed without an approved mitigation or enhancement plan consistent with LCMC 18.300.120 and the mitigation sequencing preference. This critical areas report has been prepared to address the mitigation requirements and the mitigation sequencing preference.

8.6.2 Wetland Approval Criteria

LCMC 18.300.090(6)(j)(ii) states that the City will not approve a development proposal that impacts wetlands or wetland buffers without a finding that:

(A) The proposed activity shall not cause significant degradation of ground water or surface water quality or fish and wildlife habitat.

The proposed activity will collect and detain resulting stormwater in accordance with an approved stormwater manual, which will ensure that there is no significant degradation of ground water or surface water quality. Additionally, no fish and wildlife habitat will be impacted directly by the proposed interchange improvements.

(B) The proposed activity shall comply with all state, local and federal laws, including those related to sediment control, pollution control, floodplain restrictions, stormwater management, and on-site wastewater disposal.

The proposed interchange improvements will receive approval from the USACE in accordance with Section 404 of the Clean Water Act, Section 401 water quality certification from Ecology, and City approval for stormwater management and sediment and pollution control. The project includes no floodplain restrictions or any on-site wastewater disposal.

(C) Wetland and wetland buffer impacts shall be avoided or substantially minimized consistent with the mitigation sequencing criteria.

The project design avoids wetland impacts completely; it avoids wetland buffer impacts to the greatest extent practicable, and minimizes them substantially, consistent with the mitigation sequencing criteria described in sections 7.1 through 8.5.

8.7 Wetland Marking Standards

The following marking standards for wetlands will be adhered to in accordance with LCMC 18.300.090(6)(f).

8.7.1 Marking Buffer during Construction

The location of the outer extent of the wetland buffer will be marked in the field and the markings will be maintained throughout the duration of the permit.

8.7.2 Permanent Marking of Buffer Area

A permanent physical demarcation along the upland boundary of the wetland buffer area of Wetland B_E will be installed and maintained thereafter. The demarcation may consist of logs, a tree or hedgerow, fencing, or other prominent physical marking approved by the hearings examiner. In this instance, the applicant proposes to use the stormwater detention facility as the permanent physical demarcation that will protect Wetland B_E from future development to the west.

In addition, small signs will be posted at an interval of one per lot and permanently maintained at locations along the outer perimeter of the wetland buffer worded substantially as follows: "Wetland and Buffer – Please Retain in a Natural State."

9.0 CONCLUSIONS

This report documents the presence of four regulated critical areas within the project corridor—CARAs, fish and wildlife habitat conservation areas, geologic hazard areas, and wetland areas—and evaluates the project against adopted standards for development.

This report indicates that there will be no impact to CARAs or fish and wildlife habitat conservation areas and activities within geologic hazard areas will be completed in accordance with a report submitted by an engineer licensed in Washington and specializing in geotechnical engineering.

This report indicates that wetland areas within the project include wetlands A_E, B_E, C_E, D_E, and E_E, as well as the wetland buffers associated with them. According to the critical areas ordinance, the construction of roads and stormwater facilities within wetland buffers [LCMC 18.300.090(6)(e)(iii)] is an allowed use, provided that impacts are minimized and that mitigation is conducted for any unavoidable impacts to functions.

Based on the avoidance and minimization activities and the proposed mitigation measures described above, the proposed interchange improvements project satisfies LCMC 18.300. The project will effectively result in no net loss of critical area buffer functions and values.

The permanent impacts to the degraded critical area buffers can be mitigated successfully by purchasing 0.01 credits from the agency-approved mitigation bank. The use of the bank to compensate for critical area buffer impacts is supported by the following facts developed by the bank:

1. The restoration of the aquatic resources, uplands, and their corresponding buffers is protected in perpetuity through the establishment of a conservation easement and long-term management fund, and credits are released only when required performance standards are met.

2. The location of the bank site and extent of the bank's service area represent a watershed approach to implementing mitigation.

3. According to the bank sponsors, one credit from the bank represents the restoration of approximately 2.87 acres of wetlands, associated uplands, and buffer habitat at the bank (2.87:1 ratio), resulting in no net loss of functions and values.

10.0 REFERENCES

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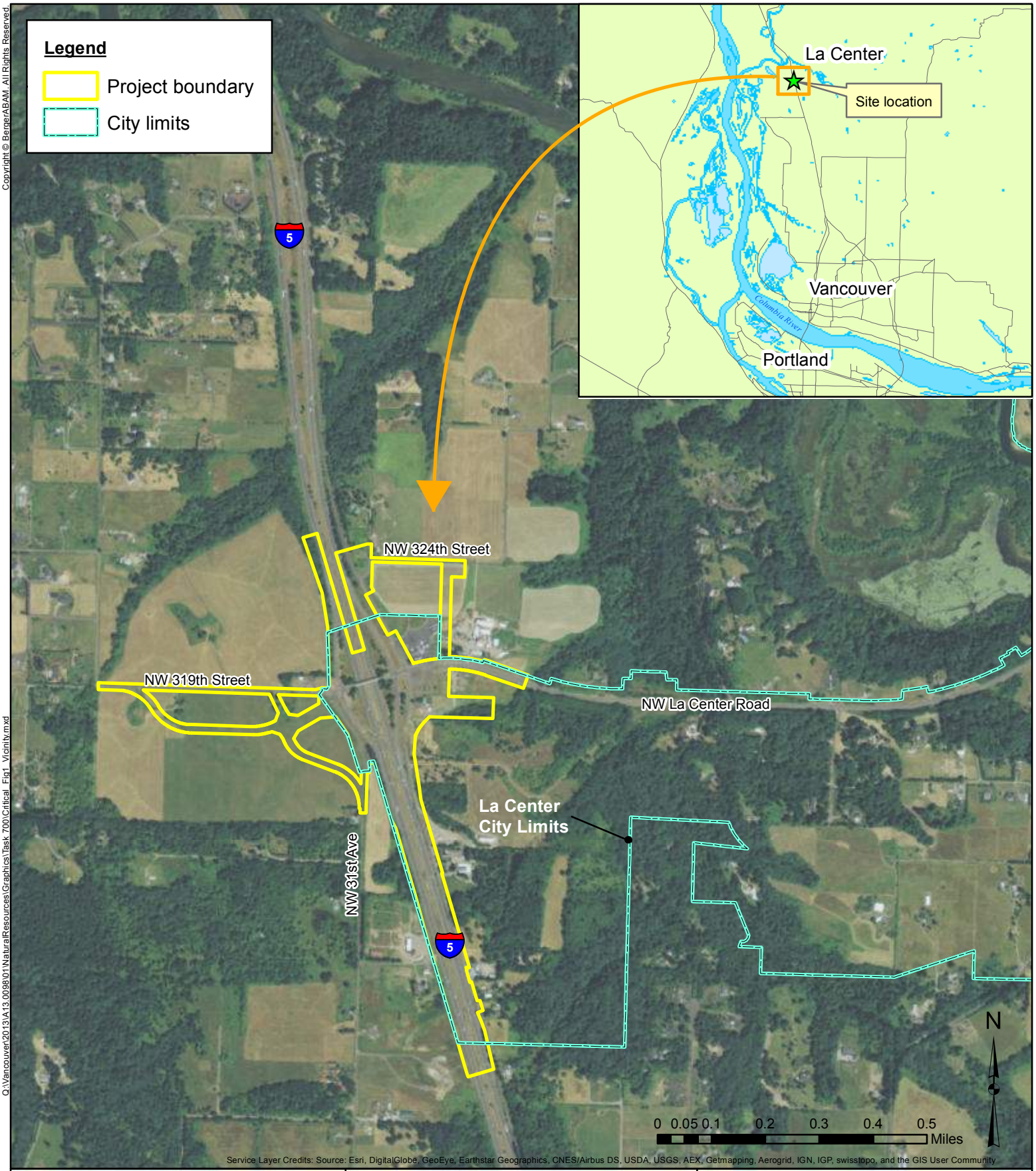
Appendix A
Figures



Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

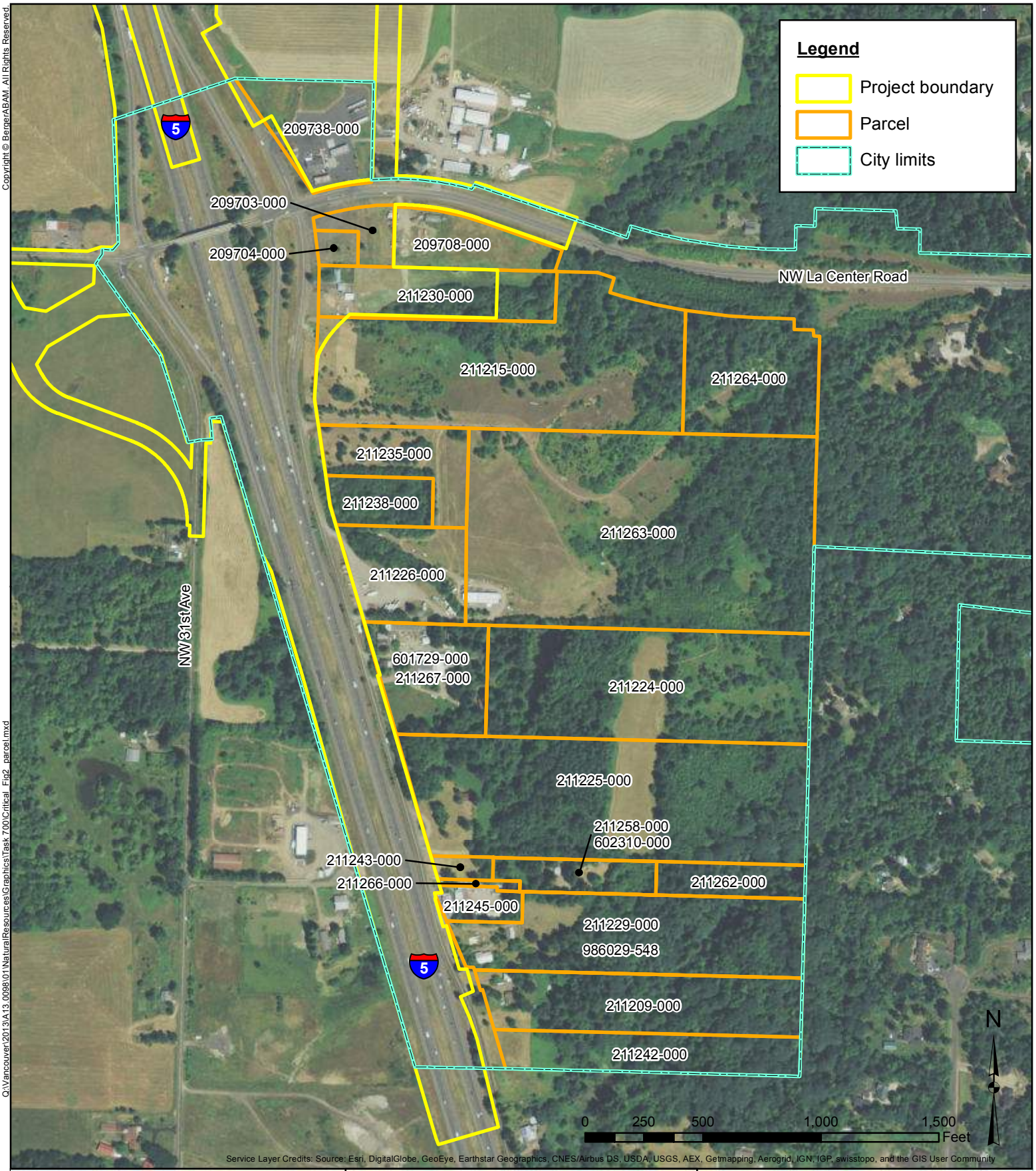
January 2016

Figure 1: Vicinity Map

BergerABAM

Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



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Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

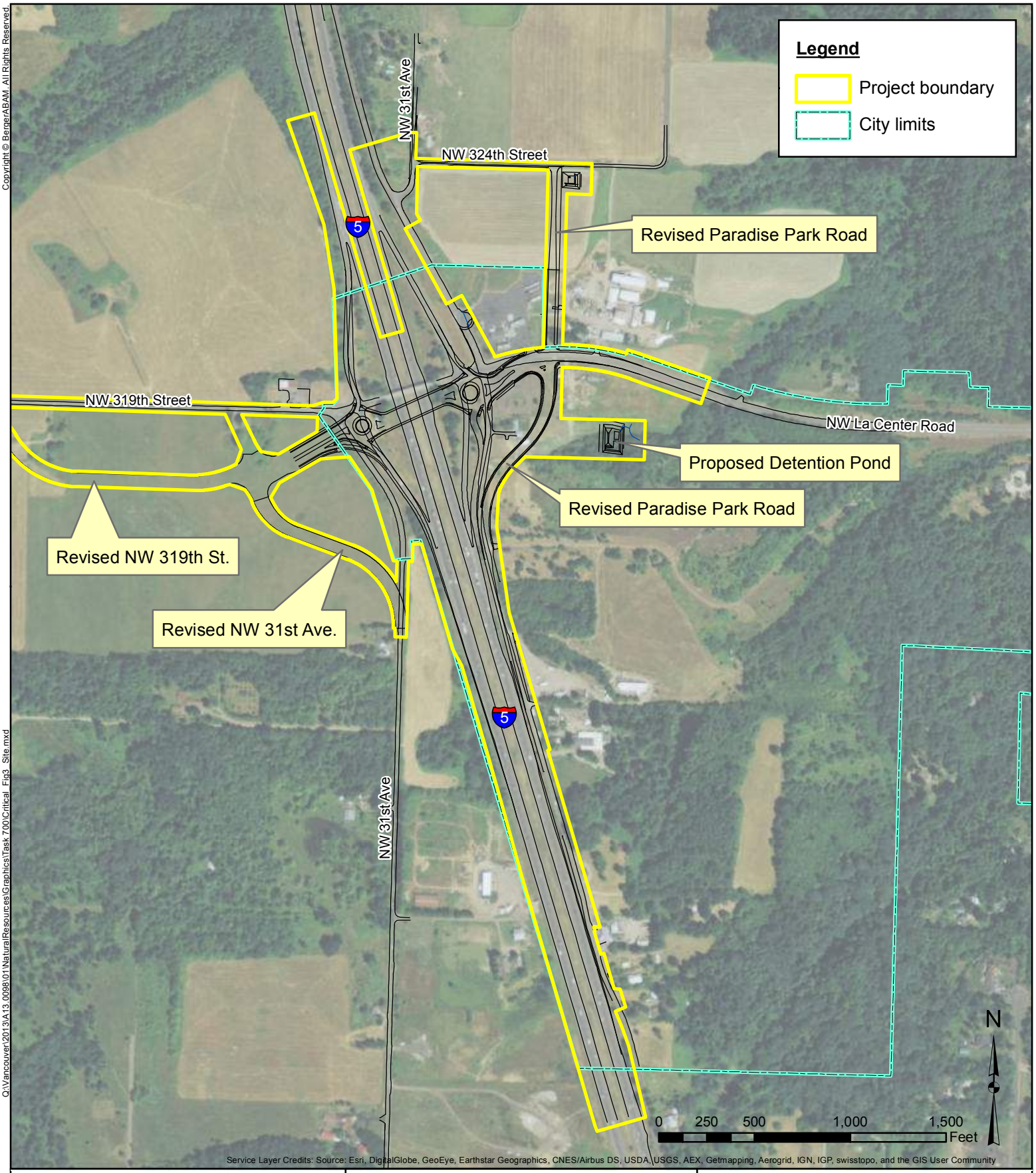
January 2016

Figure 2: Parcel Map

BergerABAM

Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



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Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

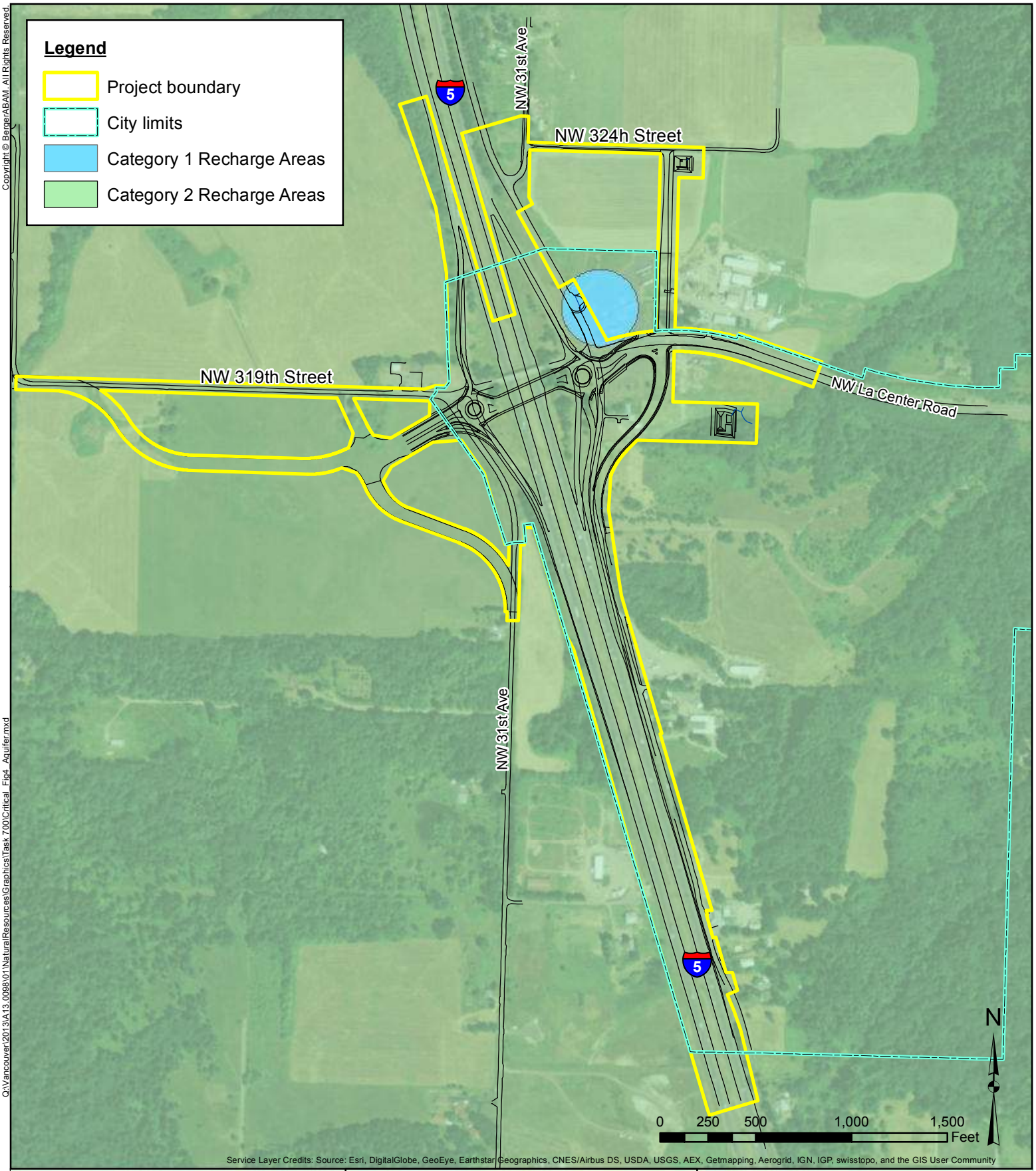
January 2016

Figure 3: Site Plan

BergerABAM

Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

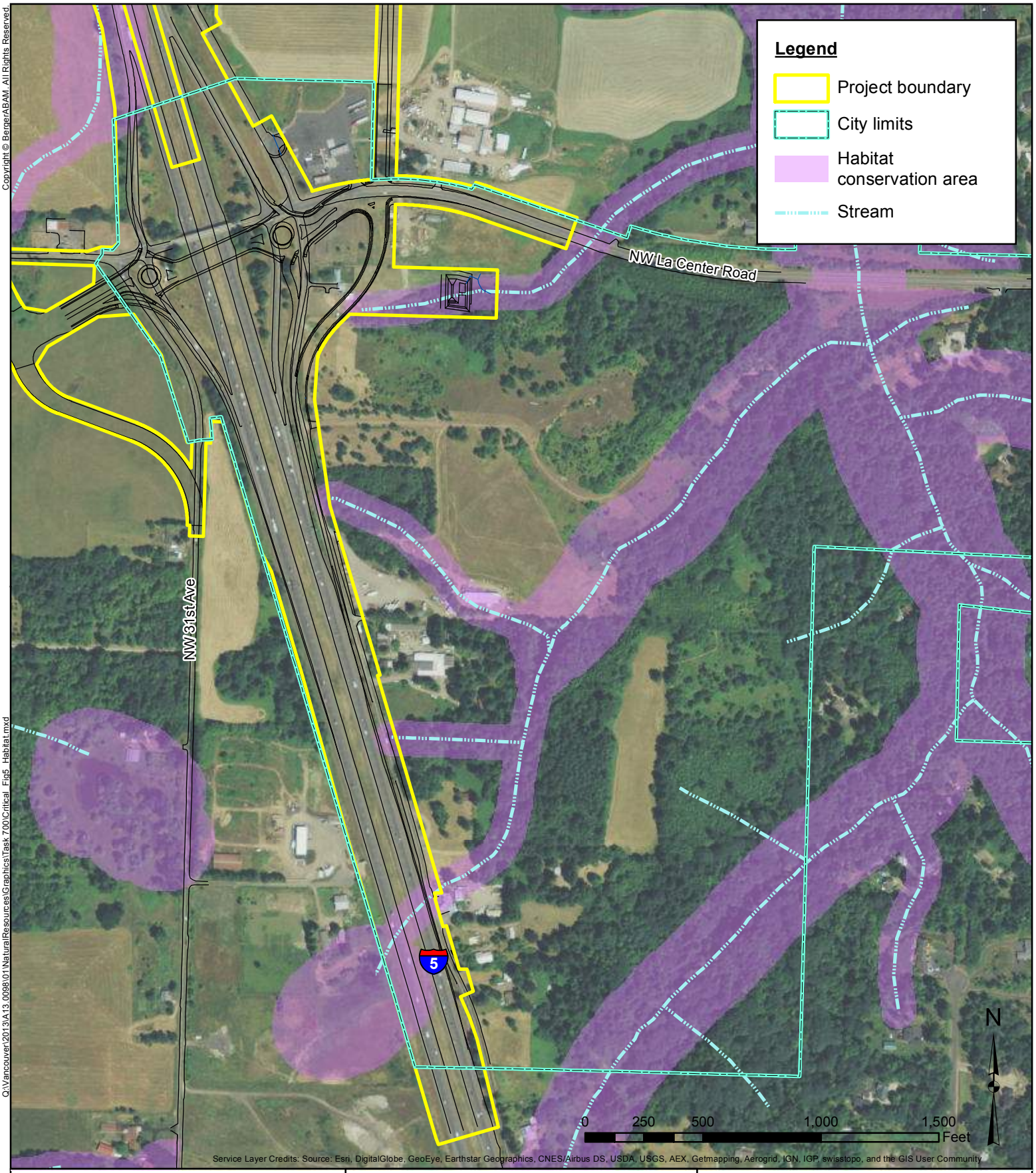
January 2016

Figure 4: Critical Aquifer Recharge Areas

BergerABAM

Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

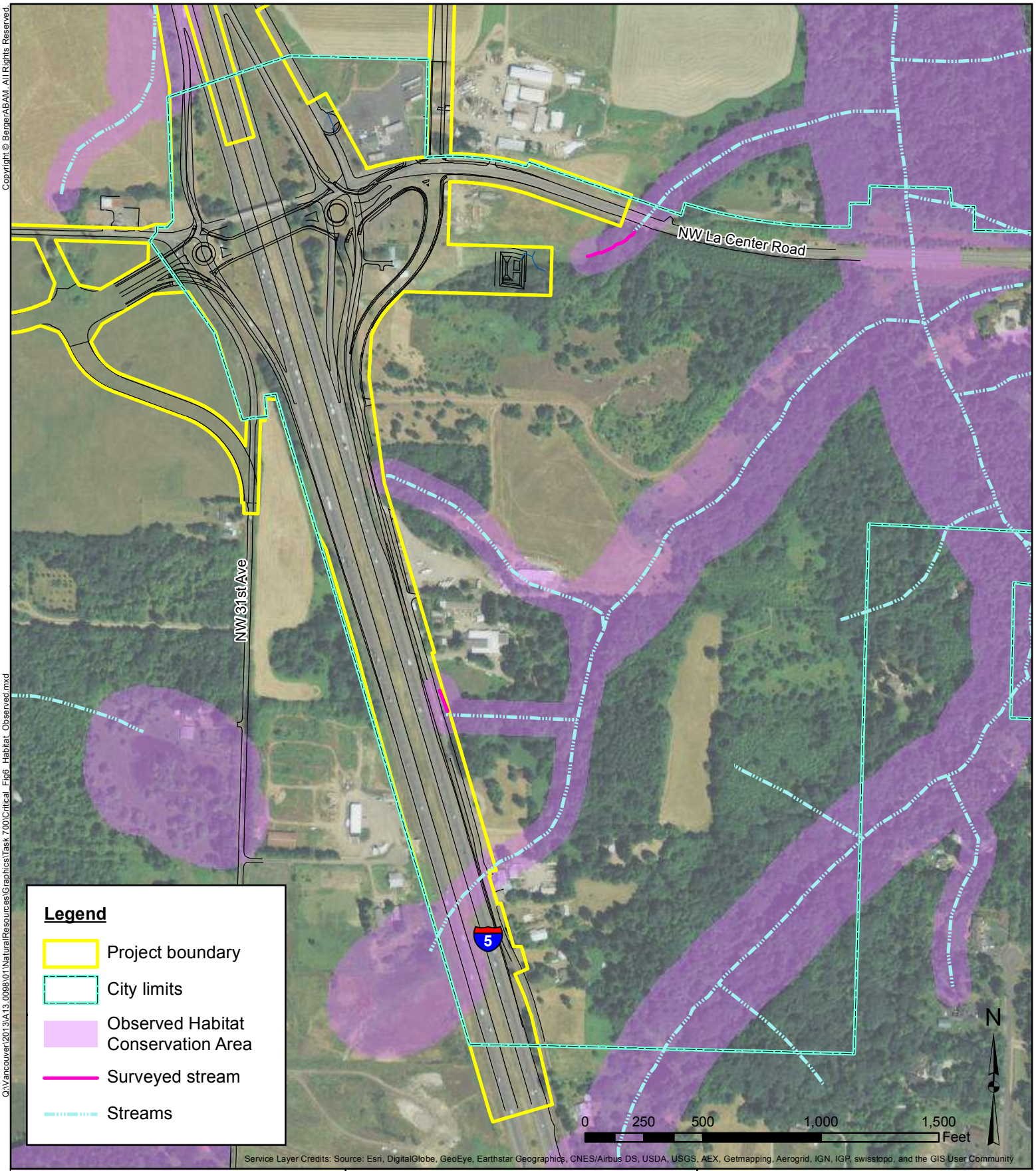
January 2016

Figure 5: Fish and Wildlife Conservation Areas

BergerABAM

Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



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Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

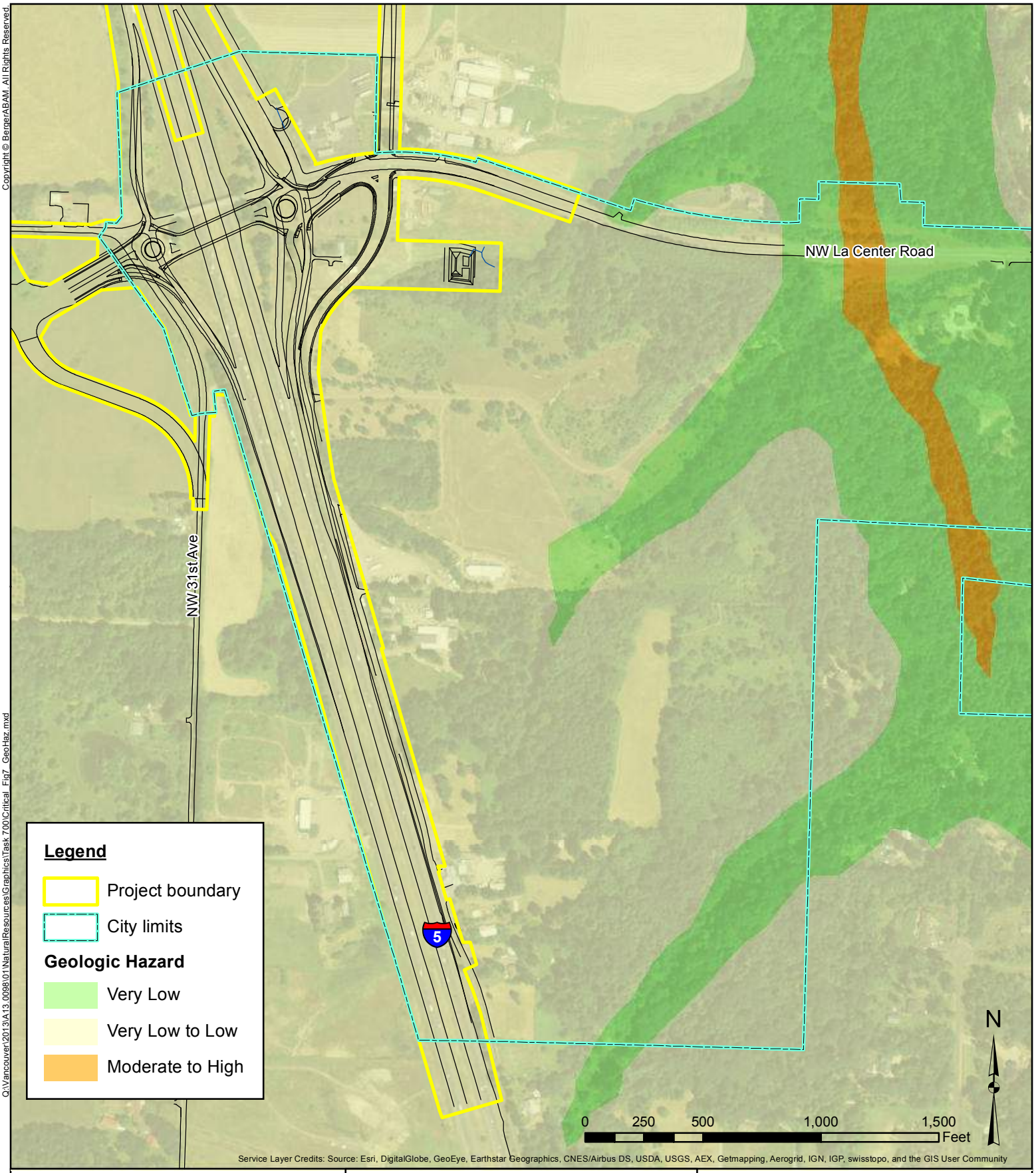
January 2016

Figure 6: Observed Fish and Wildlife Conservation Areas

BergerABAM

Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



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Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

January 2016

Figure 7: Geologic Hazard Areas

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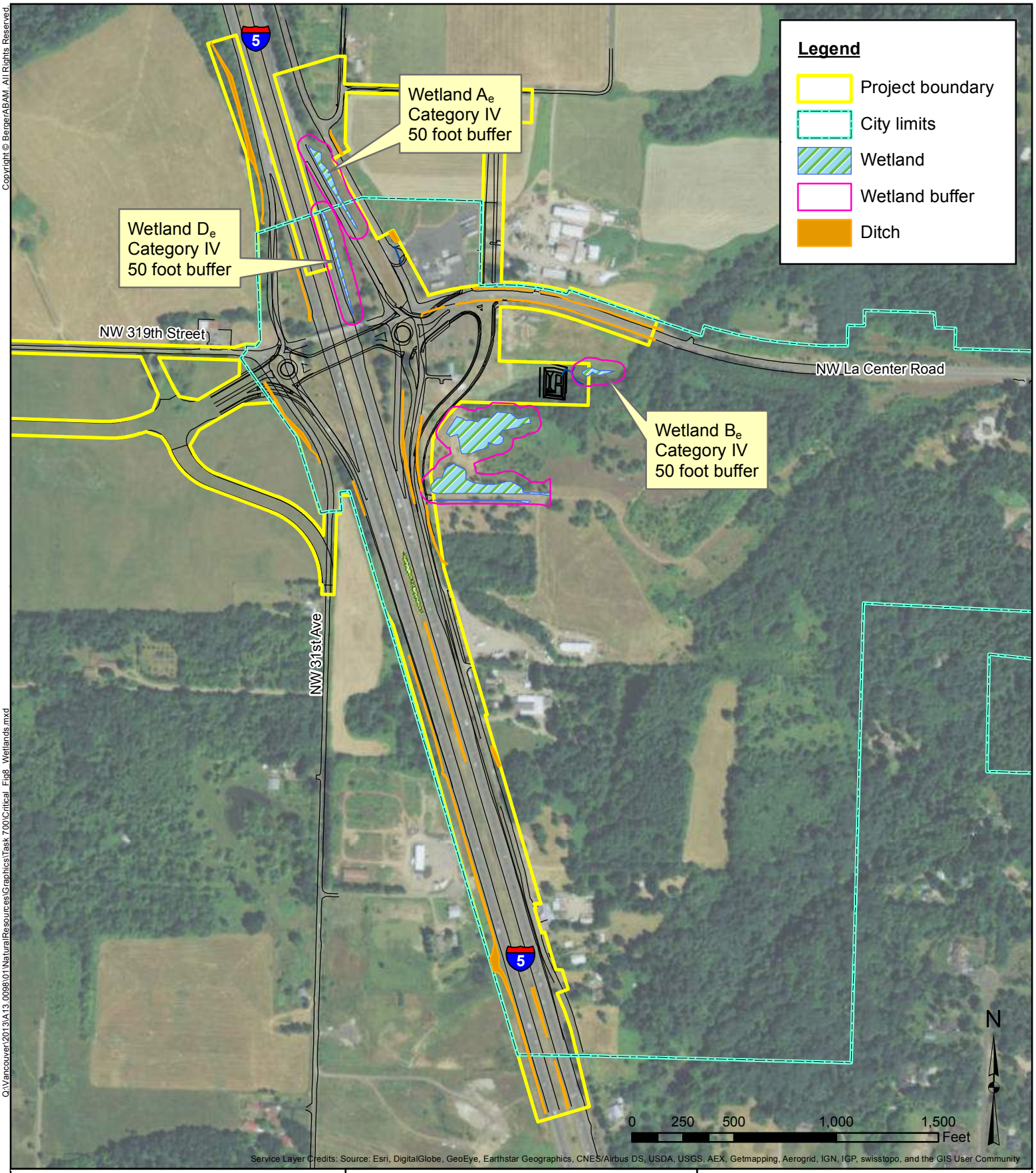
Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



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Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

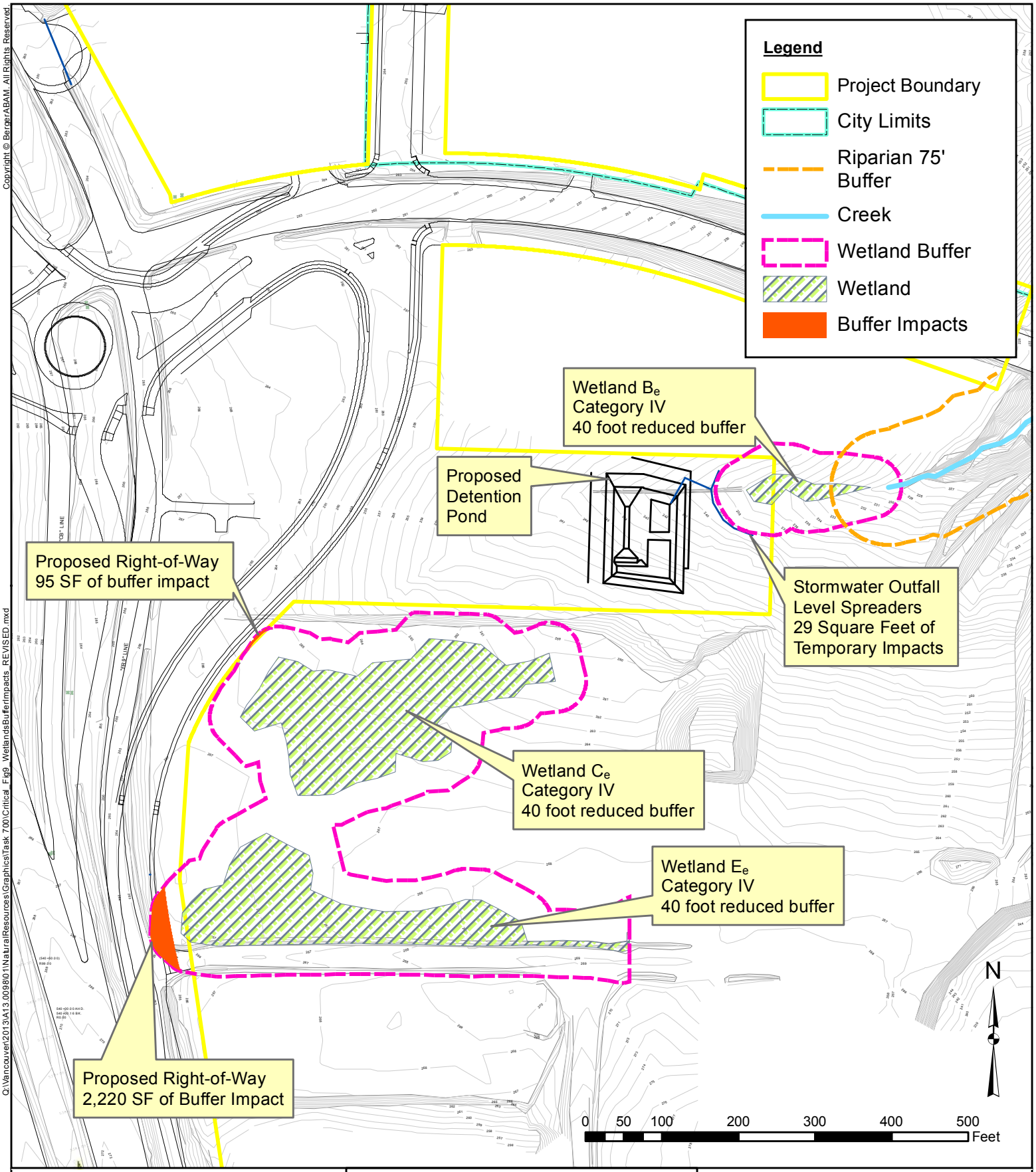
January 2016

Figure 8: Wetlands

BergerABAM

Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



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Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

January 2016

Figure 9: Wetland Buffer Impacts

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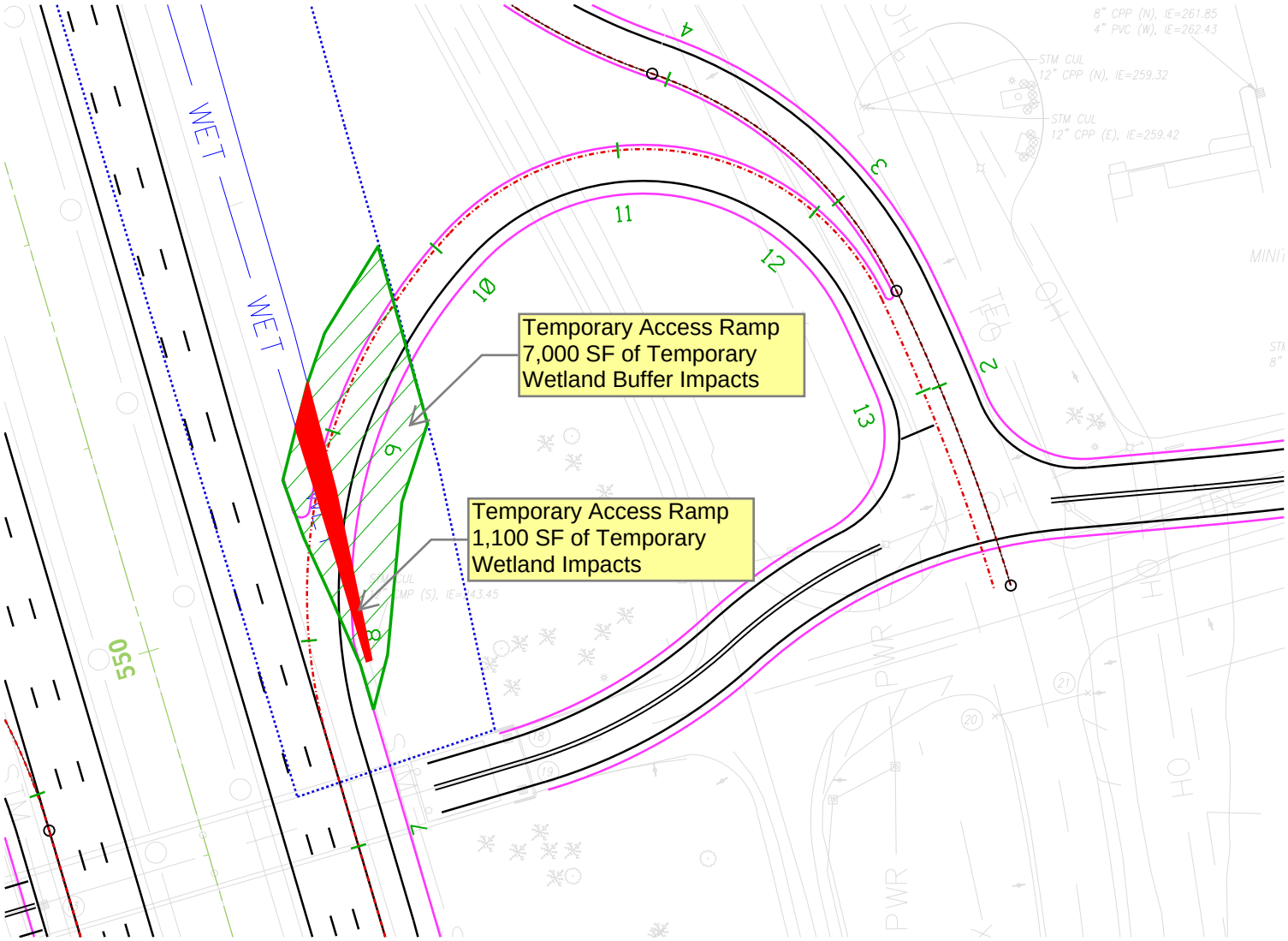
Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA



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Critical Areas Report

Applicant: Cowlitz Indian Tribe
1055 9th Avenue
Longview, WA 98632

January 2016

Figure 10: Temporary Impacts

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Proposed Project:
Cowlitz Tribe Reservation Development and I-5 / La Center Interchange

In: East Fork Lewis River Watershed
Near: La Center
County: CLark
State: WA

Appendix B
Wetland Delineation and Assessment and USACE 404 Permit

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

September 29, 2015

Regulatory Branch

William Iyall, Chairman
Cowlitz Indian Tribe
1055 9th Avenue
Longview, Washington 98632

Reference: NWS-2005-0017, Cowlitz Indian Tribe (Casino Project)

Dear Mr. Iyall:

We have reviewed your application to place fill in up to 0.084 acres of wetlands and 0.039 acres of stream that drain to the East Fork Lewis River, to construct a casino resort complex and associated road improvements, at La Center, in Clark County, Washington. Based on the information you provided to us, Nationwide Permit (NWP) 39 Commercial and Institutional Developments (Federal Register February 21, 2012, Vol. 77, No. 34), authorizes your proposal as depicted on the enclosed drawings dated September 11, 2015. In order for this authorization to be valid, you must ensure the work is performed in accordance with the enclosed *NWP 39 Terms and Conditions*, and the following special conditions:

a. If human remains, historic resources, or archaeological resources are encountered during construction, all ground disturbing activities shall cease in the immediate area and you shall immediately (within one business day of discovery) notify the U.S. Army Corps of Engineers (Corps), Seattle District, Regulatory Branch, and the Cultural Resources Department of the Cowlitz Indian Tribe. You shall perform any work required by the Corps in accordance with Section 106 of the National Historic Preservation Act and Corps regulations.

b. You must implement and abide by the Endangered Species Act (ESA) requirements and/or agreements set forth in the Biological Assessments (BAs): "Biological Assessment Cowlitz Indian Tribe Trust Acquisition and Casino Project", dated April 2007; and, "Biological Assessment NW La Center Road/Interstate 5 Interchange Improvements" , dated April 2015, in their entirety. The U.S. Fish and Wildlife Service (USFWS) concurred with findings of "may affect, not likely to adversely affect" based on these documents on July 12, 2007 and July 8, 2005 (USFWS Reference Numbers1EWFW00-2015-I-0545 and 13410-2007-I-0310). The National Marine Fisheries Service (NMFS) concurred with findings of "may affect, not likely to adversely affect" based on these documents on January 7, 2008 and June 2, 2015 (NMFS Reference Numbers WCR-2015-2571 and 2007/02379). Both agencies

will be informed of this permit issuance. Failure to comply with the commitments made in this document constitutes non-compliance with the ESA and your U.S. Army Corps of Engineers permit. The USFWS/NMFS is the appropriate authority to determine compliance with ESA.

c. You shall implement and abide by the wetland bank use plan titled "Wetland Bank Use Plan Cowlitz Tribe Reservation Development and I-5/La Center Interchange Improvements", dated September 2015, and obtain 0.166 mitigation bank credits from the East Fork Lewis Wetland Mitigation Bank.

d. You shall obtain from the East Fork Lewis Wetland Mitigation Bank sponsor documentation of the completed mitigation bank transaction. You shall submit to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch documentation on the completed mitigation bank transaction prior to performing work in waters of the U.S. authorized by this permit. All submittals must prominently display the reference number NWS-2005-0017.

The Federal Highways Administration (FHWA) and U.S. Department of the Interior Bureau of Indian Affairs completed National Historic Preservation Act, Section 7 Endangered Species Act (ESA) consultation, and Magnuson Stevens Act essential fish habitat (EFH) consultation for its involvement in the proposed activity (National Marine Fisheries Service (NMFS) reference numbers WCR-2015-2571 and 2007/02379, U.S. Fish and Wildlife Service (USFWS) reference numbers1EWFW00-2015-I-0545 and 13410-2007-I-0310). For the purpose of this Department of the Army authorization, we have determined this project will comply with the requirements of these laws provided you comply with all of the permit general and special conditions. We have determined the permit action is sufficiently addressed in their ESA and EFH consultation documents. By this letter we are advising you and the Services, in accordance with 50 CFR 402.07 and 50 CFR 600.920(b), that this agency has served as the lead Federal agency for the ESA and EFH consultation responsibilities for the activity described above.

Please note that Seattle District NWP Regional General Condition 6, Cultural Resources and Human Burials, found in the *Nationwide Permit Terms and Conditions* enclosure, details procedures that must be followed should an inadvertent discovery occur. You must ensure that you comply with this condition during the construction of your project.

You must obtain the appropriate Water Quality Certification (WQC) authorization from the U.S. Environmental Protection Agency prior to commencing any work on Tribal lands. For further information on how to obtain WQC for your project, please contact: Office of Ecosystems, Tribal, and Public Affairs, U.S. Environmental Protection Agency, Region 10, 1200 Sixth Avenue, ETPA-083, Seattle, Washington 98101-1128; telephone: (206) 553-6384.

The authorized work on non-Tribal lands complies with the Washington State Department of Ecology's (Ecology) Water Quality Certification requirements for this NWP. No further coordination with Ecology is required.

We have completed an approved jurisdictional determination for your project area dated September 23, 2015. This approved jurisdictional determination addresses the streams and wetlands associated with the proposed Interstate 5 interchange improvements. In the project area, we have determined that Ditch 9 south, Wetland A_E and Wetland B_E, are waters of the U.S. Wetland D_E, Ditches 2 through 8, Ditch 9 north, and Ditches 10 through 15, are not waters of the U.S. A copy of the approved jurisdictional determination will be provided once we receive authorization from Corps headquarters regarding release of Clean Water Rule documentation. If you object to this determination, you may request an administrative appeal under our regulations (33 Code of Federal Regulations, Part 331) as described in the enclosed *Appeal Process Fact Sheet* and the *Notification of Administrative Appeal Options and Process and Request for Appeal* form (*Appeal Form for Approved Jurisdictional Determinations*).

We have also prepared and enclosed a *Preliminary Jurisdictional Determination* (JD) dated September 23, 2015, which is a written indication that wetlands and waterways within your project area may be waters of the U.S. This preliminary JD addresses waters on the proposed casino resort complex project site, located west of the Interstate 5 interchange. Such waters will be treated as jurisdictional waters of the U.S. for purposes of computation of impact area and compensatory mitigation requirements associated with your permit application. If you believe the Preliminary JD is inaccurate, you may request an Approved JD, which is an official determination regarding the presence or absence of waters of the U.S. If one is requested, please be aware that we may require the submittal of additional information to complete an approved JD and work authorized in this letter may <u>not</u> occur until the approved JD has been finalized.

Our verification of this NWP authorization is valid until March 18, 2017, unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date and you have commenced or are under contract to commence this activity before March 18, 2017, you will have until March 18, 2018, to complete the activity under the enclosed terms and conditions of this NWP. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. You must also obtain all local, State, and other Federal permits that apply to this project.

Upon completing the authorized work, you must fill out and return the enclosed *Certificate of Compliance with Department of the Army Permit* form. Thank you for your cooperation during the permitting process. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey form. This form and information about our program is available on our website at www.nws.usace.army.mil select "Regulatory Branch, Permit Information" and then "Contact Us." A copy of this letter with

enclosures will be furnished to Mr. Dustin Day at BergerABAM, Inc., 210 East 13th Street, Suite 300, Vancouver, Washington 98660. If you have any questions, please contact me at steven.w.manlow@usace.army.mil or (206) 316-3047.

Sincerely,

Steve Manlow, Project Manager
Regulatory Branch

Enclosures

cc: Environmental Protection Agency

BergerABAM

WETLAND DELINEATION AND ASSESSMENT

NW La Center Road/Interstate 5 Interchange Improvements

Prepared for
Salishan-Mohegan LLC
Uncasville, CT

A13.0098.01

November 2014

Wetland Delineation and Assessment

NW La Center Road/Interstate 5
Interchange Improvements

Submitted to

Salishan-Mohegan LLC
1 Mohegan Sun Boulevard
Uncasville, CT 06382

November 2014

BergerABAM
210 East 13th Street, Suite 300
Vancouver, WA 98660

A13.0098.01

WETLAND DELINEATION AND ASSESSMENT

NW La Center Road/Interstate 5
Interchange Improvements

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1.0 INTRODUCTION

In anticipation of future improvements to Interstate 5 (I-5) near La Center, Washington, Salishan-Mohegan LLC contracted with BergerABAM to determine the existence and extent of jurisdictional wetlands and water bodies within the project study area as they are defined and regulated by the U.S. Army Corps of Engineers (USACE), the Washington State Department of Ecology (Ecology), Clark County (County), and the City of La Center (City).

The proposed improvements include realigning Paradise Park Road on the east side of I-5 and realigning NW 31st Avenue and NW 319th Street on its west side; constructing a new overpass with an eastbound lane, a westbound lane, and a turn lane; improving I-5 on- and off-ramps; demolishing a building; and modifying stormwater and utility infrastructure.

The approximately 62-acre project study area consists of Washington Department of Transportation (WSDOT) right of way, NW La Center Road right of way, portions of four tax lots adjacent to Paradise Park Road south of NW La Center Road, and four tax lots north of NW La Center Road up to NW 324th Street, east of I-5 (figures 1 and 2) in portions of Sections 4 and 9, Township 04 North, Range 01 East of the Willamette Meridian (see Table 1). (Appendix A contains all the figures.)

Table 1 - Parcels within the Project Site

Current Property Owners	Area Addressed	Parcel Number
North of NW La Center Road		
3B NW LLC	Right of Way Only	209746000
Fudge, Linda	Right of Way Only	209705000
Clark Pub Utility Dist. No. 1	Right of Way Only	986028840
Anastos, Maria Elaina	Right of Way Only	210123000
South of NW La Center Road		
Landon, Gloria	Full Property	209704000 & 209403000
Burk, Deford & Laura	Full Property	211230000
Carlson Investments LLC	Full Property	211215000

Using the routine on-site wetland delineation method, two BergerABAM wetland scientists identified and delineated five palustrine wetlands and numerous roadside ditches that exhibited wetland characteristics. The delineation methods and results are described below.

2.0 METHODS

As the project area was refined in 2013 and 2014 through the interchange design process, BergerABAM wetland scientists visited the project study area several times to determine the extents of wetlands within it. The Carlson Investments LLC parcel (parcel no. 211215000) was inspected and two wetlands were delineated on 22 January 2013. The Landon parcels (parcel nos. 209704000 and 209403000), as well as portions of Burk (parcel no. 211230000), Fudge (parcel no. 209705000), and 3B NW LLC (parcel no. 209746000), were inspected on 27 May 2014. The remaining tax lots and rights of way were investigated and three wetlands, along with several roadside ditches, were delineated on 3 October 2014. Figure 2 shows the tax lots and rights of way.

Guidance for the wetland delineation came from the USACE 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2* (the regional supplement) (USACE 2010). The regional supplement defines wetlands as:

> *… areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

The regional supplement uses three parameters in making wetland determinations: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology.

- Hydrophytic vegetation consists of plants that, because of morphological, physiological, and/or reproductive adaptations have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions.
- Hydric soils are soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions.
- Wetland hydrology is present when an area is inundated or the water table is within 12 inches of the surface for at least 14 or more consecutive days of the growing season at a minimum frequency of 5 years in 10. The growing season is defined as the portion of the year when soil temperature at 19.7 inches below the soil surface is greater than biological zero (5 degrees C).

Except in atypical situations as defined in the regional supplement, evidence of a minimum of one positive wetland indicator from each of the three parameters (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination. When a positive indicator of hydrophytic vegetation, hydric soils, and/or wetland hydrology cannot be identified because of recent human activities or natural events, then the atypical situations method is employed to complete the wetland delineation. The atypical situations method is used to determine if the missing parameter existed prior to the recent human activities or natural events.

The BergerABAM scientists used the following additional information to develop a preliminary indication of where potential wetlands might exist, and to aid on-site data collection:

- Updated National Wetland Plant List (Lichvar et al. 2014)
- Supplement to List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1993)
- National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988)
- National Wetlands Inventory (NWI) Online Mapper, accessed at http://www.fws.gov/wetlands/Wetlands-Mapper.html
- Soil Survey of Clark County, Washington (McGee 1972) (U.S. Department of Agriculture Natural Resources Conservation Service [USDA-NRCS])
- Washington Hydric Soils—Clark County (USDA-NRCS), accessed at http://soildatamart.nrcs.usda.gov/Report.aspx?Survey=WA011&UseState=WA
- Washington State Wetland Rating System for Western Washington—Revised (Hruby 2014)
- Preliminary Monthly Climate Data: Vancouver, Washington (National Weather Service, National Oceanic and Atmospheric Administration [NOAA]), accessed at http://www.nws.noaa.gov/climate/index.php?wfo=sew
- Wetlands Delineation Manual, Technical Report Y-87-1 (USACE 1987)

During each site visit, the scientists used the methodology discussed in the regional supplement and the technical guidance and documentation issued by the USACE and Ecology.

The scientists walked the study area to observe any visible wetland conditions. Once the general locations of the wetland areas were identified, the scientists took paired data plots in areas that represented the conditions of the uplands and wetlands. The scientists chose plots in uniform topographic positions that represented a single plant community. Paired plots were located approximately 5 to 10 feet apart, to characterize conditions at the wetland boundary. The scientists inspected soils at each sample plot to a depth of 16 inches (or more) to determine the presence or absence of hydric soil characteristics and wetland hydrologic indicators. For the ditches that exhibited wetland features, paired plots were not taken in every ditch segment, but representative sample plots were recorded to characterize these ditches as a whole.

The wetland boundaries were determined based on the presence of hydric soils and wetland hydrology (i.e., oxidized rhizospheres along living roots, soil saturation, etc.) and a dominance of hydrophytic vegetation. It should be noted that, while only paired plots were recorded in the field, numerous unrecorded plots were dug to confirm wetland boundaries. The on-site wetlands were classified according to the U.S. Fish and

Wildlife Service (USFWS) classification system (Cowardin et al. 1979) and the hydrogeomorphic (HGM) classification system (Adamus et al. 2001).

During the site visit, the scientists recorded vegetation, soil, and hydrologic conditions at ten sample plots. The wetland boundary and sample plots were marked in the field with pink pin flags. Wetland flags and sample plots were recorded with Trimble Geo XT hand-held global positions system (GPS) unit. The locations of the flags were surveyed in a subsequent professional land survey.

3.0 SITE CHARACTERISTICS

The 62-acre irregularly shaped study area extends approximately 1,600 linear feet to the east, 4,000 linear feet to the south, 2,600 linear feet to the west, and 1,400 linear feet to the north from the center of the project. Rural residential and agriculture dominate the surrounding land uses, with commercial uses near the interchange and along NW Paradise Park Road. The topography of the site is relatively flat with short, steep slopes adjacent to I-5 and NW 31st Avenue (Figure 3).

3.1 Hydrology

The growing season for Clark County (Vancouver Station) is 331 days, starting on 11 February and ending on 1 December. This growing season is based on 28° F, 5 out of 10 years in the Soil Survey of Clark County, Washington (McGee 1972). In this area, to be classified as a wetland, soils must be continuously saturated for 17 days during the growing season.

Precipitation data from the National Weather Service station at Vancouver Pearson Airport, approximately 16 miles south of the site, shows that:

- For the 14 days preceding the 22 January 2013 site visit, 0.53 inch of precipitation was recorded.
- For the entire month of December 2012, precipitation was recorded on 27 days and totaled 7.67 inches, 0.90 inch above normal.

Table 2 displays precipitation data for the 14 days prior to and during the 22 January 2013 site visit.

Table 2 - Precipitation Data for 14 Days before and during 22 January 2013 Site Visit, Vancouver Pearson Airport, Vancouver, WA (NOAA 2012)

Date	Inches	Date	Inches
1/09	0.23	1/16	0.00
1/10	0.20	1/17	0.00
1/11	0.01	1/18	0.00
1/12	0.00	1/19	0.01
1/13	0.00	1/20	0.00
1/14	0.05	1/21	0.01
1/15	0.02	1/22	0.00

Date	Inches	Date	Inches
		Total	0.53

Precipitation data from the same National Weather Service station shows that:

- For the 14 days preceding the 27 May 2014 site visit, 1.26 inches of precipitation were recorded.
- For the month-to-date including the 27 May 2014 site visit, 2.68 inches of precipitation were recorded, 0.39 inch more than the historic normal value.

Table 3 displays precipitation data for the 14 days prior to and during the 27 May 2014 site visit.

Table 3 - Precipitation Data for 14 Days Before and During 27 May 2014 Site Visit, Vancouver Pearson Airport, Vancouver, WA (NOAA 2014)

Date	Inches	Date	Inches
5/14	0.00	5/21	0.00
5/15	0.00	5/22	0.01
5/16	0.06	5/23	0.00
5/17	0.76	5/24	0.07
5/18	0.01	5/25	0.02
5/19	0.00	5/26	0.00
5/20	0.00	5/27	0.33
		Total	1.26

Precipitation data from the same National Weather Service station shows that:

- For the 14 days preceding the 3 October 2014 site visit, 1.10 inches of precipitation were recorded.
- For the month-to-date including the 3 October 2014 site visit, 1.10 inches of precipitation were recorded, 0.63 inch less than the historic normal value.

Table 4 displays precipitation data for the 14 days prior to and during the 3 October 2014 site visit.

Table 4 - Precipitation Data for 14 Days before and during 3 October 2014 Site Visit, Vancouver Pearson Airport, Vancouver, WA (NOAA 2014)

Date	Inches	Date	Inches
9/20	0.00	9/27	0.00
9/21	0.00	9/28	0.13
9/22	0.44	9/29	0.14
9/23	0.35	9/30	0.00
9/24	0.04	10/1	0.00
9/25	0.00	10/2	0.00
9/26	0.00	10/3	0.00

Date	Inches	Date	Inches
		Total	1.10

During the site investigations, the scientists documented the presence or absence of wetland hydrology field indicators for each of the eight soil pits excavated in the sample plots. The data recorded included depth of inundation, depth to water table, and soil saturation as well as primary and secondary indicators of wetland hydrology, including redoximorphic features along living roots. The primary sources of hydrology within the study area are likely direct precipitation, runoff from surrounding uplands, and a seasonally high water table.

3.2 National Wetlands Inventory Wetlands

The NWI map (Sheet 4) was reviewed for potential wetland areas identified by USFWS (USFWS 2013). The USFWS online wetland mapper website does not identify any wetlands within the study area.

3.3 Soils

The Clark County Soil Survey (McGee 1972) identified the following soil mapping units within the study area (Sheet 5). The descriptions given below are excerpts from the County soil survey.

- **Gee silt loam, 0 to 8 percent slopes (GeB).** This is the dominant soil on the terraces in the western part of the county. The slopes are moderate to short and are undulating. In a typical profile, the surface layer is very dark grayish-brown (10YR 3/2) silt loam about 9 inches thick. The subsurface layer is dark grayish-brown (10YR 4/2) silt loam about 5 inches thick. The next layer, to a depth of 72 inches, is a firm, mottled, dark-brown (10YR 4/3) silty clay loam. This soil is moderately well drained and easily tilled. Permeability is moderate in the surface layer and very slow in the lower part of the subsoil. According to the hydric soils list, this soil is classified as a non-hydric soil (USDA-NRCS 2009).
- **Gee silt loam, 8 to 20 percent slopes (GeD).** This soil is similar to Gee silt loam, 0 to 8 percent slopes, except that the surface layer is 2 to 4 inches thinner. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe if the surfaces is left bare. According to the hydric soils list, this soil is classified as a non-hydric soil (USDA-NRCS 2009).
- **Gee silt loam, 20 to 30 percent slopes (GeE).** This soil also is similar to Gee silt loam, 0 to 8 percent slopes, except that the surface layer is 2 to 4 inches thinner. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe if the surface is left bare. According to hydric soils list, this soil is classified as a non-hydric soil (USDA-NRCS 2009).
- **Gee silt loam, 30 to 60 percent slopes (GeF).** This soil also is similar to Gee silt loam, 0 to 8 percent slopes, except that the surface layer is 2 to 4 inches thinner. Surface runoff is rapid to very rapid, and the erosion hazard is severe to very severe if the

surface is left bare. According to the hydric soils list, this soil is classified as a non-hydric soil (USDA-NRCS 2009).

- **Odne silt loam, 0 to 5 percent slopes (OdB).** This soil is generally in concave areas in drainageways or depressions within areas of Gee soils. In most places, the slope is 1 to 2 percent; some side slopes that lead into the drainageways are steeper. In a typical profile, the surface layer is about 10 inches thick. It is mottled, dark-gray (10YR 4/1) heavy silt loam in the upper part, and mottled, dark-gray (10YR 4/1) silty clay loam in the lower part. The subsurface layer is firm, mottled, gray (10YR 5/1) silt loam about 9 inches thick. This soil is poorly drained and very slowly permeable. According to the hydric soils list, this soil is classified as a hydric soil (USDA-NRCS 2009).
- **Sara silt loam, 0 to 8 percent slopes (SlB).** This soil is deep, moderately well drained, nearly level, with long smooth slopes. This type consists of loamy soils that formed on terraces in old alluvial deposits that contained volcanic ash in the upper part. In a typical profile, the surface layer is dark brown (7.5YR 3/2) silt loam about 10 inches thick. The next layer is firm, mottled, dark-brown (7.5YR 4/3) silty clay loam with strong-brown (7.5YR 5/6) mottles. According to the hydric soils list, this soil is classified as a hydric soil (USDA-NRCS 2009).

The potential locations of hydric soils within the study area were obtained from the USDA-NRCS Web Soil Survey (2014). BergerABAM scientist examined each of soil pits for hydric soil indicators and recorded their soil profiles and characteristics (matrix color, redoximorphic features, texture, and other features).

In areas that had not been previously disturbed, observations of soil conditions during the site visit were generally consistent with the map unit described and identified in the USDA-NRCS soil survey. However, in areas where soils have been manipulated or fill has been placed, soils did not match the soil description. These areas include the pasture area east of the residence off Paradise Park Road and the lawn and gravel drive area associated with the residence off NW La Center Road.

3.4 Vegetation

Hydrophytic vegetation consists of plant species that have adapted to growing in periodically inundated or saturated substrates. Five basic groups of vegetation are recognized based on how frequently they occur in wetlands (Reed 1988 and 1993 supplement).[1] From the wettest to the driest plant communities, the categories are obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and obligate upland (UPL) plants. Hydrophytic vegetation is present

[1] Plant nomenclature in this report follows the Regional List of Plant Species that Occur in Wetlands: Northwest (Region 9) (Reed 1988), the 1993 Supplement to the Regional List of Plant Species that Occur in Wetlands: Northwest (Region 9) (Reed 1994), and the recent update of the National Wetland Plant List (Lichvar et al. 2014).

when more than 50 percent of the dominant species have an indicator status of OBL, FACW, and/or FAC.

The wetland scientists documented the visual percent cover of the dominant plant community species for key sample sites. Using soil pit locations as centers of reference, the scientists investigated sample plots of varying proportions for dominant tree, shrub, herb, and woody vine species. The size and shape of each sample plot were determined by the composition and orientation of the plant communities within the plot. Sample plots were set up so that their boundaries included a representative cross section of the plant community within the plot. The dominance of plant species was determined by estimating the percent aerial cover of each species within each stratum. The scientists listed species from each stratum in descending order of percent cover, and used the USACE's 50-20 technique to determine the predominance of hydrophytic vegetation.

When the most abundant plant species are ranked in descending order of abundance and cumulatively totaled, any species immediately exceeding 50 percent cover, plus any species comprising more than 20 percent cover, represent the dominant species. If more than 50 percent of the dominant species included by these criteria is FAC or wetter, the vegetation community is considered hydrophytic.

When vegetative coverage meets 50 percent but is not considered hydrophytic, a prevalence index is used to examine the percent coverage of each species based on its designation. Using the prevalence index, vegetation percentages within each designation (OBL, FACW, FAC, FACU, UPL) are added together and are given a different multiplier. Once calculated, the total in the multiplied column is divided by the original percentage total before multiplying. If the number given is less than or equal to 3.0, the vegetation community is considered hydrophytic. If the number is greater than 3.0, the vegetation community is not considered hydrophytic.

Vegetation within the site is mostly dominated by frequently mown non-native grasses and herbaceous species. The mowed grasses and herb species include velvetgrass (*Holcus lanatus*, FAC), timothy (*Phleum pretense*, FAC), sweet vernal grass (*Anthoxanthum odoratum*, FACU), tall false rye grass (*Schedonorus arundinaceus*, FAC), white clover (*Trifolium repens*, FAC), and English plantain (*Plantago lanceolata*, FACU), among others. The study area also contains scattered trees that include big leaf maple (*Acer macrophyllum*, FACU), red alder (*Ulnus rubra*, FAC), Douglas fir (*Psuedotsuga menziensii*, FACU), western red cedar (*Thuja plicata*, FAC), and balsam poplar (*Populus balsamifera*, FAC).

4.0 WETLAND DESCRIPTIONS

BergerABAM's investigation of hydrology, soils, and vegetation inside the study area identified five wetlands and several roadside ditches that exhibited wetland characteristics. The wetlands discussed in this report are denoted Wetland A_E, Wetland

B_E, Wetland C_E, Wetland D_E, and Wetland E_E, with the subscript $_E$ referring to the east side of the freeway.

The data sheets that comprise Appendix B show the data collected during the site visits. The numbers assigned to the data sheets correspond to the sample plots, which were numbered sequentially. Wetlands were rated using the revised wetland rating form developed by Ecology (Appendix C). Figure 6 is an aerial photograph of the study area, Figure 7 shows the overall location of wetlands within the study area, and figures 8A through 8G show details of the wetlands.

4.1 Wetland A_E

Wetland A_E is a palustrine emergent (PEM) wetland located within the WSDOT right of way, east of the northbound on-ramp, starting as a wetland swale feature that follows the on-ramp. This wetland is hydrologically influenced by precipitation and hillside seeps. Wetland A_E is located along a long slope and meets the HGM classification of a slope wetland. The emergent wetland vegetation is dominated by tall false ryegrass, velvetgrass, bird's-foot trefoil (*Lotus corniculatus*, FAC), and soft rush (*Juncus effusus*, FACW). Soils within the wetland samples display hydric soil characteristics, which include grayish-brown (10YR 5/2) matrix color with dark yellowish-brown (10 YR 4/6) mottles starting within the upper 10 inches. This soil profile meets the description of a depleted matrix (indicator F3 in the regional supplement). Primary indicators of wetland hydrology include saturation (hydrology indicator A3 in the regional supplement), a high water table (A2), and oxidized rhizospheres along living roots (C3).

4.2 Wetland B_E

Wetland B_E is a PEM wetland located south of NW La Center Road, in the eastern portion of tax lot 211230-000. The wetland is located within a sloped vegetated swale and meets the HGM classification for a sloped wetland. The emergent wetland vegetation is dominated by reed canarygrass (*Phalaris arundinacea,* FACW) and soft rush. Soils within the wetland samples display hydric soil characteristics, which include very dark grayish-brown (10YR 3/2) matrix color with dark yellowish-brown (10 YR 3/4) mottles found entirely within or starting within the upper 10 inches (redox dark surface F6). Primary indicators of wetland hydrology include saturation (A3), geomorphic position (D2), and oxidized rhizospheres along living roots (C3).

4.3 Wetland C_E

Wetland C_E is a PEM wetland found in the northwestern corner of tax lot 211215000 and extends off site to the east. This wetland is hydrologically influenced by precipitation and a high groundwater table. Wetland C_E sits in a topographic depression environment and meets the HGM classification of a depressional wetland. The emergent wetland vegetation is dominated by tall false ryegrass, velvetgrass, Kentucky bluegrass (*Poa pratensis*, FAC), and colonial bentgrass (*Agrostis capillaris*, FAC). Soils within the wetland samples display hydric soil characteristics, which include dark grayish-brown (10YR 4/2) matrix color with dark brown (7.5 YR 3/4) mottles found entirely within or starting

within the upper 10 inches (depleted matrix F3). Primary indicators of wetland hydrology include saturation (A3), a high water table (A2), and oxidized rhizospheres along living roots (C3).

4.4 Wetland D_E

Wetland D_E is a PEM wetland located within the WSDOT right of way, east of the northbound lane, starting north of the existing overpass. This wetland is hydrologically influenced by precipitation and hillside seeps. Wetland D_E is located along a long slope and meets the HGM classification of a slope wetland. The emergent wetland vegetation is dominated by tall false ryegrass, velvetgrass, bird's-foot trefoil, cattails (*Typha latifolia*, FACW), and soft rush. Soils within the wetland samples display hydric soil characteristics, which include very dark gray (10YR 3/1) matrix color with dark yellowish-brown (10 YR 4/6) mottles found entirely within or starting within the upper 10 inches (depleted matrix F3). Primary indicators of wetland hydrology include saturation (A3), a high water table (A2), and oxidized rhizospheres along living roots (C3).

4.5 Wetland E_E

Wetland E_E is a palustrine wetland with more than 30 percent cover of trees taller than 20 feet, meeting the Cowardin definition of a forested wetland (PFO). This wetland is located in the southwest corner of tax lot 211215000, south of Wetland C_E, and extends off site to the east. This wetland is hydrologically influenced by precipitation and a high groundwater table. Wetland C_E sits in a topographic depression environment and meets the HGM classification of a depressional wetland. Forested wetland vegetation consists of balsam poplar with a shrub understory of Nootka rose (*Rosa nutkana*, FAC). The emergent wetland vegetation is dominated by tall false ryegrass, velvetgrass, Kentucky bluegrass, and colonial bentgrass. Soils within the wetland samples display hydric soil characteristics, which include dark gray (10 YR 4/1) matrix color with dark yellowish-brown (10 YR 4/6) mottles found entirely within or starting within the upper 10 inches (depleted matrix F3). Primary indicators of wetland hydrology include saturation (A3), a high water table (A2), and oxidized rhizospheres along living roots (C3).

4.6 Roadside Ditches

The numerous roadside ditches that were identified within the study area exhibited the three wetland characteristics needed to make a wetland determination. These ditches are influenced by direct precipitation and stormwater runoff from the adjacent roads. They are classified as slope HGM wetlands and palustrine emergent (PEM) wetlands using the Cowardin classification. The dominant vegetation within the ditches varies but includes reed canarygrass, velvetgrass, tall false ryegrass, bird's-foot trefoil, and soft rush.

The soil profiles in the ditches contained dark grayish brown (10YR 4/2) soil colors with dark yellowish brown (10YR 4/6) redox concentrations as both soft masses and pore linings within the upper 12 inches of the soil, which meets the depleted matrix (F3) field

indicator for hydric soils. Hydrologic indicators include oxidized rhizospheres along living roots (C3), geomorphic position (D2), and drainage patterns (B10).

5.0 REGULATORY REVIEW

5.1 Wetlands

The study area is located within County and City jurisdiction. The five wetlands identified are located within the city limits and will be subject to the City's critical areas ordinance, La Center Municipal Code (LCMC 18.300). Its wetlands section, LCMC 18.300.090(6), designates, classifies, and protects wetland areas. The City ordinance establishes protective buffers associated with wetlands and specifies that certain permits or approvals must be obtained for projects containing wetlands or their buffers. Additionally, a portion of Wetland A_E extends across city limits into County jurisdiction and this portion would be subject to County regulations. The County's wetland protection ordinance, Clark County Code (CCC 40.450), protects wetlands within the County's jurisdiction. Like the City ordinance, the County ordinance establishes protective buffers for wetlands and says certain permits or approvals must be obtained for projects containing wetlands or their buffers.

Both local jurisdictions require the use of Ecology's *Wetland Rating System for Western Washington* to determine a wetland's category and its score for habitat, water quality, and hydrologic functions. Using the rating system, all five wetlands were rated as Category IV wetlands (Appendix C).

In addition to the City and County ordinances, jurisdictional wetlands are regulated at the federal and state levels by the USACE and Ecology under sections 404 and 401 of the Clean Water Act (CWA), respectively. Because of their direct surface water connection to East Fork Lewis River, the on-site wetlands would be considered jurisdictional wetlands based on contemporary/post-*Rapanos* guidance provided by the U.S. Environmental Protection Agency/USACE.[2] Any impacts to the regulated on-site wetlands will require notification of and approval from USACE and Ecology.

5.2 Jurisdiction Exemptions

While all of the ditches identified exhibit wetland characteristics, it is likely that not all of them are regulated by the federal, state, and local jurisdictions. It should be noted that both the City and the County exempt artificial wetlands created from non-wetland sites. Specifically, LCMC 18.300.030(76) states that the wetlands to which City regulations apply do not include wetlands artificially created from non-wetland sites; these include, but are not limited to, drainage ditches, grass-lined swales, and detention facilities. Similarly, CCC 40.450.010(C)(2)(b) states that wetlands created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, detention facilities, etc., are exempt from County regulation. The roadside ditches within

[2] *Rapanos v. United States* was a 2006 Supreme Court case challenging federal jurisdiction to regulate isolated wetlands under the Clean Water Act.

the County are artificial wetlands created from upland (e.g., Gee silt loam soils) associated with the construction of I-5 and local roads (i.e., NW 319th Street and NW 31st Avenue). Based on these definitions, it is likely that the roadside ditches would not be regulated by the County or the City.

Ecology, in accordance with its definition of wetlands under WAC-22-030(10), does not include artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities or those wetlands created after 1 July 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Based on this definition, it is likely that the roadside ditches would not be regulated by Ecology. They are drainage ditches that were excavated in and drain only uplands; therefore, these wetlands would not be regulated by Ecology (Rebecca Schroeder, Wetlands/Shorelands Specialist, Ecology, personal communication).

Recent USACE guidance stemming from the *Rapanos* decision states that ditches (including roadside ditches) excavated wholly in and draining only uplands, and not conveying flow from other waters of the United States (waters of the U.S.), would not be considered waters of the United States. Based on this guidance, the roadside ditches would likely not be regulated by the USACE. These ditches were excavated in upland Gee silt loam soils and drain only uplands. In addition to the *Rapanos* guidance, the USACE also refers to the CWA when determining waters of the U.S. The *Rapanos* guidance and the preamble to the CWA regulations provide further evidence that the roadside ditches would not be regulated by the USACE. The preamble clarifies what constitutes a water of the U.S. by saying, in part, that water-filled areas created in dry land incidental to construction activities are not considered waters of the U.S. (Steve Manlow, Project Manager, USACE, personal communication). These ditches were created in dry land incidental to the construction of I-5 and other roads and would likely not be considered waters of the U.S. or waters of the State. Therefore, these areas, although they are identified as having wetland characteristics, likely would not be regulated at the federal, state, or local level.

5.3 Wetland Buffer Widths

LCMC 18.300.090(6)(h) specifies buffer widths based on wetland category, wetland characteristics, and land use intensity. Intensity of use is based on "Table 8C-3, Types of proposed land use that can result in high, moderate, and low levels of impacts to adjacent wetlands" in Appendix 8C of Volume 2 of *Wetlands in Washington State* (Granger et al. 2005). According to the table, Category IV wetlands within an area of high land use intensity require a 50-foot buffer. Therefore, all of the regulated wetlands would be provided with 50-foot base buffers under the City's critical areas protection ordinance.

Similarly, the County assigns buffer widths based on wetland category, wetland characteristics, and land use intensity. The interchange study site traverses many different land uses that range from low intensity (e.g., open fields) to high intensity (e.g., road right of ways). However, according to the County code (CCC 40.450.030.E), the proposed transportation land use is considered a high land use intensity and the buffers associated with high intensity land use would apply. Table 5 summarizes the classifications, ratings, and buffer widths of the critical areas.

Table 5 - Summary of Critical Areas Identified for I-5/La Center Interchange Improvements

Wetland	Wetland Classification			Buffer Width (ft)[c]
	Cowardin[a]	HGM	Wetland Rating[b]	
Wetland A_E	PEM	Slopes	IV[d]	50
Wetland B_E	PEM	Slopes	IV	50
Wetland C_E	PEM	Depressional	IV	50
Wetland D_E	PEM	Slopes	IV	50
Wetland E_E	PFO	Depressional	IV	50

Notes:

[a] Cowardin et al. (1979) or NWI class based on vegetation: PEM = palustrine emergent; PFO = palustrine forested

[b] Wetland rating according to Hruby (2014)

[c] Buffer width based on Ecology publication Wetland Mitigation in Washington State (Ecology et al. 2006), City critical areas ordinance (LCMC 18.300), and County wetland protection ordinance (CCC 40.450)

[d] Wetland is regulated by both the City and County

6.0 CONCLUSIONS

Regulated wetland areas identified within the study area are subject to regulation by the City, County, Ecology, and USACE. Any fill placed within jurisdictional wetlands would require a Section 401 permit through Ecology and a Section 404 permit through USACE before project activities could commence. In addition, the City will require the submittal and approval of an application for a critical areas permit for any impacts to wetlands and/or wetland buffers (LCMC 18.300) and the County will require the submittal and approval of a wetland permit application for any impacts to wetlands and/or wetland buffers (CCC 40.450). Any required mitigation will be based on impact quantities and will be determined during the permitting process.

Finally, it should be noted that the wetland boundaries and classifications in this report were determined using the most appropriate field techniques and best professional judgment of the wetland scientists. The City, County, Ecology, and USACE have the final authority in the determination of the boundaries, categories, and jurisdictional status of wetlands under their respective jurisdictions. Therefore, BergerABAM recommends submitting this delineation and assessment report to these agencies for their concurrence before beginning any development or planning activities that would affect the wetlands and/or buffers on this site.

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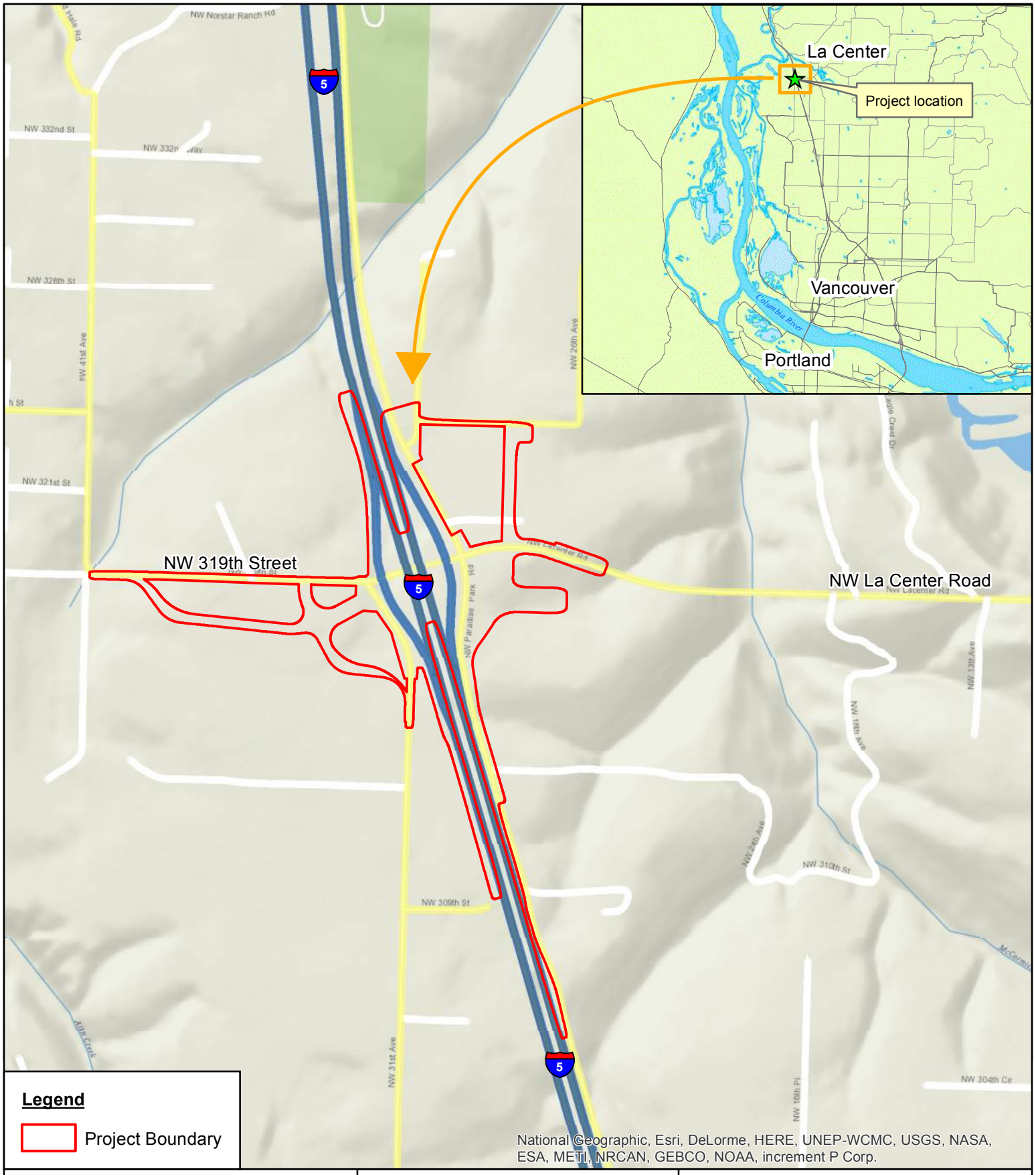
Appendix A
Figures



NW LA CENTER RD/I-5 INTERCHANGE IMPROVEMENT PROJECT

APPLICANT: SALISHAN-MOHEGAN LLC
ATTN: PAUL TRESNAN
1 MOHEGAN SUN BLVD
UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 1 - VICINITY MAP

0 250 500 1,000 1,500 Feet

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BergerABAM

PROJECT AREA IN: EAST FORK LEWIS RIVER WATERSHED

LEGAL: SECTIONS 4 & 9, T04N, R01E, W.M.
NEAR: LA CENTER
COUNTY OF: CLARK
STATE OF: WASHINGTON

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NOVEMBER 2014

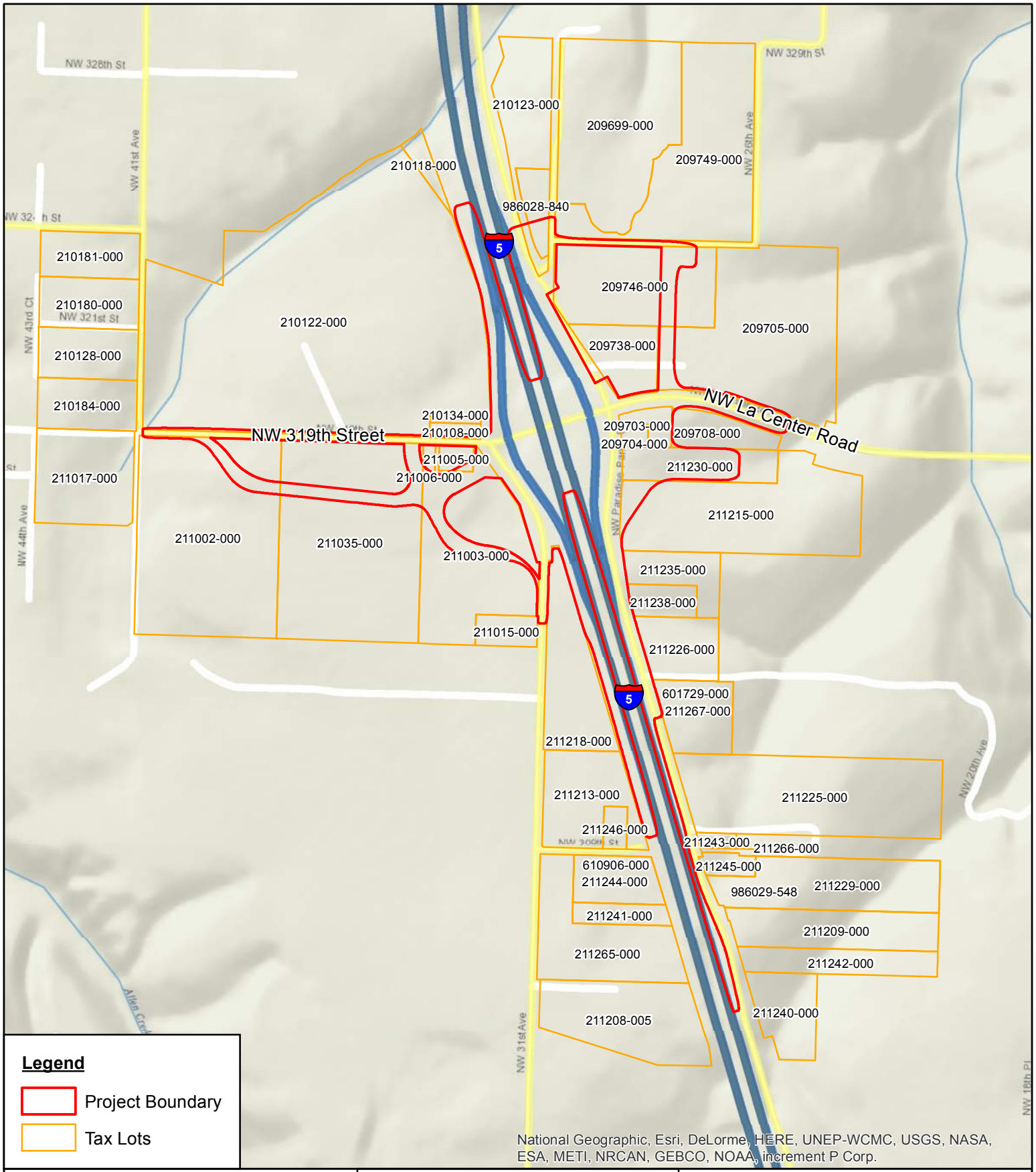

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FIGURE 2 - TAX LOTS

0 250 500 1,000 Feet

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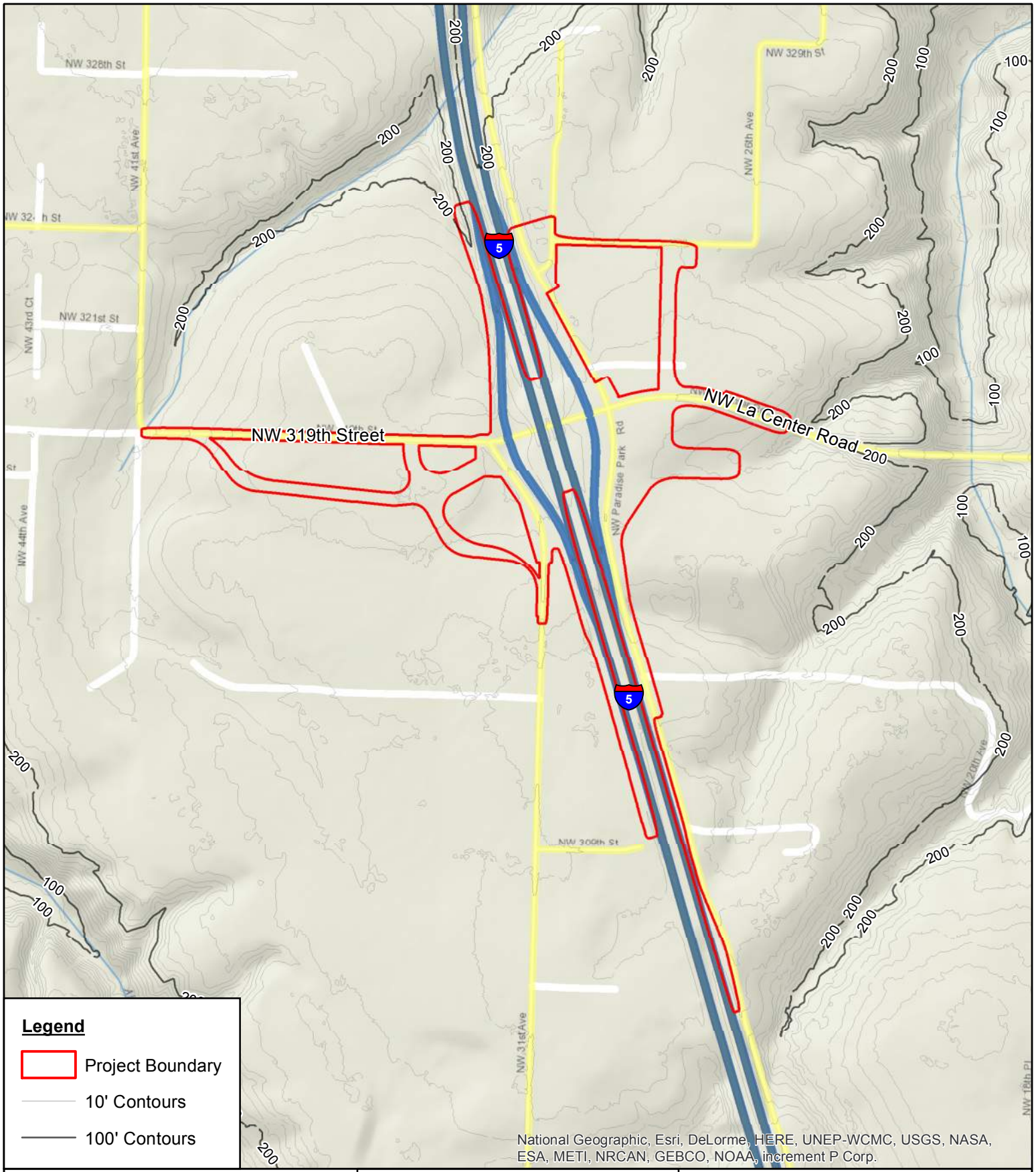

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FIGURE 3 - TOPOGRAPHY

0 250 500 1,000 Feet

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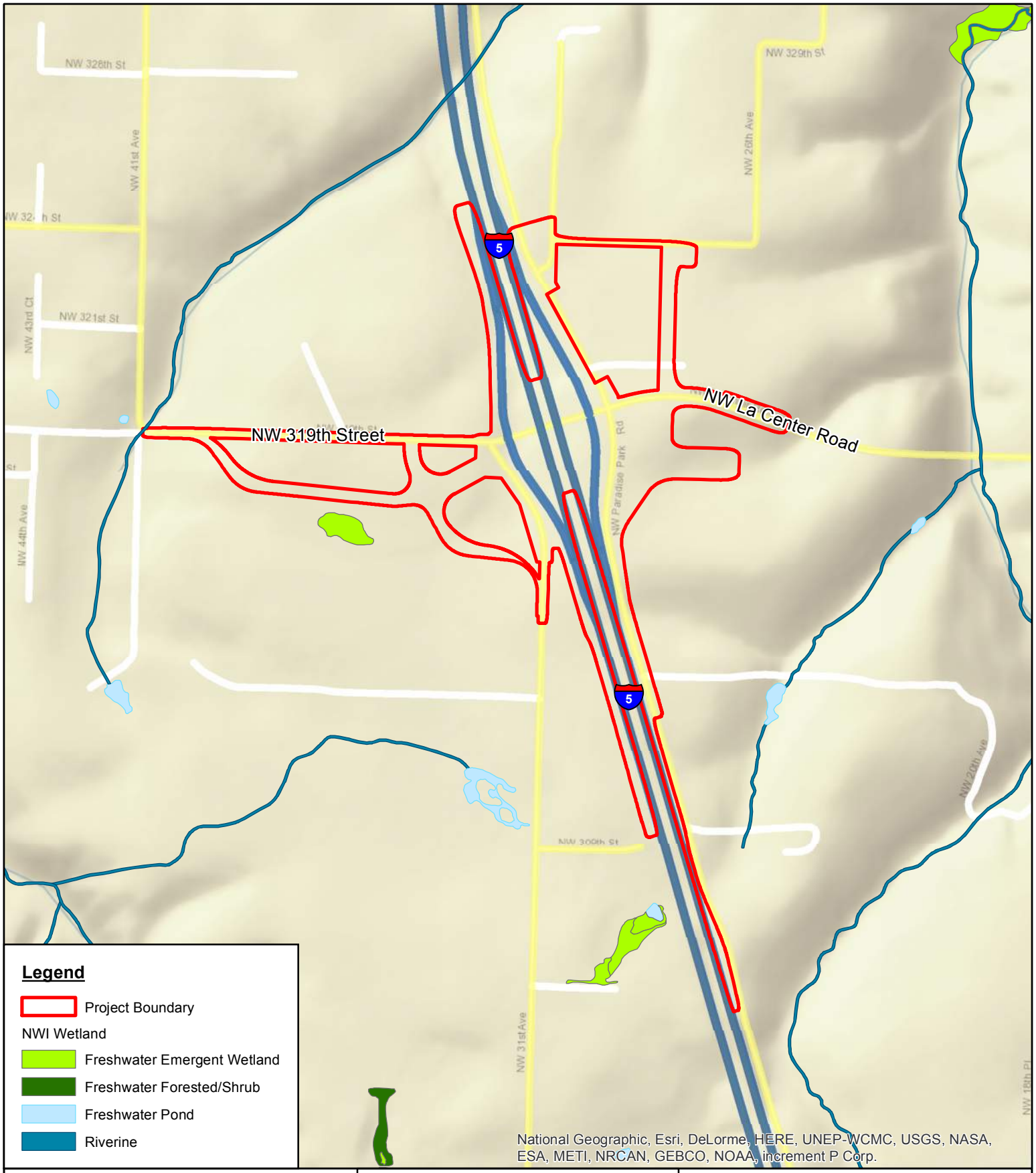

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FIGURE 4 - NWI Wetlands

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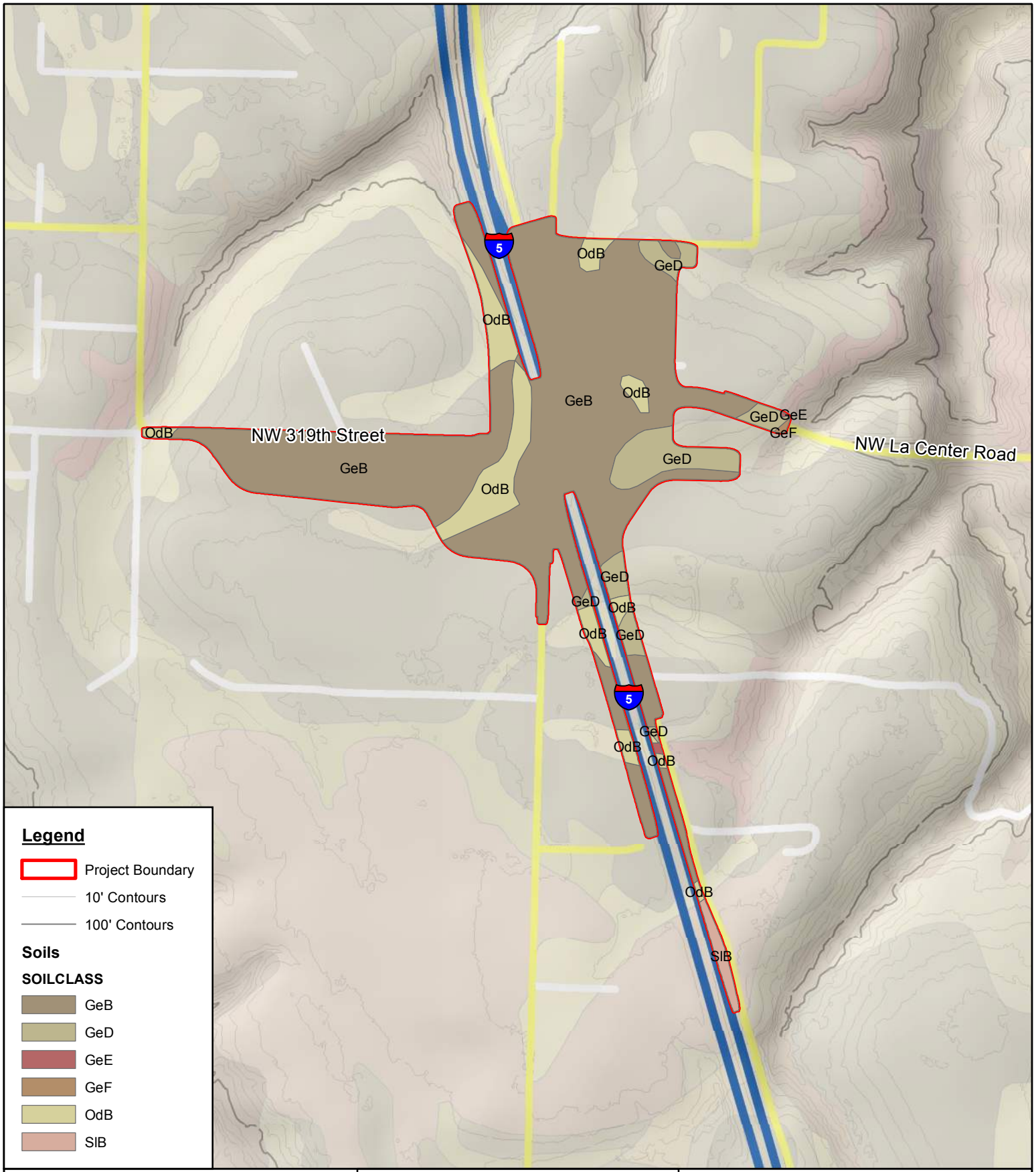

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PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 5 - SOILS

0 250 500 1,000 Feet

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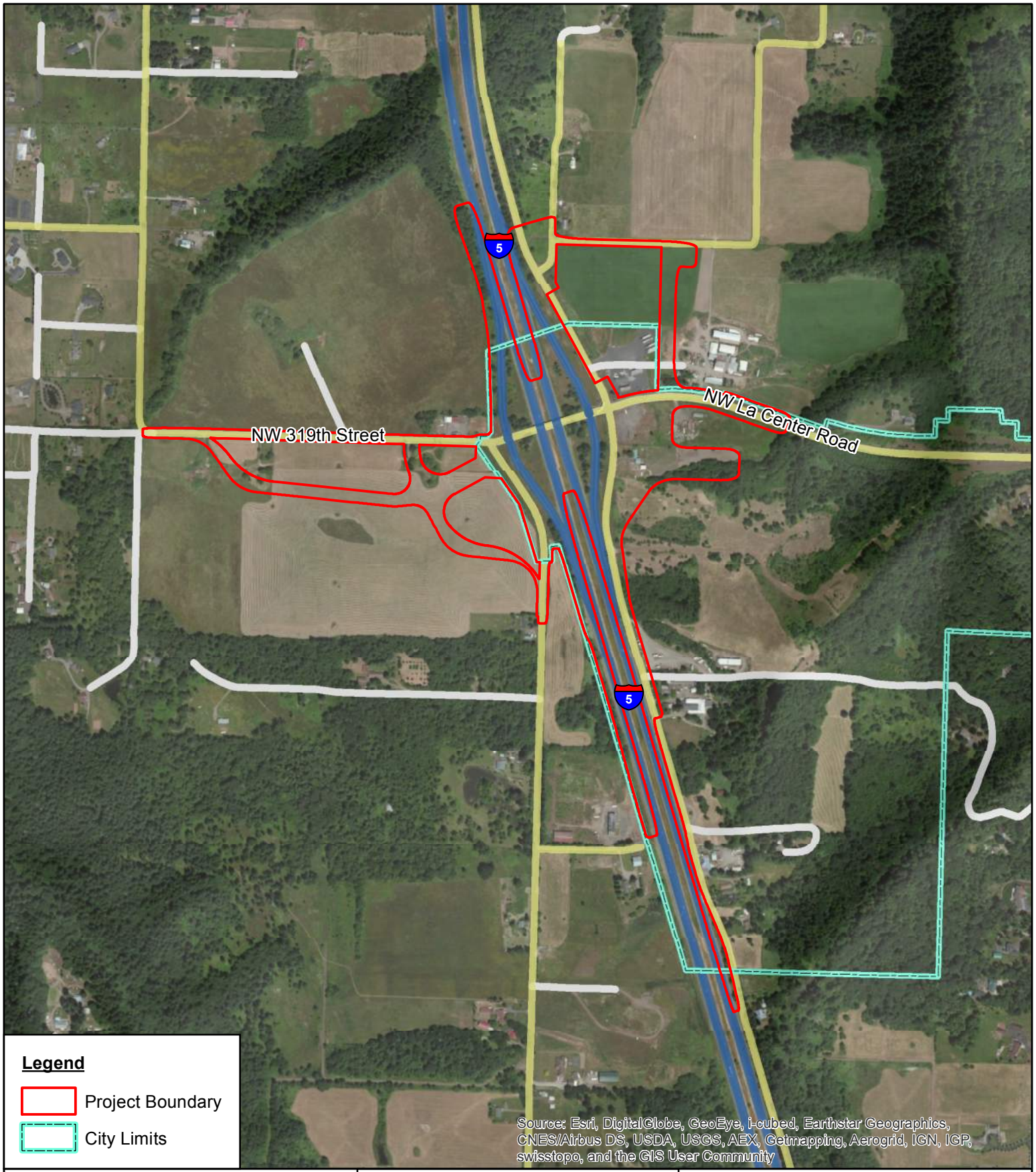

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PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 6 - AERIAL MAP

0 250 500 1,000 Feet

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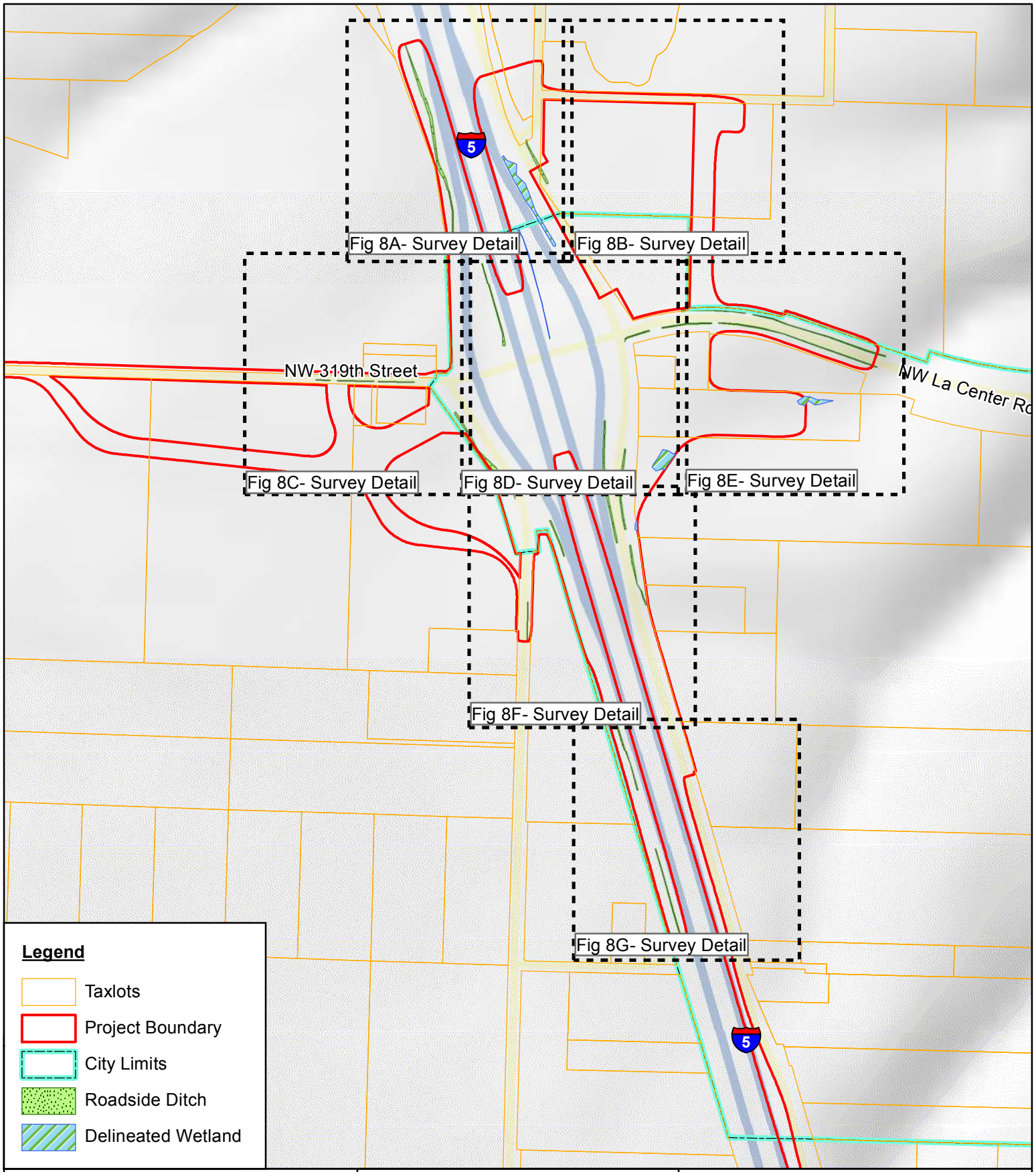

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UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 7- SURVEY MAP

0 125250 500
Feet

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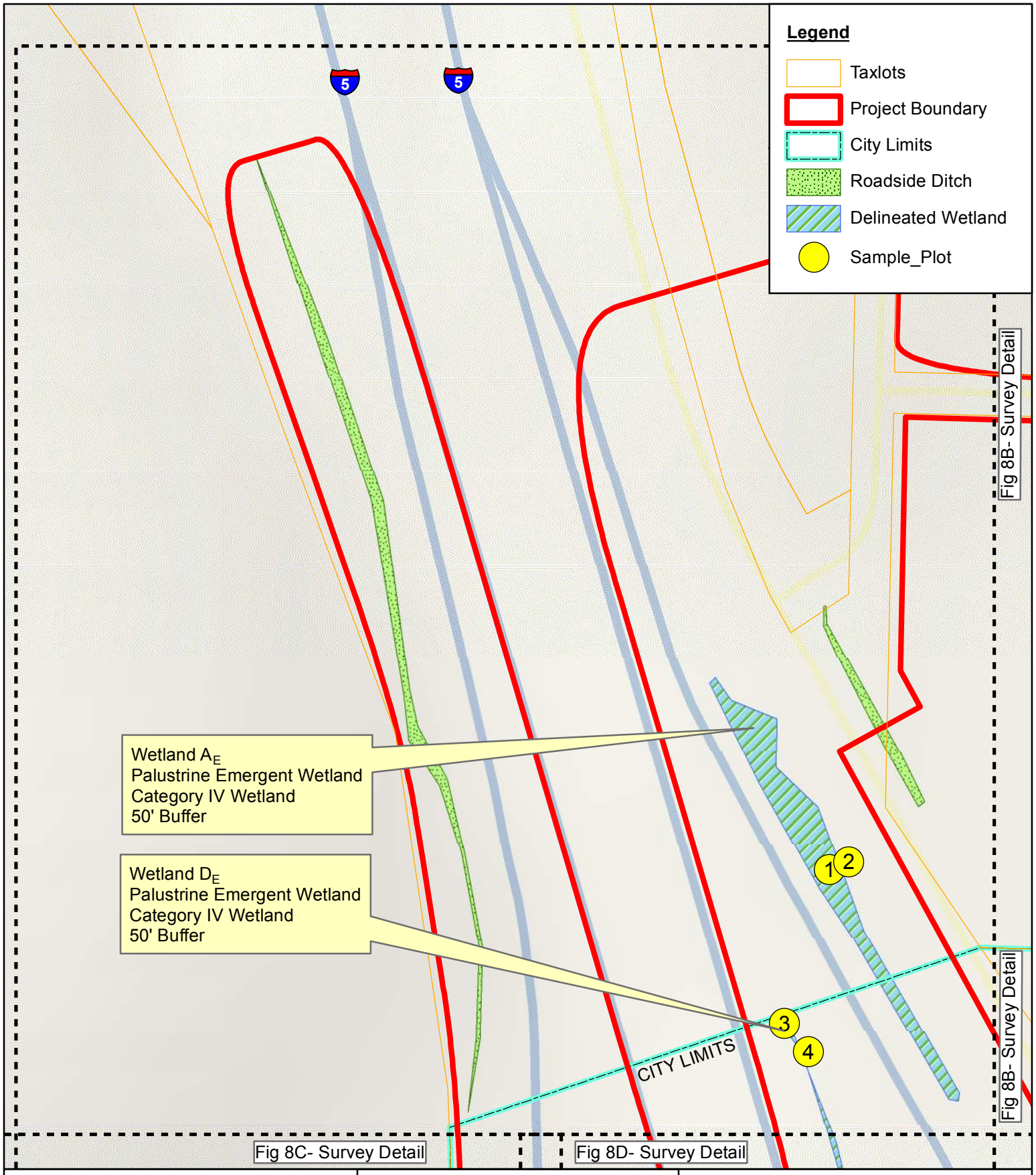

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1 MOHEGAN SUN BLVD
UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 8A- SURVEY DETAIL

0 25 50 100
Feet

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BergerABAM

PROJECT AREA IN: EAST FORK LEWIS RIVER WATERSHED

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NOVEMBER 2014

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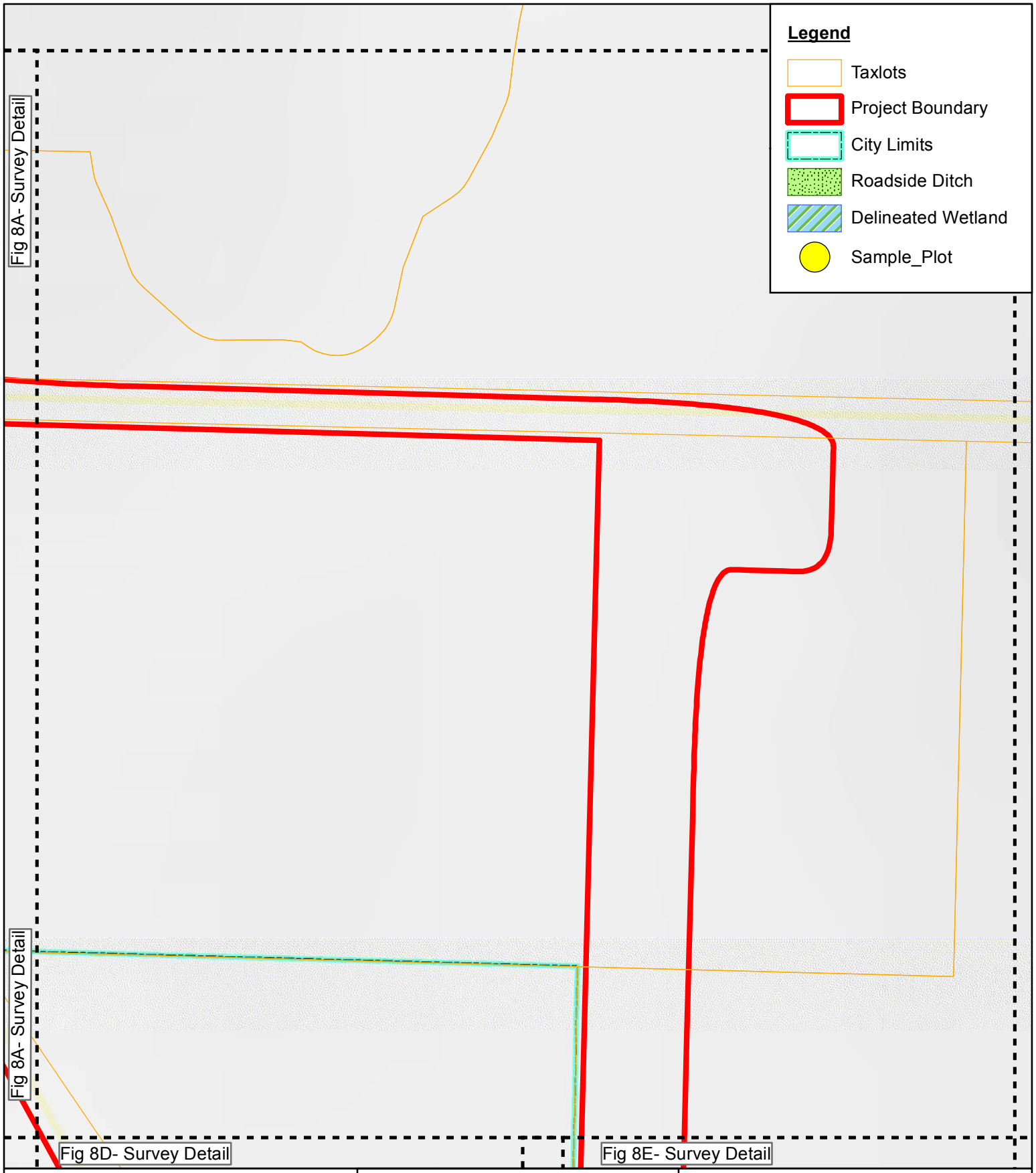

NW LA CENTER RD/I-5 INTERCHANGE IMPROVEMENT PROJECT

APPLICANT: SALISHAN-MOHEGAN LLC
ATTN: PAUL TRESNAN
1 MOHEGAN SUN BLVD
UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 8B- SURVEY MAP

0 25 50 100
Feet

N
S

BergerABAM

PROJECT AREA IN: EAST FORK LEWIS RIVER WATERSHED

LEGAL: SECTIONS 4 & 9, T04N, R01E, W.M.
NEAR: LA CENTER
COUNTY OF: CLARK
STATE OF: WASHINGTON

SHEET 9 OF 14

NOVEMBER 2014

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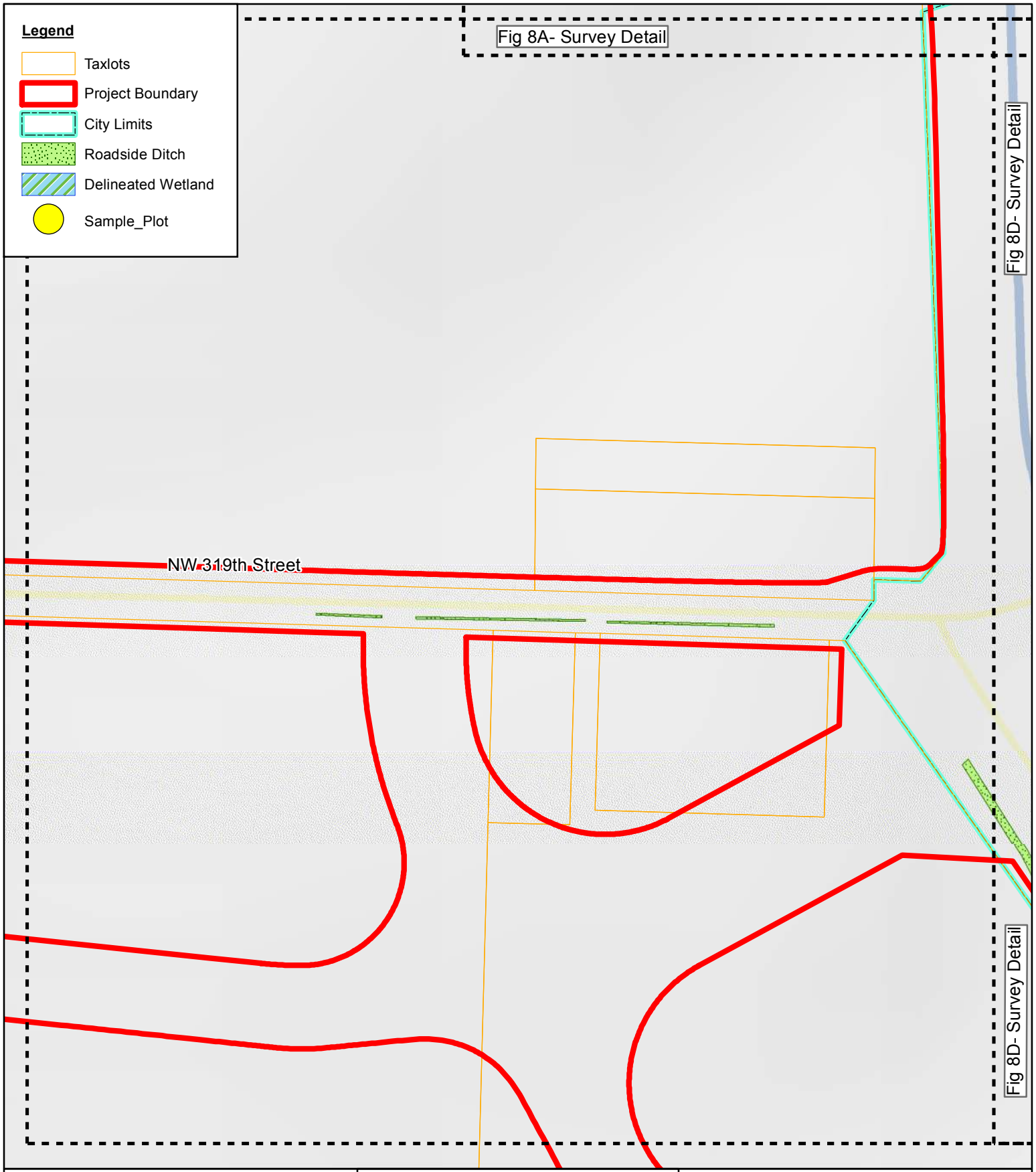

NW LA CENTER RD/I-5 INTERCHANGE IMPROVEMENT PROJECT

APPLICANT: SALISHAN-MOHEGAN LLC
ATTN: PAUL TRESNAN
1 MOHEGAN SUN BLVD
UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 8C- SURVEY MAP

0 25 50 100
Feet

N
S

BergerABAM

PROJECT AREA IN: EAST FORK LEWIS RIVER WATERSHED

LEGAL: SECTIONS 4 & 9, T04N, R01E, W.M.
NEAR: LA CENTER
COUNTY OF: CLARK
STATE OF: WASHINGTON

SHEET 10 OF 14 NOVEMBER 2014

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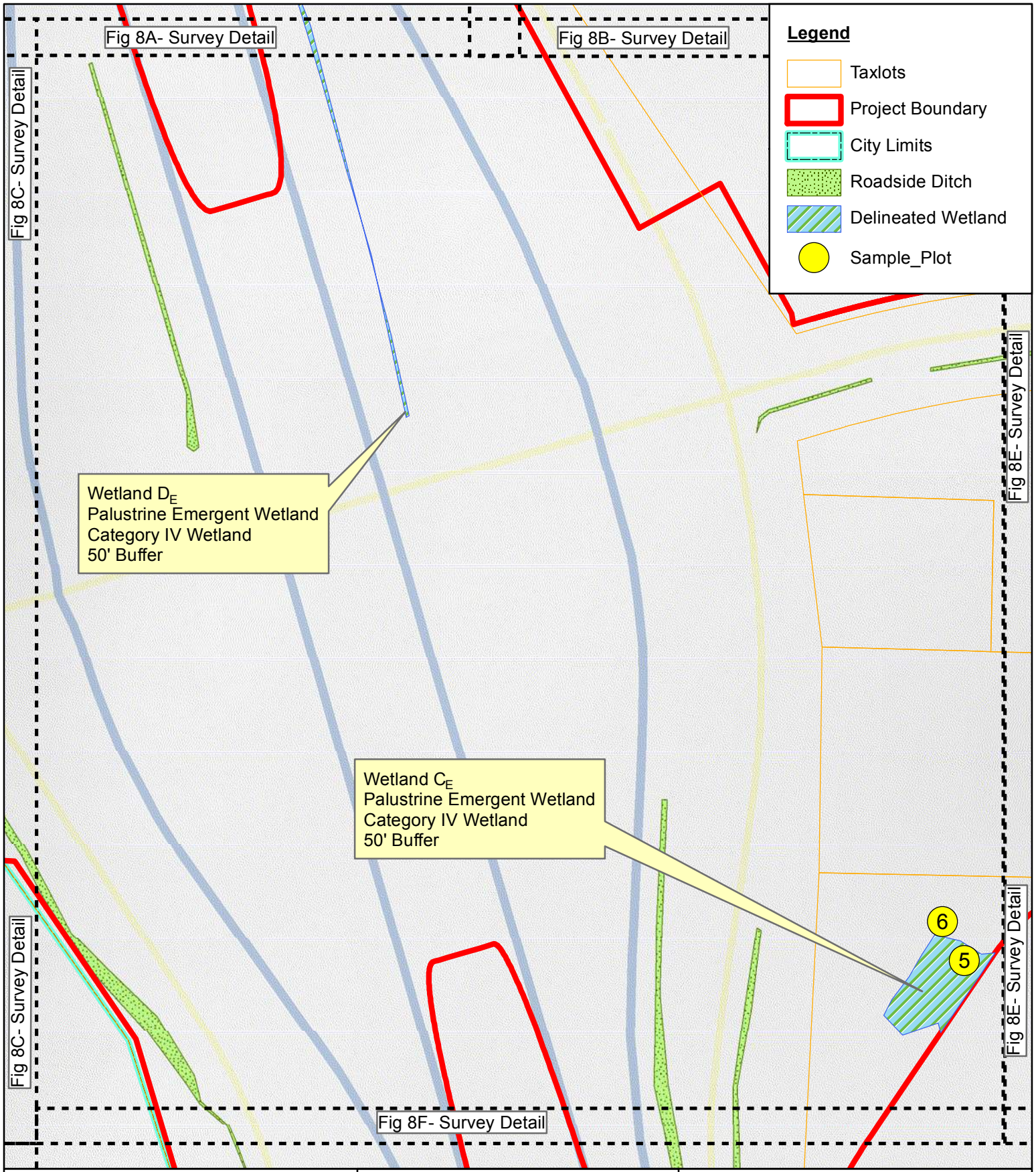

NW LA CENTER RD/I-5 INTERCHANGE IMPROVEMENT PROJECT

APPLICANT: SALISHAN-MOHEGAN LLC
ATTN: PAUL TRESNAN
1 MOHEGAN SUN BLVD
UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 8D- SURVEY MAP

0 25 50 100 Feet

N
S

BergerABAM

PROJECT AREA IN: EAST FORK LEWIS RIVER WATERSHED

LEGAL: SECTIONS 4 & 9, T04N, R01E, W.M.
NEAR: LA CENTER
COUNTY OF: CLARK
STATE OF: WASHINGTON

SHEET 11 OF 14 NOVEMBER 2014

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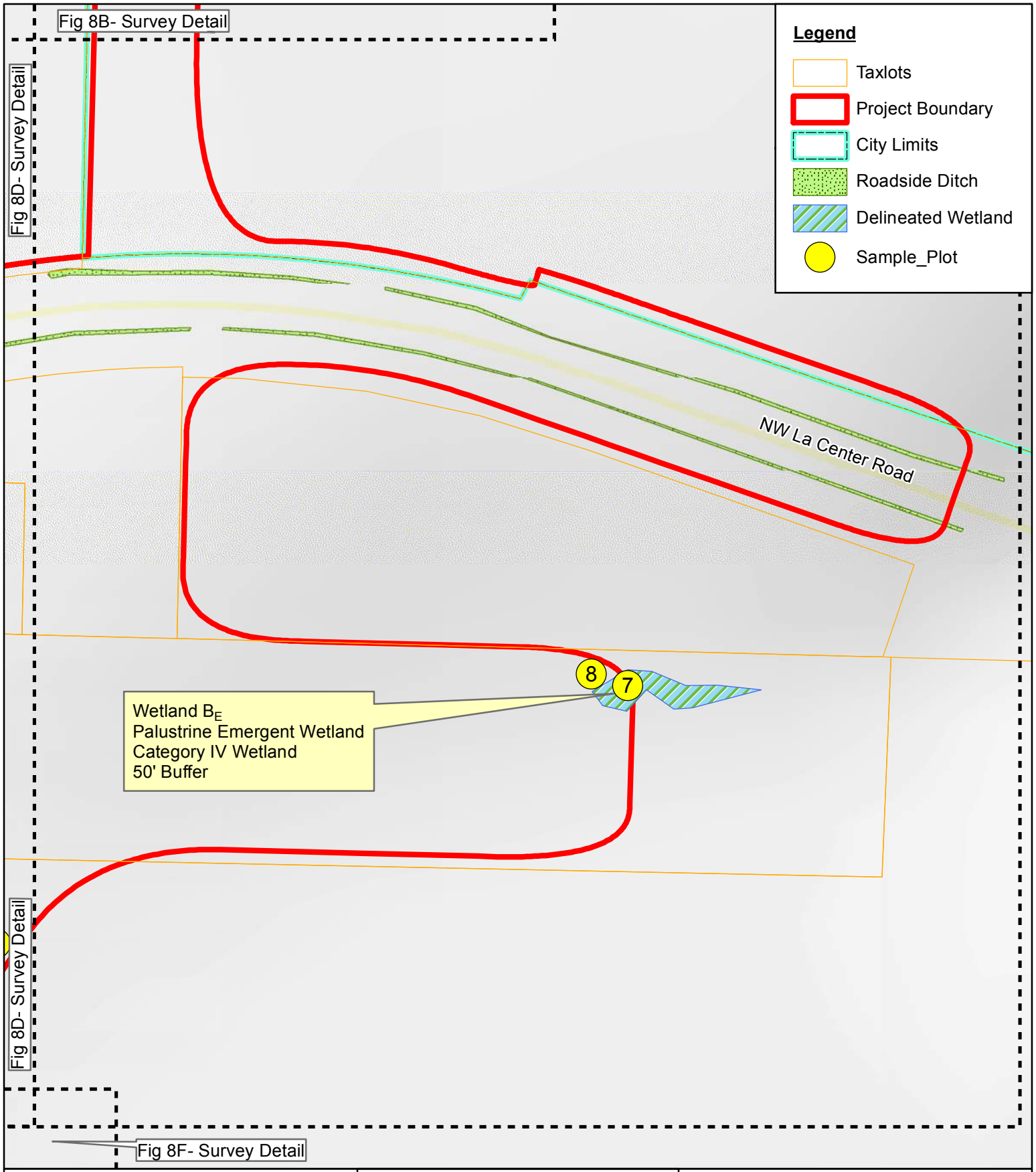

NW LA CENTER RD/I-5 INTERCHANGE IMPROVEMENT PROJECT

APPLICANT: SALISHAN-MOHEGAN LLC
ATTN: PAUL TRESNAN
1 MOHEGAN SUN BLVD
UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 8E- SURVEY MAP

0 25 50 100
Feet

N
S

BergerABAM

PROJECT AREA IN: EAST FORK LEWIS RIVER WATERSHED

LEGAL: SECTIONS 4 & 9, T04N, R01E, W.M.
NEAR: LA CENTER
COUNTY OF: CLARK
STATE OF: WASHINGTON

SHEET 12 OF 14

NOVEMBER 2014

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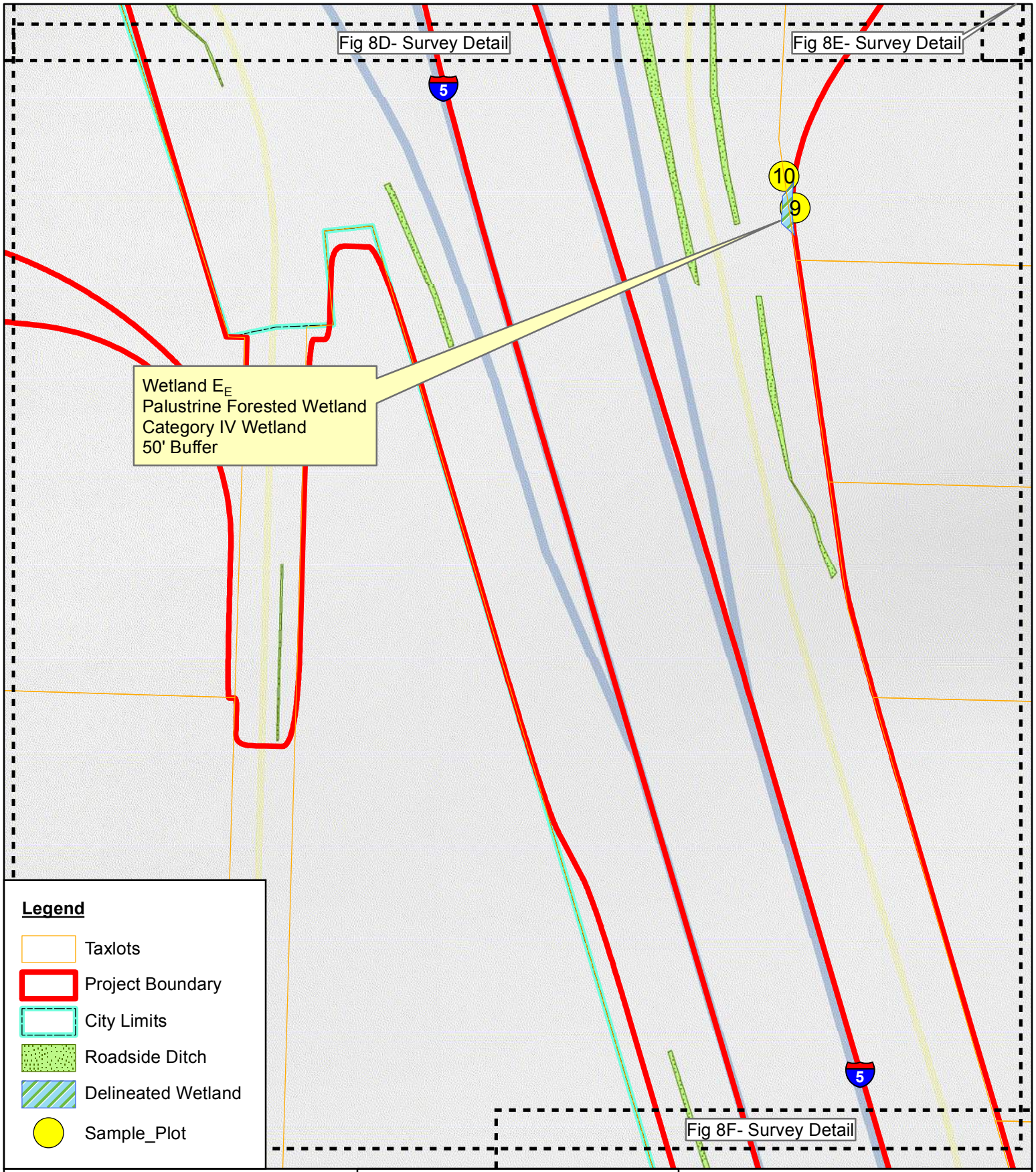

NW LA CENTER RD/I-5 INTERCHANGE IMPROVEMENT PROJECT

APPLICANT: SALISHAN-MOHEGAN LLC
ATTN: PAUL TRESNAN
1 MOHEGAN SUN BLVD
UNCASEVILLE, CT 06382

PURPOSE: WETLAND DELINEATION & ASSESSMENT

FIGURE 8F- SURVEY MAP

0 25 50 100
Feet

N
S

BergerABAM

PROJECT AREA IN: EAST FORK LEWIS RIVER WATERSHED

LEGAL: SECTIONS 4 & 9, T04N, R01E, W.M.
NEAR: LA CENTER
COUNTY OF: CLARK
STATE OF: WASHINGTON

SHEET 13 OF 14 NOVEMBER 2014

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Appendix B
Data Sheets

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 10/1/2014

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-1

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%):<1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☒	No ☐	**Is the Sampled Area within a Wetland?** **Yes ☒** **No ☐**
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Schedonorus arundinaceus*	10	☐	FAC
2. *Holcus lanatus*	10	☐	FAC
3. *Poa prqtensis*	10	☐	FAC
4. *Agrostis capillaris*	10	☐	FAC
5. *Juncus effusus*	30	☒	FACW
6. *Lotus corniculatus*	30	☒	FAC
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	%	x 1=	
FACW Species:	%	x 2=	
FAC Species:	%	x 3=	
FACU Species:	%	x 4=	
UPL Species:	%	x 5=	
Column Totals:	% (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒** **No ☐**

Remarks:

SOIL

Sampling Point: SP-1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Silt loam	
6-18	10YR 5/2	80	10YR 4/6	20	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 10/1/2014

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-2

Investigator(s): Dustin Day and Travis Kessler Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%):<1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☒	No ☐	**Is the Sampled Area within a Wetland?** **Yes ☐** **No ☒**
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Schedonorus arundinaceus*	35	☒	FAC
2. *Holcus lanatus*	20	☒	FAC
3. *Agrostis capillaris*	40	☒	FAC
4. *Circium arvense*	2	☐	FACU
5. *Dipsacus fullonum*	3	☐	FAC
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species:	%	x 1=
FACW Species:	%	x 2=
FAC Species:	%	x 3=
FACU Species:	%	x 4=
UPL Species:	%	x 5=
Column Totals:	% (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒** **No ☐**

Remarks:

SOIL

Sampling Point: SP-2

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/3						silt loam	
8-12	10YR 3/2						silt loam	
12-16	10YR 5/2	85	10YR 4/6	15	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 8 inches

Wetland Hydrology present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 10/1/2014

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-3

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%):3%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☒	No ☐	**Is the Sampled Area within a Wetland?** **Yes ☒** **No ☐**
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Lotus corniculatus*	30	☒	FAC
2. *Agrostis capillaris*	20	☒	FAC
3. *Juncus effusus*	10	☐	FACW
4. *Typha latifolia*	5	☐	OBL
5. *Phalaris arundinacea*	30	☒	FACW
6. *Cirsium arvense*	5	☐	FACU
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	90 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum: 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	%	x 1=	
FACW Species:	%	x 2=	
FAC Species:	%	x 3=	
FACU Species:	%	x 4=	
UPL Species:	%	x 5=	
Column Totals:	% (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒** **No ☐**

Remarks:

SOIL

Sampling Point: SP-3

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	85	10YR 4/6	15	C	PL	silt loam	
12-16	10YR 5/2	80	10YR 4/6	20	C	M	silt clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 10/1/2014

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-4

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%):3%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☐	No ☒	**Is the Sampled Area within a Wetland?** **Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Daucus carota*	30	☒	FACU
2. *Poa annua*	20	☒	FAC
3. *Hypochaeris radicata*	20	☒	FACU
4. *Agrostis capillaris*	10	☐	FAC
5. *Alopecurus arundinaceus*	5	☐	FAC
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	90 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum: 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	%	x 1=	
FACW Species:	%	x 2=	
FAC Species:	%	x 3=	
FACU Species:	%	x 4=	
UPL Species:	%	x 5=	
Column Totals:	% (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☐ No ☒**

Remarks:

SOIL

Sampling Point: SP-4

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					silt loam	
12-16+	10YR 3/2	90	10YR 3/4	10	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? Yes ☐ No ☒ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology present? **Yes** ☐ **No** ☒

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 1/22/2013

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-5

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%):<1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☒	No ☐	**Is the Sampled Area within a Wetland?** **Yes ☒** **No ☐**
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Schedonorus arundinaceus*	20	☒	FAC
2. *Holcus lanatus*	20	☒	FAC
3. *Poa prqtensis*	20	☒	FAC
4. *Agrostis capillaris*	20	☒	FAC
5. *Hypochaeris radicata*	20	☒	FACU
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species:	%	x 1=
FACW Species:	%	x 2=
FAC Species:	%	x 3=
FACU Species:	%	x 4=
UPL Species:	%	x 5=
Column Totals:	% (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒** **No ☐**

Remarks:

SOIL

Sampling Point: SP-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/1	70	10YR 4/6	30	C	PL	Silty clay loam	
6-20	10YR 4/1	60	10YR 4/6	40	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh 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): 10 inches

Saturation Present? Yes ☒ No ☐ Depth (inches): 6 inches

(includes capillary fringe)

Wetland Hydrology present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 1/22/2013

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-6

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%):<1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☐	No ☒	**Is the Sampled Area within a Wetland?** **Yes ☐ No ☒**
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Schedonorus arundinaceus*	5	☐	FAC
2. *Holcus lanatus*	20	☒	FAC
3. *Poa prqtensis*	5	☐	FAC
4. *Leucanthemum vulgare*	20	☒	FACU
5. *Hypochaeris radicata*	20	☒	FACU
6. *Plantago lanceolata*	10	☐	FACU
7. *Prunella vulgaris*	10	☐	FACU
8. *Rubus ursinus*	10	☐	FACU
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species:	%	x 1=
FACW Species:	%	x 2=
FAC Species:	%	x 3=
FACU Species:	%	x 4=
UPL Species:	%	x 5=
Column Totals:	% (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☐ No ☒**

Remarks:

SOIL

Sampling Point: SP-2

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	90	10YR 4/6	10	C	M	Silty clay loam	Concentrations as PL as well
10-20	10YR 4/1	70	10YR 4/6	30	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh 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): 12 inches

Saturation Present? Yes ☒ No ☐ Depth (inches): 10 inches

(includes capillary fringe)

Wetland Hydrology present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 10/1/2014

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-7

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%):1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☒	No ☐	**Is the Sampled Area within a Wetland?** **Yes ☒** **No ☐**
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Schedonorus arundinaceus*	35	☒	FAC
2. *Agrostis capillaris*	40	☒	FAC
3. *Equisetum arvese*	5	☐	FAC
4. *Phalaris arundinacea*	5	☐	FAC
5. *Circium arvese*	5	☐	FACU
6.	5	☐	FAC
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1. *Rubus armeniacus*	5	☐	FACU
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	%	x 1=	
FACW Species:	%	x 2=	
FAC Species:	%	x 3=	
FACU Species:	%	x 4=	
UPL Species:	%	x 5=	
Column Totals:	% (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒** **No ☐**

Remarks:

SOIL

Sampling Point: SP-7

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	98	10YR 3/4	2	C	PL	silt loam	
8-16	10YR 3/2	95	10YR 3/4	5	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 10/1/2014

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-8

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 8 - 20 percent slope NWI classification: None

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 ☐	No ☒	**Is the Sampled Area within a Wetland?** **Yes ☐ No ☒**
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Hypochaeris radicata*	30	☒	FACU
2. *Plantago lanceolata*	20	☒	FACU
3. *Matricaria discoidea*	10	☐	FACU
4. *Rumex crispus*	10	☐	FAC
5. *Agrostis capillaris*	20	☒	FAC
6. *Lolium perenne*	5	☐	FAC
7. *Trifolium repense*	5	☐	FAC
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:
OBL Species: %	x 1=
FACW Species: %	x 2=
FAC Species: %	x 3=
FACU Species: %	x 4=
UPL Species: %	x 5=
Column Totals: % (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☐ No ☒**

Remarks:

SOIL

Sampling Point: SP-8

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	95	10YR 4/6	5	C	M	Silt loam	
6-16+	10YR 3/2	90	10YR 3/4	10	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? Yes ☐ No ☒ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology present? **Yes** ☐ **No** ☒

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 1/8/2013

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-9

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 0 - 8 percent slope NWI classification: None

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 ☒	No ☐	**Is the Sampled Area within a Wetland?** **Yes ☒** **No ☐**
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Schedonorus arundinaceus*	35	☒	FAC
2. *Agrostis capillaris*	40	☒	FAC
3. *Alopechurus pretensis*	25	☒	FACW
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species:	%	x 1=
FACW Species:	%	x 2=
FAC Species:	%	x 3=
FACU Species:	%	x 4=
UPL Species:	%	x 5=
Column Totals:	% (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒** **No ☐**

Remarks:

SOIL

Sampling Point: SP-9

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	98	10YR 3/4	2	C	PL	silt loam	
8-16	10YR 4/1	90	10YR 3/4	10	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☒ No ☐ Depth (inches): 6 inches

Saturation Present? Yes ☒ No ☐ Depth (inches): Surface

(includes capillary fringe)

Wetland Hydrology present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: I-5/La Center Road Interchange Improvements Project City/County: La Center, WA Sampling Date: 1/8/2013

Applicant/Owner: Salishan-Mohegan LLC State: WA Sampling Point: SP-10

Investigator(s): Dustin Day and Dan Gunderson Section, Township, Range: Section 9, Township 4N, Range 1E, W.M.

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): <1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Gee silt loam, 8 - 20 percent slope NWI classification: None

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 ☐	No ☒	**Is the Sampled Area within a Wetland?** **Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

VEGETATION – Use Scientific names of plants.

	Absolute %Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Agrostis capillaris*	50	☒	FAC
2. *Schedonorus arundinaceus*	50	☒	FAC
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species:	%	x 1=
FACW Species:	%	x 2=
FAC Species:	%	x 3=
FACU Species:	%	x 4=
UPL Species:	%	x 5=
Column Totals:	% (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 – Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☐ No ☒**

Remarks:

SOIL

Sampling Point: SP-10

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/2						Silt loam	
14-20	10YR 3/2	98	10YR 3/4	2	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators oh Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer: (if present)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): 15 inches

Wetland Hydrology present? **Yes** ☐ **No** ☒

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

Remarks:

Appendix C
Wetland Rating Forms

Wetland name or number AE & DE

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland AE – La Center Rd/I-5 Date of site visit: 10/3

Rated by Dustin Day, PWS Trained by Ecology? X Yes ___ No Date of training 9/25/14

HGM Class used for rating Slope Unit has multiple HGM classes? ___ Y X N

NOTE: Form is not complete without the figures requested *(figures con be combined).*

Source of base aerial photo/map _____

OVERALL WETLAND CATEGORY IV (based on functions___ or special characteristics___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

_____**Category II** – Total score = 20 - 22

_____**Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	TOTAL
	Circle the appropriate ratings			
Site Potential	H M (L)	H M (L)	H M (L)	
Landscape Potential	H (M) L	H (M) L	(H) M L	
Value	H (M) L	H M (L)	H M (L)	
Score Based on Ratings	5	4	6	14

Score for each function based on three ratings *(order of ratings is not importont)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
(4) = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	

Wetland name or number _____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 1.4	
Boundary of 150 ft buffer *(can be added to another figure)*	D 2.2, D S.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of 150 ft buffer *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of 150 ft buffer *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 3D3(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number _____

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated. If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

   NO - go to 5 **YES** – The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number AE

NO - go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number AG

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the wetland unit have the potential to improve water quality?		
S 1.1. Characteristics of average slope of unit: *(o 1% slope hos o 1 ft verticol drop in elevotion for every 100 ft of horizontol distonce)*		
Slope is 1% or less	points = 3	
Slope is > 1%-2%	points = 2	
Slope is > 2%-5%	points = (1)	1
Slope is greater than 5%	points = 0	
S 1.2. The soil 2 in below the surface (or duff layer) is clay or organic *(use NRCS definitions)*:	Yes = 3 No = 0 points	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense meons you hove trouble seeing the soil surfoce (>75% cover), ond uncut meons not grozed or mowed ond plonts ore higher thon 6 in.*		
Dense, uncut, herbaceous plants > 90% of the wetland area	points = 6	
Dense, uncut, herbaceous plants > ½ of area	points = 3	
Dense, woody, plants > ½ of area	points = 2	
Dense, uncut, herbaceous plants > ¼ of area	points = 1	1
Does not meet any of the criteria above for plants	points = 0	
Total for S 1	Add the points in the boxes above	2

Rating of Site Potential If score is: ___12 = H ___6-11 = M ___0-5 = (L) *Record the roting on the first poge*

2.0. Does the landscape have the potential to support the water quality function at the site?		
S 2.1. Is > 10% of the buffer within 150 ft of wetland unit in land uses that generate pollutants?	Yes = (1) No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____	Yes = 1 (No) = 0	0
Total for S 2	Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___1-2 = (M) ___0 = L *Record the roting on the first poge*

S 3.0. Is the water quality improvement provided by the site valuable to society?		
S 3.1. Does the unit discharge directly to a stream, river, or lake that is on the 303(d) list?	Yes = 1 No = 0	0
S 3.2. Is the unit in a sub-basin where water quality is an issue? *At leost one oquotic resource in the basin is on the 303(d) list.*	Yes = 1 No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality?	Yes = 2 No = 0	0
Total for S 3	Add the points in the boxes above	1

Rating of Value If score is: ___2-4 = H ___1 = (M) ___0 = L *Record the roting on the first poge*

Wetland name or number A-E

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the wetland unit have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.* Dense, uncut, **rigid** plants cover > 90% of the area of the wetland — points = 1 All other conditions — points = 0	0

Rating of Site Potential If score is: ___1 = M ___0 = L (L) *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions at the site?	
S 5.1. Is more than 25% of the buffer area within 150 ft upslope of wetland unit in land uses that generate excess surface runoff? Yes = 1 No = 0	1

Rating of Landscape Potential If score is: ___1 = (M) ___0 = L *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems? The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) — points = 2 Surface flooding problems are in a sub-basin farther down-gradient — points = 1 No flooding problems anywhere downstream — points = (0)	0
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = (0)	0
Total for S 6 — Add the points in the boxes above	0

Rating of Value If score is: ___2-4 = H ___1 = M ___0 = L (L) *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number ____

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the wetland unit have the potential to provide habitat for many species?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within forest.* Check the Cowardin plant classes in unit. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____Aquatic bed	4 structures or more: points = 4
✓ Emergent plants	3 structures: points = 2
____Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
____Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a forested class, check if:

____The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated	4 or more types present: points = 3
____Seasonally flooded or inundated	3 types present: points = 2
____Occasionally flooded or inundated	2 types present: points = 1
✓ Saturated only	1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland	
____Seasonally flowing stream in, or adjacent to, the wetland	
____**Lake Fringe wetland**	**2 points**
____**Freshwater tidal wetland**	**2 points**

0

H 1.3. Richness of plant species

Count the number of plant species in the wetland unit that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

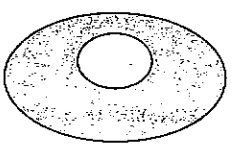
If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

1

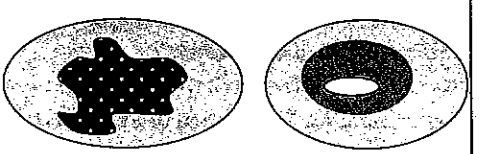
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

None = 0 points

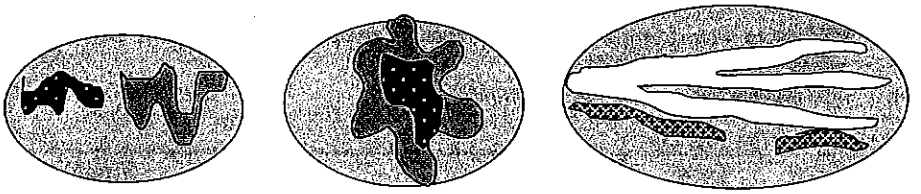


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



0

Wetland name or number Az + Pe

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the unit (> 4 in diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 in) within the unit ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	1

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** __1__**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat at the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 5 % undisturbed habitat___ + [(% moderate and low intensity land uses)/2] 5 = _____% If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	1
H 2.2. Undisturbed habitat in 1 km Polygon around unit. Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	3
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	0
Total for H 2 Add the points in the boxes above	4

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** ___**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has 3 or more priority habitats within 100m (see next page) — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	0

Rating of Value If score is:___**2 = H** ___**1 = M** ___0 **= L** *Record the rating on the first page*

Wetland name or number A & D's

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This questian is independent af the land use between the wetland unit and the priarity habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
— **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptians in WDFW PHS report p. 152*).
— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptians in WDFW PHS repart p. 158 – see web link above*).
— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptians in WDFW PHS repart p. 161 – see web link above*).
— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptians af habitats and the definition af relatively undisturbed are in WDFW repart – see web link an previaus page).*
— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criterio that apply to the wetlond. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.S ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-1S1? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 2S) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category** I No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland unit you are rating listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 2.3. Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below. **If you answer YES you will still need to rote the wetlond bosed on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than S.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

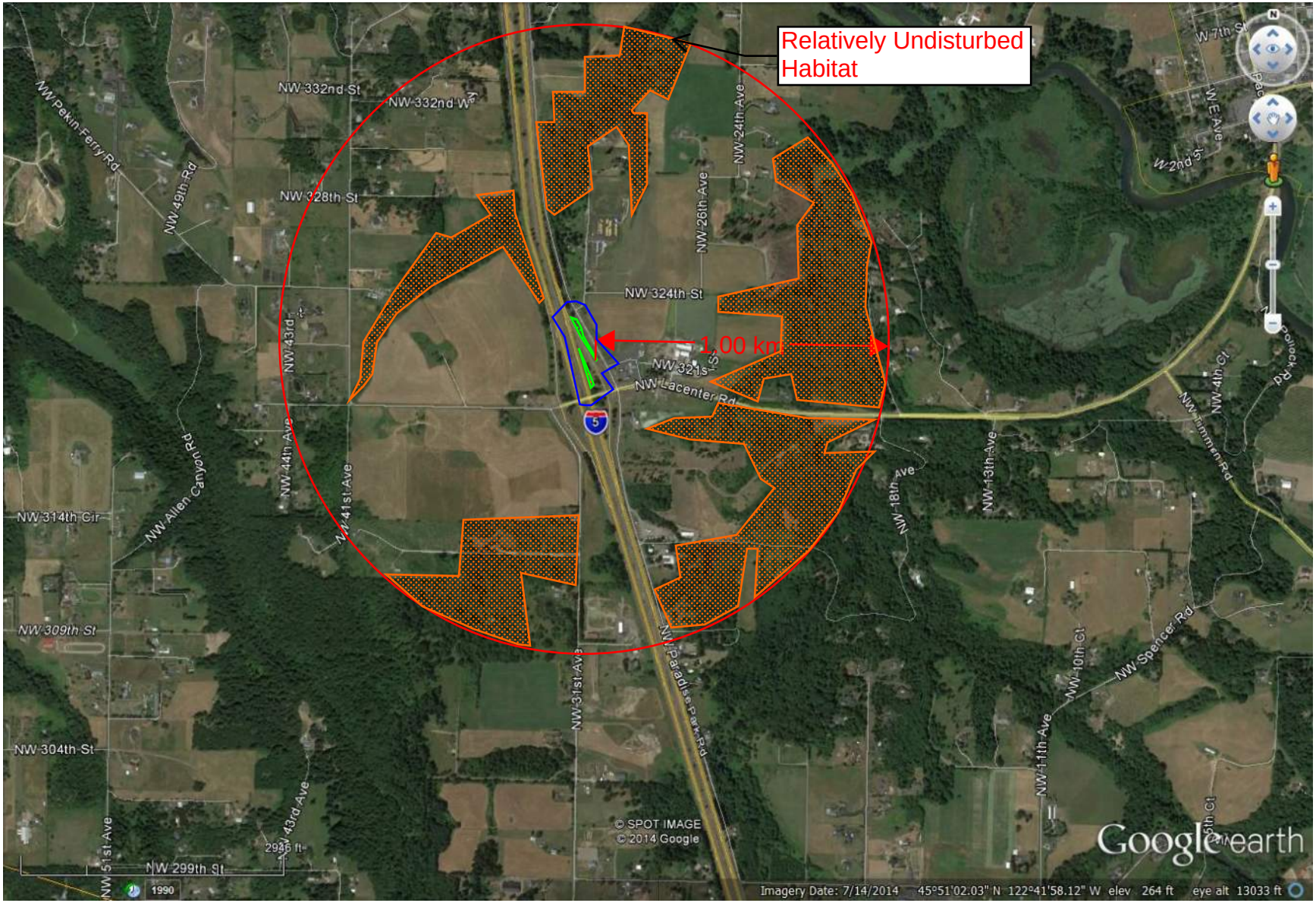
Wetland name or number _____

SC 4.0. Forested Wetlands Does the wetland unit have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC S.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC S.1** No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** **SC 6.1.** Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** **SC 6.2.** Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** **SC 6.3.** Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Appendix B. Salt-Tolerant Plants

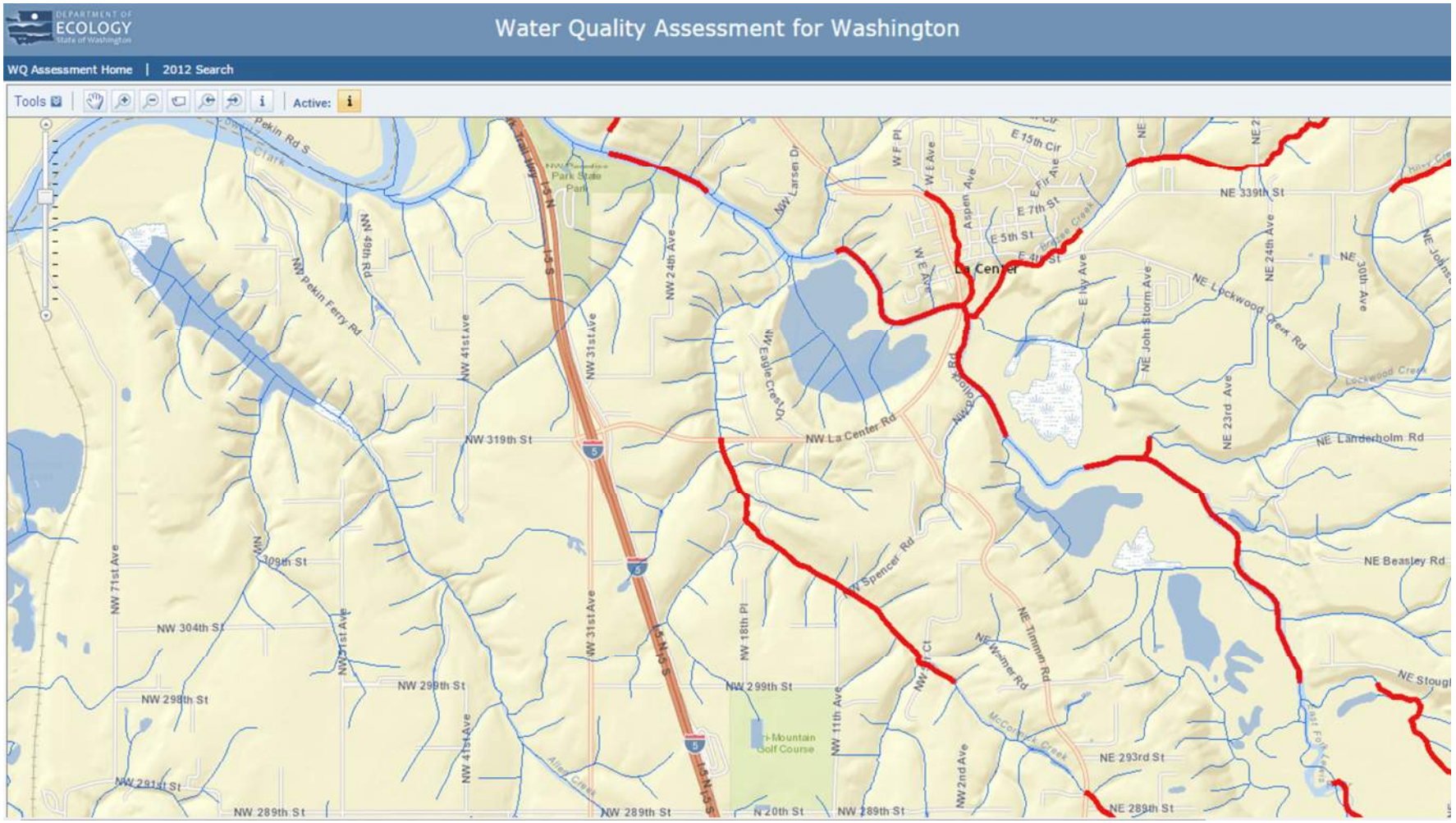
Salt sensitivity rating of the estuarine wetland and associated uplands flora of the Pacific Northwest (*=estimated) from Hutchinson (1991). Some species names have changes since 1991. New names as of July 2014 from USDA PLANTS Database and the 2014 National Wetland Plant List website version 3.2 (in parentheses): http://rsgisias.crrel.usace.army.mil/NWPL/. Names that have not changed are labeled "NC".

OLD NAME	NEW NAME
Very Sensitive	
Tsuga heterophylla	NC
Angelica arguta	NC
Berberis aquifolium	Mahonia aquifolium
Caltha asarifolia	Caltha palustris
Carex rostrata	NC
Equisetum fluviatile	NC
Galium cymosum	Galium trifidum ssp. columbianum
Habenaria dilatata	Platanthera dilatata var. dilatata (=Piperia dilatata)
Heracleum lanatum	Heracleum maximum
Hypericum formosum	Hypericum scouleri
Iris pseudacorus	NC
Juncus nevadensis	NC
Lysichitum americanum	Lysichiton americanus
Mentha arvensis	NC
Mentha piperata	Mentha aquatica
Myosotis laxa	NC
Pichea sitchensis	NC
Rumex acetosella	NC
Sensitive	
*Aira praecox	NC
*Alnus rubra	NC
*Angelica lucida	NC
*Anthoxanthum odoratum	NC
*Athyrium filix-femina	Athyrium filix-femina ssp. cyclosorum (=Athyrium cyclosorum)
*Calamagrotis nutkaensis	NC
*Carex obnupta	NC
*Cornus stolonifera	Cornus sericea (=Cornus alba)
*Equisetum arvense	NC
*Glyceria grandis	NC
*Holcus lanatus	NC
*Hypochaeris radicata	NC
*Lonicera involucrata	NC
*Maianthemum dilatatum	NC
*Physocarpus capitatus	NC



Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01



Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01

Water Quality Improvement Project

East Fork Lewis River Area: Multi-parameter

Introduction

The East Fork Lewis River sub-basin is located in Clark and Skamania Counties, in the southwest corner of the state. It subbasin drains 212 square miles, of which the lower 167 square miles are within Clark County. The upper part of the subbasin is in Skamania County, in the Gifford Pinchot National Forest. Clark County owns over 700 acres (2.6 square miles) of riparian land throughout much of the lower East Fork Lewis River valley.

The sub-basin includes a couple of small towns, but the majority of the watershed consists of small-acreage private properties. Clark County owns a significant amount of riparian area throughout much of the lower East Fork Lewis River valley, with much of that in large parcels of designated park land.

Water quality issues

The East Fork Lewis River and its tributaries are listed on the 303(d) list of impaired water bodies for high instream temperatures and fecal coliform bacteria problems. Waterbodies placed on the 303(d) list require the preparation of a Total Maximum Daily Load (TMDL) to identify and quantify sources of the impairments and to recommend implementation strategies for reducing point and nonpoint source loads.

Why this matters

Fecal coliform bacteria from human and animal waste can make people sick. Bacteria can get into our waters from untreated or partially treated discharges from wastewater treatment plants, from improperly functioning septic systems, and from livestock, pets and wildlife.

People can help keep bacteria out of the water. Bag and trash dog poop. Check your on site sewage system to make sure it is maintained and working properly. Fence livestock out of streams and use manure management practices that protect water quality.

Water temperature influences what types of organisms can live in a waterbody. Cooler water can hold more dissolved oxygen that fish and other aquatic life need to breathe. Warmer water holds less dissolved oxygen. Threatened and endangered salmon need cold, clean water to survive.

One way to cool water temperature is to shade the waterbody by adding or retaining streamside vegetation.

PROJECT INFO

Location:
WRIA: #27 (Lewis)
Counties:
Lewis
Skamania

Water-body Name:
East Fork Lewis River

Parameters:
Fecal coliform
Temperature

# of TMDLs: ---

Status:
Under development

Contact Info:
Brett Raunig
Phone: 360-690-4660
Email: Brett.Raunig@ecy.wa.gov

Vancouver Field Office
WA Department of Ecology
2108 Grand Blvd
Vancouver, WA 98661-4622

Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01

Wetland name or number B2

RATING SUMMARY – Western Washington

Name of wetland (or ID #): La Center Rd/I-5 – Wetland B2 Date of site visit: 10/3/14

Rated by Dustin Day Trained by Ecology? ✓Yes ___No Date of training 9/25/14

HGM Class used for rating Slopes Unit has multiple HGM classes? ___Y _X_N

NOTE: Form is not complete without the figures requested *(figures con be combined).*

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY IV (based on functions___ or special characteristics___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

_____**Category II** – Total score = 20 - 22

_____**Category III** – Total score = 16 - 19

__✓__**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	TOTAL
	Circle the appraprate ratings			
Site Potential	H (M) L	H M (L)	H M (L)	
Landscape Potential	H (M) L	H (M) L	H (M) L	
Value	(H) M L	H M (L)	H (M) L	
Score Based on Ratings	6	4	5	15

Score for each function based on three ratings *(order of rotings is not importont)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	✓

Wetland name or number ____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*con be added to mop of hydroperiods)*	D 1.1, D 1.4	
Boundary of 1S0 ft buffer *(can be added to another figure)*	D 2.2, D S.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of 1S0 ft buffer *(con be added to onother figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(con be added to onother figure)*	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of 1S0 ft buffer *(con be odded to onother figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(con be odded to figure obove)*	S 4.1	
Boundary of 1S0 ft buffer (can be added to another figure)	S 2.1, S S.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number Bc

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

   NO - go to 5 **YES** – The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number _____

NO - go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number 13E

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the wetland unit have the potential to improve water quality?	
S 1.1. Characteristics of average slope of unit: *(a 1% slope has a 1 ft verticol drop in elevatian for every 100 ft of horizontal distonce)* Slope is 1% or less — points = 3 Slope is > 1%-2% — points = 2 Slope is > 2%-S% — points = (1) Slope is greater than S% — points = 0	1
S 1.2. The soil 2 in below the surface (or duff layer) is clay or organic *(use NRCS definitions)*: Yes = 3 No = 0 points	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense means you have trauble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.* Dense, uncut, herbaceous plants > 90% of the wetland area — points = 6 Dense, uncut, herbaceous plants > ½ of area — points = 3 Dense, woody, plants > ½ of area — points = 2 Dense, uncut, herbaceous plants > ¼ of area — points = 1 Does not meet any of the criteria above for plants — points = 0	3
Total for S 1 — Add the points in the boxes above	4

Rating of Site Potential If score is: ___12 = H ___6-11 = M ___0-5 = (L) *Record the roting on the first page*

2.0. Does the landscape have the potential to support the water quality function at the site?	
S 2.1. Is > 10% of the buffer within 1S0 ft of wetland unit in land uses that generate pollutants? Yes = (1) No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1?Other sources _____ Yes = 1 No = 0	0
Total for S 2 — Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___1-2 = (M) ___0 = L *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the unit discharge directly to a stream, river, or lake that is on the 303(d) list? Yes = 1 No = 0	1
S 3.2. Is the unit in a sub-basin where water quality is an issue? *At least one aquatic resource in the basin is on the 303(d) list.* Yes = 1 No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? Yes = 2 No = 0	0
Total for S 3 — Add the points in the boxes above	2

Rating of Value If score is: ___2-4 = (H) ___1 = M ___0 = L *Record the rating on the first page*

Wetland name or number Be

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the wetland unit have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.* Dense, uncut, **rigid** plants cover > 90% of the area of the wetland — points = 1 All other conditions — points = 0	0

Rating of Site Potential If score is: ___1 = M ___0 = (L) *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions at the site?	
S 5.1. Is more than 25% of the buffer area within 150 ft upslope of wetland unit in land uses that generate excess surface runoff? Yes = 1 No = 0	1

Rating of Landscape Potential If score is: ___1 = (M) ___0 = L *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems? The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) — points = 2 Surface flooding problems are in a sub-basin farther down-gradient — points = 1 No flooding problems anywhere downstream — points = 0	0
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for S 6 — Add the points in the boxes above	0

Rating of Value If score is: ___**2-4** = H ___1 = M ___0 = (L) *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number BE

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the wetland unit have the potential to provide habitat for many species?

H 1.1. Structure of plant community: *Indicotors ore Cowordin closses ond stroto within forest.* Check the Cowardin plant classes in unit. *Up to 10 potches moy be combined for eoch closs to meet the threshold of ¼ oc or more thon 10% of the unit if it is smoller thon 2.5 oc. Add the number of structures checked.*

___Aquatic bed	4 structures or more: points = 4
_1_Emergent plants	3 structures: points = 2
___Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
___Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit hos o forested closs, check if:

___The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

___Permanently flooded or inundated	4 or more types present: points = 3
___Seasonally flooded or inundated	3 types present: points = 2
___Occasionally flooded or inundated	2 types present: points = 1
_✓_Saturated only	1 type present: points = 0
___Permanently flowing stream or river in, or adjacent to, the wetland	
___Seasonally flowing stream in, or adjacent to, the wetland	
___**Lake Fringe wetland**	**2 points**
___**Freshwater tidal wetland**	**2 points**

0

H 1.3. Richness of plant species

Count the number of plant species in the wetland unit that cover at least 10 ft^2.

Different potches of the some species con be combined to meet the size threshold ond you do not hove to nome the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

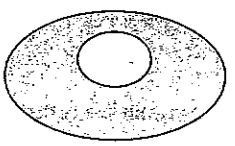
If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

0

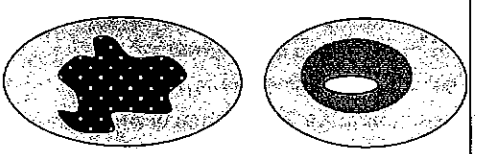
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you hove four or more plont closses or three closses ond open woter, the roting is olwoys high.*

None = 0 points

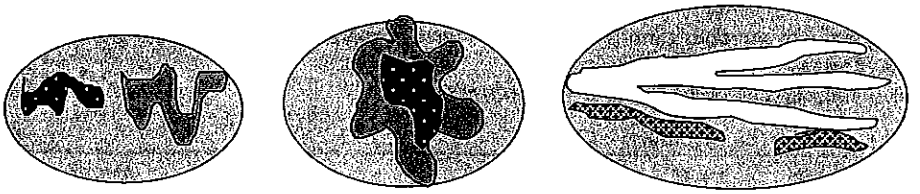


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



0

Wetland name or number _____

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the unit (> 4 in diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 in) within the unit ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ✓ Invasive plants cover less than 25% of the wetland area in every stratum of plants (see *H 1.1 for list of strata*)	1
Total for H 1 — Add the points in the boxes above	1

Rating of Site Potential If score is: ___**15-18 = H** ___**7-14 = M** ___**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat at the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat___ + [(% moderate and low intensity land uses)/2]___ = _____% If total accessible habitat is: 25 + 10/2 = 30%. > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	2
H 2.2. Undisturbed habitat in 1 km Polygon around unit. Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	0
Total for H 2 — Add the points in the boxes above	3

Rating of Landscape Potential If score is: ___**4-6 = H** ___**1-3 = M** ___**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has 3 or more priority habitats within 100m (see next page) — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	1

Rating of Value If score is: ___**2 = H** ___**1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number Be

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
— **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*
— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number Be

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland unit you are rating listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 2.3. Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland bosed on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

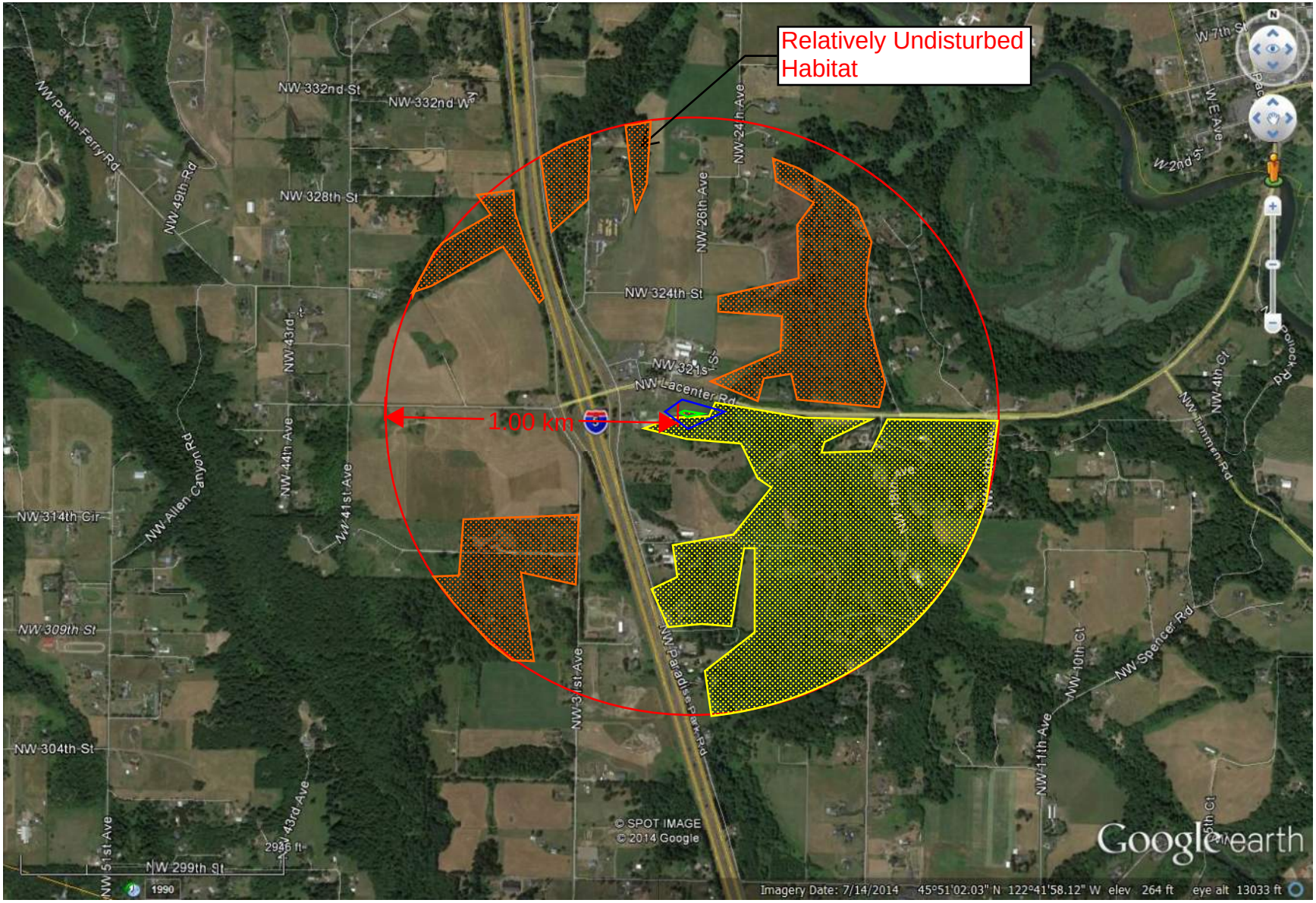
Wetland name or number B3

SC 4.0. Forested Wetlands Does the wetland unit have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you onswer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (S3 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC S.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.S ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC S.1** No = **Not a wetland in a coastal lagoon** SC S.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you onswer yes you will still need to rote the wetlond bosed on its hobitot functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 10S — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** **SC 6.1.** Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** **SC 6.2.** Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** **SC 6.3.** Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	N/A

Appendix B. Salt-Tolerant Plants

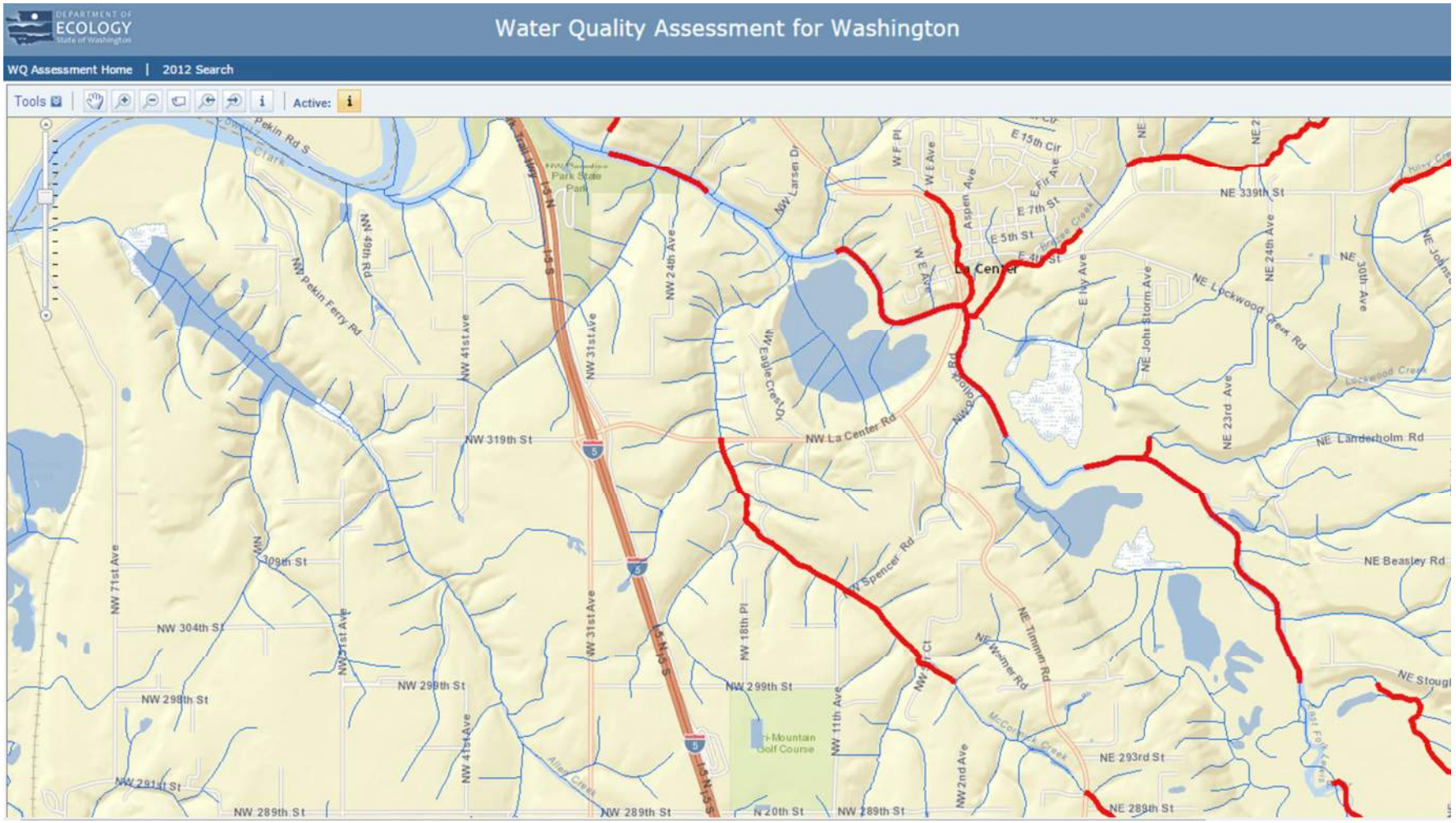
Salt sensitivity rating of the estuarine wetland and associated uplands flora of the Pacific Northwest (*=estimated) from Hutchinson (1991). Some species names have changes since 1991. New names as of July 2014 from USDA PLANTS Database and the 2014 National Wetland Plant List website version 3.2 (in parentheses): http://rsgisias.crrel.usace.army.mil/NWPL/. Names that have not changed are labeled "NC".

OLD NAME	NEW NAME
Very Sensitive	
Tsuga heterophylla	NC
Angelica arguta	NC
Berberis aquifolium	Mahonia aquifolium
Caltha asarifolia	Caltha palustris
Carex rostrata	NC
Equisetum fluviatile	NC
Galium cymosum	Galium trifidum ssp. columbianum
Habenaria dilatata	Platanthera dilatata var. dilatata (=Piperia dilatata)
Heracleum lanatum	Heracleum maximum
Hypericum formosum	Hypericum scouleri
Iris pseudacorus	NC
Juncus nevadensis	NC
Lysichitum americanum	Lysichiton americanus
Mentha arvensis	NC
Mentha piperata	Mentha aquatica
Myosotis laxa	NC
Pichea sitchensis	NC
Rumex acetosella	NC
Sensitive	
*Aira praecox	NC
*Alnus rubra	NC
*Angelica lucida	NC
*Anthoxanthum odoratum	NC
*Athyrium filix-femina	Athyrium filix-femina ssp. cyclosorum (=Athyrium cyclosorum)
*Calamagrotis nutkaensis	NC
*Carex obnupta	NC
*Cornus stolonifera	Cornus sericea (=Cornus alba)
*Equisetum arvense	NC
*Glyceria grandis	NC
*Holcus lanatus	NC
*Hypochaeris radicata	NC
*Lonicera involucrata	NC
*Maianthemum dilatatum	NC
*Physocarpus capitatus	NC



Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01



Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01

Water Quality Improvement Project

East Fork Lewis River Area: Multi-parameter

Introduction

The East Fork Lewis River sub-basin is located in Clark and Skamania Counties, in the southwest corner of the state. It subbasin drains 212 square miles, of which the lower 167 square miles are within Clark County. The upper part of the subbasin is in Skamania County, in the Gifford Pinchot National Forest. Clark County owns over 700 acres (2.6 square miles) of riparian land throughout much of the lower East Fork Lewis River valley.

The sub-basin includes a couple of small towns, but the majority of the watershed consists of small-acreage private properties. Clark County owns a significant amount of riparian area throughout much of the lower East Fork Lewis River valley, with much of that in large parcels of designated park land.

Water quality issues

The East Fork Lewis River and its tributaries are listed on the 303(d) list of impaired water bodies for high instream temperatures and fecal coliform bacteria problems. Waterbodies placed on the 303(d) list require the preparation of a Total Maximum Daily Load (TMDL) to identify and quantify sources of the impairments and to recommend implementation strategies for reducing point and nonpoint source loads.

Why this matters

Fecal coliform bacteria from human and animal waste can make people sick. Bacteria can get into our waters from untreated or partially treated discharges from wastewater treatment plants, from improperly functioning septic systems, and from livestock, pets and wildlife.

People can help keep bacteria out of the water. Bag and trash dog poop. Check your on site sewage system to make sure it is maintained and working properly. Fence livestock out of streams and use manure management practices that protect water quality.

Water temperature influences what types of organisms can live in a waterbody. Cooler water can hold more dissolved oxygen that fish and other aquatic life need to breathe. Warmer water holds less dissolved oxygen. Threatened and endangered salmon need cold, clean water to survive.

One way to cool water temperature is to shade the waterbody by adding or retaining streamside vegetation.

PROJECT INFO

Location:
WRIA: #27 (Lewis)
Counties:
Lewis
Skamania

Water-body Name:
East Fork Lewis River

Parameters:
Fecal coliform
Temperature

# of TMDLs: ---

Status:
Under development

Contact Info:
Brett Raunig
Phone: 360-690-4660
Email: Brett.Raunig@ecy.wa.gov

Vancouver Field Office
WA Department of Ecology
2108 Grand Blvd
Vancouver, WA 98661-4622

Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01

Wetland name or number Ce & Ee

RATING SUMMARY – Western Washington

Name of wetland (or ID #): La Center Rd/I-5 Interchange – Wetlands Ce + Ee Date of site visit: 10/3/14

Rated by Dustin Day, PWS Trained by Ecology? X Yes ___ No Date of training 9/25/14

HGM Class used for rating Depressional Unit has multiple HGM classes? X Y ___ N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY ____ (based on functions___ or special characteristics___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

_____**Category II** – Total score = 20 - 22

_____**Category III** – Total score = 16 - 19

__✓__**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality			Hydrologic			Habitat			TOTAL
	Circle the appropriate ratings									
Site Potential	H	M	(L)	H	(M)	L	H	M	(L)	
Landscape Potential	H	M	(L)	H	(M)	L	H	(M)	L	
Value	(H)	M	L	H	M	(L)	H	(M)	L	
Score Based on Ratings	5			5			5			15

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M;L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	

Wetland name or number ____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 1.4	
Boundary of 150 ft buffer (*can be added to another figure*)	D 2.2, D 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of 150 ft buffer (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of 150 ft buffer (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above*)	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number _____

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be ased to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

   NO - go to 5 **YES** – The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number _____

NO - go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number _____

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the wetland unit have the potential to improve water quality?		CG	GE
D 1.1. Characteristics of surface water flows out of the wetland:			
Unit is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet).	points = 3		
Unit has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.	points = 2		
Unit has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	3	2
Unit is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 1		
D 1.2. The soil 2 in below the surface (or duff layer) is clay or organic *(use NRCS definitions).*	Yes = 4 No = 0	0	0
D 1.3. Characteristics of persistent plants (emergent, shrub, and/or forest Cowardin class):			
Unit has persistent, ungrazed, plants ≥ 95% of area	points = 5		
Unit has persistent, ungrazed, plants ≥ ½ of area	points = 3		
Unit has persistent, ungrazed plants ≥ $^1/_{10}$ of area	points = 1	1	3
Unit has persistent, ungrazed plants < $^1/_{10}$ of area	points = 0		
D 1.4. Characteristics of seasonal ponding or inundation:			
This is the area of the wetland unit that is ponded for at least 2 months. See description in manual.			
Area seasonally ponded is > ½ total area of wetland	points = 4		
Area seasonally ponded is > ¼ total area of wetland	points = 2	0	0
Area seasonally ponded is < ¼ total area of wetland	points = 0		
Total for D 1	Add the points in the boxes above	4	5

Rating of Site Potential If score is: ___**12-16 = H** ___**6-11 = M** ___**0-5 = L** (L) *Record the rating an the first page*

D 2.0. Does the landscape have the potential to support the water quality function at the site?			
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	0	0
D 2.2. Is > 10% of the buffer within 150 ft of wetland unit in land uses that generate pollutants?	Yes = 1 No = 0	0	0
D 2.3. Are there septic systems within 250 ft of the wetland unit?	Yes = 1 No = 0	0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____	Yes = 1 No = 0	0	0
Total for D 2	Add the points in the boxes above	0	0

Rating of Landscape Potential If score is: ___**3 or 4 = H** ___**1 or 2 = M** ___**0 = L** (L) *Record the rating an the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?			
D 3.1. Does the unit discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list?	Yes = 1 No = 0	1	1
D 3.2. Is the unit in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	1	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which unit is found*)?	Yes = 2 No = 0	0	0
Total for D 3	Add the points in the boxes above	2	2

Rating of Value If score is: ___**2-4 = H** (H) ___**1 = M** ___**0 = L** *Record the rating an the first page*

Wetland name or number _____

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the wetland unit have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water flows out of the wetland:

Unit is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	
Unit has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Unit is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Unit has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	2

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For units with no outlet, measure from the surface of permanent water or if dry, the deepest part.*

Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least D.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
The wetland is a "headwater" wetland	points = 3	
Unit is flat but has small depressions on the surface that trap water	points = 1	3
Marks of ponding less than 0.5 ft (6 in)	points = 0	

D 4.3. Contribution of unit to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*

The area of the basin is less than 1D times the area of the unit	points = 5	
The area of the basin is 1D to 100 times the area of the unit	points = 3	5
The area of the basin is more than 1D0 times the area of the unit	points = D	
Entire unit is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	10

Rating of Site Potential If score is: ___12-16 = H ___6-11 = (M) ___0-5 = L *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions at the site?

D 5.1. Does the unit receive any stormwater discharges?	Yes = 1 No = D	0
D 5.2. Is >1D% of the land use within 15D ft of the wetland in a land use that generates runoff?	Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland unit covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = D	0
Total for D 5	Add the points in the boxes above	0

Rating of Landscape Potential If score is: ___3 = H ___1 or 2 = M ___0 = (L) *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met..*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds),

- Damage occurs in sub-basin that is immediately down-gradient of unit. points = 2
- Damage occurs in a sub-basin farther down-gradient. points = 1

Flooding from groundwater is an issue in the sub-basin. points = 1

The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = D

There are no problems with flooding downstream of the unit. points = (0) → 0

D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0 → 0

Total for D 6 Add the points in the boxes above → 0

Rating of Value If score is: ___2-4 = H ___1 = M ___0 = (L) *Record the rating on the first page*

Wetland name or number _____

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the wetland unit have the potential to provide habitat for many species? CO Ee

H 1.1. Structure of plant community: *Indicotors ore Cowardin classes and strota within forest.* Check the Cowardin plant classes in unit. *Up to 10 patches may be combined for each class to meet the threshold of ¼ oc or more thon 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____Aquatic bed	4 structures or more: points = 4
__✓__Emergent plants	3 structures: points = 2
____Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
____Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a forested class, check if:

____The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon

0 1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated	4 or more types present: points = 3
__✓__Seasonally flooded or inundated	3 types present: points = 2
____Occasionally flooded or inundated	2 types present: points = 1
__✓__Saturated only	1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland	
____Seasonally flowing stream in, or adjacent to, the wetland	
____**Lake Fringe wetland**	**2 points**
____**Freshwater tidal wetland**	**2 points**

1 1

H 1.3. Richness of plant species

Count the number of plant species in the wetland unit that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurosian milfoil, reed conorygross, purple loosestrife, Canadian thistle***

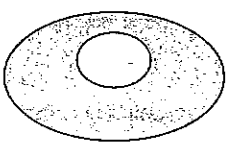
If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

1 1

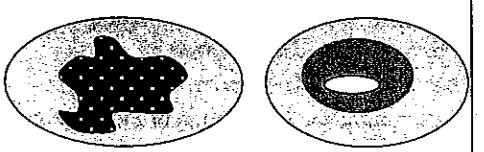
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you hove four or more plant classes or three closses and open water, the roting is always high.*

None = 0 points

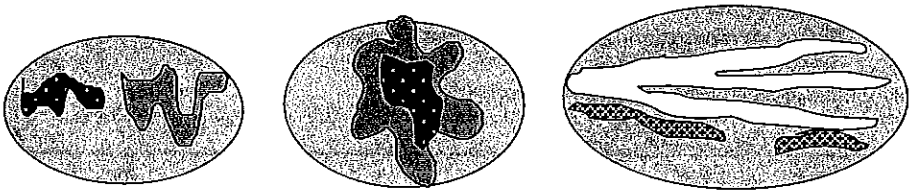


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



0 1

Wetland name or number _____

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the unit (> 4 in diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 in) within the unit ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __✓__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	1
Total for H 1 — Add the points in the boxes above	3

Rating of Site Potential If score is: ___**15-18** = H ___**7-14** = M ___**0-6** = L — *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat at the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat___ + [(% moderate and low intensity land uses)/2]___ = _____% 25 + 10/2 = 30% If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	2
H 2.2. Undisturbed habitat in 1 km Polygon around unit. Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	0
Total for H 2 — Add the points in the boxes above	3

Rating of Landscape Potential If score is: ___**4-6** = H ___**1-3** = M ___**< 1** = L — *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has 3 or more priority habitats within 100m (see next page) — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	1

Rating of Value If score is: ___**2** = H ___**1** = M ___**0** = L — *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptians in WDFW PHS report p. 152*).
— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link abave*).
— **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptians in WDFW PHS repart p. 161 – see web link above*).
— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptians of habitats and the definition af relatively undisturbed are in WDFW repart – see web link on previaus page).*
— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland unit you are rating listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 2.3. Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rote the wetland bosed on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

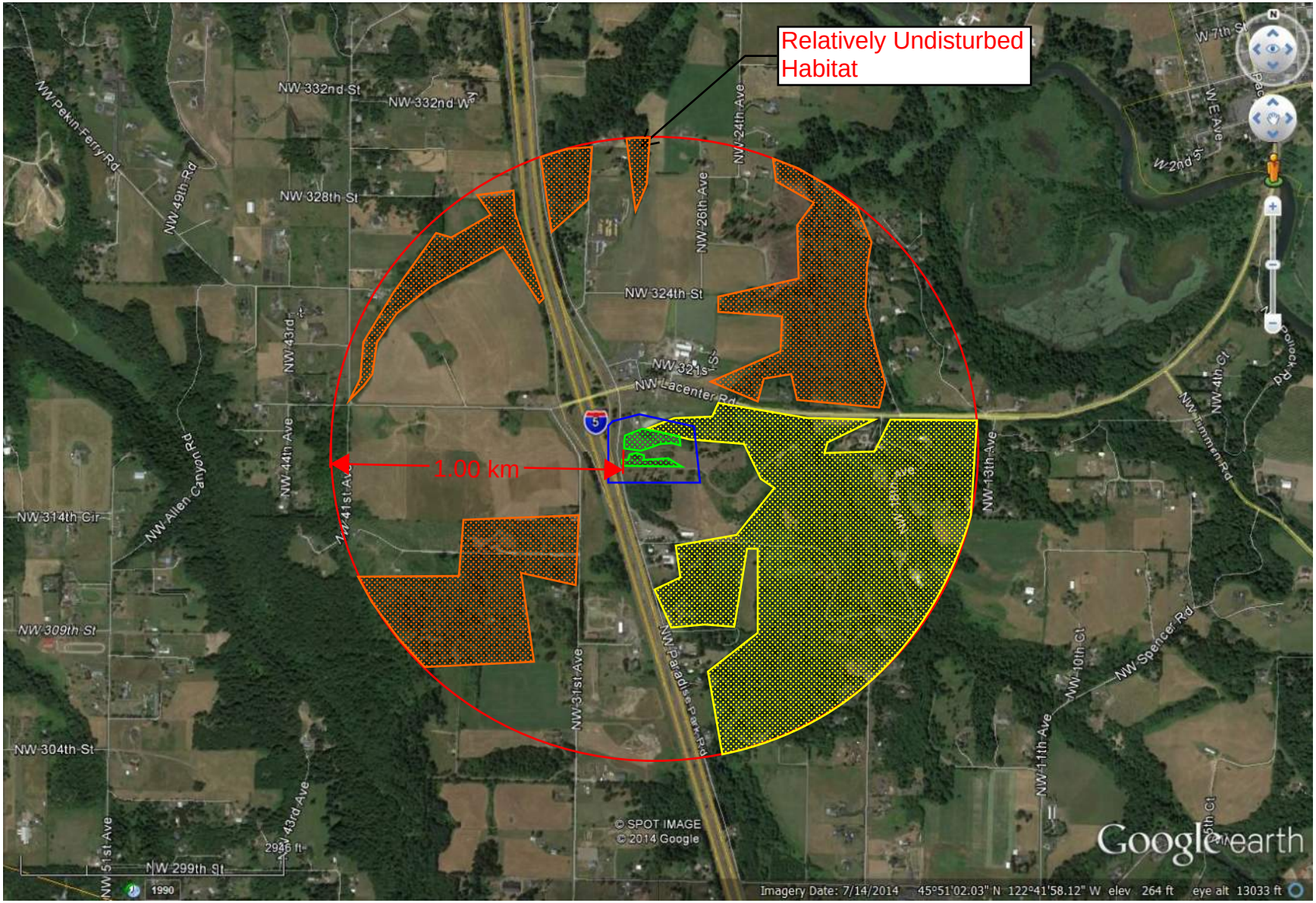
Wetland name or number _____

SC 4.0. Forested Wetlands Does the wetland unit have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you onswer YES you will still need to rote the wetlond based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be meosured neor the bottom)* Yes – Go to **SC S.1** No = **Not a wetland in a coastal lagoon** 5C 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you onswer yes you will still need to rote the wetlond bosed on its hobitot functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean 5hores-Copalis: Lands west of SR 115 and 5R 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** **SC 6.1.** Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** **SC 6.2.** Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** **SC 6.3.** Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Appendix B. Salt-Tolerant Plants

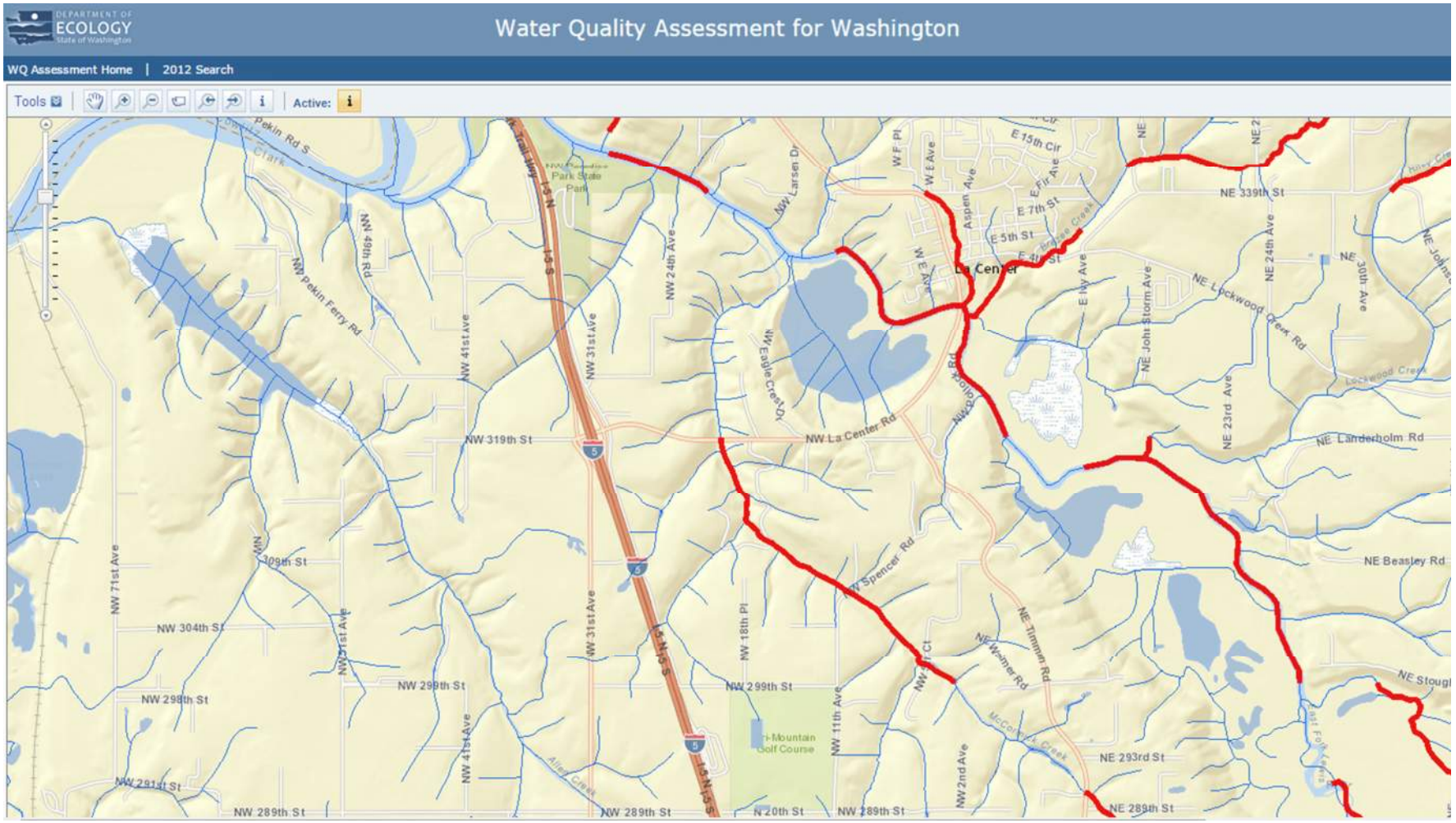
Salt sensitivity rating of the estuarine wetland and associated uplands flora of the Pacific Northwest (*=estimated) from Hutchinson (1991). Some species names have changes since 1991. New names as of July 2014 from USDA PLANTS Database and the 2014 National Wetland Plant List website version 3.2 (in parentheses): http://rsgisias.crrel.usace.army.mil/NWPL/. Names that have not changed are labeled "NC".

OLD NAME	NEW NAME
Very Sensitive	
Tsuga heterophylla	NC
Angelica arguta	NC
Berberis aquifolium	Mahonia aquifolium
Caltha asarifolia	Caltha palustris
Carex rostrata	NC
Equisetum fluviatile	NC
Galium cymosum	Galium trifidum ssp. columbianum
Habenaria dilatata	Platanthera dilatata var. dilatata (=Piperia dilatata)
Heracleum lanatum	Heracleum maximum
Hypericum formosum	Hypericum scouleri
Iris pseudacorus	NC
Juncus nevadensis	NC
Lysichitum americanum	Lysichiton americanus
Mentha arvensis	NC
Mentha piperata	Mentha aquatica
Myosotis laxa	NC
Pichea sitchensis	NC
Rumex acetosella	NC
Sensitive	
*Aira praecox	NC
*Alnus rubra	NC
*Angelica lucida	NC
*Anthoxanthum odoratum	NC
*Athyrium filix-femina	Athyrium filix-femina ssp. cyclosorum (=Athyrium cyclosorum)
*Calamagrotis nutkaensis	NC
*Carex obnupta	NC
*Cornus stolonifera	Cornus sericea (=Cornus alba)
*Equisetum arvense	NC
*Glyceria grandis	NC
*Holcus lanatus	NC
*Hypochaeris radicata	NC
*Lonicera involucrata	NC
*Maianthemum dilatatum	NC
*Physocarpus capitatus	NC



Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01



Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01

Water Quality Improvement Project

East Fork Lewis River Area: Multi-parameter

Introduction

The East Fork Lewis River sub-basin is located in Clark and Skamania Counties, in the southwest corner of the state. It subbasin drains 212 square miles, of which the lower 167 square miles are within Clark County. The upper part of the subbasin is in Skamania County, in the Gifford Pinchot National Forest. Clark County owns over 700 acres (2.6 square miles) of riparian land throughout much of the lower East Fork Lewis River valley.

The sub-basin includes a couple of small towns, but the majority of the watershed consists of small-acreage private properties. Clark County owns a significant amount of riparian area throughout much of the lower East Fork Lewis River valley, with much of that in large parcels of designated park land.

Water quality issues

The East Fork Lewis River and its tributaries are listed on the 303(d) list of impaired water bodies for high instream temperatures and fecal coliform bacteria problems. Waterbodies placed on the 303(d) list require the preparation of a Total Maximum Daily Load (TMDL) to identify and quantify sources of the impairments and to recommend implementation strategies for reducing point and nonpoint source loads.

Why this matters

Fecal coliform bacteria from human and animal waste can make people sick. Bacteria can get into our waters from untreated or partially treated discharges from wastewater treatment plants, from improperly functioning septic systems, and from livestock, pets and wildlife.

People can help keep bacteria out of the water. Bag and trash dog poop. Check your on site sewage system to make sure it is maintained and working properly. Fence livestock out of streams and use manure management practices that protect water quality.

Water temperature influences what types of organisms can live in a waterbody. Cooler water can hold more dissolved oxygen that fish and other aquatic life need to breathe. Warmer water holds less dissolved oxygen. Threatened and endangered salmon need cold, clean water to survive.

One way to cool water temperature is to shade the waterbody by adding or retaining streamside vegetation.

PROJECT INFO

Location:
WRIA: #27 (Lewis)
Counties:
Lewis
Skamania

Water-body Name:
East Fork Lewis River

Parameters:
Fecal coliform
Temperature

# of TMDLs: ---

Status:
Under development

Contact Info:
Brett Raunig
Phone: 360-690-4660
Email: Brett.Raunig@ecy.wa.gov

Vancouver Field Office
WA Department of Ecology
2108 Grand Blvd
Vancouver, WA 98661-4622

Wetland Rating Graphics

NW La Center Road/Interstate – 5 Interchange Improvements Project, La Center WA
October 3, 2014
A13.0098.01

Appendix C
ESA Letters of Concurrence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

JUL - 8 2015

In Reply Refer To:
01EWFW00-2015-I-0545
XRef 13410-2007-I-0310

Barb Aberle
Southwest Region Environmental Manager
Washington State Department of Transportation
11018 Northeast 551st Circle
Vancouver, Washington 98682-6686

Dear Ms. Aberle:

Subject: Northwest La Center Road/Interstate 5 Interchange Improvements Project

This letters responds to the Washington State Department of Transportation (WSDOT) request, on behalf of the Federal Highway Administration (FHWA), for informal consultation on the Northwest (NW) La Center Road/ Interstate 5 Interchange Improvement Project. The project has Federal funding from FHWA.

We have reviewed the WSDOT Biological Assessment (BA) received on April 27, 2015, in support of a "may affect, not likely to adversely affect" determination for bull trout (*Salvelinus confluentus*). The FHWA and WSDOT also determined that the project will have "no effect" on several additional species and critical habitat known to occur in Clark County, washington. There is no requirement for the U.S. Fish and Wildlife Service (Service) to concur on "no effect" determinations. These determinations that the project will have no effect on these species and habitats rest with the action agency. This informal consultation was conducted in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA).

The project will occur in Clark County at the existing interchange (milepost 16.8) of Interstate 5 (I-5) at NW La Center Road near La Center, Washington. The primary purpose of the proposed project is to provide traffic mitigation for a planned Cowlitz Tribe development located west of the interchange. The development includes a casino, resort, and tribal government center. The ESA consultation for that project was completed in 2007 (XRef 13410-2007-I-0310) and identified the proposed NW La Center Road/I-5 Interchange Improvements Project as an interrelated action that would undergo separate ESA consultation.

The interchange improvements project will include the following:

- Construction of a new overpass structure located immediately south of the existing structure that will accommodate four travel lanes and pedestrian and bicycle facilities.
- Modification of the existing northbound and southbound interchange ramp terminals to include multiple-lane roundabouts.
- A modified northbound off-ramp that is lengthened and includes a second exit lane.
- A modified southbound on-ramp that includes two receiving lanes off of the ramp terminal that transition to a single lane prior to merging with I-5 mainline traffic.
- A partial relocation of Paradise Park Road and the development of a new intersection with NW La Center Road.
- Relocation of NW 319th Street approximately 350 feet south of the current alignment to accommodate the new overpass and provide an enhanced east-west circulation network that is more compatible with the Cowlitz Tribe development.
- A partial relocation of NW 31st Avenue and the development of a new intersection with NW 319th Street. The new intersection will operate as a roundabout to accommodate near-term and future development.

There are currently 6.83 acres of pollutant-generating impervious surface (PGIS) in the project footprint. Stormwater flows untreated through a series of ditches and culverts to an unnamed tributary northeast of the project as well as several tributaries to McCormick Creek southeast of the project. Both the unnamed tributary and McCormick Creek drain to the East Fork Lewis River approximately one mile east of the project footprint. The project will create an additional 11.59 acres of PGIS and provide stormwater treatment for 13.63 acres of PGIS. Treatment will consist of compost amended vegetated filter strips (CAVFS), biofiltration swales, and/or cartridge filters. Flow control will be provided by detention ponds or CAVFS.

Sufficient information has been provided to determine the effects of the proposed project to federally listed species and to conclude whether the changes are likely to adversely affect those species. Our concurrence is based on information in the BA and associated documents, successful implementation of the minimization measures and best management practices (BMPs) as described in these documents, email and phone communication between the Service and WSDOT occurring between April 24 and May 19, 2015, and the following rationale:

Bull Trout

Occurrence in the Action Area

The proposed project area is located within the bull trout Coastal Recovery Unit (USFWS 2014, p. 37). The Lewis River has been designated as a bull trout core area within the Recovery Unit, and includes the mainstem Lewis River and tributaries downstream to the confluence with the Columbia River. Bull trout occur in the upper North Fork Lewis River, but are not known to occur in the lower North Fork Lewis River downstream of Merwin Dam (Lower Columbia Fish Recovery Board 2010, Vol. II, Section K, p. 16). An occasional bull trout may enter the East Fork Lewis River subbasin; however, a population does not occur in the subbasin (Lower Columbia Fish Recovery Board 2010, Vol. II, Section L, p. 13).

Effects to Bull Trout

Project construction does not include in-water work. Ground-disturbing activities during construction have the potential to generate increased levels of sedimentation and turbidity in downstream waters, which could adversely affect bull trout. The project will implement BMPs designed to minimize impacts, such as spill prevention and erosion control measures, and prevent material from entering waters of the State.

The proposed project will create 11.59 acres of new PGIS that will discharge stormwater pollutants to several tributaries to McCormick Creek and an unnamed tributary to the East Fork of the Lewis River. These two drainage areas are referred to as threshold discharge areas (TDAs). New PGIS will increase pollutant loading to those waterbodies, particularly dissolved copper and dissolved zinc. However, stormwater treatment provided by the project will reduce the distance in which pollutant concentrations dilute to biological thresholds. During most months, pollutant concentrations will decrease to biological thresholds within 1 foot of project outfalls. In August, September, and October, dilution distances are longer but still decrease post project, from a maximum of 400 feet to 350 feet in TDA 1, and from a maximum of 780 feet to 210 feet in TDA 2.

There are no documented occurrences of bull trout within the modeled dilution distances. Stormwater in TDA 1 will flow through swales or ditches a minimum of 330 feet before reaching the unnamed stream, and 3,260 feet before reaching potentially fish-bearing waters. During summer months, the unnamed stream is mostly dry and stormwater will infiltrate or evaporate before reaching lower portions of the tributary. Stormwater in TDA 2 will travel a minimum of 915 feet before discharging into tributaries to McCormick Creek. In the summer, these tributaries are also mostly dry and late summer runoff is not likely to reach the stream. Bull trout are therefore extremely unlikely to be exposed to increased pollutant concentrations.

The project has the potential to accommodate demand for new development at the interchange and thereby increase the rate of development on adjacent urban lands within the urban growth boundary. Up to 50 acres of land could be converted from low- to medium-density development

to high-density development, resulting in as much as 40 acres of new impervious surface that could increase levels of total suspended solids, copper, and zinc discharged to receiving water bodies.

This area is currently zoned for industrial and commercial developments that would likely occur regardless of the proposed project, but may occur at a faster rate because of the interchange improvements. Development would be required to meet current stormwater regulations that would minimize pollutant loading. Federal, state, and local laws are already in place to minimize potential impacts from changes in land use and associated development. The Clean Water Act requires the use of BMPs to reduce the discharge of pollutants to the maximum extent practicable, and the City of La Center (City) requires stormwater treatment in accordance with the City's stormwater and erosion control ordinance. Any development within sensitive areas would require a critical areas permit from the City to protect those areas and provide compensatory mitigation for project impacts. The City also has a mitigation ordinance that can require design or monetary mitigation for development that negatively affects the environment.

The distance from the area identified as potentially being indirectly affected by land use changes to potentially fish-bearing waters downstream is greater than the worst-case scenario of 350 feet modeled by the dilution analysis. We assume that future development will be held to similar standards for stormwater treatment as the proposed action, and that pollutants generated by development within the action area would therefore dilute to background concentrations prior to reaching fish-bearing waters.

In summary, the effects of the proposed action are reasonably likely to include temporary water quality impacts from increased sedimentation and turbidity during ground disturbing activities, and increased pollutant loading due to creation of additional PGIS and an increased rate of development of land around the interchange. We have analyzed the potential effects of the proposed project and have determined that the effects on bull trout will be insignificant and discountable for the following reasons:

1. The project does not include any in-water work.

2. BMPs such as a Spill Prevention Countermeasure and Control Plan and Temporary Sediment and Erosion Control Plan will be implemented to minimize sediment and turbidity during construction.

3. Stormwater treatment will be provided for all new PGIS as well as 2.04 acres of existing PGIS.

4. Elevated pollutant concentrations from stormwater runoff will be diluted to below biological thresholds before reaching waterbodies potentially containing bull trout.

5. Federal, state, and local regulations requiring stormwater treatment and mitigation for environmental impacts will minimize impacts to water quality, hydrology, and streams resulting from land use changes in the action area.

Concurrence

Based on the analysis presented in the BA and summarized above, we concur that the subject action is not likely to adversely affect bull trout. This concludes informal consultation under section 7 of the ESA.

You should request reinitiation of consultation with the Service on this action if:

1. new information reveals the action may affect the bull trout, or other listed species or critical habitats in a manner or to an extent not considered in this consultation;

2. the action is subsequently modified in a manner that causes an effect to the bull trout, or other listed species or critical habitats that was not considered in this consultation; or

3. a new species or critical habitat is designated that may be affected by this project.

The Service appreciates your efforts to protect proposed species and the habitats on which they depend while meeting your agency needs. If you have any questions regarding this letter or our joint responsibilities under the ESA, please contact Leslie Durham (360-753-9532; leslie_durham@fws.gov) or Mark Miller (360) 534-9347; mark_miller@fws.gov), of this office.

Sincerely,

for Eric Rickerson, State Supervisor
Washington Fish and Wildlife Office

cc:
WSDOT, Vancouver, WA (A. Haffie)
FHWA, Olympia, WA (L. Liu)
USFWS, Lacey, WA (M. Miller)

LITERATURE CITED

Lower Columbia Fish Recovery Board. 2010. Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan. Volume II. Available on line at: http://www.lcfrb.gen.wa.us/default1.htm#!library/c1tqm

U.S. Fish and Wildlife Service. 2014. Revised draft recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Portland, Oregon. Xiii + 151 pp.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, Washington 98115

Refer to NMFS Tracking No.: WCR-2015-2571

June 2, 2015

Megan White
Environmental Director
WSDOT Southwest Region
310 Maple Park Ave SE
Olympia, WA 98501

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Northwest La Center Road/Interstate 5 Interchange Improvements Project (HUC 1708000205 - East Fork Lewis River, Clark County, Washington)

Dear Ms. White:

On April 27, 2015, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the Federal Highway Administration's (FHWA) Northwest (NW) La Center Road/Interstate 5 (I-5) Interchange Improvements Project is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the Endangered Species Act (ESA). This response to your request was prepared by the NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

The NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination you made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. In this case, the NMFS concluded that the action would not adversely affect EFH. Therefore, consultation under the MSA is not required for this action.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). A complete record of this consultation is on file at the Oregon and Washington Coasts Area Office in Lacey, Washington.

Proposed Action and Action Area

The FHWA proposes to fund a construction project to provide traffic mitigation for a planned Cowlitz Tribe development located west of the interchange. The development includes a casino, resort, and a tribal government center. The formal ESA Section 7 consultation for that project was completed in 2007 and identified the proposed NW LaCenter Road/I-5 Interchange Improvements Project as an interrelated action that would undergo separate ESA consultation.

The interchange improvement project will include the following:

- Construction of a new overpass structure located immediately south of the existing structure that will accommodate four travel lanes and pedestrian and bicycle facilities.
- Modification of the existing northbound and southbound interchange ramp terminals to include multiple-lane roundabouts.
- A modified northbound off-ramp that is lengthened and includes a second exit lane.
- A modified southbound on-ramp that includes two receiving lanes off of the ramp terminal that transition to a single lane prior to merging with I-5 mainline traffic.
- A partial relocation of Paradise Park Road and the development of a new intersection with NW La Center Road.
- Relocation of NW 319th Street approximately 350 feet south of the current alignment to accommodate the new overpass and provide an enhanced east-west circulation network that is more compatible with the Cowlitz Tribe development.
- A partial relocation of NW 31st Avenue and the development of a new intersection with NW 319th Street. The new intersection will operate as a roundabout to accommodate near-term and future development.

There are currently 6.83 acres of pollutant-generating impervious surface (PGIS) in the project footprint. Stormwater flows untreated through a series of ditches and culverts to an unnamed tributary northeast of the project as well as to several tributaries of McCormick Creek southeast of the project. Both the unnamed tributary and McCormick Creek drain to the East Fork Lewis River approximately one mile east of the project footprint.

The project will create an additional 11.59 acres of PGIS and provide stormwater treatment for a total of 13.63 acres of PGIS. Treatment will consist of compost-amended vegetated filter strips (CAVFS), biofiltration swales, and/or cartridge filters. Flow control will be provided by detention ponds or CAVFS.

The action area includes the project footprint and terrestrial areas extending 7,924 feet (1.5 miles) from the footprint to account for the extent of sound generated by impact pile-driving. A dilution analysis completed for the project indicates that stormwater pollutants could extend as far as 350 feet downstream from stormwater outfalls before diluting to biological thresholds. The action area therefore includes a distance of 350 feet from any stormwater outfalls.

Additional traffic capacity created by the proposed project could result in an increased rate of development in the action area. Parcels east of the interchange and south of La Center Road are likely to be developed based on their zoning and location within the Urban Growth Area. As much as 50 acres of land could be developed at a faster rate, creating up to 40 acres of new

impervious surface. This developable land is included in the action area, as outlined in Figure 1, below:

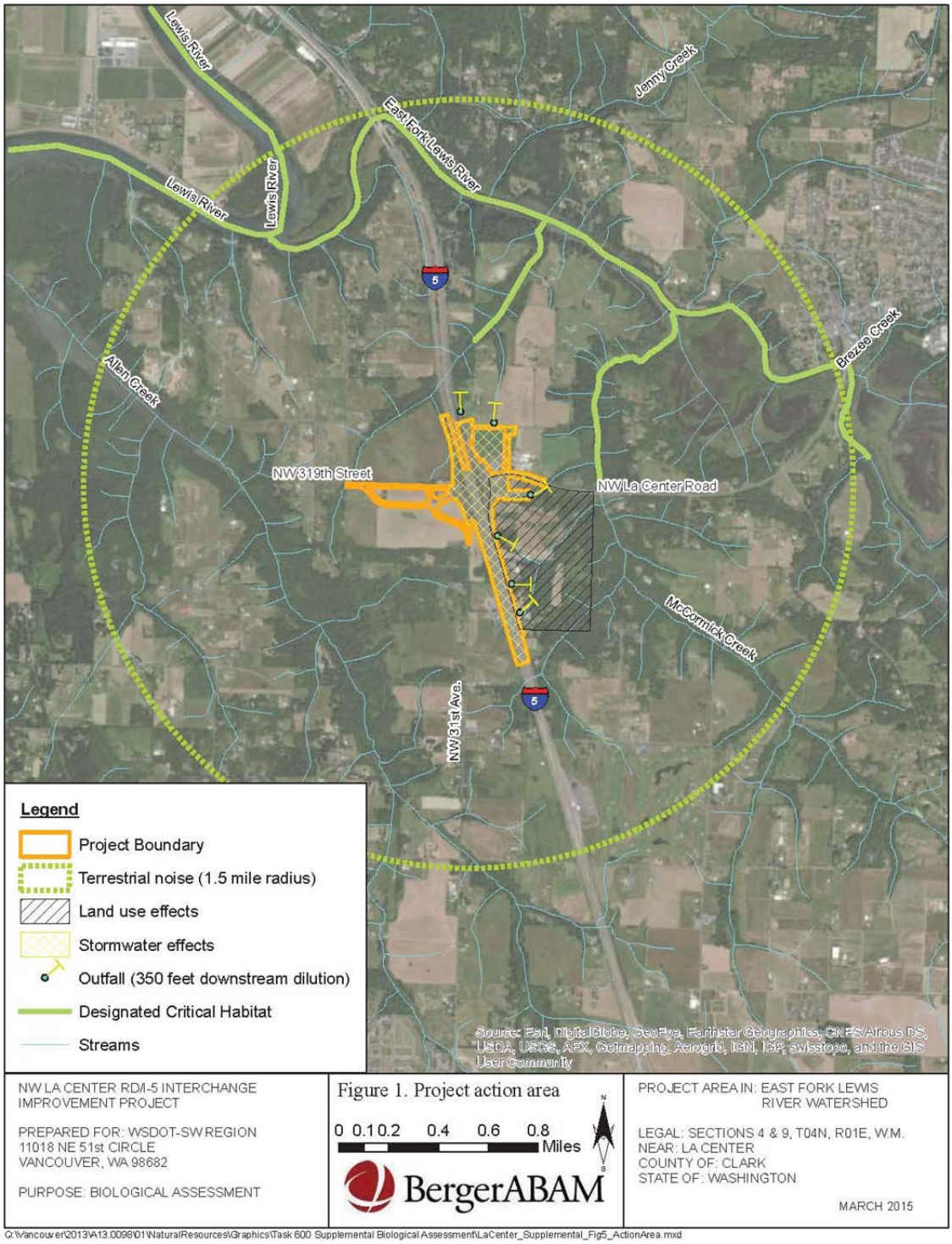


Figure 1. Action area for the NW La Center Road/Interstate 5 Interchange Improvements Project

Action Agency's Effects Determination

The FHWA is requesting a determination of "may affect, not likely to adversely affect" for the following species and critical habitats:

- Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU)
- LCR Chinook designated critical habitat
- Columbia River (CR) chum salmon (*O. keta*) ESU
- CR chum salmon designated critical habitat
- LCR coho (*O. kisutch*) ESU
- LCR steelhead (*O. mykiss*) distinct population segment (DPS)
- LCR steelhead designated critical habitat
- Pacific eulachon (*Thaleichthys pacificus*) Southern DPS

Proposed critical habitat for LCR coho ESU is present in the project vicinity. The FHWA has determined that the proposed project will not destroy or adversely modify LCR coho proposed critical habitat. As explained below, NMFS concurs with this conference determination and this concurrence will apply when NMFS finalizes the designation. The FHWA has also determined the project will not adversely affect EFH for Pacific salmon.

The LCR Chinook, CR chum, and LCR coho salmon were listed as threatened under the ESA on June 28, 2005 (70 FR 37160) and LCR steelhead were listed as threatened on January 5, 2006 (71 FR 834). Pacific eulachon of the southern DPS were listed as threatened on March 18, 2010 (75 FR 13012). Chinook salmon and Pacific eulachon are documented in the East Fork Lewis River but have not been documented in the unnamed tributary or McCormick Creek. Chum salmon are present in the East Fork Lewis River and in McCormick Creek up to NW La Center Road, but are not present in tributaries to McCormick Creek or the unnamed tributary to East Fork Lewis River. Coho and steelhead occur in McCormick Creek, but not its tributaries. Both species are mapped as potentially occurring in the unnamed tributary, but a natural 12-foot high waterfall 200 yards upstream from the confluence of the tributary and East Fork Lewis River prevents salmonids from accessing upstream portions of the tributary.

Critical habitat for LCR Chinook, CR chum, LCR steelhead was designated on September 2, 2005 (70 FR 52630). NMFS proposed to designate LCR coho critical habitat on January 14, 2013 (78 FR 2726), and that process is not complete.

In the action areas, only the East Fork Lewis River is designated critical habitat for LCR Chinook. CR chum and LCR steelhead critical habitat in the action area includes the East Fork Lewis River as well as McCormick Creek up to NW La Center Road. Proposed LCR coho critical habitat includes East Fork Lewis River, McCormick Creek up to NW La Center Road, and the unnamed tributary a distance of 0.5 miles upstream from the confluence with East Fork Lewis River.

Effects of the action in the action area could occur from:

- Water quality impacts during construction
- Increased pollutant loading from new PGIS created at the interchange and also resulting from new development that could be created at a faster rate around the interchange.

As explained in the analysis that follows, FHWA has determined that these effects in the environment are not likely to adversely affect listed species, designated critical habitat, or proposed critical habitat.

Consultation History

The ESA consultation for the Cowlitz Reservation project was completed in 2007 and considered improvements at the interchange as an interrelated and interdependent action. A letter of concurrence (LOCs) was issued by the National Marine Fisheries Service (NMFS) on 7 January 2008 (NMFS No. 2007/02379). The NMFS concurred with the "may affect, not likely to adversely affect" determinations for ESA-listed salmonids because the proposed stormwater treatment system was expected to treat stormwater runoff to the extent that metal and suspended solids in treated stormwater would dilute to background levels prior to reaching ESA-listed fish-bearing waters. Impacts to ESA-listed species and designated critical habitats were therefore determined to be insignificant. The BA and the NMFS LOC stated that traffic mitigation under WSDOT jurisdiction would be subject to a separate ESA consultation.

A pre-BA meeting for the NW LaCenter Road Interchange Improvements Project was conducted with representatives of WSDOT, FHWA, NMFS, and USFWS on 21 February 2013. The primary topics of discussion were that the BA for the project should address the potential for indirect effects associated with 1) stormwater and 2) the potential for changes in land use.

Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

The effects of the proposed action are reasonably likely to include temporary water quality impacts from increased sedimentation and turbidity during ground-disturbing activities, and increased pollutant loading due to the creation of additional PGIS.

Ground-disturbing activities during construction have the potential to generate increased levels of sedimentation and turbidity in downstream waters, which could adversely affect listed fish species and critical habitats. The project will implement best management practices (BMPs) designed to minimize impacts, such as spill prevention and erosion control measures, and prevent material from entering any fish-bearing waters.

The proposed project will create 11.59 acres of new PGIS that will discharge stormwater pollutants to several tributaries to McCormick Creek and an unnamed tributary to the East Fork of the Lewis River. The new PGIS will increase pollutant loading to those water bodies. However, stormwater treatment provided by the project will reduce the distance in which pollutant concentrations dilute to biological thresholds. During most months, pollutant concentrations will decrease to biological thresholds within 1 foot of project outfalls. In August, September, and October, dilution distances are longer but still decrease post project, from a maximum of 400 feet to 350 feet in TDA 1, and from a maximum of 780 feet to 210 feet in TDA 2.

There are no documented occurrences of listed fish species or critical habitats within the modeled dilution distances. Stormwater in TDA 1 will flow through swales or ditches a minimum of 330 feet before reaching the unnamed stream, approximately 2,770 feet before reaching critical habitat, and 3,260 feet before reaching potentially fish-bearing waters. During summer months the unnamed stream is mostly dry and stormwater will infiltrate or evaporate before reaching lower portions of the tributary. Stormwater in TDA 2 will travel a minimum of 915 feet before discharging into tributaries to McCormick Creek. In the summer, these tributaries are also mostly dry and late summer runoff is not likely to reach the Creek. Listed species are therefore extremely unlikely to be exposed to increased pollutant concentrations.

The project has the potential to accommodate demand for new development at the interchange and thereby increase the rate of development on adjacent urban lands with the urban growth boundary. Up to 50 acres of land could be converted from low- to medium-density development to high-density development, resulting in as much as 40 acres of new impervious surface that could increase levels of total suspended solids, copper, and zinc discharged to receiving water bodies.

This area is currently zoned for industrial and commercial development that would likely occur regardless of the proposed project, but may occur at a faster rate because of the interchange improvements. Development would occur south of NW La Center Road and therefore outside of the areas where listed species have been documented and outside the designated or proposed critical habitats.

The distance from the area identified as potentially being indirectly affected by land use changes to potential fish-bearing waters downstream is greater than the worst-case scenario of 350 feet modeled by the dilution analysis

There is impact pile-driving associated with construction of the new overpass. The general area is highlighted in red in Figure 1. The closest streams to the pile-driving location are a tributary of

McCormick Creek to the southeast and a tributary of the unnamed tributary of E. Fork Lewis River to the northwest. Both are over 700 feet from where pile-driving would occur, and neither contains listed species or critical habitat, so pile-driving would have no effect on listed species or critical habitat.

The NMFS has analyzed the potential effects of the proposed project and has determined that the effects on ESA-listed fish species will be insignificant from ground-disturbing activities because the BMPs for their Spill Prevention Countermeasure and Control Plan and Temporary Sediment and Erosion Control Plan will be implemented to minimize sediment and turbidity during construction.

The NMFS has analyzed the potential effects of the proposed project and has determined that the effects from stormwater on ESA-listed fish species will be discountable for the following reasons:

- Enhanced stormwater treatment to biological thresholds will be provided for all new PGIS as well as 2.04 acres of existing PGIS.
- Potential elevated pollutant concentrations from stormwater runoff will be diluted to below biological thresholds before reaching water bodies containing listed fish species or their critical habitats.

Conclusion

Based on this analysis, the NMFS concurs with the FHWA that the proposed action is not likely to adversely affect the subject listed species and designated critical habitats.

Reinitiation of Consultation

The reinitiation of consultation is required and shall be requested by the FHWA or the NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. The FHWA also has the same responsibilities, and informal consultation offers action agencies an opportunity to address their conservation responsibilities under section 7(a)(1).

Please direct questions regarding this letter to Michael Grady of the Oregon and Washington Coastal Office at (206) 526-4645 or by electronic mail at Michael.Grady@noaa.gov.

Sincerely,

William W. Stelle, Jr.
Regional Administrator

cc: Jennifer Chariarse, WSDOT Southwest Region Environmental Coordinator
Liana Liu, FHWA
Cindy Callahan, FHWA

Appendix D
Geotechnical Report

RhinoOne GEOTECHNICAL

Geotechnical Data Report

NW La Center Road/I-5 Interchange Improvement Project
(CH2M Hill Engineers Project Number 458952)
La Center, Washington

Prepared for:
Mr. Darren Hippenstiel, PE
CH2M Hill Engineers
2020 SW Fourth Avenue, 3rd Floor
Portland, Oregon 97201

08/18/2015

August 17, 2015
Project No. CH2M-2015-003 T001 & T002

RhinoOne Geotechnical | 4610 NE 77th Avenue #126 | Vancouver, WA 98662 | phone 360.258.1738

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SUPPORTING DATA

Appendix A – Figures

Appendix B – Summary Boring and Test Pit Logs

Appendix C – Laboratory Testing Results

1.0 INTRODUCTION

This geotechnical data report (GDR) presents the results of the supplementary geotechnical exploration program performed by Rhino One Geotechnical (ROG) for the proposed NW La Center Road/I-5 Interchange Improvements Project (project) in La Center, Washington. CH2M Hill has previously completed a geotechnical data report[1] dated May 2015. This supplementary geotechnical exploration program was carried out as part of the Cowlitz Reservation Development Project. This project involves efforts of the Cowlitz Indian Tribe to develop land on the west side of the existing Interstate 5 (I-5) freeway at Exit 16 near La Center, Washington. Authorization for the supplemental geotechnical work was provided by CH2M Hill of Portland, Oregon, by Purchase order number 10006-7-102533 dated May 29, 2015 and modification M0001 dated June 17, 2015.

The details of the proposed project are presented in the above referenced report by CH2M Hill in Section 1.1.

1.1 Objective and Scope of Work

The objective of the supplementary geotechnical exploration program is to collect information about subsurface soil and groundwater conditions necessary for design and construction of the proposed storm water management / infiltration system for the NW La Center Road / I-5 Bridge Improvement Project. The scope of work for the supplementary geotechnical program includes the following:

- Conduct supplementary geotechnical field investigation at the project site consisting of nine (9) soil borings and eight (8) test pits.
- Characterize and develop the general subsurface stratigraphy along the proposed storm-water infiltration system locations.
- Develop and perform a laboratory testing program for physical analysis of selected samples collected from the borings and test pits.
- Prepare this GDR in order to summarize the results of the field investigations and laboratory testing program.

2.0 EXPLORATION AND TESTING

The scope of this project consisted of conducting a design-level exploration program, including field investigation, soil classification, and laboratory testing. The collected data are presented in the following sections. The previous Geotechnical Data Report prepared by CH2M Hill provides a review of previous investigations and a summary of site geology and is therefore not repeated in this report.

2.1 Field Investigation

Supplementary field investigation was completed in two phases of work from June 02 to June 05, 2015, and through June 23 to June 25, 2015. From June 02 through 05, in the first phase of work, ROG completed a geotechnical field investigation consisting of 3 soil borings (B-14 through B-16) advanced to depths of 41.5 feet BGS and 8 test pits (TP-12 through TP-19) excavated to depths of 8 feet BGS. From June 23 through 26, ROG completed the second phase of geotechnical field investigation consisting of 6 soil borings (B-17 through B-22) advanced to depths of 41.5 feet BGS. Open standpipe piezometers were also installed in all of the supplementary soil borings B-14 through B-22. Procedures used in these programs are described in the following sections.

[1] CH2M Hill (2015, May). *Geotechnical Data Report, NW La Center Road / I5 Interchange Improvements Project*, CH2M Hill Project No. 458952.

2.2 Soil Borings and Test Pits

Soil boring and test pits were advanced to obtain in situ information about the stiffness or density of the soil and to obtain soil samples for subsequent laboratory testing. Procedures used to conduct the work generally followed American Society of Testing and Materials (ASTM) requirements, as described below.

2.2.1 Soil Drilling and Sampling

The supplementary nine (9) soil borings were advanced by Western States Soil Conservation, Inc., of Hubbard, Oregon, using a CME 850 track-mounted drill rig equipped with an automatic hammer with calibrated hammer energy of 88.5 percent. Borings were drilled using mud rotary (3-inch-diameter rods) methods with a 3 ¼ inch tricone bit. During drilling, soil sampling was performed using two methods: (1) a 2-inch-outside-diameter (OD) split-spoon sampler with lengths of 18 to 24 inches, and (2) a thin-wall, steel Shelby tube sampler (3-inch-OD, 24 inches long).

The split-spoon samplers were driven by an automatic-trip hammer of 140 pounds falling 30 inches, in general accordance with standard procedures outlined in ASTM International D1586, “Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.” This test is used to characterize the consistency of fine-grained soil or the relative density of coarse-grained soil by measuring penetration resistance expressed as blow counts, or N-value. The blow count is the number of blows required to advance the standard split-spoon sampler 6 inches with a 140-pound hammer falling 30 inches. The sampler is driven 18 inches, and the blow count is recorded for each 6-inch increment. The sum of the blow counts for the second and third increments is referred to as the N-value in blows per foot (bpf). Low N-values indicate soft or loose soil; high N-values are evidence of hard or dense materials. After the sampler is driven and the blow counts are recorded, the sampler is withdrawn from the borehole to recover a disturbed soil sample. Sampling typically was performed at approximately 5-foot intervals.

At selected depths, relatively undisturbed samples were collected in fine-grained soils in general accordance with standard procedures outlined in ASTM International D1587, “Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.” In this test, a soil sample is recovered by pushing a 30-inch-long “Shelby” tube with a 3-inch OD and 0.065-inch wall thickness into the bottom of the borehole.

Disturbed samples were placed in sealable plastic bags. Undisturbed samples were left in the sampling Shelby tubes, capped, and sealed to preserve moisture contents. Select SPT and Shelby tube samples were transported to a geotechnical test laboratory following completion of each soil boring. Care was used during transport of the Shelby tube samples to avoid causing disturbance of the soil.

Sampling intervals and field classifications of soil samples are recorded on the soil boring logs presented in Appendix B.

2.2.2 Test Pits and Sampling

The test pits were excavated by Western States Soil Conservation using a John Deere 120 track-mounted excavator fitted with a 3-foot bucket. Test pit dimensions were 3 feet wide and 8 to 10 feet in length. During excavation, one to four grab samples were collected per test pit at a maximum interval of approximately 4 feet. Sample intervals were more frequent when necessary to represent soil transitions. Samples were collected and stored in sealable plastic bags for transport to the laboratory.

Water seepage was observed in TP-14 and TP-19 at a depth of 6 and 7 feet BGS.

Sampling intervals and field classifications of soil samples are recorded on the test pit logs presented in Appendix B.

2.3 Surveying

Boring and test pit locations and depths are summarized in Table 2.3-1, and approximate boring and test pit locations are shown in Figures 2 and 3 of Appendix A. Borehole and test pit locations were recorded in the field using a handheld global positioning system unit, and elevations were estimated by projecting the boring locations onto a map of the project topography, which was surveyed by Olson Engineering in 2004 for areas west of I-5 and between October 2012 and January 2015 for all other areas.

Table 2.3-1 Summary of Borings

Boring	Latitude	Longitude	Depth (feet BGS)	Approximate Ground Surface Elevation (feet, NGVD 29)
B-14	45.84364N	122.69895W	41.5	268
B-15	45.84898N	122.70135W	41.5	274
B-16	45.84632N	122.70013W	41.5	271
B-17	45.85283N	122.70190W	41.5	258
B-18	45.85242N	122.70391W	41.5	242
B-19	45.85105N	122.70338W	41.5	254
B-20	45.84854N	122.70163W	41.5	271
B-21	45.84656N	122.70067W	41.5	274
B-22	45.84352N	122.69918W	41.5	270
TP-12	45.84283N	122.69896W	8	275
TP-13	45.84442N	122.69957W	8	272
TP-14	45.84442N	122.70027W	8	276
TP-15	45.84767N	122.70115W	8	271
TP-16	45.84891N	122.70175W	8	271
TP-17	45.85259N	122.70177W	8	260
TP-18	45.85262N	122.70396W	8	243
TP-19	45.85375N	122.70282W	8	242

Latitude and Longitude is referenced to the World Geodetic System of 1984
Elevation from Google Earth and Projection by project topography by Olson Engineers
BGS: below ground surface
NGVD 29: National Geodetic Vertical Datum 1929

2.4 Soil Classification

Soil samples from the soil borings and test pits were examined and visually classified in accordance with ASTM International D2488, “Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).” This method allows convenient and consistent soil comparison using a standard method for describing the soil. The use of the Unified Soil Classification System method provides a basis for comparison of soils from widespread geographic areas.

To determine the relative density and consistency of soils represented by each sample, ROG calculated a “corrected,” or N_{60}, blow count. The field blow counts (N), shown on the boring logs, are standardized to account for hammers other than the standard safety hammer, varying types of samplers, and the length of the drilling rod for the sample depth. The field blow count value (N) is multiplied by a correction factor of 1.1 for the split-spoon sampler, a correction factor of 1.48 for the

auto-hammer, and a correction factor ranging from 0.75 to 1.0 for the rod depth to achieve the corrected blow counts (N_{60}).

For granular soils, the relative density was based on the corrected blow count (N_{60}) using the guidelines presented in Table 2.4-1. For cohesive soils, consistencies were based on corrected blow counts (N_{60}) using the guidelines presented in Table 2.4-1.

Table 2.4-1 Summary of Soil Consistency and Relative Density

Soil Type	Description	Corrected SPT Blow Count, N_{60} (bpf)	Unconfined Compressive Strength (tsf)
Cohesive (Silts and Clays)	Very Soft	0 to 2	< 0.25
	Soft	3 to 4	0.25 to 0.50
	Firm	5 to 8	0.50 to 1.00
	Stiff	9 to 15	1.00 to 2.00
	Very Stiff	16 to 30	2.00 to 4.00
	Hard	> 30	< 4.00
Non Cohesive (Sands and Gravels)	Very Loose	0 to 4	N/A
	Loose	5 to 10	N/A
	Medium Dense	11 to 30	N/A
	Dense	31 to 50	N/A
	Very Dense	> 50	N/A

Notes:
>= greater than
<= less than
bpf = blow(s) per foot
N/A = not applicable
SPT = Standard Penetration Test
tsf = ton(s) per square foot

2.5 Open Standpipe Piezometers

Open standpipe piezometers were installed in each of the nine additional borings (B-14 through B-22) during the geotechnical exploration program in order to allow periodic observation of the depth to groundwater. The piezometers consist of a 1-inch-diameter, polyvinyl chloride (PVC) casing and machine-slotted screen. Sand was placed in the annular space from below the bottom of the screen to approximately 2 to 5 feet above the top of the screen in each of the soil borings. A bentonite seal was placed above the sand up to the concrete-sealed monument in all borings. The piezometers were completed with flush-mounted monuments. Piezometer construction details are presented on the soil boring logs in Appendix B and are summarized in Table 2.5-1.

Table 2.5-1 Open Standpipe Piezometer Configurations

Boring Location ID for Piezometer	Approximate Monument Elevation (feet, NGVD 29)	Screen Type	Well Screen Depth (feet, BGS)		Sand Pack Depth (feet, BGS)	
			From	To	From	To
B-14	268	0.010 Slot	40	30	41.5	27
B-15	274	0.010 Slot	40	30	41.5	27
B-16	271	0.010 Slot	40	30	41.5	27
B-17	258	0.010 Slot	40	30	41.5	27
B-18	242	0.010 Slot	40	30	41.5	27
B-19	254	0.010 Slot	40	30	41.5	27
B-20	271	0.010 Slot	40	30	41.5	27
B-21	274	0.010 Slot	40	30	41.5	27
B-22	270	0.010 Slot	40	30	41.5	27

Notes:
ID = Identification
BGS = below ground surface
NGVD 29 = National Geodetic Vertical Datum of 1929

2.6 Groundwater Level Measurement

Groundwater levels at the site were measured in the open standpipe piezometers installed during the geotechnical exploration program. The measurements were made using an electronic water-level indicator. Table 2.6-1 summarizes the groundwater levels measured in each of the piezometers. Groundwater levels will continue to be measured throughout the design phase of the project.

Table 2.6-1 Groundwater Level Measurements

Boring/Well Number	Date Installed & Water Level at Time of Drilling (feet BGS)	Measured Water Level BGS (feet)			
		6/24/2015	6/25/2015	7/31/2015	Remarks
B-14	6/4/2015	38.6		38.4	
B-15	6/5/2015	39		38.80	Dry
B-16	6/4/2015	38.8		38.32	
B-17	6/23/2015		17.3	20.33	
B-18	6/24/2015		15.8	20.21	
B-19	6/25/2015		28.7	29.66	
B-20	6/24/2015		18.1	39	Dry
B-21	6/24/2015		38.6	39.22	Dry
B-22	6/25/2015		35.8	39.10	Dry

Notes:
BGS = below ground surface
ft = feet
ID = Identification
NGVD 29 = National Geodetic Vertical Datum of 1929

2.7 Laboratory Testing

A laboratory testing program was developed in order to provide classification and engineering properties of the soils at the project site. Samples obtained during drilling and test pit excavation were transported to Asphalt Concrete Soils (ACS) Testing, Inc. of Tigard, Oregon. Testing was performed using the following methods.

- ASTM International D422, *Test Method for Particle-Size Analysis of Soils*
- ASTM International D1140, *Test Method for Amount of Material in Soils Finer than the No. 200 Sieve*
- ASTM International D2216, *Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock*

Select laboratory test results are included with the soil boring and test pit logs in Appendix B. A summary table of laboratory test data and results provided by ACS Testing, Inc., is presented in Table 2.7-1.

Table 2.7-1 Summary of Laboratory Test Data

Sample ID	Percent Passing (%)					
	#4	#10	#100	#200 (0.075 mm)	0.005 mm	0.002 mm
B-14 @ 5 – 6.5 ft	100	100	97	89	21	15
B-16 @ 5 – 6.5 ft	100	100	96	88	20	12
B-17 @ 5 – 6.5 ft	100	100	91	81	16	12
B-19 @ 5 – 6.5 ft	100	100	94	81	22	15
B-20 @ 5 – 6.5 ft	100	100	96	88	17	13
B-21 @ 5 – 6.5 ft	100	100	95	85	18	15
B-22 @ 5 – 6.5 ft	100	100	97	84	21	16
TP12 @ 6 ft	100	100	98	97	35	29
TP13 @ 5 ft	100	100	93	92	33	28
TP14 @ 6 ft	100	100	98	93	21	13
TP15 @ 3 ft	100	100	97	94	31	23
TP16 @ 3.5 ft	77	75	61	53	16	12
TP16 @ 8 ft	100	100	95	82	16	12
TP17 @ 3 ft	100	100	93	84	22	16
TP17 @ 8 ft	100	99	92	83	29	24
TP18 @ 1 ft	44	43	38	34	11	8
TP18 @ 4 ft	100	100	92	76	29	20
TP19 @ 3 ft	100	100	96	90	24	19

3.0 SITE CONDITIONS

Results of field explorations described in the previous sections, as well as information about the local geology for the project site, were used to identify surface and subsurface, geotechnical, and groundwater conditions which could affect the design and construction of the storm water management system. The following sections summarize the interpretation of available site condition information.

3.1 Surface Conditions

The location for the proposed bridge and related intersections spans I-5 at Exit 16 near La Center, Washington. At this location, I-5 is a four-lane highway divided by a grass median. La Center Road, which is perpendicular to I-5, is a two-lane arterial carried over the freeway on the existing two-lane, four-span bridge. The area surrounding the bridge location is rural and light commercial, with an empty lot and a gas station immediately east of the existing bridge, and a grassy field, warehouse building, and coffee stand immediately west of the bridge. The quadrants enclosed by the on- and off-ramps are grassy with sparse tree cover. The proposed storm water system will be along the I-5 median or on shoulders.

3.2 Subsurface Conditions

Subsurface conditions encountered in the nine (9) soil borings and eight (8) test pits consist of up to 15 feet of fill material, underlain by soft to very stiff clays and silts. The following sections describe the fill layer as well as the underlying clays and silts.

3.2.1 Fill Material

Fill was encountered in most of the test pits and borings. Fill was encountered to depths on the order of 1.0 feet to a maximum of 15 feet BGS. The deepest fill was encountered north of the interchange on both the SB off ramp (B-18) and NB on-ramp (B-17). The fill generally consists of grass in the freeway median and reworked native silts and clays with peat, roots and miscellaneous organic matter. Gravel fill was encountered to a depth of 7.5 feet in boring B-10, 15 feet in Boring B-17 and B-18, and 5 feet in TP-16. The field measured SPT values ranged from a low of 2 to a high of 16 blows per foot (bpf). Grain size analysis indicates that the percentage passing #200 sieve (0.075 mm) is on the order of ±50 % to ±90 %.

3.2.2 Clay and Silt Material

The borings were drilled to a maximum depth of 41.5 feet BGS for installation of standpipe piezometers. The test pits were excavated to a maximum depth of 8 feet BGS. Clay and silt materials with low to high plasticity were encountered to the depth of termination. The field measured SPT values ranged from a low of 3 to a high of 27 blows per foot (bpf). Grain size analysis indicates that the percentage passing #200 sieve (0.075 mm) is on the order of ±80 % to ±90 % for most of the samples tested at a depth of 5 to 6 feet BGS.

3.3 Groundwater Conditions

As stated previously, piezometers were installed in each of the boring (B14 through B22) at the project site to monitor groundwater levels during the design phase of the project. Table 2.6.1 shows the measured groundwater levels during June and July 2015. A review of this table indicates that the piezometers B-14 through B-16 and B-20 through B-24 (top elevation ± 270 feet) appears to be essentially dry. Groundwater levels in boring B-17 through B-19 were measured to be approximately 15.8 to 20.33 feet BGS (approximate elevation 226.2 to 237.67 feet) at the proposed storm water facility.

During the field exploration program, water seeped into the test pit excavations at depths of 6 feet in test pit TP-14 and at 7.0 feet in TP-19. Test pit TP-14 was excavated in a wet drainage ditch and therefore this water probably seeped in during excavation. TP-19 encountered only fill material and the water could just be trapped water in the fill material. The water seepage encountered is therefore not ground water but standing water and water trapped in the fill material.

4.0 LIMITATIONS

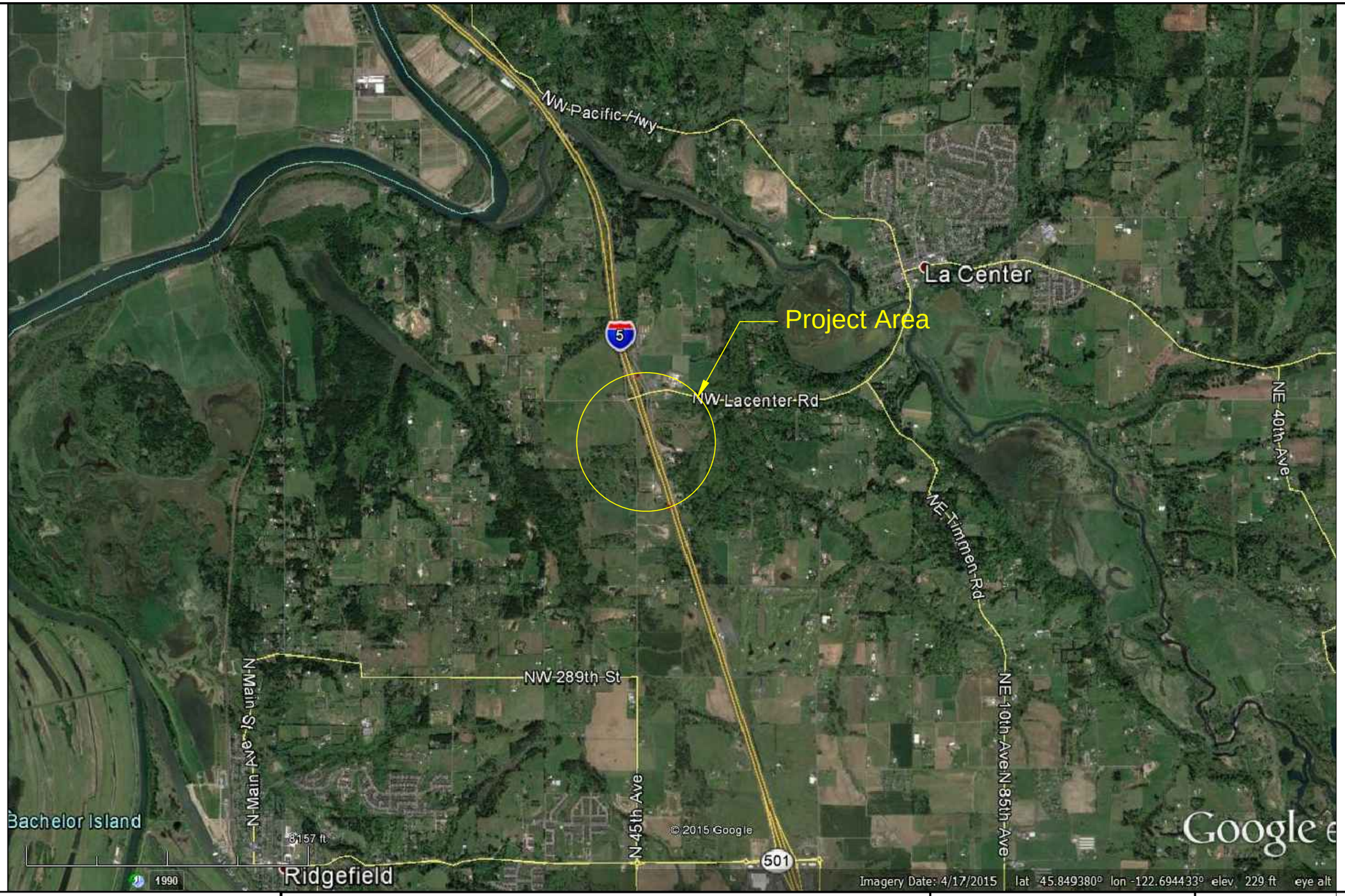
This report has been prepared for the exclusive use of CH2M HILL, for specific application to the NW La Center Road/I-5 Interchange Improvements Project in La Center, Washington. The report has been prepared in accordance with generally accepted geotechnical engineering practice. No other warranty, express or implied, is made.

The data contained in this report are based on the soil borings and test pit excavations advanced during the 2015 supplementary geotechnical exploration program. Exploration data indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. The data does not reflect strata variations which may exist between such locations. Subsurface conditions and water levels at other locations may differ from conditions occurring at these locations. The passage of time may result in a change in the conditions at these locations. If there

are changes in the nature, design, or location of the planned facilities, the data contained in this report should not be considered valid unless the changes are reviewed and the data verified or modified in writing by ROG. ROG is not responsible for any claims, damages, or liability associated with the interpretations of subsurface data or reuse of the subsurface data without the express written authorization of ROG.

APPENDIX A

Figures



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360-258-1738

I-5/La Center Road Interchange

La Center, WA 98629

Project No: CH2M-2015-001-T001

Drawn By: ST

Figure 1 - Site Location Map

Date: August 2015

Reviewed by: RA

Legend

TP-12 Test Pit Number & Approximate Location

Drawing Not to Scale

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I-5/La Center Road Interchange La Center, WA 98629		Project No: CH2M-2015-001-T001	Drawn By: ST
Figure 2 - Site Plan for Test Pits		Date: August 2015	Reviewed by: RA

Legend

● B-14 Boring Number & Approximate Location

Drawing Not to Scale

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I-5/La Center Road Interchange La Center, WA 98629	Project No: CH2M-2015-001-T001	Drawn By: ST
Figure 3 - Site Plan for Borings	Date: August 2015	Reviewed by: RA

APPENDIX B

Summary Boring and Test Pit Logs

RhinoOne GEOTECHNICAL
4610 NE 77th Avenue, Suite 126
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I-5/La Center Road Interchange
La Center, WA

TP-12

Location:
I-5 Shoulder SB:
45.84283N, 122.69896W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/3/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 275 ft.
Diameter:	Water Table : N/A — Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
		0		GWT not encountered	FL	0-1' Grass, roots, dark brown, moist to wet, gravelly SILT (FILL)	
1		2			MH	Clayey SILT (MH) Grey-brown damp clayey SILT, medium to high plasticity, trace rootlets (to 2 bgs ft), trace black cemented particles	
2		4					
		6					@6' Seive/Hydrometer Analysis Size % Passing #16 100% #200 97% 0.005mm 35% 0.002mm 29%
3		8				@ 7.0' - becoming orange-brown/grey color.	
		10				Bottom of test pit (feet BGS): 8'; backfilled and compacked with backhoe; covered with straw for erosion BMP (per WSDOT)	
		12					

File: C:\Projects\CH2M-2015-003\Logs\Test_Pit\Test_pit_logs.log Date: 8/17/2015

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TP-13

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Shoulder SB:
45.844429N, 122.69957W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/2/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 272 ft.
Diameter:	Water Table : N/A — Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
		0		GWT not encountered	FL	0-1' grass, roots, dark brown, moist to wet, gravelly SILT (FILL).	
1		2			MH	Clayey SILT (MH) Grey-brown damp clayey SILT, medium to high plasticity, trace black cemented particles, trace orange mottling	
2		4					@5' Seive/Hydrometer Analysis Size % Passing #10 100% #200 92% 0.005mm 33% 0.002mm 28%
3		6				@ 6.0 ft becomes orange-brown/gray color, damp to moist	
		8				Bottom of test pit (feet BGS): 8'; backfilled and compacted with backhoe; covered with straw for erosion BMP (per WSDOT)	
		10					
		12					

File: C:\Projects\CH2M-2015-003\Logs\Test_Pit\Test_pit_logs.log Date: 8/17/2015

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TP-14

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Shoulder SB:
45.84588N, 122.70027W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/2/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 276 ft.
Diameter:	Water Table : Seepage @ 6' — Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
		0			FL	0-10" grassroots, and brown, damp, gravelly SILT (FILL)	
1		2		GWT not encountered	MH	Clayey SILT (MH) Grey-brown, damp to moist, clayey SILT, medium to high plasticity, orange mottling, trace black cemented particles	
2		4					@6' Seive/Hydrometer Analysis Size % Passing #30 100% #200 93% 0.005mm 21% 0.002mm 13%
3		6				Encountered water seepage @ 6'	
		8				Bottom of test pit (feet BGS): 8'; backfilled and compacted with backhoe; covered with straw for erosion BMP (per WSDOT)	
		10					
		12					

File: C:\Projects\CH2M-2015-003\Logs\Test_Pit\Test_pit_logs.log Date: 8/17/2015

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4610 NE 77th Avenue, Suite 126
Vancouver, Washington 98662
360-258-1738

TP-15

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Shoulder SB:
45.84767N, 122.70115W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/2/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 271 ft.
Diameter:	Water Table :
	Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
		0		GWT not encountered	FL	0-16" brown, moist to wet, sandy GRAVEL(FILL) with trace silt.	
1		2			MH	Clayey SILT (MH) Grey brown damp to moist SILT medium to high plasticity, < 5% fine sand	
2		4				Trace black cemented particles - orange mottled	@3' Seive/Hydrometer Analysis Size % Passing #30 100% #200 94% 0.005mm 31% 0.002mm 23%
3		8				Bottom of test pit (feet BGS): 8'; backfilled and compacked with backhoe; covered with straw for erosion BMP (per WSDOT)	
		10					
		12					

File: C:\Projects\CH2M-2015-003\Logs\Test_Pit\Test_pit_logs.log Date: 8/17/2015

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I-5/La Center Road Interchange
La Center, WA

TP-16

Location:
I-5 Shoulder SB:
45.84891N, 122.70175 W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/2/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 271 ft.
Diameter:	Water Table :
	Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
		0		GWT not encountered	FL	Grass (0-6") roots (FILL)	
1						Brown, moist, medium to high plasticity, Silty CLAY with some sand and trace fine gravel (FILL)	
		2					
						Gravel @ 3'; 50% clay	@3.5' Seive/Hydrometer Analysis Size % Passing 1 1/4" 100% #4 77% #200 53% 0.005mm 16% 0.002mm 12%
2		4					
					ML	Clayey SILT (ML) Gray with mottles, damp to moist, clayey SILT, low to medium plasticity.	
		6					
3							
		8				Bottom of test pit (feet BGS): 8'; backfilled and compacked with backhoe; covered with straw for erosion BMP (per WSDOT)	@8' Seive/Hydrometer Analysis Size % Passing #10 100% #200 82% 0.005mm 16% 0.002mm 12%
		10					
		12					

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TP-17

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 NB on Ramp Shoulder:
45.85259N, 122.70177W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/2/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 260 ft.
Diameter: Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
1		0		GWT not encountered	FL	0-1' Brown, damp to moist, clayey SILT trace gravel and cobbles (FILL)	
2		2					@3.0' Seive/Hydrometer Analysis Size % Passing #10 100% #200 84% 0.005mm 22% 0.002mm 16%
3		4				Becomes dark grey SILT with some clay, low to medium plasticity (FILL) voids observed @ 3-5'	
		6					
		8				Bottom of test pit (feet BGS): 8'; backfilled and compacted with backhoe; covered with straw for erosion BMP (per WSDOT)	
		10					
		12					

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TP-18

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB off Ramp Shoulder:
45.85262N, 122.70396W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/3/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 243 ft.
Diameter:	Water Table : Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
		0		GWT not encountered	FL	0-2' Grass; Brown silty/gravelly CLAY with some cobbles, damp to moist (FILL)	
1		2				Becomes dark grey clayey SILT with some peat (organic smell)	
2		4					@4.0' Seive/Hydrometer Analysis Size % Passing #16 100% #200 76% 0.005mm 29% 0.002mm 20%
3		6				Open voids in sidewalls.	
		8				Bottom of test pit (feet BGS): 8'; backfilled and compacted with backhoe; covered with straw for erosion BMP (per WSDOT)	
		10					
		12					

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TP-19

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 NB On-Ramp Shoulder:
45.85375N, 122.70282W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR) (Brad)
Proj No.: CH2M-2015-003-T001	Date: 6/3/2015
Drilling Methods: PC 40 Van Mar Backhoe	Elevation: Approx 242 ft.
Diameter:	Water Table : Seepage @ 7.5' — Logged by: B. Haug

Sample No.	Sample Type	Depth (ft BGS)	Graphic Log	Water Table	USCS	Materials Description	Remarks
		0		GWT not encountered	FL	0-3'; Grass, roots; Brown, damp to moist clayey SILT with some gravel, trace cobbles (FILL)	
1		2					
2		4				Some clay; becomes low to medium plasticity.	@3.0' Seive/Hydrometer Analysis Size % Passing #16 100% #200 90% 0.005mm 24% 0.002mm 19%
3		6				Becomes wet @ 7.0' Water seepage into base of TP @ 7.5'	TP caved after 8' bucket sample. Voids in sidewalls.
		8				Bottom of test pit (feet BGS): 8'; backfilled and compacked with backhoe; covered with straw for erosion BMP (per WSDOT)	
		10					
		12					

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B-14

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Median:
45.84364N, 122.69895W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/4/2015
Drilling Method: Mud Rotary	Elevation: Approx 268 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
						GWT not encountered	0	VG-CN	Grass Swale, freeway median.		Standpipe Piezometer Well Tag No. 614 Start Card DOE 11398
1		100		1/2/4	6		5	MH	Clayey SILT (MH) Medium stiff, grey-brown, damp clayey SILT with orange mottles; medium to high plasticity.	33.6	Sieve/hydrometer analyis Size % Passing #10 100% #200 89% .005mm 21% .002mm 15%
2		100		2/2/2	4		10		Becomes soft to medium stiff.	30.7	
3		100		1/1/3	4		15		Becomes blue-grey.	35.8	
4		100		2/3/5	8		20		Becomes medium stiff to stiff; high plasticity.	39.2	
5		100		2/2/3	5		25		Becomes medium stiff; medium plasticity.	40.3	
6		100		1/1/1	2		30		Becomes very soft.	33	

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B-14

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Median:
45.84364N, 122.69895W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/4/2015
Drilling Method: Mud Rotary	Elevation: Approx 268 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		94		5/6/7	13		35		ML Silt (ML) Stiff, light orange-brown, wet, SILT with trace sand and clay; low plasticity.	30.6	
8		100		2/4/8	12		40		Some iron staining.	37.1	
							45		Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							50				
							55				
							60				
							65				

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B-15

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Median:
45.84898N, 122.70135W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/5/2015
Drilling Method: Mud Rotary	Elevation: Approx 274 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
						GWT not encountered	0	VG-CN	Grass Swale, freeway median.		Standpipe Piezometer Well Tag No. 616 Start Card DOE 11398
1		0		5/7/6	13		5		No recovery. Possible gravel fill to 7.5' per driller.		
								MH	Clayey SILT (MH) Stiff, dark grey, damp clayey SILT; medium plasticity.		
2		100		1/4/7	11		10			33.4	
3		100		1/2/2	4		15		Becomes soft to medium stiff, orange-brown	29.6	
4		100		3/4/6	10		20		Becomes stiff, high plasticity	26.8	
5		100		3/5/7	12		25		Becomes low to mediun plasticity, micaceous with fine sand (=30%)	93.6	
6		89		4/6/7	13		30			29.9	

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B-15

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Median:
45.84898N, 122.70135W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/5/2015
Drilling Method: Mud Rotary	Elevation: Approx 274 ft.
Diameter: 3 1/4" Tricone / Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		100		0/0/3	3		35		Becomes soft, high plasticity	28.6	
8		83		3/7/9	16		40		SILT (ML) Stiff, orange-brown, wet SILT; low plasticity, micaceous with some clay and sand Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips	30.2	
							45				
							50				
							55				
							60				
							65				

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B-16

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Median:
45.84632N, 122.70013W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/4/2015
Drilling Method: Mud Rotary	Elevation: Approx 271 ft.
Diameter: 3 1/4" Tricone / Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log		Materials Description	Moisture (%)	Remarks
							0		VG-CN	Grass Swale, freeway median.		Standpipe Piezometer Well Tag No. 615 Start Card DOE 11398
1		100		1/1/2	3	GWT not encountered	5		FL	FILL soft, dark, brown, moist to wet, clayey SILT (fill) with peat, roots and miscellaneous organic matter.	31	Sieve/hydrometer analyis Size % Passing #10 100% #200 88% .005mm 20% .002mm 12%
2		100		1/2/3	5		10		MH	Clayey SILT (MH) medium stiff, grey-brown, wet, clayey SILT; low to meduim palsticity	32	
3		100		1/1/2	3		15			Becomes soft	30.6	
4		100		3/6/6	12		20			Becomes stiff, high plastcity, red-grey and brown	22.9	
5		100		1/2/3	5		25			Becomes medium stiff	42.3	
6		100		3/5/5	10		30		ML	Sandy SILT (ML) stiff, light orange, brown, moist, candy SILT with trace clay; low plasticity.	27.4	

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B-16

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 Median:
45.84632N, 122.70013W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/4/2015
Drilling Method: Mud Rotary	Elevation: Approx 271 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		100		5/6/9	15		35		Becomes stiff to very stiff with trace carbon/black organics.	29.2	
8		100		5/6/8	14		40			35.9	
							45		Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							50				
							55				
							60				
							65				

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B-17

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 NB On-Ramp:
45.85283N, 122.70190W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/23/2015
Drilling Method: Mud Rotary	Elevation: Approx 258 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log		Materials Description	Moisture (%)	Remarks
							0		VG	Grass field, root zone.		Standpipe Piezometer Well Tag No. 617 Start Card DOE 11460
									MH-FL	Clayey SILT (MH) (Fill) Medium stiff, grey-brown, damp clayey SILT; medium to high plasticity, micaceous (Fill)		
1		100		2/2/4	6	GWT not encountered	5					Sieve/hydrometer analyis Size % Passing #10 100% #200 81% .005mm 16% .002mm 12%
2		100		1/1/1	2		10			Becomes very soft to soft.		
3		100		3/3/4	7		15		MH	Clayey SILT (MH) Medium stiff, dark grey to brown, with orange mottles, damp clayey SILT; medium to high plasticity, some trace black cemented particles.		
4		100		2/2/3	5		20					
5		100		4/4/6	10		25		CH	Silty CLAY (CH) Stiff, grey-brown, damp, silty CLAY; medium to high plasticity.		
6		100		4/6/9	15		30			Becomes very stiff.		

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B-17

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 NB On-Ramp:
45.85283N, 122.70190W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/23/2015
Drilling Method: Mud Rotary	Elevation: Approx 258 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		100		5/6/10	16		35	CH	Silty CLAY (CH) Stiff, grey-brown, damp, silty CLAY; medium to high plasticity.		
8		100		5/10/15	25		40		Becomes very stiff.		
							45		Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							50				
							55				
							60				
							65				

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B-18

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB Off Ramp:
45.85242N, 122.70391W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/23/2015
Drilling Method: Mud Rotary	Elevation: Approx 242 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
						GWT not encountered	0	VG	Grass Fields, Roots etc.		Standpipe Piezometer Well Tag No. 618
								FL	Silty GRAVEL (Fill) Medium dense,brown, damp, silty fine to coarse GRAVEL (Fill)		
1		22		5/6/9	15		5				
2		33		7/8/8	16		10		Becomes very stiff, brown gravelly silt with coarse sand (FILL)		
3		56		4/7/12	19		15	ML-MH	SILT Very stiff, gray to brown, damp SILT with trace clay; medium plasticity.		
4		100		5/5/6	11		20	MH-CH	Clayey SILT Stiff, dark gray to brown, damp, clayey SILT; medium to high plasticity.		
5		100		3/3/4	7		25		Becomes medium stiff with dark red, black mottles, medium plasticity, moist.		
6		100		1/2/3	5		30				

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B-18

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB Off Ramp:
45.85242N, 122.70391W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/23/2015
Drilling Method: Mud Rotary	Elevation: Approx 242 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		100		9/8/9	17		35		Becomes very stiff		
8		100		7/12/15	27		40				
							45		Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							50				
							55				
							60				
							65				

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B-19

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB On-Ramp:
45.85105N, 122.70338W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/25/2015
Drilling Method: Mud Rotary	Elevation: Approx 254 ft.
Diameter: 3 1/4" Tricone — Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log		Materials Description	Moisture (%)	Remarks
						GWT not encountered	0		MH/GM	Grass mat/Roots (Fill). Medium stiff, grey to dark brown, damp, clayey SILT; low to medium plasticity. Gravels @ 3.5'		Standpipe Piezometer Well Tag No. 621
1		83		2/2/5	7		5					Sieve/hydrometer analyis Size % Passing #10 100% #200 81% .005mm 22% .002mm 15%
2		100		3/3/3	6		10		MH-CH	Clayey SILT Medium stiff, grey brown with orange mottles, moist, clayey SILT; medium to high plasticity.		
3		100		2/2/3	5		15					
4		100		1/2/3	5		20		CH	Silty CLAY(CH) Soft to medium stiff, gray brown, moist, silty CLAY; high plasticity.		
5		100		3/4/7	11		25			Becomes stiff with medium plasticity.		
6		100		4/5/7	12		30					

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B-19

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB On-Ramp:
45.85105N, 122.70338W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/25/2015
Drilling Method: Mud Rotary	Elevation: Approx 254 ft.
Diameter: 3 1/4" Tricone / Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		100		2/2/3	5		35		Becomes soft to medium stiff (possible water table)		
8		100		3/4/7	11		40	ML	Clayey SILT(ML) Stiff, grey-brown moist, clayey SILT with trace fine sand; low plasticity. Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							45				
							50				
							55				
							60				
							65				

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B-20

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB Shoulder:
45.848546N, 122.701639W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/24/2015
Drilling Method: Mud Rotary	Elevation: Approx 271 ft.
Diameter: 3 1/4" Tricone / Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log		Materials Description	Moisture (%)	Remarks
						GWT not encountered	0		FL	Fill Grass Field. Stiff dark-blue gray, moist, SILT with trace clay and organics.		Standpipe Piezometer Well Tag No. 619
1		83		4/5/6	11		5					Sieve/hydrometer analyis Size % Passing #10 100% #200 88% .005mm 17% .002mm 13%
2		100		1/2/5	7		10		ML-MH	Clayey SILT Medium stiff, gray-blue, damp to moist, clayey SILT; micaceous, low to medium plasticity.		
3		100		2/2/2	4		15			Becomes soft with orange-brown mottles.		
4		100		2/3/3	6		20					
5		100		4/7/8	15		25		CH	Silty CLAY Stiff to very stiff, tan-brown, moist, silty CLAY; medium to high plasticity.		
6		100		2/3/5	8		30		MH-CH	Clayey SILT Medium stiff tan brown, moist, clayey SILT; high plasticity.		

File: C:\Projects\CH2M-2015-003\Logs\Ch2m-2015-003.log Date: 8/17/2015

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Vancouver, Washington 98662
360-258-1738

B-20

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB Shoulder:
45.848546N, 122.701639W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/24/2015
Drilling Method: Mud Rotary	Elevation: Approx 271 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		100		1/1/2	3		35		Becomes soft with orange mottles and black cemented particles.		
8		100		5/5/6	11		40	ML	Sandy SILT Stiff, brown, moist, fine sandy SILT with trace clay; low plasticity.		
							45		Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							50				
							55				
							60				
							65				

File: C:\Projects\CH2M-2015-003\Logs\Ch2m-2015-003.log Date: 8/17/2015

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B-21

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB W. Ditch Area
45.84656N, 122.70067W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/24/2015
Drilling Method: Mud Rotary	Elevation: Approx 274 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
						GWT not encountered	0	VG	Grass, black berries etc.		Standpipe Piezometer Well Tag No. 620
								MH	Clayey SILT (MH) Medium stiff, tan-brown, damp, clayey SILT; orange-brown mottles, medium plasticity.		
1		100		2/3/4	7		5				Sieve/hydrometer analyis Size % Passing #10 100% #200 85% .005mm 18% .002mm 15%
2		100		4/8/11	19		10	CH	Silty CLAY (CH) Very stiff, gray,damp, silty CLAY; medium to high plasticity, some mottles.		
3		100		3/8/14	22		15				
4		100		5/9/14	23		20				
5		78		5/6/7	13		25	MH	Sandy SILT (MH) Stiff, tan-brown, damp, fine sandy SILT with trace clay; medium plasticity.		
6		100		2/2/6	8		30	CH	Silty CLAY (CH) Medium stiff, brown to gray, damp, silty CLAY; medium to high plasticity.		

File: C:\Projects\CH2M-2015-003\Logs\Ch2m-2015-003.log Date: 8/17/2015

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B-21

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB W. Ditch Area
45.84656N, 122.70067W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/24/2015
Drilling Method: Mud Rotary	Elevation: Approx 274 ft.
Diameter: 3 1/4" Tricone — Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		89		6/8/8	16		35		MH Clayey SILT (MH) Stiff to very stiff, brown, gray, damp, clayey SILT; medium plasticity, orange-brown mottling.		
8		100		6/7/13	20		40		Becomes fine sandy SILT. Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							45				
							50				
							55				
							60				
							65				

File: C:\Projects\CH2M-2015-003\Logs\Ch2m-2015-003.log Date: 8/17/2015

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B-22

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB W. Ditch Area
45.843529N, 122.699180W

Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/25/2015
Drilling Method: Mud Rotary	Elevation: Approx 270 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
						GWT not encountered	0	VG	Grass Roots, organics etc.		Standpipe Piezometer Well Tag No. 622
								MH	Clayey SILT (MH) Medium stiff, blue-gray, damp, clayey SILT; low to medium plasticity.		
1		100		2/3/4	7		5				Sieve/hydrometer analyis Size % Passing #10 100% #200 84% .005mm 21% .002mm 16%
2		100		2/4/4	8		10		Trace fine to medium sand.		
3		100		3/4/6	10		15	MH-CH	Silty CLAY(MH-CH) Stiff, light gray-brown, damp silty CLAY; medium to high plasticity, trace weathered gravels.		
4		100		5/7/10	17		20		Becomes very stiff. Trace black cemented particle.		
5		100		2/2/3	5		25	ML-MH	Clayey SILT(ML-MH) Medium stiff, brown, gray, moist, clayey SILT; low to medium plasticity.		
6		100		3/3/5	8		30		Becomes sandy SILT.		

File: C:\Projects\CH2M-2015-003\Logs\Ch2m-2015-003.log Date: 8/17/2015

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B-22

I-5/La Center Road Interchange
La Center, WA

Location:
I-5 SB W. Ditch Area
45.843529N, 122.699180W

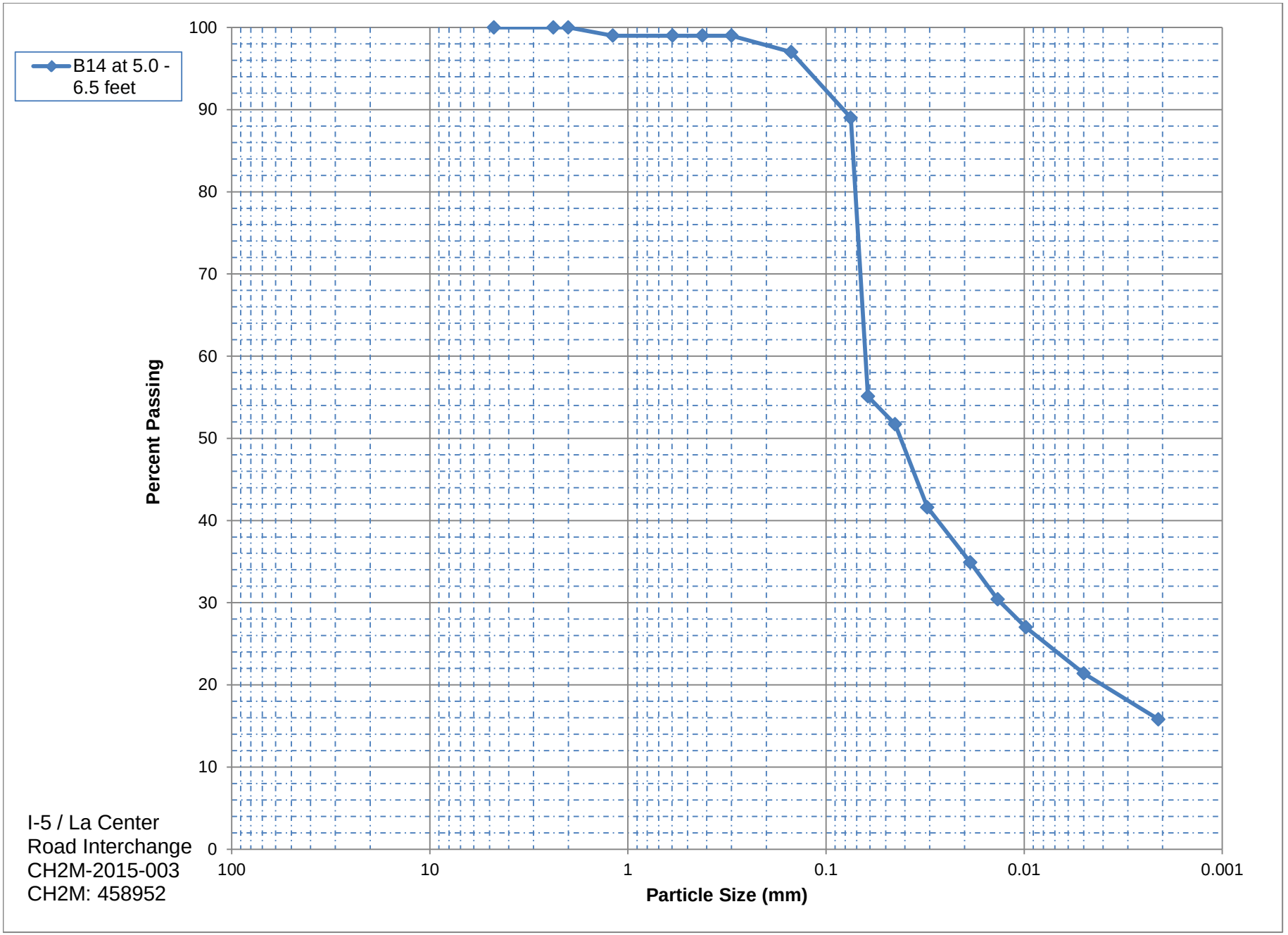
Project: I-5/La Center Road Interchange	Driller: Western States (Hubbard, OR)
Proj No.: CH2M-2015-003-T001	Date: 6/25/2015
Drilling Method: Mud Rotary	Elevation: Approx 270 ft.
Diameter: 3 1/4" Tricone | Water Table :	Logged by: B. Haug

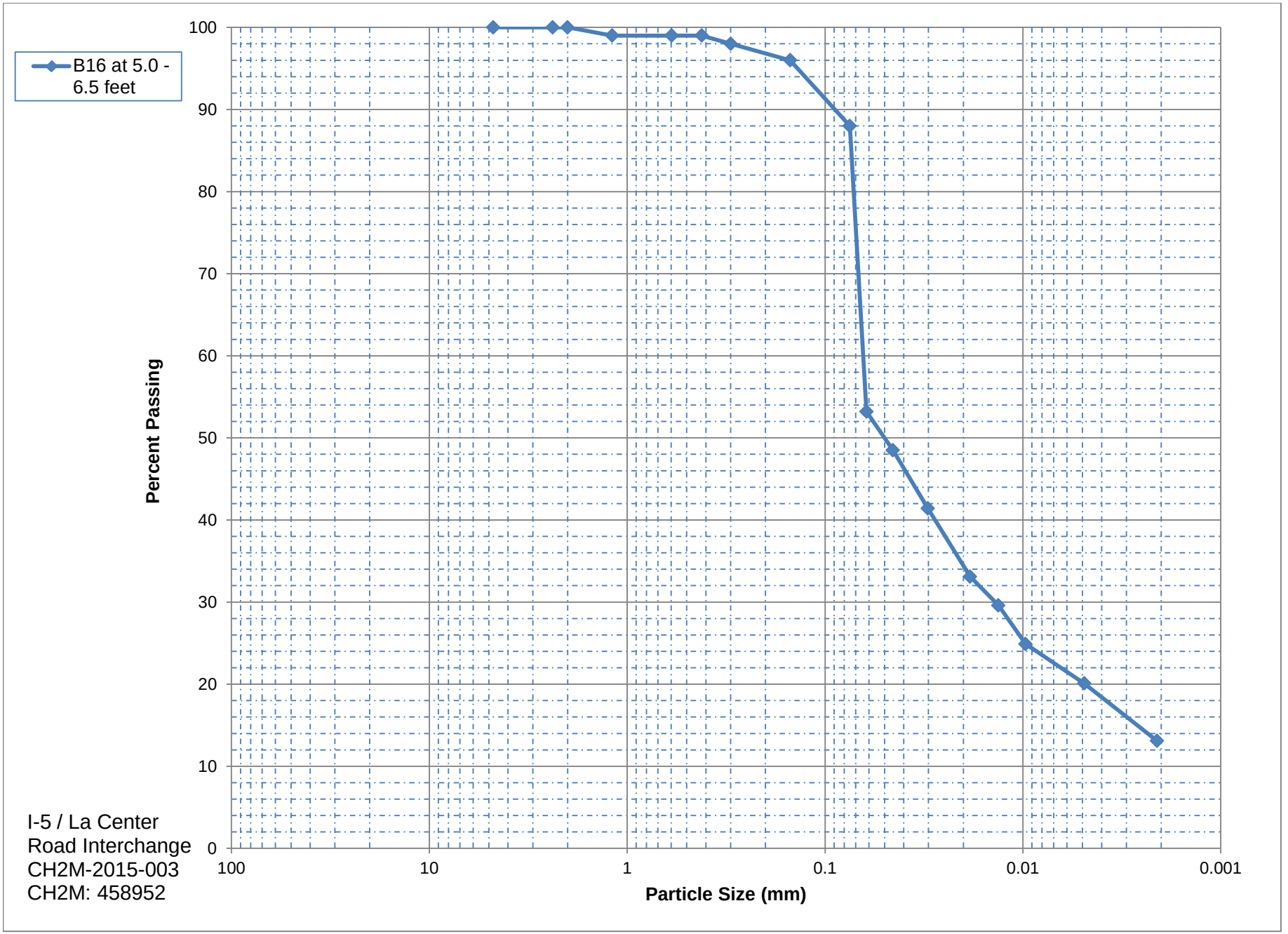
Sample No.	Sample Type	Recovery (%)	RQD (%)	Blow Count per 6 inches	Blows/Foot (N)	Water Table	Depth (ft BGS)	Graphic Log	Materials Description	Moisture (%)	Remarks
7		94		3/5/8	13		35		MH Clayey SILT (MH). Becomes stiff; low plasticity.		
8		100		4/4/6	10		40				
							45		Boring terminated at : (feet BGS): 41.5' Standpipe piezometer: -40 to 41.5': 10/20 sand -30' to -40': 1" diameter, 0.010 slot PVC screen capped @ bottom -30 to 0': 1" PVC Blank -41.5 to -27': 10/20 Colorado Sand -27 to -1.5': 3/8 Bentonite chips		
							50				
							55				
							60				
							65				

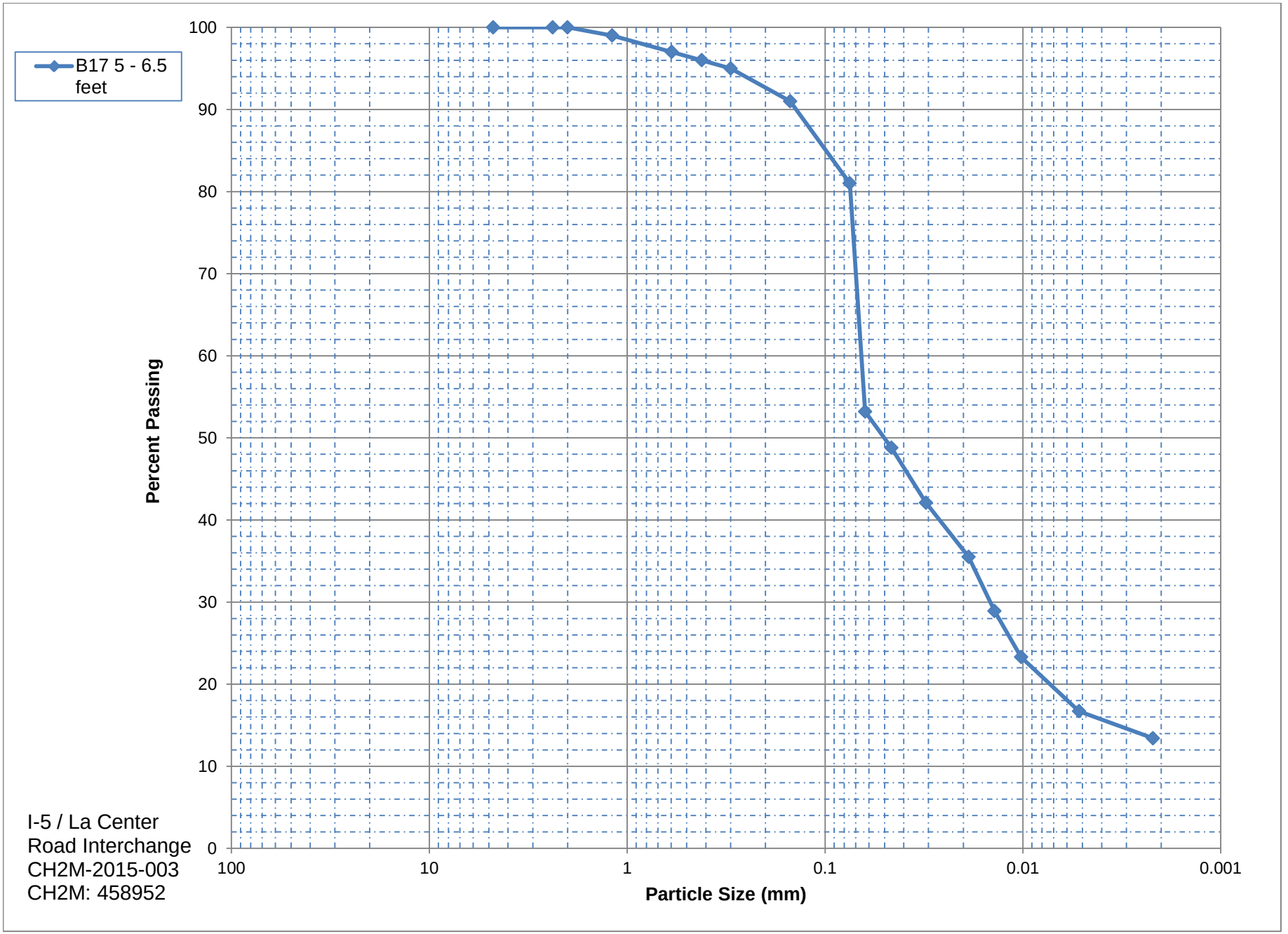
File: C:\Projects\CH2M-2015-003\Logs\Ch2m-2015-003.log Date: 8/17/2015

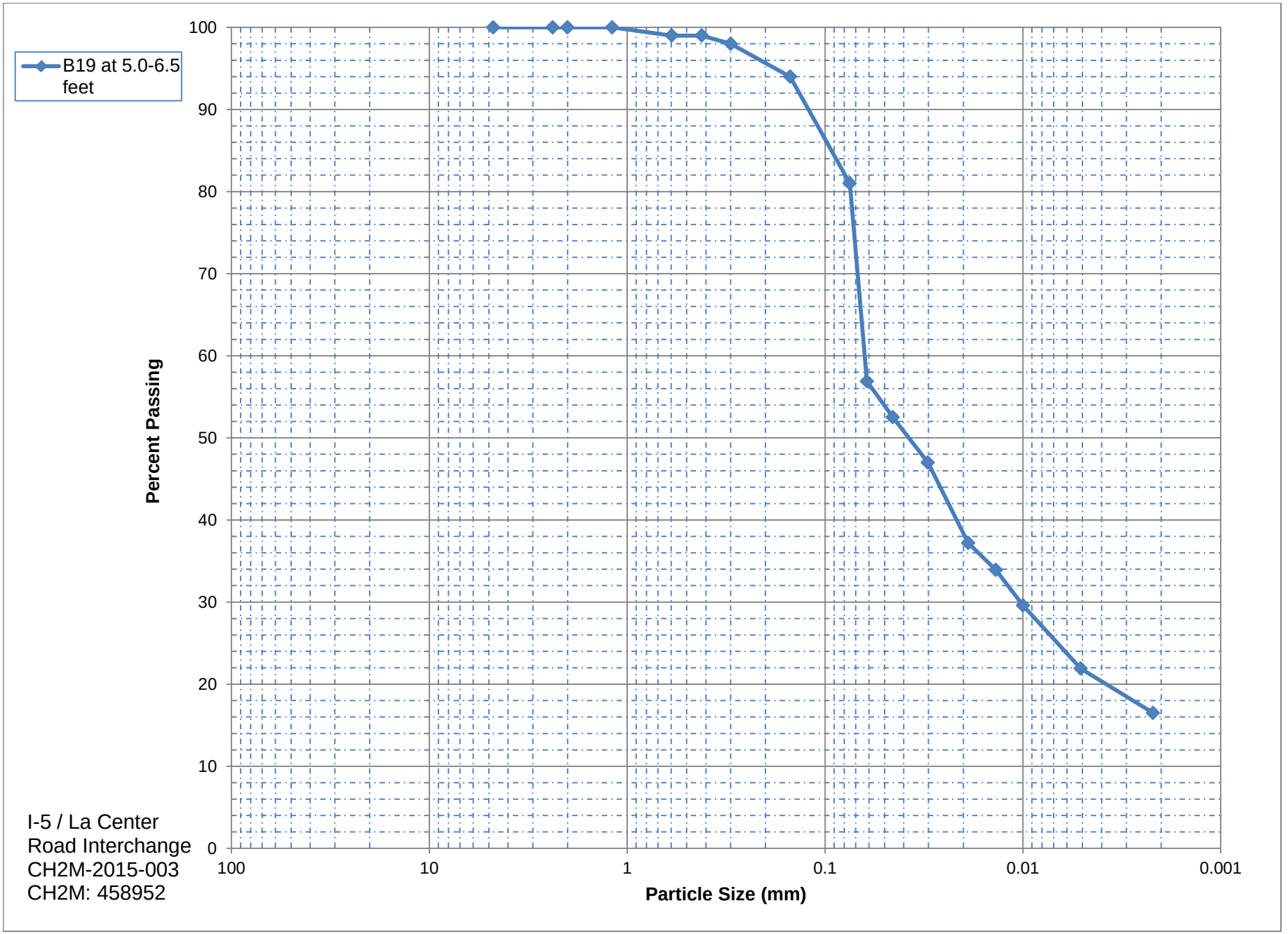
APPENDIX C

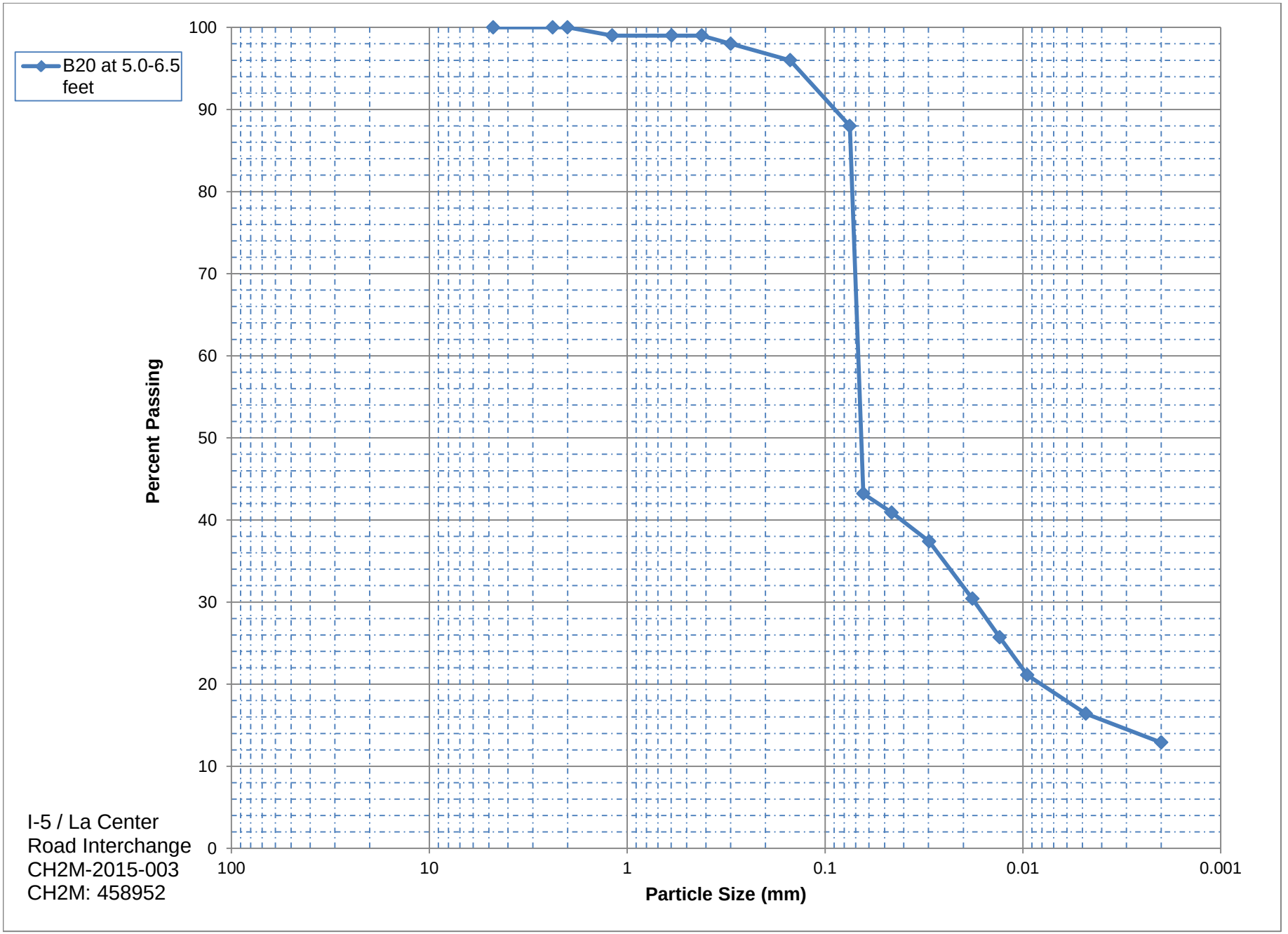
Laboratory Testing Results

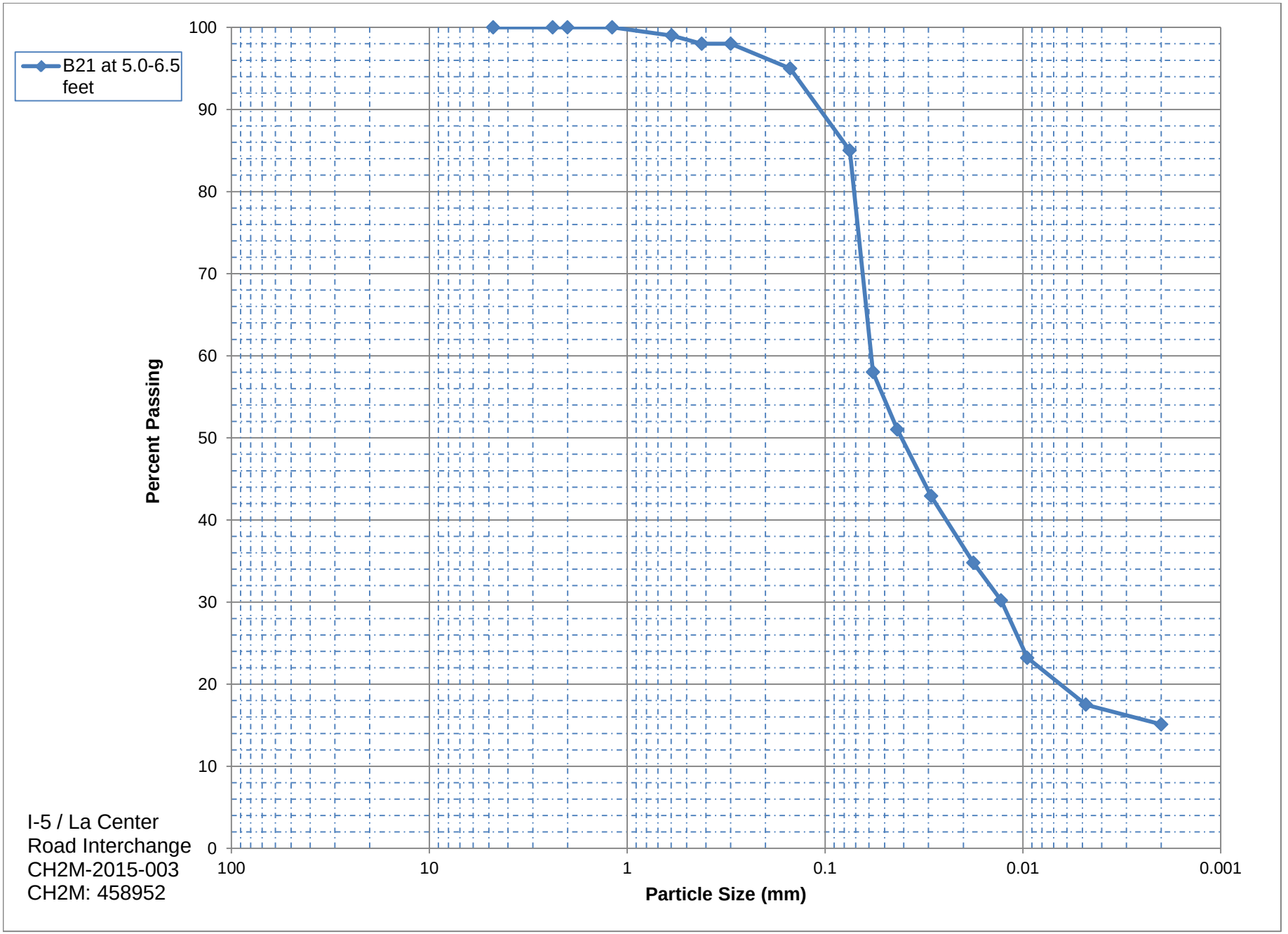

B14 at 5.0 - 6.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

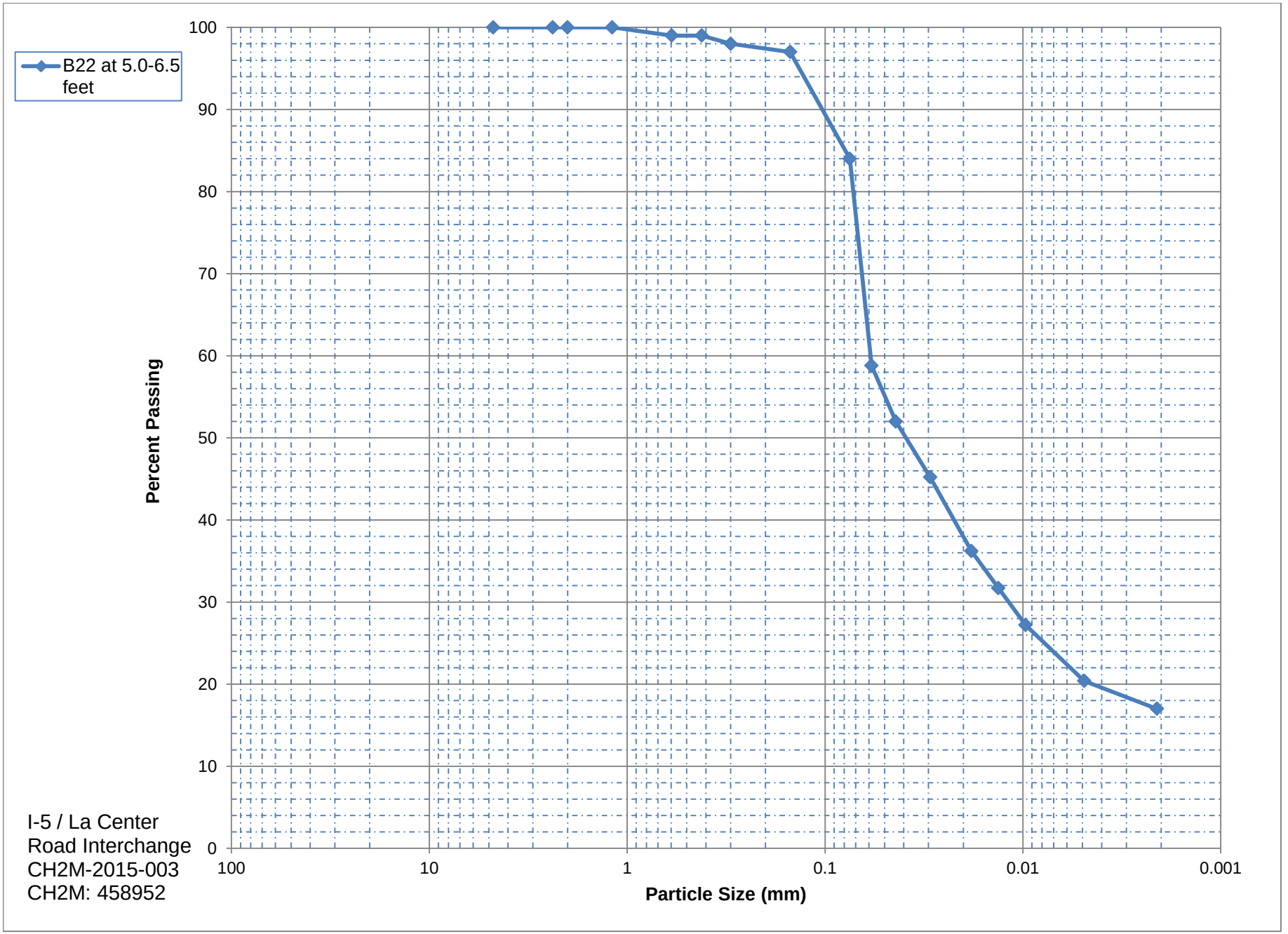

B16 at 5.0 - 6.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

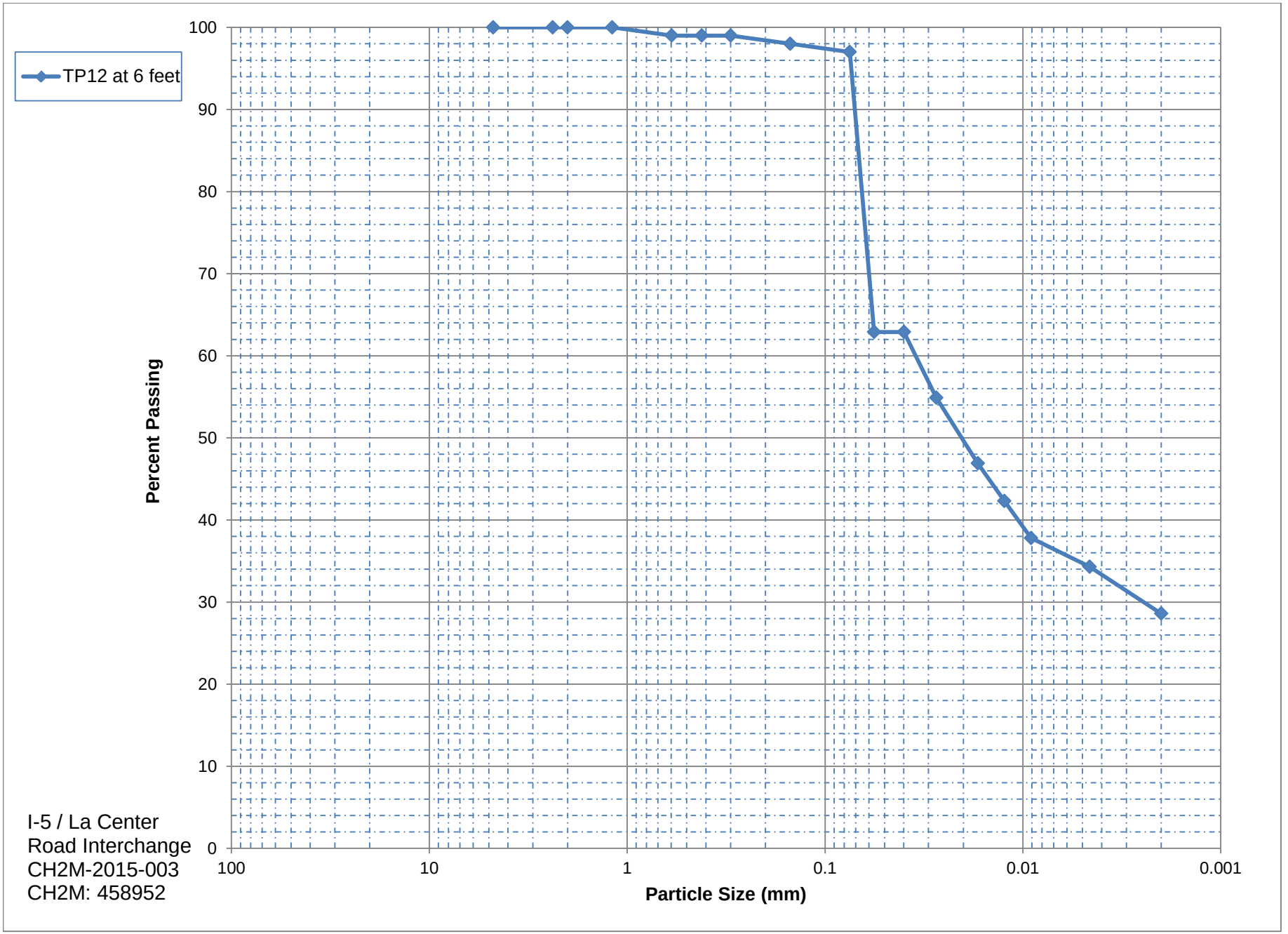

B17 5 - 6.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

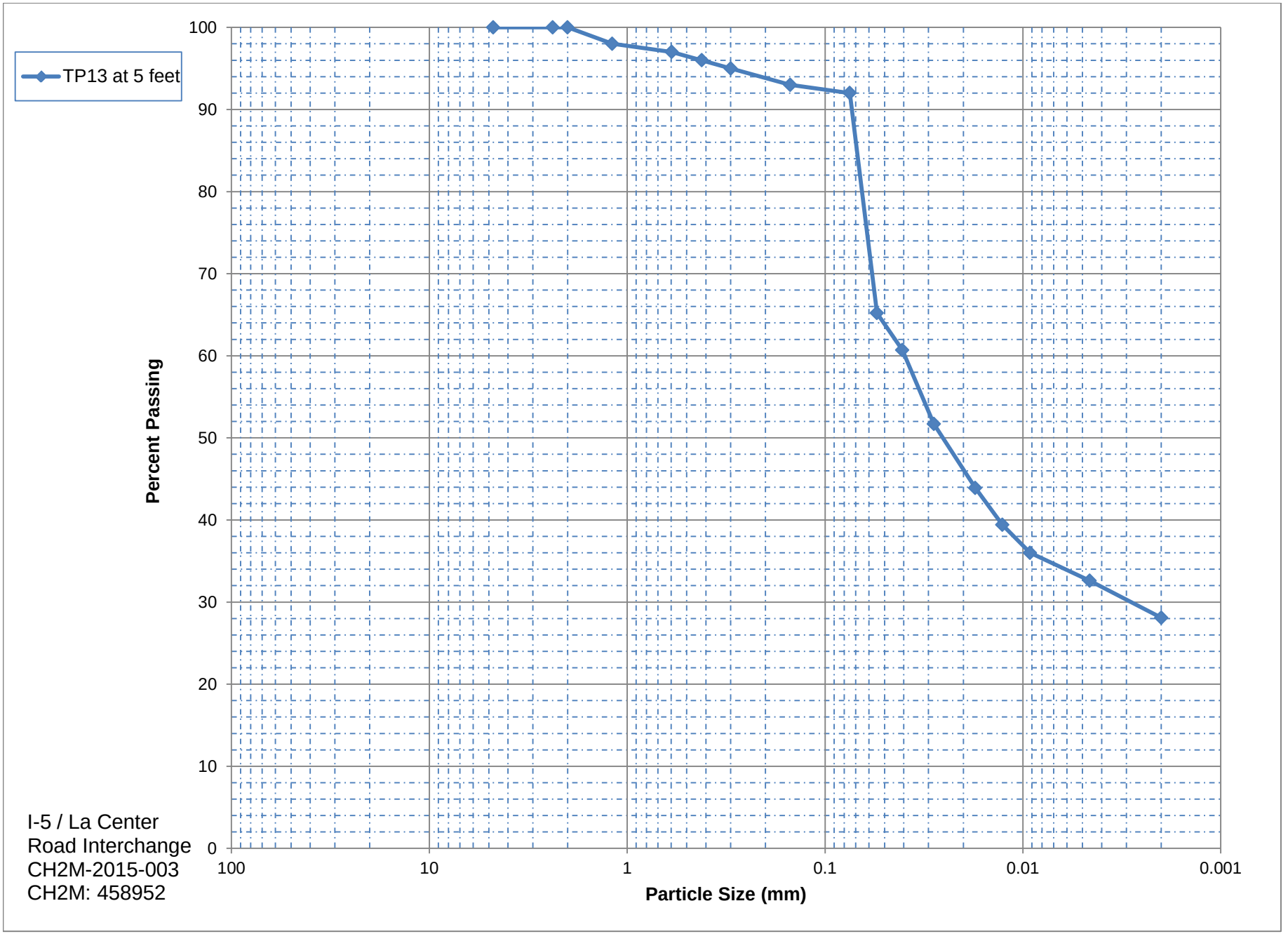

B19 at 5.0-6.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

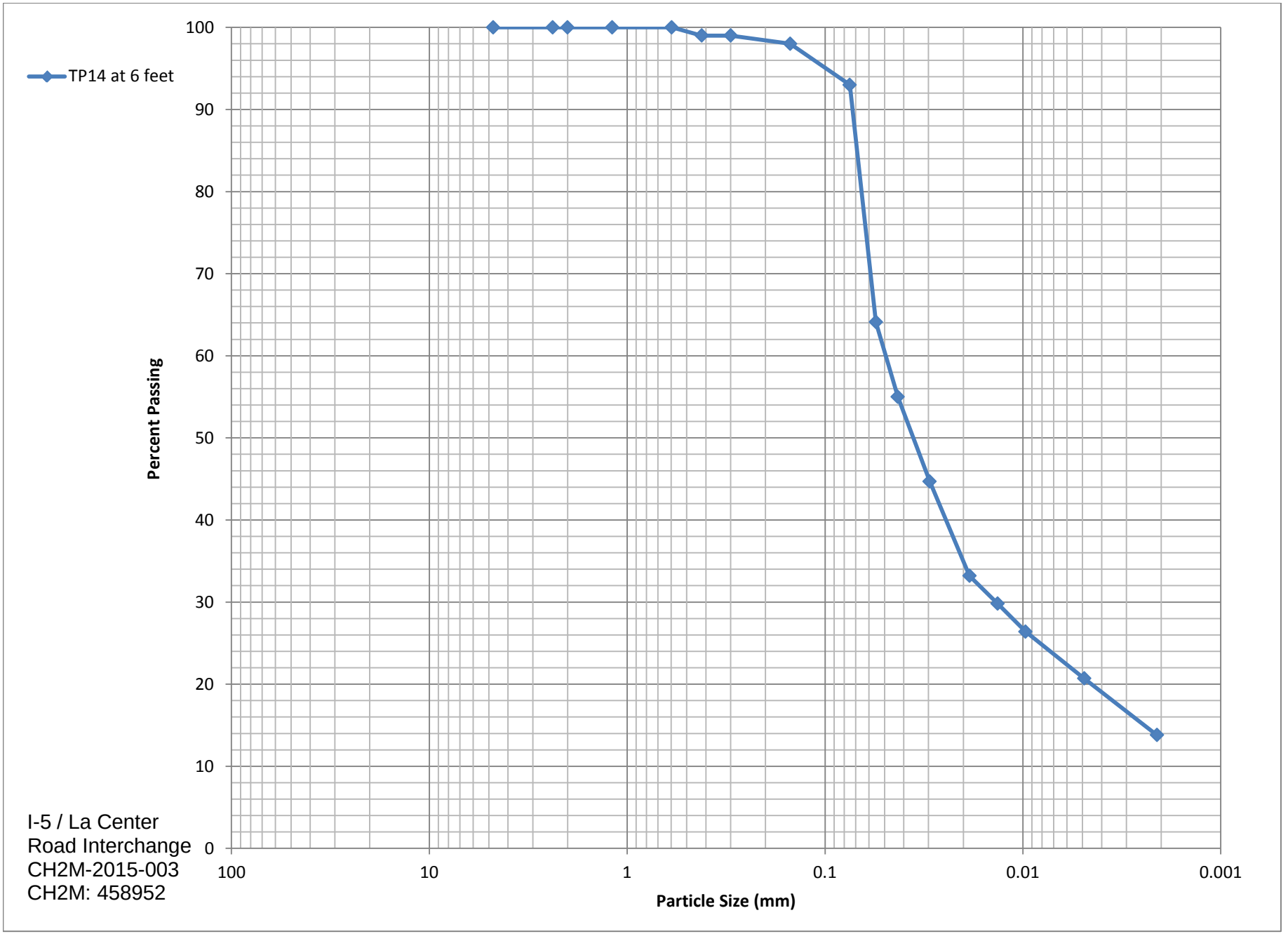

B20 at 5.0-6.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

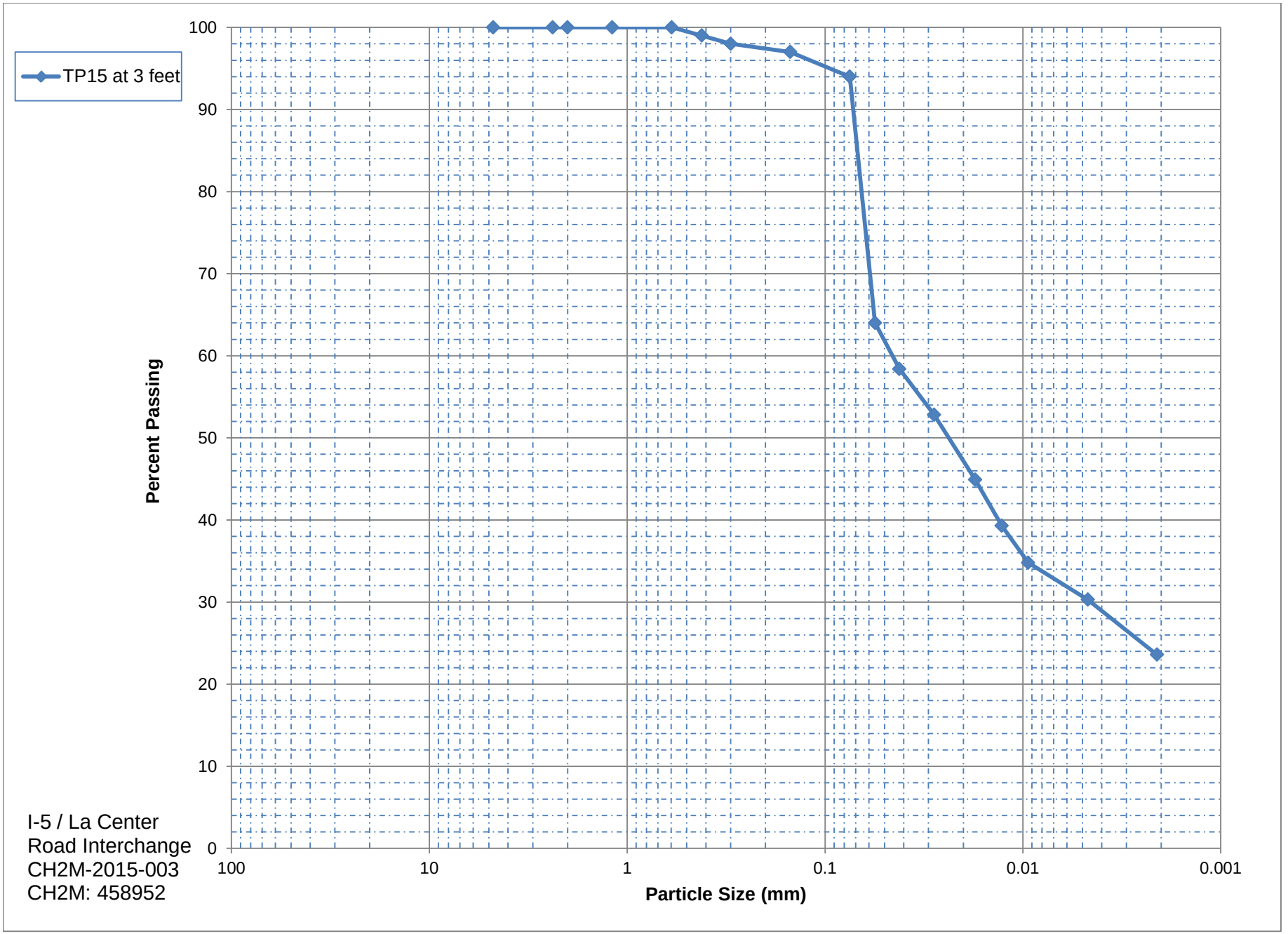

B21 at 5.0-6.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

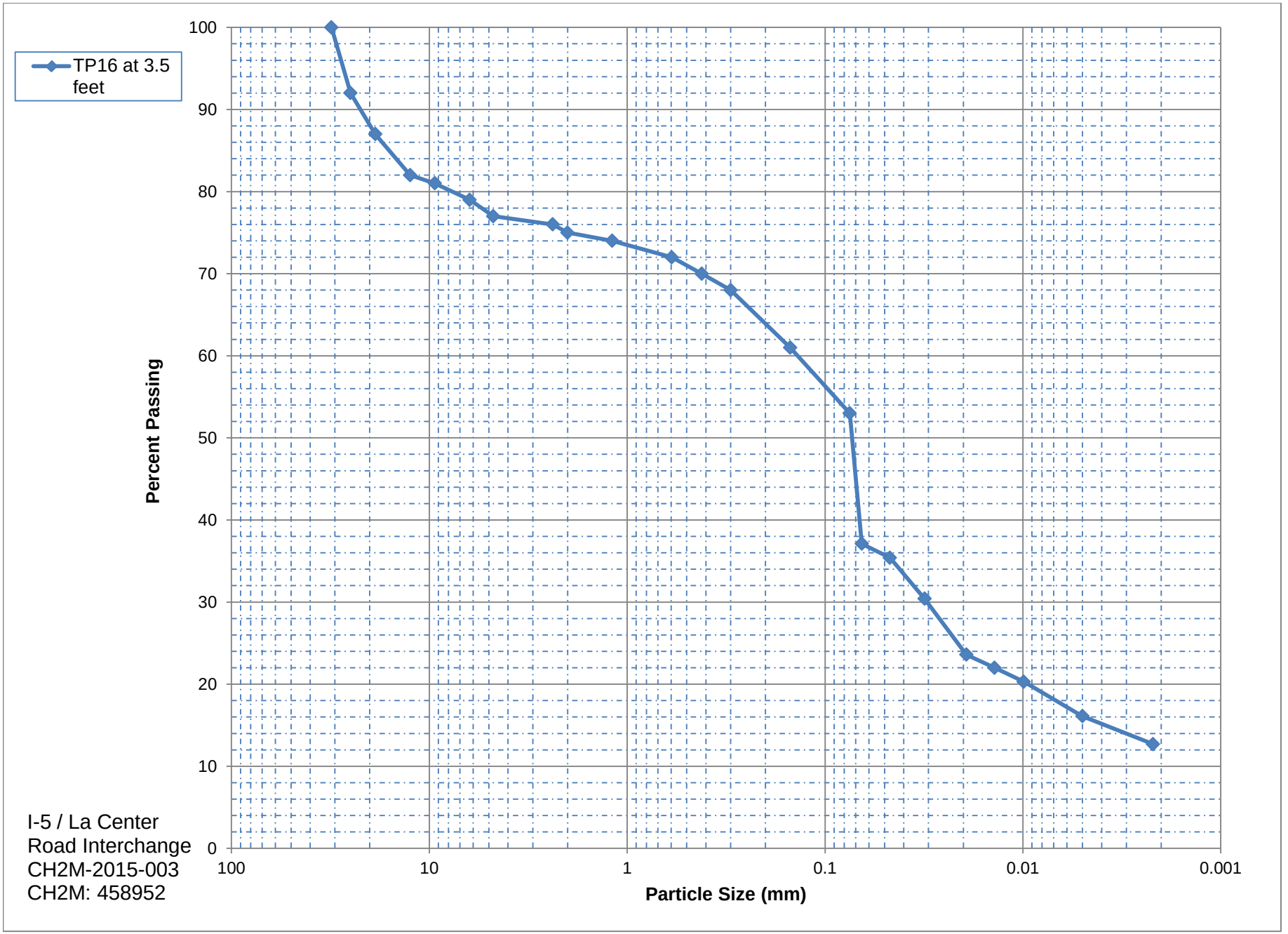

B22 at 5.0-6.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

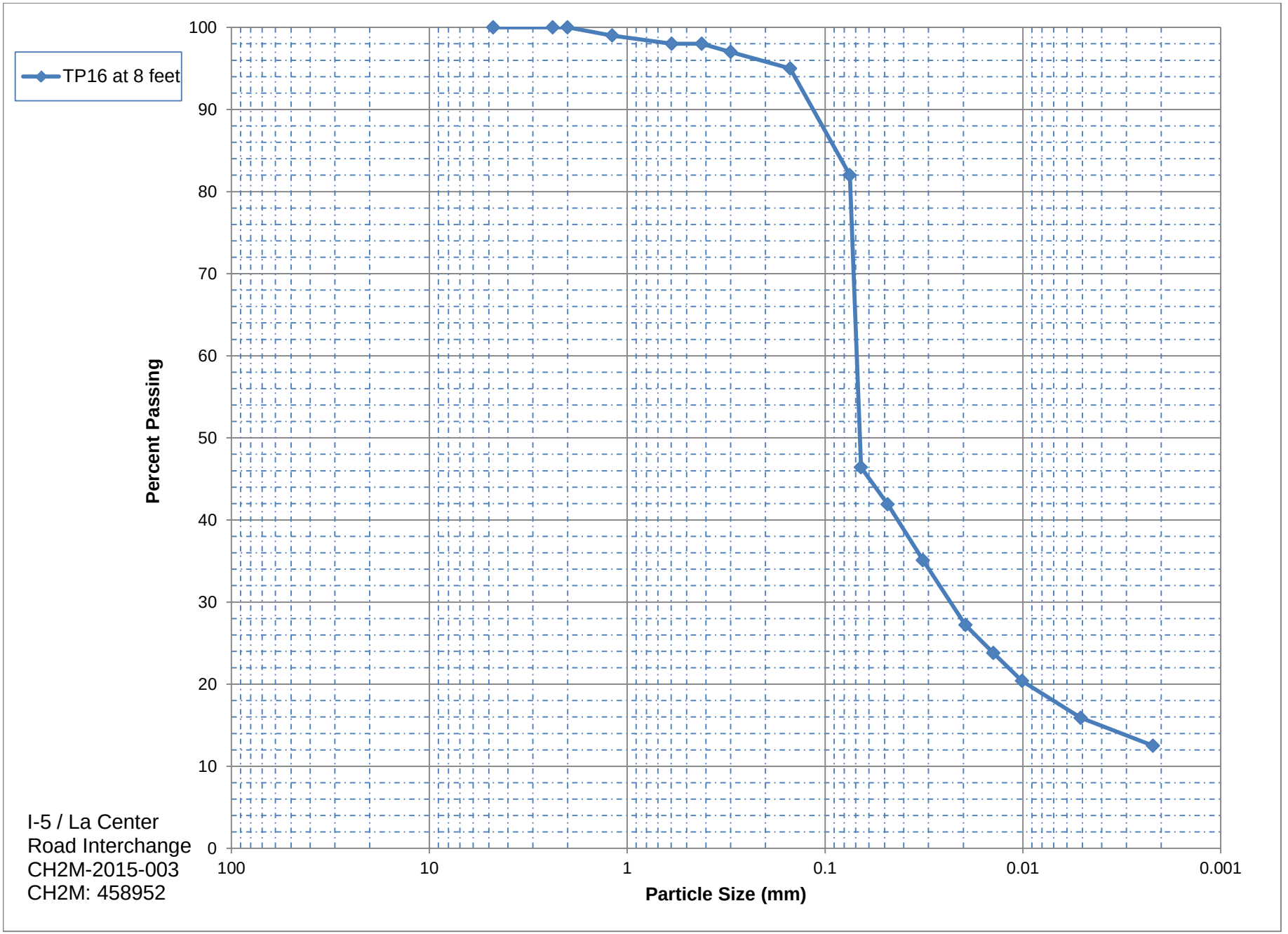

TP12 at 6 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952

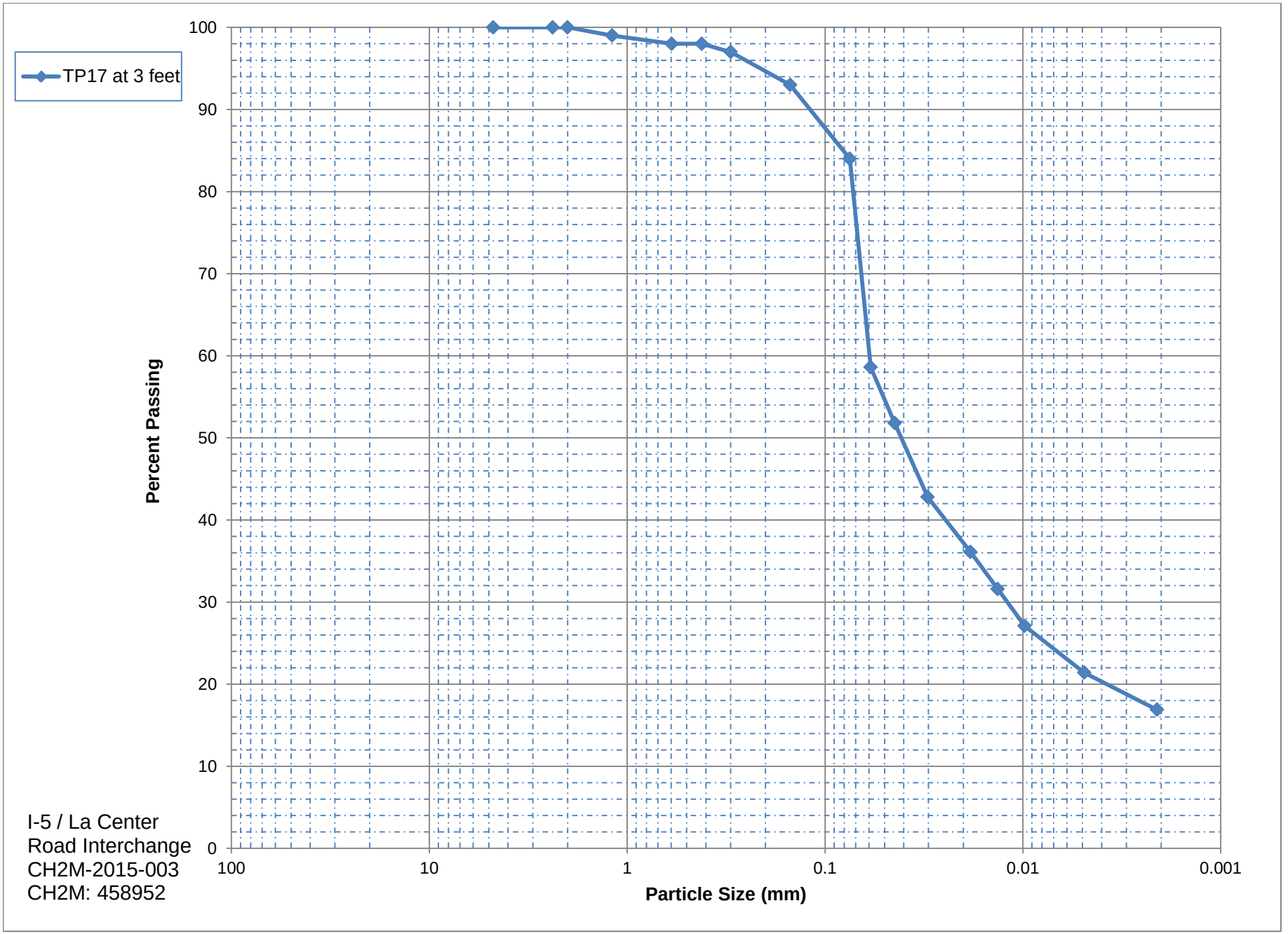

TP13 at 5 feet
100
90
80
70
60
50
40
30
20
10
0
Percent Passing
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952

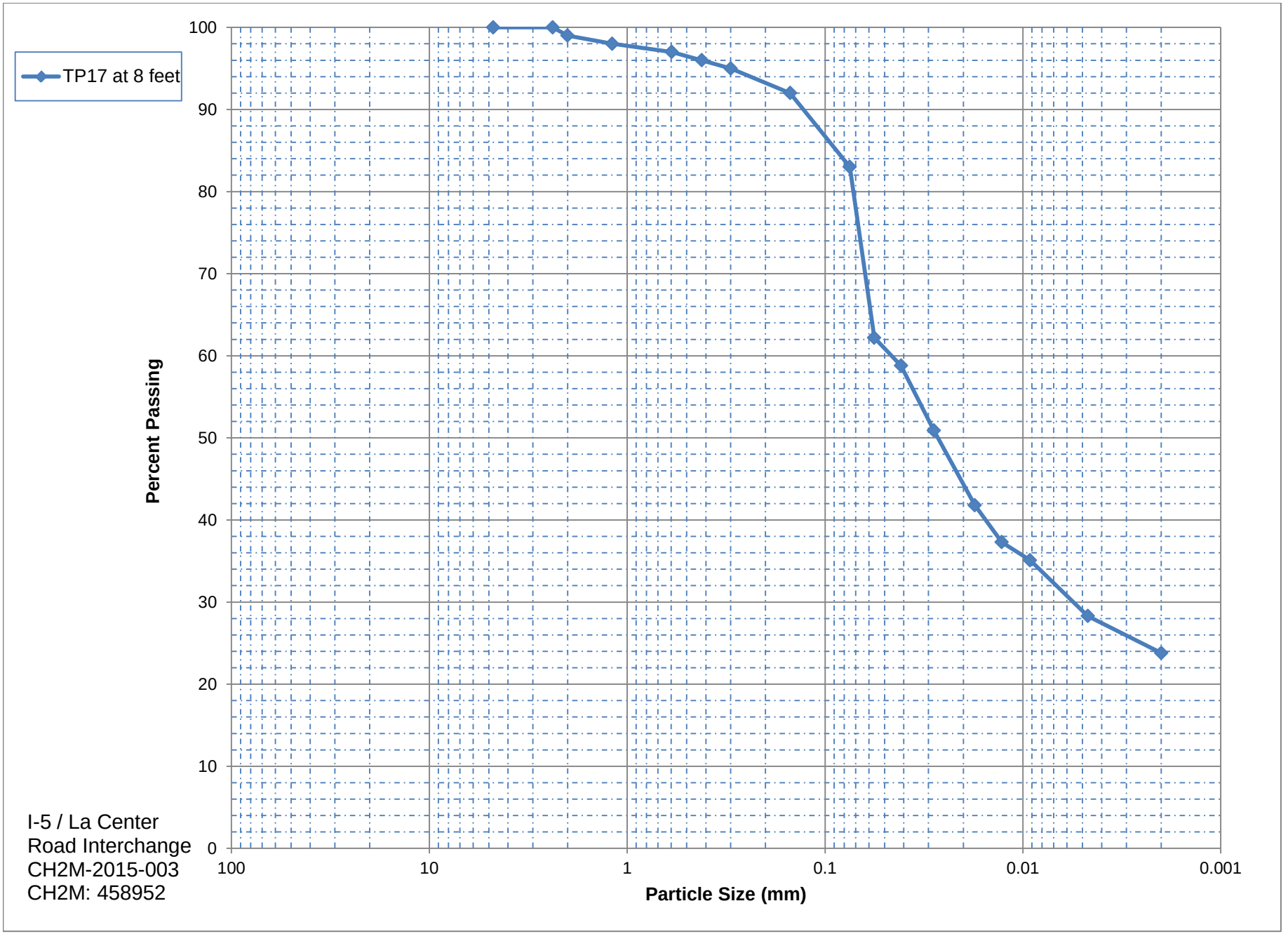

TP14 at 6 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952

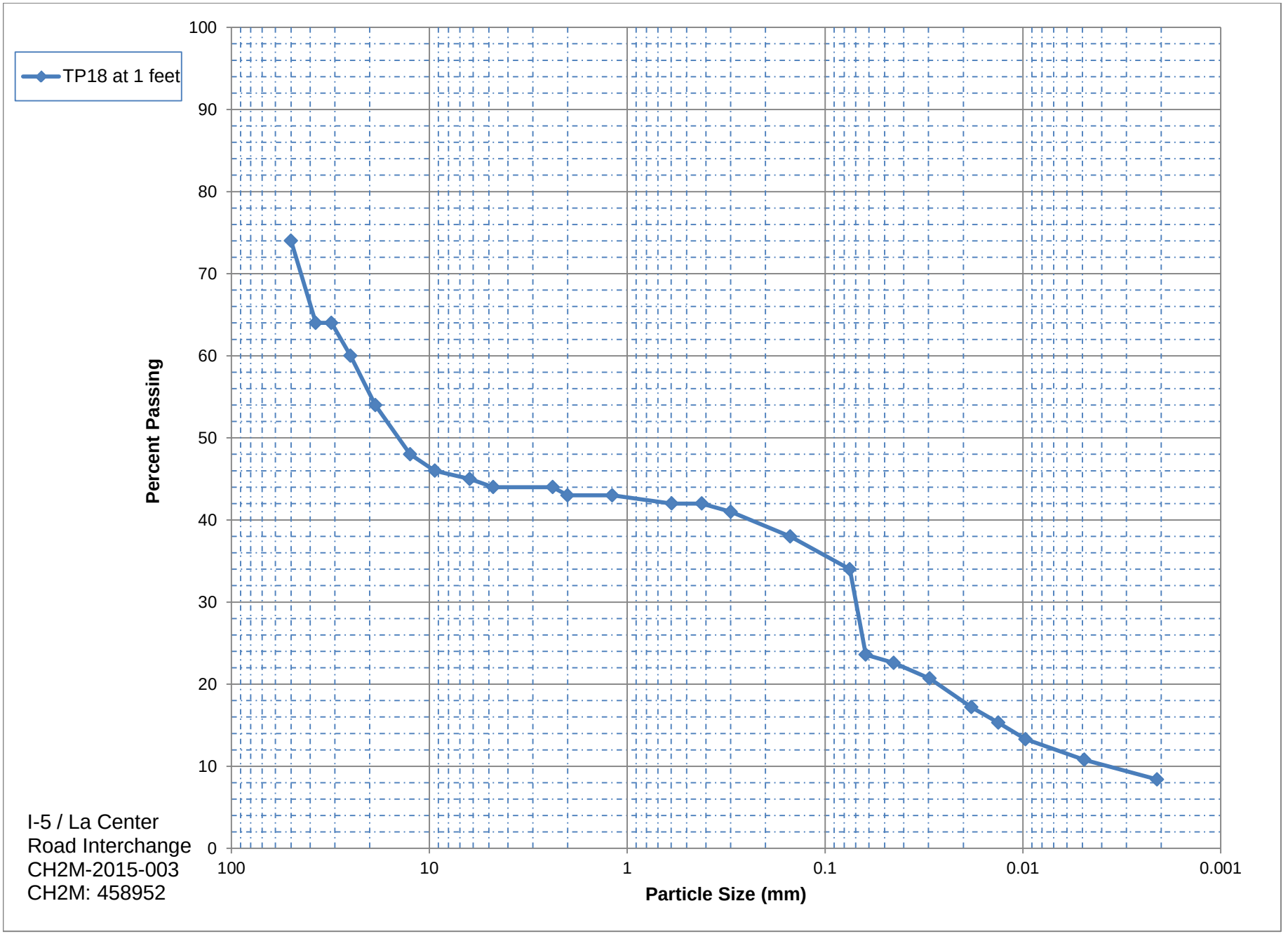

TP15 at 3 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952

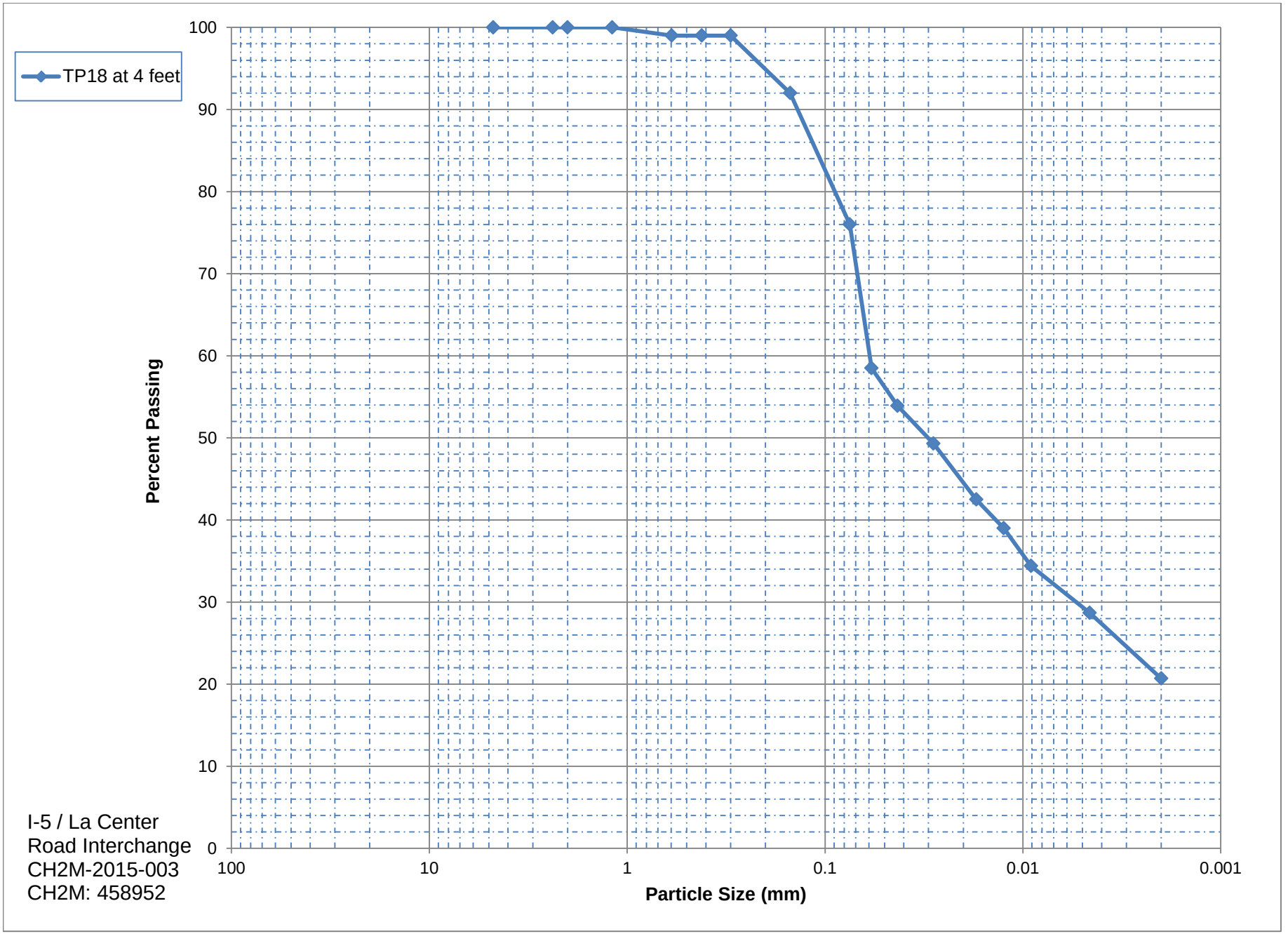

TP16 at 3.5 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center Road Interchange
CH2M-2015-003
CH2M: 458952

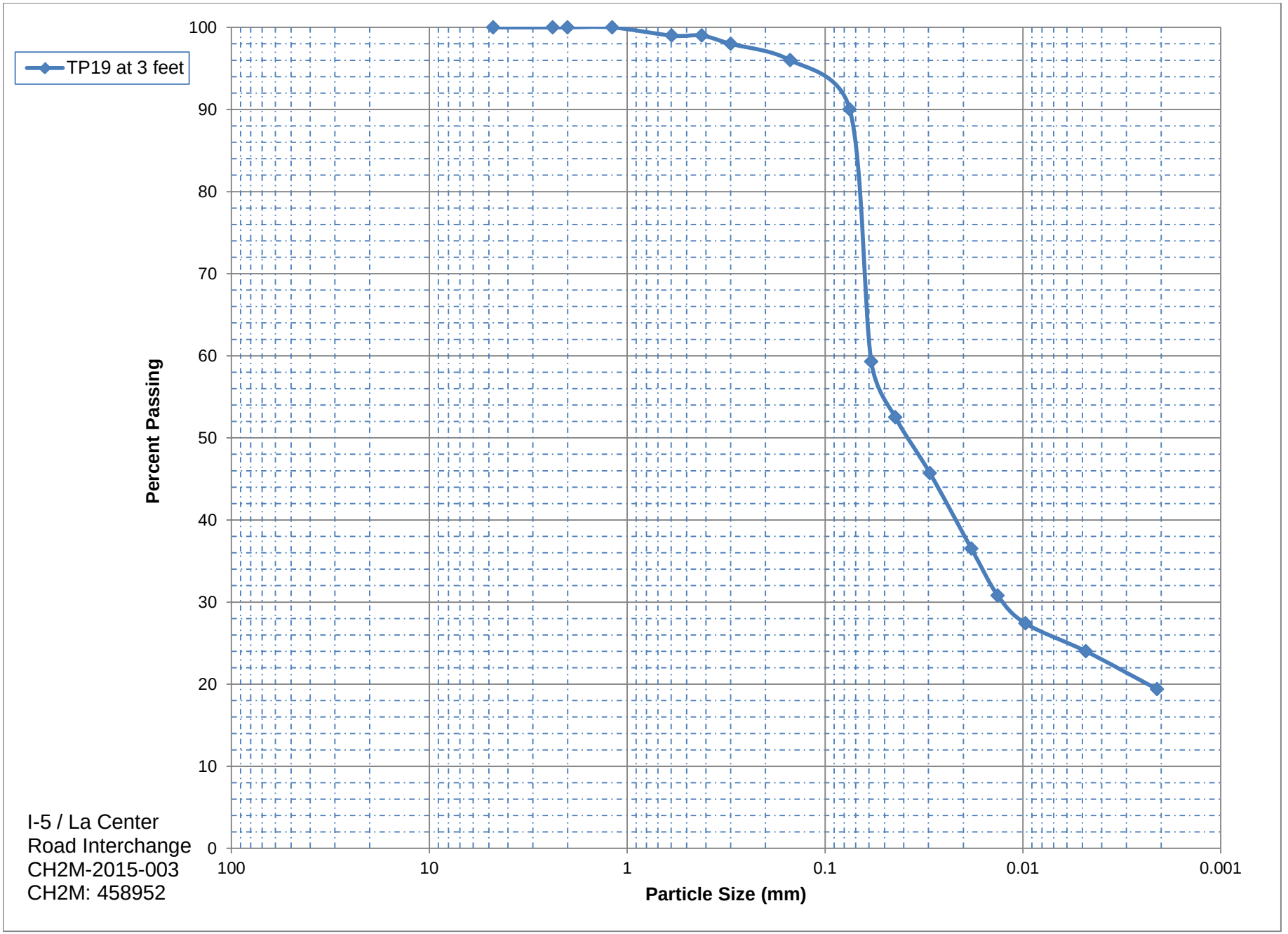

TP16 at 8 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952


TP17 at 3 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952


TP17 at 8 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952


TP18 at 1 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952


TP18 at 4 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952


TP19 at 3 feet
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
100
10
1
0.1
0.01
0.001
Particle Size (mm)
I-5 / La Center
Road Interchange
CH2M-2015-003
CH2M: 458952

Rhino One Geotechnical
4610 NE 77th Ave.
Vancouver WA 98662

503.443.3799

ACS Testing
7409 SW Tech Cnter DR, #145
Tigard, OR 97223

PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	
MATERIAL:	Native Soil	**LAB NO:**	8162-1
SAMPLE SOURCE:	B3-5-6.5'	**DATE SAMPLED:**	6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	87.50	SPECIFIC GRAVITY OF SOLIDS	2.49
PERCENT PASSING #10 SIEVE	100.00		

HYDROMETER RESULTS (% PASSING)

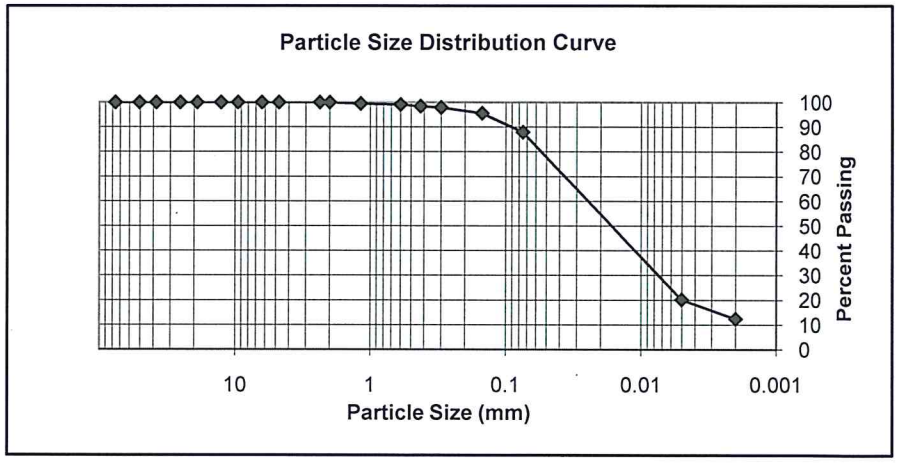
PARTICLE SIZE (DIA. mm)	0.0617	0.0454	0.0302	0.0185	0.0133	0.0097	0.0049	0.0021
PERCENT SAMPLE TESTED	53.2	48.5	41.4	33.1	29.6	24.9	20.1	13.1
PERCENT TOTAL SAMPLE	53.2	48.5	41.4	33.1	29.6	24.9	20.1	13.1

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	99
# 30	99
# 40	99
# 50	98
# 100	96
# 200	88
0.005 mm	20
0.002 mm	12

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
88	95	98	99	99	99	100



REVIEWED BY _____

Rhino One Geotechnical
4610 NE 77th Ave.
Vancouver WA 98662

ASPHALT CONCRETE SOILS TESTING, INC
503.443.3799

ACS Testing
7409 SW Tech Cnter DR, #145
Tigard, OR 97223

PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: B1 @ 5-6.5'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-2
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.80	SPECIFIC GRAVITY OF SOLIDS	2.60
PERCENT PASSING #10 SIEVE	99.72		

HYDROMETER RESULTS (% PASSING)

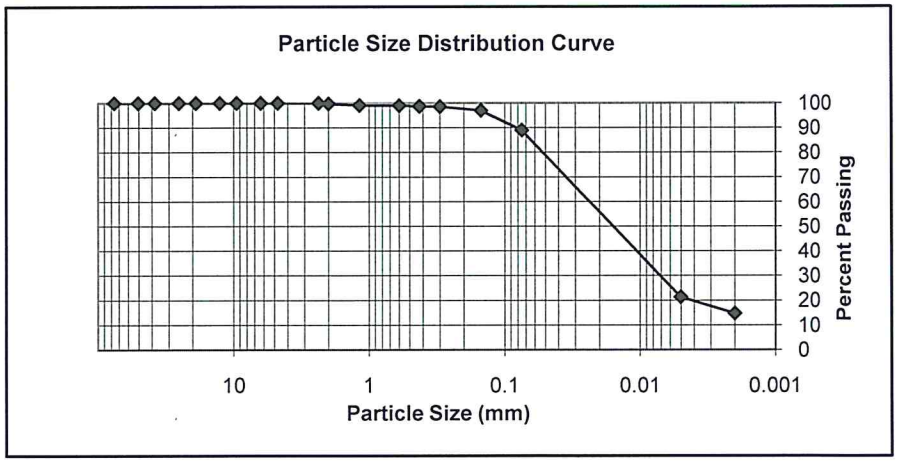
PARTICLE SIZE (DIA. mm)	0.0614	0.0448	0.0308	0.0187	0.0136	0.0098	0.0050	0.0021
PERCENT SAMPLE TESTED	55.2	51.8	41.7	35.0	30.5	27.1	21.5	15.8
PERCENT TOTAL SAMPLE	55.1	51.7	41.6	34.9	30.4	27.0	21.4	15.8

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	99
# 30	99
# 40	99
# 50	99
# 100	97
# 200	89
0.005 mm	21
0.002 mm	15

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
88	96	98	99	99	99	100



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4610 NE 77th Ave.
Vancouver WA 98662

ACS Testing
7409 SW Tech Cnter DR, #145
Tigard, OR 97223

503.443.3799

PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	
MATERIAL:	Native Soil	**LAB NO:**	8162-3
SAMPLE SOURCE:	TP 8 @3'	**DATE SAMPLED:**	6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.20	SPECIFIC GRAVITY OF SOILS	2.55
PERCENT PASSING #10 SIEVE	99.57		

HYDROMETER RESULTS (% PASSING)

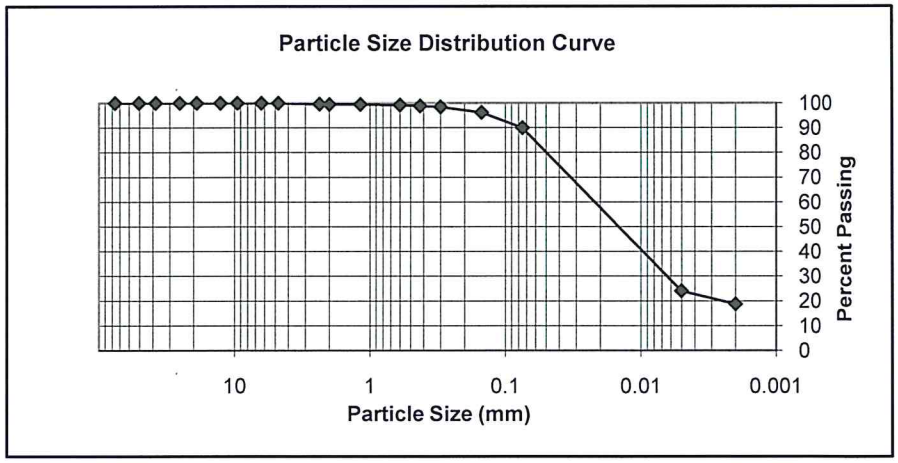
PARTICLE SIZE (DIA. mm)	0.0584	0.0441	0.0295	0.0182	0.0134	0.0097	0.0048	0.0021
PERCENT SAMPLE TESTED	59.6	52.7	45.9	36.7	31.0	27.5	24.1	19.5
PERCENT TOTAL SAMPLE	59.3	52.5	45.7	36.5	30.8	27.4	24.0	19.4

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	99
# 40	99
# 50	98
# 100	96
# 200	90
0.005 mm	24
0.002 mm	19

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
89	96	98	99	99	99	100



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PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: TP2 @ 5'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-4
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.90	SPECIFIC GRAVITY OF SOILS	2.58
PERCENT PASSING #10 SIEVE	99.54		

HYDROMETER RESULTS (% PASSING)

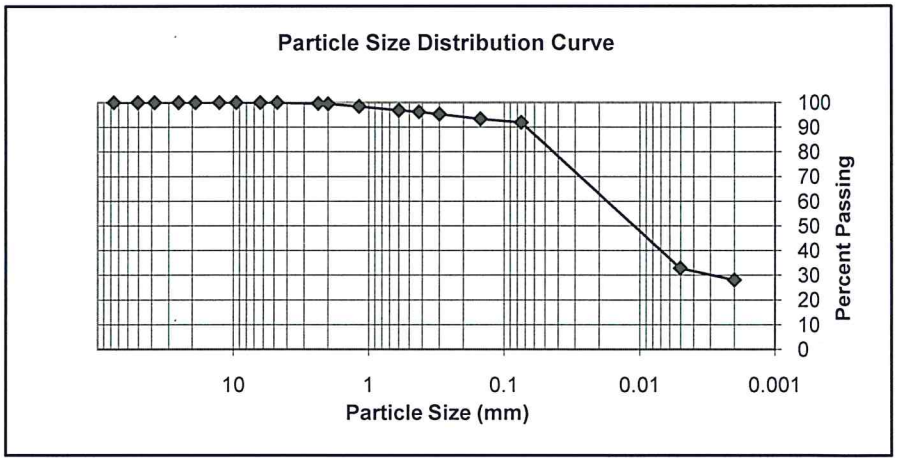
PARTICLE SIZE (DIA. mm)	0.0547	0.0407	0.0282	0.0174	0.0127	0.0092	0.0046	0.0020
PERCENT SAMPLE TESTED	65.5	61.0	52.0	44.1	39.6	36.2	32.8	28.3
PERCENT TOTAL SAMPLE	65.2	60.7	51.7	43.9	39.4	36.0	32.6	28.1

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	98
# 30	97
# 40	96
# 50	95
# 100	93
# 200	92
0.005 mm	33
0.002 mm	28

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
89	91	94	95	96	98	100



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PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: TP4 @3'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-5
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.90	SPECIFIC GRAVITY OF SOILS	2.61
PERCENT PASSING #10 SIEVE	99.89		

HYDROMETER RESULTS (% PASSING)

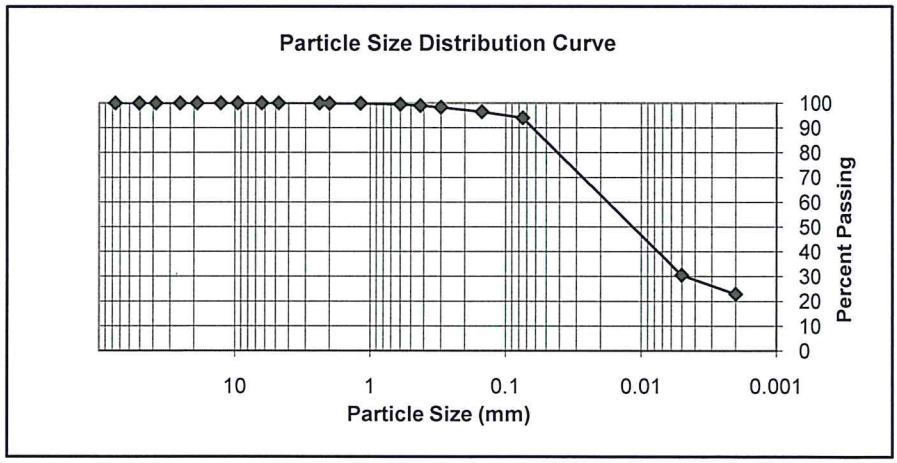
PARTICLE SIZE (DIA. mm)	0.0559	0.0421	0.0281	0.0174	0.0128	0.0094	0.0047	0.0021
PERCENT SAMPLE TESTED	64.0	58.4	52.8	45.0	39.3	34.9	30.4	23.6
PERCENT TOTAL SAMPLE	64.0	58.4	52.8	44.9	39.3	34.8	30.3	23.6

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	100
# 40	99
# 50	98
# 100	97
# 200	94
0.005 mm	31
0.002 mm	23

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
93	97	98	99	99	100	100



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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	
MATERIAL:	Native Soil	**LAB NO:**	8162-6
SAMPLE SOURCE:	TP 7 @ 4'	**DATE SAMPLED:**	6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.70	SPECIFIC GRAVITY OF SOILS	2.50
PERCENT PASSING #10 SIEVE	99.75		

HYDROMETER RESULTS (% PASSING)

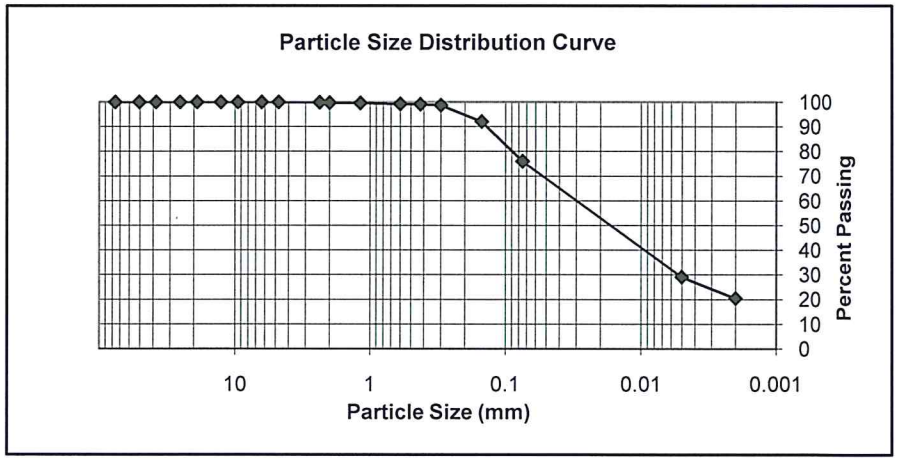
PARTICLE SIZE (DIA. mm)	0.0582	0.0430	0.0283	0.0172	0.0125	0.0091	0.0046	0.0020
PERCENT SAMPLE TESTED	58.6	54.0	49.5	42.6	39.1	34.5	28.8	20.7
PERCENT TOTAL SAMPLE	58.5	53.9	49.3	42.5	39.0	34.4	28.7	20.7

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	99
# 40	99
# 50	99
# 100	92
# 200	76
0.005 mm	29
0.002 mm	20

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
75	91	98	99	99	99	100



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PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: TP 1 @ 6'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-7
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.10	SPECIFIC GRAVITY OF SOLIDS	2.56
PERCENT PASSING #10 SIEVE	99.91		

HYDROMETER RESULTS (% PASSING)

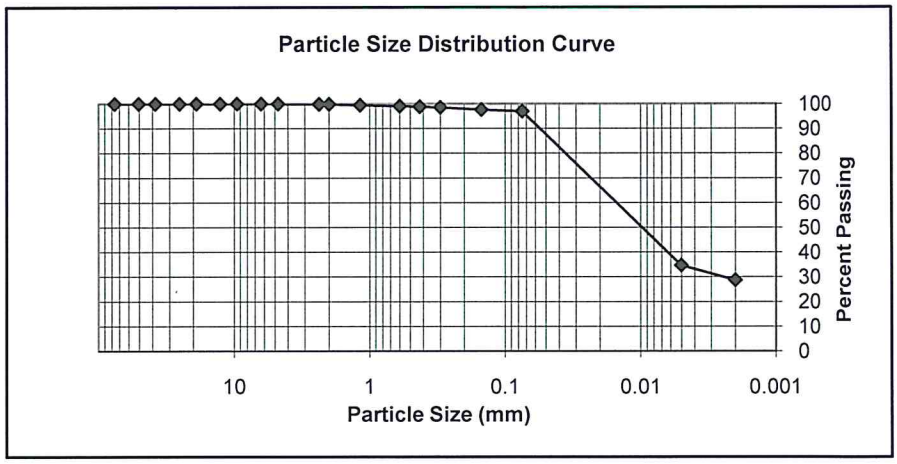
PARTICLE SIZE (DIA. mm)	0.0565	0.0399	0.0274	0.0169	0.0124	0.0091	0.0046	0.0020
PERCENT SAMPLE TESTED	63.0	63.0	55.0	47.0	42.4	37.8	34.4	28.7
PERCENT TOTAL SAMPLE	62.9	62.9	54.9	46.9	42.3	37.8	34.3	28.6

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	99
# 40	99
# 50	99
# 100	98
# 200	97
0.005 mm	35
0.002 mm	29

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
92	95	97	98	98	99	100



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PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: TP 5 @3.5'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-8
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89:70	SPECIFIC GRAVITY OF SOLIDS	2.63
PERCENT PASSING #10 SIEVE	75.24		

HYDROMETER RESULTS (% PASSING)

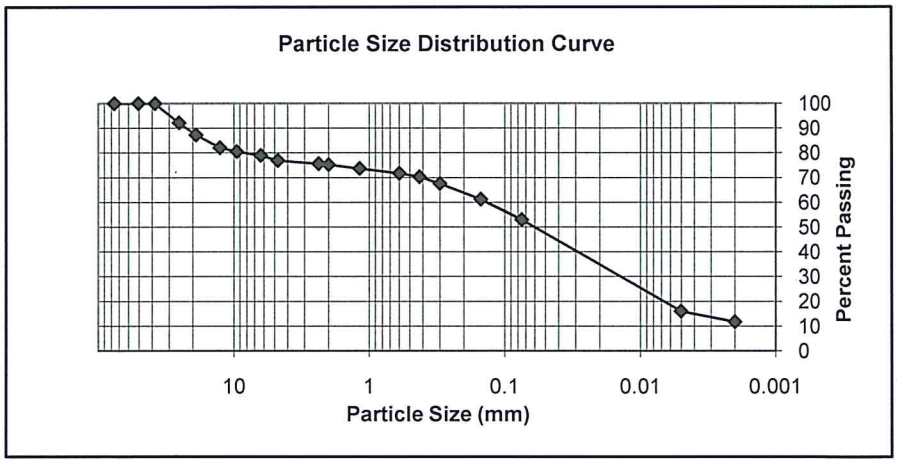
PARTICLE SIZE (DIA. mm)	0.0652	0.0470	0.0314	0.0193	0.0139	0.0099	0.0050	0.0022
PERCENT SAMPLE TESTED	49.3	47.1	40.4	31.4	29.2	26.9	21.3	16.9
PERCENT TOTAL SAMPLE	37.1	35.4	30.4	23.6	22.0	20.3	16.1	12.7

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	92
3/4 IN	87
1/2 IN	82
3/8 IN	81
1/4 IN	79
# 4	77
# 8	76
# 10	75
# 16	74
# 30	72
# 40	70
# 50	68
# 100	61
# 200	53
0.005 mm	16
0.002 mm	12

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
56	63	68	71	72	74	75



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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	
MATERIAL:	Native Soil	**LAB NO:**	8162-9
SAMPLE SOURCE:	TP 5 @8'	**DATE SAMPLED:**	6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.90	SPECIFIC GRAVITY OF SOILS	2.56
PERCENT PASSING #10 SIEVE	99.83		

HYDROMETER RESULTS (% PASSING)

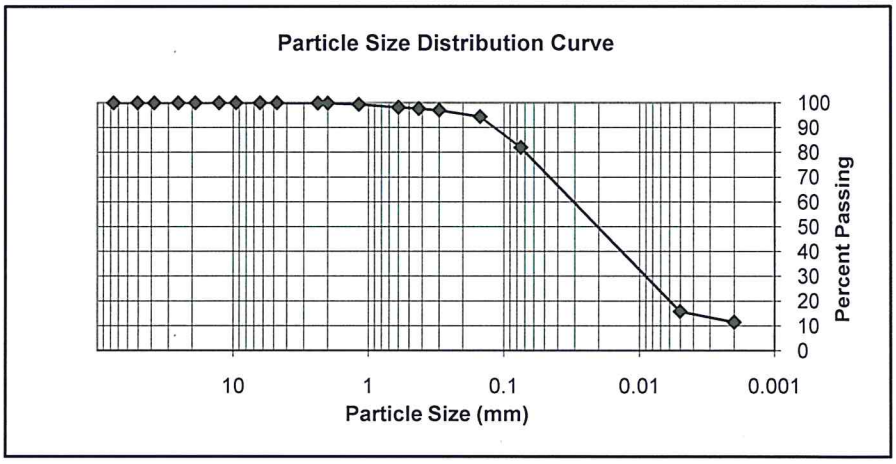
PARTICLE SIZE (DIA. mm)	0.0658	0.0482	0.0320	0.0195	0.0141	0.0101	0.0051	0.0022
PERCENT SAMPLE TESTED	46.5	41.9	35.1	27.2	23.8	20.4	15.9	12.5
PERCENT TOTAL SAMPLE	46.4	41.9	35.1	27.2	23.8	20.4	15.9	12.5

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	99
# 30	98
# 40	98
# 50	97
# 100	95
# 200	82
0.005 mm	16
0.002 mm	12

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
81	95	98	98	99	100	100



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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	
MATERIAL:	Native Soil	**LAB NO:**	8162-10
SAMPLE SOURCE:	TP 6 @3'	**DATE SAMPLED:**	6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	90.00	SPECIFIC GRAVITY OF SOILS	2.57
PERCENT PASSING #10 SIEVE	99.61		

HYDROMETER RESULTS (% PASSING)

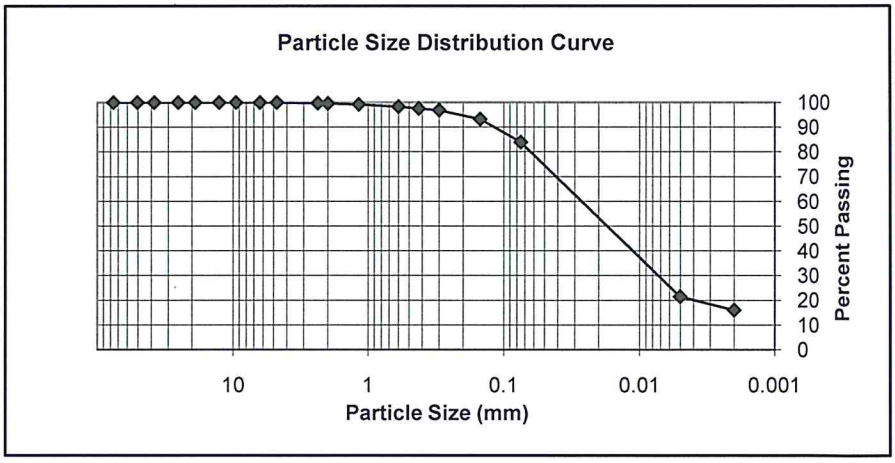
PARTICLE SIZE (DIA. mm)	0.0588	0.0444	0.0303	0.0184	0.0134	0.0098	0.0049	0.0021
PERCENT SAMPLE TESTED	58.8	52.0	43.0	36.2	31.7	27.2	21.5	17.0
PERCENT TOTAL SAMPLE	58.6	51.8	42.8	36.1	31.6	27.1	21.4	16.9

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	99
# 30	98
# 40	98
# 50	97
# 100	93
# 200	84
0.005 mm	22
0.002 mm	16

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
83	94	98	98	98	99	100



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PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: TP 3 @ 6'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-11
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.60	SPECIFIC GRAVITY OF SOILS	2.53
PERCENT PASSING #10 SIEVE	100.00		

HYDROMETER RESULTS (% PASSING)

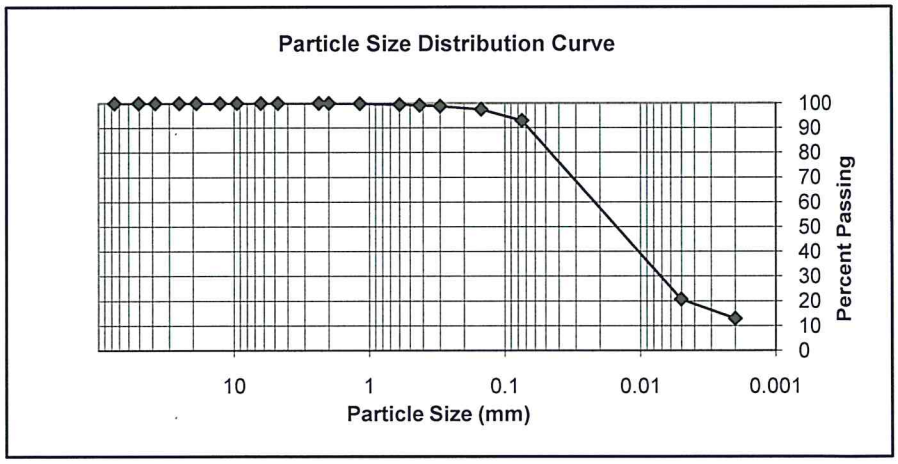
PARTICLE SIZE (DIA. mm)	0.0553	0.0429	0.0296	0.0186	0.0134	0.0097	0.0049	0.0021
PERCENT SAMPLE TESTED	64.1	55.0	44.7	33.2	29.8	26.4	20.7	13.8
PERCENT TOTAL SAMPLE	64.1	55.0	44.7	33.2	29.8	26.4	20.7	13.8

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	100
# 40	99
# 50	99
# 100	98
# 200	93
0.005 mm	21
0.002 mm	13

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
93	98	99	99	99	100	100



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PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: TP 6 @ 8'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-12
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.70	SPECIFIC GRAVITY OF SOILS	2.55
PERCENT PASSING #10 SIEVE	99.30		

HYDROMETER RESULTS (% PASSING)

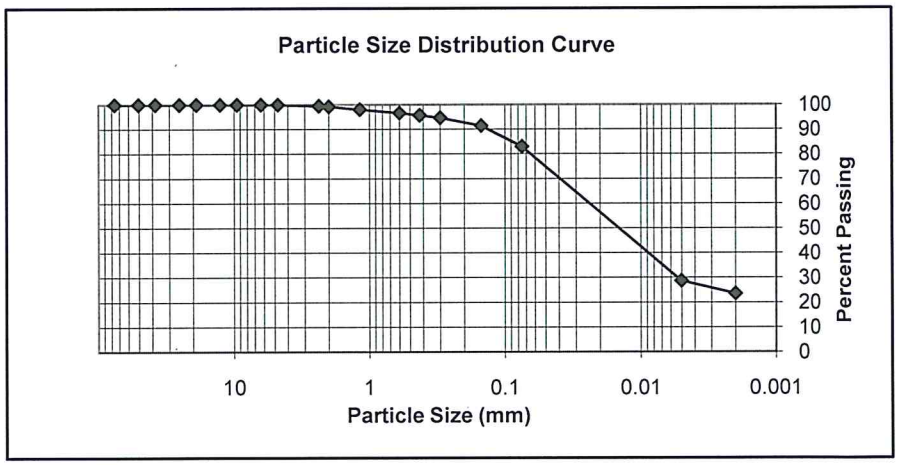
PARTICLE SIZE (DIA. mm)	0.0564	0.0413	0.0282	0.0175	0.0128	0.0092	0.0047	0.0020
PERCENT SAMPLE TESTED	62.6	59.2	51.2	42.1	37.6	35.3	28.5	24.0
PERCENT TOTAL SAMPLE	62.2	58.8	50.9	41.8	37.3	35.1	28.3	23.8

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	99
# 16	98
# 30	97
# 40	96
# 50	95
# 100	92
# 200	83
0.005 mm	29
0.002 mm	24

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
85	92	96	96	97	98	99



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PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native Soil
SAMPLE SOURCE: TP 7 @1'

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162-13
DATE SAMPLED: 6/4/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	89.10	SPECIFIC GRAVITY OF SOLIDS	2.61
PERCENT PASSING #10 SIEVE	43.41		

HYDROMETER RESULTS (% PASSING)

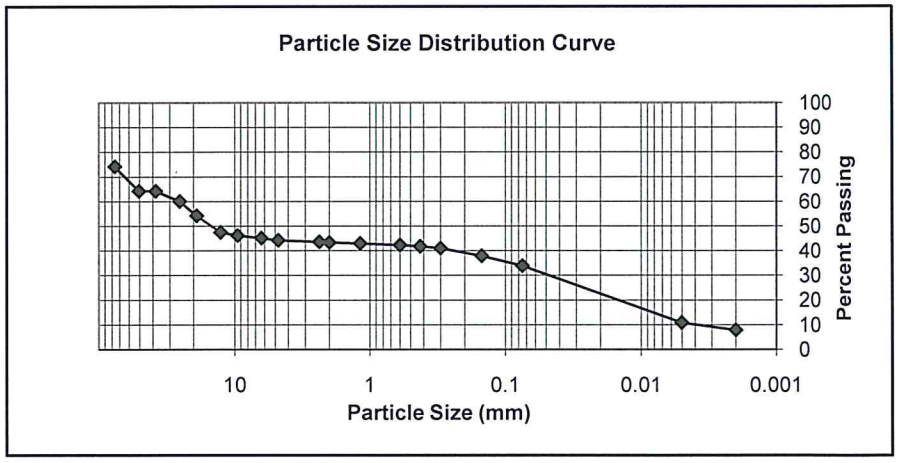
PARTICLE SIZE (DIA. mm)	0.0623	0.0450	0.0296	0.0182	0.0133	0.0097	0.0049	0.0021
PERCENT SAMPLE TESTED	54.4	52.1	47.6	39.7	35.2	30.6	25.0	19.3
PERCENT TOTAL SAMPLE	23.6	22.6	20.7	17.2	15.3	13.3	10.8	8.4

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	74
1 1/2 IN	64
1 1/4 IN	64
1 IN	60
3/4 IN	54
1/2 IN	48
3/8 IN	46
1/4 IN	45
# 4	44
# 8	44
# 10	43
# 16	43
# 30	42
# 40	42
# 50	41
# 100	38
# 200	34
0.005 mm	11
0.002 mm	8

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
33	37	41	42	42	43	43



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7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

Rhino One Geotechnical
4610 NE 77th Ave.
Vancouver WA 98662

PROJECT: I 5 LA Center Interchange
LOCATION: Site
MATERIAL: Native
SAMPLE SOURCE: See Below B-1

JOB NO: 15-5623
WORK ORDER NO:
LAB NO: 8162
DATE SAMPLED: 6/4/15

MOISTURE CONTENT OF SOIL (ASTM D2216)

LAB #	BORING	DEPTH	WET WT. (gram)	DRY WT. (gram)	MOISTURE CONTENT
8162	B-1	5-6.5'	353.3	264.5	33.6%
8162	B-1	10-11.5'	547.9	419.2	30.7%
8162	B-1	15-16.5'	362.2	266.8	35.8%
8162	B-1	20-21.5'	300.3	215.7	39.2%
8162	B-1	25-26.5'	285.4	203.4	40.3%
8162	B-1	30-31.5'	220.0	165.4	33.0%
8162	B-1	35-36.5'	227.2	174.0	30.6%
8162	B-1	40-41.5'	290.3	211.7	37.1%

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ASPHALT CONCRETE SOILS Testing, Inc.

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Vancouver WA 98662

PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	
MATERIAL:	Native	**LAB NO:**	8162
SAMPLE SOURCE:	See Below B-2	**DATE SAMPLED:**	6/4/15

MOISTURE CONTENT OF SOIL (ASTM D2216)

LAB #	BORING	DEPTH	WET WT. (gram)	DRY WT. (gram)	MOISTURE CONTENT
8162	B-2	10-11.5'	281.4	210.9	33.4%
8162	B-2	15-16.5'	263.9	203.7	29.6%
8162	B-2	20-21.5'	434.7	342.7	26.8%
8162	B-2	25-26.5'	465.7	240.5	93.6%
8162	B-2	30-36.5'	218.1	167.9	29.9%
8162	B-2	35-36.5'	278.1	216.2	28.6%
8162	B-2	40-41.5'	240.8	184.9	30.2%

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Vancouver WA 98662

PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	
MATERIAL:	Native	**LAB NO:**	8162
SAMPLE SOURCE:	See Below B-3	**DATE SAMPLED:**	6/4/15

MOISTURE CONTENT OF SOIL (ASTM D2216)

LAB #	BORING	DEPTH	WET WT. (gram)	DRY WT. (gram)	MOISTURE CONTENT
8162	B-3	5-6.5'	297.1	226.8	31.0%
8162	B-3	10-11.5'	320.7	242.9	32.0%
8162	B-3	15-16.5'	353.5	270.7	30.6%
8162	B-3	20-21.5'	489.1	398.1	22.9%
8162	B-3	25-26.5'	270.6	190.1	42.3%
8162	B-3	30-31.5'	248.6	195.2	27.4%
8162	B-3	35-36.5'	263.4	203.9	29.2%
8162	B-3	40-41.5'	731.9	538.4	35.9%

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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	N/A
MATERIAL:	Native Soil	**LAB NO:**	8251-1
SAMPLE SOURCE:	BORING #4	**DATE SAMPLED:**	6/24/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	90.50	SPECIFIC GRAVITY OF SOLIDS	2.63
PERCENT PASSING #10 SIEVE	99.87		

HYDROMETER RESULTS (% PASSING)

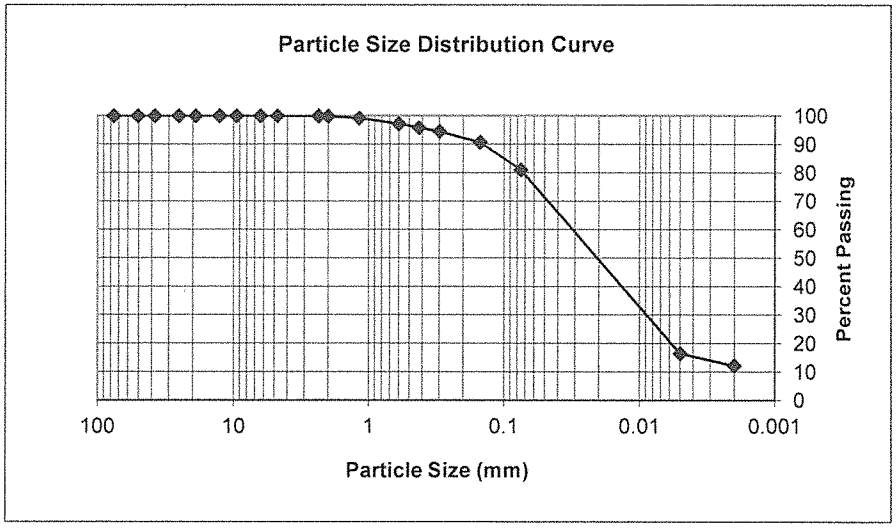
PARTICLE SIZE (DIA. mm)	0.0627	0.0462	0.0309	0.0188	0.0139	0.0102	0.0052	0.0022
PERCENT SAMPLE TESTED	53.3	48.9	42.2	35.5	28.9	23.4	16.7	13.4
PERCENT TOTAL SAMPLE	53.2	48.8	42.1	35.5	28.9	23.3	16.7	13.4

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	99
# 30	97
# 40	96
# 50	95
# 100	91
# 200	81
0.005 mm	16
0.002 mm	12

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
85	94	97	98	98	100	100



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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	N/A
MATERIAL:	Native Soil	**LAB NO:**	8251-2
SAMPLE SOURCE:	BORING #6 5.0'- 6.5'	**DATE SAMPLED:**	6/24/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	90.30	SPECIFIC GRAVITY OF SOLIDS	2.71
PERCENT PASSING #10 SIEVE	99.87		

HYDROMETER RESULTS (% PASSING)

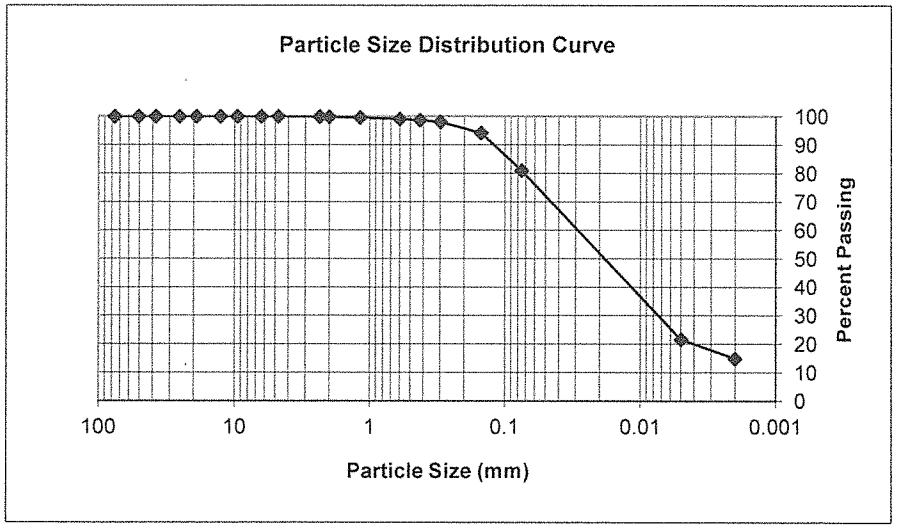
PARTICLE SIZE (DIA. mm)	0.0614	0.0454	0.0302	0.0189	0.0137	0.0100	0.0051	0.0022
PERCENT SAMPLE TESTED	56.9	52.6	47.1	37.3	34.0	29.6	21.9	16.5
PERCENT TOTAL SAMPLE	56.9	52.5	47.0	37.2	33.9	29.6	21.9	16.5

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	99
# 40	99
# 50	98
# 100	94
# 200	81
0.005 mm	22
0.002 mm	15

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
82	95	99	99	99	99	100



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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	N/A
MATERIAL:	Native Soil	**LAB NO:**	8251-3
SAMPLE SOURCE:	BORING #7 5.0'- 6.5'	**DATE SAMPLED:**	6/24/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	90.30	SPECIFIC GRAVITY OF SOLIDS	2.38
PERCENT PASSING #10 SIEVE	99.80		

HYDROMETER RESULTS (% PASSING)

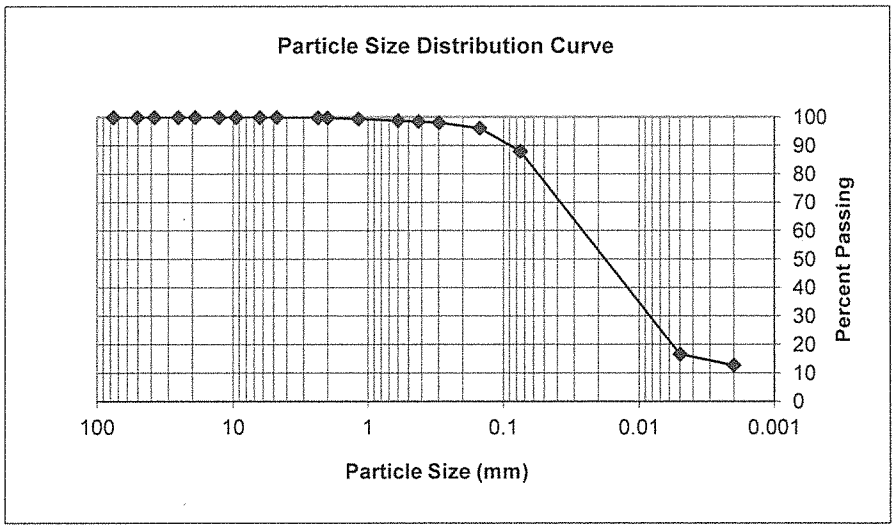
PARTICLE SIZE (DIA. mm)	0.0640	0.0460	0.0298	0.0180	0.0131	0.0095	0.0048	0.0020
PERCENT SAMPLE TESTED	43.3	41.0	37.5	30.4	25.8	21.1	16.4	12.9
PERCENT TOTAL SAMPLE	43.2	40.9	37.4	30.4	25.7	21.1	16.4	12.9

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	99
# 30	99
# 40	99
# 50	98
# 100	96
# 200	88
0.005 mm	17
0.002 mm	13

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
88	97	98	99	99	99	100



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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	N/A
MATERIAL:	Native Soil	**LAB NO:**	8251-4
SAMPLE SOURCE:	BORING #8 5.0'- 6.5'	**DATE SAMPLED:**	6/24/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	90.20	SPECIFIC GRAVITY OF SOLIDS	2.42
PERCENT PASSING #10 SIEVE	99.90		

HYDROMETER RESULTS (% PASSING)

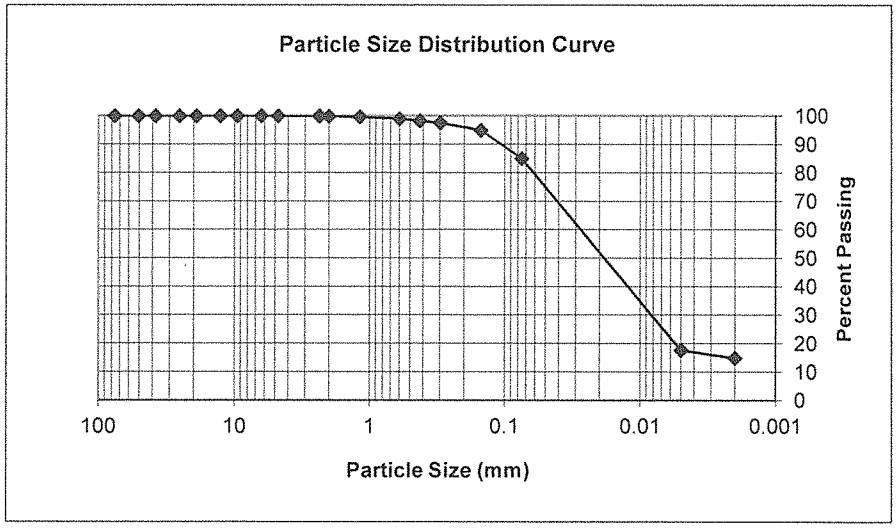
PARTICLE SIZE (DIA. mm)	0.0572	0.0431	0.0291	0.0178	0.0129	0.0095	0.0048	0.0020
PERCENT SAMPLE TESTED	58.1	51.1	43.0	34.9	30.2	23.3	17.5	15.2
PERCENT TOTAL SAMPLE	58.0	51.0	42.9	34.8	30.2	23.2	17.5	15.1

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	99
# 40	98
# 50	98
# 100	95
# 200	85
0.005 mm	18
0.002 mm	15

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
87	96	98	99	99	99	100



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PROJECT:	I 5 LA Center Interchange	**JOB NO:**	15-5623
LOCATION:	Site	**WORK ORDER NO:**	N/A
MATERIAL:	Native Soil	**LAB NO:**	8251-5
SAMPLE SOURCE:	BORING #9 5.0'- 6.5'	**DATE SAMPLED:**	6/24/15

PARTICLE-SIZE ANALYSIS OF SOILS (ASTM D422)

WEIGHT OF SAMPLE DISPERSED	90.50	SPECIFIC GRAVITY OF SOLIDS	2.54
PERCENT PASSING #10 SIEVE	99.93		

HYDROMETER RESULTS (% PASSING)

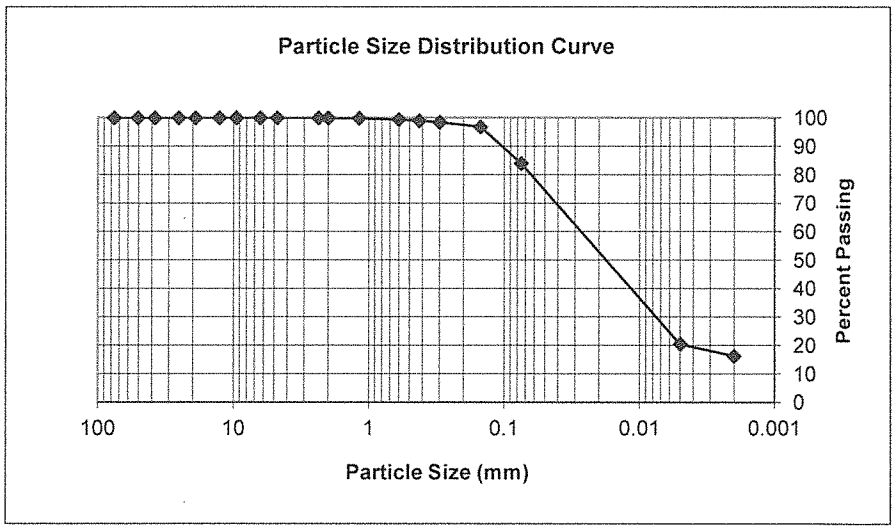
PARTICLE SIZE (DIA. mm)	0.0582	0.0439	0.0294	0.0182	0.0133	0.0097	0.0049	0.0021
PERCENT SAMPLE TESTED	58.8	52.0	45.3	36.2	31.7	27.2	20.4	17.0
PERCENT TOTAL SAMPLE	58.8	52.0	45.2	36.2	31.7	27.2	20.4	17.0

FULL SIEVE ANALYSIS
MECHANICAL SIEVE & HYDROMETER
(% PASSING)

2 IN	100
1 1/2 IN	100
1 1/4 IN	100
1 IN	100
3/4 IN	100
1/2 IN	100
3/8 IN	100
1/4 IN	100
# 4	100
# 8	100
# 10	100
# 16	100
# 30	99
# 40	99
# 50	98
# 100	97
# 200	84
0.005 mm	21
0.002 mm	16

MECHANICAL SIEVE ANALYSIS AFTER HYDROMETER (% PASSING)

#200	#100	#50	#40	#30	#16	#10
84	97	99	99	99	100	100



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