Appendix I

Biological Resources Studies

Appendix I-1

USFWS Biological Assessment

BIOLOGICAL ASSESSMENT

For United States Fish and Wildlife Service

Nisqually Indian Tribe Quiemuth Village Mixed-Use Project
City of Lacey, Thurston County, Washington

Lead Agency: Bureau of Indian Affairs

September 6, 2023

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Attachment E WDFW Priority Habitat and Species Management Recommendations

Section 1 | Introduction

The purpose of this Biological Assessment (BA) is to address the effect of the Nisqually Indian Tribe (Tribe) 174-acre Fee-to-Trust and Quiemuth Village Mixed Use Project (Proposed Project) on species listed as endangered or threatened under the Endangered Species Act (ESA). The Proposed Project involves the acquisition of a 174-acre site in the City of Lacey, Washington (Project Site; **Figures 1** and **2**) into federal trust status (Proposed Action) and the subsequent development of the site with mixed-use development and related facilities. The Tribe has proposed two alternative site plans for the Proposed Project, a Commercial-Heavy Alternative (**Figure 3**) that would develop the entire Project Site and a Recreation-Heavy Alternative (**Figure 4**) that would develop most of the Project Site except for approximately 19.03 acres of the mixed conifer-hardwood forest in the northern portion of the Project Site. To be conservative, this BA bases the analysis on the Commercial-Heavy Alternative as it has the biggest development footprint.

An Environmental Assessment (EA) is anticipated to be prepared by the BIA pursuant to the National Environmental Policy Act (NEPA) to assess potential environmental effects of the Proposed Action. This BA serves as the environmental support document for the future determinations made by the EA and corresponding avoidance and minimization measures regarding federally listed species and addresses the Proposed Action's compliance with Section 7 of the ESA. A separate BA/Essential Fish Habitat Assessment (EFHA) has been prepared for the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the ESA and the Magnuson-Stevens Fishery Conservation and Management Act.

1.1 PURPOSE AND NEED

The purpose of the Proposed Action is to facilitate tribal self-sufficiency, self-determination, and economic development, thus satisfying both the Department of the Interior's (Department) land acquisition policy as articulated in the Department's trust land regulations at 25 CFR Part 151. The need for the Department to act on the Tribe's application is established by the Department's regulations at 25 CFR § 151.10(h).

1.2 ACTION AREA

The Action Area consists of the approximately 174-acre Project Site, as well as off-site areas proposed for access improvements (**Figure 5**), located in the City of Lacey, Thurston County, Washington. The Action Area is located directly north of Interstate 5 (I-5), and west of the Marvin Road / I-5 interchange. The Action Area is adjacent to a 1-acre parcel currently in federal trust for the Tribe, which is developed with the Nisqually Markets Tobacco Outlet store. The Project Site consists of 8 parcels with the assigned APNs 118-11-210200, 118-10-101101, 118-10-101103, 118-10-101000, 118-11-201000, 118-11-2010402, 118-11-210400, and 118-11-20404 and are located within Section 10 and 11, Township 18 North, Range 1 West, Willamette Principal Meridian, Lacey, WA United States Geological Survey 7.5-minute topographic quadrangle (USGS, 2022). An aerial photograph of the Action Area is shown in **Figure 6**. Regional access to the Action Area is provided by I-5, which runs in an east-west direction immediately south of the Action Area, from the existing I-5/State Route (SR) 510/Marvin Road interchange. Local access to the Action Area is currently provided through Marvin Road Northeast (NE) via Main Street NE in the eastern portion of the Action Area, and Britton Parkway NE via Gateway Boulevard NE in the western portion of the Action Area.

Right-in-right-out ramps for southbound traffic on I-5 have been constructed south of the Action Area, however, the ramps are not currently open to traffic.

1.3 PROPOSED ACTION COMPONENTS

The Proposed Action includes the transfer of the approximately 174-acre proposed trust property into federal trust status. Following the acquisition of the Project Site into trust, the Tribe proposes to develop the following components within the Action Area under the Commercial-Heavy Alternative (**Figure 3**):

- Approximately 929,500 square feet (sf) of commercial retail, including grocers, retail and dining;
- Approximately 7.4 acres of recreational facilities, including a golf entertainment facility, bowling center, and movie theater;
- A 4-story, 200 room hotel;
- 320 units of housing, including high density multi-family apartments and onsite live/work housing;
- A 28-acre travel center, to include 26 diesel and gasoline fuel pumps;
- Approximately 4,655 parking spaces provided by several surface parking areas; and
- Infrastructure, including electrical, natural gas, water supply, wastewater treatment and/or collection facilities, and stormwater drainage, treatment, and infiltration facilities (note that off-site infrastructure is described and analyzed in **Section 4.5**).

Section 2 | Methodology

The following information was obtained and reviewed in support of this analysis contained in this BA:

- United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Official Species List, dated March 9, 2023, of special-status species with the potential to occur on or be affected by the Proposed Action (USFWS, 2023a; **Attachment A**);
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species viewer (PHS), dated March13, 2023, of special-status species with the potential to occur on or be affected by the Proposed Action (WDFW, 2023a; **Attachment A**);
- Washington Natural Heritage Program 2021 Washington Vascular Plant Species of Conservation;
- Burke Herbarium Plants of Washington Identification Key (Giblin and Legler, 2003);
- USFWS National Wetlands Inventory (NWI) map of wetland features on the Action Area (USFWS, 2022b; **Attachment B**);
- A map of the nearest critical habitat identified by USFWS and NOAA Fisheries (USFWS, 2022c; NOAA, 2022; **Figure 7, Attachment C**).
- A custom soils report from the Natural Resources Conservation Service (NRCS) (NRCS, 2022; **Attachment D**); and

2.1 BIOLOGICAL SURVEYS

Biological resource surveys of the Action Area were conducted April 12 to 14 and June 16 to 18, 2021. Surveys assessed habitat types, federally listed species, suitable habitat for federally listed species, and wetlands and other Waters of the U.S. Species and habitat types were classified using the WDFW Priority Habitat and Species List (WDFW, 2022a) and The Jepson Manual (Baldwin, 2012).

2.2 ANALYSIS

An analysis to determine federally listed species that have the potential to occur within the Action Area was conducted. Habitat requirements for each species were assessed and compared to the type and quality of habitats observed during surveys. Species with no potential to occur within the Action Area were ruled out based on lack of suitable habitat, elevation range, substrate/soils, and/or geographic distribution. The results of this analysis are summarized below.

Section 3 | Environmental Setting

3.1 TOPOGRAPHY, CLIMATE, AND SOIL TYPES

The Action Area is located within Section 10 and 11 of Willamette Principal Meridian in Township 18 North, Range 1 West as depicted on the "Lacey" United States Geological Survey (USGS) 7.5' quadrangle maps. The region has an annual mean high temperature of 60.4 degrees Fahrenheit (° F) and an annual mean low temperature of 40.6° F; the average annual rainfall is approximately 50.00 inches (NOAA, 2021). The Action Area is comprised of four soil types (NRCS, 2022) as shown in **Figure 8** and listed below:

- Alderwood gravelly sandy loam, 8 to 15 percent slopes;
- Everett very gravelly sandy loam, 8 to 15 percent slopes;
- Indianola loamy sand, 0 to 5 percent slopes; and
- Spanaway gravelly sandy loam, 0 to 3 percent slopes.

3.2 HABITAT TYPES

3.2.1 Terrestrial Habitat Types

Two terrestrial habitat types were identified within the Action Area (**Figure 9**): ruderal/disturbed and mixed conifer – hardwood forest. The majority of the Action Area is heavily disturbed as a result of historical logging, and thinning, and grading activities on adjacent properties. The Action Area is largely open land with some forested areas near the I-5 corridor and along the northern perimeter of the site.

Ruderal/Disturbed

Ruderal/disturbed areas are a mixture of barren gravelly soils, shrubs, and weedy herbaceous cover, usually in areas heavily impacted by human habitation, industry, and commerce. The Action Area consists of approximately 82.11 acres of this habitat type. Common species found within this habitat included Scotch broom (*Cytisus scoparius*), oxeye daisy (*Leucanthemum vulgare*), foxglove (*Digitalis purpurea*), blackberry (*Rubus spp*.), and common St. John's wort (*Hypericum perforatum*).

Mixed Conifer- Hardwood Forest

Mixed conifer – hardwood stands are interspersed throughout the Action Area, with the northern area the densest. The mixed conifer – hardwood stands habitat make up approximately 92.09 acres. This habitat is comprised of Douglas fir (*Pseudotsuga menziesii*) and Oregon white oak (*Quercus garryana*). The understory is comprised of a mix of native and non-native weedy/grass species including oceanspray (*Holodiscus discolor*), blackberry, hardhack (*Spiraea douglasii*), Bermuda grass (*Cynodon dactylon*), and salal (*Gaultheria shallon*).

3.3 WETLANDS AND WATERS OF THE UNITED STATES

Background review of the NWI database did not indicate the presence of any wetlands, waters of the U.S., or other aquatic features (**Attachment B**). Previous surveys conducted in November 2012 mapped eleven wetlands in the north section of the Action Area (Chad Armour LLC, 2013). The U.S. Army Corps of Engineers (USACE) determination of this previous delineation concluded that the wetlands were not jurisdictional but may still be under the purview of the Washington State Department of Ecology. This jurisdictional determination was valid for five years and has since lapsed (Chad Armour LLC, 2013). The previously mapped wetlands were assessed during the 2021 site visit. Eight of the eleven previously mapped wetlands were able to be identified. Three wetland sites were not present and there were no indicators to suggest previous presence of these wetlands. The eight identifiable wetland sites were disturbed with most occurring in obvious excavation pits, cuts, or similar features that were disturbed by heavy machinery. None of the previously mapped wetlands met the required parameters to be considered a wetland (i.e., hydrophytic vegetation, hydrology, and hydric soils) [USACE, 2008].

3.4 CRITICAL HABITAT

There is no designated critical habitat for federally listed species within the Action Area, nor are there any surface waters or aquatic habitats within the Action Area. The Action Area is located within the Woodland Creek Drainage Basin. The nearest flowing water features to the Action Area are an unnamed stream system approximately 0.13 miles northwest, Woodland Creek approximately 3,500 feet west and McAllister Creek approximately 1.7 miles east of the Action Area. McAllister Creek flows into the nearby Nisqually Flats that are part of the Billy Frank Jr. Nisqually National Wildlife Refuge. In addition, the Nisqually River is approximately 2.08 miles east of the Project Site and terminates into the Nisqually Flats that eventually drains into the Puget Sound.

There are no surface water features in the Action Area itself. Using the NOAA Fisheries Protected Resources App Critical Habitat Mapper, critical habitat was identified in Woodland Creek for the threatened Steelhead (*Oncorhynchus mykiss*). The Nisqually Reach, within Puget Sound is designated critical habitat for bull trout (*Salvelinus confluentus*) (**Figure 7**). McAllister Creek, which leads to the Nisqually Reach contains critical habitat for the following species, the threatened Chinook Salmon (*Oncorhynchus tshawytscha*) and threatened steelhead (*Oncorhynchus mykiss*); however, the Action Area is not within the drainage watershed of McAllister Creek.

A separate BA/EFHA has been prepared for NMFS pursuant to Section 7 of the ESA.

3.5 OBSERVED WILDLIFE

Wildlife species observed in the Action Area during surveys included red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), American robin (*Turdus migratorius*), great-horned owl (*Bubo virginianus*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), chesnut-backed chickadee (*Poecile rufescens*), dark-eyed junco (*Junco hyemalis*), white-crowned sparrow (*Zonotrichia leucophrys*), and house finch (*Haemorhous mexicanus*).

3.6 FEDERALLY LISTED SPECIES

Regionally occurring federally listed species were determined by doing a query using the USFWS IPaC tool and WDFW PHS viewer of special-status species with the potential to occur on or be affected by the Proposed Action. The query generated a USFWS Official Species List for the Action Area and a list from WDFW (**Attachment A**). The WDFW results yielded three bat species which are not federally listed or candidate species and thus are not discussed further. The IPaC results yielded eight federally species that may regionally occur, these included:

- One mammal species, Yelm Pocket Gopher (*Thomomys mazama yelmensis);*
- Three bird species, Marbled Murrelet (*Brachyramphus marmoratus*), Streaked Horned Lark (*Eremophila alpestris strigata*), and Yellow-billed cuckoo (*Coccyzus americanus*);
- One fish, Bull Trout (*Salvelinus confluentus*);
- Two insects, Monarch Butterfly (*Danaus plexippus*) and Taylor's (=whulge) Checkerspot (*Euphydryas Editha taylori*); and
- One flowering plant, Golden Paintbrush (*Castilleja levisecta*).

Of these species only three may occur in the Action Area based on habitat requirements. The fish species was dismissed due to no aquatic habitat in the Action Area (however, it should be noted that indirect effects to fish species from water quality impacts are addressed in a separate BA/EFHA prepared for consultation with NMFS). Yellow-billed cuckoo were dismissed due to no riparian habitat in the Action Area. Insects were dismissed due to lack of required plant species (milkweed and nectar sources) on the site and habitat preferences. Monarch butterflies often concentrate along large river courses of the Columbia and Snake Rivers (WDWF, 2023a). Taylor's checkerspot butterflies prefer prairie and grassland habitats with certain host plant species, all of which are not found within the Action Area (WDFW, 2023b). Special-status plant surveys were conducted during the appropriate bloom period for each potentially occurring species. No federally listed plant or animal species were observed.

This BA addresses the Yelm pocket gopher (*Thomomys mazama yelmensis*), marbled murrelet (*Brachyramphus marmoratus*), and streaked horned lark (*Eremophila alpestris strigata)* which are federally listed as threatened. These species may occur in the project region. Pertinent data and information such as habitat preference and distribution of each species in the project and Action Areas are briefly summarized below.

3.6.1 Yelm pocket gopher (Thomomys mazama yelmensis)

FEDERAL STATUS: Threatened

STATE STATUS: Threatened

The Yelm pocket gopher is one of four federally listed subspecies of Mazama pocket gopher in the State of Washington. It was listed on April 9, 2014. This species is only found in Thurston County, west of the cascades. These animals live the majority of their lives underground, are active all year long, and prefer grassland and prairie type ecosystems. They are small mammals, only eight to nine inches in length, with short tubular bodies and blackish brown fur. Their fur can change depending on soil types. They live one to two years with sexual maturity reached at one year of age. This territorial species lives alone, except during mating season. Pups are with their mothers for spring and summer months, but then disperse on

their own. They forage from below-ground, feeding on roots or pulling entire plants into foraging tunnels (USFWS, 2022a and 2022c).

Their habitat preference is well-drained and easily crumbled soil types in prairie-like habitats that are relatively open, with few woody plants and small vegetation. They prefer succulent, nutrient-rich roots, bulbs, tubers, and shoots, and will eat both native and non-native plant species.

The current range of all subspecies is east of the Black River and south of I-5 on soils that support the burrowing of the Mazama pocket gopher (Thurston County, 2022). These soils are listed in **Table 1**. The Yelm pocket gopher are known to occur on federal, State, and private lands, with a population located on Joint Base Lewis-McChord (USFWS, 2022a).

Table 1: Prairie soils with documented use by Mazama Pocket Gopher subspecies in Thurston County

More Preferred Soils		Less Preferred Soils	
Nisqually loamy fine sand	0 to 3% slopes and 3 to 15% slopes	Alderwood gravelly sandy loam	0 to 3% slopes and 3 to 15% slopes
Spanaway-Nisqually complex	2 to 10% slopes	Everett very gravelly sandy loam	0 to 3% slopes and 3 to 15% slopes
Cagey loamy sand	-	Indianola loamy sand	3 to 15% slopes
Indianola loamy sand	0 to 3% slopes	Kapowsin silt loam	3 to 15% slopes
Spanaway gravelly sandy loam	0 to 3% slopes and 3 to 15% slopes	McKenna gravelly silt loam	0 to 5% slopes
-	-	Norma silt loam	-
-	-	Norma fine sandy loam	-
-	-	Spana gravelly loam	-
-	-	Spanaway stony sandy loam	0 to 3% slopes and 3 to 15% slopes
-	-	Yelm fine sandy loam	0 to 3% slopes and 3 to 15% slopes

Thurston County has a Habitat Conservation Plan (HCP) as a response to the federal ESA listing of several species in the County. It was federally approved in 2022 and will be implemented in 2023. The HCP states there are no known soils that support the Mazama pocket gopher in the region of the County north of I-5, including the Action Area. While some gopher soils are present in this region of the County, and mound surveys have occurred, there have not been documented gopher detections in this area as of the time of the HCP development. Future natural recolonization of the area of the Mazama pocket gopher subspecies is unlikely due to the barrier presented by I-5 (Thurston County, 2022). The nearest and most recent occurrences of this species are documented approximately 1.25 miles south of I-5 in 2016 (WDFW, 2022d).

3.6.2 Marbled murrelet (*Brachyramphus marmoratus*)

FEDERAL STATUS: Threatened

STATE STATUS: Endangered

The marbled murrelet is a seabird that forages in marine waters but nests in forests. The populations in Washington are low and declining, due to their need for old, mature, forest habitats. They prefer to nest in mature old-growth trees. This species is small, about 10 inches in length, with an overall brownish "marbled" look plumage during breeding. Non-breeding plumage is mostly black with white patches, underside, and scapulars on the wings.

Their habitat preferences is in old-growth conifer forests, and sometimes younger forests with residual old-growth trees. They forage in marine waters usually located within 1.2 to three miles from shore, in waters less than 100 feet deep.

Marbled murrelets are most abundant in northern Puget Sound and the Strait of Juan de Fuca. Surveys show the highest nesting presence of this species is on the Olympia Peninsula, the northern Cascades and in limited habitats in southwest Washington. A 2015 population estimate for Washington is about 7,500 birds (WDFW, 2023d).

3.6.3 Streaked horned lark (*Eremophila alpestris strigata*)

FEDERAL STATUS: Threatened

STATE STATUS: Endangered

The streaked horned lark is a coastal subspecies only found in southwest Washington and western Oregon and was listed as threatened in 2013. They have a known range from Oregon to Washington and have been locally extinct in British Columbia (USFWS, 2022b). This species is a slender, long-winged passerine about 7 inches long. Adults are marked with a dark facial mask and breast band that contrasts with a pale face and throat. These features are especially clear and distinctive in adult males, which have a yellow throat. The "horns" for which the species is named are tiny, black feather tufts on the sides of the head in adult males. Adult females are similar to males, but duller, smaller, and lack horns. Streaked horned larks nest on the ground, usually next to a tuft of vegetation or other small object. They may rear two to three broods per season, clutching three to five eggs at a time. Nest building in southern Puget Sound generally begins in mid-April to early May, and concludes by mid-August (WDFW, 2022b).

Their habitat preference is large, bare, and sparsely vegetated land, like fields and prairies and similar areas with low/sparse grassy vegetation (WDFW, 2022b). They forage in areas containing a large percentage of bare ground.

Streaked horned lark can be found in prairies and grasslands south of Puget Sound, coastal beaches, dredge spoil islands, and sparsely vegetated shorelines on the lower Columbia River. The streaked horned lark is known to occupy the Joint Base Lewis-McChord, and a multiple other isolated sites throughout their range. They are known to breed at up to 17 locations in Washington, 8 in the southern Puget Sound region, 6 on the outer coast, and 4 on islands and shore sites along the lower Columbia River. The range wide population is estimated at 1,170 to 1,610 individuals, including fewer than 150 pairs in Washington (Stinson, 2016).

Section 4 | Effects of the Action

4.1 DETERMINATION OF EFFECT

Based on guidance provided by the ESA Section 7 Effects Determination Guidance, possible effects determinations for the Proposed Action include:

No effect: The proposed action will not affect the listed species or critical habitat.

May affect but is not likely to adversely affect: The proposed action will affect a listed species in a way that is discountable, insignificant, or completely beneficial. Discountable effects are extremely unlikely to occur; insignificant effects are impacts small enough that they never reach the scale where a take occurs, and completely beneficial effects are positive effects without any adverse effects to the species.

May affect and is likely to adversely affect: The proposed action will either directly or indirectly, or through its interrelated and interdependent actions, adversely affect a listed species.

These guidelines were used in determining conclusions of this BA and are discussed for the listed species and migratory birds below.

4.2 CRITICAL HABITAT

There are no aquatic features within the Action Area. The nearest critical habitat to the Action Area are described in **Section 3.4**. Indirect effects to critical habitat are discussed below.

Ground disturbing activities during construction could lead to erosion which could increase sediment discharges to surface waters during storm events. As a mitigation/conservation measure and in accordance with the Clean Water Act, the Tribe would obtain coverage under the National Pollution Discharge Elimination System General Construction Permit, requiring the implementation of a Stormwater Pollution Prevention Plan and best management practices (BMPs) during construction to prevent contaminated run-off from entering any off-site waters.

Currently, all stormwater within the Action Area infiltrates into the ground and no stormwater currently leaves the Action Area. The Proposed Action will result in an increase of impervious surfaces which would result in increased peak flows and increased total discharge from the Action Area during precipitation events. If not properly managed, this could increase stormwater flows to area drainage systems and cause localized flooding. However, the Proposed Action includes a stormwater system that will be installed to collect, treat, detain, and convey runoff throughout the Action Area that would also prevent flooding and other adverse effects related with runoff.

The Action Area is located within the Woodland Creek Watershed. Groundwater-fed springs maintain year-round base flow in Woodard Creek and Woodland Creek, therefore, groundwater pumping in the Action Area could impact Woodland Creek. Avoidance and minimization would ensure that the development of a groundwater well in the Action Area would not adversely impact the flow of Woodland Creek.

With the implementation of avoidance and minimization measures and bioretention and infiltration facilities incorporated into project design, the Proposed Action may affect and is not likely to adversely affect critical habitat. More details regarding critical habitat are discussed in the separate BA/EFHA prepared for NMFS.

4.3 FEDERALLY LISTED SPECIES

No suitable habitat for federally listed plant species occurs within the Action Area. Based on biological desktop review and survey results, three federally listed wildlife species have the potential to occur within the Action Area: Yelm pocket gopher, marbled murrelet, and streaked horned lark. The Action Area contains marginal habitat to support these species.

4.3.1 Yelm pocket gopher (Thomomys mazama yelmensis)

There are no recent documented occurrences of Mazama pocket gophers within one mile of the Action Area. The nearest and most recent occurrences of this species are documented approximately 1.25 miles south of I-5 in 2016 (WDFW, 2022c). No mounds or burrows indicating the presence of pocket gophers were observed and no pocket gophers were observed at the time of survey of the Action Area.

Soils that support the burrowing of the Mazama pocket gopher are listed in **Table 1**. Soil types found within the Action Area contain Indianola loamy sand 0-5% which is a “more preferred” soil type but at a 0-3%., and three “less preferred: soil types (Alderwood gravelly sandy loam, Everett very gravelly sandy loam, and Spanaway gravelly sandy loam), 2 of which have a lower slope percentage.

The Thurston County HCP states there are no known soils that support the Mazama pocket gopher in the region of the County north of I-5, which includes the Project Site. While some gopher soils are present in this region of the County, and mound surveys have occurred, there have not been documented gopher detections in this area as of the time of the HCP development. Future natural recolonization of the area of the Mazama pocket gopher subspecies is unlikely due to the barrier presented by I-5 (Thurston County, 2022).

Although the Action Area has the correct habitat and soil types for pocket gopher species, the I-5 roadway creates a barrier that separates both sides of the roadway and inhibits gophers from passing. Therefore, the likelihood of gophers being in the project area is very low as discussed in **Section 3.6.1**.

Although unlikely, if the Yelm pocket gophers were to be present at the time of construction of the Proposed Action, construction-related activities have the potential to cause mortality. Potential adverse effects would be avoided or minimized to less-than-significant levels with the implementation of the avoidance and minimization measures discussed below. With implementation of these measures, the Proposed Action **may affect, but is not likely to adversely affect** the Yelm pocket gophers.

4.3.2 Marbled murrelet (*Brachyramphus marmoratus)*

Marbled murrelets may occur in the mixed conifer-hardwood forest habitat areas of the Action Area. Overall, habitat quality is marginal due to site disturbance, limited native vegetation, and ongoing human activity.

Migratory birds are protected under the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 United States Code [USC] §§ 703 712). The MBTA makes it unlawful to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, buy, sell, purchase, or barter any migratory bird listed under 50 Code of Federal Regulations (CFR) §10. This includes feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR § 21). Trees and shrubs within 500 feet of the Action Area may provide habitat for migratory birds during the general nesting season (February 15 – September 15).

Although unlikely, if the marbled murrelet or any migratory bird were to be present in the area of impact at the time of construction of the Proposed Action, construction-related activities have the potential to cause mortality or nest abandonment. Potential adverse effects would be avoided or minimized to less-than-significant levels with the implementation of avoidance and minimization measures discussed below. With the implementation of these measures, the Proposed Action **may affect but is not likely to adversely affect** migratory birds protected under the MBTA. There would be **no effect** for the marbled murrelet, as the forest in the Action Area is even-aged young forest that was previously harvested old growth.

4.3.3 Streaked horned lark (Eremophila alpestris strigata)

Streak horned lark may occur in the open grassy areas of the Action Area, primarily in ruderal habitat. Grasses are short and there are areas of bare and sparsely vegetated ground suitable for nesting. Overall, habitat quality is marginal due to site disturbance, limited native vegetation, and ongoing human activity.

Although unlikely, if the streaked horned lark or any migratory bird were to be present in the area of impact at the time of construction of the Proposed Action, construction-related activities have the potential to cause mortality or nest abandonment. Potential adverse effects would be avoided or minimized to less-than-significant levels with the implementation of avoidance and minimization measures discussed below. With the implementation of these measures, the Proposed Action **may affect but is not likely to adversely affect** the streaked horned lark or any migratory birds protected under the MBTA.

4.4 CONSERVATION MEASURES

The following conservation measures will be implemented during construction activities to avoid or minimize potential adverse impacts to federally protected species, and other migratory nesting birds.

- Prior to construction, the Tribe shall retain a qualified biologist to conduct an informational meeting to educate all construction staff on the pocket gophers, marbled murrelet, streaked horned lark, and nesting migratory birds. This will include a description of habitat needs, status of the species, and the following measures below.
- Preconstruction mound surveys for Yelm pocket gophers shall be conducted between June and October by a qualified biologist who has received training from WDFW or USFWS in Mazama pocket gopher survey protocols. List of qualified biologists can be found on the WDFW website. If no occupied pocket gopher habitat is identified, then no further action is necessary.
- In the highly unlikely event that a survey shows occupied pocket gopher habitat within the Action Area, as determined by WDFW or USFWS training protocols, then a habitat protection area shall be established according to consultation with USFWS. Width to length ratio of the habitat protection area shall be maximized so that large, contiguous patches are protected. Long, narrow corridors shall be avoided as habitat protection areas. Multiple habitat protection areas may be

appropriate or necessary to allow development. Access to the habitat protection area shall be restricted. No construction shall occur in habitat protection areas. A detailed list of species management recommendations from the WDFW for Mazama Pocket Gophers is found in **Attachment E**, these will be followed in the unlikely event pocket gophers are found on site.

- If construction activities (e.g., building, grading, ground disturbance, removal of vegetation) are scheduled to occur during the general nesting season (February 15 – September 15), a preconstruction nesting bird survey shall be conducted by a qualified biologist throughout accessible areas of suitable habitat within 500 feet of proposed construction activity. The survey shall occur no more than 7 days prior to the scheduled onset of construction. If construction is delayed or halted for more than 7 days, another preconstruction survey for nesting bird species shall be conducted. If no nesting birds are detected during the preconstruction survey, no additional surveys or mitigation measures are required.
- If nesting bird species are observed within 500 feet of construction areas during the survey, appropriate "no construction" buffers shall be established. The size and scale of nesting bird buffers shall be determined by a qualified biologist and shall be dependent upon the species observed and the location of the nest. Buffers shall be established around active nest locations. The nesting bird buffers shall be completely avoided during construction activities. The buffers may be removed when the qualified wildlife biologist confirms that the nest is no longer occupied, and all birds have fledged.
- A qualified biologist shall monitor the work area at project appropriate intervals to assure avoidance, BMPs, and conservation measures are being implemented.

With the implementation of the avoidance and minimization measures listed above, the Proposed Action **may affect but is not likely to adversely affect** Federally listed species, migratory birds, and associated habitats.

4.5 INTERRELATED AND INTERDEPENDENT EFFECTS

Interrelated and interdependent effects are direct or indirect effects that occur as a result of activities that are closely affiliated with a project in areas outside the Action Area. Such actions include road or utility improvements off-site that would not be constructed but for implementation of the Proposed Action.

Implementation of the Proposed Action would involve the construction of off-site access improvements, and traffic mitigation, and may involve off-site improvements for the extension of water supply, wastewater collection and/or electrical/natural gas utilities to the Project Site.

Off-site Improvements

Access Improvements

Off-site access improvement areas are shown in **Figure 5**, and generally include 1) an extension of Main Street NE from its current termination point in the east to join a new onsite roadway that eventually connects to the existing Gateway Boulevard NE and Main Street NE in the west. Part of this new roadway connection would go through the adjacent Nisqually Owned Property and 2) a new intersection on Maine Street NE in the eastern part of the Action Area that would join a proposed onsite roadway to connect to Access 3. Access 3 is an existing limited access right-in/right-out entrance located at the intersection of Marvin Rd NE and Nisqually Markets Tobacco Outlet on the southeastern corner of the Action Area. All

access improvements would take place within land owned by the Tribe, or dedicated rights-of-way held by the City.

Traffic Mitigation

There are two off-site traffic mitigation measures that would occur:

- Installation of a roundabout in place of the two-way stop-controlled existing traffic control at Eastern Parkway NE/Britton Parkway NE with the northbound approach serving as the Project Site access.
- Restrict the northbound and southbound left movements at the existing two-way stop-controlled intersection at Britton Parkway NE/Western Parkway NE with the northbound approach serving as Project Site access.

All traffic mitigation measures will be installed within previously disturbed dedicated road rights-of-way held by the City. Adherence to federal and state environmental regulations during construction of the improvements would avoid any potentially significant indirect effects from off-site intersection improvements.

Optional Off-site Water, Wastewater, and Energy Infrastructure Improvements

Implementation of the Proposed Action may involve improvements to off-site water supply, wastewater collection, and energy infrastructure. Construction of improvements would take place entirely within previously disturbed areas and roadways devoid of habitat for wildlife, fish, or native plants. Once construction is complete, the pipeline/utility corridors and infrastructure pads will be repaved and restored to pre-existing conditions.

Terrestrial Habitat Effects

Off-site access and utility improvements would occur within land owned by the Tribe or dedicated rights-of-way held by the City and as such, these areas have been subject to recent surveys for biological resources, including special status species and wetlands. The proposed off-site access improvement areas, and anticipated traffic mitigation and utility improvements, would take place entirely within previously disturbed areas, including dirt roadways, paved roadways, and road shoulders. These areas do not contain sensitive habitat, Critical Habitat, EFH, or Waters of the U.S. Once construction is complete, disturbed areas will be paved or revegetated to prevent erosion. A discussion of potential effects associated with water quality and associated impacts to fish is provided below. Transportation improvements and utility improvements will result in no net loss of habitat and will not result in adverse impacts to biological resources. Impacts to sensitive biological resources would be less than significant.

Water Quality and Fish Habitat

The construction of the off-site roadway improvements or utility trenching would require grading and the introduction of fill material to extend the roadbed to provide for the additional facilities. The increase of impervious surfaces and additional cut and fill embankments could result in an increase in surface water runoff and erosion of soils that could affect water quality and soil resources. Additionally, water quality could be impacted as a result of construction and roadway pollutants, such as grease and oil. Stable fill material, engineered embankments, and erosion control features would be used to reduce the potential for slope instability, subsidence and erosion. In accordance with the federal CWA, off-site improvements

would be required to comply with the NPDES General Construction Permit Program. To comply with the program, a SWPPP would be developed that would include soil erosion and sediment control practices to reduce the amount of exposed soil, prevent runoff from flowing across disturbed area, slow runoff from the site, and filter sediment from the runoff. With standard construction practices and specifications required by the NPDES permit program, and local requirements, including the City of Lacey Municipal Code Chapter 14.27, which includes provisions intended to manage stormwater runoff from construction and development sites, and WSDOT *Temporary Erosion and Sediment Control Manual* (WSDOT, 2019b), the off-site roadway improvements or utility trenching would result in less-than-significant effects associated with erosion and water quality during construction.

The effects to runoff volumes resulting from the increase in impervious roadways are expected to be minimal due to the limited extent of the improvements in comparison to the existing roadways. Some existing stormwater drains, and ditches may be relocated along roadways to provide space for improvements. Stormwater collection and detention facilities will be designed and installed in accordance with applicable local requirements, including the City's Municipal Code Chapter 14.27, which includes provisions intended to control stormwater runoff generated by development, redevelopment, construction sites, or modifications to existing stormwater systems, or the WSDOT *Highway Runoff Manual* (WSDOT, 2019a) to accommodate the increase in impervious surfaces resulting from the off-site roadway improvements or utility trenching. With incorporation of these drainage features, effects to water quality and fish habitat would be less than significant.

Summary

Although unlikely, if pocket gophers, marbled murrelets, or streaked horned lark were to be present in the Action Area and/or off-site improvements area at the time of construction of off-site improvements, construction-related activities have the potential to cause mortality. Potential adverse effects to these species could be avoided or minimized with the implementation of the avoidance and minimization measures discussed above. Required construction for access improvements, traffic mitigation and utility connections **may affect but is not likely to adversely affect** federally listed species, as implementation of all avoidance and minimization measures would reduce impacts to protected species.

Section 5 | Conclusions

The Action Area is comprised of ruderal/disturbed and mixed conifer-hardwood forest habitat. Habitats within the Action Area have the potential to support three federally listed species in addition to migratory birds protected under the MTBA. These species are Yelm pocket gopher, marbled murrelet, and streaked horned lark. The forest in the Action Area is even-aged young forest that was previously harvested old growth, therefore the Proposed Action will have no effect on the marbled murrelet. With implementation of avoidance and minimization measures outlined in this BA, the Proposed Action **may affect but is not likely to adversely affect** the Yelm pocket gopher and streaked horned lark.

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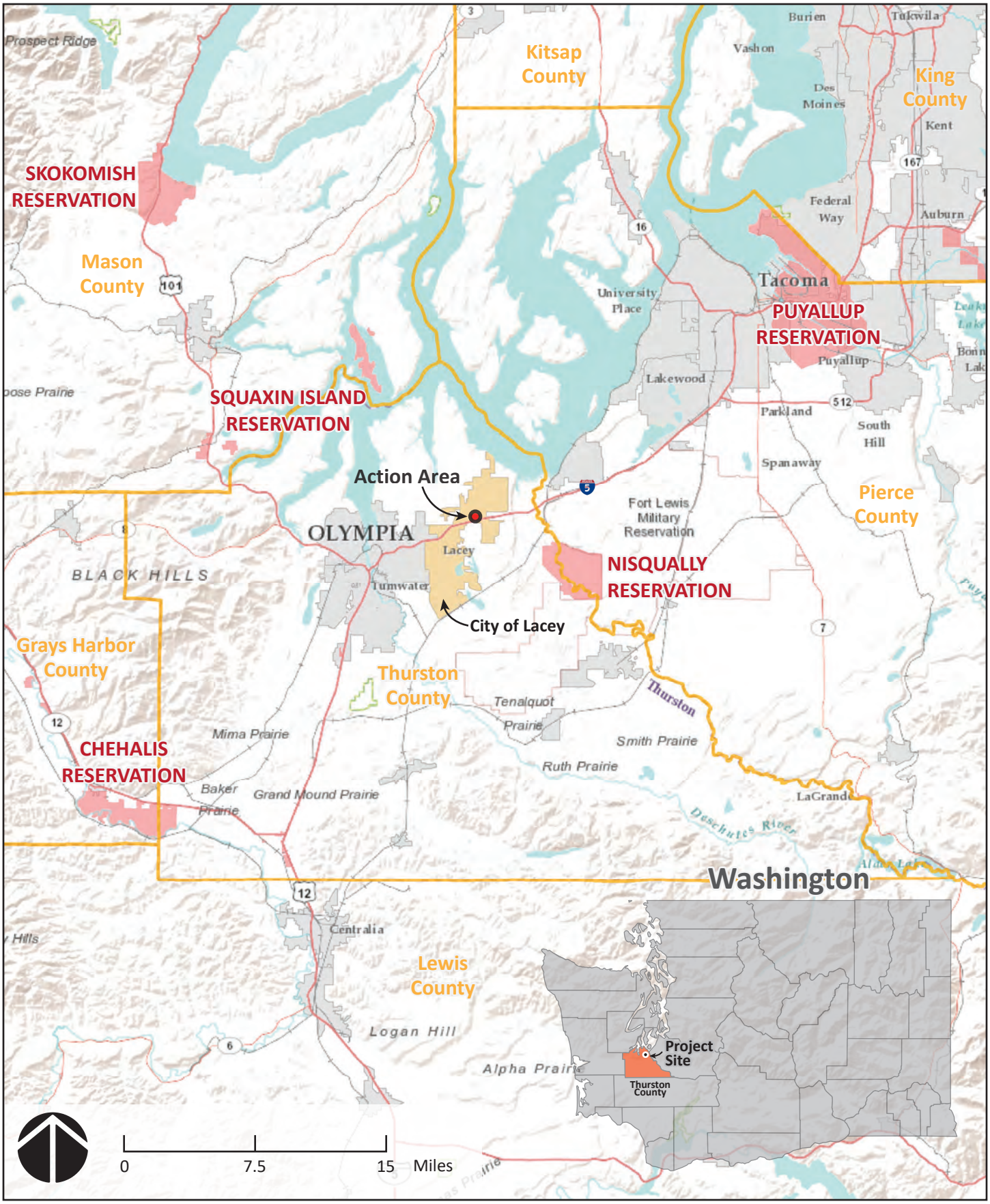
Section 7 | Preparers

This section lists the preparers of this BA as shown in **Table 2**.

Table 2: List of Preparers

Name	Qualifications	Participation
Acorn Environmental		
Ryan Sawyer, AICP	BA; 17 years if experience; certified environmental planner by the American Institute of Certified Planners	Project Director
Jennifer Wade	BA; 17 years of experience	Senior Environmental Analyst
Kimberly Fuchs	BS; 18 years of experience	Senior Environmental Analyst
Oakum Solutions LLC		
Jeremy Huey	MS; 10+ years of experience	GIS Principal/Owner
Montrose Environmental Solutions		
Kathleen Sholty	BS, MS; 8 years of experience	Senior Biologist
Amy Gondran	BS, MS; 5+ years of experience	Biologist

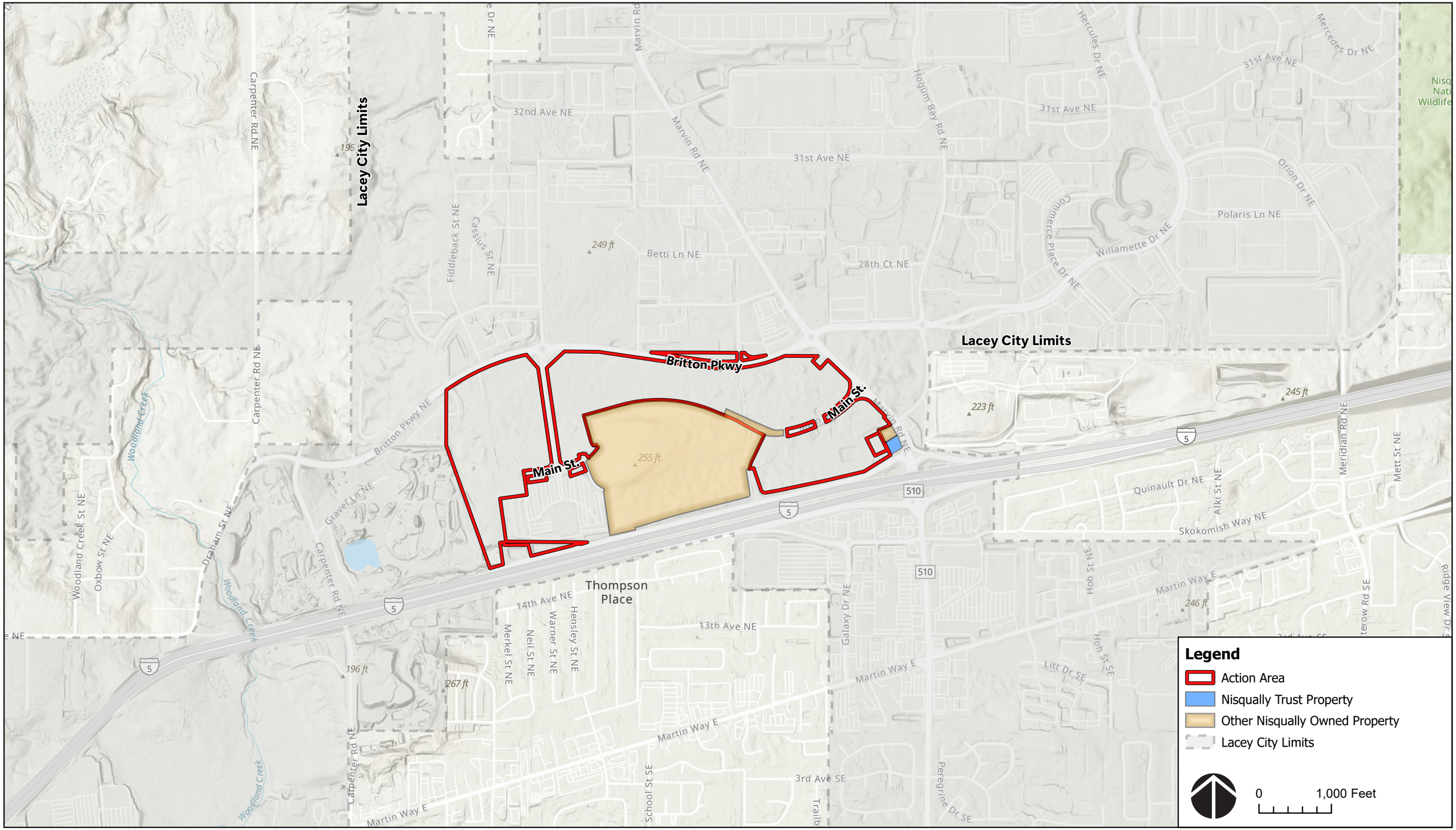
Figures



Source: ESRI, USGS, NOAA

FIGURE 1

REGIONAL LOCATION



SOURCE: Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI and the GIS User Community, Esri Community

FIGURE 02

SITE AND VICINITY

01. GENERAL COMMERCIAL RETAIL
02. GOLF ENTERTAINMENT FACILITY
03. CAR DEALERSHIP
04. PARKING
05. WELL SITE
06. HOTEL (LIMITED SERVICE)
07. FAMILY ENTERTAINMENT
08. MULTI-FAMILY RESIDENTIAL
09. MULTI-FAMILY RESIDENTIAL
10. CULTURAL VILLAGE
11. UPSCALE GROCERY
12. NEIGHBORHOOD RETAIL
13. NEIGHBORHOOD RETAIL
14. TRAVEL CENTER
15. EXISTING CABELA'S N.I.S.

NISQUALLY TRUST PROPERTY
OTHER NISQUALLY OWNED PROPERTY
EXISTING ROAD
ACTION AREA

0 500 Feet

FIGURE 3

COMMERCIAL-HEAVY MIXED USE DEVELOPMENT PROJECT STIE PLAN

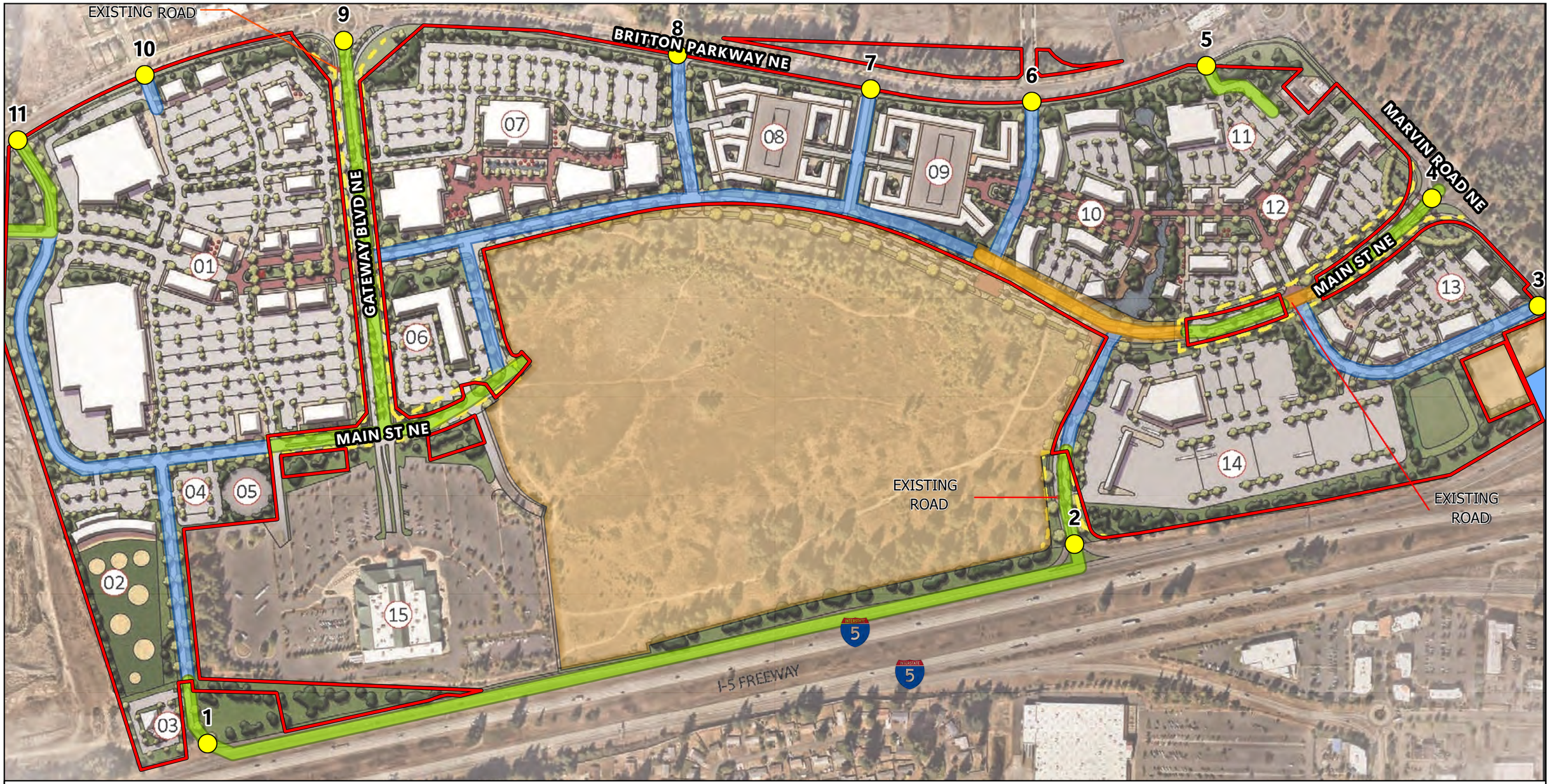
01. SCHOOL
02. BALL FIELDS
03. BALL FIELDS
04. GOLF ENTERTAINMENT FACILITY
05. CAR DEALERSHIP
06. PARKING
07. INDOOR RECREATION
08. HOTEL (LIMITED SERVICE)
09. CULTURAL VILLAGE
10. MULTI-FAMILY
11. MULTI-FAMILY
12. UPSCALE GROCERY
13. FAMILY ENTERTAINMENT
14. NEIGHBORHOOD RETAIL
15. CONVENIENCE STORE
16. UNDEVELOPED / PARK
17. EXISTING CABELLA'S N.I.S.

ACTION AREA
NISQUALLY TRUST PROPERTY
OTHER NISQUALLY OWNED PROPERTY
EXISTING ROAD

0 500 Feet

FIGURE 4

RECREATION-HEAVY MIXED-USE DEVELOPMENT PROJECT SITE PLAN



01. GENERAL COMMERCIAL RETAIL
02. TOP GOLF
03. CARVANA
04. PARKING
05. WELL SITE
06. HOTEL (LIMITED SERVICE)
07. FAMILY ENTERTAINMENT
08. MULTI-FAMILY RESIDENTIAL
09. MULTI-FAMILY RESIDENTIAL
10. CULTURAL VILLAGE
11. UPSCALE GROCERY
12. NEIGHBORHOOD RETAIL
13. NEIGHBORHOOD RETAIL
14. TRUCK STOP
15. EXISTING CABELA'S N.I.S.

NISQUALLY TRUST PROPERTY
OTHER NISQUALLY OWNED PROPERTY
EXISTING ROAD
ACTION AREA
EXISTING ROADWAY
ONSITE IMMPROVEMENTS
OFFSITE IMPROVEMENTS
ACCESS LOCATIONS

0 500 Feet

FIGURE 5

PROPOSED ACCESS IMPROVEMENTS

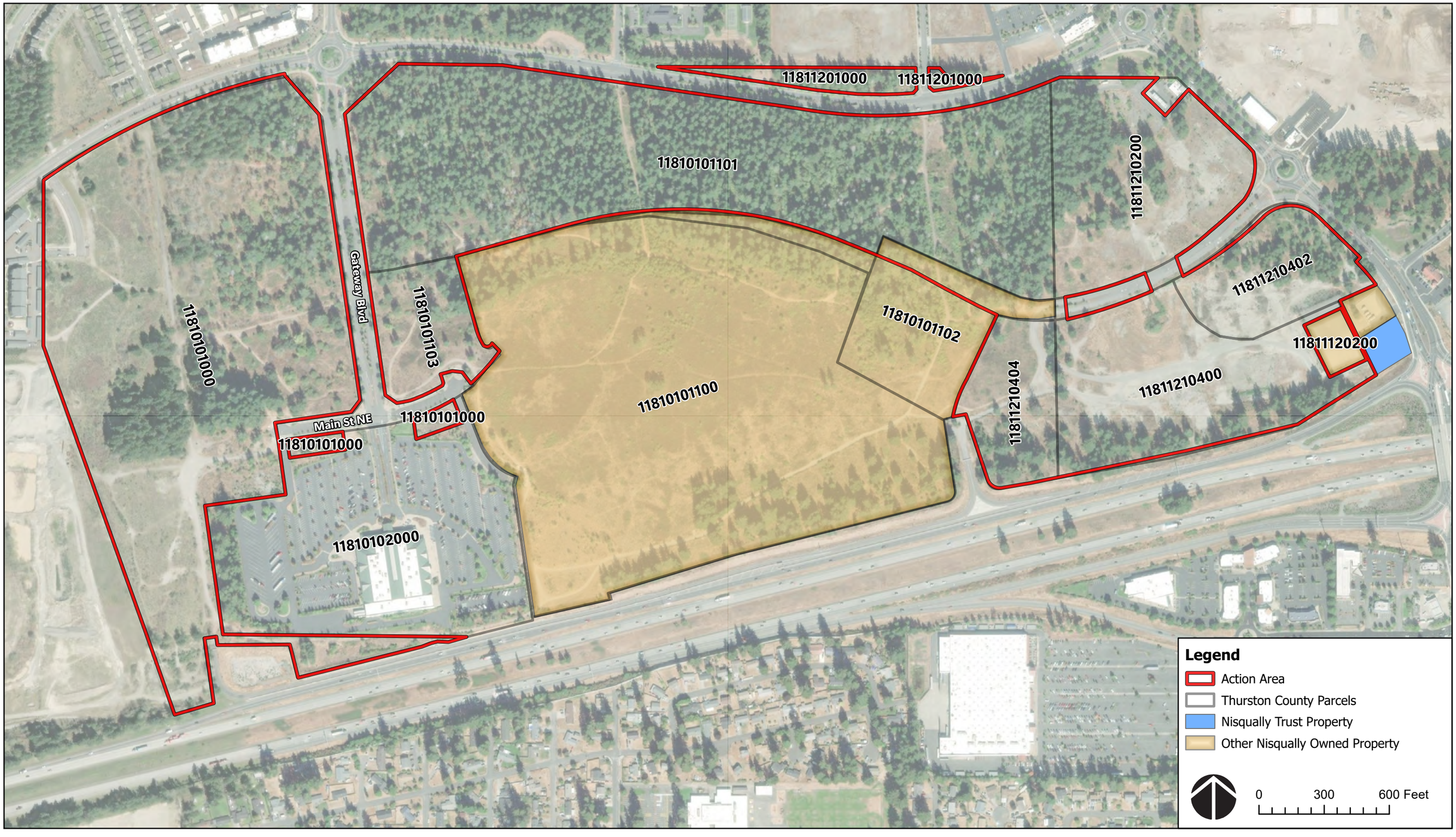


FIGURE 6

AERIAL PHOTOGRAPH

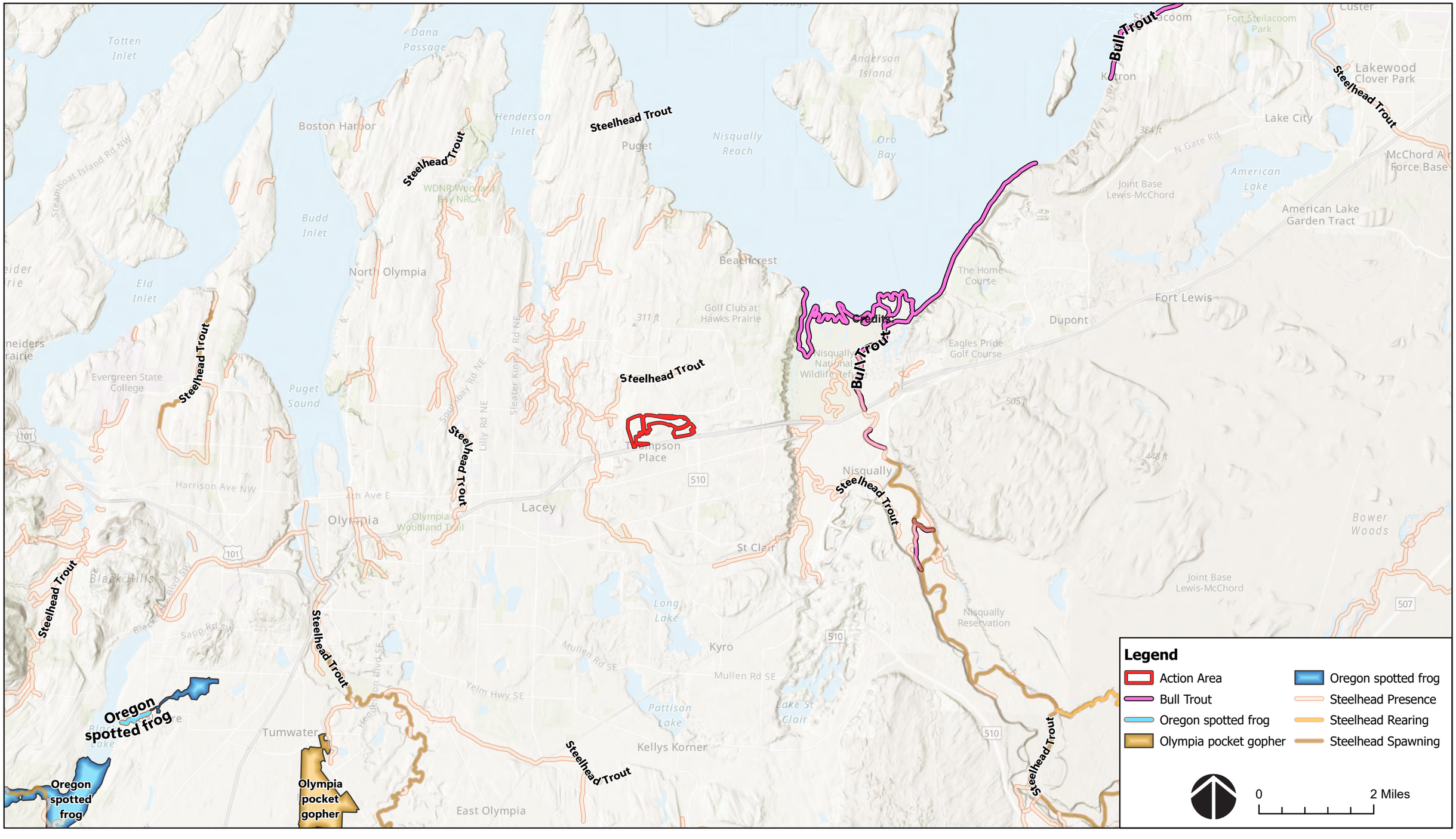


FIGURE 7

CRITICAL HABITAT

Source: ESRI World Imagery

FIGURE 8

USDA SOILS

Source: ESRI World Imagery

FIGURE 9

HABITAT TYPES

Attachment A

USFWS IPaC Report/WDFW Priority Habitats and Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
Phone: (360) 753-9440 Fax: (360) 753-9405

In Reply Refer To:
Project Code: 2023-0054110
Project Name: Nisqually Mixed Use

March 09, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

PROJECT SUMMARY

Project Code: 2023-0054110
Project Name: Nisqually Mixed Use
Project Type: Mixed-Use Construction
Project Description: Thurston County, City of Lacey Washington
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@47.064129199999996,-122.7883459838829,14z

Counties: Thurston County, Washington

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Yelm Pocket Gopher *Thomomys mazama yelmensis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7257	Threatened

BIRDS

NAME	STATUS
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Streaked Horned Lark *Eremophila alpestris strigata* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

FISHES

NAME	STATUS
Bull Trout *Salvelinus confluentus*	Threatened

Population: U.S.A., conterminous, lower 48 states
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8212

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

Taylor's (=whulge) Checkerspot *Euphydryas editha taylori*	Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/5907

FLOWERING PLANTS

NAME	STATUS
Golden Paintbrush *Castilleja levisecta*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/7706

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPAC USER CONTACT INFORMATION

Agency: Nisqually Indian Tribe
Name: Kimberly Fuchs
Address: 5170 Golden Foothill Parkway
City: El Dorado Hills
State: CA
Zip: 95762
Email kfuchs@acorn-env.com
Phone: 3022229102

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Bureau of Indian Affairs

Priority Habitats and Species on the

Buffer radius: 100 Feet

Report Date: 03/13/2023

PHS Species/Habitats Overview:

Occurence Name	Federal Status	State Status	Sensitive Location
Big brown bat	undefined	undefined	Yes
Little Brown Bat	undefined	undefined	Yes
Yuma myotis	undefined	undefined	Yes

PHS Species/Habitats Details:

Big brown bat	
Scientific Name	Eptesicus fuscus
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	Myotis lucifugus
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Yuma myotis	
Scientific Name	Myotis yumanensis
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necesssary to rule out the

presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

Attachment B

National Wetlands Inventory Map

U.S. Fish and Wildlife Service

National Wetlands Inventory

Wetlands

August 9, 2021

Wetlands

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

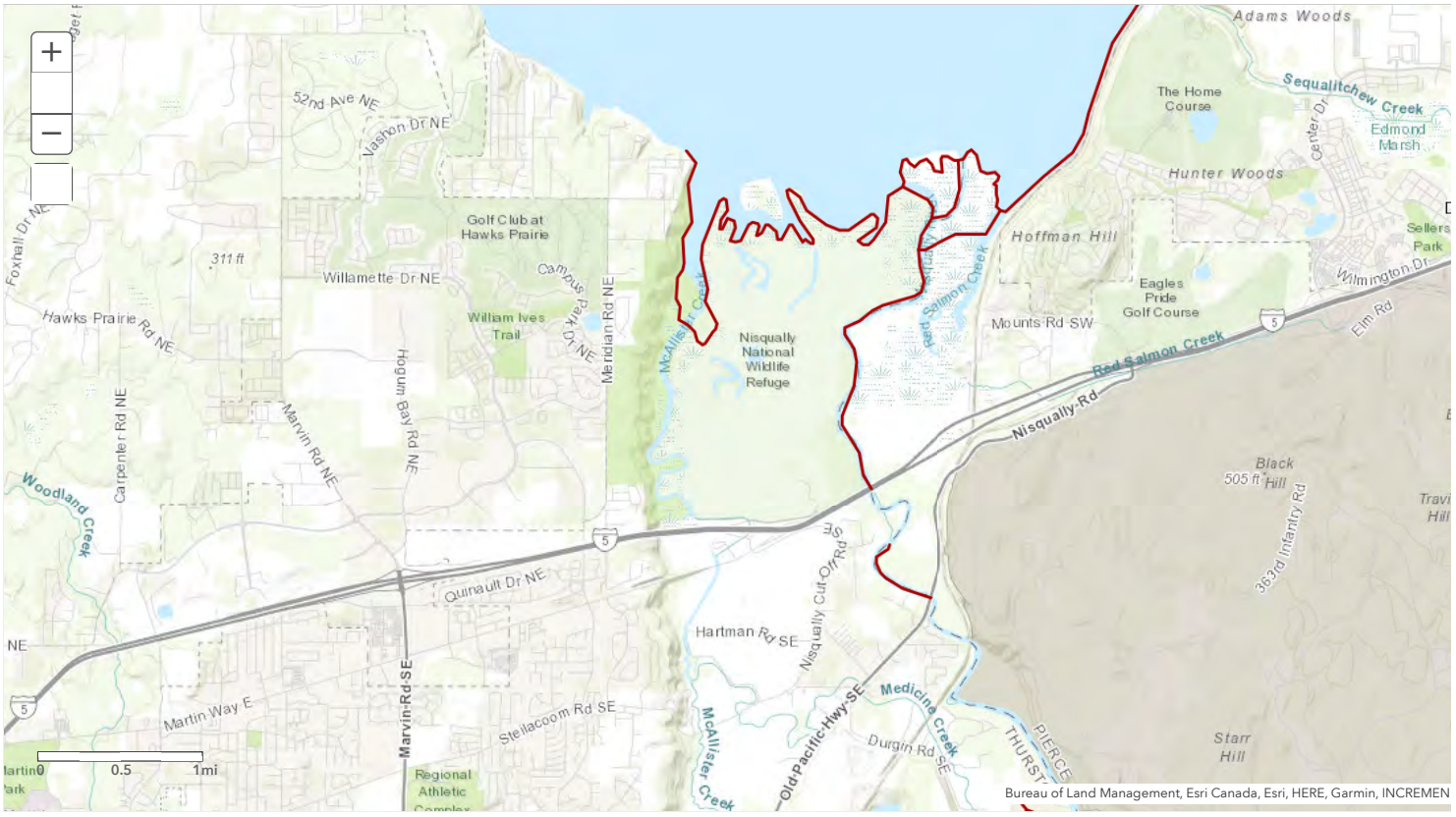
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Attachment C

USFWS Critical Habitat Map

Home ▾ Critical Habitat for Threatened & Endangered Species [USFWS]

Details | Basemap | Share Print | Measure Bookmarks



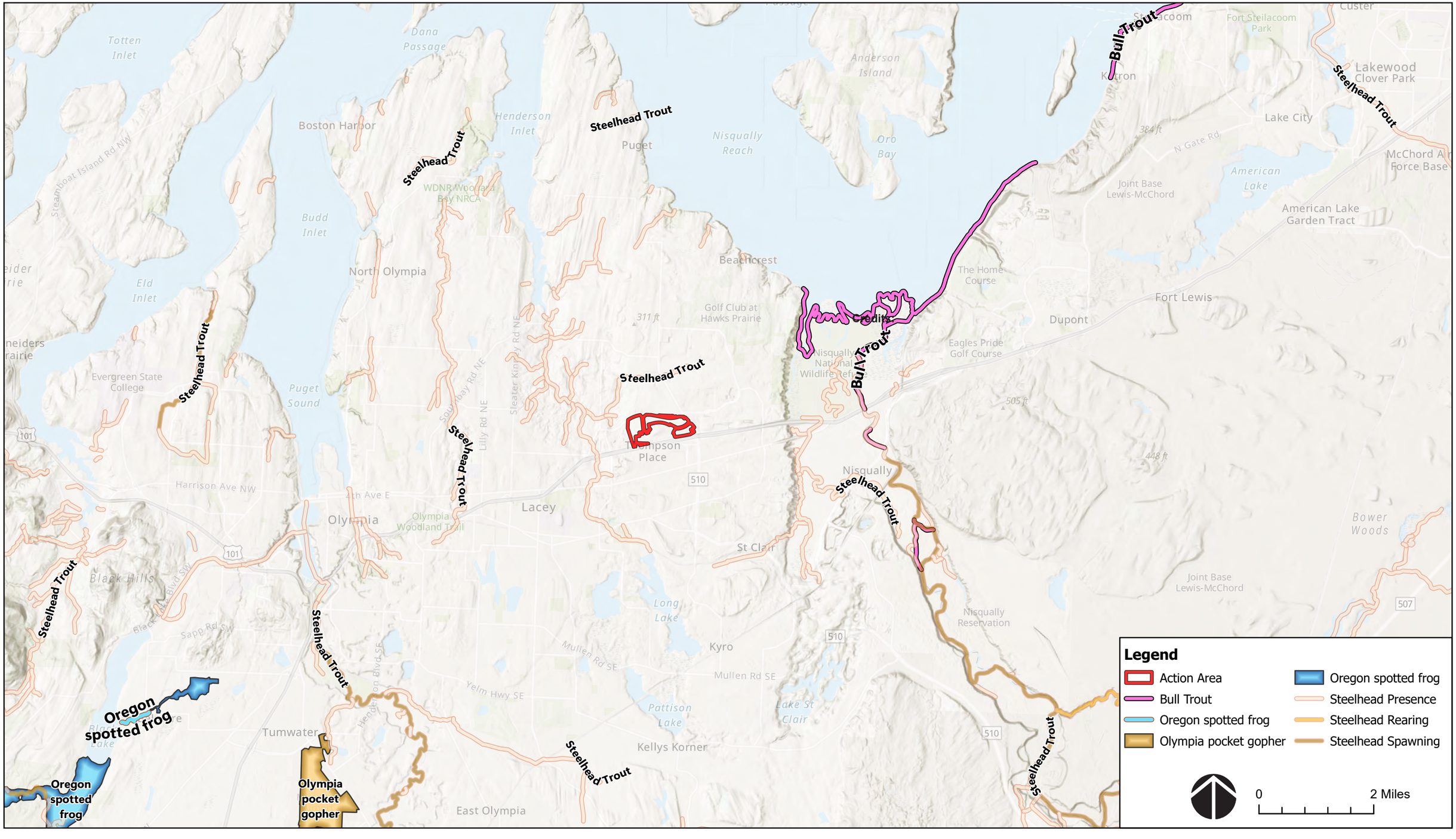


FIGURE 05

CRITICAL HABITAT

Attachment D

NRCS Custom Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Thurston County Area, Washington

August 9, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 14, Jun 4, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 22, 2018—Jul 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Alderwood gravelly sandy loam, 8 to 15 percent slopes	64.0	20.7%
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	45.1	14.6%
46	Indianola loamy sand, 0 to 5 percent slopes	15.1	4.9%
110	Spanaway gravelly sandy loam, 0 to 3 percent slopes	185.4	59.9%
Totals for Area of Interest		**309.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Thurston County Area, Washington

2—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)
Other vegetative classification: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)

Hydric soil rating: No

Minor Components

Indianola

Percent of map unit: 5 percent
Landform: Kames, terraces, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Everett

Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

33—Everett very gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t62b
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Kames, eskers, moraines
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit: 10 percent
Landform: Terraces, eskers, kames
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

46—Indianola loamy sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t62k
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Eskers, kames, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XV402WA), Droughty Soils (G002XS401WA)

Other vegetative classification: Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XV402WA), Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Kames, eskers, moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

110—Spanaway gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2ndb6
Elevation: 330 to 1,310 feet
Mean annual precipitation: 35 to 65 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Spanaway and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spanaway

Setting
Landform: Terraces, outwash plains

Parent material: Volcanic ash over gravelly outwash

Typical profile

H1 - 0 to 15 inches: gravelly sandy loam
H2 - 15 to 20 inches: very gravelly loam
H3 - 20 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

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Attachment E

WDFW Priority Habitat and Species Management Recommendations

Washington Department of FISH and WILDLIFE

IMPORTANT MESSAGE

May 2016

In April 2014, the U.S. Fish and Wildlife Service (USFWS) listed four subspecies of Mazama pocket gophers in Thurston and Pierce Counties as *Threatened* under the federal Endangered Species Act (16 U.S.C. §1531 et seq.). Activities that may result in impacts to those subspecies should be discussed with the USFWS. For more information, please refer to the USFWS' Mazama pocket gopher website at http://www.fws.gov/wafwo/articles.cfm?id=149489588.

PRIORITY HABITATS AND SPECIES MANAGEMENT RECOMMENDATIONS:

MAZAMA POCKET GOPHER

The Washington Department of Fish and Wildlife (WDFW) is providing these management recommendations to inform local government permit reviewers, applicants, consultants, and landowners working on projects with potential impacts to Mazama pocket gopher, a state-listed threatened species. These recommendations are not regulatory, but are based on best available science for avoiding, minimizing, and mitigating impacts to gophers and their habitat, which is primarily located in South Puget Sound. WDFW recommends the following mitigation sequence for reviewing and conditioning proposed development projects with potential impacts to Mazama pocket gophers:

1. **Avoid** direct impacts to occupied Mazama pocket gopher habitat.
    a. Determine the potential for gopher occupancy. A list of soil types known to be inhabited by Mazama pocket gopher in Mason, Pierce, Thurston and Lewis Counties is attached (Attachment 1). A generalized map of these soil types in Thurston and Pierce Counties is posted online, along with these management recommendations, at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations/. WDFW also maintains information on gopher locations based on survey and research information, which is updated frequently. Applicants can request current data on known locations of Mazama pocket gopher from WDFW's Priority Habitats and Species program (http://wdfw.wa.gov/conservation/phs/maps_data/), or by calling 360-902-2543. WDFW also provides gopher location data directly to local jurisdictions.

    b. Because mapped gopher data is incomplete, WDFW recommends that the local permit authority require a **Mazama pocket gopher mound survey** for all projects proposed on sites with soils listed in Attachment 1. We recommend that a qualified professional who has received training from WDFW in Mazama pocket gopher survey protocols conduct the mound survey between the months of June and October. Surveys conducted outside that time period may not be accurate as to the presence of gophers, and applicants should be encouraged to plan ahead for their projects in order to complete a survey between June and October. A list of consultants who have received the training is available online at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations/. Information on identifying gopher mounds, including differences from mole mounds, can be found at http://wdfw.wa.gov/living/gophers.html.

    c. If a survey shows occupied gopher habitat on a proposed project site, require the applicant to design/re-design the project to **avoid** impacts to the occupied area. WDFW defines occupied gopher habitat as Mazama pocket gopher mounds found wholly or partially within the boundaries of the parcel(s) to be developed, buffered by a 5.64-m radial buffer, and with overlapping radii dissolved. To account for the estimated location

of the burrow system (based on surface mounds) occupied by the pocket gopher and biological needs for dispersal and reproduction, the occupied area should be multiplied by a factor of three (3) this area is considered the habitat protection area[1]. (Consultants trained in the survey protocol are familiar with these mapping criteria.) See Attachment 2. All development should be located outside the gopher habitat protection area or areas. The permit authority may want to include mounds located off site in the assessment of areas that will be directly impacted by infrastructure improvements required by the development (e.g., right-of-way improvements).

d. If relocating the project completely outside of existing, occupied gopher habitat is *not* possible without impacting reasonable use of the property, go to Step 2- minimize impacts. A determination of reasonable use is at the discretion of the local permit authority, but it is assumed that legal definitions of reasonable use within the context of the property's zoning/land use designation will be followed. WDFW recommends that the full mitigation sequence described here, including a consideration of offsite mitigation opportunities, be employed before issuing a reasonable use exception.

e. If a survey has been completed for a site, a record of this survey should be maintained by the local permit authority, even if the development project does not move forward and even if no pocket gophers were found on the site. Requiring the survey to be recorded is the best way to notify future landowners that occupied gopher habitat has been found on their site. We recommend that a new survey be required if more than one year has passed between an initial survey and the issuance of preliminary plat approval or site plan approval. If mitigation is not implemented at the preliminary approval stage of the project, a new survey should be required when 5 or more years pass between preliminary approval and beginning of earth-moving work. Depending on available resources, WDFW may provide comment on the survey to the local jurisdiction and/or may be available to work with a consultant who is new to the survey protocol to fulfill survey requirements. WDFW will add the survey results to our mapped gopher data if the permit authority or consultant provides the results as a GIS shapefile or hard copy map, along with basic information including parcel number, surveyor and landowner name, date of survey, and number of mounds found (if any). By receiving this data, WDFW will be able to provide it to future landowners and jurisdictions planning or reviewing projects on the same or adjacent sites. Data should be submitted to WDFW Biological Data Management, Gretchen.Blatz@dfw.wa.gov.

[1] Methodology to determine gopher habitat is based on best available science, including peer-reviewed literature and the best professional judgment of WDFW species experts. WDFW derived the 100 sq m habitat buffer depicted as a circle with a 5.64-m radius from data on home range. Witmer et al (1996) reported a mean home range of 108 sq m for males (range 73-143), and 97 sq m for females (range 47-151). Witmer reports that these figures are somewhat smaller than reported in the literature for other *Thomomys,* perhaps due to the limited duration of his study (Feb-April). Anderson and MacMahon (1981) reported that in the similar Northern pocket gopher, adults typically made only small shifts (10-15 m) in the their home range over the course of the year. A multiplication factor (x3) accounts for uncertainty about the exact location of the burrow system relative to surface mounds as well as species reproduction and dispersal needs and buffering from development impacts, and is WDFW's recommendation based on the best professional judgment of our species and habitat experts. See Attachment 4 for literature citations and other resources.

f. WDFW can assist landowners with projects that do not require local permits, but whose property is likely to contain Mazama pocket gopher habitat. The permit authority is encouraged to refer such landowners to WDFW for guidance and stewardship advice. Information on living with pocket gophers can also be found at http://wdfw.wa.gov/living/gophers.html. Malicious harm to state threatened species is prohibited[2].

2. <u>If impacts to some active gopher mounds can't be avoided, **minimize** impacts to occupied Mazama pocket gopher habitat.</u>
   a. Designate as a habitat protection area onsite the area(s) that contains the highest gopher mound density, plus additional area(s) to make up for occupied habitat that will be destroyed by development. Maximizing width to length ratio such that large, contiguous patch(es) are provided and long, narrow corridors are avoided are most appropriate as habitat protection areas. Multiple habitat protection areas may be appropriate on some parcels or necessary to allow development. Corridors may be appropriate to maintain connectivity with adjacent sites that also have known gopher populations.

   b. The total habitat protection area should include an area equivalent to the total occupied habitat area multiplied by three (3) (as calculated above). Attachment 2 shows a habitat protection area shaped to incorporate the concentrated population of gopher use onsite while also achieving the amount of buffer or protection area necessary to afford long-term benefits of habitat use. The habitat protection area should include habitat suitable for gophers. Restoration may be needed to achieve suitable habitat. See subsection (f), below.

   c. Record the location of the habitat protection area on the face of the plat, short plat, or site plan. The habitat protection area may be designated as a separate tract.

   d. Access to the habitat protection area should be restricted. Perimeter fencing should be installed if necessary to reduce human impacts and pet predation on gophers. Informational signage should be installed at the habitat protection area perimeter stating "Mazama pocket gopher habitat area: No entry" and explaining that the habitat protection area contains habitat sensitive to disturbance of a state-threatened species.

   e. A habitat management plan (HMP) detailing the location and long-term management of the habitat protection area should be required as a condition of project approval, and recorded to run with the title. A recommended habitat management plan template is

[2] RCW 77.15.130 defines the unlawful taking of protected fish or wildlife as when a person hunts, fishes, possesses or maliciously kills protected fish and wildlife, or maliciously destroys the eggs or nests of protected fish or wildlife, and the taking has not been authorized by rule of the commission; or the person violates any rule of the commission regarding the taking, harming, harassment, possession or transport of protected fish and wildlife. Unlawful taking of protected fish or wildlife is a misdemeanor. WAC 232-12-297 classifies state threatened and sensitive species as subcategories of protected wildlife.

attached (Attachment 3). We request that the permit authority provide WDFW an opportunity to review the HMP by sending the Department a copy during the project review period (however, WDFW will not maintain HMP records and we may not have resources to provide timely comment on all submitted HMPs).

f. The HMP should include invasive vegetation control and restoration. WDFW recommends removing all Scotch Broom (Cytissus scoparius) using above ground hand techniques (e.g. no significant movement of earth or large machinery). Twice annually, the habitat protection area should be mowed to control Scotch Broom and enhance herbaceous plant growth. (Information on Scotch Broom control may be found at http://w.southsoundprairies.org/scotchbroom.htm. Restoration of native plants should occur following invasive/Scotch Broom removal. A planting plan should incorporate herbaceous species and minimizes the number of trees proposed for planting in the tree tracts. Examples of beneficial herbaceous plants include legumes, broadleaf forbs, and grasses such as broadleaf lupine (Lupinus latifolius), clover (Trifolium sp.) nodding onion (Allium cernuum) common yarrow (Achillea millefolium), field chickweed (Cerastium arvense) showy fleabane (Erigeron speciosus) coast strawberry (Fragaria chiloensis) and blue wildrye (Elymus glaucus). Possible deciduous trees to plant include Oregon white oak (Quercus garryana), big leaf maple (Acer macrophyllum) or dogwood (Cornus sp).

g. Avoid using herbicides and pesticides in the habitat protection area(s).

h. WDFW encourages the permit authority to require the applicant to submit annual compliance reports to the local jurisdiction for a period of three to five years after the HMP is approved. Such reports should provide basic information on how the conditions of the HMP are being implemented. WDFW recognizes that the ability to track compliance information is dependent on available local resources.

3. **Mitigate** unavoidable impacts to Mazama pocket gopher active mounds.
   a. Only if the avoidance or minimization of impacts through an onsite habitat protection area is not possible, as determined by the permit authority, then offsite mitigation *or* a combination of onsite and offsite mitigation may be used. A *combination* of onsite and offsite mitigation is preferred where there is the potential to retain some onsite habitat protection, even if that habitat protection is less than the amount recommended here.

   b. The offsite mitigation ratio should be calculated at the rate of three acres of suitable gopher habitat permanently protected for every one acre of occupied gopher habitat (as defined above) that is destroyed. Permanent protection may come in the form of a permanent conservation easement implemented by another property owner with gopher habitat. The offsite habitat protection area should be one contiguous patch in single ownership, and use of the site for permanent habitat mitigation should be an allowable use by the local land use permitting authority. The site should contain suitably drained prairie soils of a type and quality equivalent to the gopher habitat on the development site, and be free of impervious surfaces or structures within the habitat protection area. WDFW biologists may be available to review off site proposals for suitability as gopher habitat.

c. A habitat management plan as described in Step 2, above, should be implemented for the mitigation site. The HMP should also specify that the site is being used as off site mitigation for a development site, and may not be used as mitigation for other development activities.

WDFW Key Contacts:

Area Habitat Biologists
HMP review, general project assistance
Thurston County: Tel. 360-902-2579 E-mail Amy.Iverson@dfw.wa.gov
Pierce County: Tel. 360-895-3965 E-mail Gina.Piazza@dfw.wa.gov
Mason County: Tel. 360-249-4628 x 249 E-mail Gloria.Rogers@dfw.wa.gov
Lewis County: Tel. 360-785-0472 E-mail Scott.Brummer@dfw.wa.gov

District Wildlife Biologist
Consultant training for surveys
Tel. 253-813-8906 E-mail Michelle.Tirhi@dfw.wa.gov

PHS Data
For applicant data requests
Tel. 360-902-2543 E-mail phsproducts@dfw.wa.gov
http://wdfw.wa.gov/conservation/phs/maps_data/

Biological Data Management
To submit gopher survey results
Tel. 360-902-2484 E-mail Gretchen.Blatz@dfw.wa.gov

Attachments

1. Soils list
2. Mazama pocket habitat protection example
3. Habitat Management Plan template
4. Resource list
5. March 2011 amendments

Attachment 1

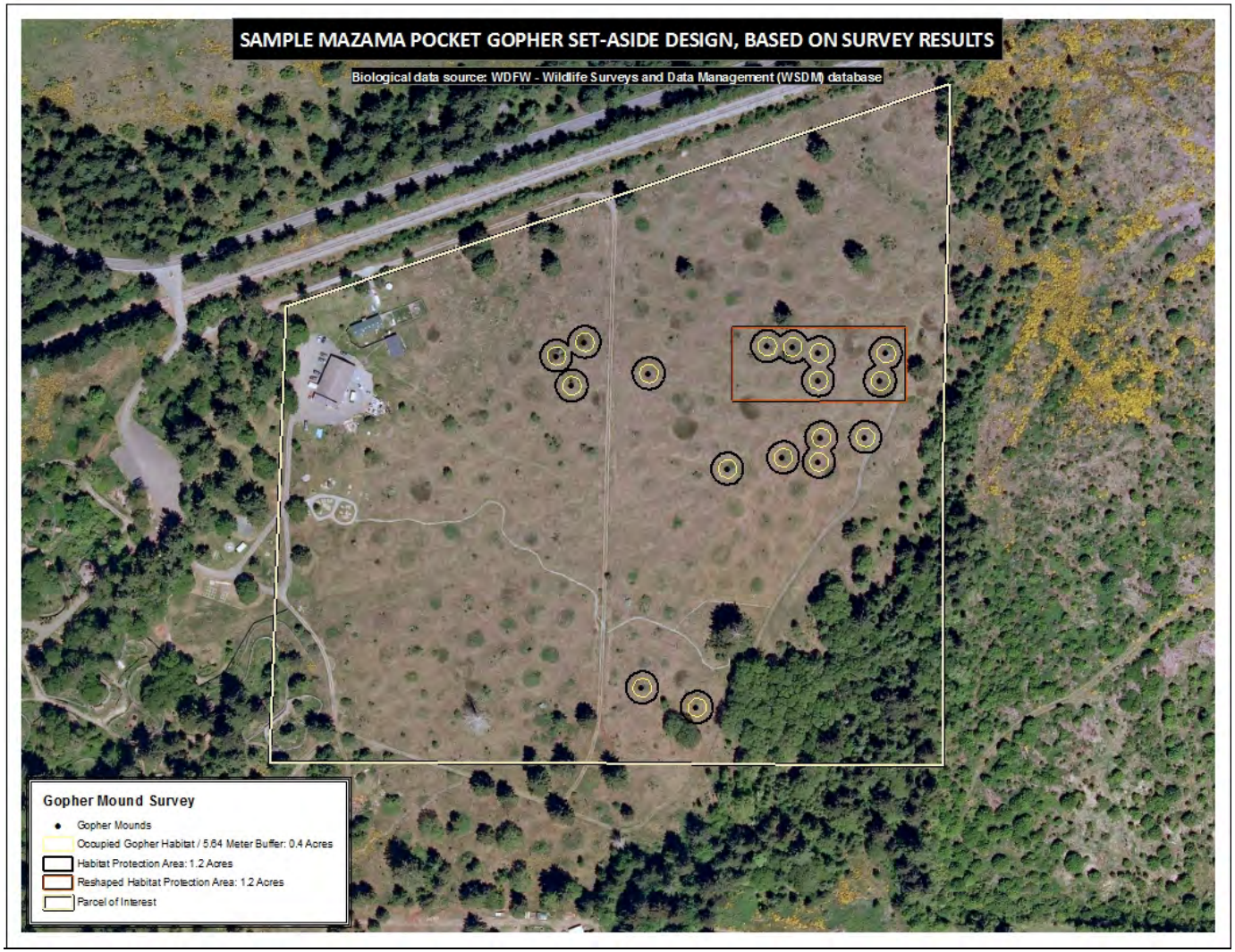
Soil types where Mazama pocket gophers are most commonly found

Cagey loamy sand
Everett very gravelly sandy loam, 0-3%
Everett very gravelly sandy loam, 3-15%
Indianola loamy sand, 0-3%
Indianola loamy sand, 3-15%
Nisqually loamy fine sand, 0-3%
Nisqually loamy fine sand, 3-15%
Spana gravelly loam
Spanaway gravelly sandy loam, 0-3%
Spanaway gravelly sandy loam, 3-15%
Spanaway stony sandy loam, 0-3%
Spanaway stony sandy loam, 3-15%
Spanaway-Nisqually complex

Go online to http://wdfw.wa.gov/conservation/phs/mgmt_recommendations/ to see a generalized map of soils associated with pocket gopher habitat in Thurston and Pierce Counties. Local records may be more accurate.

Attachment 2

SAMPLE MAZAMA POCKET GOPHER SET-ASIDE DESIGN, BASED ON SURVEY RESULTS



Attachment 3

HABITAT MANAGEMENT PLAN TEMPLATE:
MAZAMA POCKET GOPHER

WDFW Mazama pocket gopher management recommendations can be found online at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations/.

Applicant
NAME AND ADDRESS

Subject Property
PARCEL NUMBER, ADDRESS, JURISDICTION

EXISTING CONDITIONS

1. Parcel size, location, and current use including any improvements.

2. Mazama pocket gopher status and use of subject property. If other wildlife species of concern are also found on or near the property, their status and use should also be described. A single HMP can be used to cover multi-species and habitat management issues.

PROPOSED ACTIVITY

Describe the proposed activity including a discussion of proposed structures, roads, right-of-ways and their location on the subject parcel. Include a timeline for proposal activities and whether or not this proposal is part of a long-term plan for continued development of the property.

HABITAT MANAGEMENT PLAN CONDITIONS

ON-SITE

1. Describe habitat preservation actions that will be taken on site. Include size and shape of any preserved area (set-aside) and how this area relates to the existing pocket gopher mound distribution on the parcel.
2. Describe actions that will be taken to maintain and enhance the habitat preservation area on the parcel. This may include but is not limited to; mowing, invasive species control, reestablishment of native plant species associated with gopher habitat.
3. Describe protection and education actions that will be taken on the preservation site and the property as a whole. This may include fencing, educational signs, etc.

OFF-SITE

1. Describe any mitigation actions that will be taken on parcels other than the parcel where the project is proposed.
2. Include a description of the parcel(s) their location(s).

3. Discuss how these parcels will be acquired and how managed as was done for the ON-SITE parcel.

DURATION OF PLAN and MODIFICATIONS

1. Describe how long the plan will be enforced, how often the plan will be reviewed, and what conditions lead to this review.
2. Describe how the plan will be funded and who or what organization(s) will be responsible for ensuring the plan is carried out and the site maintained.
3. Describe how responsibility for maintaining this plan will be transferred if ownership changes.
4. Describe how the plan will be reviewed and modified should land use on the parcel is proposed to change. This could include changes in how other natural resources on the parcel are managed in addition to additional or change in development.
5. Describe who will notify the local jurisdiction of any new proposed land use activities.

COMPLIANCE

Failure to comply with this Plan is a violation of [JURISDICTION] codes and may be subject to civil or criminal penalty.

_____ _____

_____ _____

Landowner or Agent Signature (Date)

Landowner or Agent Names (Print)

_____

Address

_____

City, State, Zip

_____

[JURISDICTION] Representative (Date)

For review and comment purposes, a copy of this plan may be sent to:
WDFW- Habitat Program
Attention: Region 6 Area Habitat Biologist
600 Capitol Way North
Olympia, WA 98501-1091

Attachment 4

Resources for further information about
Mazama pocket gopher species and habitat

Andersen, D.C. and J.A. MacMahon. 1981. Population dynamics and bioenergetics of a fossorial herbivore, Thomomys talpoides (Rodentia: Geomyidae), in a spruce-fir sere. Ecological Monographs 51:179-202.

Campbell, B. 2004. Restoring Rare Native Habitats in the Willamette Valley. A Landowner's Guide to Restoring Oak Woodlands, Wetlands, Prairies and Bottomland Hardwood and Riparian Forests. See Chapter 5. http://www.southsoundprairies.org/documents/Landownerguide.pdf

Stinson, D. W. 2005. Washington State Status Report for the Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot. Washington Department of Fish and Wildlife, Olympia. 129+ xii pp. http://wdfw.wa.gov/publications/pub.php?id=00390

WDFW Living with Wildlife Series: Pocket Gophers http://wdfw.wa.gov/living/gophers.html

Witmer, G. W., R. D. Sayler, and M. J. Pipas. 1996. Biology and habitat use of the Mazama pocket gopher (Thomomys mazama) in the Puget Sound area, Washington. Northwest Science 70:93-98.

Attachment 5

Amendments to Mazama Pocket Gopher Habitat Management Recommendations

In March 2011, the Washington Department of Fish and Wildlife revised the July 2009 Mazama Pocket Gopher Habitat Management Recommendations as follows:

1. Section 1c was amended to correct the radial buffer used to depict the 100 sq m gopher mound. The correct radial buffer distance is 5.64 m. The map in Attachment 2 was also replaced to reflect the change.
2. The term “active” was removed to describe gopher mounds from section 1c. Gopher mound activity varies throughout the year and therefore an inactive mound in one season may be occupied in another.
3. Section 2 was amended to replace the term “set-aside” with “habitat protection area.” The habitat protection area is not a true set-aside because it may have other uses consistent with gopher occupancy.
4. Internet links and contact information were updated throughout.

Appendix I-2

NMFS Biological Assessment/Essential Fish Habitat Assessment

BIOLOGICAL ASSESSMENT/ESSENTIAL FISH HABITAT ASSESSMENT

For National Marine Fisheries Service

Nisqually Quiemuth Mixed-Use Fee-to-Trust Project
City of Lacey, Thurston County, Washington

Lead Agency: Bureau of Indian Affairs

September 6, 2023

acorn environmental

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Section 1 | Introduction

The purpose of this Biological Assessment (BA) / Essential Fish Habitat (EFH) Assessment (EFHA) is to address the effects of the proposed Nisqually Indian Tribe 174-acre Fee-to-Trust and Quiemuth Village Mixed Use Project (Proposed Project) on fish species listed as endangered or threatened under the Endangered Species Act (ESA) and EFH designated under the Magnuson-Stevens Fishery Conservation and Management Act. The Proposed Project involves the acquisition of a 174-acre site in the City of Lacey, Washington (Project Site; **Figures 1** and **2**) into federal trust status (Proposed Action) and the subsequent development of the site with mixed use development and related facilities. The Tribe has proposed two alternative site plans for the Proposed Project, a Commercial-Heavy Alternative (**Figure 3**) that would develop the entire Project Site and a Recreation-Heavy Alternative (**Figure 4**) that would develop most of the Project Site except for approximately 19.03-acres of the mixed conifer-hardwood forest in the northern portion of the Project Site. To be conservative, this BA/EFH bases the analysis on the Commercial-Heavy Alternative as it has the biggest development footprint.

An Environmental Assessment (EA) is anticipated to be prepared by the BIA pursuant to the National Environmental Policy Act (NEPA) to assess potential environmental effects of the Proposed Action. This BA/EFHA serves as the environmental support document for the future determinations made by the EA or EIS and corresponding mitigation and conservation measures regarding federally listed species and addresses the Proposed Action's compliance with Section 7 of the ESA. A separate BA has been prepared for the United States Fish and Wildlife Service (USFWS) pursuant to Section 7 of the ESA.

1.1 PURPOSE AND NEED

The purpose of the Proposed Action is to facilitate tribal self-sufficiency, self-determination, and economic development, thus satisfying both the Department of the Interior's (Department) land acquisition policy as articulated in the Department's trust land regulations at 25 CFR Part 151. The need for the Department to act on the Tribe's application is established by the Department's regulations at 25 CFR § 151.10(h).

1.2 ACTION AREA

The Action Area consists of the approximately 174-acre Project Site, as well as off-site areas proposed for access improvements (**Figure 5**), located in the City of Lacey, Thurston County, Washington. The Action Area is located directly north of Interstate 5 (I-5), and west of the Marvin Road / I-5 interchange. The Action Area is adjacent to a 1-acre parcel currently in federal trust for the Tribe, which is developed with the Nisqually Markets Tobacco Outlet store. The Project Site consists of 8 parcels with the assigned APNs 118-11-210200, 118-10-101101, 118-10-101103, 118-10-101000, 118-11-201000, 118-11-2010402, 118-11-210400, and 118-11-20404 and are located within Section 10 and 11, Township 18 North, Range 1 West, Willamette Principal Meridian, Lacey, WA United States Geological Survey 7.5-minute topographic quadrangle (USGS, 2022). An aerial photograph of the Action Area is shown in **Figure 6**. Regional access to the Action Area is provided by I-5, which runs in an east-west direction immediately south of the Action Area, from the existing I-5/State Route (SR) 510/Marvin Road interchange. Local access to the Action Area is currently provided through Marvin Road Northeast (NE) via Main Street NE in the eastern portion of the Action Area, and Britton Parkway NE via Gateway Boulevard NE in the western portion of the Action Area.

Right-in-right-out ramps for southbound traffic on I-5 have been constructed south of the Action Area, however, the ramps are not currently open to traffic.

1.3 PROPOSED ACTION COMPONENTS

The Proposed Action includes the transfer of the approximately 174-acre proposed trust property into federal trust status. Following the acquisition of the Project Site into trust, the Tribe proposes to develop the following components within the Action Area under the Commercial-Heavy Alternative (**Figure 3**):

- Approximately 929,500 square feet (sf) of commercial retail, including grocers, retail and dining;
- Approximately 7.4 acres of recreational facilities, including a golf entertainment facility, bowling center, and movie theater;
- A 4-story, 200 room hotel;
- 320 units of housing, including high density multi-family apartments and onsite live/work housing;
- A 28-acre travel center, to include 26 diesel and gasoline fuel pumps;
- Approximately 4,655 parking spaces provided by several surface parking areas; and
- Infrastructure, including electrical, natural gas, water supply, wastewater treatment and/or collection facilities, and stormwater drainage, treatment, and infiltration facilities (note that off-site infrastructure is described and analyzed in **Section 4.4**).

Additional detail regarding the proposed grading and drainage plan and water supply /wastewater treatment facilities is provided below.

1.3.1 Grading and Drainage

The Action Area is gently to moderately sloping with localized small hills, ridges, and depressions. It is situated in the central portion of the Lacy glacial outwash plain. The Action Area has subsurface layers of organics, overlying dense glacial soils. Below the fill material, glacial soils consist of dense to very dense silty sand, sandy gravel and gravelly sand, as well as some cobbles and boulders. Based on findings, the nearby historical and on-site field infiltration rates range from 0 to 200 inches per hour, with an average of 20 inches per hour. Depth to groundwater is variable throughout the Action Area. The regional groundwater table varies across the site and may vary according to seasonal precipitation and other factors. Historical boring and well logs reported encountering water at various elevations. These ranges were from 186 feet above mean sea level (amsl) to 202 feet amsl. The site has a high point near its center with low areas in the southwest, northwest, and southeast corners. From the low area in the southeast corner, the site gently slopes up to the north and northwest. From the center of the site, a small valley develops to the west just south of Britton Pkwy. The Stormwater and Grading Strategies (**Attachment A**) indicates that there is no off-site stormwater runoff.

Following construction, the maximum proposed slopes after construction would not exceed 3H:1V. Approximately 370,000 cubic yards of fill will be excavated and used as fill within the Action Area. No import or export of fill material is anticipated. The proposed development will create more than 147 acres of new impervious surfaces. Runoff from roads, sidewalks, roofs, and landscape areas will be collected and routed to a water quality and/or flow control facilities depending on the surface type or use under the Proposed Project. Runoff from approximately 118.3 acres of hard surfaces with the potential for pollutants that could contaminate stormwater, such as roads and parking areas, and from approximately 26.1 acres of adjacent landscaping will be collected and routed to a bioretention treatment facility prior

to an infiltration facility. Each catchment or development area will consist of multiple bioretention cells spaced throughout the parking area of the Action Area to mimic existing infiltration conditions to the greatest extent practical. The biofiltration cells shall be designed to treat the stormwater (91% of the 24-hour continuous runoff volume) in accordance with City of Lacey Stormwater Design Standards Manual based on Section 5.03 and Volume V of the Stormwater Management Manual for Western Washington (SWMMWW). Runoff from approximately 29.6 acres of roof areas will be routed directly to infiltration facilities since rooftops are not a potential source of stormwater pollution.

All on-site stormwater will be collected and conveyed to infiltration facilities, in one or various locations across the Action Area, the exact locations of which will be determined during final design. There will be one facility per catchment/development area (see **Figure 7**).

Each catchment or development area will consist of multiple infiltration trenches/galleries dispersed throughout the parking areas of the site to mimic existing infiltration conditions to the greatest extent practical. Collectively, the facility footprint will be approximately 1,925 sf per acre of catchment area, with a minimum depth of 3 feet, and have an infiltration rate of 20 in/hr; with the safety rate of 2, it is assumed the design rate would be 10 inches per hour. Infiltration facility area sizes would range from 16,60010,300 – 62,50051,400 sf with a total combined area of 335,500275,800 sf on-site.

Conveyance for on-site surface water will be provided via a catch basin network. Roof drains will be tightly lined directly to the infiltration galleries. The conveyance system will be designed in accordance with the 2022 SDM with sufficient capacity to convey and contain the 25-year peak flow. The proposed location of conveyance systems can be seen on the conceptual stormwater plan included as **Figure 7.**

Oil/water separation devices will be installed according to City of Lacey and WSDOE requirements. The proposed truck stop in the eastern most lot will use oil/water separation devices as well as dead-end sumps, double walled tanks, and extensive subsurface monitoring and implementation of best management practices (BMPs) to ensure no leaks.

As part of the stormwater treatment system, the Tribe intends to create an interactive display of how the on-site stormwater is being treated and how this is providing required treatment needed to protect salmon and other stream life. This will include but not be limited to descriptions of the BMPs, what they remove from the runoff, how they operate, the path of the runoff from the sky to the streams and descriptions of plants and other fauna being used to enhance the natural environment.

1.3.2 Water Supply and Wastewater Treatment

The Action Area would be provided water supply via connections to City of Lacey (City) municipal utilities (Water Supply Option 1) or through the development of on-site wells and treatment facilities (Water Supply Option 2). Wastewater service would be provided via off-site disposal or through the development of on-site wastewater treatment facilities. These options are summarized below.

Water Supply

Option 1: Off-Site Water Supply

The Action Area is located within the service area of the City. Under this option, water supply to serve the Proposed Action would be provided through connection to the City of Lacey's municipal water distribution system that has multiple water lines wither onsite or immediately adjacent to it offsite. Distribution will

be through pipes consisting of potable water and reclaimed water (if used). If reclaimed water is used, the overall potable water demand will be reduced, but a dual distribution system would be required, consisting of one for potable water and one for reclaimed water. These connections are described in more detail in **Section 4.4**. Two 67-foot diameter, 25-foot-tall storage tanks with a combined capacity of approximately 1,300,000 gallons and an associated booster pump may be developed on site to ensure fire flow volumes and maximum peak water daily demand are available.

Option 2: On-site Water Supply

With this option, an on-site well system would be installed including a treatment plant and two groundwater wells with one serving as the primary well and the other as a secondary redundancy well. A reservoir to provide fire, standby equalization, and operational flows would also be established. The size of the reservoir would depend on the number of wells and flow supplied and whether reclaimed water is available, but it is anticipated to be similar to the two 67-foot diameter, 25-foot-tall storage tanks with a combined capacity of approximately 1,300,000 gallons described under Option 1. The northern part of the County where the Action Area is located has been delineated to have approximately seven geohydrological units. Groundwater in this portion of the County tends to move towards major surface drainage channels and marine waters (Drost et al., 1998).

Wastewater Collection, Treatment and Disposal

Option 1: Off-site Wastewater Treatment and Disposal

Under this option, off-site wastewater services would be provided by a connection to the City's existing infrastructure. Two options would be available for connection, the first would connect to the sewer main that intersects Main Street NE, the second option would be to connect to the city sewer line adjacent to the Project Site on the northwestern border, and connecting to sewer lines in Gateway Blvd. Sewer extensions would be needed to access the wastewater system. The City's wastewater system is predicted to provide enough capacity to accept wastewater from the Action Area. Connections are described in more detail in **Section 4.4**.

Option 2: On-site Wastewater Treatment and Disposal

Under this option, an on-site wastewater treatment plan (WWTP) would be constructed to treat the wastewater generated by the Proposed Action. The WWTP would use a membrane bioreactor plan with ultraviolet radiation treatment of the membrane filtrate. This system would meet Washington State Department of Ecology (WADOE) Class A effluent standards to facilitate subsurface discharge as well as reclaimed water use.

If a reclaimed system is used for reducing water demand, it would be classified as Class A reuse water by WADOE. The reclaimed system would be a 1,300,000-gallon system, which includes storage for fire protection, toilet flushing, landscape irrigation, and reserve storage. Additionally, a booster would be required to provide the necessary fire flow.

All surplus water not needed for the reclaimed water system would be discharged in one of the following ways:

- **On-site Ponds and Infiltration Basins**: A reclaimed water pond facility would be developed within the Action Area that consists of approximately 7.5 acres of ponds and approximately 0.4 acres of infiltration basins. The ponds would be designed as water features within the Action Area or as

standalone ponds. These ponds would allow for both infiltration and evaporation. The infiltration basins would be placed under a parking lot to avoid potential impacts to landscaping or other uses.

- **On-site Groundwater Injection Well**: One or more Class V injection wells would be developed within the Action Area. This well would inject treated effluent under pressure to a depth above the underlying aquifer where it would continue to be treated as it moved through the vadose zone and into the aquifer. The injection well would be regulated by the USEPA under their Underground Injection Control program. The injection point for the effluent would be placed as far as practicable from the potable water well to ensure maximum filtration before being withdrawn.

In addition to treated effluent, approximately 1,800 gpd of biosolids would be produced by the wastewater treatment process on average (peak would produce up to 3,650 gpd). When cleaning is required for the treated biosolids, approximately every two years, the biosolids would go through a thickening process before being dried. The dried solids would be delivered to a municipal solid waste landfill or a dedicated sludge disposal site.

Section 2 | Methodology

The following information was obtained and reviewed in support of this analysis contained in this BA/EFHA:

- United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC) Official Species List, dated March 9, 2023, of special-status species with the potential to occur on or be affected by the Proposed Action (USFWS, 2023a; **Attachment B**);
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species viewer (PHS), dated March 13, 2023, of special-status species with the potential to occur on or be affected by the Proposed Action (WDFW, 2023a);
- USFWS National Wetlands Inventory (NWI) map of wetland features on the Action Area (USFWS, 2021; **Attachment C**); and
- A map of the nearest critical habitat identified by USFWS and NOAA Fisheries (USFWS, 2022b; NOAA, 2022; **Figure 9**).
- NOAA Fisheries Essential Fish Habitat (EFH) Mapper (NOAA, 2022a; **Figure 10**).

2.1 BIOLOGICAL SURVEYS

Biological resource surveys of the Action Area were conducted April 12 to 14 and June 16 to 18, 2021. Surveys assessed habitat types, federally listed species, suitable habitat for federally listed species, and wetlands and other Waters of the U.S. Species and habitat types were classified using the WDFW Priority Habitat and Species List (WDFW, 2023a).

2.2 ANALYSIS

An analysis was conducted to determine federally listed fish species that may have the potential to occur within the Action Area or within downstream waterways that may be affected by the Proposed Action. Habitat requirements for fish species were assessed and compared to the type and quality of habitats observed during surveys. Federally listed fish species with no potential to occur within the Action Area or downstream waterways that may be affected by the Proposed Action were ruled out based on lack of suitable habitat and/or geographic distribution. The results of this analysis are summarized below.

Section 3 | Environmental Setting

3.1 TOPOGRAPHY AND CLIMATE

The Action Area is located within Section 10 and 11 of Willamette Principal Meridian in Township 18 North, Range 1 West as depicted on the "Lacey" United States Geological Survey (USGS) 7.5' quadrangle maps. The region has an annual mean high temperature of 60.4 degrees Fahrenheit (° F) and an annual mean low temperature of 40.6° F; the average annual rainfall is approximately 50.00 inches (NOAA, 2021).

3.2 HABITAT TYPES

Two terrestrial habitat types were identified within the Action Area (**Figure 11**): ruderal/disturbed and mixed conifer – hardwood forest. There are no aquatic habitats identified within the Action Area.

3.3 POTENTIAL FISH HABITAT

There are several riverine habitats located within the watershed of the Action Area that support significant fish species.

The Action Area is located within the Woodland Creek Drainage Basin. The nearest flowing water features to the Action Area are an unnamed stream system approximately 0.13 miles northwest, Woodland Creek approximately 3,500 feet west, which provides fish habitat for steelhead and Chinook Salmon, and McAllister Creek approximately 1.7 miles east of the Action Area. McAllister Creek flows into the nearby Nisqually Flats that are part of the Billy Frank Jr. Nisqually National Wildlife Refuge. In addition, the Nisqually River is approximately 2.08 miles east of the Action Area and terminates into the Nisqually Flats that eventually drains into the Puget Sound, and provides fish habitat for Chinook salmon, coho salmon, and Puget Sound pink salmon. The Nisqually Reach also provides habitat for Bull trout. There are no surface water features in the Action Area itself. Surface water features in close proximity to the Action Area can be seen in **Figure 12.**

3.4 CRITICAL HABITAT AND ESSENTIAL FISH HABITAT

There is no designated critical habitat for federally listed species within the Action Area, nor are there any surface waters or aquatic habitats within the Action Area. Using the NOAA Fisheries Protected Resources App Critical Habitat Mapper, critical habitat was identified approximately 3,500 feet west of the Action Area in Woodland Creek for the threatened Steelhead (*Oncorhynchus mykiss*). This Creek runs from Long Lake into Henderson Inlet. The Nisqually Reach, within Puget Sound, occurs approximately 2.6 miles east of the Action Area and is designated critical habitat for bull trout (*Salvelinus confluentus*) (**Figure 9**). McAllister Creek, approximately 1.7 miles to the east of the Action Area, which leads to the Nisqually Reach contains critical habitat for the following species, the threatened Chinook Salmon (*Oncorhynchus tshawytscha*) and threatened steelhead (*Oncorhynchus mykiss*); however, the Action Area is not within the drainage watershed of McAllister Creek (**Figure 9**).

Federally managed marine and anadromous fish species are protected by the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFC). The MSFC set forth the EFH provision. Federal agencies which fund, permit, or undertake activities that may adversely affect EFH, are required to consult with NMFS regarding the potential effects of their actions.

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. "Waters" include aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include aquatic areas historically used by fish where appropriate. "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities (NMFS, 1999).

The Action Area does not contain aquatic features and thus does not contain EFH; however, it is identified as within a watershed which affects EFH for coho/Puget Sound steelhead and pink salmon species. Puget Sound and Nisqually Reach are designated EFH for Chinook, coho, Puget Sound pink salmon, groundfish, and coastal pelagic species. A map of designated EFH in the project area is provided as **Figure 10**.

3.5 FEDERALLY LISTED SPECIES

Based on a biological desktop review, the following federally listed fish species have the potential to occur within Action Area watershed: bull trout (*Salvelinus confluentus),* Chinook salmon *(Oncorhynchus tshawytscha),* steelhead *(Oncorhynchus mykiss),* coho salmon (*Oncorhynchus kisutch),* groundfish, coastal pelagic species, and killer whales. Puget Sound pink salmon (*Oncorhynchus gorbuscha*) are not federally listed; however, this species is described below to the presence of EFH. Killer whales, pelagic fish, and groundfish were dismissed from study due to the distance to Puget Sound and Nisqually Reach from the Action Area, the unlikelihood of the species traveling upstream into Woodland Creek and the need for deeper waters. The other fish species may occur in the project region. Pertinent data and information such as habitat preference and distribution of each species in the Action Area are briefly summarized below.

3.5.1 Bull Trout (*Salvelinus confluentus*)

USFWS FEDERAL STATUS: Threatened

The bull trout is a member of the Salmonidae family and are a char native to Washington, Idaho, Nevada, Oregon, Montana, and western Canada. They are most commonly found in high mountainous areas where there is snow and glaciers. They have specific habitat requirements including cold water, clean, complex, and connected habitats. This species is rarely found in waters above 59 degrees Fahrenheit. They reside in deep pools of large, cold rivers and lakes. Resident bull trout remain in the same stream or creek their entire lives, whereas the migratory species move to larger bodies of water to overwinter and then migrate back to smaller waters to reproduce. There is an anadromous form of this species localized to the Coastal-Puget Sound area, which spawns in rivers and streams but rears its young in the ocean.

This species can spawn every year or every other year, and usually between the months of August and November. Fry and juveniles rear for one to four years in their birth stream before they migrate to other waters to mature (USFWS, 2022d).

Resident and juveniles' prey on small fish and invertebrates, where migratory fish prey primarily on fish. This species prefers stable stream channels, clean gravel for spawning and rearing, diverse vegetative cover, and open migration corridors (USFWS, 2022a).

Activities that could impact this species survival include development or land uses that degrade habitat and water quality, block migration routes, or introduce non-native species into the ecosystem.

The Nisqually Reach is designated critical habitat for this species.

3.5.2 Chinook Salmon (*Oncorhynchus tshawytscha*)

NMFS FEDERAL STATUS: Threatened

EVOLUTIONARY SIGNIFICANT UNIT: Puget Sound

The Chinook salmon, also known as King salmon, are the largest of the Pacific salmon. They are an anadromous species that spends their life at sea and returns to freshwater to spawn. They tend to spawn in high water flow, mainstem streams, and large rivers on both sides of the Cascade Range. These fish usually run in the spring and summer runs due to their long migration routes. Fall runs usually are found closer to the ocean and use smaller coastal streams, but all fish reach their grounds by fall, in time to spawn. Fry rear in freshwater for up to one year (WDFW, 2022b). Juveniles feed on crustaceans and terrestrial insects, while adults feed on fish and squid.

Puget Sound was once home to larger populations of this species and other salmon species with greater diversity than populations today. The remaining population in this evolutionary significant unit are at 10% of their historic numbers. Only 22 of 37 populations remain in the Puget Sound ecosystem (EPA 2021).

Factors that could impact survival of this species include harvest rates, habitat loss and degradation, hatchery influence, dams that impede migration routes, and a low resilience to climate change.

The Nisqually Indian Tribe are in a partnership for recovery of this species. They are working with all levels of government and stakeholders to restore healthy salmon runs and provide cultural, economic, and environmental benefits (NMFS, 2007).

Puget Sound is considered EFH for this species.

3.5.3 Steelhead (*Oncorhynchus mykiss*)

NMFS FEDERAL STATUS: Threatened

DISTINCT POPULATION SEGMENT: Puget Sound

This distinct population segment includes naturally spawned anadromous fish that originated below natural and manmade impassable barriers from rivers flowing into Puget Sound from the Elwha River, and from artificial programs (NOAA, 2022b).

This species is born in freshwater streams and spends up to the first three years of life there. Migration to the ocean occurs where they spend an additional one to four growing seasons, where they then return to the native freshwater stream to spawn. Steelhead spawn in the spring in clean gravel with swift water.

Not all steelhead die after spawning, like other salmon species, some return to the ocean and spawn again. Fry spend one to five years in freshwater and migrate downstream to disperse offshore (BC 2022). Juveniles feed on insects and crustaceans and occasionally salmon eggs. In the ocean, they feed on fish, amphipods, and squid.

Factors that could impact survival of this species include harvest rates, habitat loss and degradation, hatchery influence, dams that impede migration routes, and a low resilience to climate change.

This species is also part of the Puget Sound Recovery Domain, in which the Nisqually Indian Tribe is in partnership for recovery of this species.

Woodland Creek is designated critical habitat for this species.

3.5.4 Coho Salmon (Oncorhynchus kisutch)

NMFS FEDERAL STATUS: Protected

The coho salmon is an anadromous species found throughout the North Pacific Ocean and in most coastal streams and rivers from Alaska to central California. They hatch in freshwater and spend a year in streams and rivers then migrate to saltwater to grow and feed. They tend to spawn in fall or early winter around the age of three or four. This species dies after spawning. In freshwater they prey on plankton and insects, in saltwater they prey on small fish. Adults sometimes eat juveniles of other salmon species (NOAA 2022c).

Factors that could impact survival of this species include changes in ocean and climatic conditions, habitat loss from urban development and dam construction, and degraded water quality for agriculture and logging.

Puget Sound is considered EFH for this species.

3.5.5 Pink Salmon (*Oncorhynchus gorbuscha)*

NMFS FEDERAL STATUS: Not Listed

AREA: Puget Sound

The global population of this species remains steady, hence why it is not federally listed. This species is the smallest salmon in the Pacific salmon family and is also referred to as Humpback salmon. During spawning males develop a hump on their back. They have a regular life history, living two years before returning to spawn, therefore Washington runs only occur every other year. Pink salmon use mainstems of larger rivers and some tributaries, close to saltwater, because once they spawn their fry immediately go to saltwater (WDFW, 2022a). They feed on small fish, insects, squid, and crustaceans (USFWS, 2022c).

Puget Sound is considered EFH for this species. Due to the need for this species to be in close proximity to saltwater, they are unlikely to occur in Woodland Creek near the Action Area.

Section 4 | Effects of the Action

4.1 DETERMINATION OF EFFECT

Based on guidance provided by the ESA Section 7 Effects Determination Guidance, possible effects determinations for the Proposed Action include:

No effect: The proposed action will not affect the listed species or critical habitat.

May affect but is not likely to adversely affect: The proposed action will affect a listed species in a way that is discountable, insignificant, or completely beneficial. Discountable effects are extremely unlikely to occur; insignificant effects are impacts small enough that they never reach the scale where a take occurs, and completely beneficial effects are positive effects without any adverse effects to the species.

May affect and is likely to adversely affect: The proposed action will either directly or indirectly, or through its interrelated and interdependent actions, adversely affect a listed species.

These guidelines were used in determining conclusions of this BA/EFHA and are discussed for the listed species, critical habitat, and EFH below.

4.2 CRITICAL HABITAT AND ESSENTIAL FISH HABITAT

There are no aquatic features within the Action Area; therefore, the Proposed Action would not directly impact critical habitat for fish, or EFH. The Action Area is located within the Woodland Creek Watershed. Woodland Creek is located approximately 3,500 feet west of the Action Area and is designated critical habitat for the threatened Steelhead (*Oncorhynchus mykiss*), and designated EFH for coho/Puget Sound steelhead and pink salmon species. The nearest critical habitat and EFH to the Action Area are described further in **Section 3.4**. Indirect effects to critical habitat and EFH within Woodland Creek are discussed below.

Water Quality

Construction

Ground disturbing activities during construction could lead to erosion which could increase sediment discharges to surface waters during storm events. As a conservation measure (see **Section 4.5**) and in accordance with the Clean Water Act, the Tribe would obtain coverage under the National Pollution Discharge Elimination System General Construction Permit, requiring the implementation of a Stormwater Pollution Prevention Plan and best management practices (BMPs) during construction to prevent contaminated run-off from entering any off-site waters. The BMPs within the Stormwater Pollution Prevention Plan (SWPPP) would minimize adverse impacts to the local and regional watershed from construction activities associated with the Proposed Action by reducing erosion, reducing the risk of soil contamination from construction materials (e.g., fuel, fertilizer, paint), and by preventing movement of loose soil into waterways. In addition, dust suppression BMPs would further prevent fugitive dust or loose soil from dispersing offsite. With implementation conservation measures, construction activities associated with Proposed Action would have **no effect** on water quality in critical habitat for fish and EFH.

Stormwater Run-off during Operation

Currently, all stormwater within the Action Area infiltrates into the ground and no stormwater currently leaves the Action Area. The Proposed Action will result in an increase of impervious surfaces which would result in increased peak flows and increased total discharge from the Action Area during precipitation events. If not properly managed, this could increase stormwater flows to area drainage systems and cause localized flooding. However, as described in **Section 1.3.1**, the Proposed Action includes a stormwater system that will be installed to collect, treat, detain, and convey runoff throughout the Action Area that would also prevent flooding and other adverse effects related with runoff. This stormwater system was designed to be consistent with the standards in the City of Lacey Stormwater Design Standards Manual based on Section 5.03 and Volume V of the Stormwater Management Manual for Western Washington and will consist of a series of bioretention facilities and infiltration facilities throughout the Action Area to manage the new runoff generated as a result of the development. By detaining runoff in the infiltration areas after treatment in the bioretention facilities, stormwater would infiltrate into the ground and no runoff would leave the Project Site.

The bioretention facilities described in **Section 1.3.1** and **Attachment A** would provide treatment and filtrations for pollution generating hard-surfaces and the adjacent landscape before being discharged into an infiltration facility. Multiple types of pollutants would be treated from this stormwater, including 6PPD-Quinone (6PPD). 6PPD is a component that is used to reduce the rate or deterioration of tires and when 6PPD reacts with ozone, it transforms into multiple chemicals that includes 6PPDQuinone, a toxic chemical responsible for salmon mortality. Stormwater from all low pollution generating areas, such as rooftops, would be discharged directly into the infiltration facilities. These design features would reduce the potential of pollutants to enter the environment during operation. With development of the on-site stormwater treatment, detention and infiltration system described in **Attachment A**, the Proposed Action would have **no effect** on water quality in critical habitat and EFH.

Wastewater Treatment and Disposal

Wastewater Treatment Option 1 – Off-site Wastewater Treatment

Wastewater generated under the Proposed Action would be transported to the LOTT wastewater treatment system to be treated and disposed of. Therefore, the Proposed Action Wastewater Treatment Option 1 would have **no effect** to groundwater quality or surface water quality in critical habitat and EFH.

Wastewater Treatment Option 2 – On-site Wastewater Treatment

Under Wastewater Treatment Option 2, wastewater produced by the Proposed Project would be treated onsite through a wastewater treatment system. As described in **Section 1.3.2**, this system would treat wastewater to Class A reclaimed water standards and the treated effluent would be discharged either via on-site ponds and infiltration basins or a groundwater injection well. As effluent would meet Class A standards, no significant reduction in the quality of groundwater or surface water is anticipated. Disposal of treated effluent in a groundwater injection well would require authorization under the USEPA's Underground Injection Control (UIC) program as a Class V injection well. The UIC program is authorized under the Federal Safe Drinking Water Act and prohibits any injection that may cause of violation of any primary drinking water regulation. Compliance with the federal regulations and guidelines for Class V injection wells would ensure potential impacts to surface water and groundwater resources from wastewater treatment and disposal activities associated with the Proposed Action would be less than significant. Therefore, the Proposed Action Wastewater Treatment Option 2 would have **no effect** to groundwater quality or surface water quality in critical habitat and EFH.

Summary

As outlined above, the Proposed Action would have **no effect** to water quality in EFH and critical habitat for listed fish species.

Surface Water and Groundwater Resource Availability

The Action Area is located within the Woodland Creek Watershed. Groundwater-fed springs maintain year-round base flow in Woodard Creek and Woodland Creek (Ecology, 2022). Therefore, effects to groundwater could impact flows in Woodland Creek.

The Proposed Action has the potential to impact groundwater and surface water levels through the use of approximately 363,129 gpd of water (or 226,750 gpd if reclaimed water is used) for the proposed development. Potential effects under each option for water supply are described below.

Option 1 – Off-site Water Supply

As described in **Section 1.3.2**, under Water Supply Option 1 off-site domestic water supply would be provided to the Action Area by extending the City's existing water main. The City has sufficient water rights granted by the State to accommodate the Proposed Action while still having excess water rights that are currently unutilized. The Proposed Action includes a stormwater system that would detain all runoff in infiltration areas where treated stormwater would infiltrate into the ground, recharging groundwater aquifers similar to existing conditions. Additionally, if wastewater generated by the Proposed Action is treated at one of the LOTT reclamation plants, treated effluent would be discharged to the Hawks Prairie Ponds or Woodland Creek Groundwater Recharge Facility, thereby further increasing regional groundwater recharge. Thus, the Proposed Action Water Supply Option 1 would have **no effect** on critical habitat and EFH in Woodland Creek.

Option 2 – On-site Water Supply and Wastewater Treatment

As described in **Section 1.3.2**, Water Supply Option 2 would include development of an on-site water treatment plant and two 928-gpm groundwater wells, with one well serving as the primary well and the second one providing redundancy. Under Wastewater Option 2, reclaimed water produced by the WWTP would be used to offset the potable water demands of the project, resulting in a water demand of 226,751 gpd. The proposed wells would be constructed with a 100-foot sanitary control area to be consistent with Washington Department of Health guidelines (WAC 246-290-135). The ability of the local aquifers to provide an adequate water supply has been assessed in a hydrogeological report. Based on information from surrounding wells in the aquifer, the hydrogeologic report determined that the undifferentiated sediments (TQu) aquifer would be able to support the 928-gpm needed for the Proposed Action.

Because groundwater-fed springs maintain year-round base flow in Woodland Creek, groundwater pumping on the Project Site could impact Woodland Creek and its tributaries, resulting in a potentially significantly impact to critical fish habitat and EFH. Some of this impact would be offset by the discharge of surplus treated wastewater produced by the on-site WWTP to on-site ponds and infiltration basins or groundwater injection well. The resulting average net impact to groundwater supplies would be approximately 152,000 gpd (226,751 gpd of water demand less 75,115 gpd of treated wastewater discharge). Proposed conservation measures presented in **Section 4.5** would ensure that the development of a groundwater well at the Project Site would not adversely impact water levels in Woodland Creek. As described above, the Proposed Project includes a stormwater system that would detain all runoff in infiltration areas where treated stormwater would infiltrate into the ground, recharging groundwater aquifers similar to existing conditions. Thus, with the implementation of conservation measures, the

Proposed Action Water Supply Option 2 **may affect but would not adversely affect**, critical habitat and EFH in Woodland Creek.

4.3 FEDERALLY LISTED FISH SPECIES

Suitable habitat for protected fish species does not occur within the Action Area as it lacks aquatic features. Based on biological desktop review, federally listed bull trout, Chinook salmon, steelhead, coho salmon, and pink salmon have the potential to occur in Woodland Creek, Nisqually Reach, and/or Puget Sound. As described in **Section 4.2**, the Proposed Action could result in indirect effects to off-site water quantity in Woodland Creek from the use of groundwater under Option 2 for water supply. With the conservation measures listed in **Section 4.5**, and bioretention and infiltration facilities incorporated into project design, the Proposed Action **may affect but is not likely to adversely affect** federally listed bull trout, Chinook salmon, steelhead, coho salmon, and pink salmon.

4.4 INTERRELATED AND INTERDEPENDENT EFFECTS

Interrelated and interdependent effects are direct or indirect effects that occur as a result of activities that are closely affiliated with a project in areas outside the Action Area. Such actions include road or utility improvements off-site that would not be constructed but for implementation of the Proposed Action.

Implementation of the Proposed Action would involve the construction of off-site access improvements, and traffic mitigation, and may involve off-site improvements for the extension of water supply, wastewater collection and/or electrical/natural gas utilities to the Project Site.

Off-site Improvements

Access Improvements

Off-site access improvement areas are shown in **Figure 5**, and generally include 1) an extension of Main Street NE from its current termination point in the east to join a new onsite roadway that eventually connects to the existing Gateway Boulevard NE and Main Street NE in the west. Part of this new roadway connection would go through the adjacent Nisqually Owned Property and 2) a new intersection on Maine Street NE in the eastern part of the Action Area that would join a proposed onsite roadway to connect to Access 3. Access 3 is an existing limited access right-in/right-out entrance located at the intersection of Marvin Rd NE and Nisqually Markets Tobacco Outlet on the southeastern corner of the Action Area. All access improvements would take place within land owned by the Tribe, or dedicated rights-of-way held by the City.

Traffic Mitigation

There are two off-site traffic mitigation measures that would occur:

- Installation of a roundabout in place of the two-way stop-controlled existing traffic control at Eastern Parkway NE/Britton Parkway NE with the northbound approach serving as the Project Site access.

- Restrict the northbound and southbound left movements at the existing two-way stop-controlled intersection at Britton Parkway NE/Western Parkway NE with the northbound approach serving as Project Site access.

All traffic mitigation measures will be installed within previously disturbed dedicated road rights-of-way held by the City. Adherence to federal and state environmental regulations during construction of the improvements would avoid any potentially significant indirect effects from off-site intersection improvements.

Optional Off-site Water, Wastewater and Energy Infrastructure Improvements

Implementation of the Proposed Action may involve improvements to off-site water supply, wastewater collection, and energy infrastructure. Areas for off-site water and wastewater improvements are shown on **Figure 8**. Construction of improvements would take place entirely within previously disturbed areas and roadways devoid of habitat for wildlife, fish, or native plants, with the exception of one optional segment of a sewer pipeline that would extend through land owned by the Tribe. Once construction is complete, the pipeline/utility corridors and infrastructure pads will be repaved and restored to pre-existing conditions.

Terrestrial Habitat Effects

Off-site access and utility improvements would occur within land owned by the Tribe and as such, these areas have been subject to recent surveys for biological resources, including special status species and wetlands. The proposed off-site access improvement areas, and anticipated traffic mitigation and utility improvements, would take place entirely within previously disturbed areas, including dirt roadways, paved roadways and road shoulders. These areas do not contain Critical Habitat, EFH, or Waters of the U.S. Once construction is complete, disturbed areas will be paved or revegetated to prevent erosion. A discussion of potential effects associated with water quality and associated impacts to fish is provided below.

Water Quality and Fish Habitat

The construction of the off-site roadway improvements or utility trenching would require grading and the introduction of fill material to extend the roadbed to provide for the additional facilities. The increase of impervious surfaces and additional cut and fill embankments could result in an increase in surface water runoff and erosion of soils that could affect water quality and soil resources. Additionally, water quality could be impacted as a result of construction and roadway pollutants, such as grease and oil. Stable fill material, engineered embankments, and erosion control features would be used to reduce the potential for slope instability, subsidence and erosion. In accordance with the federal CWA, off-site improvements would be required to comply with the NPDES General Construction Permit Program. To comply with the program, a SWPPP would be developed that would include soil erosion and sediment control practices to reduce the amount of exposed soil, prevent runoff from flowing across disturbed area, slow runoff from the site, and filter sediment from the runoff. With standard construction practices and specifications required by the NPDES permit program, and local requirements, including the City of Lacey Municipal Code Chapter 14.27, which includes provisions intended to manage stormwater runoff from construction and development sites, and WSDOT *Temporary Erosion and Sediment Control Manual* (WSDOT, 2019b), the off-site roadway improvements or utility trenching would result in less-than-significant effects associated with erosion and water quality during construction.

The effects to runoff volumes resulting from the increase in impervious roadways are expected to be minimal due to the limited extent of the improvements in comparison to the existing roadways. Some existing stormwater drains, and ditches may be relocated along roadways to provide space for improvements. Stormwater collection and detention facilities will be designed and installed in accordance with applicable local requirements, including the City's Municipal Code Chapter 14.27, which includes provisions intended to control stormwater runoff generated by development, redevelopment, construction sites, or modifications to existing stormwater systems, or the WSDOT *Highway Runoff Manual* (WSDOT, 2019a) to accommodate the increase in impervious surfaces resulting from the off-site roadway improvements or utility trenching. With incorporation of these drainage features, effects to water quality and fish habitat would be less than significant.

4.5 PROPOSED CONSERVATION MEASURES

The following conservation measures will be implemented as part of the Proposed Action to avoid or minimize potential adverse impacts to the environment, critical habitat, essential fish habitat, and federally listed fish species.

- The Tribe shall apply for coverage under and comply with the National Pollutant Discharge Elimination System (NPDES) General Construction Permit from the USEPA, for construction site runoff during the construction phase in compliance with the Clean Water Act (CWA). A SWPPP shall be prepared, implemented, and maintained throughout the construction phase of the development, consistent with General Construction Permit requirements. The SWPPP prepared for the Project Site would include, but would not be limited to, the following BMPs to minimize storm water effects to water quality during construction:
    - To the extent feasible, grading activities shall be limited to the immediate area required for construction.
    - Temporary erosion control measures (such as silt fences, fiber rolls, vegetated swales, a velocity dissipation structure, staked straw bales, temporary re-vegetation, rock bag dams, erosion control blankets, and sediment traps) shall be employed for disturbed areas.
    - Construction activities shall be scheduled to minimize land disturbance during peak runoff periods.
    - Disturbed areas shall be paved or re-vegetated following construction activities.
    - Construction area entrances and exits shall be stabilized with large-diameter rock.
    - A spill prevention and countermeasure plan shall be developed which identifies proper storage, collection, and disposal measures for potential pollutants (such as fuel, fertilizers, pesticides, etc.) used on site.
    - Petroleum products shall be stored, handled, used, and disposed of properly in accordance with provisions of the CWA (33 USC §§ 1251 to 1387).
    - Construction materials, including topsoil and chemicals, shall be stored, covered, and isolated to prevent runoff losses and contamination of surface and groundwater.
    - Fuel and vehicle maintenance areas shall be designed to control runoff.
    - Sanitary facilities shall be provided for construction workers.
    - Disposal facilities shall be provided for soil wastes, including excess asphalt during construction.
    - Solid waste storage containers will be stored in a roofed enclosure so that runoff cannot come into contact with the waste storage containers. The storage area will be paved

with the area's grading to prevent uncontaminated stormwater from flowing into the waste storage area.
    - To minimize dust generation during construction, soil will be wetted down with water prior to ground disturbance. All generated waste must be properly disposed of.
    - Loose aggregate chunks and dust will be swept or shoveled and collected (not hosed down a storm drain) for recycling or proper disposal.
    - Wheel wash or rumble strips and sweeping of paved surfaces shall be used to remove any and all tracked soil.
    - Low impact development (LID) methods (i.e. bioswales) shall be implemented that would help store, infiltrate, evaporate, and detain stormwater runoff.

- The following mitigation and conservation measures would be implemented to prevent water supply impacts to Woodland Creek:
    - To reduce water usage, low-flow toilets, faucets, and other water-using appliances shall be installed.
    - If the Tribe chooses to develop a groundwater well on the Project Site to provide water for the development alternative, the Tribe shall first develop a test well to determine if a well can provide an adequate and sustainable yield without significant impacts to Woodland Creek and its tributaries. A hydrogeologic study shall be conducted to evaluate the hydraulic connectivity with the applicable aquifer to assess potential impairment to Woodland Creek and determine mitigation needs.
    - If the hydrogeologic study determines that the streamflow of Woodland Creek and/or its tributaries would be impaired or depleted by use of the Tribe's groundwater well on the Project Site, a mitigation program shall be drafted and adopted by the Tribe to offset any associated losses in the streamflow of Woodland Creek and/or its tributaries. Options to offset the adverse effects of the Tribe's groundwater withdrawal include, but are not limited to the use of reclaimed water, purchase of additional water rights, or fair share payments towards groundwater offset projects within the Woodland Creek Subbasin, such as the Hicks Lake Stormwater Retrofit or Managed Aquifer Recharge Project included in the WRIA 13 Watershed Restoration and Enhancement Plan.

Section 5 | Conclusions

There are no aquatic features within the Action Area; therefore, the Proposed Action would not directly impact listed fish species, critical habitat for fish, or EFH. The Action Area is located within the Woodland Creek Watershed. Woodland Creek is located approximately 3,500 feet west of the Action Area and is designated critical habitat for the threatened Steelhead (*Oncorhynchus mykiss*), and designated EFH for coho/Puget Sound steelhead and pink salmon species. The Proposed Action may indirectly impact aquatic habitat in Woodland Creek. Currently, all stormwater within the Action Area infiltrates into the ground and no stormwater currently leaves the Action Area. The Proposed Action includes a stormwater system that will be installed to collect, treat, and infiltrate stormwater run-off; stormwater will not leave the Action Area during construction and operation and will not impact critical habitat, EFH, or federally listed bull trout, Chinook salmon, steelhead, coho salmon, and pink salmon. The Action Area is located within the Woodland Creek Watershed; Woodland Creek has been a contentious focus of modeled impacts from groundwater withdrawals. Groundwater use associated with the Proposed Action Water Supply Option 2 is likely to impact Woodland Creek. With the implementation of conservation measures, Proposed Action **may affect but is not likely to adversely affect** critical habitat, EFH, or federally listed bull trout, Chinook salmon, steelhead, coho salmon, and pink salmon.

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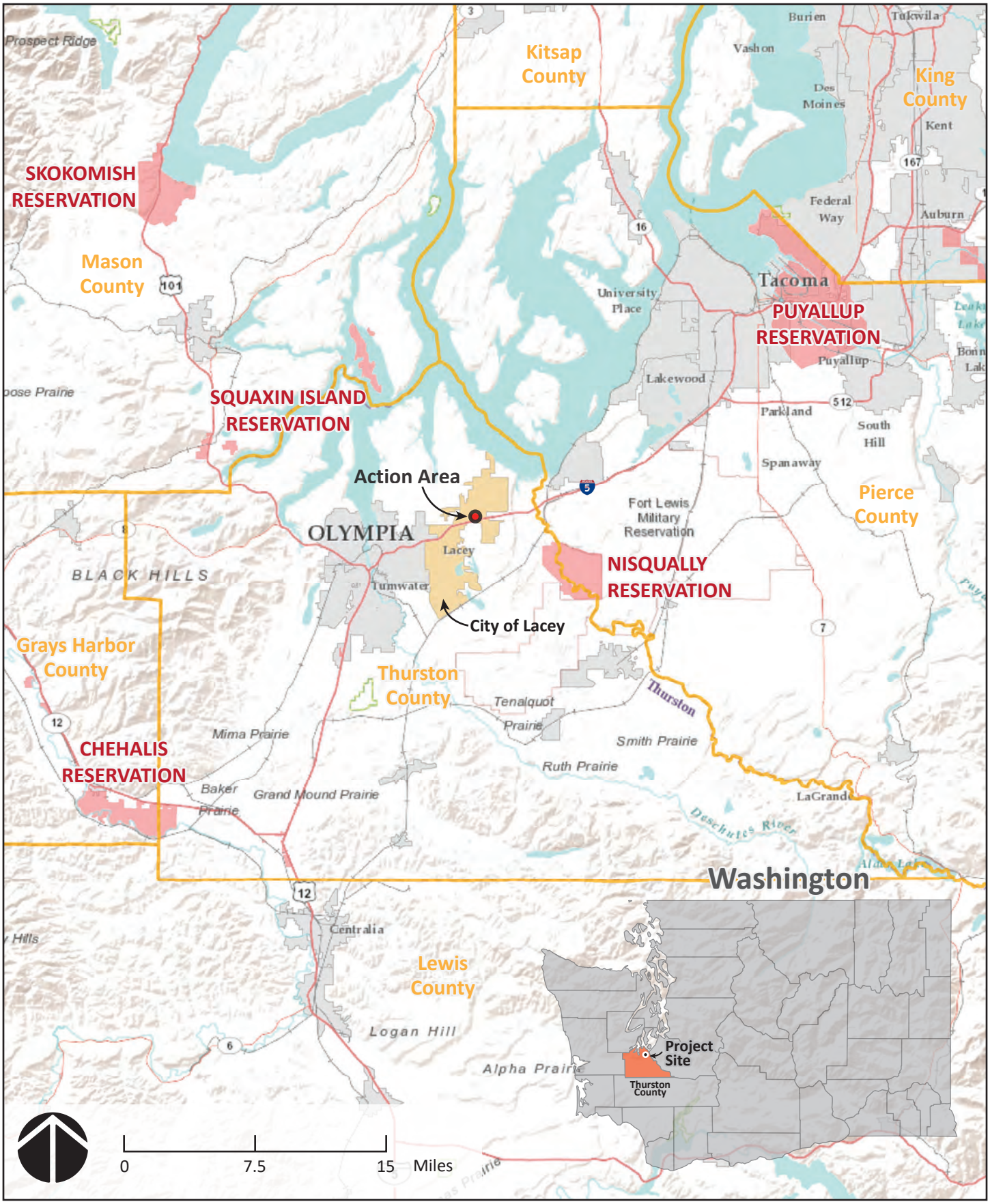
Section 7 | Preparers

This section lists the preparers of this BA/EFHA as shown in **Table 7-1**.

Table 7-1: List of Preparers

Name	Qualifications	Participation
Acorn Environmental		
Ryan Sawyer, AICP	BA; 17 years if experience; certified environmental planner by the American Institute of Certified Planners	Project Director
Jennifer Wade	BA; 17 years of experience	Senior Environmental Analyst
Kimberly Fuchs	BS; 18 years of experience	Senior Environmental Analyst
Oakum Solutions LLC		
Jeremy Huey	MS; 10+ years of experience	GIS Principal/Owner
Montrose Environmental Solutions		
Kathleen Sholty	BS, MS; 8 years of experience	Senior Biologist
Amy Gondran	BS, MS; 5+ years of experience	Biologist

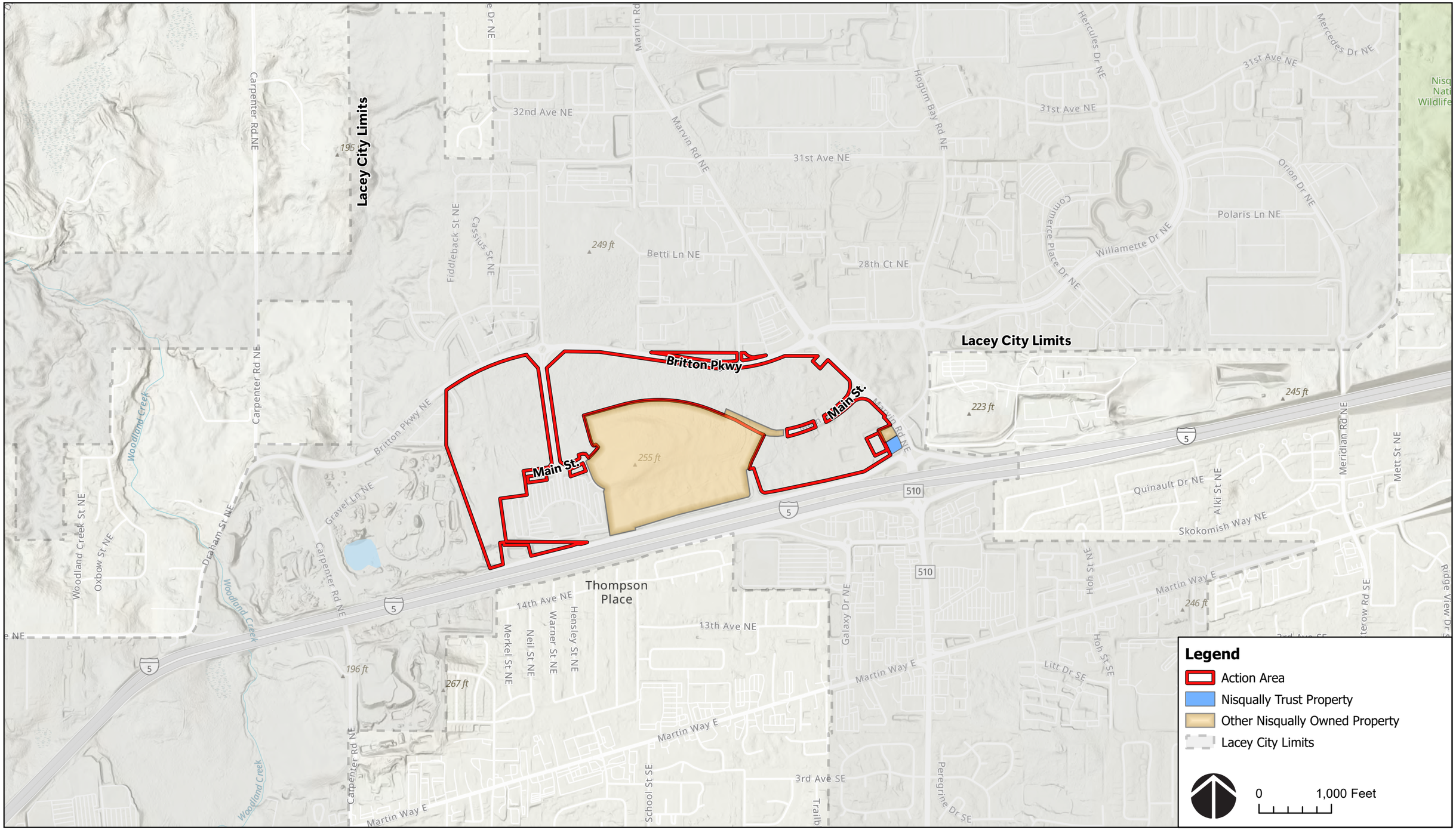
Figures



Source: ESRI, USGS, NOAA

FIGURE 1

REGIONAL LOCATION



SOURCE: Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI and the GIS User Community, Esri Community

FIGURE 02

SITE AND VICINITY

01. GENERAL COMMERCIAL RETAIL
02. GOLF ENTERTAINMENT FACILITY
03. CAR DEALERSHIP
04. PARKING
05. WELL SITE
06. HOTEL (LIMITED SERVICE)
07. FAMILY ENTERTAINMENT
08. MULTI-FAMILY RESIDENTIAL
09. MULTI-FAMILY RESIDENTIAL
10. CULTURAL VILLAGE
11. UPSCALE GROCERY
12. NEIGHBORHOOD RETAIL
13. NEIGHBORHOOD RETAIL
14. TRAVEL CENTER
15. EXISTING CABELA'S N.I.S.

NISQUALLY TRUST PROPERTY
OTHER NISQUALLY OWNED PROPERTY
EXISTING ROAD
ACTION AREA

0 500 Feet

FIGURE 3

COMMERCIAL-HEAVY MIXED USE DEVELOPMENT PROJECT STIE PLAN

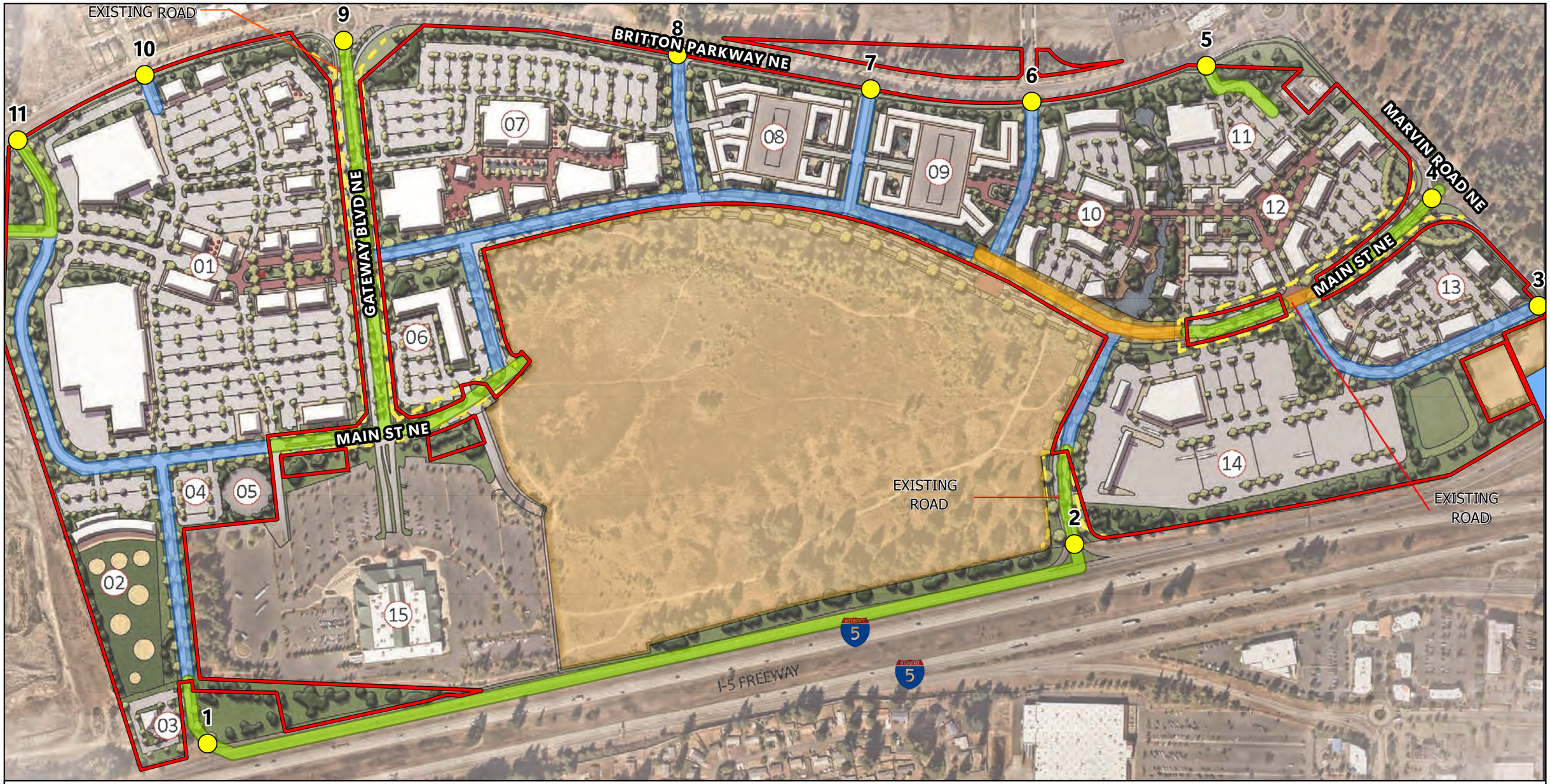
01. SCHOOL
02. BALL FIELDS
03. BALL FIELDS
04. GOLF ENTERTAINMENT FACILITY
05. CAR DEALERSHIP
06. PARKING
07. INDOOR RECREATION
08. HOTEL (LIMITED SERVICE)
09. CULTURAL VILLAGE
10. MULTI-FAMILY
11. MULTI-FAMILY
12. UPSCALE GROCERY
13. FAMILY ENTERTAINMENT
14. NEIGHBORHOOD RETAIL
15. CONVENIENCE STORE
16. UNDEVELOPED / PARK
17. EXISTING CABELLA'S N.I.S.

ACTION AREA
NISQUALLY TRUST PROPERTY
OTHER NISQUALLY OWNED PROPERTY
EXISTING ROAD

0 500 Feet

FIGURE 4

RECREATION-HEAVY MIXED-USE DEVELOPMENT PROJECT SITE PLAN



01. GENERAL COMMERCIAL RETAIL
02. TOP GOLF
03. CARVANA
04. PARKING
05. WELL SITE
06. HOTEL (LIMITED SERVICE)
07. FAMILY ENTERTAINMENT
08. MULTI-FAMILY RESIDENTIAL
09. MULTI-FAMILY RESIDENTIAL
10. CULTURAL VILLAGE
11. UPSCALE GROCERY
12. NEIGHBORHOOD RETAIL
13. NEIGHBORHOOD RETAIL
14. TRUCK STOP
15. EXISTING CABELA'S N.I.S.

NISQUALLY TRUST PROPERTY
OTHER NISQUALLY OWNED PROPERTY
EXISTING ROAD
ACTION AREA
EXISTING ROADWAY
ONSITE IMMPROVEMENTS
OFFSITE IMPROVEMENTS
ACCESS LOCATIONS

0 500 Feet

FIGURE 5

PROPOSED ACCESS IMPROVEMENTS

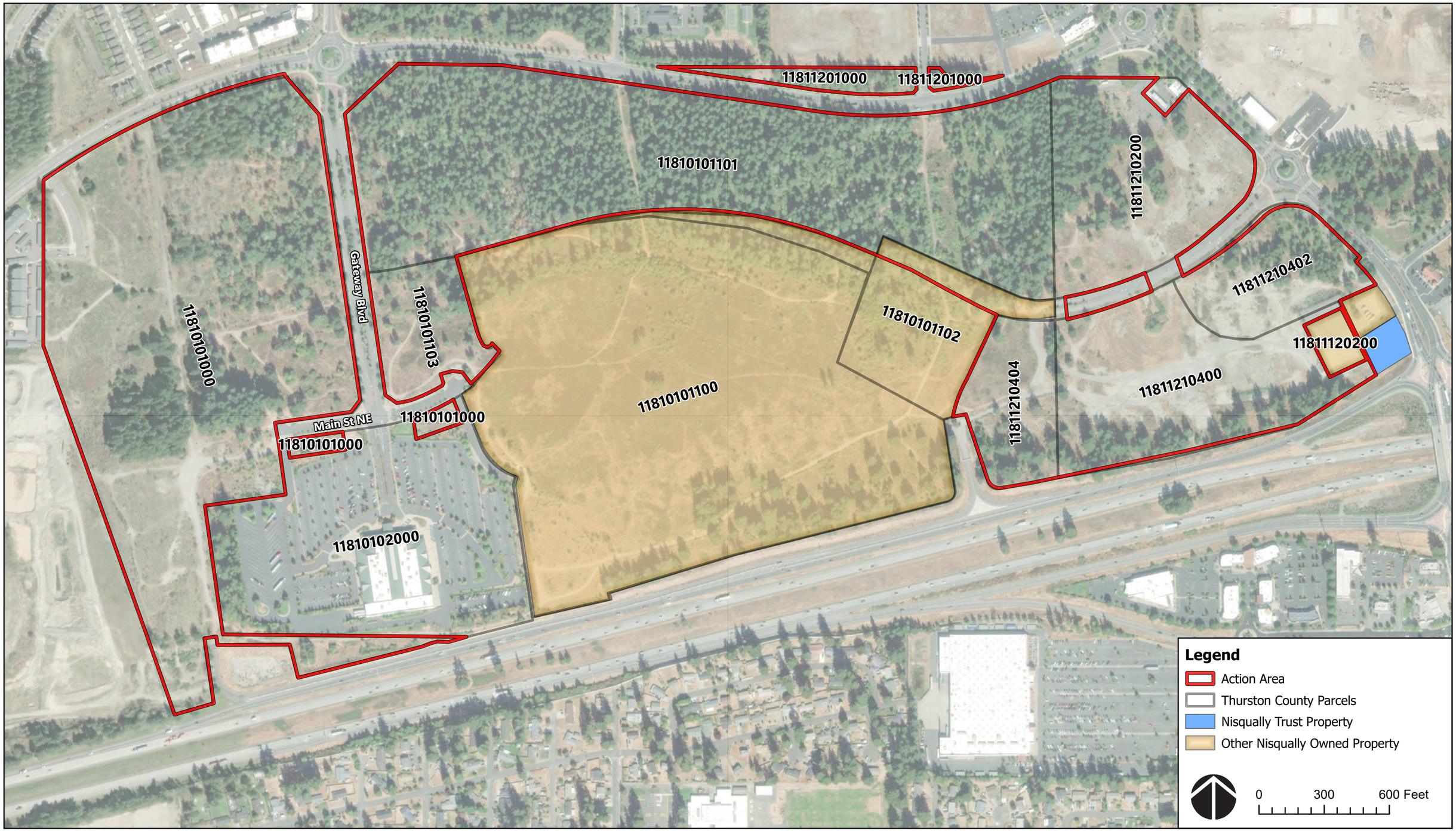


FIGURE 6

AERIAL PHOTOGRAPH

BRITTON PARKWAY NE

MARVIN ROAD NE

GATEWAY BOULEVARD

MAIN STREET

MAIN STREET

INTERSTATE 5

CABELA'S

EXIST. STORMWATER FACILITY

BIORETENTION FACILITY (TOTAL AREA SHOWN) THIS WILL ULTIMATELY CONSIST OF MULTIPLE SMALLER FACILITIES DISPERSED THROUGHOUT THE SITE (TYP.)

INFILTRATION FACILITY (TOTAL AREA SHOWN) THIS MAY ULTIMATELY CONSIST OF MULTIPLE SMALLER FACILITIES DISPERSED THROUGHOUT THE SITE (TYP.)

C1 C2 C3 C4 C5 C6 C7 C8 C9

TOTAL INFILTRATION TRENCH AREA REQUIRED

TOTAL BIORETENTION CELL AREA REQUIRED

0 500 1,000 Feet

Catchment #	Total Area (Acre)	Impervious Area (SF)	Landscape Area (SF)	Bioretention Area Required (SF)
C1	19.21	15.37	3.39	12,200
C2	19.53	15.63	3.45	12,400
C3	15.75	12.80	2.78	10,000
C4	27.56	22.05	4.86	17,500
C5	7.32	5.65	1.29	4,700
C6	24.20	19.36	4.27	15,400
C7	5.53	4.43	0.98	3,600
C8	21.18	16.95	3.74	13,500
C9	7.62	6.09	1.34	4,900

Table 5: Bioretention Treatment Area Required (total)

Catchment #	Total Area (Acre)	Impervious Area (SF)	Landscape Area (SF)	Infiltration Trench Area Required (SF)
C1	22.60	19.21	3.39	43,600
C2	22.98	19.53	3.45	44,300
C3	18.53	15.75	2.78	35,700
C4	32.42	27.56	4.86	62,500
C5	8.61	7.32	1.29	16,600
C6	28.47	24.20	4.27	54,900
C7	6.51	5.53	0.98	12,600
C8	24.92	21.18	3.74	48,000
C9	8.96	7.62	1.34	17,300

Table 7: Stormwater Infiltration Facility Dimensions (1925sf/ac)

FIGURE 7

PRELIMINARY DRAINAGE

EXISTING PUMP STATION #49

EXISTING 24" SANITARY SEWER LINE

EXISTING 24" SANITARY SEWER LINE

EXISTING SANITARY SEWER FORCE MAIN FROM PUMP STATION #49

EXISTING 15" SANITARY SEWER MAIN

FUTURE PLANNED WATER LINE EXTENSION

EXISTING 16" WATER LINE

WATER SOURCE AND TREATMENT

PROJECT BOUNDARY

AUTO DEALERSHIP

WASTEWATER TREATMENT PLANT

INTERSTATE 5

BRITTON PARKWAY

MAIN STREET

GENERAL COMMERCIAL

FAMILY ENTERTAINMENT

APARTMENTS

CULTURAL VILLAGE / WORK

UPS-GALE GROCERY

HOTEL

DRIVING RANGE

TRUCK STOP

QUINAULT VILLAGE

ALTERNATIVE 1 WATER/WASTEWATER PLANT LOCATIONS

SCALE: NTS
DATE: 08/01/2022
ISSUED BY: SGB
JOB NO. A10367.01.01
DWG NO. A3.0

Legend

- POTENTIAL OFFSITE WATER IMPROVEMENT AREA
- OFFSITE WATER CONNECTION POINT
- EXISTING WATER LINE
- POTENTIAL OFFSITE WASTEWATE IMPROVEMENT AREA
- OFFSITE WASTEWATER CONNECTION POINT
- EXISTING WASTEWATER LINE

0 500 1,000 Feet

FIGURE 8

OFF SITE WATER AND WASTEWATER OPTION

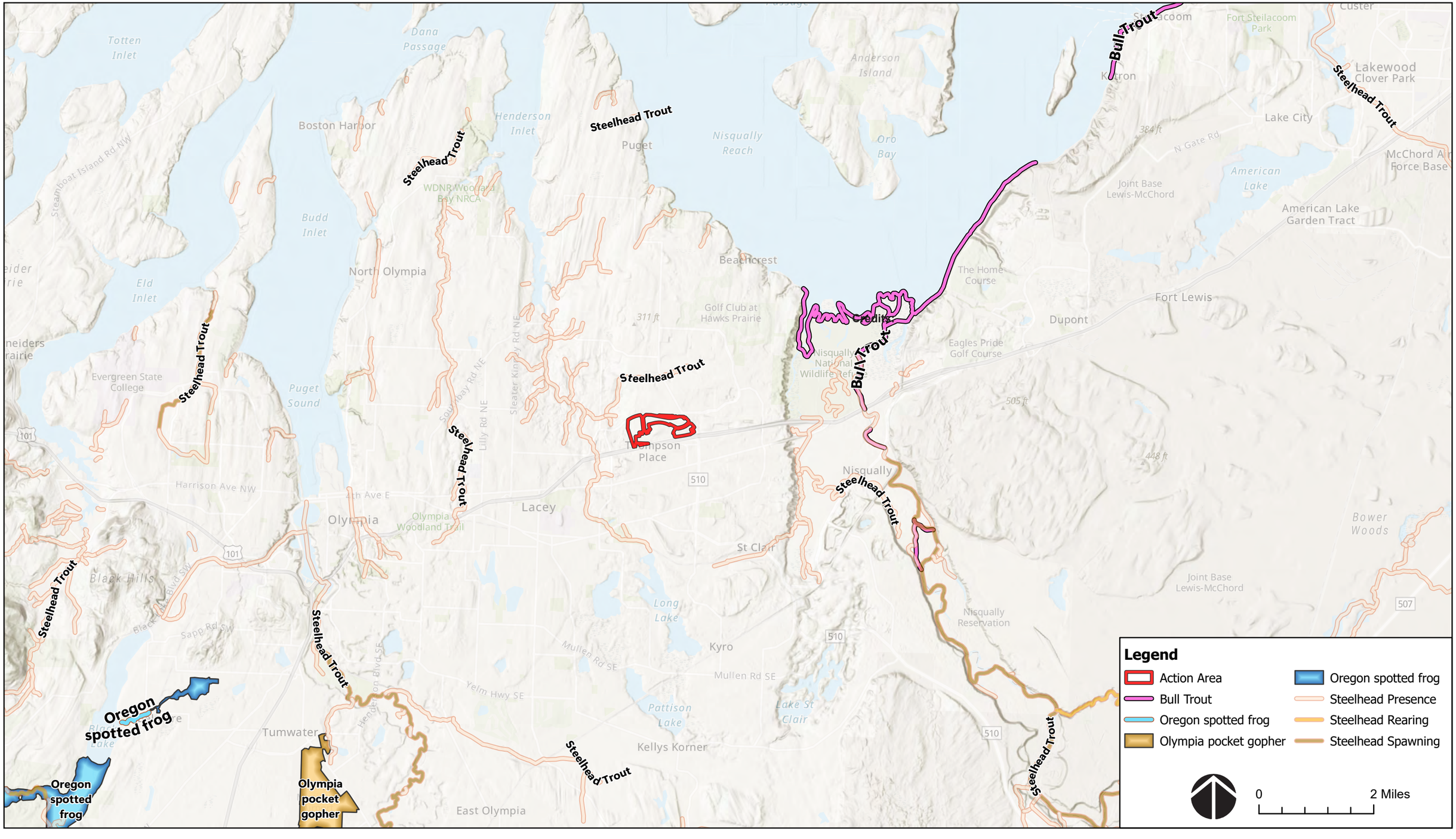
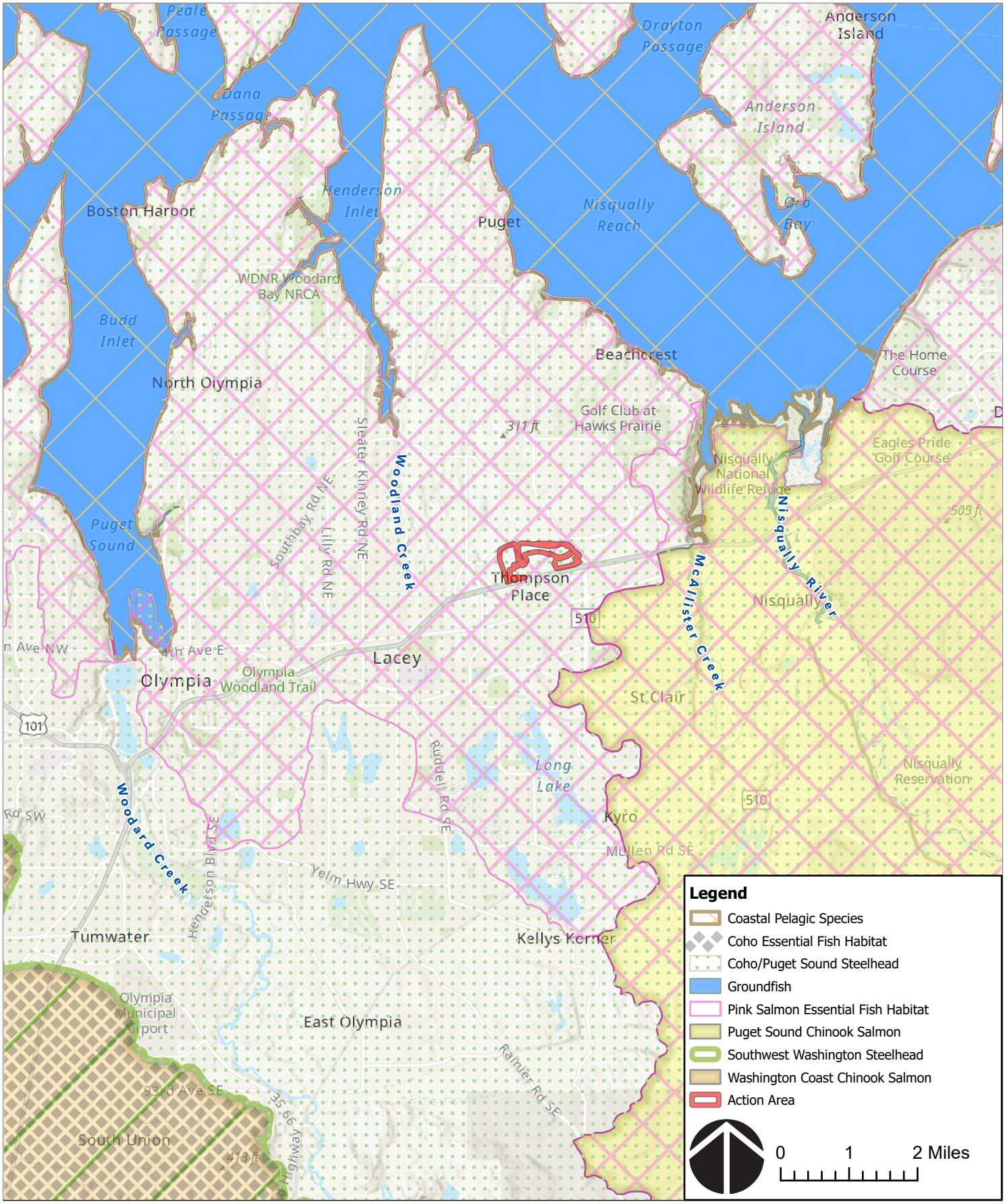


FIGURE 9

CRITICAL HABITAT



Source: ESRI World Imagery

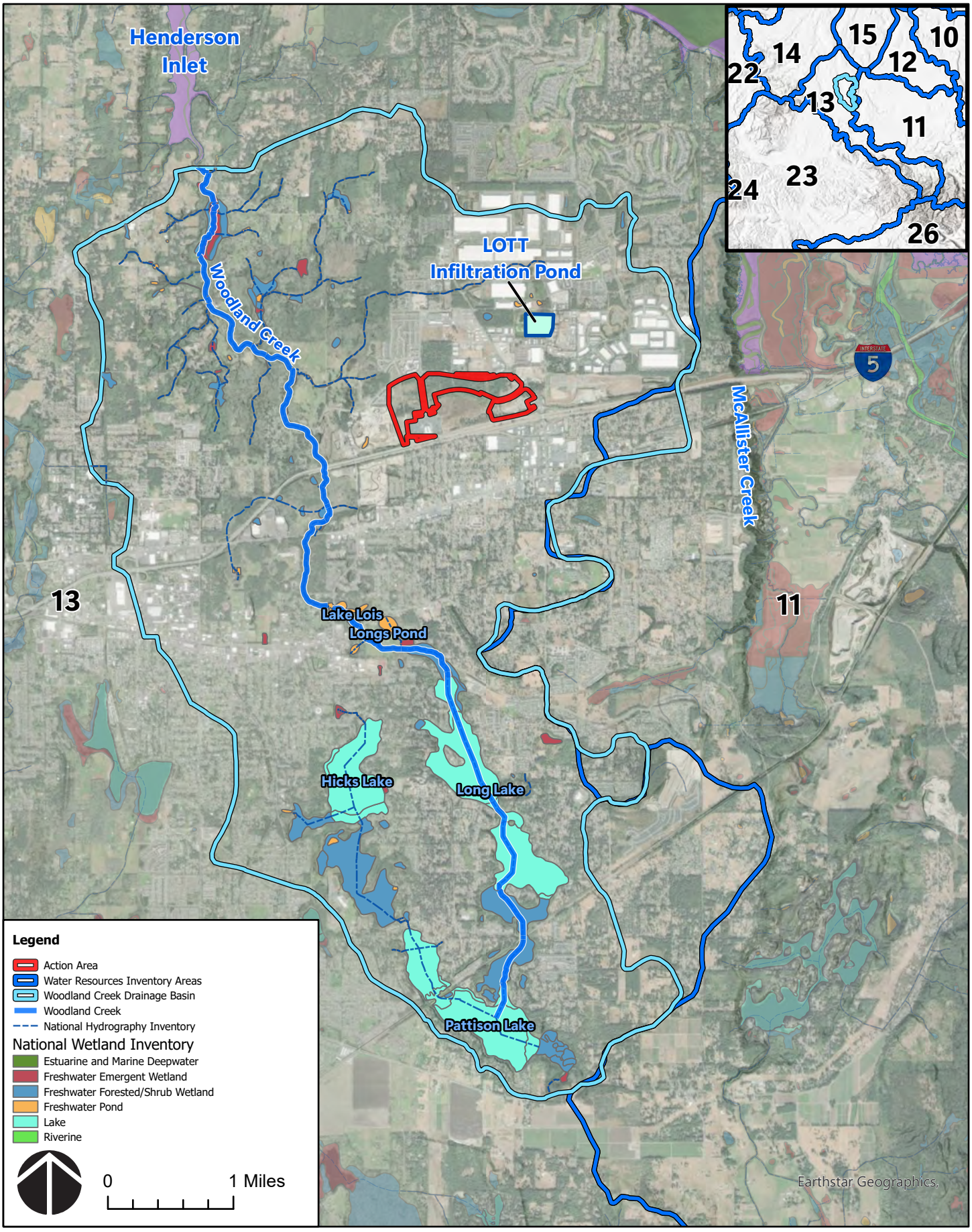
FIGURE 10

ESSENTIAL FISH HABITAT

Source: ESRI World Imagery

FIGURE 11

HABITAT TYPES



Source: ESRI World Imagery

Exhibit 12

SURFACE WATER FEATURES

Attachment A

Stormwater and Grading Strategies

STORMWATER AND GRADING STRATEGIES

Quiemuth Village

Address:

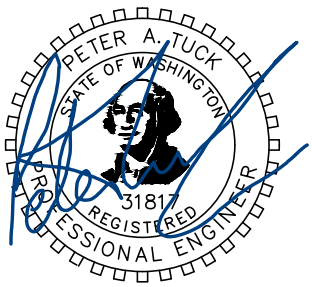
Prepared for: Acorn Environmental
5170 Golden Foothill Parkway | El Dorado Hills, CA 95762

Submitted by: Olson Engineering Inc.

Compiled by: Gregory Oehley, PE

Reviewed by: Peter Tuck, PE

June 1st, 2023
Job No. A10367



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Appendix F Geotech Report by GeoResources LLC, dated Sept. 2013 .....
Geotech Report by Haley Aldrich, dated Sept. 2022 .....

Appendix F CP-1.0 Pre-developed Catchment Plan .....
CP-2.0 Developed Catchment Plan Alternative 1 .....
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G-1.0 Grading Plan Alternative 2 .....

1.0 PROPOSED PROJECT

1.1 Introduction

Olson Engineering Inc. (OEI) was retained by Acorn Environmental (AE) to complete a conceptual evaluation of the stormwater and grading requirements for the proposed Quiemuth Village development in Lacey, Washington. This study will be used to support the environmental impact analysis being prepared by AE for the mixed-use project. The scope includes a review of background site conditions, an evaluation of on-site facility requirements and a conceptual design of key grading and stormwater facilities as required.

The Nisqually Indian Tribe have traditionally lived off the land and rivers, sustaining their civilization through the respect and protection of the natural ecosystem. The Nisqually Department of Natural Resources maintains the pristine native lands and waterways important to the survival of fish, plants, and wildlife, and in turn their cultural heritage. They have a reputation for environmental stewardship programs that protect and enhance the natural environment.

The method of stormwater runoff treatment is of the utmost importance to the Nisqually Department of Natural Resources. The plan to address runoff is to use the latest Best Management Practices (BMPs) that provide treatment of runoff while also enabling runoff to be infiltrated across the site rather than concentrated in a specific location. The plan also incorporates native vegetation where possible to reduce need for irrigation and further mimic the historic pattern of runoff treating plants and soil as part of the infiltration process. It is the plan of the tribe to create an interactive display of how the onsite stormwater is treated and how this provides the required treatment needed to protect salmon and other stream life. The interactive display will include but not be limited to BMPs descriptions, pollutant types and methods of removal, the cycle of the runoff from the atmosphere to the streams and groundwater, and descriptions of fauna and flora that enhance the natural environment.

1.2 Objectives

The goal of this analysis is to identify and evaluate the stormwater and grading needs and options for the Quiemuth Village on a conceptual level. Specific objectives of the study are to:

- Estimate stormwater flows for the existing and developed conditions and proposed solutions for onsite stormwater treatment and disposal
- Estimate grading quantities and show preliminary finished grade contours

Only once the property is taken into trust will it be subject to federal regulations. These include the Clean Water Act, the National Pollution Discharge Elimination Scheme (NPDES) and the Underground Injection Control (UIC) for Class 5 Injection Wells. Since the project is planning on infiltrating 100% of all runoff on site, the predominant regulation will be the treatment requirements as specified by UIC for class 5 injection wells. The proposed treatment and infiltration system sizing meets these requirements.

Although the project is not subject to the City of Lacey 2022 Stormwater Design Manual (2022 SDM) or the Stormwater Manual for Western Washington (SWMWW) (or any other authority), this analysis seeks to be consistent with both standards.

There are 9 minimum/core requirements as detailed in the Western Washington Stormwater Management Manual and City of Lacey Stormwater Management Manual and these are listed and addressed for this project in section 4.1 of this report. The main focus of this report is how the project will meet the runoff treatment requirements for quality (Core Requirement 6) and quantity (Core Requirement 7) per City of Lacey Stormwater Design Manual.

1.3 Proposed Development

The 174-acre proposed trust property referred to as the “Quiemuth Village” is located adjacent to an existing parcel of land held in trust for the Tribe that is developed with the Nisqually Markets Smoke Shop. The Project Site is bounded by Interstate Highway 5, a parking area for the Cabela’s retail store, and commercially zoned land owned by the Tribe to the south; Marvin Road to the east; Britton Parkway to the north, and a gravel mine and townhome development to the west.

There are two development alternatives: Alternative 1- Proposed Mixed Use Development, and Alternative 2- Reduced Intensity Mixed Use Development. The Tribe proposes to develop a mix of commercial, retail, office, housing, and recreational land uses within the Project Site in addition to ancillary infrastructure and facilities.

Alternative 1: Commercial use consisting of grocers, dining facilities, movie theaters and bowling alley, hotel, artist studios and offices, general and neighborhood retail, a Carvana, a truck stop, and a Top Golf are proposed. The residential portion includes high-density multi-family units and live/work units in the Cultural Village. Throughout the Project Site, there would be parking spaces provided by several surface parking areas

Alternative 2: Similar to Alternative 1 but would have less commercial and retail development and increased recreational space. Commercial uses include a grocer, dining facilities, movie theater and bowling alley, the Cultural Village that include artist studios and offices, regional and neighborhood retail, a Carvana, and a gas station with convenience store. Recreational and open-space development would consist of Top Golf, Open-Space, Indoor Recreation, and an Athletic Complex. In addition, lodging facilities and residential development is proposed, including a hotel, high-density multi-family units and live/work units in the Cultural Village and a school. Throughout the Project Site, there would be parking spaces provided by several surface parking areas.

Below are the areas for the project as a whole for each alternative (1 & 2). These are broken out into their respective individual "sub" developments or catchment areas in section 4.2 to follow. This analysis assumes 85% impervious and 15% impervious area for the commercial sites which will suffice for the conceptual analysis. The impervious area is further divided into roof to paved area ratio of 1:4.

Coverage	Acres
Paved (Pollution Generating Impervious Surface (PGIS))	118.3
Roof	29.6
Landscape (Pollution Generating Pervious Surface (PGPS))	26.1
Total	174.0

Table 1.1: Alternative 1 - Proposed Ground Cover

Coverage	Acres
Paved (PGIS)	86.5
Roof	19.2
Landscape (PGPS)	68.3
Total	174.0

Table 1.2: Alternative 2 – Proposed Ground Cover

See vicinity and site layout maps in **Appendix A** of this report.

2.0 EXISTING CONDITIONS

2.1 Site Description

The 174-acre site is currently undeveloped but has been previously disturbed by logging and grading activities. The southern boundary of the Project Site generally aligns with the planned extension of Main Street from Marvin Road to Gateway Boulevard as shown in the City of Lacey Gateway Specific Plan, and access to the site is provided via partially constructed segments of Main Street that dead end at the western and eastern boundaries of the site. Additionally, southbound off-ramps and on-ramps from Interstate Highway-5 have been partially constructed within the southeastern portion of the Project Site.

The Project Site is situated in the central portion of the Lacy glacial outwash plain that formed as the Vashon glacial ice receded from the area. The ground surface at the site is gently to moderately sloping with localized small hills, ridges, and depressions. The site vegetation consists of scattered young second growth timber, primarily evergreens, with a moderate to dense understory of native and invasive brush and grasses. The site is traversed by a number of gravel roads and trails, including several that reflect the proposed final road configuration.

For calculation purposes to be consistent with the Western Washington Standards, the existing condition is assumed to be forested. However, it should be noted that historically runoff infiltrates onsite and no stormwater leaves the site, therefore the historic ground cover is not relevant since the intent is to also infiltrate all stormwater in the developed condition.

Catchment #	Total Area Forested (AC)
C101	22.59
C102	22.97
C103	18.53
C104	32.50
C105	8.60
C106	28.45
C107	6.50
C108	24.91
C109	8.95
Total:	**174.00**

Table 2: Historic Ground Cover

There is no evidence of on-site stormwater runoff leaving the site that was documented in the geotechnical report by GeoResources LLC dated September 20th, 2013, in **Appendix E**. Furthermore, a site visit was completed by Olson Engineering on April 22, 2022 where the perimeter of the site was walked. From the site visit, it was evident that the site area slopes away from Briton Parkway and Marvin Road with no runoff leaving the site along the north or east property lines. The south portion of the site north of the property line has lots of small depressions. Since the majority of the site slopes to the south, these depressions have the

ability to collect any runoff that could move to the south. The site visit was during the wet season, however there was no standing water in any of the depressions and very little evidence that water ever collected in them. The location of the depressions and pervious nature of the surface soils means that no runoff leaves the site along the south property line. There is a natural drainage located in the NW of the site that could concentrate runoff to the north portion of the west property line. However, there are several localized depressions that collect any runoff and enable it to infiltrate prior to leaving the site. At the time of the site visit, these localized depressions only had very minor evidence of standing water. Therefore, no runoff will leave the site along the west property line. Based on the above evidence, no runoff currently leaves the project sites.

Based on the geotechnical report by Haley Aldridge in **Appendix E**, the tested soils generally have poor to good infiltration properties, exhibiting unfactored drawdown rates of 0.0 to approximately 200 inches per hour. These rates are quite low in some cases and are reflective of the moderate fines content and dense nature of the various soils. Other tests are quite high and are reflective of the gravellier outwash soils found above the till soils. The tests only represent soils at the test locations at the depth that they were obtained, and are unlikely to be representative of the deeper, denser till soils that may underlie the test depths. Haley Aldridge anticipated the deeper soils to generally have lower permeability than the surficial soils. However, the logs from deeper historical borings indicate fines content generally decreasing at greater depths. This suggests that deep infiltration systems may be possible as lower fines content could indicate increased permeability. The adjacent property to the west where the Cabela's retail store is located has a functioning stormwater facility that consists of a constructed wetland for treatment and an onsite infiltration gallery. There are no stormwater facilities on the Project Site.

3.0 SUBSURFACE CONDITIONS

Soil Description and Classification

The Project Site is situated in the central portion of the Lacy glacial outwash plain that formed as the Vashon glacial ice receded from the area.

According to the Web Soil Survey, the soil on-site is classified as:

(2) Alderwood Gravelly Sand, 8-15% slopes, 29.6%

(33) Everette Very Gravelly Sandy Loam, 8-15% slopes, 7.4%

(46) Indianola Loamy Sand, 0-5% slopes, 5.5%

(110) Spanaway Sandy Gravelly Loam, 0-3% slopes, 57.5%

The hydrologic soil group (HSG) used in WWHM (Western Washington Hydrology Model) calculations based on the City of Lacey SDM are summarized in the table below:

Soil Type	Web Soil Map Unit	HSG
Alderwood	2	A/B
Everette	33	A
Indianola	46	A
Spanaway	110	A/B

Table 3: Hydrologic Soil Groups (HSG)

See Chapter 6 of the City of Lacey Stormwater Design Manual (SDM) Table 6A.6, page 6A-11 and refer to the soils map in the **Appendix A** of this report which shows the soil types and locations within the Project Site.

In accordance with the Geotechnical Report by Haley Aldrich dated September 2022 (See **Appendix E**), subsurface conditions in the site vicinity and therefore expected at the site are typically defined by a layer of organics (topsoil/forest duff) and/or loose to medium dense artificial fill and weathered native soils, overlying native dense to very dense glacial soils. The glacial soils typically consist of sandy gravel or gravelly sand with varying amounts of silt and occasional silt layers. Generally current and historical borings and test pits encountered loose to medium dense fill or native soils to depths of up to about 10 feet below ground surface (bgs) before encountering more dense native materials. However, some historical explorations encountered dense glacial soils at or very near the ground surface.

Below the fill material, native glacial soils consisting of dense to very dense silty sand, sandy gravel and gravelly sand with occasional sandy silt layers typically extended to the bottom of borings, test pits, and wells around the site. Cobbles and boulders were also encountered in the glacial soils.

Based on findings by Haley Aldrich, the nearby historical and on-site field infiltration rates range from 0 to 200 inches per hour, with an average value of approximately 38 inches per hour. When the two highest (200 inches per hour) and two lowest (0 and 0.25 inches per hour) rates are removed, the average rate is approximately 20 inches per hour. Based on this data, for preliminary design purposes, they recommend using an average infiltration rate of 20 inches per hour as an unfactored rate.

3.2 Groundwater

Depth to groundwater appears variable across the site according to the historical explorations. Historical test pits encountered groundwater seepage at depths as shallow as 4 feet. However, as many of the test pits did not encounter seepage, the presence of perched water is interpreted to be variable across the site and may vary with seasonal precipitation and other factors. Historical boring and well logs reported encountering water at various elevations. Terra Associates monitoring wells MW-1 and MW-3 encountered free water at the approximate elevations of 192 and 190(depths of 15 and 10 feet bgs), respectively. WSDOT borings H-4p-17 and H-12-17 encountered free water at elevations of 202 and 186 (depths of 27 and 12 feet bgs), respectively. Hart Crowser borings HC-2 and HC-3 encountered free water at approximate elevations of 188 and 192 (depths of 22 and 30 feet bgs), respectively. As many of the borings did not report free water at or below these elevations, Haley Aldrich concluded that the regional groundwater table varies across the site and may vary according to seasonal precipitation and other factors.

4.0 STORMWATER ANALYSIS

As mentioned previously, the project is not subject to the City of Lacey 2022 Stormwater Design Manual (2022 SDM) or any other jurisdiction, but this analysis seeks to satisfy the city requirements for stormwater. Based on Table 1.0 on page 6 of this report, listing the proposed development ground cover and areas, it shows that the proposed development will create more than 5,000sf of new impervious surface.

Based on the flow diagram, Figure 6 from the 2022 SDM (*Determining requirements for new Development)* shown in **Appendix D**, all core requirements apply to all new and replaced hard surfaces. The reason for this is that the proposed project does not have more than 35% of existing impervious coverage but it does result in greater than 5000sf of new hard surface. Below is a list of the minimum/core requirements based on the City of Lacey 2022 SDM and responses as to how these will be addressed:

4.1 Core Requirements (City of Lacey)

Core Requirement No. 1*: Prepare Stormwater Site Plans and Reports.*

A drainage report and plans will be prepared during the final engineering stage for review and approval.

Core Requirement No. 2*: Construction Stormwater Pollution Prevention.*

An Erosion/Sedimentation Control plan along with a Construction Stormwater Pollution Prevention Plan will be prepared during the final engineering plan approval process consistent with the City of Lacey2022 SDM.

Core Requirement No. 3*: Source Control of Pollution.*

Source control BMPs typically prevent pollution, or other adverse effects of stormwater, from occurring at a developed site. Source control BMPs are classified as operational or structural. All required Source Control BMPs associated with any onsite activity or use, will be implemented once construction has been completed. Examples of these include: correcting illicit discharges to storm drains, formation of a pollution prevention team, preventive maintenance, spill prevention and cleanup, employee training, and record keeping to name a few. More detail about these can be found in 2019 Stormwater Management Manual for Western Washington Volume IV - Chapter 1 - Page 497.

Core Requirement No. 4*: Preserve Natural Drainage Systems and Outfalls.*

There is no evidence of stormwater runoff leaving the site in the existing condition. In the developed condition stormwater runoff will be collected and conveyed to on-site infiltration galleries that will hydrologically mimic the existing condition to the greatest extent practical.

Core Requirement No. 5*: On-Site Stormwater Management.*

Onsite stormwater will be collected and conveyed to water quality treatment facilities prior to being infiltrated onsite. Since no runoff will be leaving the site, the Low Impact Development (LID) performance standard will be met thus meeting the requirements of Core Requirement 5.

***Core Requirement No. 6**: Runoff Water Quality Treatment.*
All runoff from pollution generating hard surfaces will be collected and treated in accordance with City of Lacey stormwater manual requirements. See section 6.0 for a more detailed analysis of runoff water quality treatment.

***Core Requirement No. 7**: Flow Control.*
All runoff from the site will be collected and routed to infiltration facilities where it will be infiltrated into the ground. No runoff will leave the site. For more detailed analysis of flow control, see section 7.0.

***Core Requirement No. 8**: Wetland Protection.*
There are no known wetlands on the project site, therefore this requirement does not apply

***Core Requirement No. 9**: Operations and Maintenance.*
Operations and maintenance will be satisfied during final engineering.

4.2 Sizing Flow control and Water Quality Best Management Practices (BMP's)

Each catchment area within the proposed project alternatives contains areas of road, sidewalk, roof, and landscape. Runoff from all these areas will be collected and routed to different water quality and/or flow control BMPs depending on the surface type or use.
The stormwater pollutants of most concern are total suspended solids (TSS), oil and grease, nutrients, pesticides, other organics, pathogens, biochemical oxygen demand (BOD), heavy metals, and salts (chlorides). The excerpt below from the Stormwater Management Manual for Western Washington (SWMWW) gives a brief description for each pollutant:

Total Suspended Solids
This represents particulate solids such as eroded soil, heavy metal precipitates, and biological solids (all considered as conventional pollutants), which can cause sedimentation in streams and turbidity in receiving surface waters. These sediments can destroy the desired habitat for fish and can impact drinking water supplies. The sediment may be carried to streams, lakes, or Puget Sound where they may be toxic to aquatic life and make dredging necessary.

Oil and Grease
Oil and grease can be toxic to aquatic life. Concentrations in stormwater from commercial and industrial areas often exceed Ecology guidelines of:
- *10 mg/L maximum daily average,*
- *15 mg/L maximum at any time, and*
- *no ongoing or frequently recurring visible sheen.*

Nutrients
Phosphorus and nitrogen compounds can cause excessive growth of aquatic vegetation in lakes and marine waters.

Biological Oxygen Demand (BOD)
Biological Oxygen Demand (BOD) is a measure of the oxygen demand from organic, nitrogenous, and other materials that are consumed by bacteria present in receiving waters. BOD in the water may deplete oxygen in the process, threatening higher organisms such as fish.

Toxic Organics
*A study found 19 of the U.S. Environmental Protection Agency's 121 priority pollutants present in the runoff from Seattle streets. The most frequently detected pollutants were pesticides, phenols, phthalates, and polynuclear aromatic hydrocarbons (PAHs).**Heavy***

Metals
Stormwater can contain heavy metals such as lead, zinc, cadmium, and copper at concentrations that often exceed water quality criteria and that can be toxic to fish and other aquatic life. Research in Puget Sound has shown that metals and toxic organics concentrate in sediments and at the water surface (microlayer) where they interfere with the reproductive cycle of many biotic species as well as cause tumors and lesions in fish.

pH
A measure of the alkalinity or acidity that can be toxic to fish if it varies appreciably from neutral pH, which is 7.0.

Bacteria and Viruses *Stormwater can contain disease-causing bacteria and viruses, although not at concentrations found in sanitary sewage. Shellfish subjected to stormwater discharges near urban areas are usually unsafe for human consumption. Research has shown that the concentrations of pollutants in stormwater from residential, commercial, and industrial areas can exceed Ecology's water quality standards and guidelines.*

The different BMPs proposed to treat runoff for this project have been modelled to determine the runoff and size of each BMP required for treatment and quantity control. Further detail for this modelling is detailed in following sections. For water quality BMP's, the water quality flow was calculated, and the biofiltration cells sized accordingly. For quantity control, shallow infiltration trenches were sized to infiltrate 100% of all the runoff. To size each of the BMP's, the Western Washington Hydrology Model (WWHM2012) was used to determine both the water quality flows and quantity of runoff for each of the design storms.

Biofiltration Cells are discussed in more detail in section 5 which follows, and shallow infiltration trenches are analyzed for the site and discussed in the section 6.

5.0 WATER QUALITY

5.1 Bioretention

The Western Washington Hydrology Model (WWHM2012) was used to model developed flows for water quality facilities. Per both the "Geotechnical Engineering Study" attached in **Appendix E**, and the NRCS Web Soil Survey, on-site soils are gravelly sandy loams, consistent with soil type A and B in WWHM2012. Based on *Figure 8.1 Treatment Facility Selection Flow Chart (***Appendix C**, since infiltration for pollutant removal is practicable due to the suitability of the particle size and cation charge on the particles and the fact that the runoff is to be 100% infiltrated, the following pretreatment BMPs are applicable:

- Pre-settling Basin
- Any Basic Treatment BMP
- Emerging Technologies

The City of Lacey Water Quality flow chart (see **Appendix C**) shows that only basic treatment is required because oil control, phosphorus control and enhanced treatment are not required for this site. The Basic Treatment Facility chosen was Bioretention Cells. This option not only provides the required runoff treatment but also enables some or even all of the treated water to be infiltrated at the location of the biofiltration cell. Bioretention cells also provide the level of enhanced treatment not required but preferred by the Nisqually Indian Tribe.

For the purposes of this analysis all treatment area has been combined thus resulting in a single facility for each catchment or each commercial development that will provide the required treatment. During final design, small individual facilities will be dispersed throughout each site but should have a total treatment capacity similar to the combined facility sizes calculated for this report.

The following Land coverage was used for each facility for their respective catchments. The land uses are limited to paved areas and any landscaping within or directly adjacent to it. No roof areas were included as runoff generated by most roof surfaces do not require treatment. Runoff from roof areas will be routed directly to infiltration facilities for disposal

Catchment #	Treated Area Total (Acre)	Paved Area (SF)	Landscape Area (SF)
C101	18.75	15.36	3.39
C102	19.07	15.62	3.45
C103	15.38	12.60	2.78
C104	26.95	22.09	4.86
C105	7.14	5.85	1.29
C106	23.62	19.35	4.27
C107	5.40	4.42	0.98
C108	20.68	16.94	3.74
C109	7.43	6.09	1.34

Table 4.1: Alternative 1 - Developed Land Cover flowing to Water Quality Facilities

Catchment #	Treated Area Total (Acre)	Paved Area (SF)	Landscape Area (SF)
C201	21.75	4.35	17.40
C202	19.07	15.62	3.45
C203	18.53	3.71	14.82
C204	26.95	22.09	4.86
C205	7.14	5.85	1.29
C206	23.62	19.35	4.27
C207	5.40	4.42	0.98
C208	24.91	4.98	19.93
C209	7.43	6.09	1.34

Table 4.2: Alternative 2 - Developed Land Cover flowing to Water Quality Facilities

5.2 WWHM Model Assumptions and Results

Bioretention facilities provide treatment for the water quality storm (91% of the 24-hour continuous runoff volume) in accordance with City of Lacey Stormwater Design Standards Manual based in Section 5.03 and Volume V of the Stormwater Management Manual for Western Washington (SWMMWW). Each catchment or development area will consist of multiple bioretention cells dispersed throughout the parking area of the site to mimic existing infiltration conditions to the greatest extent practical.

The water quality storm was modeled using Western Washington Hydrology Model (WWHM2012). For bioretention facilities treating less than 5000sf of PGIS and less than 10,000sf total impervious, a saturation safety factor 2 is used to model the facility; otherwise, a saturation safety factor of 4 is applied. A factor of 4 was used in our calculations with the assumption that all the sub-catchments flowing to the bioretention cells will be greater than 5000sf of pollution generating impervious surface (PGIS) and/or greater than 10,000sf total impervious area. Bioretention cell media is required to have an infiltration rate of 12 in/hr for calculation (per SWMMWW). When a saturation safety factor of 4 is applied as required, it results in a media design infiltration rate of 3 in/hr. This would be the most conservative approach for this conceptual design since limiting the catchment area for any bioretention cell could reduce the size by about 50%. At the time of final design, the size of bioretention cells can be reduced by restricting contributing areas to 5,000sf and 10,000sf respectively and thus reducing the saturation factor of safety to 2.

All bioretention treatment facilities are assumed to be 4’ deep, have a native soil infiltration rate of 20 in/hr with a safety factor of 2 applied which results in a design rate of 10 inches per hour. This was determined as previously mentioned, based on findings by Haley Aldrich, the nearby historical and on-site field infiltration rates range from 0 to 200 inches per hour, with an average value of approximately 38 inches per hour. When the two highest (200 inches per hour) and two lowest (0 and 0.25 inches per hour) rates are removed, the average rate is approximately 20 inches per hour. Based on this data, for preliminary design purposes, they recommend using an average infiltration rate of 20 inches per hour as an unfactored rate. To generate a design rate, they recommend applying a factor of safety of 2. This results in a design rate of 10 inches per hour.

Treated runoff infiltrates into the ground through the native soil which aids in reducing the downstream infiltration trenches.

For the WWHM analysis, a 1-acre site was modeled as a baseline or "per/acre" model for each surface type (paving and landscape) to apply to each catchment area to simplify the calculations. The results of this analysis assuming a 4' facility depth are as follows based on the WWHM report in **Appendix B**:

Footprint Area* required per acre of paving = 1580sf
Footprint Area* required per acre of landscape = 400sf
*Area was determined by multiplying the length and width for the facility as defined in the WWHM report

Since there is a linear relationship between the site area and the facility size, simply multiplying the acreage for each catchment by the "per/acre" facility size for each surface type, it allows us to determine the bioretention (BR) facility sizes for each catchment as shown below. For example, C101 is calculated as follows:

BR Facility Area Required for C101(Alt 1) =Paved Area x Area req. per Paved Acre
+ Landscape Area x Area req. per Landscape Acre
= (15.37ac x 1580 sf/ac) + (3.39ac x 400 sf/ac)
= 24,285 sf + 1,356 sf
= 25,641 sf
~ 25,700sf (Rounded up to nearest 100)

The results of the Western Washington Hydrology Model (WWHM12) report for water quality are tabulated on below. The WWHM report can be found in **Appendix B**.

Tabulated sizing results for the bioretention systems WWHM analysis:

Catchment #	Total Treatment Area (Acre)	Paved Area (SF)	Landscape Area (SF)	Bioretention Area Required (SF)
C101	18.75	15.36	3.39	25,700
C102	19.07	15.62	3.45	26,100
C103	15.38	12.60	2.78	21,100
C104	26.95	22.09	4.86	36,900
C105	7.14	5.85	1.29	9,800
C106	23.62	19.35	4.27	32,300
C107	5.40	4.42	0.98	7,400
C108	20.68	16.94	3.74	28,300
C109	7.43	6.09	1.34	10,200

Table 5.1: Alternative 1 - Bioretention Treatment Area Required (total)

Catchment #	Total Treatment Area (Acre)	Paved Area (SF)	Landscape Area (SF)	Bioretention Area Required (SF)
C201	21.75	4.35	17.40	18,500
C202	19.07	15.62	3.45	27,900
C203	18.53	3.71	14.82	15,800
C204	26.95	22.09	4.86	39,400
C205	7.14	5.85	1.29	10,500
C206	23.62	19.35	4.27	34,600
C207	5.40	4.42	0.98	7,900
C208	24.91	4.98	19.93	21,200
C209	7.43	6.09	1.34	10,900

Table 5.2: Alternative 2 - Bioretention Treatment Area Required (total)

The land uses in the table above are limited to paved areas and any landscaping within or directly adjacent to them. No roof areas were included as runoff generated by roof area does not require treatment. Runoff from roof areas will be routed directly to infiltration facilities for disposal.

The proposed locations of these facilities can be seen on the conceptual stormwater plan (C1.0) in **Appendix F**. Supporting data on the design and specifications for biofiltration systems from the Stormwater Manual for Western Washington can be found in **Appendix C** and also include standard plan and cross-sectional details.

5.3 Oil/water Separation Devices

For any site uses subject to oil control, oil/water separation devices will be installed according to City of Lacey and WSDOE requirements. All oil/water separation devices will be sized according to the manufacturer's specifications. The project would not be subject to City of Lacey and WSDOE rules after being taken into trust but would be installed according to these standards.

A truck stop is proposed in the eastern most lot. Development of this use will not only incorporate oil/water separation devices but will also use dead-end sumps within the fuel island, double walled tanks, extensive subsurface monitoring to ensure there are no leaks in any part of the fuel storage or conveyance systems, and implementation of all source control BMPs related to service stations. See “Core Requirement No.3” on page 11 of this report for examples of source control of pollution BMPs.

5.4 Protection for Salmon

The Nisqually Indian Tribe is very active in environment stewardship programs and is partnering with Washington State University (WSU) and the University of Washington (UW) in their research into toxic chemicals that pollute our waterways.

The scientists from WSU and UW have been able to identify a component in runoff that is

highly toxic to salmon. Initially a mix of 2,000 chemicals was found in the runoff that was studied. Through extensive studies and testing the scientist were able to narrow it down to one highly toxic chemical named 6PPD-Quinone. 6PPD is a component that is used as an anti-degradant for motor vehicle tires. When 6PPD reacts with ozone, the researchers found that it was transformed into multiple chemicals, including 6PPD-Quinone, the toxic chemical responsible for killing salmon. While 6PPD-Quinone's toxicity to salmon is now well established, the mechanism for toxicity is not yet fully understood and further studies are needed. Since 6PPD is used in the manufacture of all tires around the world, it is assumed that 6PPD-Quinone will be present on every traffic bearing road worldwide.

While additional studies are needed to assess the full effect of 6PPD-Quinone, there have been some positive findings related to its treatment and removal from runoff. There are new studies in which the effectiveness of various methods of filtration have been measured such as sand and biofiltration filters.

Since 6PPD-Quinone is dissolved in water, sand filters were not found to be effective since they only stop contaminants that are 'particulate' in nature, i.e., bound to particles that can be physically filtered out by sand grains. Biofiltration has shown promise since the researchers have found that 6PPD-Quinone is hydrophobic and expect that it will be sequestered by organic matter in the biofiltration media much the same way as other organic pollutants.

Anecdotally based on Dr. Kolodziej's retrospective analysis of water samples from studies on bioretention and bioswales, bioretention (relying on infiltration) removed 6PPD-Quinone to below detection levels whereas bioswales (relying on horizontal flow over vegetation and compost) removed the majority of 6PPD-Quinone, but not all.

Based on the importance of protecting the local waterways and salmon in them, the Nisqually Tribe wants to ensure they are doing everything to treat runoff to achieve this goal. Based on the early studies showing positive removal levels by using bioretention cells followed by infiltration with further treatment in the soils, this is the preferred treatment option proposed for the development of the mixed-use development.

As previously mentioned, the Tribe intends to create an interactive display showing how the onsite stormwater will be treated and how this will provide the required treatment needed to protect salmon and other stream life. This will include but not be limited to; descriptions of the BMPs, pollutant removal methods and how they function, the path of the runoff from the atmosphere to the streams and descriptions of fauna and other flora used to enhance the natural environment.

References:

- A Ubiquitous tire rubber-derived chemical induces acute mortality in Coho Salmon - Science 3rd December 2020 Vol 371, Issue 6525, pg. 185-189 – (Multiple Authors)
- WA Stormwater Center - Technical Q+A On Stormwater and Tire Chemical Toxicity to Aquatic Organisms – Dr's McIntyre and Kolodjiez
- Bioretention reduction of toxicity to Coho salmon from urban stormwater – Effectiveness Study – Stormwater Action Monitoring; September 2017.

6.0 FLOW CONTROL

Please reference sheets CP-1.0: Existing Catchment Plan sheet, CP-2.0 and CP-3.0: Developed Catchment Plans for drainage basins and drainage basin coverage areas in **Appendix F**.

Based on the geotechnical report by Haley Aldrich in **Appendix E**, the tested soils generally have poor to good infiltration properties, exhibiting unfactored drawdown rates of 0.0 to approximately 200 inches per hour. These rates are quite low in some cases and are reflective of the moderate fines content and dense nature of the various soils. Other tests are quite high and are reflective of the gravellier outwash soils found above the till soils. The tests are representative only of the soils at the location and elevation of the tests, and are unlikely to be representative of deeper, denser till soils which may underlie the test depths. Haley Aldrich anticipated deeper soils generally having lower permeability than surficial soils. However, the logs from deeper historical borings indicate fines content generally decreasing at greater depths. This suggests that deep infiltration systems may be possible as lower fines content could indicate increased permeability.

Even though there is variable infiltration across the site, Haley Aldrich still finds the use of stormwater infiltration systems to be feasible. They also recommend and propose the use of small, dispersed, low volume systems, such as bio-swales and infiltration trenches for the project.

Based on findings by Haley Aldrich, the nearby historical and on-site field infiltration rates range from 0 to 200 inches per hour, with an average value of approximately 38 inches per hour. When the two highest (200 inches per hour) and two lowest (0 and 0.25 inches per hour) rates are removed, the average rate is approximately 20 inches per hour. Based on this data, for preliminary design purposes, they recommend using an average infiltration rate of 20 inches per hour as an unfactored rate. A factor a safety of 2 is recommended which results in a design rate of 10 inches per hour.

In the analysis below, The Western Washington Hydrology Model (WWHM2012) was used to model developed and existing flows to size the infiltration galleries. Per both the geotechnical engineering studies, attached in **Appendix E**, and the NRCS Web Soil Survey, onsite soils are gravelly sandy loams, consistent with soil type A/B in WWHM2012 which are generally excellent for infiltration.

Category A Flow Control (as described in the *2020 City of Lacey Stormwater Design Manual on page 2-26 Chapter 2 – Applicability and Core Requirements*) is required for the project which matches developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow.

The existing condition was modeled as forested per the 2022 City of Lacey Stormwater Design Manual, Chapter 2.2.7. The existing condition, however, does not influence the design since no runoff leaves the site but infiltrates and will be fully infiltrated onsite in the developed condition.

As all onsite stormwater will be collected and conveyed to infiltration facilities, in one or various locations which will be determined during final design. For the purposes of this analysis, we will assume one facility per catchment/development area. Because roof drains will bypass the water quality facility, roofs were subtracted from the land coverage when calculating water quality facility flow rates. As a conservative approach for conceptual calculation purposes, catchment areas are divided as follows with the assumption that each sub catchment consists of 85% impervious area and 15% pervious area. The impervious area was further divided into paved and roof area at a 80/20 ratio. Each “sub” development is assumed to be a catchment area in which the stormwater for that area will be individually managed as far as treatment and quantity control or disposal is concerned. The areas for each of the sub-catchments are tabulated as follows:

Catchment #	Total Area (AC)	Impervious Total Area (AC)	Paved Area (PGIS) (AC)	Roof Area (AC)	Landscape Area (AC)
C101	22.59	19.20	15.36	3.84	3.39
C102	22.97	19.52	15.62	3.90	3.45
C103	18.53	15.75	12.60	3.15	2.78
C104	32.50	27.64	22.09	5.55	4.86
C105	8.60	7.31	5.85	1.46	1.29
C106	28.45	24.18	19.35	4.83	4.27
C107	6.50	5.52	4.42	1.10	0.98
C108	24.91	21.17	16.94	4.23	3.74
C109	8.95	7.61	6.09	1.52	1.34
Total:	**174.00**	**147.90**	**118.32**	**29.58**	**26.10**

Table 6.1: Alternative 1 - Developed Land Coverage flowing to Infiltration Facilities

Catchment #	Total Area (AC)	Impervious Total Area (AC)	Paved Area (PGIS) (AC)	Roof Area (AC)	Landscape Area (AC)
C201	22.59	5.19	4.35	0.84	17.40
C202	22.97	19.52	15.62	3.90	3.45
C203	18.53	3.71	3.71	0.00	14.82
C204	32.50	27.64	22.09	5.55	4.86
C205	8.60	7.31	5.85	1.46	1.29
C206	28.45	24.18	19.35	4.83	4.27
C207	6.50	5.52	4.42	1.10	0.98
C208	24.91	4.98	4.98	0.00	19.93
C209	8.95	7.61	6.09	1.52	1.34
Total:	**174.00**	**105.66**	**86.46**	**19.20**	**68.34**

Table 6.2: Alternative 2 - Developed Land Coverage flowing to Infiltration Facilities

Conveyance for on-site surface water will be provided via a catch basin network. Roof drains will be tight lined directly to the infiltration galleries.

The conveyance system will be designed in accordance with the 2022 SDM with sufficient capacity to convey and contain the 25-year peak flow. Calculations will be provided during the final engineering stage of the design.

6.1 Infiltration Facility Design – WWHM Model Results

Each catchment or development area will consist of multiple infiltration trenches (IT) dispersed throughout the parking area of the site to mimic existing infiltration conditions to the greatest extent practical and in accordance with recommendations from Haley Aldrich. Infiltration trenches are relatively shallow and can be affected by perched ground water therefore a conservative infiltration rate was used in the analysis assuming a generic shallow infiltration trench with 35% void space.

For the WWHM analysis, a 1-acre site was modeled as a baseline or "per/acre" model for each surface type (roof, paving and landscape). This is applied to each catchment area to simplify the calculations. The results of this analysis assuming a 3' facility depth, an infiltration rate of 20 in/hr with a safety factor of 2 applied (which results in a design rate of 10 inches per hour) are as follows based on the WWHM report in **Appendix B**:

Footprint Area* required per acre of paving = 1700sf
Footprint Area* required per acre of landscape = 580sf
Footprint Area* required per acre of roof = 2000sf

*Area was determined by multiplying the length and width of the facility as defined in the WWHM report

Since there is a linear relationship between the site area and the facility size, simply multiplying the acreage for each catchment by the "per/acre" facility size for each surface type, it allows us to determine the facility sizes for each catchment as shown below. For example, C1 is calculated as follows:

IT Area Required for C101 = (Paved Area x Area req. per Paved Acre)
+ (Roof Area x Area req. per Landscape Acre)
+ (Landscape Area x Area req. per Roof Acre)
= (15.36ac x 1700sf/ac) + (3.84ac x 2,000sf/ac) + (3.39 x 580sf/ac)
= 26,112sf + 2,227 sf + 6,780sf
= 35,758sf
~ 35,800sf (Rounded up to nearest 100)

Tabulated sizing results for the Infiltration Trench Facilities WWHM analysis:

Catchment #	Total Area (Acre)	Paved Area (SF)	Roof Area (SF)	Landscape Area (SF)	Infiltration Trench Area Required (SF)
C101	22.59	15.36	3.84	3.39	35,800
C102	22.97	15.62	3.90	3.45	36,400
C103	18.53	12.60	3.15	2.78	29,400
C104	32.50	22.09	5.55	4.86	51,500
C105	8.60	5.85	1.46	1.29	13,700
C106	28.45	19.35	4.83	4.27	45,100
C107	6.50	4.42	1.10	0.98	10,300
C108	24.91	16.94	4.23	3.74	39,500
C109	8.95	6.09	1.52	1.34	14,200

Table 7.1: Alternative 1 - Stormwater Infiltration Facility Footprint Area

Catchment #	Total Area (Acre)	Paved Area (SF)	Roof Area (SF)	Landscape Area (SF)	Infiltration Trench Area Required (SF)
C201	22.59	4.35	0.84	17.40	35,900
C202	22.97	15.62	3.90	3.45	42,100
C203	18.53	3.71	0.00	14.82	29,000
C204	32.50	22.09	5.55	4.86	59,600
C205	8.60	5.85	1.46	1.29	15,800
C206	28.45	19.35	4.83	4.27	52,200
C207	6.50	4.42	1.10	0.98	12,000
C208	24.91	4.98	0.00	19.93	38,900
C209	8.95	6.09	1.52	1.34	16,400

Table 7.1: Alternative 2 - Stormwater Infiltration Facility Footprint Area

The proposed location of these facilities can be seen on the conceptual stormwater plans included in **Appendix F**. The facilities have been designed to contain and infiltrate the 24-hour 100-year storm event.

Prior to the final design phase, further geological and infiltration investigation should be completed. This may include PIT tests, trenching, borings and other in situ testing methods as needed to determine the accurate design information for the area of the site being developed. Final facility sizes will be altered accordingly based on these results.

7.0 CONVEYANCE

7.1 Recommendations for Conveyance

Conveyance for on-site surface water will be provided via a catch basin network. Roof drains will be tightlined directly to the infiltration trenches/galleries. The conveyance system will be designed in accordance with the 2022 SDM with sufficient capacity to convey and contain the 25-year peak flow. Calculations will be provided during the final engineering design stage.

8.0 GRADING ANALYSIS AND DESIGN

The site is situated in the central portion of the Lacy glacial outwash plain that formed as the Vashon glacial ice receded from the area. The ground surface at the site is gently to moderately sloping with localized small hills, ridges, and depressions. The site is currently vegetated with scattered young second growth timber, primarily evergreens, with a moderate to dense understory of native and invasive brush and grasses. The site is traversed by a number of gravel roads and trails, including several that reflect the proposed final road configuration.

8.1 Recommendations for construction

- We anticipate that the majority of the excavated native soil along the northern side of the site will be reused as structural fill to raise grades along the southern side of the site. The native soils anticipated to be reused consist of sandy gravel with trace amounts of silt
- Dependent on the time of year this material is reused, moisture conditioning may be necessary, i.e., water added during the dry season and protected from moisture during wet weather.
- When using native material, moisture conditioning will probably be required and will only be possible during extended periods of dry, warm weather.
- Staging areas and haul roads should be constructed to minimize future over excavation of deteriorated sub grade soil.
- If construction occurs during wet periods increased sub grade stabilization will be required.
- Cement treatment may be a suitable alternative wet weather construction technique for sub grade conditions encountered at the site.
- In general fill slopes should not be greater than 2H:IV (horizontal to vertical) and should be benched in if an existing slopes greater than 4H:IV.
- Permanent cut slopes should not be sloped steeper than 3H:IV.

8.2 Grading Assumptions and Quantities

The site has a high point near its center with low areas in the SW NW and SE corners. From the low area in the SE corner, the site gently slopes up to the north and northwest. From the center of the site, a small valley develops to the west just south of the Britton Parkway. This becomes more pronounced as it moves west.

The slopes and low areas associated with the valley in the NW of the site will require extensive grading to enable the proposed uses to be constructed. However, with Gateway Boulevard already constructed, the scope of this grading will be somewhat limited.

The size of the site and flexibility of design elements like road profiles and site layout should enable the site grading to be balanced with no import or export needed.

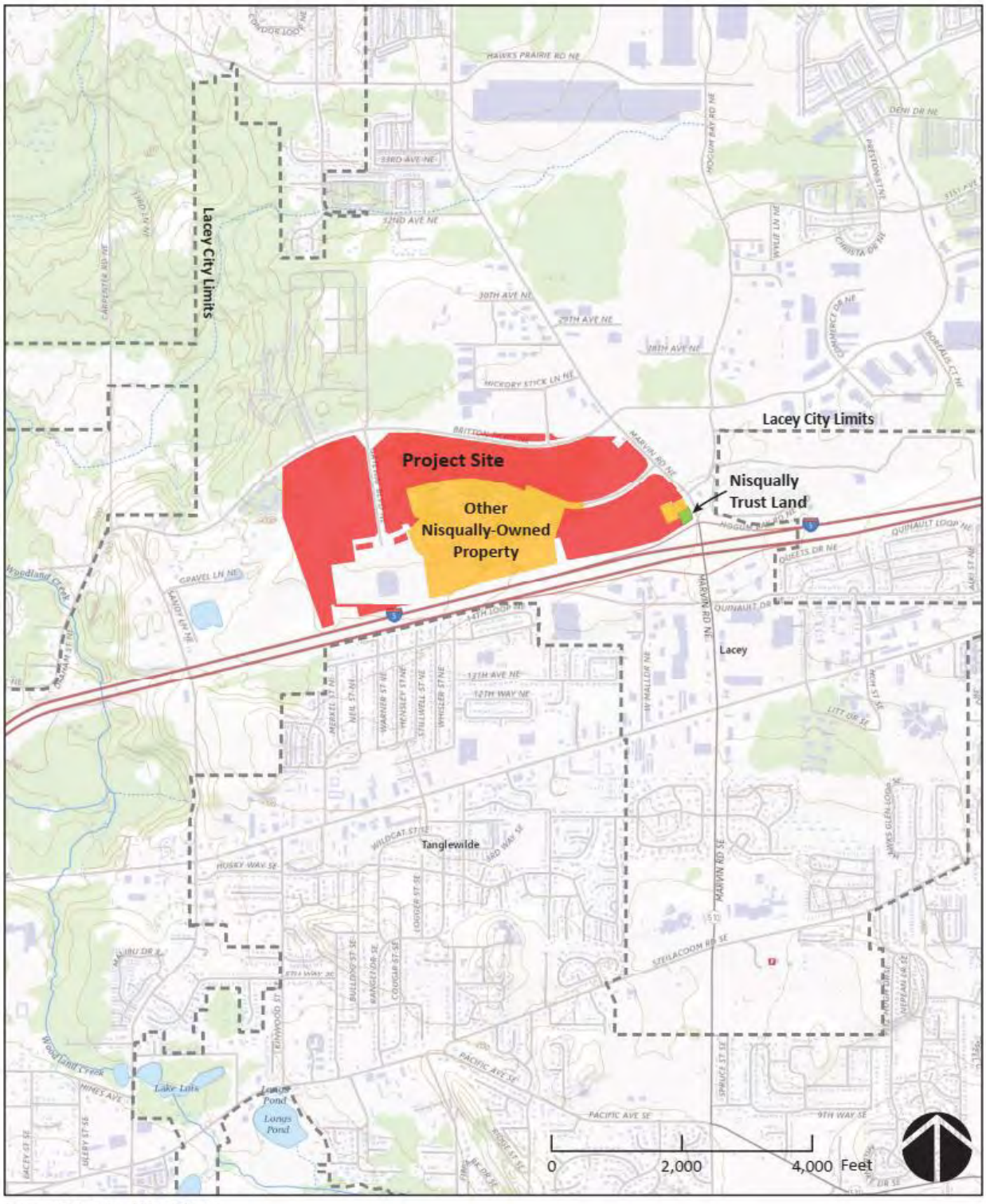
The graded volumes based on the above assumptions are tabulated below:

Alternative	Earthwork Volumes (cy)
Alternative 1	370,000
Alternative 2	362,000

Table 10: Conceptual Grading Volumes

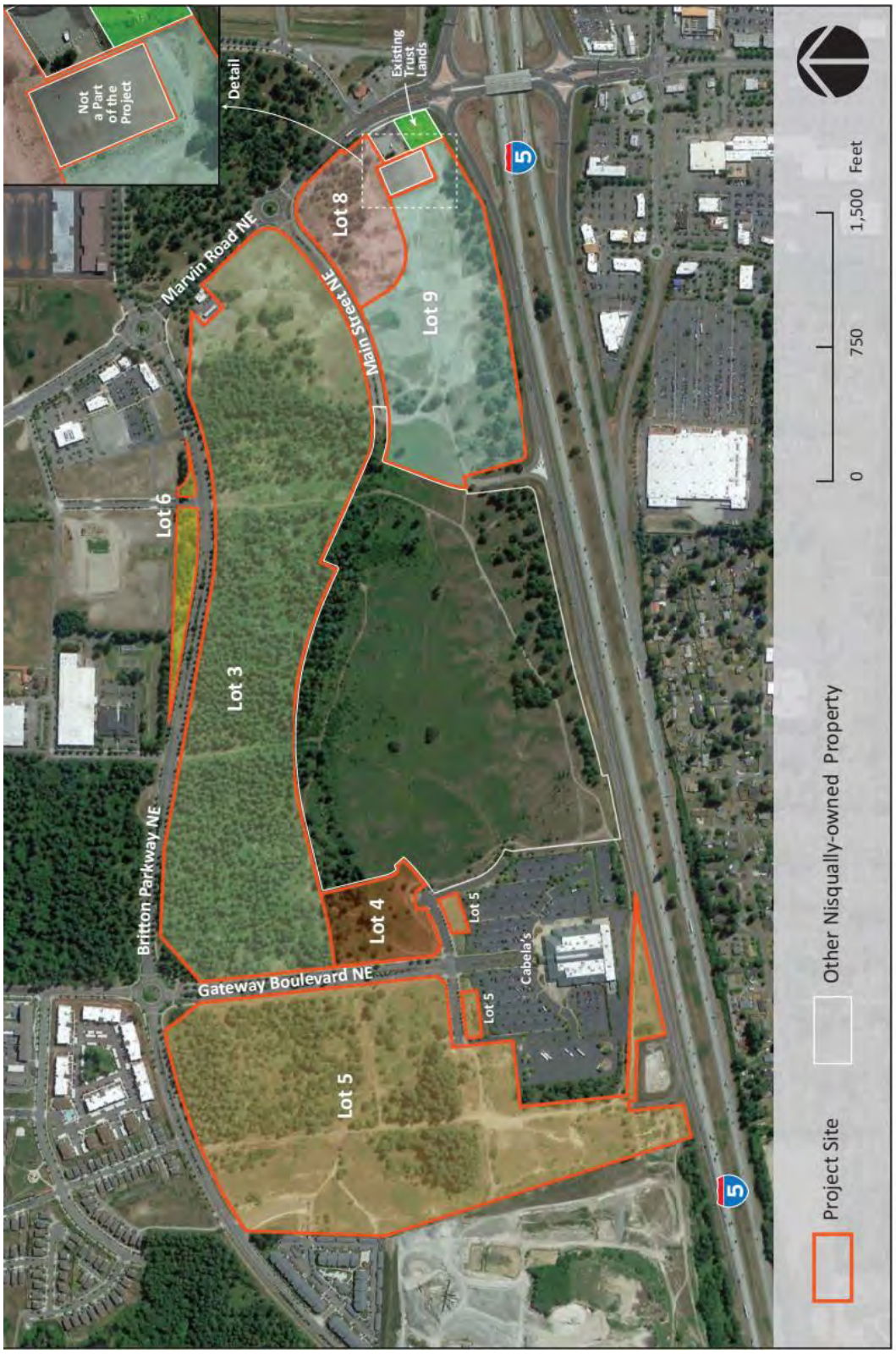
See Conceptual Grading Plan, sheets G-1.0 and G-2.0 in **Appendix F**.

APPENDIX A



Source: USGS National Map (6/2020)

Scale: ***Horizontal:*** ***N.T.S.*** ***Vertical:*** ***N/A***	For: Quiemuth Village	Job Number A10367
OLSON LAND SURVEYORS ENGINEERS ENGINEERING INC. 222 E. EVERGREEN BLVD, VANCOUVER, WA 98660 360-695-1385 503-289-9936	Title: VICINITY MAP	Figure 1 DATE: 8/04/22



Scale: ***Horizontal:*** ***N.T.S.*** ***Vertical:*** ***N/A***	For: Quiemuth Village	Job Number A10367
OLSON LAND SURVEYORS ENGINEERS ENGINEERING INC. 222 E. EVERGREEN BLVD, VANCOUVER, WA 98660 360-695-1385 503-289-9936	Title: PROJECT SITE MAP	Figure 2
		DATE: 8/04/22

ALT 01
EXISTING ROAD
GATEWAY BLVD. NE
BRITTON PARKWAY NE
MARVIN ROAD NE
EXISTING ROAD
EXISTING ROAD
I-5 FREEWAY
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
LEGEND
01 GENERAL COMMERCIAL RETAIL
02 TOP GOLF
03 CARVANA
04 PARKING
05 WELL SITE
06 HOTEL (LIMITED SERVICE)
07 FAMILY ENTERTAINMENT
08 MULTI-FAMILY RESIDENTIAL
09 MULTI-FAMILY RESIDENTIAL
10 CULTURAL VILLAGE
11 UPSCALE GROCERY
12 NEIGHBORHOOD RETAIL
13 NEIGHBORHOOD RETAIL
14 TRUCK STOP
15 EXISTING CABELA'S N.I.S.

Figure 3

ALT 02
EXISTING ROAD
GATEWAY BLVD. NE
BRITTON PARKWAY NE
MARVIN ROAD NE
EXISTING ROAD
EXISTING ROAD
I-5 FREEWAY
LEGEND
01 SCHOOL
02 BALL FIELDS
03 BALL FIELDS
04 TOP GOLF
05 CARVANA
06 PARKING
07 INDOOR RECREATION
08 HOTEL (LIMITED SERVICE)
09 CULTURAL VILLAGE
10 MULTI-FAMILY
11 MULTI-FAMILY
12 UPSCALE GROCERY
13 FAMILY ENTERTAINMENT
14 NEIGHBORHOOD RETAIL
15 CONVENIENCE STORE
16 UNDEVELOPED / PARK
17 EXISTING CABELA'S N.I.S.

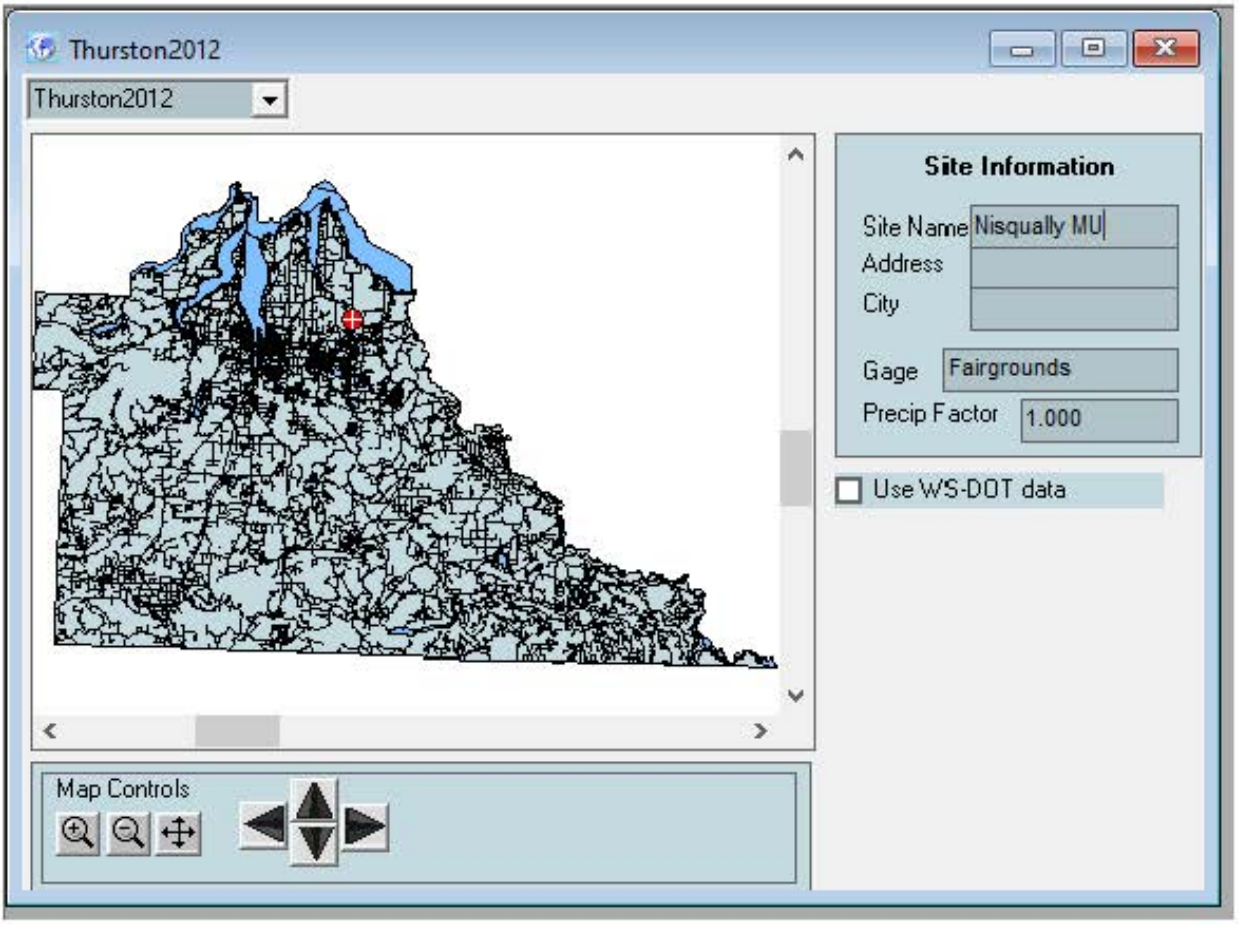
Figure 4

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Alderwood gravelly sandy loam, 8 to 15 percent slopes	54.0	29.6%
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	13.5	7.4%
46	Indianola loamy sand, 0 to 5 percent slopes	10.1	5.5%
110	Spanaway gravelly sandy loam, 0 to 3 percent slopes	105.1	57.5%
Totals for Area of Interest		**182.8**	**100.0%**

Scale: *Horizontal:* N.T.S. *Vertical:* N/A	*For:* Quiemuth Village	Job Number A10367
OLSON ENGINEERING INC. LAND SURVEYORS ENGINEERS 360-695-1385 503-289-9936 222 E. EVERGREEN BLVD, VANCOUVER, WA 98660	*Title:* SOIL SURVEY MAP	Figure 5
		DATE: 8/04/22

APPENDIX B


Thurston2012
Thurston2012
Site Information
Site Name
Nisqually MU
Address
City
Gage
Fairgrounds
Precip Factor
1.000
Use WS-DOT data
Map Controls

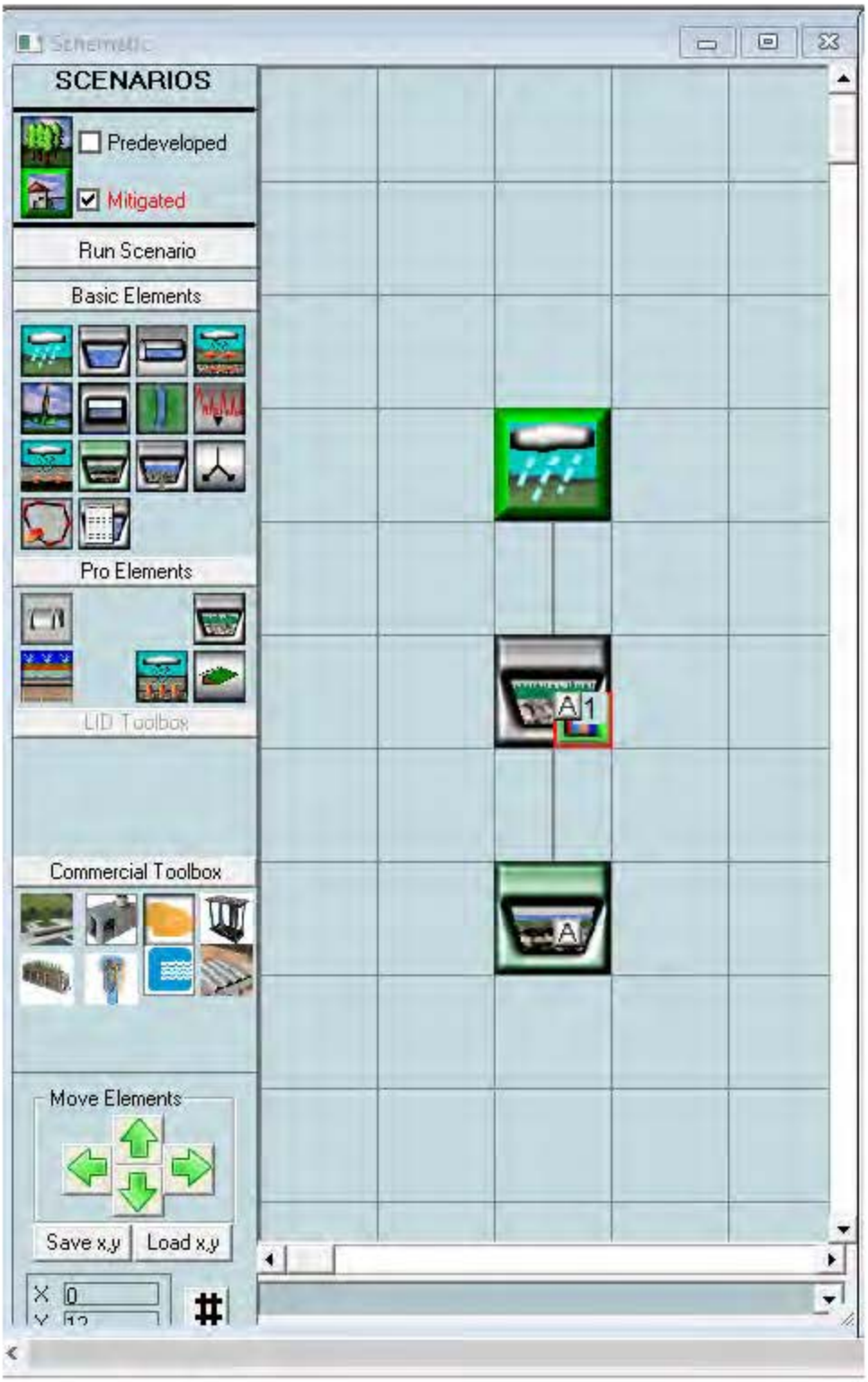
PAVED

AREA CALCULATIONS

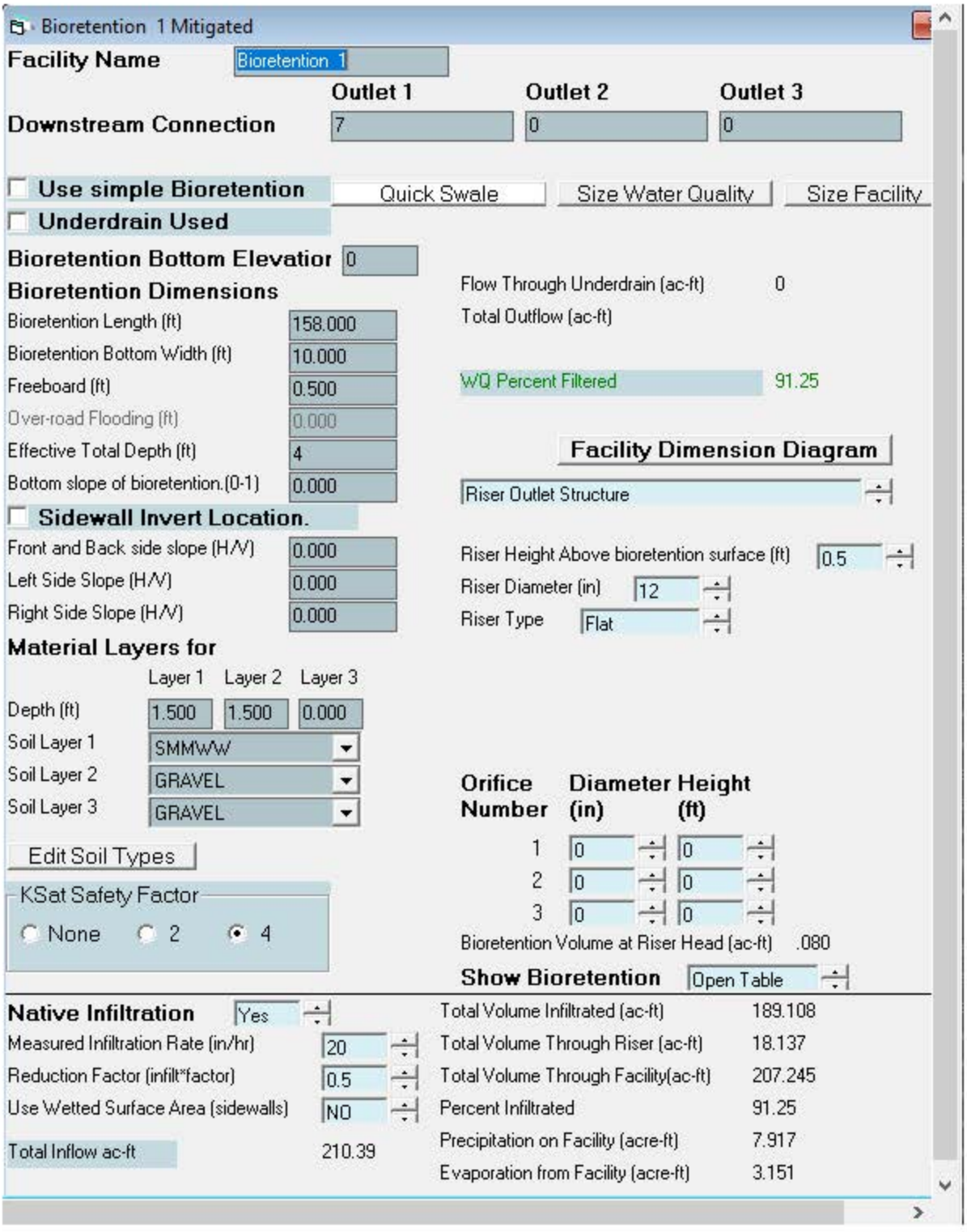
WWHM2012

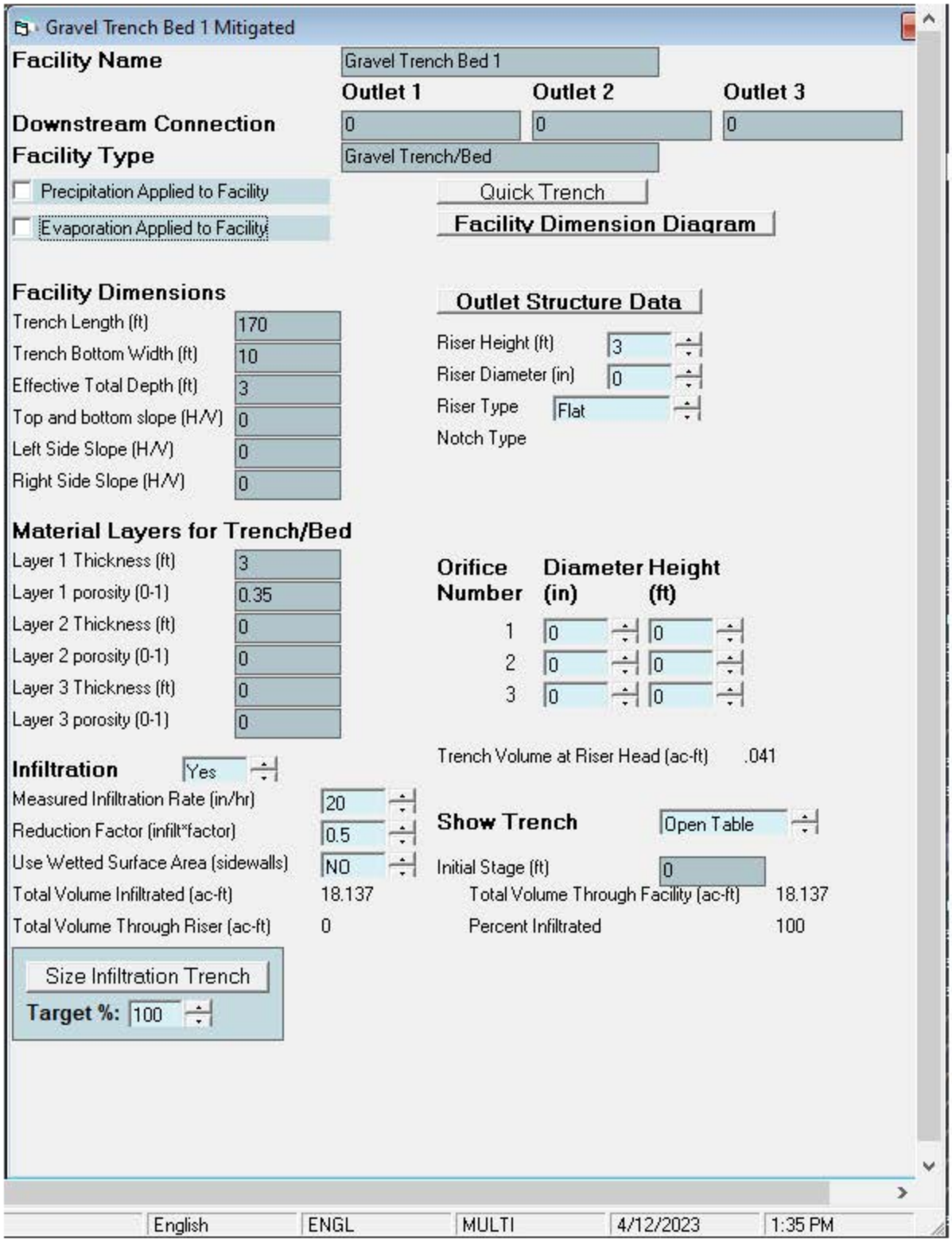
PROJECT REPORT

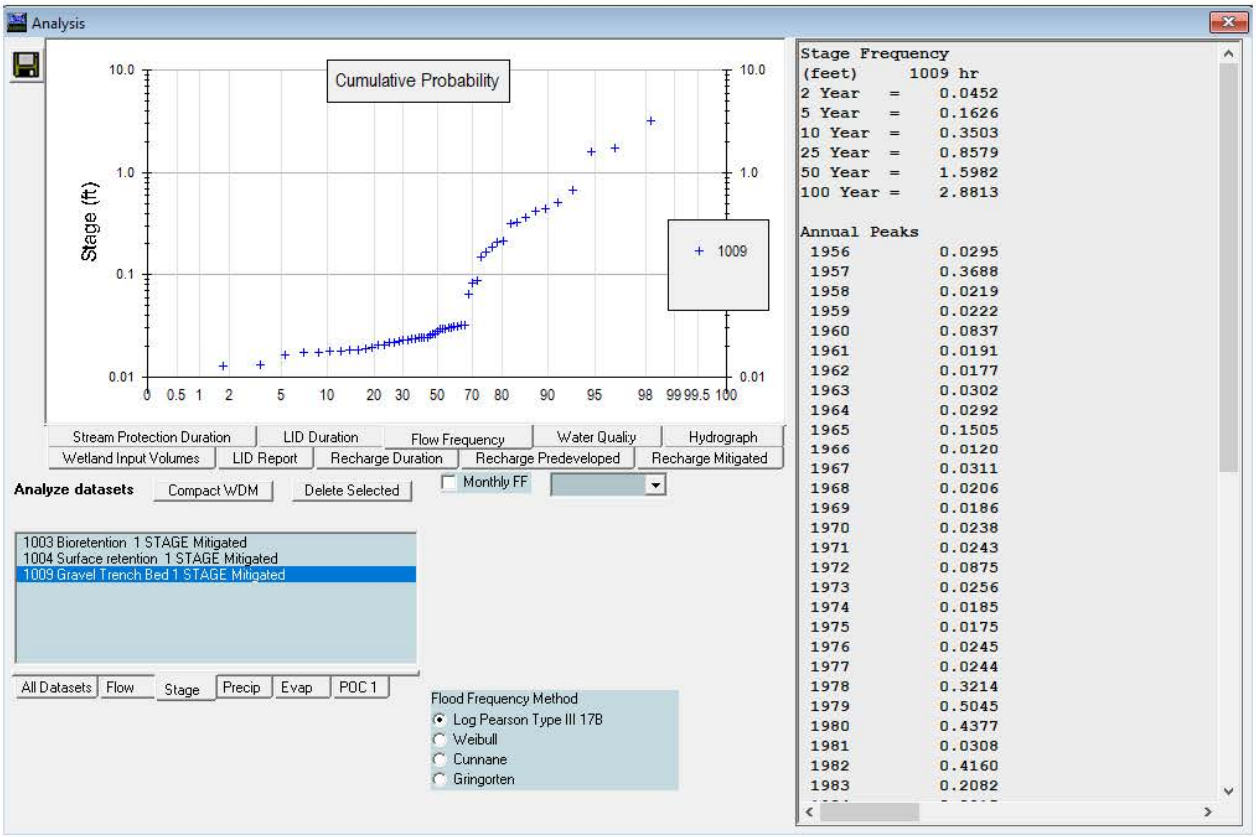
PAVED AREA CALCULATIONS


Schematic
SCENARIOS
Predeveloped
Mitigated
Run Scenario
Basic Elements
Pro Elements
LID Toolbox
Commercial Toolbox
Move Elements
Save x,y
Load x,y
X
0
A1
A

Basin 1 Mitigated
Subbasin Name: Basin 1
Designate as Bypass for POC:
Surface
Interflow
Groundwater
Flows To :
Surface retention 1
Surface retention 1
Area in Basin
Show Only Selected
Available Pervious
Acres
A/B, Forest, Mod
0
Available Impervious
Acres
ROADS/FLAT
1
Pervious Total
0
Acres
Impervious Total
1
Acres
Basin Total
1
Acres
Deselect Zero
Select By:
GO


Bioretention 1 Mitigated
Facility Name
Bioretention 1
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
7
0
0
Use simple Bioretention
Quick Swale
Size Water Quality
Size Facility
Underdrain Used
Bioretention Bottom Elevatior
0
Bioretention Dimensions
Bioretention Length (ft)
158.000
Bioretention Bottom Width (ft)
10.000
Freeboard (ft)
0.500
Over-road Flooding (ft)
0.000
Effective Total Depth (ft)
4
Bottom slope of bioretention.(0-1)
0.000
Sidewall Invert Location.
Front and Back side slope (H/V)
0.000
Left Side Slope (H/V)
0.000
Right Side Slope (H/V)
0.000
Material Layers for
Layer 1
Layer 2
Layer 3
Depth (ft)
1.500
1.500
0.000
Soil Layer 1
SMMWW
Soil Layer 2
GRAVEL
Soil Layer 3
GRAVEL
Edit Soil Types
KSat Safety Factor
None
2
4
Flow Through Underdrain (ac-ft)
0
Total Outflow (ac-ft)
WQ Percent Filtered
91.25
Facility Dimension Diagram
Riser Outlet Structure
Riser Height Above bioretention surface (ft)
0.5
Riser Diameter (in)
12
Riser Type
Flat
Orifice Number
Diameter (in)
Height (ft)
1
0
0
2
0
0
3
0
0
Bioretention Volume at Riser Head (ac-ft)
.080
Show Bioretention
Open Table
Native Infiltration
Yes
Measured Infiltration Rate (in/hr)
20
Reduction Factor (infilt*factor)
0.5
Use Wetted Surface Area (sidewalls)
NO
Total Inflow ac-ft
210.39
Total Volume Infiltrated (ac-ft)
189.108
Total Volume Through Riser (ac-ft)
18.137
Total Volume Through Facility(ac-ft)
207.245
Percent Infiltrated
91.25
Precipitation on Facility (acre-ft)
7.917
Evaporation from Facility (acre-ft)
3.151


Gravel Trench Bed 1 Mitigated
Facility Name
Gravel Trench Bed 1
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
0
0
0
Facility Type
Gravel Trench/Bed
Precipitation Applied to Facility
Evaporation Applied to Facility
Quick Trench
Facility Dimension Diagram
Facility Dimensions
Trench Length (ft) 170
Trench Bottom Width (ft) 10
Effective Total Depth (ft) 3
Top and bottom slope (H/V) 0
Left Side Slope (H/V) 0
Right Side Slope (H/V) 0
Outlet Structure Data
Riser Height (ft) 3
Riser Diameter (in) 0
Riser Type Flat
Notch Type
Material Layers for Trench/Bed
Layer 1 Thickness (ft) 3
Layer 1 porosity (0-1) 0.35
Layer 2 Thickness (ft) 0
Layer 2 porosity (0-1) 0
Layer 3 Thickness (ft) 0
Layer 3 porosity (0-1) 0
Orifice Number
Diameter (in)
Height (ft)
1 0 0
2 0 0
3 0 0
Trench Volume at Riser Head (ac-ft) .041
Infiltration Yes
Measured Infiltration Rate (in/hr) 20
Reduction Factor (infilt*factor) 0.5
Use Wetted Surface Area (sidewalls) NO
Total Volume Infiltrated (ac-ft) 18.137
Total Volume Through Riser (ac-ft) 0
Show Trench
Open Table
Initial Stage (ft) 0
Total Volume Through Facility (ac-ft) 18.137
Percent Infiltrated 100
Size Infiltration Trench
Target %: 100
English
ENGL
MULTI
4/12/2023
1:35 PM


Analysis
Cumulative Probability
Stage (ft)
10.0
1.0
0.1
0.01
0 0.5 1 2 5 10 20 30 50 70 80 90 95 98 99 99.5 100
1009
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
Recharge Duration
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
1003 Bioretention 1 STAGE Mitigated
1004 Surface retention 1 STAGE Mitigated
1009 Gravel Trench Bed 1 STAGE Mitigated
All Datasets
Flow
Stage
Precip
Evap
POC 1
Flood Frequency Method
Log Pearson Type III 17B
Weibull
Cunnane
Gringorten
Stage Frequency
(feet) 1009 hr
2 Year = 0.0452
5 Year = 0.1626
10 Year = 0.3503
25 Year = 0.8579
50 Year = 1.5982
100 Year = 2.8813
Annual Peaks
1956 0.0295
1957 0.3688
1958 0.0219
1959 0.0222
1960 0.0837
1961 0.0191
1962 0.0177
1963 0.0302
1964 0.0292
1965 0.1505
1966 0.0120
1967 0.0311
1968 0.0206
1969 0.0186
1970 0.0238
1971 0.0243
1972 0.0875
1973 0.0256
1974 0.0185
1975 0.0175
1976 0.0245
1977 0.0244
1978 0.3214
1979 0.5045
1980 0.4377
1981 0.0308
1982 0.4160
1983 0.2082

General Model Information

Project Name:	10367.e.Nisqually.MIXED.USE.1ac.paved
Site Name:	Nisqually MU
Site Address:	
City:	
Report Date:	4/12/2023
Gage:	Fairgrounds (Kaiser)
Data Start:	1955/10/01
Data End:	2011/09/30
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Forest, Mod	3
Pervious Total	3
Impervious Land Use	acre
Impervious Total	0
Basin Total	3

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	1
Impervious Total	1
Basin Total	1

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 1	Surface retention 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bioretention 1

Bottom Length: 158.00 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: SMMWW
Material thickness of second layer: 1.5
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Infiltration On
Infiltration rate: 20
Infiltration safety factor: 0.5
Total Volume Infiltrated (ac-ft.): 189.108
Total Volume Through Riser (ac-ft.): 18.137
Total Volume Through Facility (ac-ft.): 207.245
Percent Infiltrated: 91.25
Total Precip Applied to Facility: 7.917
Total Evap From Facility: 3.151
Underdrain not used
Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 12 in.
Element Flows To:
Outlet 1 Outlet 2
Gravel Trench Bed 1

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0363	0.0000	0.0000	0.0000
0.0440	0.0363	0.0006	0.0000	0.0000
0.0879	0.0363	0.0013	0.0000	0.0000
0.1319	0.0363	0.0019	0.0000	0.0000
0.1758	0.0363	0.0026	0.0000	0.0000
0.2198	0.0363	0.0032	0.0000	0.0002
0.2637	0.0363	0.0038	0.0000	0.0004
0.3077	0.0363	0.0045	0.0000	0.0006
0.3516	0.0363	0.0051	0.0000	0.0009
0.3956	0.0363	0.0058	0.0000	0.0013
0.4396	0.0363	0.0064	0.0000	0.0017
0.4835	0.0363	0.0070	0.0000	0.0023
0.5275	0.0363	0.0077	0.0000	0.0029
0.5714	0.0363	0.0083	0.0000	0.0036
0.6154	0.0363	0.0090	0.0000	0.0044
0.6593	0.0363	0.0096	0.0000	0.0053
0.7033	0.0363	0.0102	0.0000	0.0057
0.7473	0.0363	0.0109	0.0000	0.0064
0.7912	0.0363	0.0115	0.0000	0.0075
0.8352	0.0363	0.0122	0.0000	0.0088
0.8791	0.0363	0.0128	0.0000	0.0101
0.9231	0.0363	0.0134	0.0000	0.0116
0.9670	0.0363	0.0141	0.0000	0.0132
1.0110	0.0363	0.0147	0.0000	0.0138
1.0549	0.0363	0.0154	0.0000	0.0150
1.0989	0.0363	0.0160	0.0000	0.0169

1.1429	0.0363	0.0166	0.0000	0.0189
1.1868	0.0363	0.0173	0.0000	0.0211
1.2308	0.0363	0.0179	0.0000	0.0234
1.2747	0.0363	0.0186	0.0000	0.0258
1.3187	0.0363	0.0192	0.0000	0.0263
1.3626	0.0363	0.0198	0.0000	0.0284
1.4066	0.0363	0.0205	0.0000	0.0312
1.4505	0.0363	0.0211	0.0000	0.0341
1.4945	0.0363	0.0218	0.0000	0.0371
1.5385	0.0363	0.0224	0.0000	0.0403
1.5824	0.0363	0.0231	0.0000	0.0437
1.6264	0.0363	0.0237	0.0000	0.0441
1.6703	0.0363	0.0244	0.0000	0.0472
1.7143	0.0363	0.0251	0.0000	0.0509
1.7582	0.0363	0.0257	0.0000	0.0546
1.8022	0.0363	0.0264	0.0000	0.0731
1.8462	0.0363	0.0271	0.0000	0.0731
1.8901	0.0363	0.0277	0.0000	0.0731
1.9341	0.0363	0.0284	0.0000	0.0731
1.9780	0.0363	0.0290	0.0000	0.0731
2.0220	0.0363	0.0297	0.0000	0.0731
2.0659	0.0363	0.0304	0.0000	0.0731
2.1099	0.0363	0.0310	0.0000	0.0731
2.1538	0.0363	0.0317	0.0000	0.0731
2.1978	0.0363	0.0324	0.0000	0.0731
2.2418	0.0363	0.0330	0.0000	0.0731
2.2857	0.0363	0.0337	0.0000	0.0731
2.3297	0.0363	0.0343	0.0000	0.0731
2.3736	0.0363	0.0350	0.0000	0.0731
2.4176	0.0363	0.0357	0.0000	0.0731
2.4615	0.0363	0.0363	0.0000	0.0731
2.5055	0.0363	0.0370	0.0000	0.0731
2.5495	0.0363	0.0376	0.0000	0.0731
2.5934	0.0363	0.0383	0.0000	0.0731
2.6374	0.0363	0.0390	0.0000	0.0731
2.6813	0.0363	0.0396	0.0000	0.0731
2.7253	0.0363	0.0403	0.0000	0.0731
2.7692	0.0363	0.0410	0.0000	0.0731
2.8132	0.0363	0.0416	0.0000	0.0731
2.8571	0.0363	0.0423	0.0000	0.0731
2.9011	0.0363	0.0429	0.0000	0.0731
2.9451	0.0363	0.0436	0.0000	0.0731
2.9890	0.0363	0.0443	0.0000	0.0731
3.0000	0.0363	0.0444	0.0000	0.0731

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.0363	0.0444	0.0000	0.0549	0.0000
3.0440	0.0363	0.0460	0.0000	0.0549	0.0000
3.0879	0.0363	0.0476	0.0000	0.0581	0.0000
3.1319	0.0363	0.0492	0.0000	0.0597	0.0000
3.1758	0.0363	0.0508	0.0000	0.0613	0.0000
3.2198	0.0363	0.0524	0.0000	0.0629	0.0000
3.2637	0.0363	0.0540	0.0000	0.0645	0.0000
3.3077	0.0363	0.0556	0.0000	0.0661	0.0000
3.3516	0.0363	0.0572	0.0000	0.0677	0.0000
3.3956	0.0363	0.0588	0.0000	0.0693	0.0000
3.4396	0.0363	0.0604	0.0000	0.0709	0.0000

3.4835	0.0363	0.0620	0.0000	0.0725	0.0000
3.5275	0.0363	0.0636	0.0483	0.0742	0.0000
3.5714	0.0363	0.0652	0.2020	0.0758	0.0000
3.6154	0.0363	0.0667	0.4122	0.0774	0.0000
3.6593	0.0363	0.0683	0.6597	0.0790	0.0000
3.7033	0.0363	0.0699	0.9282	0.0806	0.0000
3.7473	0.0363	0.0715	1.2008	0.0822	0.0000
3.7912	0.0363	0.0731	1.4606	0.0838	0.0000
3.8352	0.0363	0.0747	1.6924	0.0854	0.0000
3.8791	0.0363	0.0763	1.8845	0.0870	0.0000
3.9231	0.0363	0.0779	2.0318	0.0886	0.0000
3.9670	0.0363	0.0795	2.1391	0.0902	0.0000
4.0000	0.0363	0.0807	2.2515	0.0914	0.0000

Surface retention 1

Element Flows To:

Outlet 1	Outlet 2
Gravel Trench Bed 1	Bioretention 1

Gravel Trench Bed 1

Bottom Length:	170.00 ft.
Bottom Width:	10.00 ft.
Trench bottom slope 1:	0 To 1
Trench Left side slope 0:	0 To 1
Trench right side slope 2:	0 To 1
Material thickness of first layer:	3
Pour Space of material for first layer:	0.35
Material thickness of second layer:	0
Pour Space of material for second layer:	0
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	20
Infiltration safety factor:	0.5
Total Volume Infiltrated (ac-ft.):	18.137
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	18.137
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	0 in.
Element Flows To:	
Outlet 1	Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.039	0.000	0.000	0.000
0.0333	0.039	0.000	0.000	0.393
0.0667	0.039	0.000	0.000	0.393
0.1000	0.039	0.001	0.000	0.393
0.1333	0.039	0.001	0.000	0.393
0.1667	0.039	0.002	0.000	0.393
0.2000	0.039	0.002	0.000	0.393
0.2333	0.039	0.003	0.000	0.393
0.2667	0.039	0.003	0.000	0.393
0.3000	0.039	0.004	0.000	0.393
0.3333	0.039	0.004	0.000	0.393
0.3667	0.039	0.005	0.000	0.393
0.4000	0.039	0.005	0.000	0.393
0.4333	0.039	0.005	0.000	0.393
0.4667	0.039	0.006	0.000	0.393
0.5000	0.039	0.006	0.000	0.393
0.5333	0.039	0.007	0.000	0.393
0.5667	0.039	0.007	0.000	0.393
0.6000	0.039	0.008	0.000	0.393
0.6333	0.039	0.008	0.000	0.393
0.6667	0.039	0.009	0.000	0.393
0.7000	0.039	0.009	0.000	0.393
0.7333	0.039	0.010	0.000	0.393
0.7667	0.039	0.010	0.000	0.393
0.8000	0.039	0.010	0.000	0.393
0.8333	0.039	0.011	0.000	0.393

0.8667	0.039	0.011	0.000	0.393
0.9000	0.039	0.012	0.000	0.393
0.9333	0.039	0.012	0.000	0.393
0.9667	0.039	0.013	0.000	0.393
1.0000	0.039	0.013	0.000	0.393
1.0333	0.039	0.014	0.000	0.393
1.0667	0.039	0.014	0.000	0.393
1.1000	0.039	0.015	0.000	0.393
1.1333	0.039	0.015	0.000	0.393
1.1667	0.039	0.015	0.000	0.393
1.2000	0.039	0.016	0.000	0.393
1.2333	0.039	0.016	0.000	0.393
1.2667	0.039	0.017	0.000	0.393
1.3000	0.039	0.017	0.000	0.393
1.3333	0.039	0.018	0.000	0.393
1.3667	0.039	0.018	0.000	0.393
1.4000	0.039	0.019	0.000	0.393
1.4333	0.039	0.019	0.000	0.393
1.4667	0.039	0.020	0.000	0.393
1.5000	0.039	0.020	0.000	0.393
1.5333	0.039	0.020	0.000	0.393
1.5667	0.039	0.021	0.000	0.393
1.6000	0.039	0.021	0.000	0.393
1.6333	0.039	0.022	0.000	0.393
1.6667	0.039	0.022	0.000	0.393
1.7000	0.039	0.023	0.000	0.393
1.7333	0.039	0.023	0.000	0.393
1.7667	0.039	0.024	0.000	0.393
1.8000	0.039	0.024	0.000	0.393
1.8333	0.039	0.025	0.000	0.393
1.8667	0.039	0.025	0.000	0.393
1.9000	0.039	0.026	0.000	0.393
1.9333	0.039	0.026	0.000	0.393
1.9667	0.039	0.026	0.000	0.393
2.0000	0.039	0.027	0.000	0.393
2.0333	0.039	0.027	0.000	0.393
2.0667	0.039	0.028	0.000	0.393
2.1000	0.039	0.028	0.000	0.393
2.1333	0.039	0.029	0.000	0.393
2.1667	0.039	0.029	0.000	0.393
2.2000	0.039	0.030	0.000	0.393
2.2333	0.039	0.030	0.000	0.393
2.2667	0.039	0.031	0.000	0.393
2.3000	0.039	0.031	0.000	0.393
2.3333	0.039	0.031	0.000	0.393
2.3667	0.039	0.032	0.000	0.393
2.4000	0.039	0.032	0.000	0.393
2.4333	0.039	0.033	0.000	0.393
2.4667	0.039	0.033	0.000	0.393
2.5000	0.039	0.034	0.000	0.393
2.5333	0.039	0.034	0.000	0.393
2.5667	0.039	0.035	0.000	0.393
2.6000	0.039	0.035	0.000	0.393
2.6333	0.039	0.036	0.000	0.393
2.6667	0.039	0.036	0.000	0.393
2.7000	0.039	0.036	0.000	0.393
2.7333	0.039	0.037	0.000	0.393
2.7667	0.039	0.037	0.000	0.393

2.8000	0.039	0.038	0.000	0.393
2.8333	0.039	0.038	0.000	0.393
2.8667	0.039	0.039	0.000	0.393
2.9000	0.039	0.039	0.000	0.393
2.9333	0.039	0.040	0.000	0.393
2.9667	0.039	0.040	0.000	0.393
3.0000	0.039	0.041	0.000	0.393

Analysis Results

POC 1

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

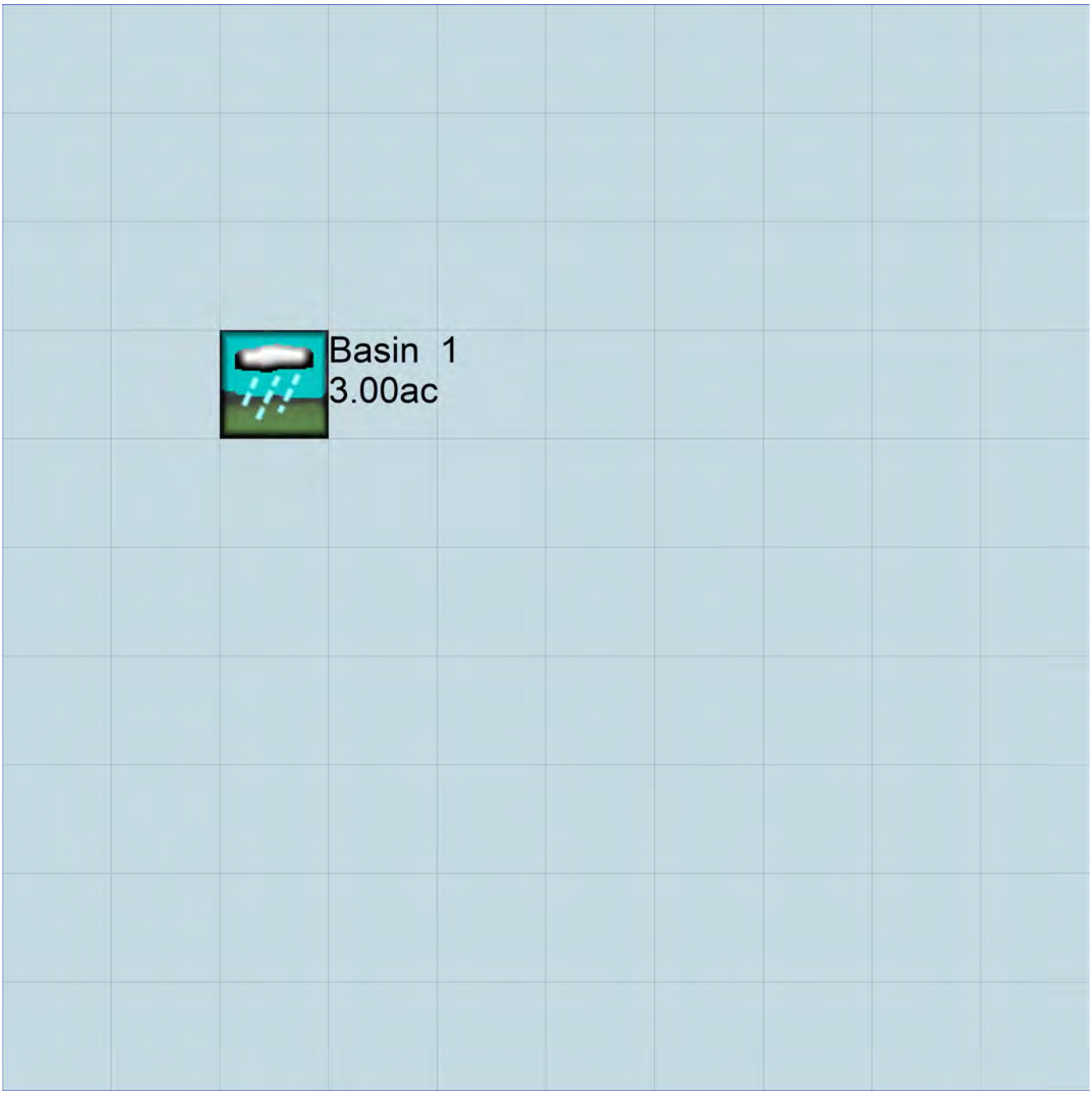
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   10367.e.Nisqually.MIXED.USE.1ac.paved.wdm
MESSU       25   Pre10367.e.Nisqually.MIXED.USE.1ac.paved.MES
            27   Pre10367.e.Nisqually.MIXED.USE.1ac.paved.L61
            28   Pre10367.e.Nisqually.MIXED.USE.1ac.paved.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND       2
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
    2     A/B, Forest, Mod        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
    2         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
    2         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
    2         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1
```

```
  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
    2             0         5         2       400       0.1       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    2             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    2          0.2       0.5      0.35         0       0.7       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
    2             0         0         0         0         3         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                <--Area-->     <-Target->   MBLK   ***
<Name>   #                <-factor->     <Name>   #   Tbl#   ***
```

```
******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                            ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1          SUM  PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1          SUM  IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76            IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
END EXT TARGETS
```

```
MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***

END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   10367.e.Nisqually.MIXED.USE.1ac.paved.wdm
MESSU       25   Mit10367.e.Nisqually.MIXED.USE.1ac.paved.MES
            27   Mit10367.e.Nisqually.MIXED.USE.1ac.paved.L61
            28   Mit10367.e.Nisqually.MIXED.USE.1ac.paved.L62
            30   POC10367.e.Nisqually.MIXED.USE.1ac.paved1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      IMPLND       1
      GENER        2
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Surface retention  1        MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3
```

```
  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
IMPLND   1                           1     RCHRES   1      5

******Routing******
RCHRES   1                           1     RCHRES   3      7
RCHRES   1                           1     RCHRES   2      8
IMPLND   1                           1     COPY     1     15
RCHRES   2                           1     COPY   501     17
RCHRES   1                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0002778     RCHRES   1     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Surface retentio-006    2    1    1    1   28    0    1
    2     Bioretention  1         2    1    1    1   28    0    1
    3     Gravel Trench Be-007    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    4  5  0  0  0       0  1  0  0  0        ***
    1       0  1  0  0    4  5  0  0  0       0  1  0  0  0       2  1  2  2  2
    2       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1
```

```
  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0       0.0       0.0       0.0
    2              2      0.03       0.0       0.0       0.0       0.0
    3              3      0.03       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                          ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPECIAL-ACTIONS
*** User-Defined Variable Quantity Lines
***                            addr
***                           <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL              4
  UVQUAN v2m2   GLOBAL     WORKSP  1        3
  UVQUAN vpo2   GLOBAL     WORKSP  2        3
  UVQUAN v2d2   GENER    2 K       1        3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   2                               v2m2            =  2198.56
*** Compute remaining available pore space
  GENER   2                               vpo2            =  v2m2
  GENER   2                               vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                               vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                               v2d2            =  vpo2
END SPECIAL-ACTIONS
FTABLES
  FTABLE      2
   70    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.036272  0.000000  0.000000  0.000000
  0.043956  0.036272  0.000640  0.000000  0.000000
  0.087912  0.036272  0.001280  0.000000  0.000000
  0.131868  0.036272  0.001920  0.000000  0.000000
  0.175824  0.036272  0.002561  0.000000  0.000000
  0.219780  0.036272  0.003201  0.000000  0.000230
  0.263736  0.036272  0.003841  0.000000  0.000397
  0.307692  0.036272  0.004481  0.000000  0.000623
  0.351648  0.036272  0.005121  0.000000  0.000917
  0.395604  0.036272  0.005761  0.000000  0.001284
  0.439560  0.036272  0.006401  0.000000  0.001730
  0.483516  0.036272  0.007042  0.000000  0.002261
  0.527473  0.036272  0.007682  0.000000  0.002882
  0.571429  0.036272  0.008322  0.000000  0.003598
  0.615385  0.036272  0.008962  0.000000  0.004413
```

```
0.659341  0.036272  0.009602  0.000000  0.005332
0.703297  0.036272  0.010242  0.000000  0.005693
0.747253  0.036272  0.010882  0.000000  0.006359
0.791209  0.036272  0.011522  0.000000  0.007498
0.835165  0.036272  0.012163  0.000000  0.008753
0.879121  0.036272  0.012803  0.000000  0.010127
0.923077  0.036272  0.013443  0.000000  0.011625
0.967033  0.036272  0.014083  0.000000  0.013249
1.010989  0.036272  0.014723  0.000000  0.013758
1.054945  0.036272  0.015363  0.000000  0.015003
1.098901  0.036272  0.016003  0.000000  0.016891
1.142857  0.036272  0.016644  0.000000  0.018915
1.186813  0.036272  0.017284  0.000000  0.021078
1.230769  0.036272  0.017924  0.000000  0.023384
1.274725  0.036272  0.018564  0.000000  0.025835
1.318681  0.036272  0.019204  0.000000  0.026340
1.362637  0.036272  0.019844  0.000000  0.028433
1.406593  0.036272  0.020484  0.000000  0.031182
1.450549  0.036272  0.021125  0.000000  0.034082
1.494505  0.036272  0.021765  0.000000  0.037136
1.538462  0.036272  0.022426  0.000000  0.040345
1.582418  0.036272  0.023088  0.000000  0.043709
1.626374  0.036272  0.023750  0.000000  0.044074
1.670330  0.036272  0.024411  0.000000  0.047223
1.714286  0.036272  0.025073  0.000000  0.050876
1.758242  0.036272  0.025735  0.000000  0.054571
1.802198  0.036272  0.026396  0.000000  0.073148
1.846154  0.036272  0.027058  0.000000  0.073148
1.890110  0.036272  0.027720  0.000000  0.073148
1.934066  0.036272  0.028381  0.000000  0.073148
1.978022  0.036272  0.029043  0.000000  0.073148
2.021978  0.036272  0.029705  0.000000  0.073148
2.065934  0.036272  0.030366  0.000000  0.073148
2.109890  0.036272  0.031028  0.000000  0.073148
2.153846  0.036272  0.031690  0.000000  0.073148
2.197802  0.036272  0.032351  0.000000  0.073148
2.241758  0.036272  0.033013  0.000000  0.073148
2.285714  0.036272  0.033675  0.000000  0.073148
2.329670  0.036272  0.034336  0.000000  0.073148
2.373626  0.036272  0.034998  0.000000  0.073148
2.417582  0.036272  0.035660  0.000000  0.073148
2.461538  0.036272  0.036321  0.000000  0.073148
2.505495  0.036272  0.036983  0.000000  0.073148
2.549451  0.036272  0.037645  0.000000  0.073148
2.593407  0.036272  0.038306  0.000000  0.073148
2.637363  0.036272  0.038968  0.000000  0.073148
2.681319  0.036272  0.039630  0.000000  0.073148
2.725275  0.036272  0.040291  0.000000  0.073148
2.769231  0.036272  0.040953  0.000000  0.073148
2.813187  0.036272  0.041615  0.000000  0.073148
2.857143  0.036272  0.042276  0.000000  0.073148
2.901099  0.036272  0.042938  0.000000  0.073148
2.945055  0.036272  0.043600  0.000000  0.073148
2.989011  0.036272  0.044261  0.000000  0.073148
3.000000  0.036272  0.050472  0.000000  0.073148
END FTABLE  2
FTABLE      1
 24    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.036272  0.000000  0.000000  0.000000
0.043956  0.036272  0.001594  0.000000  0.054861
0.087912  0.036272  0.003189  0.000000  0.058076
0.131868  0.036272  0.004783  0.000000  0.059684
0.175824  0.036272  0.006377  0.000000  0.061292
0.219780  0.036272  0.007972  0.000000  0.062899
0.263736  0.036272  0.009566  0.000000  0.064507
0.307692  0.036272  0.011161  0.000000  0.066115
0.351648  0.036272  0.012755  0.000000  0.067722
0.395604  0.036272  0.014349  0.000000  0.069330
```

```
0.439560  0.036272  0.015944  0.000000  0.070938
0.483516  0.036272  0.017538  0.000000  0.072545
0.527473  0.036272  0.019132  0.048301  0.074153
0.571429  0.036272  0.020727  0.202028  0.075761
0.615385  0.036272  0.022321  0.412175  0.077368
0.659341  0.036272  0.023915  0.659695  0.078976
0.703297  0.036272  0.025510  0.928167  0.080584
0.747253  0.036272  0.027104  1.200769  0.082191
0.791209  0.036272  0.028699  1.460630  0.083799
0.835165  0.036272  0.030293  1.692395  0.085407
0.879121  0.036272  0.031887  1.884482  0.087014
0.923077  0.036272  0.033482  2.031838  0.088622
0.967033  0.036272  0.035076  2.139092  0.090230
1.000000  0.036272  0.036272  2.251466  0.091435
END FTABLE  1
FTABLE      3
 92    5
    Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.039027  0.000000  0.000000  0.000000
0.033333  0.039027  0.000455  0.000000  0.393519
0.066667  0.039027  0.000911  0.000000  0.393519
0.100000  0.039027  0.001366  0.000000  0.393519
0.133333  0.039027  0.001821  0.000000  0.393519
0.166667  0.039027  0.002277  0.000000  0.393519
0.200000  0.039027  0.002732  0.000000  0.393519
0.233333  0.039027  0.003187  0.000000  0.393519
0.266667  0.039027  0.003642  0.000000  0.393519
0.300000  0.039027  0.004098  0.000000  0.393519
0.333333  0.039027  0.004553  0.000000  0.393519
0.366667  0.039027  0.005008  0.000000  0.393519
0.400000  0.039027  0.005464  0.000000  0.393519
0.433333  0.039027  0.005919  0.000000  0.393519
0.466667  0.039027  0.006374  0.000000  0.393519
0.500000  0.039027  0.006830  0.000000  0.393519
0.533333  0.039027  0.007285  0.000000  0.393519
0.566667  0.039027  0.007740  0.000000  0.393519
0.600000  0.039027  0.008196  0.000000  0.393519
0.633333  0.039027  0.008651  0.000000  0.393519
0.666667  0.039027  0.009106  0.000000  0.393519
0.700000  0.039027  0.009562  0.000000  0.393519
0.733333  0.039027  0.010017  0.000000  0.393519
0.766667  0.039027  0.010472  0.000000  0.393519
0.800000  0.039027  0.010927  0.000000  0.393519
0.833333  0.039027  0.011383  0.000000  0.393519
0.866667  0.039027  0.011838  0.000000  0.393519
0.900000  0.039027  0.012293  0.000000  0.393519
0.933333  0.039027  0.012749  0.000000  0.393519
0.966667  0.039027  0.013204  0.000000  0.393519
1.000000  0.039027  0.013659  0.000000  0.393519
1.033333  0.039027  0.014115  0.000000  0.393519
1.066667  0.039027  0.014570  0.000000  0.393519
1.100000  0.039027  0.015025  0.000000  0.393519
1.133333  0.039027  0.015481  0.000000  0.393519
1.166667  0.039027  0.015936  0.000000  0.393519
1.200000  0.039027  0.016391  0.000000  0.393519
1.233333  0.039027  0.016846  0.000000  0.393519
1.266667  0.039027  0.017302  0.000000  0.393519
1.300000  0.039027  0.017757  0.000000  0.393519
1.333333  0.039027  0.018212  0.000000  0.393519
1.366667  0.039027  0.018668  0.000000  0.393519
1.400000  0.039027  0.019123  0.000000  0.393519
1.433333  0.039027  0.019578  0.000000  0.393519
1.466667  0.039027  0.020034  0.000000  0.393519
1.500000  0.039027  0.020489  0.000000  0.393519
1.533333  0.039027  0.020944  0.000000  0.393519
1.566667  0.039027  0.021400  0.000000  0.393519
1.600000  0.039027  0.021855  0.000000  0.393519
1.633333  0.039027  0.022310  0.000000  0.393519
1.666667  0.039027  0.022766  0.000000  0.393519
```

```
  1.700000  0.039027  0.023221  0.000000  0.393519
  1.733333  0.039027  0.023676  0.000000  0.393519
  1.766667  0.039027  0.024131  0.000000  0.393519
  1.800000  0.039027  0.024587  0.000000  0.393519
  1.833333  0.039027  0.025042  0.000000  0.393519
  1.866667  0.039027  0.025497  0.000000  0.393519
  1.900000  0.039027  0.025953  0.000000  0.393519
  1.933333  0.039027  0.026408  0.000000  0.393519
  1.966667  0.039027  0.026863  0.000000  0.393519
  2.000000  0.039027  0.027319  0.000000  0.393519
  2.033333  0.039027  0.027774  0.000000  0.393519
  2.066667  0.039027  0.028229  0.000000  0.393519
  2.100000  0.039027  0.028685  0.000000  0.393519
  2.133333  0.039027  0.029140  0.000000  0.393519
  2.166667  0.039027  0.029595  0.000000  0.393519
  2.200000  0.039027  0.030051  0.000000  0.393519
  2.233333  0.039027  0.030506  0.000000  0.393519
  2.266667  0.039027  0.030961  0.000000  0.393519
  2.300000  0.039027  0.031416  0.000000  0.393519
  2.333333  0.039027  0.031872  0.000000  0.393519
  2.366667  0.039027  0.032327  0.000000  0.393519
  2.400000  0.039027  0.032782  0.000000  0.393519
  2.433333  0.039027  0.033238  0.000000  0.393519
  2.466667  0.039027  0.033693  0.000000  0.393519
  2.500000  0.039027  0.034148  0.000000  0.393519
  2.533333  0.039027  0.034604  0.000000  0.393519
  2.566667  0.039027  0.035059  0.000000  0.393519
  2.600000  0.039027  0.035514  0.000000  0.393519
  2.633333  0.039027  0.035970  0.000000  0.393519
  2.666667  0.039027  0.036425  0.000000  0.393519
  2.700000  0.039027  0.036880  0.000000  0.393519
  2.733333  0.039027  0.037335  0.000000  0.393519
  2.766667  0.039027  0.037791  0.000000  0.393519
  2.800000  0.039027  0.038246  0.000000  0.393519
  2.833333  0.039027  0.038701  0.000000  0.393519
  2.866667  0.039027  0.039157  0.000000  0.393519
  2.900000  0.039027  0.039612  0.000000  0.393519
  2.933333  0.039027  0.040067  0.000000  0.393519
  2.966667  0.039027  0.040523  0.000000  0.393519
  3.000000  0.039027  0.040978  0.000000  0.393519
  3.033333  0.039027  0.042279  0.064540  0.393519
  END FTABLE  3
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1         SUM  PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1         SUM  IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1         SUM  RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.76           RCHRES   2     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   2 HYDR   RO      1 1        1      WDM   1000 FLOW     ENGL       REPL
RCHRES   2 HYDR   O       1 1        1      WDM   1001 FLOW     ENGL       REPL
RCHRES   2 HYDR   O       2 1        1      WDM   1002 FLOW     ENGL       REPL
RCHRES   2 HYDR   STAGE   1 1        1      WDM   1003 STAG     ENGL       REPL
RCHRES   1 HYDR   STAGE   1 1        1      WDM   1004 STAG     ENGL       REPL
RCHRES   1 HYDR   O       1 1        1      WDM   1005 FLOW     ENGL       REPL
COPY     1 OUTPUT MEAN    1 1     12.1      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN    1 1     12.1      WDM    801 FLOW     ENGL       REPL
RCHRES   3 HYDR   RO      1 1        1      WDM   1006 FLOW     ENGL       REPL
RCHRES   3 HYDR   O       1 1        1      WDM   1007 FLOW     ENGL       REPL
```

```
RCHRES   3 HYDR   O      2 1        1      WDM   1008 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1009 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1992/ 4/16 22: 0

RCHRES:     3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
92 1.7850E+03 1841.7     2176.2
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1992/ 4/16 22: 0

RCHRES:     3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 3400.0     -2.347E+04    6.9021  6.9021E+00      2
```

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

ROOF

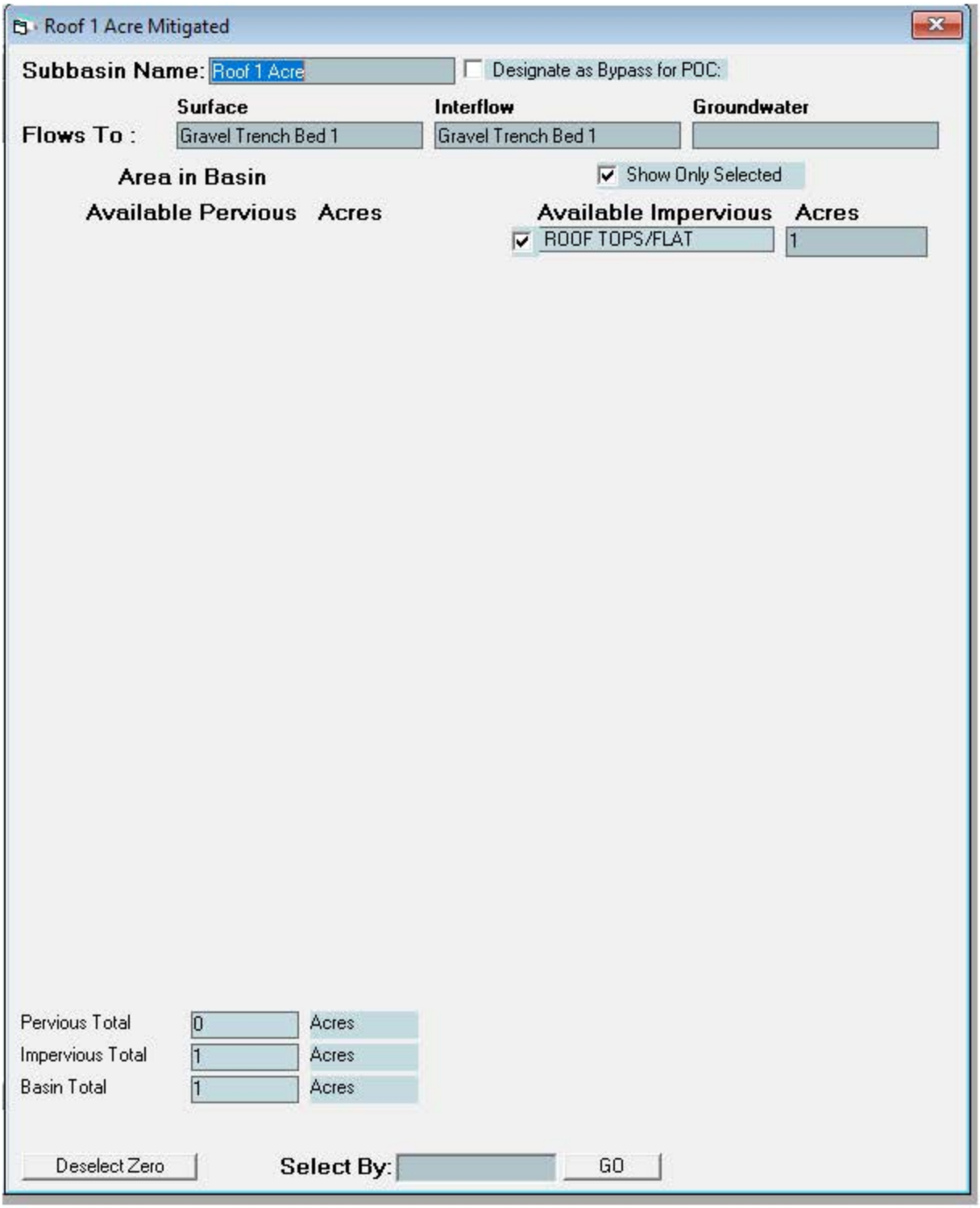
AREA CALCULATIONS

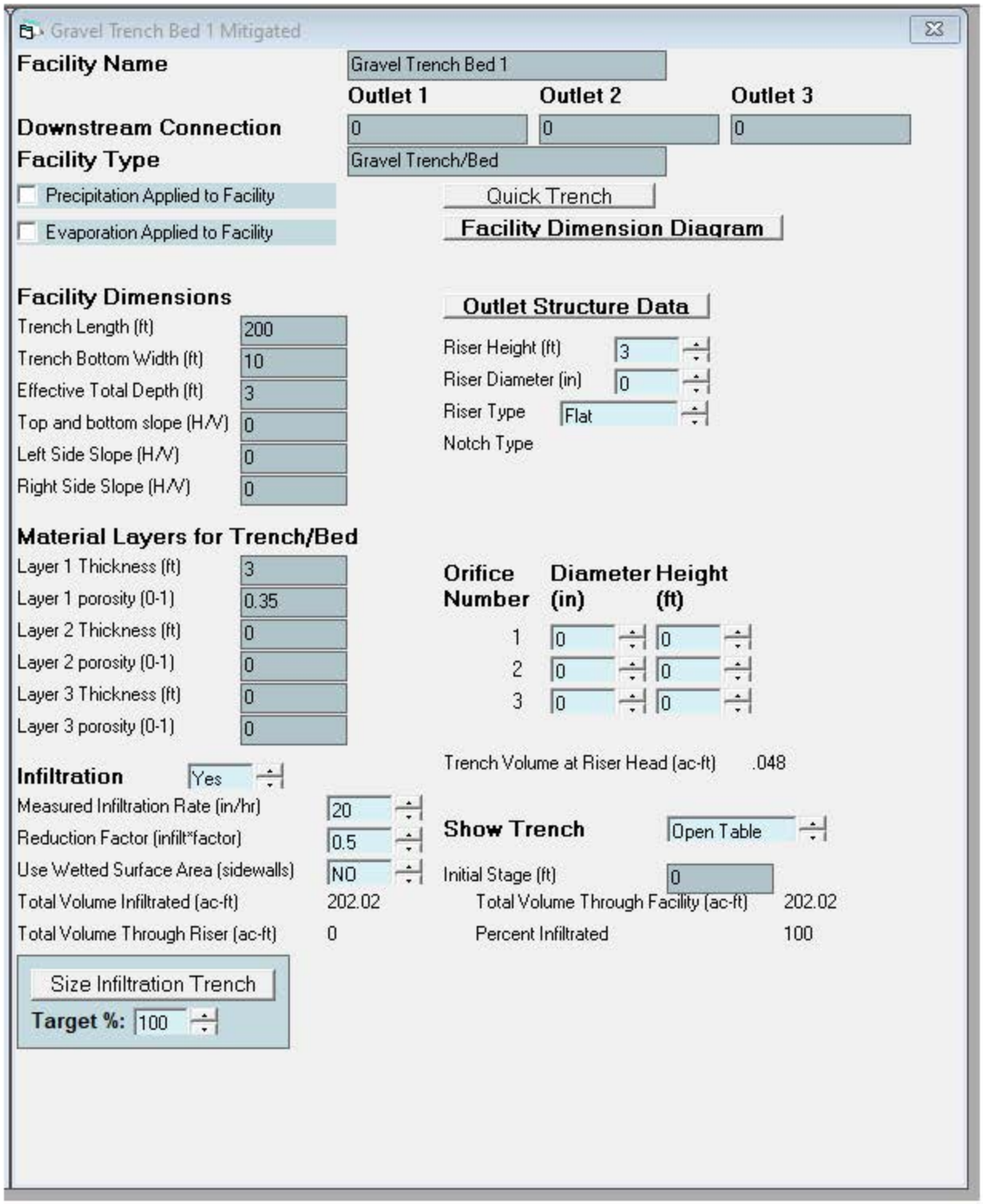
WWHM2012

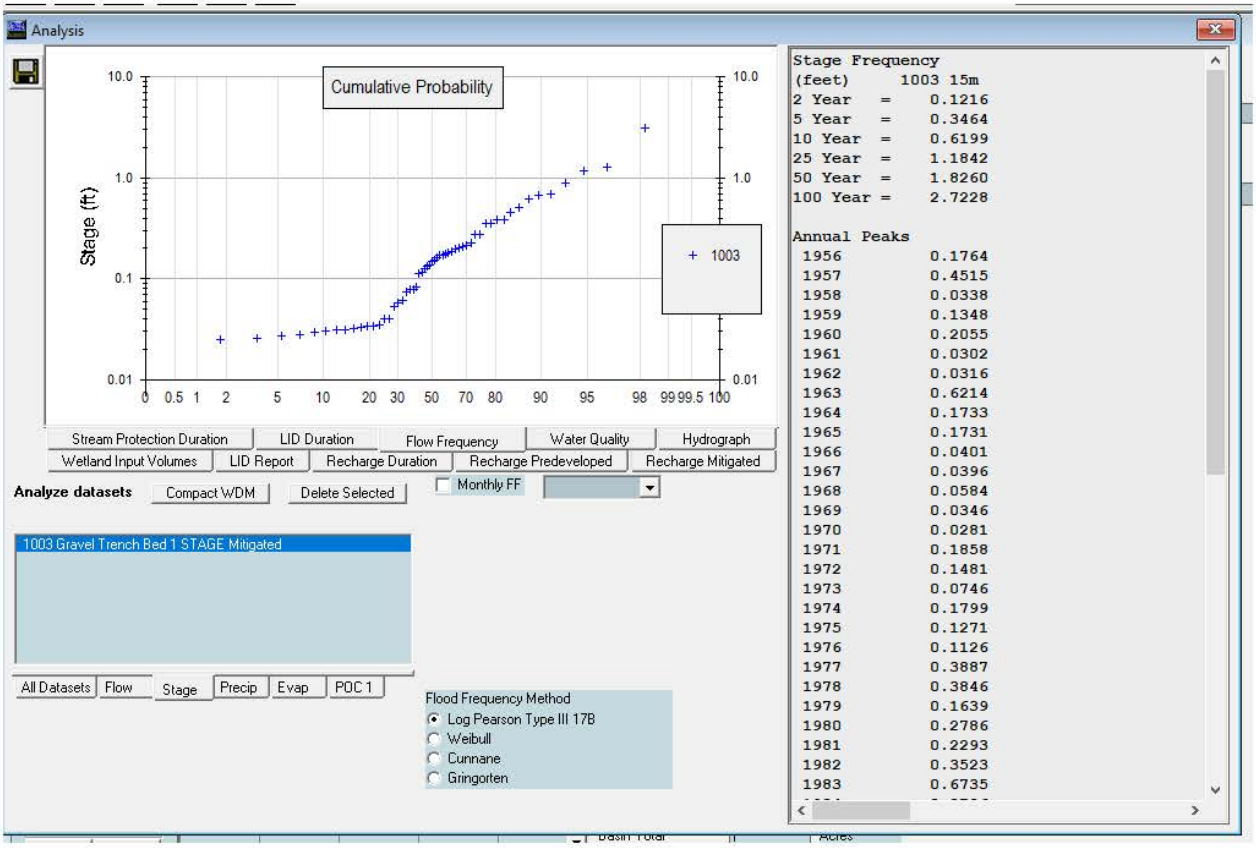
PROJECT REPORT

ROOF AREA CALCULATIONS

Schematic
SCENARIOS
Predeveloped
Mitigated
Run Scenario
Basic Elements
Pro Elements
LID Toolbox
Commercial Toolbox
Move Elements
Save x,y
Load x,y
X
40


Roof 1 Acre Mitigated
Subbasin Name: Roof 1 Acre
Designate as Bypass for POC:
Surface
Interflow
Groundwater
Flows To :
Gravel Trench Bed 1
Gravel Trench Bed 1
Area in Basin
Show Only Selected
Available Pervious Acres
Available Impervious Acres
ROOF TOPS/FLAT
1
Pervious Total
0
Acres
Impervious Total
1
Acres
Basin Total
1
Acres
Deselect Zero
Select By:
GO


Gravel Trench Bed 1 Mitigated
Facility Name
Gravel Trench Bed 1
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
0
0
0
Facility Type
Gravel Trench/Bed
Precipitation Applied to Facility
Evaporation Applied to Facility
Quick Trench
Facility Dimension Diagram
Facility Dimensions
Trench Length (ft) 200
Trench Bottom Width (ft) 10
Effective Total Depth (ft) 3
Top and bottom slope (H/V) 0
Left Side Slope (H/V) 0
Right Side Slope (H/V) 0
Outlet Structure Data
Riser Height (ft) 3
Riser Diameter (in) 0
Riser Type Flat
Notch Type
Material Layers for Trench/Bed
Layer 1 Thickness (ft) 3
Layer 1 porosity (0-1) 0.35
Layer 2 Thickness (ft) 0
Layer 2 porosity (0-1) 0
Layer 3 Thickness (ft) 0
Layer 3 porosity (0-1) 0
Orifice Number
Diameter (in)
Height (ft)
1 0 0
2 0 0
3 0 0
Trench Volume at Riser Head (ac-ft) .048
Infiltration Yes
Measured Infiltration Rate (in/hr) 20
Reduction Factor (infilt*factor) 0.5
Use Wetted Surface Area (sidewalls) NO
Total Volume Infiltrated (ac-ft) 202.02
Total Volume Through Riser (ac-ft) 0
Show Trench
Open Table
Initial Stage (ft) 0
Total Volume Through Facility (ac-ft) 202.02
Percent Infiltrated 100
Size Infiltration Trench
Target %: 100


Analysis
Cumulative Probability
Stage (ft)
10.0
1.0
0.1
0.01
0 0.5 1 2 5 10 20 30 50 70 80 90 95 98 99 99.5 100
1003
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
Recharge Duration
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
1003 Gravel Trench Bed 1 STAGE Mitigated
All Datasets
Flow
Stage
Precip
Evap
POC 1
Flood Frequency Method
Log Pearson Type III 17B
Weibull
Cunnane
Gringorten
Stage Frequency
(feet) 1003 15m
2 Year = 0.1216
5 Year = 0.3464
10 Year = 0.6199
25 Year = 1.1842
50 Year = 1.8260
100 Year = 2.7228
Annual Peaks
1956 0.1764
1957 0.4515
1958 0.0338
1959 0.1348
1960 0.2055
1961 0.0302
1962 0.0316
1963 0.6214
1964 0.1733
1965 0.1731
1966 0.0401
1967 0.0396
1968 0.0584
1969 0.0346
1970 0.0281
1971 0.1858
1972 0.1481
1973 0.0746
1974 0.1799
1975 0.1271
1976 0.1126
1977 0.3887
1978 0.3846
1979 0.1639
1980 0.2786
1981 0.2293
1982 0.3523
1983 0.6735

General Model Information

Project Name:	10367.e.Nisqually.MIXED.USE.1ac.roof
Site Name:	Nisqually MU
Site Address:	
City:	
Report Date:	4/12/2023
Gage:	Fairgrounds (Kaiser)
Data Start:	1955/10/01
Data End:	2011/09/30
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Forest, Mod	1
Pervious Total	1
Impervious Land Use	acre
Impervious Total	0
Basin Total	1

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Roof 1 Acre

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	1
Impervious Total	1
Basin Total	1

Element Flows To:

Surface	Interflow	Groundwater
Gravel Trench Bed 1	Gravel Trench Bed 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Gravel Trench Bed 1

Bottom Length:	200.00 ft.
Bottom Width:	10.00 ft.
Trench bottom slope 1:	0 To 1
Trench Left side slope 0:	0 To 1
Trench right side slope 2:	0 To 1
Material thickness of first layer:	3
Pour Space of material for first layer:	0.35
Material thickness of second layer:	0
Pour Space of material for second layer:	0
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	20
Infiltration safety factor:	0.5
Total Volume Infiltrated (ac-ft.):	202.02
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	202.02
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	0 in.

Element Flows To:
Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.045	0.000	0.000	0.000
0.0333	0.045	0.000	0.000	0.463
0.0667	0.045	0.001	0.000	0.463
0.1000	0.045	0.001	0.000	0.463
0.1333	0.045	0.002	0.000	0.463
0.1667	0.045	0.002	0.000	0.463
0.2000	0.045	0.003	0.000	0.463
0.2333	0.045	0.003	0.000	0.463
0.2667	0.045	0.004	0.000	0.463
0.3000	0.045	0.004	0.000	0.463
0.3333	0.045	0.005	0.000	0.463
0.3667	0.045	0.005	0.000	0.463
0.4000	0.045	0.006	0.000	0.463
0.4333	0.045	0.007	0.000	0.463
0.4667	0.045	0.007	0.000	0.463
0.5000	0.045	0.008	0.000	0.463
0.5333	0.045	0.008	0.000	0.463
0.5667	0.045	0.009	0.000	0.463
0.6000	0.045	0.009	0.000	0.463
0.6333	0.045	0.010	0.000	0.463
0.6667	0.045	0.010	0.000	0.463
0.7000	0.045	0.011	0.000	0.463
0.7333	0.045	0.011	0.000	0.463
0.7667	0.045	0.012	0.000	0.463

0.8000	0.045	0.012	0.000	0.463
0.8333	0.045	0.013	0.000	0.463
0.8667	0.045	0.013	0.000	0.463
0.9000	0.045	0.014	0.000	0.463
0.9333	0.045	0.015	0.000	0.463
0.9667	0.045	0.015	0.000	0.463
1.0000	0.045	0.016	0.000	0.463
1.0333	0.045	0.016	0.000	0.463
1.0667	0.045	0.017	0.000	0.463
1.1000	0.045	0.017	0.000	0.463
1.1333	0.045	0.018	0.000	0.463
1.1667	0.045	0.018	0.000	0.463
1.2000	0.045	0.019	0.000	0.463
1.2333	0.045	0.019	0.000	0.463
1.2667	0.045	0.020	0.000	0.463
1.3000	0.045	0.020	0.000	0.463
1.3333	0.045	0.021	0.000	0.463
1.3667	0.045	0.022	0.000	0.463
1.4000	0.045	0.022	0.000	0.463
1.4333	0.045	0.023	0.000	0.463
1.4667	0.045	0.023	0.000	0.463
1.5000	0.045	0.024	0.000	0.463
1.5333	0.045	0.024	0.000	0.463
1.5667	0.045	0.025	0.000	0.463
1.6000	0.045	0.025	0.000	0.463
1.6333	0.045	0.026	0.000	0.463
1.6667	0.045	0.026	0.000	0.463
1.7000	0.045	0.027	0.000	0.463
1.7333	0.045	0.027	0.000	0.463
1.7667	0.045	0.028	0.000	0.463
1.8000	0.045	0.028	0.000	0.463
1.8333	0.045	0.029	0.000	0.463
1.8667	0.045	0.030	0.000	0.463
1.9000	0.045	0.030	0.000	0.463
1.9333	0.045	0.031	0.000	0.463
1.9667	0.045	0.031	0.000	0.463
2.0000	0.045	0.032	0.000	0.463
2.0333	0.045	0.032	0.000	0.463
2.0667	0.045	0.033	0.000	0.463
2.1000	0.045	0.033	0.000	0.463
2.1333	0.045	0.034	0.000	0.463
2.1667	0.045	0.034	0.000	0.463
2.2000	0.045	0.035	0.000	0.463
2.2333	0.045	0.035	0.000	0.463
2.2667	0.045	0.036	0.000	0.463
2.3000	0.045	0.037	0.000	0.463
2.3333	0.045	0.037	0.000	0.463
2.3667	0.045	0.038	0.000	0.463
2.4000	0.045	0.038	0.000	0.463
2.4333	0.045	0.039	0.000	0.463
2.4667	0.045	0.039	0.000	0.463
2.5000	0.045	0.040	0.000	0.463
2.5333	0.045	0.040	0.000	0.463
2.5667	0.045	0.041	0.000	0.463
2.6000	0.045	0.041	0.000	0.463
2.6333	0.045	0.042	0.000	0.463
2.6667	0.045	0.042	0.000	0.463
2.7000	0.045	0.043	0.000	0.463

2.7333	0.045	0.043	0.000	0.463
2.7667	0.045	0.044	0.000	0.463
2.8000	0.045	0.045	0.000	0.463
2.8333	0.045	0.045	0.000	0.463
2.8667	0.045	0.046	0.000	0.463
2.9000	0.045	0.046	0.000	0.463
2.9333	0.045	0.047	0.000	0.463
2.9667	0.045	0.047	0.000	0.463
3.0000	0.045	0.048	0.000	0.463

Analysis Results

POC 1

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

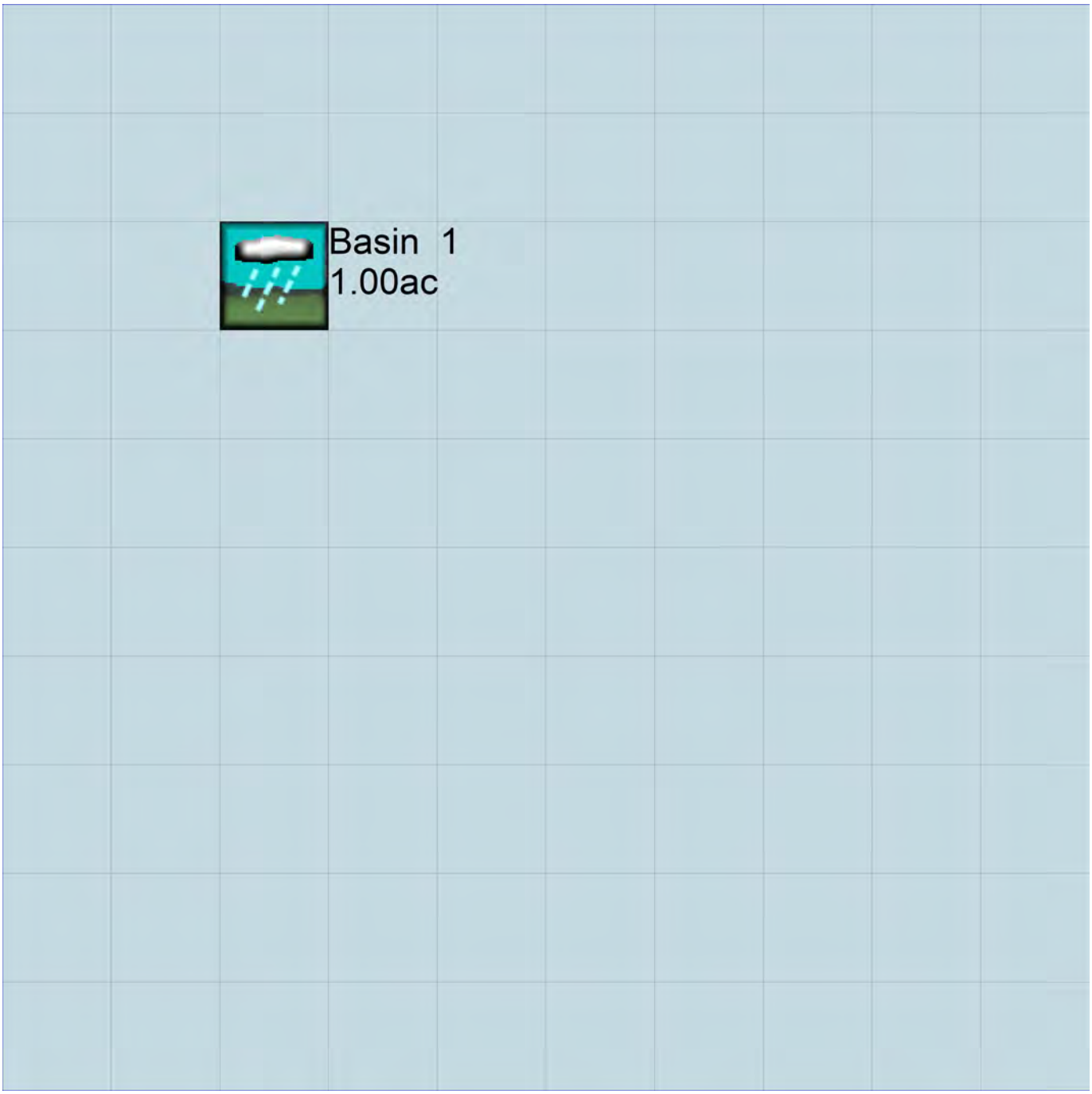
PERLND Changes

No PERLND changes have been made.

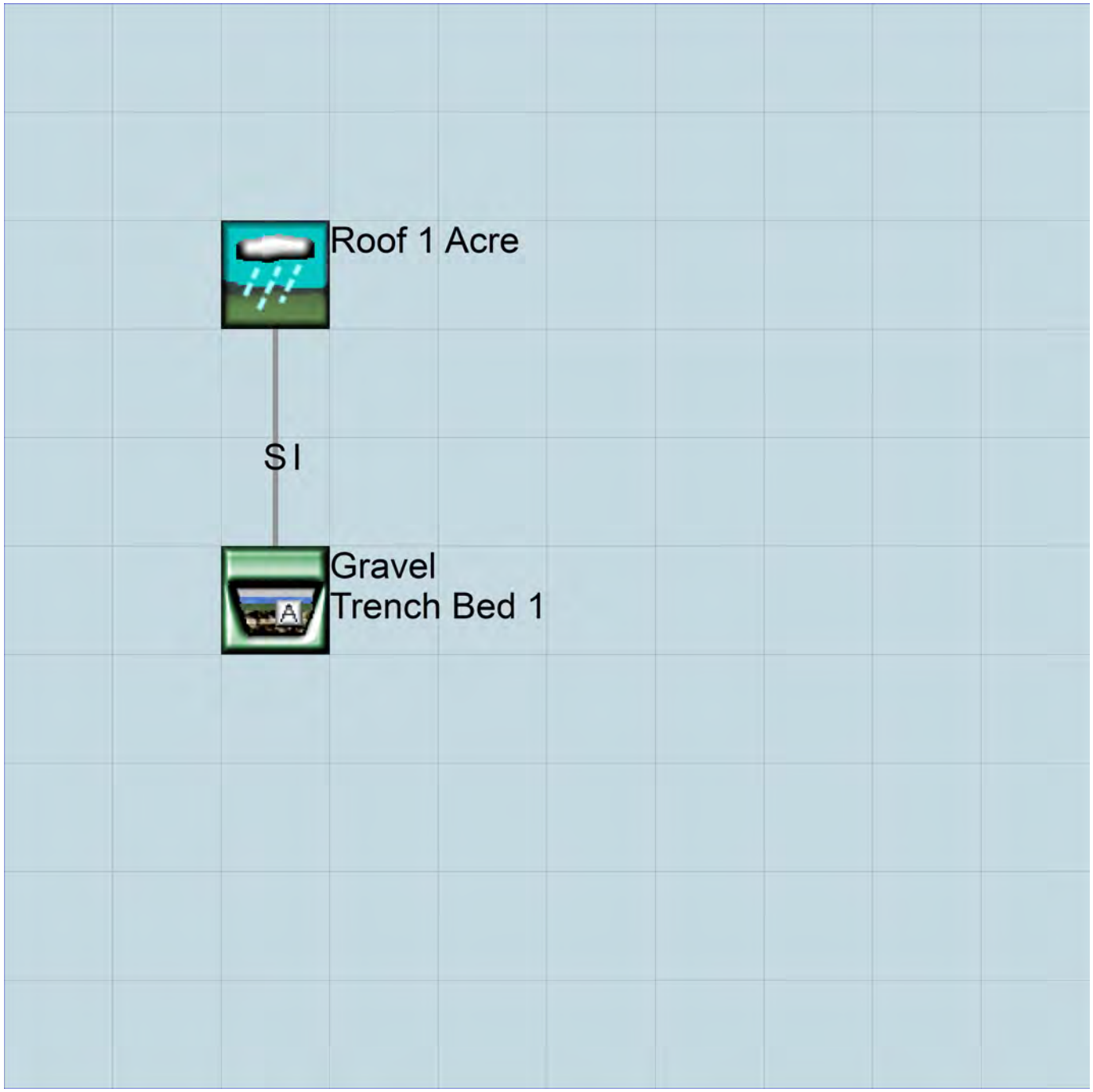
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   10367.e.Nisqually.MIXED.USE.1ac.roof.wdm
MESSU       25   Mit10367.e.Nisqually.MIXED.USE.1ac.roof.MES
            27   Mit10367.e.Nisqually.MIXED.USE.1ac.roof.L61
            28   Mit10367.e.Nisqually.MIXED.USE.1ac.roof.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND       4
      RCHRES       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                          in  out           ***
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
```

```
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                          ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    ***
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL     *********
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    4         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    4           400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    4             0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    4             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                <--Area-->     <-Target->   MBLK   ***
<Name>   #                <-factor->     <Name>   #   Tbl#   ***
```

```
Roof 1 Acre***
IMPLND   4                          1     RCHRES   1      5

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                        in  out                             ***
    1     Gravel Trench Be-005    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>***
    1             1      0.04       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   92    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.045914  0.000000  0.000000  0.000000
  0.033333  0.045914  0.000536  0.000000  0.462963
  0.066667  0.045914  0.001071  0.000000  0.462963
  0.100000  0.045914  0.001607  0.000000  0.462963
```

0.133333	0.045914	0.002143	0.000000	0.462963
0.166667	0.045914	0.002678	0.000000	0.462963
0.200000	0.045914	0.003214	0.000000	0.462963
0.233333	0.045914	0.003750	0.000000	0.462963
0.266667	0.045914	0.004285	0.000000	0.462963
0.300000	0.045914	0.004821	0.000000	0.462963
0.333333	0.045914	0.005357	0.000000	0.462963
0.366667	0.045914	0.005892	0.000000	0.462963
0.400000	0.045914	0.006428	0.000000	0.462963
0.433333	0.045914	0.006964	0.000000	0.462963
0.466667	0.045914	0.007499	0.000000	0.462963
0.500000	0.045914	0.008035	0.000000	0.462963
0.533333	0.045914	0.008571	0.000000	0.462963
0.566667	0.045914	0.009106	0.000000	0.462963
0.600000	0.045914	0.009642	0.000000	0.462963
0.633333	0.045914	0.010178	0.000000	0.462963
0.666667	0.045914	0.010713	0.000000	0.462963
0.700000	0.045914	0.011249	0.000000	0.462963
0.733333	0.045914	0.011785	0.000000	0.462963
0.766667	0.045914	0.012320	0.000000	0.462963
0.800000	0.045914	0.012856	0.000000	0.462963
0.833333	0.045914	0.013391	0.000000	0.462963
0.866667	0.045914	0.013927	0.000000	0.462963
0.900000	0.045914	0.014463	0.000000	0.462963
0.933333	0.045914	0.014998	0.000000	0.462963
0.966667	0.045914	0.015534	0.000000	0.462963
1.000000	0.045914	0.016070	0.000000	0.462963
1.033333	0.045914	0.016605	0.000000	0.462963
1.066667	0.045914	0.017141	0.000000	0.462963
1.100000	0.045914	0.017677	0.000000	0.462963
1.133333	0.045914	0.018212	0.000000	0.462963
1.166667	0.045914	0.018748	0.000000	0.462963
1.200000	0.045914	0.019284	0.000000	0.462963
1.233333	0.045914	0.019819	0.000000	0.462963
1.266667	0.045914	0.020355	0.000000	0.462963
1.300000	0.045914	0.020891	0.000000	0.462963
1.333333	0.045914	0.021426	0.000000	0.462963
1.366667	0.045914	0.021962	0.000000	0.462963
1.400000	0.045914	0.022498	0.000000	0.462963
1.433333	0.045914	0.023033	0.000000	0.462963
1.466667	0.045914	0.023569	0.000000	0.462963
1.500000	0.045914	0.024105	0.000000	0.462963
1.533333	0.045914	0.024640	0.000000	0.462963
1.566667	0.045914	0.025176	0.000000	0.462963
1.600000	0.045914	0.025712	0.000000	0.462963
1.633333	0.045914	0.026247	0.000000	0.462963
1.666667	0.045914	0.026783	0.000000	0.462963
1.700000	0.045914	0.027319	0.000000	0.462963
1.733333	0.045914	0.027854	0.000000	0.462963
1.766667	0.045914	0.028390	0.000000	0.462963
1.800000	0.045914	0.028926	0.000000	0.462963
1.833333	0.045914	0.029461	0.000000	0.462963
1.866667	0.045914	0.029997	0.000000	0.462963
1.900000	0.045914	0.030533	0.000000	0.462963
1.933333	0.045914	0.031068	0.000000	0.462963
1.966667	0.045914	0.031604	0.000000	0.462963
2.000000	0.045914	0.032140	0.000000	0.462963
2.033333	0.045914	0.032675	0.000000	0.462963
2.066667	0.045914	0.033211	0.000000	0.462963
2.100000	0.045914	0.033747	0.000000	0.462963
2.133333	0.045914	0.034282	0.000000	0.462963
2.166667	0.045914	0.034818	0.000000	0.462963
2.200000	0.045914	0.035354	0.000000	0.462963
2.233333	0.045914	0.035889	0.000000	0.462963
2.266667	0.045914	0.036425	0.000000	0.462963
2.300000	0.045914	0.036961	0.000000	0.462963
2.333333	0.045914	0.037496	0.000000	0.462963
2.366667	0.045914	0.038032	0.000000	0.462963
2.400000	0.045914	0.038567	0.000000	0.462963
2.433333	0.045914	0.039103	0.000000	0.462963

```
  2.466667  0.045914  0.039639  0.000000  0.462963
  2.500000  0.045914  0.040174  0.000000  0.462963
  2.533333  0.045914  0.040710  0.000000  0.462963
  2.566667  0.045914  0.041246  0.000000  0.462963
  2.600000  0.045914  0.041781  0.000000  0.462963
  2.633333  0.045914  0.042317  0.000000  0.462963
  2.666667  0.045914  0.042853  0.000000  0.462963
  2.700000  0.045914  0.043388  0.000000  0.462963
  2.733333  0.045914  0.043924  0.000000  0.462963
  2.766667  0.045914  0.044460  0.000000  0.462963
  2.800000  0.045914  0.044995  0.000000  0.462963
  2.833333  0.045914  0.045531  0.000000  0.462963
  2.866667  0.045914  0.046067  0.000000  0.462963
  2.900000  0.045914  0.046602  0.000000  0.462963
  2.933333  0.045914  0.047138  0.000000  0.462963
  2.966667  0.045914  0.047674  0.000000  0.462963
  3.000000  0.045914  0.048209  0.000000  0.462963
  3.033333  0.045914  0.049740  0.064540  0.462963
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1992/ 4/16 21:30

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
92 2100.0     2166.7     2292.3
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1992/ 4/16 21:30

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 4000.0     -1.154E+04    2.8840  2.8840E+00      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1992/ 4/16 21:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
92 2.1000E+03 2166.7     2345.8
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1992/ 4/16 21:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 4000.0     -1.474E+04    3.6857     3.6857       2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1992/ 4/16 22: 0

RCHRES:     1
```

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	2100.0	2166.7	2428.7

ERROR/WARNING ID: 341 5

DATE/TIME: 1992/ 4/16 22: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	4000.0	-1.971E+04	4.9283	4.9283E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1992/ 4/16 22:15

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	2.1000E+03	2166.7	2262.9

ERROR/WARNING ID: 341 5

DATE/TIME: 1992/ 4/16 22:15

RCHRES: 1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	4000.0	-9.770E+03	2.4426	2.4426E+00	2

Disclaimer

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

LANDSCAPE

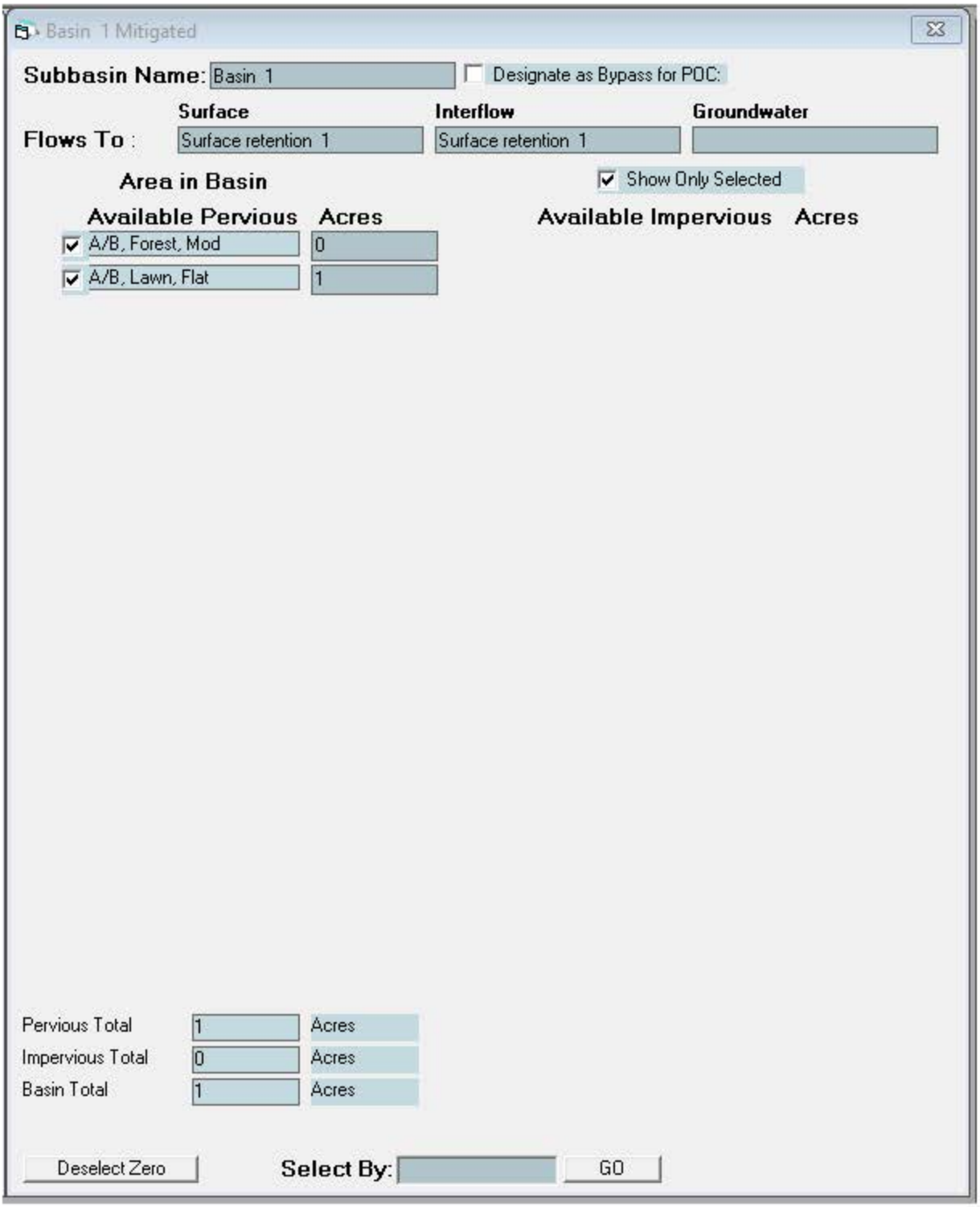
AREA CALCULATIONS

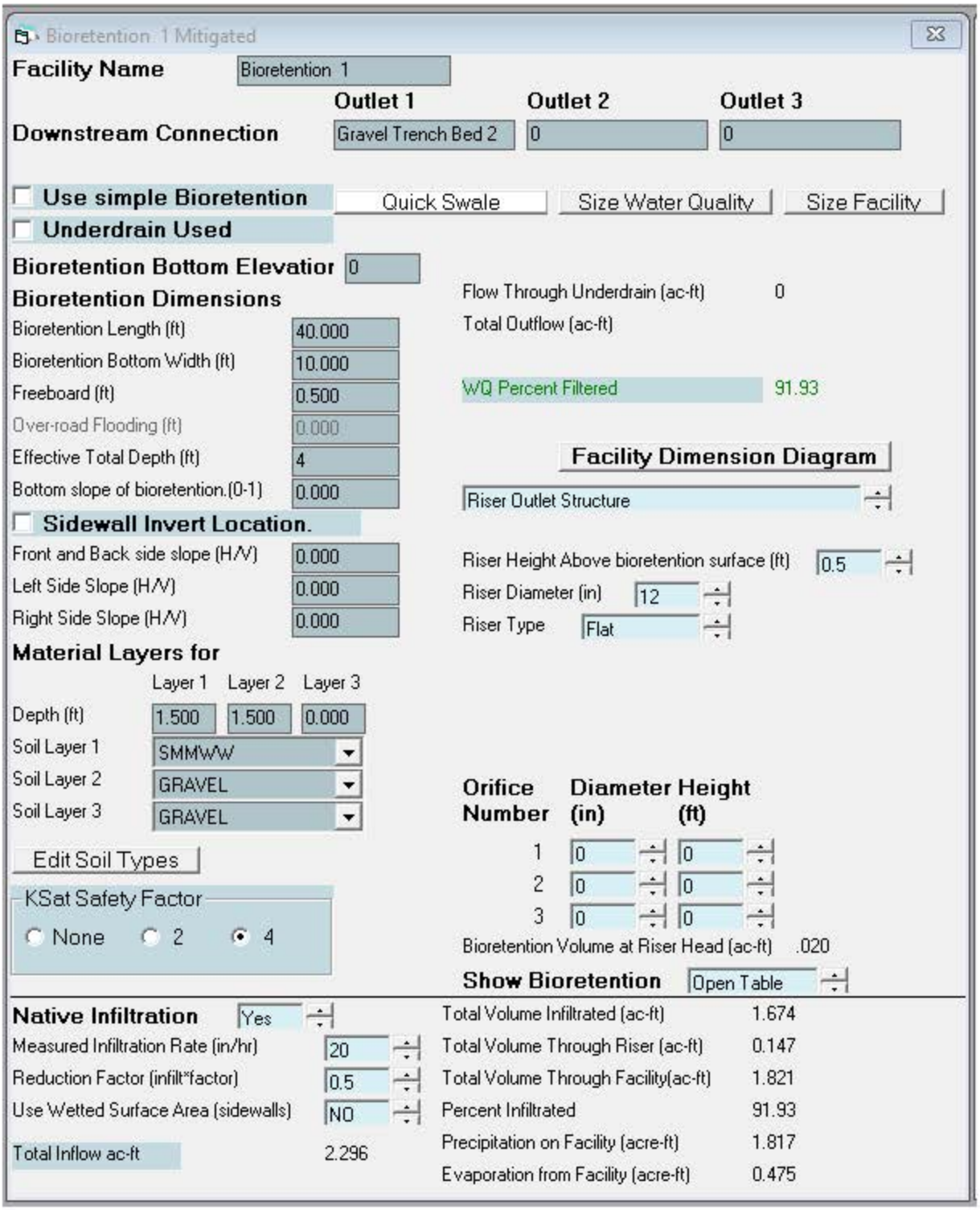
WWHM2012

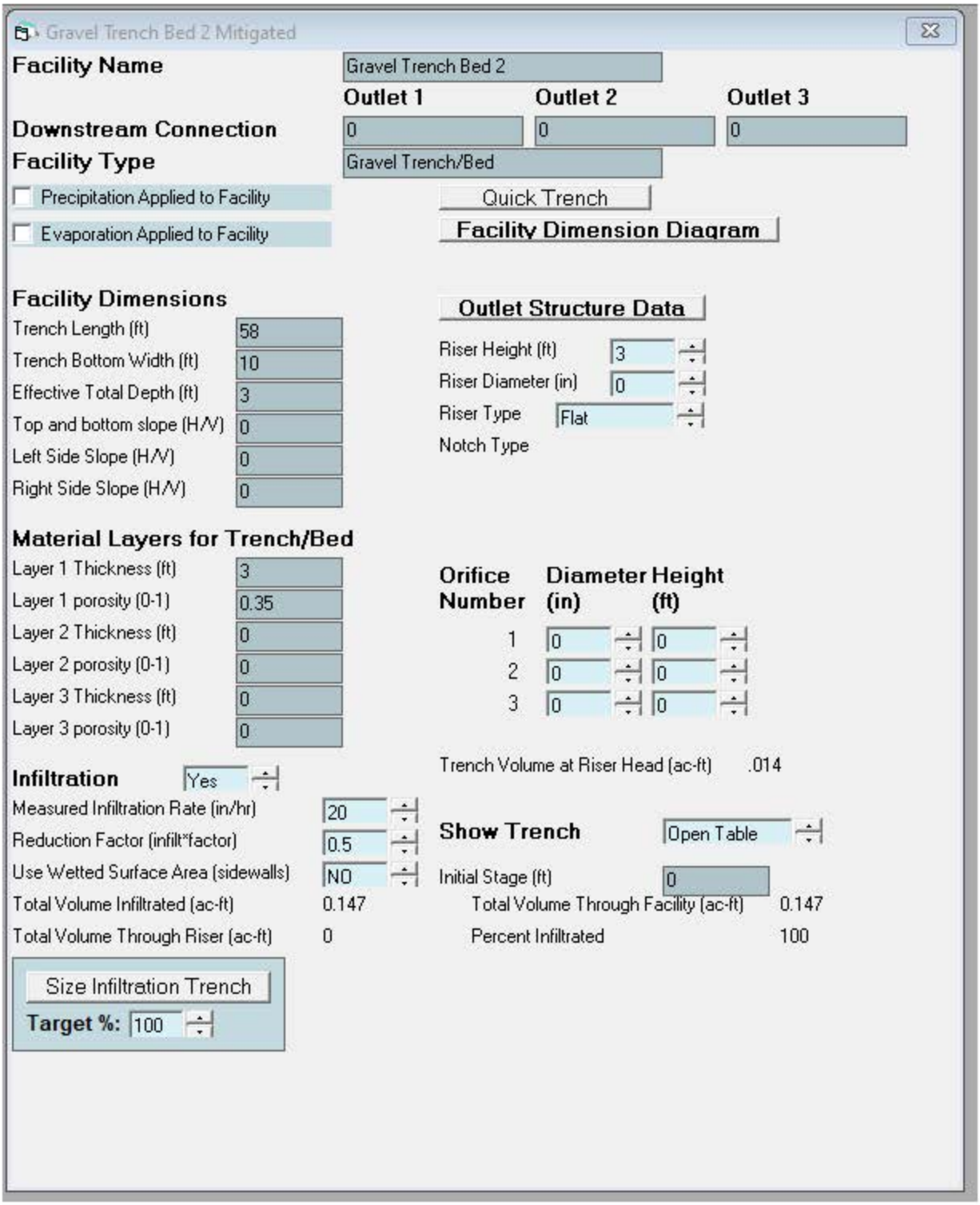
PROJECT REPORT

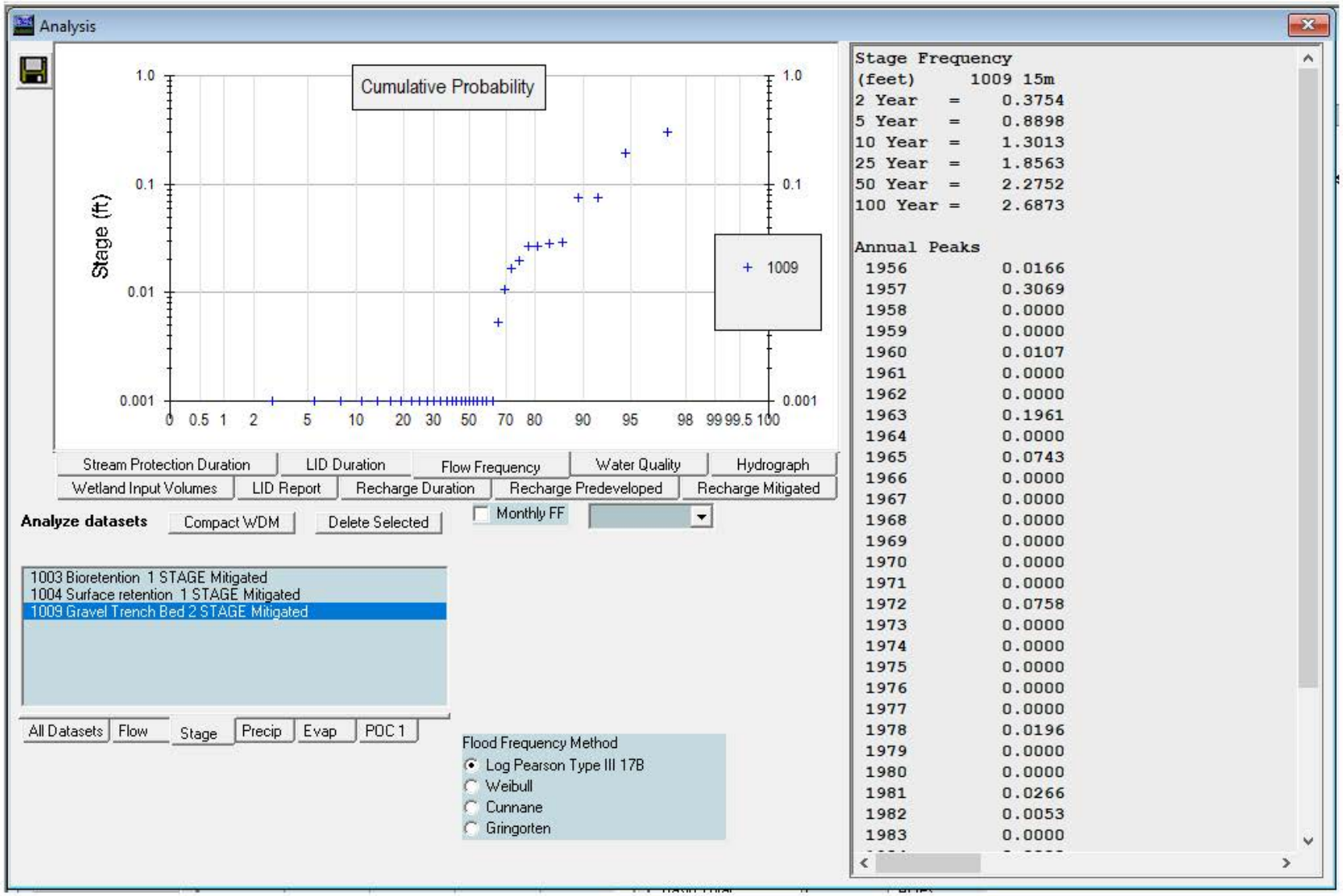
LANDSCAPE AREA CALCULATIONS

SCENARIOS
Predeveloped
Mitigated
Run Scenario
Basic Elements
Pro Elements
LID Toolbox
Commercial Toolbox
Move Elements
Save x,y
Load x,y
30
A1
A


Basin 1 Mitigated
Subbasin Name: Basin 1
Designate as Bypass for POC:
Surface
Interflow
Groundwater
Flows To :
Surface retention 1
Surface retention 1
Area in Basin
Show Only Selected
Available Pervious
Acres
Available Impervious
Acres
A/B, Forest, Mod
0
A/B, Lawn, Flat
1
Pervious Total
1
Acres
Impervious Total
0
Acres
Basin Total
1
Acres
Deselect Zero
Select By:
GO


Bioretention 1 Mitigated
Facility Name
Bioretention 1
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
Gravel Trench Bed 2
0
0
Use simple Bioretention
Quick Swale
Size Water Quality
Size Facility
Underdrain Used
Bioretention Bottom Elevatior
0
Bioretention Dimensions
Bioretention Length (ft)
40.000
Bioretention Bottom Width (ft)
10.000
Freeboard (ft)
0.500
Over-road Flooding (ft)
0.000
Effective Total Depth (ft)
4
Bottom slope of bioretention.(0-1)
0.000
Sidewall Invert Location.
Front and Back side slope (H/V)
0.000
Left Side Slope (H/V)
0.000
Right Side Slope (H/V)
0.000
Material Layers for
Layer 1
Layer 2
Layer 3
Depth (ft)
1.500
1.500
0.000
Soil Layer 1
SMMWW
Soil Layer 2
GRAVEL
Soil Layer 3
GRAVEL
Edit Soil Types
KSat Safety Factor
None
2
4
Flow Through Underdrain (ac-ft)
0
Total Outflow (ac-ft)
WQ Percent Filtered
91.93
Facility Dimension Diagram
Riser Outlet Structure
Riser Height Above bioretention surface (ft)
0.5
Riser Diameter (in)
12
Riser Type
Flat
Orifice Number
Diameter (in)
Height (ft)
1
0
0
2
0
0
3
0
0
Bioretention Volume at Riser Head (ac-ft)
.020
Show Bioretention
Open Table
Native Infiltration
Yes
Measured Infiltration Rate (in/hr)
20
Reduction Factor (infilt*factor)
0.5
Use Wetted Surface Area (sidewalls)
NO
Total Inflow ac-ft
2.296
Total Volume Infiltrated (ac-ft)
1.674
Total Volume Through Riser (ac-ft)
0.147
Total Volume Through Facility(ac-ft)
1.821
Percent Infiltrated
91.93
Precipitation on Facility (acre-ft)
1.817
Evaporation from Facility (acre-ft)
0.475


Gravel Trench Bed 2 Mitigated
Facility Name
Gravel Trench Bed 2
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
0
0
0
Facility Type
Gravel Trench/Bed
Precipitation Applied to Facility
Evaporation Applied to Facility
Quick Trench
Facility Dimension Diagram
Facility Dimensions
Trench Length (ft) 58
Trench Bottom Width (ft) 10
Effective Total Depth (ft) 3
Top and bottom slope (H/V) 0
Left Side Slope (H/V) 0
Right Side Slope (H/V) 0
Outlet Structure Data
Riser Height (ft) 3
Riser Diameter (in) 0
Riser Type Flat
Notch Type
Material Layers for Trench/Bed
Layer 1 Thickness (ft) 3
Layer 1 porosity (0-1) 0.35
Layer 2 Thickness (ft) 0
Layer 2 porosity (0-1) 0
Layer 3 Thickness (ft) 0
Layer 3 porosity (0-1) 0
Orifice Number
Diameter (in)
Height (ft)
1 0 0
2 0 0
3 0 0
Trench Volume at Riser Head (ac-ft) .014
Infiltration Yes
Measured Infiltration Rate (in/hr) 20
Reduction Factor (infilt*factor) 0.5
Use Wetted Surface Area (sidewalls) NO
Total Volume Infiltrated (ac-ft) 0.147
Total Volume Through Riser (ac-ft) 0
Show Trench
Open Table
Initial Stage (ft) 0
Total Volume Through Facility (ac-ft) 0.147
Percent Infiltrated 100
Size Infiltration Trench
Target %: 100


Analysis
Cumulative Probability
Stage (ft)
1.0
0.1
0.01
0.001
0 0.5 1 2 5 10 20 30 50 70 80 90 95 98 99 99.5 100
1009
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
Recharge Duration
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
1003 Bioretention 1 STAGE Mitigated
1004 Surface retention 1 STAGE Mitigated
1009 Gravel Trench Bed 2 STAGE Mitigated
All Datasets
Flow
Stage
Precip
Evap
POC 1
Flood Frequency Method
Log Pearson Type III 17B
Weibull
Cunnane
Gringorten
Stage Frequency
(feet) 1009 15m
2 Year = 0.3754
5 Year = 0.8898
10 Year = 1.3013
25 Year = 1.8563
50 Year = 2.2752
100 Year = 2.6873
Annual Peaks
1956 0.0166
1957 0.3069
1958 0.0000
1959 0.0000
1960 0.0107
1961 0.0000
1962 0.0000
1963 0.1961
1964 0.0000
1965 0.0743
1966 0.0000
1967 0.0000
1968 0.0000
1969 0.0000
1970 0.0000
1971 0.0000
1972 0.0758
1973 0.0000
1974 0.0000
1975 0.0000
1976 0.0000
1977 0.0000
1978 0.0196
1979 0.0000
1980 0.0000
1981 0.0266
1982 0.0053
1983 0.0000

General Model Information

Project Name:	10367.e.Nisqually.MIXED.USE.1ac.landscape
Site Name:	Nisqually MU
Site Address:	
City:	
Report Date:	4/12/2023
Gage:	Fairgrounds (Kaiser)
Data Start:	1955/10/01
Data End:	2011/09/30
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Forest, Mod	1
Pervious Total	1
Impervious Land Use	acre
Impervious Total	0
Basin Total	1

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Lawn, Flat	1
Pervious Total	1
Impervious Land Use	acre
Impervious Total	0
Basin Total	1

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 1	Surface retention 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bioretention 1

Bottom Length: 40.00 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: SMMWW
Material thickness of second layer: 1.5
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Infiltration On
Infiltration rate: 20
Infiltration safety factor: 0.5
Total Volume Infiltrated (ac-ft.): 1.674
Total Volume Through Riser (ac-ft.): 0.147
Total Volume Through Facility (ac-ft.): 1.821
Percent Infiltrated: 91.93
Total Precip Applied to Facility: 1.817
Total Evap From Facility: 0.475
Underdrain not used
Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 12 in.
Element Flows To:
Outlet 1 Outlet 2
Gravel Trench Bed 2

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0092	0.0000	0.0000	0.0000
0.0440	0.0092	0.0002	0.0000	0.0000
0.0879	0.0092	0.0003	0.0000	0.0000
0.1319	0.0092	0.0005	0.0000	0.0000
0.1758	0.0092	0.0006	0.0000	0.0000
0.2198	0.0092	0.0008	0.0000	0.0001
0.2637	0.0092	0.0010	0.0000	0.0001
0.3077	0.0092	0.0011	0.0000	0.0002
0.3516	0.0092	0.0013	0.0000	0.0002
0.3956	0.0092	0.0015	0.0000	0.0003
0.4396	0.0092	0.0016	0.0000	0.0004
0.4835	0.0092	0.0018	0.0000	0.0006
0.5275	0.0092	0.0019	0.0000	0.0007
0.5714	0.0092	0.0021	0.0000	0.0009
0.6154	0.0092	0.0023	0.0000	0.0011
0.6593	0.0092	0.0024	0.0000	0.0013
0.7033	0.0092	0.0026	0.0000	0.0014
0.7473	0.0092	0.0028	0.0000	0.0016
0.7912	0.0092	0.0029	0.0000	0.0019
0.8352	0.0092	0.0031	0.0000	0.0022
0.8791	0.0092	0.0032	0.0000	0.0026
0.9231	0.0092	0.0034	0.0000	0.0029
0.9670	0.0092	0.0036	0.0000	0.0034
1.0110	0.0092	0.0037	0.0000	0.0035
1.0549	0.0092	0.0039	0.0000	0.0038
1.0989	0.0092	0.0041	0.0000	0.0043

1.1429	0.0092	0.0042	0.0000	0.0048
1.1868	0.0092	0.0044	0.0000	0.0053
1.2308	0.0092	0.0045	0.0000	0.0059
1.2747	0.0092	0.0047	0.0000	0.0065
1.3187	0.0092	0.0049	0.0000	0.0067
1.3626	0.0092	0.0050	0.0000	0.0072
1.4066	0.0092	0.0052	0.0000	0.0079
1.4505	0.0092	0.0053	0.0000	0.0086
1.4945	0.0092	0.0055	0.0000	0.0094
1.5385	0.0092	0.0057	0.0000	0.0102
1.5824	0.0092	0.0058	0.0000	0.0111
1.6264	0.0092	0.0060	0.0000	0.0112
1.6703	0.0092	0.0062	0.0000	0.0120
1.7143	0.0092	0.0063	0.0000	0.0129
1.7582	0.0092	0.0065	0.0000	0.0138
1.8022	0.0092	0.0067	0.0000	0.0185
1.8462	0.0092	0.0069	0.0000	0.0185
1.8901	0.0092	0.0070	0.0000	0.0185
1.9341	0.0092	0.0072	0.0000	0.0185
1.9780	0.0092	0.0074	0.0000	0.0185
2.0220	0.0092	0.0075	0.0000	0.0185
2.0659	0.0092	0.0077	0.0000	0.0185
2.1099	0.0092	0.0079	0.0000	0.0185
2.1538	0.0092	0.0080	0.0000	0.0185
2.1978	0.0092	0.0082	0.0000	0.0185
2.2418	0.0092	0.0084	0.0000	0.0185
2.2857	0.0092	0.0085	0.0000	0.0185
2.3297	0.0092	0.0087	0.0000	0.0185
2.3736	0.0092	0.0089	0.0000	0.0185
2.4176	0.0092	0.0090	0.0000	0.0185
2.4615	0.0092	0.0092	0.0000	0.0185
2.5055	0.0092	0.0094	0.0000	0.0185
2.5495	0.0092	0.0095	0.0000	0.0185
2.5934	0.0092	0.0097	0.0000	0.0185
2.6374	0.0092	0.0099	0.0000	0.0185
2.6813	0.0092	0.0100	0.0000	0.0185
2.7253	0.0092	0.0102	0.0000	0.0185
2.7692	0.0092	0.0104	0.0000	0.0185
2.8132	0.0092	0.0105	0.0000	0.0185
2.8571	0.0092	0.0107	0.0000	0.0185
2.9011	0.0092	0.0109	0.0000	0.0185
2.9451	0.0092	0.0110	0.0000	0.0185
2.9890	0.0092	0.0112	0.0000	0.0185
3.0000	0.0092	0.0112	0.0000	0.0185

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.0092	0.0112	0.0000	0.0139	0.0000
3.0440	0.0092	0.0117	0.0000	0.0139	0.0000
3.0879	0.0092	0.0121	0.0000	0.0147	0.0000
3.1319	0.0092	0.0125	0.0000	0.0151	0.0000
3.1758	0.0092	0.0129	0.0000	0.0155	0.0000
3.2198	0.0092	0.0133	0.0000	0.0159	0.0000
3.2637	0.0092	0.0137	0.0000	0.0163	0.0000
3.3077	0.0092	0.0141	0.0000	0.0167	0.0000
3.3516	0.0092	0.0145	0.0000	0.0171	0.0000
3.3956	0.0092	0.0149	0.0000	0.0176	0.0000
3.4396	0.0092	0.0153	0.0000	0.0180	0.0000

3.4835	0.0092	0.0157	0.0000	0.0184	0.0000
3.5275	0.0092	0.0161	0.0483	0.0188	0.0000
3.5714	0.0092	0.0165	0.2020	0.0192	0.0000
3.6154	0.0092	0.0169	0.4122	0.0196	0.0000
3.6593	0.0092	0.0173	0.6597	0.0200	0.0000
3.7033	0.0092	0.0177	0.9282	0.0204	0.0000
3.7473	0.0092	0.0181	1.2008	0.0208	0.0000
3.7912	0.0092	0.0185	1.4606	0.0212	0.0000
3.8352	0.0092	0.0189	1.6924	0.0216	0.0000
3.8791	0.0092	0.0193	1.8845	0.0220	0.0000
3.9231	0.0092	0.0197	2.0318	0.0224	0.0000
3.9670	0.0092	0.0201	2.1391	0.0228	0.0000
4.0000	0.0092	0.0204	2.2515	0.0231	0.0000

Surface retention 1

Element Flows To:

Outlet 1	Outlet 2
Gravel Trench Bed 2	Bioretention 1

Gravel Trench Bed 2

Bottom Length:	58.00 ft.
Bottom Width:	10.00 ft.
Trench bottom slope 1:	0 To 1
Trench Left side slope 0:	0 To 1
Trench right side slope 2:	0 To 1
Material thickness of first layer:	3
Pour Space of material for first layer:	0.35
Material thickness of second layer:	0
Pour Space of material for second layer:	0
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	20
Infiltration safety factor:	0.5
Total Volume Infiltrated (ac-ft.):	0.147
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	0.147
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	0 in.

Element Flows To:
Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.013	0.000	0.000	0.000
0.0333	0.013	0.000	0.000	0.134
0.0667	0.013	0.000	0.000	0.134
0.1000	0.013	0.000	0.000	0.134
0.1333	0.013	0.000	0.000	0.134
0.1667	0.013	0.000	0.000	0.134
0.2000	0.013	0.000	0.000	0.134
0.2333	0.013	0.001	0.000	0.134
0.2667	0.013	0.001	0.000	0.134
0.3000	0.013	0.001	0.000	0.134
0.3333	0.013	0.001	0.000	0.134
0.3667	0.013	0.001	0.000	0.134
0.4000	0.013	0.001	0.000	0.134
0.4333	0.013	0.002	0.000	0.134
0.4667	0.013	0.002	0.000	0.134
0.5000	0.013	0.002	0.000	0.134
0.5333	0.013	0.002	0.000	0.134
0.5667	0.013	0.002	0.000	0.134
0.6000	0.013	0.002	0.000	0.134
0.6333	0.013	0.003	0.000	0.134
0.6667	0.013	0.003	0.000	0.134
0.7000	0.013	0.003	0.000	0.134
0.7333	0.013	0.003	0.000	0.134
0.7667	0.013	0.003	0.000	0.134
0.8000	0.013	0.003	0.000	0.134
0.8333	0.013	0.003	0.000	0.134

0.8667	0.013	0.004	0.000	0.134
0.9000	0.013	0.004	0.000	0.134
0.9333	0.013	0.004	0.000	0.134
0.9667	0.013	0.004	0.000	0.134
1.0000	0.013	0.004	0.000	0.134
1.0333	0.013	0.004	0.000	0.134
1.0667	0.013	0.005	0.000	0.134
1.1000	0.013	0.005	0.000	0.134
1.1333	0.013	0.005	0.000	0.134
1.1667	0.013	0.005	0.000	0.134
1.2000	0.013	0.005	0.000	0.134
1.2333	0.013	0.005	0.000	0.134
1.2667	0.013	0.005	0.000	0.134
1.3000	0.013	0.006	0.000	0.134
1.3333	0.013	0.006	0.000	0.134
1.3667	0.013	0.006	0.000	0.134
1.4000	0.013	0.006	0.000	0.134
1.4333	0.013	0.006	0.000	0.134
1.4667	0.013	0.006	0.000	0.134
1.5000	0.013	0.007	0.000	0.134
1.5333	0.013	0.007	0.000	0.134
1.5667	0.013	0.007	0.000	0.134
1.6000	0.013	0.007	0.000	0.134
1.6333	0.013	0.007	0.000	0.134
1.6667	0.013	0.007	0.000	0.134
1.7000	0.013	0.007	0.000	0.134
1.7333	0.013	0.008	0.000	0.134
1.7667	0.013	0.008	0.000	0.134
1.8000	0.013	0.008	0.000	0.134
1.8333	0.013	0.008	0.000	0.134
1.8667	0.013	0.008	0.000	0.134
1.9000	0.013	0.008	0.000	0.134
1.9333	0.013	0.009	0.000	0.134
1.9667	0.013	0.009	0.000	0.134
2.0000	0.013	0.009	0.000	0.134
2.0333	0.013	0.009	0.000	0.134
2.0667	0.013	0.009	0.000	0.134
2.1000	0.013	0.009	0.000	0.134
2.1333	0.013	0.009	0.000	0.134
2.1667	0.013	0.010	0.000	0.134
2.2000	0.013	0.010	0.000	0.134
2.2333	0.013	0.010	0.000	0.134
2.2667	0.013	0.010	0.000	0.134
2.3000	0.013	0.010	0.000	0.134
2.3333	0.013	0.010	0.000	0.134
2.3667	0.013	0.011	0.000	0.134
2.4000	0.013	0.011	0.000	0.134
2.4333	0.013	0.011	0.000	0.134
2.4667	0.013	0.011	0.000	0.134
2.5000	0.013	0.011	0.000	0.134
2.5333	0.013	0.011	0.000	0.134
2.5667	0.013	0.012	0.000	0.134
2.6000	0.013	0.012	0.000	0.134
2.6333	0.013	0.012	0.000	0.134
2.6667	0.013	0.012	0.000	0.134
2.7000	0.013	0.012	0.000	0.134
2.7333	0.013	0.012	0.000	0.134
2.7667	0.013	0.012	0.000	0.134

2.8000	0.013	0.013	0.000	0.134
2.8333	0.013	0.013	0.000	0.134
2.8667	0.013	0.013	0.000	0.134
2.9000	0.013	0.013	0.000	0.134
2.9333	0.013	0.013	0.000	0.134
2.9667	0.013	0.013	0.000	0.134
3.0000	0.013	0.014	0.000	0.134

Analysis Results

POC 1

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic

Predeveloped UCI File

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   10367.e.Nisqually.MIXED.USE.1ac.landscape.wdm
MESSU       25   Mit10367.e.Nisqually.MIXED.USE.1ac.landscape.MES
            27   Mit10367.e.Nisqually.MIXED.USE.1ac.landscape.L61
            28   Mit10367.e.Nisqually.MIXED.USE.1ac.landscape.L62
            30   POC10367.e.Nisqually.MIXED.USE.1ac.landscape1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       7
      GENER        2
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Surface retention  1        MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
    7     A/B, Lawn, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
    7         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
    7         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
    7         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
    7              0         5       0.8       400      0.05       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    7              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    7            0.1       0.5      0.25         0       0.7      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
    7              0         0         0         0         3         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
```

```
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND   7                          1     RCHRES   1      2
PERLND   7                          1     RCHRES   1      3

******Routing******
PERLND   7                          1     COPY     1     12
PERLND   7                          1     COPY     1     13
RCHRES   2                          1     RCHRES   3      7
RCHRES   1                          1     RCHRES   3      7
RCHRES   1                          1     RCHRES   2      8
RCHRES   2                          1     COPY   501     17
RCHRES   1                          1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0011111     RCHRES   1     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                       in  out                              ***
    1     Surface retentio-006    2    1    1    1   28    0    1
    2     Bioretention  1         2    1    1    1   28    0    1
    3     Gravel Trench Be-007    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
```

```
    1        0  1  0  0    4  5  0  0  0       0  1  0  0  0       2  1  2  2  2
    2        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50        ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
    1              1      0.01       0.0       0.0       0.0       0.0
    2              2      0.01       0.0       0.0       0.0       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                          ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                           addr
***                          <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL              4
  UVQUAN v2m2   GLOBAL     WORKSP  1        3
  UVQUAN vpo2   GLOBAL     WORKSP  2        3
  UVQUAN v2d2   GENER    2 K       1        3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   2                               v2m2           =  506.6
*** Compute remaining available pore space
  GENER   2                               vpo2           =  v2m2
  GENER   2                               vpo2          -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                               vpo2           =  0.0
END IF
*** Infiltration volume
  GENER   2                               v2d2           =  vpo2
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   70    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.009183  0.000000  0.000000  0.000000
  0.043956  0.009183  0.000162  0.000000  0.000000
  0.087912  0.009183  0.000324  0.000000  0.000000
  0.131868  0.009183  0.000486  0.000000  0.000000
  0.175824  0.009183  0.000648  0.000000  0.000000
  0.219780  0.009183  0.000810  0.000000  0.000058
  0.263736  0.009183  0.000972  0.000000  0.000100
  0.307692  0.009183  0.001134  0.000000  0.000158
  0.351648  0.009183  0.001296  0.000000  0.000232
  0.395604  0.009183  0.001459  0.000000  0.000325
  0.439560  0.009183  0.001621  0.000000  0.000438
```

```
0.483516  0.009183  0.001783  0.000000  0.000572
0.527473  0.009183  0.001945  0.000000  0.000730
0.571429  0.009183  0.002107  0.000000  0.000911
0.615385  0.009183  0.002269  0.000000  0.001117
0.659341  0.009183  0.002431  0.000000  0.001350
0.703297  0.009183  0.002593  0.000000  0.001441
0.747253  0.009183  0.002755  0.000000  0.001610
0.791209  0.009183  0.002917  0.000000  0.001898
0.835165  0.009183  0.003079  0.000000  0.002216
0.879121  0.009183  0.003241  0.000000  0.002564
0.923077  0.009183  0.003403  0.000000  0.002943
0.967033  0.009183  0.003565  0.000000  0.003354
1.010989  0.009183  0.003727  0.000000  0.003483
1.054945  0.009183  0.003889  0.000000  0.003798
1.098901  0.009183  0.004052  0.000000  0.004276
1.142857  0.009183  0.004214  0.000000  0.004789
1.186813  0.009183  0.004376  0.000000  0.005336
1.230769  0.009183  0.004538  0.000000  0.005920
1.274725  0.009183  0.004700  0.000000  0.006540
1.318681  0.009183  0.004862  0.000000  0.006668
1.362637  0.009183  0.005024  0.000000  0.007198
1.406593  0.009183  0.005186  0.000000  0.007894
1.450549  0.009183  0.005348  0.000000  0.008628
1.494505  0.009183  0.005510  0.000000  0.009402
1.538462  0.009183  0.005678  0.000000  0.010214
1.582418  0.009183  0.005845  0.000000  0.011065
1.626374  0.009183  0.006013  0.000000  0.011158
1.670330  0.009183  0.006180  0.000000  0.011955
1.714286  0.009183  0.006348  0.000000  0.012880
1.758242  0.009183  0.006515  0.000000  0.013815
1.802198  0.009183  0.006683  0.000000  0.018519
1.846154  0.009183  0.006850  0.000000  0.018519
1.890110  0.009183  0.007018  0.000000  0.018519
1.934066  0.009183  0.007185  0.000000  0.018519
1.978022  0.009183  0.007353  0.000000  0.018519
2.021978  0.009183  0.007520  0.000000  0.018519
2.065934  0.009183  0.007688  0.000000  0.018519
2.109890  0.009183  0.007855  0.000000  0.018519
2.153846  0.009183  0.008023  0.000000  0.018519
2.197802  0.009183  0.008190  0.000000  0.018519
2.241758  0.009183  0.008358  0.000000  0.018519
2.285714  0.009183  0.008525  0.000000  0.018519
2.329670  0.009183  0.008693  0.000000  0.018519
2.373626  0.009183  0.008860  0.000000  0.018519
2.417582  0.009183  0.009028  0.000000  0.018519
2.461538  0.009183  0.009195  0.000000  0.018519
2.505495  0.009183  0.009363  0.000000  0.018519
2.549451  0.009183  0.009530  0.000000  0.018519
2.593407  0.009183  0.009698  0.000000  0.018519
2.637363  0.009183  0.009865  0.000000  0.018519
2.681319  0.009183  0.010033  0.000000  0.018519
2.725275  0.009183  0.010200  0.000000  0.018519
2.769231  0.009183  0.010368  0.000000  0.018519
2.813187  0.009183  0.010535  0.000000  0.018519
2.857143  0.009183  0.010703  0.000000  0.018519
2.901099  0.009183  0.010870  0.000000  0.018519
2.945055  0.009183  0.011038  0.000000  0.018519
2.989011  0.009183  0.011205  0.000000  0.018519
3.000000  0.009183  0.011630  0.000000  0.018519
END FTABLE  2
FTABLE      1
 24    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.009183  0.000000  0.000000  0.000000
0.043956  0.009183  0.000404  0.000000  0.013889
0.087912  0.009183  0.000807  0.000000  0.014703
0.131868  0.009183  0.001211  0.000000  0.015110
0.175824  0.009183  0.001615  0.000000  0.015517
0.219780  0.009183  0.002018  0.000000  0.015924
```

```
0.263736  0.009183  0.002422  0.000000  0.016331
0.307692  0.009183  0.002825  0.000000  0.016738
0.351648  0.009183  0.003229  0.000000  0.017145
0.395604  0.009183  0.003633  0.000000  0.017552
0.439560  0.009183  0.004036  0.000000  0.017959
0.483516  0.009183  0.004440  0.000000  0.018366
0.527473  0.009183  0.004844  0.048301  0.018773
0.571429  0.009183  0.005247  0.202028  0.019180
0.615385  0.009183  0.005651  0.412175  0.019587
0.659341  0.009183  0.006055  0.659695  0.019994
0.703297  0.009183  0.006458  0.928167  0.020401
0.747253  0.009183  0.006862  1.200769  0.020808
0.791209  0.009183  0.007265  1.460630  0.021215
0.835165  0.009183  0.007669  1.692395  0.021622
0.879121  0.009183  0.008073  1.884482  0.022029
0.923077  0.009183  0.008476  2.031838  0.022436
0.967033  0.009183  0.008880  2.139092  0.022843
1.000000  0.009183  0.009183  2.251466  0.023148
END FTABLE  1
FTABLE      3
 92    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.013315  0.000000  0.000000  0.000000
0.033333  0.013315  0.000155  0.000000  0.134259
0.066667  0.013315  0.000311  0.000000  0.134259
0.100000  0.013315  0.000466  0.000000  0.134259
0.133333  0.013315  0.000621  0.000000  0.134259
0.166667  0.013315  0.000777  0.000000  0.134259
0.200000  0.013315  0.000932  0.000000  0.134259
0.233333  0.013315  0.001087  0.000000  0.134259
0.266667  0.013315  0.001243  0.000000  0.134259
0.300000  0.013315  0.001398  0.000000  0.134259
0.333333  0.013315  0.001553  0.000000  0.134259
0.366667  0.013315  0.001709  0.000000  0.134259
0.400000  0.013315  0.001864  0.000000  0.134259
0.433333  0.013315  0.002019  0.000000  0.134259
0.466667  0.013315  0.002175  0.000000  0.134259
0.500000  0.013315  0.002330  0.000000  0.134259
0.533333  0.013315  0.002485  0.000000  0.134259
0.566667  0.013315  0.002641  0.000000  0.134259
0.600000  0.013315  0.002796  0.000000  0.134259
0.633333  0.013315  0.002951  0.000000  0.134259
0.666667  0.013315  0.003107  0.000000  0.134259
0.700000  0.013315  0.003262  0.000000  0.134259
0.733333  0.013315  0.003418  0.000000  0.134259
0.766667  0.013315  0.003573  0.000000  0.134259
0.800000  0.013315  0.003728  0.000000  0.134259
0.833333  0.013315  0.003884  0.000000  0.134259
0.866667  0.013315  0.004039  0.000000  0.134259
0.900000  0.013315  0.004194  0.000000  0.134259
0.933333  0.013315  0.004350  0.000000  0.134259
0.966667  0.013315  0.004505  0.000000  0.134259
1.000000  0.013315  0.004660  0.000000  0.134259
1.033333  0.013315  0.004816  0.000000  0.134259
1.066667  0.013315  0.004971  0.000000  0.134259
1.100000  0.013315  0.005126  0.000000  0.134259
1.133333  0.013315  0.005282  0.000000  0.134259
1.166667  0.013315  0.005437  0.000000  0.134259
1.200000  0.013315  0.005592  0.000000  0.134259
1.233333  0.013315  0.005748  0.000000  0.134259
1.266667  0.013315  0.005903  0.000000  0.134259
1.300000  0.013315  0.006058  0.000000  0.134259
1.333333  0.013315  0.006214  0.000000  0.134259
1.366667  0.013315  0.006369  0.000000  0.134259
1.400000  0.013315  0.006524  0.000000  0.134259
1.433333  0.013315  0.006680  0.000000  0.134259
1.466667  0.013315  0.006835  0.000000  0.134259
1.500000  0.013315  0.006990  0.000000  0.134259
1.533333  0.013315  0.007146  0.000000  0.134259
```

```
  1.566667  0.013315  0.007301  0.000000  0.134259
  1.600000  0.013315  0.007456  0.000000  0.134259
  1.633333  0.013315  0.007612  0.000000  0.134259
  1.666667  0.013315  0.007767  0.000000  0.134259
  1.700000  0.013315  0.007922  0.000000  0.134259
  1.733333  0.013315  0.008078  0.000000  0.134259
  1.766667  0.013315  0.008233  0.000000  0.134259
  1.800000  0.013315  0.008388  0.000000  0.134259
  1.833333  0.013315  0.008544  0.000000  0.134259
  1.866667  0.013315  0.008699  0.000000  0.134259
  1.900000  0.013315  0.008854  0.000000  0.134259
  1.933333  0.013315  0.009010  0.000000  0.134259
  1.966667  0.013315  0.009165  0.000000  0.134259
  2.000000  0.013315  0.009320  0.000000  0.134259
  2.033333  0.013315  0.009476  0.000000  0.134259
  2.066667  0.013315  0.009631  0.000000  0.134259
  2.100000  0.013315  0.009787  0.000000  0.134259
  2.133333  0.013315  0.009942  0.000000  0.134259
  2.166667  0.013315  0.010097  0.000000  0.134259
  2.200000  0.013315  0.010253  0.000000  0.134259
  2.233333  0.013315  0.010408  0.000000  0.134259
  2.266667  0.013315  0.010563  0.000000  0.134259
  2.300000  0.013315  0.010719  0.000000  0.134259
  2.333333  0.013315  0.010874  0.000000  0.134259
  2.366667  0.013315  0.011029  0.000000  0.134259
  2.400000  0.013315  0.011185  0.000000  0.134259
  2.433333  0.013315  0.011340  0.000000  0.134259
  2.466667  0.013315  0.011495  0.000000  0.134259
  2.500000  0.013315  0.011651  0.000000  0.134259
  2.533333  0.013315  0.011806  0.000000  0.134259
  2.566667  0.013315  0.011961  0.000000  0.134259
  2.600000  0.013315  0.012117  0.000000  0.134259
  2.633333  0.013315  0.012272  0.000000  0.134259
  2.666667  0.013315  0.012427  0.000000  0.134259
  2.700000  0.013315  0.012583  0.000000  0.134259
  2.733333  0.013315  0.012738  0.000000  0.134259
  2.766667  0.013315  0.012893  0.000000  0.134259
  2.800000  0.013315  0.013049  0.000000  0.134259
  2.833333  0.013315  0.013204  0.000000  0.134259
  2.866667  0.013315  0.013359  0.000000  0.134259
  2.900000  0.013315  0.013515  0.000000  0.134259
  2.933333  0.013315  0.013670  0.000000  0.134259
  2.966667  0.013315  0.013825  0.000000  0.134259
  3.000000  0.013315  0.013981  0.000000  0.134259
  3.033333  0.013315  0.014425  0.000000  0.134259
  END FTABLE  3
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.76           RCHRES   2     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   2 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1004 STAG     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1005 FLOW     ENGL      REPL
```

```
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1006 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1007 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1008 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1009 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

ERROR/WARNING ID: 341 6

DATE/TIME: 1991/ 4/ 4 16:15

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	715.06

ERROR/WARNING ID: 341 5

DATE/TIME: 1991/ 4/ 4 16:15

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-6.360E+03	5.4831	5.4831E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1991/ 4/ 4 16:30

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	832.37

ERROR/WARNING ID: 341 5

DATE/TIME: 1991/ 4/ 4 16:30

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-1.340E+04	11.548	11.548	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1991/ 4/ 4 16:45

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	982.86

ERROR/WARNING ID: 341 5

DATE/TIME: 1991/ 4/ 4 16:45

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-2.242E+04	19.330	19.330	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1991/ 4/ 4 17: 0

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	1180.2

ERROR/WARNING ID: 341 5

DATE/TIME: 1991/ 4/ 4 17: 0

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-3.426E+04	29.535	2.9535E+01	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1991/ 4/ 4 17:15

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	1395.3

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 17:15

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-4.716E+04	40.657	40.657	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 17:30

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	1631.0

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 17:30

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-6.129E+04	52.840	5.2840E+01	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 17:45

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	1876.0

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 17:45

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).

Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-7.599E+04	65.508	65.508	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 18: 0

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	2068.0

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 18: 0

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-8.751E+04	75.436	75.436	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 18:15

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	2132.1

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 18:15

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-9.135E+04	78.748	78.748	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 18:30

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	2156.4

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 18:30

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-9.281E+04	80.006	80.006	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 18:45

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	2176.9

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 18:45

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-9.404E+04	81.066	8.1066E+01	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 19: 0

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

```
NROWS         V1         V2        VOL
92 6.0901E+02  628.35    2159.9
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1991/ 4/ 4 19: 0

RCHRES:     3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 1160.0     -9.302E+04   80.189     80.189        2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1991/ 4/ 4 19:15

RCHRES:     3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
92  609.01     628.35    2094.4
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1991/ 4/ 4 19:15

RCHRES:     3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 1160.0     -8.909E+04   76.799     76.799        2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1991/ 4/ 4 19:30

RCHRES:     3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
92  609.01     628.35    1995.5
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1991/ 4/ 4 19:30

RCHRES:     3
```

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-8.316E+04	71.687	71.687	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 19:45

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	1874.6

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 19:45

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-7.591E+04	65.439	6.5439E+01	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 20: 0

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	1753.8

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 20: 0

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-6.866E+04	59.191	5.9191E+01	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 20:15

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	1633.0

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 20:15

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-6.141E+04	52.944	5.2944E+01	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 20:30

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	1512.1

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 20:30

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-5.417E+04	46.696	4.6696E+01	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 20:45

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the

simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	6.0901E+02	628.35	1391.3

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 20:45

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-4.692E+04	40.449	40.449	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1991/ 4/ 4 21: 0

RCHRES: 3

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92	609.01	628.35	1270.5

The count for the WARNING printed above has reached its maximum.

If the condition is encountered again the message will not be repeated.

ERROR/WARNING ID: 341   5

DATE/TIME: 1991/ 4/ 4 21: 0

RCHRES: 3

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	1160.0	-3.967E+04	34.201	3.4201E+01	2

Disclaimer

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

APPENDIX C

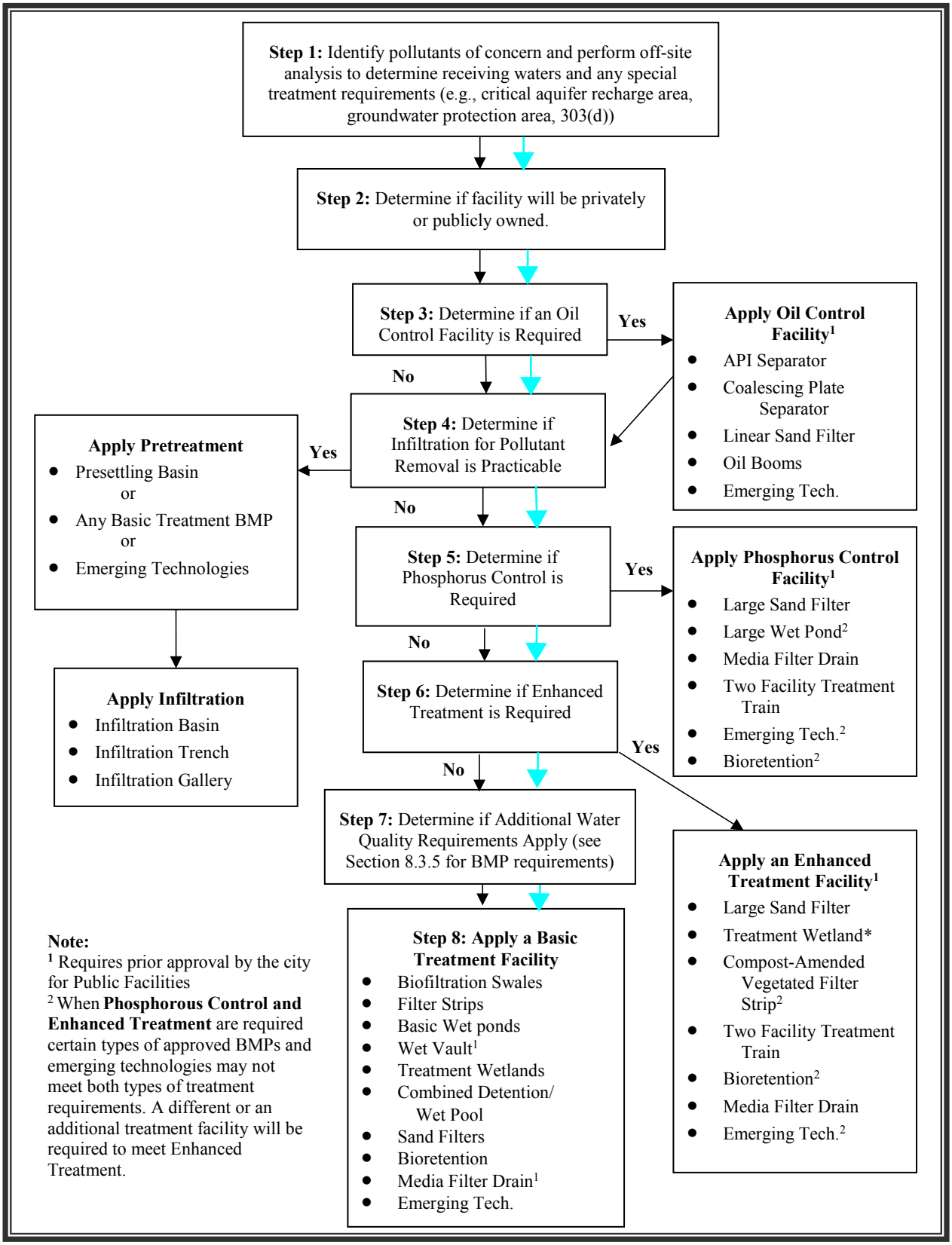


Figure 8.1. Treatment Facility Selection Flow Chart.

7.4.4 Bioretention Cells, Swales, and Planter Boxes (Ecology BMPs T5.14B and T7.30)

Description

Bioretention BMPs are shallow stormwater systems with a designed soil mix and plants adapted to the local climate and soil moisture conditions. Bioretention BMPs are designed to mimic a forested condition by controlling stormwater through detention, infiltration, and evapotranspiration. Bioretention BMPs also provide runoff treatment through sedimentation, filtration, adsorption, and phytoremediation.

Bioretention BMPs function by storing stormwater as surface ponding before it filters through the underlying amended soil. Stormwater that exceeds the surface storage capacity overflows to an adjacent drainage system. Treated water is infiltrated into the underlying soil.

The terms "bioretention" and "rain garden" are sometimes used interchangeably. Bioretention BMPs and rain gardens are applications of the same LID concept and can be highly effective for reducing surface runoff and removing pollutants. However, in the City (in accordance with Ecology's distinction), the term "bioretention" is used to describe an engineered BMP that includes designed soil mixes and perhaps underdrains and control structures. The term "rain garden" is used to describe a shallow landscaped depression on small project sites that only trigger Core Requirements #1 through #5. Rain gardens have less restrictive design criteria for the soil mix and do not include underdrains or other control structures. See Section 7.4.5 for more information on rain garden design.

The term bioretention is used to describe various designs using soil and plant complexes to manage stormwater. The following bioretention-related terminology is used in this manual:

- **Bioretention cells** are shallow depressions with a designed planting soil mix and a variety of plant material, including trees, shrubs, grasses, and/or other herbaceous plants. Bioretention cells may or may not have an underdrain and are not designed as a conveyance system. Bioretention cells can be configured as depressed landscape islands, larger basins, planters, or vegetated curb extensions.

- **Bioretention swales** incorporate the same design features as bioretention cells; however, bioretention swales are designed as part of a system that can convey stormwater when maximum ponding depth is exceeded. Bioretention swales have relatively gentle side slopes and ponding depths that are typically 6 to 12 inches.

- **Bioretention planters and planter boxes** incorporate designed soil mix and a variety of plant material including trees, shrubs, grasses, and/or other herbaceous plants within a vertical walled container usually constructed from formed concrete, but could include other materials. Planter boxes are completely impervious and include a bottom (must include an underdrain). Planters have an

open bottom and allow infiltration to the subgrade. These designs are often used in ultra-urban settings.

Note: Ecology has approved use of certain patented treatment systems that use specific, high flow rate media for treatment. These systems may be similar to bioretention BMPs, but unless specifically approved by Ecology are not considered on-site stormwater management BMPs and are not options for meeting the requirements of Core Requirement #5. The Ecology approval (General Use Level Designations only) is meant to be used to meet Core Requirement #6, where appropriate.

Figure 7.6 provides an example illustration of a bioretention BMP. See Figure 7.7 for an example of a bioretention planter. Refer to the DG&PWS for standard detail drawings.

Applications and Limitations

Bioretention provides effective removal of many stormwater pollutants by passing stormwater through a soil profile that meets specified characteristics. Bioretention BMPs that infiltrate stormwater into the ground can also serve a significant flow reduction function.

- Bioretention BMPs are an on-site stormwater management BMP option for:

  1) Projects that only have to comply with Core Requirements #1 through #5, and

  2) Projects that trigger Core Requirements #1 through #9.

- Bioretention can achieve the LID Performance Standard option or can be applied from the List #1 or List #2 option of Core Requirement #5.

- Bioretention BMPs may meet the Core Requirement #6 requirements for basic and enhanced treatment (see Chapter 2 and Chapter 8) when the bioretention soil meets the requirements described under the Bioretention Soil Mix subsection below.

- Bioretention can be designed to fully meet the flow control duration standard of Core Requirement #7. However, because they typically do not have an orifice restricting overflow or underflow discharge rates, most designs typically don't fully meet Core Requirement #7. Nonetheless, their performance contributes to meeting the standard, and that can result in much smaller flow control BMPs on the project site.

- Bioretention BMPs are particularly effective at flow control in locations where the underlying soil has a high infiltration rate. Where the native soils have low infiltration rates, underdrain systems can be installed and the BMP used to filter pollutants and detain flows that exceed infiltration capacity of the surrounding soil. However, designs utilizing underdrains provide less flow control benefits.

- Bioretention constructed with imported composted material should not be used within one-quarter mile of phosphorus-sensitive waterbodies if the underlying native soil does not meet the requirements for treatment soil provided in Chapter 8, Section 8.6.3.

- Bioretention constructed with imported composted material and underdrains are not allowed when the underdrain is upstream of a phosphorus-sensitive receiving water because preliminary monitoring indicates that bioretention BMPs constructed with imported composted material can add phosphorus to stormwater.

    - Phosphorus-sensitive waterbodies include:

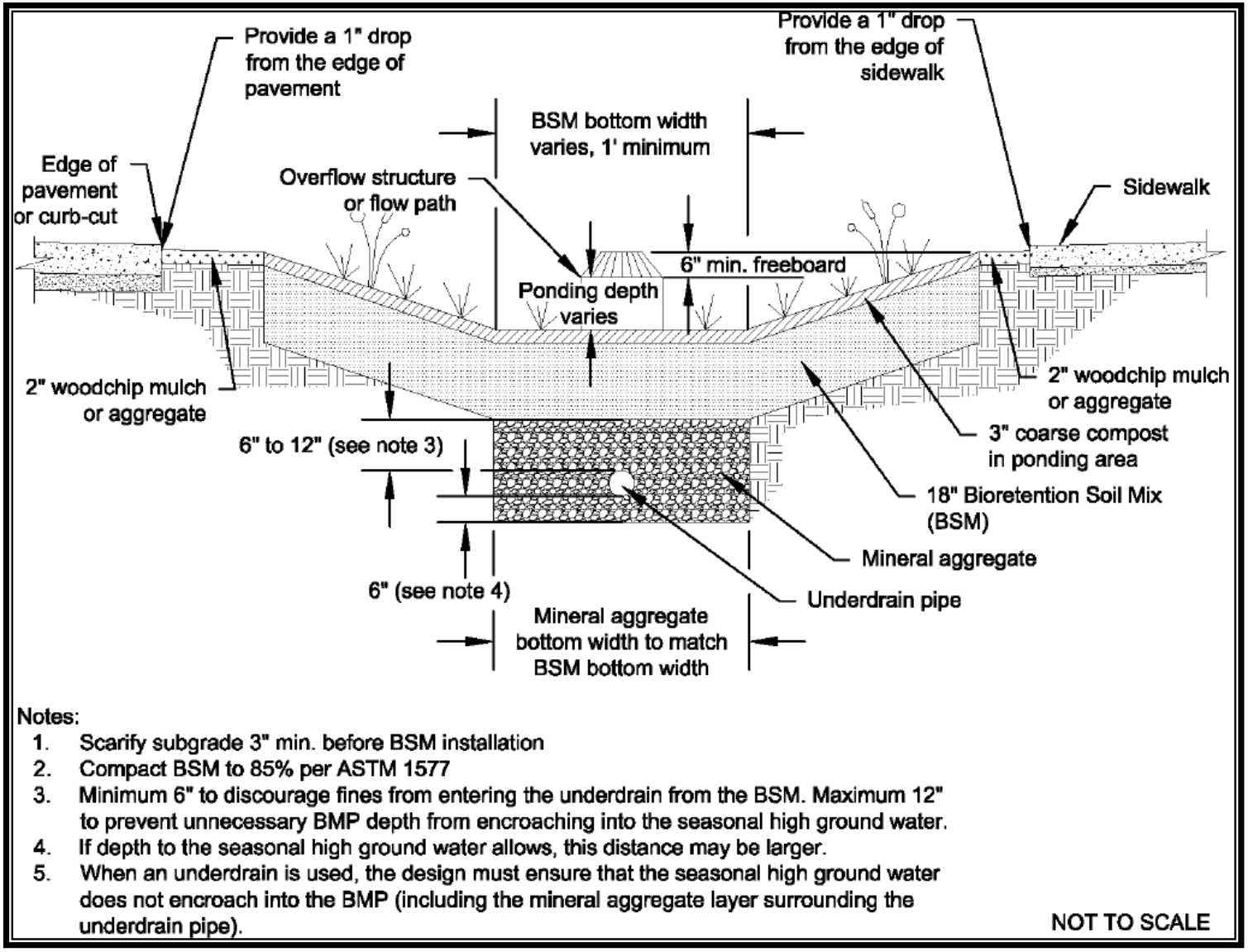
        - All lakes and ponds

        - Waterbodies listed in lake management plans, water quality improvement plans, or salmon recovery plans that recommend reducing sources of phosphorus in order to control aquatic plant growth

        - Surface waters listed on the state (303)d list for dissolved oxygen or pH due partly, or entirely, to elevated nutrient concentrations

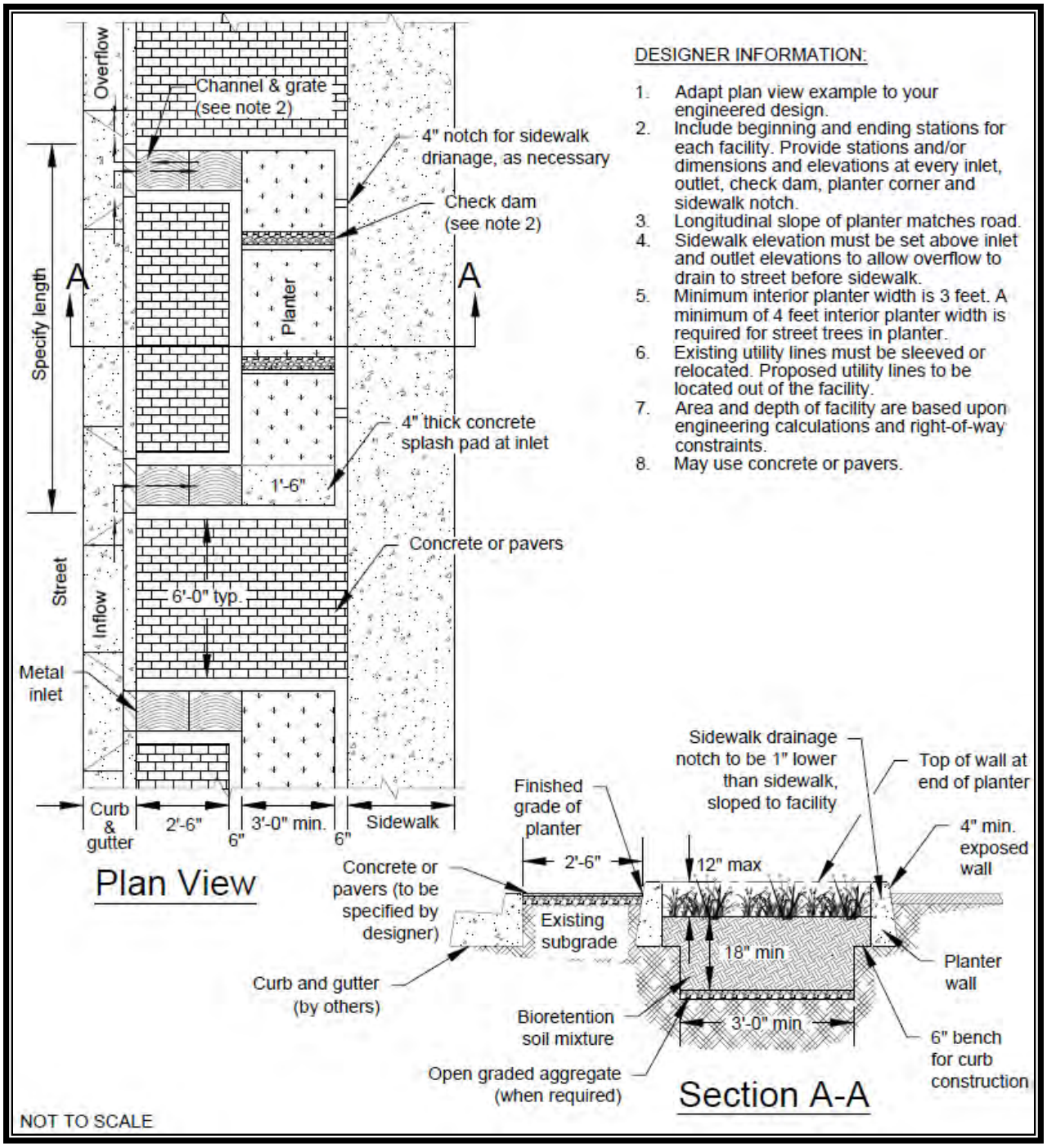
    - High-performance bioretention soil mixes may be used in locations near phosphorus-sensitive waterbodies. Refer to the latest guidance on using high-performance mixes, available on Ecology's website at: <https://fortress.wa.gov/ecy/publications/SummaryPages/2110023.html>

- Because bioretention BMPs use an imported soil mix that has a moderate design infiltration rate, they are best applied for small drainage areas, and near the source of the stormwater. Cells may be scattered throughout a subdivision, a swale may run alongside the access road, or a series of planter boxes may serve the road.



Source: Ecology

Figure 7.6. Bioretention (shown with optional underdrain).



Source: Ecology

Figure 7.7. Example of a Bioretention Planter.

- Bioretention BMPs are applicable to new development, redevelopment and retrofit projects. Typical applications with or without underdrains include:
    - Individual lots for managing rooftop, driveway, and other on-lot impervious surfaces.
    - Shared BMPs located in common areas for individual lots.
    - Areas within loop roads or cul-de-sacs.
    - Landscaped parking lot islands, where bioretention can be situated lower than the height of the parking lot surface so that stormwater runoff is directed as sheet flow into the bioretention BMP. This application, in concert with permeable surfaces in the parking lot, can greatly attenuate stormwater runoff.
    - Within rights-of-ways along roads (often linear bioretention swales and cells).
    - Common landscaped areas in apartment complexes or other multifamily housing designs.
    - Planters on building roofs, patios, and as part of streetscapes.

Infeasibility Criteria

See Appendix 7B for infeasibility criteria for bioretention. If one or more infeasibility criteria apply, bioretention is not required for consideration in the List #1 or List #2 option of Core Requirement #5. In addition, other bioretention design criteria and site limitations that make bioretention BMPs infeasible (e.g., setback requirements) may also be used to demonstrate infeasibility, subject to approval by the City. If a project proponent wishes to use a bioretention BMP, though is not required to because of these infeasibility criteria, they may propose a functional design to the City.

Other Site Suitability Factors

- **Utility conflicts:** Consult City requirements for horizontal and vertical separation required for publicly-owned utilities, such as sewer lines. Consult the appropriate franchise utility owners for separation requirements from their utilities, which may include communications, water, power, and gas. When separation requirements cannot be met, designs should include appropriate mitigation measures, such as impermeable liners over the utility, sleeving utilities, fixing known leaky joints or cracked conduits, and/or adding an underdrain to the bioretention.

- **Transportation safety:** The design configuration and selected plant types should provide adequate sight distances, clear zones, and appropriate setbacks for roadway applications in accordance with the City's requirements.

- **Ponding depth and surface water draw-down:** Flow control needs, as well as location in the development, and mosquito breeding cycles will determine draw-down timing. For example, front yards and entrances to residential or commercial developments may require rapid surface dewatering for aesthetics.

- **Impacts of surrounding activities:** Human activity influences the location of the BMP in the development. For example, locate bioretention BMPs away from traveled areas on individual lots to prevent soil compaction and damage to vegetation or provide elevated or bermed pathways in areas where foot traffic is inevitable and provide barriers, such as wheel stops, to restrict vehicle access in roadside applications.

- **Visual buffering:** Bioretention BMPs can be used to buffer structures from roads, enhance privacy among residences, and as an aesthetic site feature.

- **Site growing characteristics and plant selection:** Appropriate plants should be selected for sun exposure, soil moisture, and adjacent plant communities. Native species or hardy cultivars are recommended and can flourish in the properly designed and placed bioretention soil mix with no nutrient or pesticide inputs and 2 to 3 years of irrigation for establishment. Invasive species control will be required as typical with all planted landscape areas.

Modeling and Sizing

Bioretention BMPs receiving runoff from roads or a combination of roads and other impervious/pervious surfaces will be larger than rain gardens. For bioretention BMPs designed to meet Core Requirement #5, the bioretention BMP shall have a horizontally projected surface area below the overflow which is at least 5 percent of the total impervious surface area draining to it. If pervious areas will also be draining to the bioretention BMP, the horizontally projected surface area below the overflow shall be increased by 2 percent of the pervious area. For bioretention BMPs designed to meet Core Requirement #6 or #7, the bioretention BMP must be sized using an approved continuous simulation model.

Ecology's approval status for continuous simulation models is provided in the "Additional Resources" section of the 2019 Ecology Manual: <https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm>

When using continuous modeling to size bioretention BMPs, the assumptions listed in Table 7.3 shall be applied. It is recommended that bioretention cells be modeled as a layer of soil (with specified infiltration rate) with infiltration to underlying soil, ponding, and overflow. The bioretention soil is designed in accordance with the treatment soil requirements outlined in the design criteria below.

To meet Core Requirement #6, at least 91 percent of the influent runoff file produced using a continuous simulation model must be infiltrated. Applicable water quality design storm volume drawdown requirements must also be met (see Chapter 8).

If 91 percent of the influent runoff file cannot be infiltrated, the percent infiltrated may be subtracted from the 91 percent volume that must be treated, and downstream treatment BMPs may be significantly smaller as a result.

Table 7.3. Continuous Modeling Assumptions for Bioretention Cells.

Variable	Assumption
Computational Time Step	15 minutes
Inflows to BMP	Surface flow and interflow from drainage area routed to BMP
Precipitation and Evaporation Applied to BMP	Yes. If model does not apply precipitation and evaporation to BMP, include the BMP area in the basin area (note that this will underestimate the evaporation of ponded water).
Bioretention Soil Mix Measured Infiltration Rate	For imported soil, rate is 12 inch per hour before applying the correction factor.
Bioretention Soil Porosity	30 percent
Bioretention Soil Depth	Minimum of 18 inches
Native Soil Infiltration Rate	Measured infiltration rate, including applicable safety factors (see Appendix 7A)
Infiltration Across Wetted Surface Area	Only if side slopes are 3:1 or flatter
Underdrain (optional)	If an underdrain is placed at bottom extent of the bioretention soil layer, all water that filters through the bioretention soil must be routed through the underdrain (i.e., no losses to infiltration). If there is no liner or impermeable layer and the underdrain is elevated above the bottom extent of the bioretention soil or aggregate layer, water stored in the bioretention soil or aggregate below the underdrain invert may be allowed to infiltrate.
Overflow	Overflow elevation set at maximum ponding elevation (excluding freeboard). May be modeled as weir flow over riser edge or riser notch. Note that the total BMP depth (including freeboard) must be sufficient to allow water surface elevation to rise above the overflow elevation to provide head for discharge.

To meet Core Requirement #7, the tributary areas, cell bottom area, and ponding depth must be iteratively sized until the duration curves and/or peak values meet the applicable flow control requirements (see Chapter 2).

Infiltration rates of the native soil (i.e., the undisturbed soil below the imported and/or amended BMP soil) and bioretention soil mix infiltration rate must be used when sizing and modeling bioretention BMPs. The native infiltration rate shall be determined using the methods outlined above. The method for determining infiltration rate of bioretention soil mix is described in the Bioretention Soil Mix subsection below.

Field and Design Procedures

Geotechnical analysis is an important first step to develop an initial assessment of the variability of site soils, infiltration characteristics, and the necessary frequency and depth of infiltration tests. This section includes infiltration testing requirements and application of appropriate safety factors specific to bioretention BMPs.

Refer to Appendix 7A for detailed descriptions of methods for infiltration rate testing procedures; however, note that the subgrade safety factors in Appendix 7A may not apply to bioretention (additional details provided below).

If the bioretention BMP includes a liner and does not infiltrate into the underlying soils, they are not considered infiltration BMPs and are not subject to the infiltration procedures or the setbacks provided in this section. Adhere to setbacks and site constraints for detention vaults included in Section 7.5.3 for these BMPs.

Determining Design Infiltration Rate

Determining the infiltration rate of the site soils is necessary to determine feasibility of designs that intend to infiltrate stormwater on site. Infiltration rates are also necessary to estimate bioretention performance using an approved continuous simulation model.

Determining Initial Soil Infiltration Rate

Initial (measured) infiltration rates are determined through soil infiltration tests. Infiltration tests must be run at the anticipated elevation of the top of the native soil beneath the bioretention BMP. Test hole or test pit explorations shall be conducted during mid to late in the "wet season" (December 1 through April 30) to provide accurate soil saturation and groundwater-level information. The following provides required test procedures for analysis of the soils underlying bioretention BMPs:

- Projects subject to Core Requirements #1 through #5:
    - One small-scale PIT or soil grain size analysis (for sites underlain by Type A soils) outlined in Appendix 7A shall be performed at each potential bioretention site. Tests at more than one site could reveal the advantages of one location over another.

      Note that to demonstrate infeasibility of bioretention BMPs for Core Requirement #5, a small-scale PIT in accordance with Appendix 7A must be used (i.e., measured infiltration rate of less than 0.3 inches per hour).
    - Confirm that the site has the required 1-foot minimum clearance to the seasonal high groundwater or other impermeable layer (refer to Setbacks and Site Constraints below).

- Projects subject to Core Requirements #1 through #9:

  - For small bioretention cells (bioretention BMPs receiving water from one or two individual lots or <0.25 acre of pavement or other impervious surface), a small-scale PIT or soil grain size analysis (for sites underlain by Type A soils) outlined in Appendix 7A shall be performed at each potential bioretention site. Tests at more than one site could reveal the advantages of one location over another.

  - For large bioretention cells (bioretention BMPs receiving water from several lots or 0.25 acre or more of pavement or other impervious surface), a small-scale PIT or soil grain size analysis (for sites underlain by Type A soils) outlined in Appendix 7A, shall be performed every 5,000 square feet. The more test pits/borings used, and the more evidence of consistency in the soils, the less of a safety factor may be used. If soil characteristics across the site are consistent, a geotechnical professional may recommend a reduction in the number of tests.

    If using the PIT method, multiple small-scale or one large-scale PIT can be used. If using the small-scale test, measurements shall be taken at several locations within the area of interest.

  - For bioretention swales or long, narrow bioretention BMPs (i.e., one following the road right-of-way), a small-scale PIT or soil grain size analysis (for sites underlain by Type A soils) outlined in Appendix 7A shall be performed every 200 linear feet and within each length of road with varying subsurface characteristics (i.e., groundwater elevation, soils type, infiltration rates). However, if the site subsurface characterization, including soil borings across the development site, indicate consistent soil characteristics and depths to seasonal high groundwater conditions, the number of test locations may be reduced to a frequency recommended by a geotechnical professional.

    Note that to demonstrate infeasibility of bioretention BMPs for Core Requirement #5, a small-scale PIT or large-scale PIT in accordance with Appendix 7A must be used (i.e., measured infiltration rate of less than 0.3 inches per hour).

  - Confirm that the site has the required 1- or 3-foot minimum clearance to the seasonal high groundwater or other impermeable layer (refer to Setbacks and Site Constraints below).

  - If a single bioretention BMP serves a drainage area exceeding 1 acre, infiltration receptor analysis and performance testing may be necessary. See Section 7.2.2, Step 5, for specific requirements for infiltration receptor characterization.

- If the general site assessment cannot confirm that the seasonal high groundwater or hydraulic restricting layer will be greater than 1 or 3 feet below the bottom of the bioretention, monitoring wells or excavated pits should be placed strategically to assess depth to groundwater.

Assignment of Appropriate Safety Factor

- If deemed necessary by a qualified professional engineer, a safety factor may be applied to the measured K_{sat} of the subgrade soils to estimate its design (long-term) infiltration rate. Depending on the size of the BMP, the variability of the underlying soils, and the number of infiltration tests performed, a safety factor may be advisable. (Note: This is a separate design issue from the assignment of a safety factor to the overlying, designed bioretention soil mix. See the Bioretention Soil Mix subsection below).

- The overlying bioretention soil mix provides excellent protection for the underlying native soil from sedimentation. Accordingly, a safety factor for the native soil (i.e., $F_{plugging}$ used in Appendix 7A) does not have to take into consideration the extent of influent control and clogging over time.

Prepare Soils Report

For projects subject to Core Requirements #1 through #5, a Soils Report must be prepared by a professional soil scientist certified by the Soil Science Society of America (or an equivalent national program), a locally licensed on-site sewage designer, or by other suitably trained persons working under the supervision of a professional engineer, geologist, hydrogeologist, or engineering geologist registered in the State of Washington. Refer to Chapter 3, Section 3.3.2, for Abbreviated Drainage Plan Soils Report requirements.

For projects subject to Core Requirements #1 through #9, a Soils Report must be prepared that is stamped by a professional engineer with geotechnical expertise, a licensed geologist, a hydrogeologist, or an engineering geologist registered in the State of Washington. Refer to Chapter 3, Section 3.3.3, for Drainage Control Plan Soils Report requirements.

Estimate Volume of Stormwater

If required, use an approved continuous simulation model to generate an influent file that will be used to size the bioretention BMP. The BMP must infiltrate either all of the flow volume as specified by the influent file, or a sufficient amount of the flow volume such that any overflow/bypass meets the flow duration standard in Core Requirement #7. In addition, the overflow/bypass must meet the LID Performance Standard if it is the option chosen to meet Core Requirement #5, or if it is required of the project.

Bioretention Design Criteria

The following provides descriptions, recommendations, and requirements related to the components of bioretention. Some or all of the components may be used for a given

application depending on the site characteristics and restrictions, pollutant loading, and design objectives. Submittal for BMP review must include documentation of the following elements, discussed in detail below:

- Setbacks and site constraints
- Flow entrance/presettling
- Ponding area
- Bottom area and side slopes
- Overflow
- Bioretention soil mix
- Underdrain (if included)
- Check dams and weirs
- Planting
- Mulch layer
- Hydraulic restriction layer.

Setbacks and Site Constraints

For setbacks and site constraints for non-infiltrating bioretention (i.e., lined bioretention cells or planter boxes), refer to the setbacks for detention vaults in Section 7.5.3. Infeasibility criteria documented in Appendix 7B include setbacks and site constraints used to evaluate the bioretention option of List #1 and List #2 (Core Requirement #5). The following minimum setbacks and site constraints apply to all infiltrating bioretention BMPs (i.e., bioretention without a liner or planter box):

- All bioretention BMPs shall have a minimum of 1-foot positive vertical clearance from any open water maximum surface elevation to structures within 25 feet.

- All bioretention BMPs shall be a minimum of 10 feet away from any structure or property line. This setback may be reduced by the City for BMPs within or adjacent to the right-of-way.

- All bioretention BMPs shall be set back at least 50 feet from top of slopes steeper than 15 percent and greater than 10 feet high. A reduced setback may be allowed if a geotechnical assessment and Soils Report is prepared that addresses the potential impact of the BMP on the slope and recommends a reduced setback. In no case shall the setback be less than the vertical height of the slope.

- All bioretention BMPs shall be a minimum of 5 feet from septic tanks and distribution boxes.

- For sites with on-site or adjacent septic systems, the edge of the design water surface must be at least 30 feet upgradient, or 10 feet downgradient, of the septic drainfield primary and reserve areas (per WAC 246-272A-0210). Additional site-specific considerations may be required for septic systems serving commercial or light industrial land use to protect environmentally sensitive areas. This requirement may be modified by the Thurston County Public Health and Social Services Department if site topography clearly prohibits flows from intersecting the septic drainfield or where site conditions (soil permeability, distance between systems, etc.) indicate that this is unnecessary.

- Bioretention is prohibited within 300 feet of an erosion hazard or landslide hazard area (as defined by Section 14.37.030 LMC) unless the slope stability impacts of such systems have been analyzed and mitigation proposed by a geotechnical professional, and appropriate analysis indicates that the impacts are negligible.

- In no case shall bioretention BMPs be placed closer than 100 feet from drinking water wells and springs used for drinking water supplies.

    - Where water supply wells exist nearby, it is the responsibility of the applicant's engineer to locate such wells, meet any applicable protection standards, and assess possible impacts of the proposed infiltration BMP on groundwater quality. If negative impacts on an individual or community water supply are possible, additional runoff treatment must be included in the BMP design, or relocation of the BMP should be considered.

    - Bioretention BMPs upgradient of drinking water supplies and within 1-, 5-, and 10-year time of travel zones must comply with the DG&PWS, Chapter 6.025 Wellhead Protection Areas, which includes the following:

        - Requires directing all stormwater away from source wells

        - Prohibits introducing stormwater directly into the same aquifer of a drinking water supply well within the well's 1-year WHPA

        - May require more stringent requirements, if needed to protect drinking water sources with higher susceptibility to contamination.

    - Infiltration systems that qualify as Underground Injection Control Wells must comply with Chapter 173-218 WAC. Refer to Appendix 7C for additional requirements and guidance related to UIC wells.

    - The Soils Report must be updated to demonstrate and document that the above criteria are met and to address potential impacts to water supply wells or springs.

- All bioretention BMPs shall be a minimum of 3 feet from the lowest elevation of the bioretention soil, or any underlying gravel layer, and the seasonal high

groundwater elevation or other impermeable layer if the area tributary to the BMP meets or exceeds any of the following thresholds:

- 5,000 square feet of PGIS
- 10,000 square feet of impervious area
- 0.75 acres of lawn and landscape.

- For bioretention systems with a contributing area less than the above thresholds, a minimum of 1 foot of clearance from seasonal high groundwater or other impermeable layer is acceptable.

- In the event that the downstream pathway of infiltration, interflow, and/or the infiltration capacity is insufficient to handle the contributing area flows (e.g., a BMP enclosed in a loop roadway system or a landscape island within a parking lot), an underdrain system can be incorporated into the bioretention BMP. The underdrain system can then be conveyed to a nearby vegetated channel, another stormwater BMP or dispersed into a natural protection area. See the underdrain section below for additional information.

Flow Entrance/Presettling

The design of flow entrance to a bioretention BMP will depend upon topography, flow velocities, flow volume, and site constraints. Flows entering a BMP should have a velocity of less than 1 foot per second to minimize erosion potential. Vegetated buffer strips are the preferred entrance type because they slow incoming flows and provide initial settling of particulates.

Minimum requirements associated with the flow entrance/presettling design include the following:

- If concentrated flows are entering the BMP, engineered flow dissipation (e.g., rock pad or flow dispersion weir) must be incorporated. Avoid the use of angular rock or quarry spalls at the flow entrance and instead use round (river) rock if needed. Removing sediment from angular rock is difficult.

- A minimum 2-inch grade change between the edge of a contributing impervious surface and the vegetated flow entrance, or 5 percent slope from the outer curb face extending to a minimum of 12 inches beyond the back of curb, is required.

- If the catchment area contains unvegetated exposed soils or steep slopes, a presettling system (e.g., a filter strip, presettling basin, or vault) is required.

Four primary types of flow entrances can be used for bioretention:

1. Dispersed, low velocity flow across a grass or landscape area—this is the preferred method of delivering flows to the BMP and can provide initial settling

of particulates. Dispersed flow may not be possible given space limitations or if the BMP is controlling roadway or parking lot flows where curbs are mandatory.

2. Dispersed flow across pavement or gravel and past wheel stops for parking areas.

   - Parking lots that incorporate bioretention into landscaped areas should use concrete curb blocks as wheel stops to protect the bioretention BMP from traffic intrusion while also allowing the parking lot runoff to flow somewhat unobstructed to the bioretention BMP.

   - A 1-inch drop should be provided from the edge of pavement to the top of the bioretention BMP.

3. Drainage curb cuts for roadside, driveway, or parking lot areas—curb cuts shall include rock or other erosion protection material in the channel entrance to dissipate energy.

   - The minimum 12-inch drainage curb cut results in a 12-inch opening measured at the curb flow line and will require a 3-foot cut in an existing curb. An 18-inch curb cut is recommended for most applications.

   - Provide an area for settling and periodic removal of sediment and coarse material before flow dissipates to the remainder of the cell.

   - Curb cuts used for bioretention BMPs in high-use parking lots or roadways require increased level of maintenance due to high coarse particulates and trash accumulation in the flow entrance and associated bypass of flows. The following are methods recommended for areas where heavy trash and coarse particulates are anticipated:

     - Curb cut width: 18 inches.

     - At a minimum the flow entrance should drop 2 inches from gutter line into the bioretention BMP and provide an area for settling and periodic removal of debris.

     - Plan for more frequent inspection and maintenance for areas with large impervious areas, high traffic loads and larger debris loads.

     - Catch basins or forebays may be necessary at the flow entrance to adequately capture debris and sediment load from large contributing areas and high-use areas. Piped flow entrance in this setting can easily clog and catch basins with regular maintenance are necessary to capture coarse and fine debris and sediment.

   - A 1-inch drop should be provided from the edge of the curb-cut to the top of the bioretention BMP.

- Refer to the Bioretention Curb Cut Standard Detail (Drawing 5-12) in the DG&PWS.

4. Pipe flow entrance—piped entrances shall include rock or other erosion protection material in the BMP entrance to dissipate energy and/or provide flow dispersion.

    - Catch basin: In some locations where road sanding or higher than usual sediment inputs are anticipated, catch basins can be used to settle sediment and release water to the bioretention BMP through a grate for filtering coarse material.

    - Trench drains: can be used to cross sidewalks or driveways where a deeper pipe conveyance creates elevation problems. Trench drains tend to clog and may require additional maintenance.

Woody plants should not be placed directly in the entrance flow path as they can restrict or concentrate flows and can be damaged by erosion around the root ball.

Ponding Area

Bioretention ponding area may be an earthen depression (for bioretention cells and swales), or a planter box (for bioretention planters or planter boxes). The ponding area provides surface storage for storm flows, particulate settling, and the first stages of pollutant treatment within the BMP. Ponding depth and draw-down rate requirements are to provide surface storage, adequate infiltration capability, and soil moisture conditions that allow for a range of appropriate plant species. Soils must be allowed to dry out periodically in order to 1) restore hydraulic capacity of system, 2) maintain infiltration rates, 3) maintain adequate soil oxygen levels for healthy soil biota and vegetation, 4) provide proper soil conditions for biodegradation and retention of pollutants, and 5) prevent conditions supportive of mosquito breeding.

Minimum requirements associated with the bioretention ponding area design include the following:

- The ponding depth shall be a maximum of 12 inches.

- The surface pool drawdown time (surface ponding volume) shall be a maximum of 24 hours (drain time is calculated as a function of ponding depth and native soil design infiltration rate or bioretention soil mix infiltration rate, whichever is less).

The minimum freeboard measured from the invert of the overflow pipe or earthen channel to BMP overtopping elevation shall be 2 inches for drainage areas less than 1,000 square feet and 6 inches for drainage areas 1,000 square feet or greater. There should be a 1-inch drop from the edge of pavement or curb cut to the maximum freeboard elevation.

If berming is used to achieve the minimum top elevation needed to meet ponding depth and freeboard needs, the maximum slope on the berm shall be 3H:1V, and minimum top width of the design berm shall be 1 foot. Soil used for berming shall be imported bioretention soil or amended native soil and compacted to a minimum of 90 percent dry density.

Bottom Area and Side Slopes

Bioretention BMPs are highly adaptable and can fit various settings such as rural and urban roadsides, ultra-urban streetscapes, and parking lots by adjusting bottom area and side slope configuration. Recommended maximum and minimum dimensions include:

- The maximum planted side slope should be 3H:1V. If steeper side slopes are necessary rockeries, concrete walls, or soil wraps may be effective design options.
- The bottom width should be no less than 2 feet.

Bioretention BMPs should have a minimum shoulder of 12 inches between the road edge and beginning of the bioretention side slope where flush curbs are used. Compaction effort for the shoulder should be 90 percent proctor.

Overflow

An overflow route must be identified for stormwater flows that overtop the bioretention BMP when infiltration capacity is exceeded or the BMP becomes plugged and fails. The overflow route must be able to convey the 100-year recurrence interval developed peak flow to the downstream conveyance system or other acceptable discharge point without posing a health or safety risk or causing property damage.

Overflow designs shall be tailored to site conditions. Options include, but are not limited to: an emergency overflow spillway (minimum length of 3 feet), a vertical drain pipe installed at the designed maximum ponding elevation (12 inches) and connected to a downstream BMP or an approved discharge point, or a curb cut at the downgradient end of the bioretention BMP to direct overflows back to the street.

Bioretention Soil Mix

Unlike infiltration basins and trenches, the native soil underlying bioretention BMPs is not subject to the soil infiltration treatment requirements discussed in Chapter 8 (i.e., soil suitability criteria #1 and soil suitability criteria #2). Bioretention BMPs meet the requirements for basic and enhanced treatment, when the bioretention soil mix meets the requirements of the bioretention soil mix design criteria (see bioretention soil mix criteria below).

Do not use filter fabrics between the subgrade and the bioretention soil mix. The gradation between existing soils and bioretention soil mix is not great enough to allow significant migration of fines into the bioretention soil mix. Additionally, filter fabrics may clog with downward migration of fines from the bioretention soil mix.

The minimum requirements associated with the bioretention soil mix include the following:

- Minimum depth of treatment soil must be 18 inches
- Projects can either use a default bioretention soil mix or can create a custom bioretention soil mix.
    - Projects which use the default bioretention soil mix do not have to test bioretention soil mix infiltration rate. They may assume the rates specified in the next subsection.
    - Projects which create a custom bioretention soil mix rather than using the default requirements must demonstrate compliance with the specific design criteria and must test the bioretention soil mix infiltration rate as described in the Custom Bioretention Soil Mix subsection below.

Default Bioretention Soil Mix

Bioretention soil shall be a well-blended mixture of mineral aggregate and composted material measured on a volume basis. Bioretention soil shall consist of two parts fine compost (approximately 35 to 40 percent) by volume and three parts mineral aggregate (approximately 60 to 65 percent), by volume. The mixture shall be well blended to produce a homogeneous mix.

Mineral Aggregate

- Percent Fines: A range of 2 to 4 percent passing the U.S. #200 sieve is ideal and fines should not be above 5 percent for a proper functioning specification according to American Society for Testing and Materials (ASTM) D422.

Mineral Aggregate Gradation

- Mineral Aggregate shall be free of wood, waste, coating, or any other deleterious material. The aggregate portion of the bioretention soil mix shall be well graded. According to ASTM D2487-98 (Classification of Soils for Engineering Purposes [Unified Soil Classification System]), well-graded sand should have the following gradation coefficients:
    - Coefficient of Uniformity (Cu = D60/D10) equal to or greater than 4, and
    - Coefficient of Curve (Cc = (D30)2/D60 x D10) greater than or equal to 1 and less than or equal to 3.

Aggregate shall be analyzed by an accredited lab using the U.S. sieve numbers and gradation noted in Table 7.4.

Table 7.4. Aggregate for Bioretention Soil.	
U.S. Sieve Number	**Percent Passing**
0.375 inch	100
4	95–100
10	75–90
40	24–40
100	4–10
200	2–5

Where existing soils meet the above aggregate gradation, those soils may be amended rather than importing mineral aggregate.

Compost to Aggregate Ratio, Organic Matter Content, Cation Exchange Capacity

- Compost to aggregate ratio: 60 to 65 percent mineral aggregate, 35 to 40 percent compost.
- Organic matter content: 5 to 8 percent by weight.
- Cation Exchange Capacity (CEC) must be greater than 5 milliequivalents (meq) per 100 grams of dry soil. Note: Soil mixes meeting the above specifications do not have to be tested for CEC. They will readily meet the minimum CEC.

Composted Material

To ensure that the bioretention soil mix will support healthy plant growth and root development, contribute to biofiltration of pollutants, and not restrict infiltration when used in the proportions cited herein, the following compost standards are required:

- Material must meet the definition of "composted material" in WAC 173-350-100 and complies with testing parameters and other standards in WAC 173-350-220.
- Material must be produced at a composting facility that is permitted by a jurisdictional health authority. Permitted compost facilities in Washington are included on a list available at <https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Organic-materials/Managing-organics-compost>.
- The compost product must originate a minimum of 65 percent by volume from recycled plant waste comprising "yard debris," "crop residues," and "bulking agents" as those terms are defined in WAC 173-350-100. A maximum of 35 percent by volume of "postconsumer food waste" as defined in WAC 173-350-100, but not including biosolids, may be substituted for recycled plant waste.
- Moisture content must be such that there is no visible free water or dust produced when handling the material.

- The material shall be tested in accordance with the U.S. Composting Council "Test Method for the Examination of Compost and Composting" (TMECC), as established in the Composting Council's "Seal of Testing Assurance" (STA) program. Most Washington compost BMPs now use these tests.

- Composted material shall meet the size gradations established in the U.S. Composting Council's Seal of Testing Assurance (STA) program, as follows: Fine Compost shall meet the following gradation by dry weight:

	Min.	**Max.**
Percent passing 2″	100	
Percent passing 1″	99	100
Percent passing 0.625″	90	100
Percent passing 0.25″	75	100

- The pH shall be between 6.0 and 8.5 (TMECC 04.11-A).

- "Physical contaminants" (as defined in WAC 173-350-100) content shall be less than 1 percent by weight (TMECC 03.08-A) total, not to exceed 0.25 percent film plastic by dry weight.

- Minimum organic matter content shall be 40 percent by dry weight basis as determined by TMECC 05.07-A, "Loss-On-Ignition Organic Matter Method."

- Soluble salt contents shall be less than 4.0 dS/mm (mmhos/cm) tested in accordance with TMECC 04.10-A, "1:5 Slurry Method, Mass Basis."

- Maturity indicators from a cucumber bioassay shall be greater than 80 percent for both emergence and vigor, in accordance with TMECC 05.05-A, "Germination and Vigor".

- The material must be stable (low oxygen use and CO2 generation) and mature (capable of supporting plant growth). This is critical to plant success in a bioretention soil mixes. Stability shall be 7 mg CO_2-C/g OM/day or below in accordance with TMECC 05.08-B, "Carbon Dioxide Evolution Rate."

- Fine Compost shall have a carbon to nitrogen ratio of less than 25:1 as determined using TMECC 05.02A "Carbon to Nitrogen Ratio" which uses the TMECC 04.01 "Organic Carbon" and TMECC 04.02-D "Total Nitrogen by Oxidation." The Engineer may specify a Carbon:Nitrogen ratio up to 35:1 for projects where the plants selected are entirely Puget Sound lowland native species, and up to 40:1 for coarse compost to be used as a surface mulch (not in a soil mix).

Compost not conforming to the above requirements or taken from a source other than those tested and accepted shall be immediately removed from the project and replaced.

If using the bioretention soil mix included herein, a default infiltration rate of 12 inches per hour shall be used. Refer to the Determining Design Bioretention Soil Mix Infiltration Rate section below.

High Performance Bioretention Soil Mix

High-performance bioretention soil mixes may be used in locations near phosphorus-sensitive waterbodies. Refer to the latest guidance on using high-performance soil mixes, available on Ecology's website at: <https://fortress.wa.gov/ecy/publications/SummaryPages/2110023.html>.

Custom Bioretention Soil Mixes

Projects which prefer to create a custom bioretention soil mix rather than using the default requirements above must demonstrate compliance with the following criteria using the specified test method:

- CEC ≥ 5 milliequivalents/100 grams of dry soil; U.S. EPA 9081.
- pH between 5.5 and 7.0.
- 5 to 8 percent organic matter content before and after the saturated hydraulic conductivity test; ASTM D2974 (Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils).
- 2 to 5 percent fines passing the U.S. #200 sieve; TMECC 04.11-A.
- If compost is used in creating the custom mix, it must meet all of the specifications listed above for compost, except for the gradation specification. An alternative gradation specification must indicate the minimum percent passing for a range of similar particle sizes.
- Measured (initial) saturated hydraulic conductivity of less than 12 inches per hour; ASTM D2434 (Standard Test Method for Permeability of Granular Soils [Constant Head]) at 85 percent compaction per ASTM D1557 (Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort). Also, use Appendix 7A, Recommended Modifications to ASTM D2434 When Measuring Hydraulic Conductivity for Bioretention Soil Mixes.
- Design (long-term) saturated hydraulic conductivity greater than 1 inch per hour. Refer to the Determining Design Bioretention Soil Mix Infiltration Rate section below.

Determining Design Bioretention Soil Mix Infiltration Rate

A long-term infiltration rate correction factor of 4 shall be used for the bioretention soil if the area tributary to the BMP meets or exceeds any of the below thresholds:

- 10,000 square feet of impervious area
- 5,000 square feet of PGIS
- 0.75 acres of lawn and landscape.

For bioretention BMPs with a contributing area less than the above thresholds, a long-term infiltration rate correction factor of 2 for the bioretention soil mix is acceptable.

Underdrain (Optional)

Where the underlying native soils have an estimated initial infiltration rate between 0.3 and 0.6 inches per hour, bioretention BMPs without an underdrain, or with an elevated underdrain directed to a surface outlet, may be used to satisfy List #2 of Core Requirement #5. Underdrained bioretention BMPs must meet the following criteria if they are used to satisfy List #2 of Core Requirement #5:

- The invert of the underdrain must be at least 6 inches above the bottom of the aggregate bedding layer. A larger distance between the underdrain and bottom of the bedding layer is desirable, but cannot be used to trigger infeasibility due to inadequate vertical separation to the seasonal high water table, bedrock, or other impermeable layer.
- The distance between the bottom of the bioretention soil mix and the crown of the underdrain pipe must be not less than 6 or more than 12 inches.
- The aggregate bedding layer must run the full length and the full width of the bottom of the bioretention BMP.
- The BMP must not be underlain by a low permeability liner that prevents infiltration into the native soil.

Underdrain systems should be installed only if the bioretention BMP is located where infiltration is not permitted and a liner is used, or where subgrade soils have infiltration rates that do not meet the maximum pool drawdown time. In these cases, underdrain systems can be installed and the BMP can be used to filter pollutants and detain flows. However, designs utilizing underdrains provide less infiltration and flow control benefits.

The volume above an underdrain pipe in a bioretention BMP provides pollutant filtering and some flow attenuation; however, only the void volume of the aggregate below the underdrain invert and above the bottom of the bioretention BMP (subgrade) can be used in an approved continuous simulation model for dead storage volume that provides flow control benefit. Assume a 40 percent void volume for the filter material aggregate specified below.

The minimum requirements associated with the underdrain design include:

- Slotted, thick-walled plastic pipe must be used:

  - Minimum pipe diameter: 6 inches (pipe diameter will depend on hydraulic capacity required). Changes in pipe diameter shall be made using a junction box or other approved structure. Within the public right-of-way any underdrain shall have a minimum diameter of 8 inches (pipe diameter will depend on hydraulic capacity required).

  - Slotted subsurface drain PVC per DG&PWS and WSDOT Standard Specifications.

- Slots should be cut perpendicular to the long axis of the pipe and be 0.04 to 0.069 inches by 1-inch long and be spaced 0.25 inches apart (spaced longitudinally). Slots should be arranged in four rows spaced on 45-degree centers and cover one-half of the circumference of the pipe. Underdrain pipe slope must be no less than 0.5 percent.

- Pipe must be placed in filter material and have a minimum cover depth of 4 inches.

- Filter material shall meet the requirements of WSDOT Standard Specifications Section 9-03.12(4) (gravel backfill for drains).

- A 6-inch non-perforated cleanout must be connected to the underdrain every 300 feet minimum.

- The underdrain can be connected to a downstream BMP such as another bioretention/rain garden BMP as part of a connected system, or to an approved discharge point. A geotextile fabric (specifications in Chapter 8, Appendix 8A) must be used between the soil layer and underdrain.

Check Dams and Weirs

For sloped bioretention BMPs, check dams are necessary to provide ponding, reduce flow velocities, and reduce the potential for erosion. Typical check dam materials include concrete, wood, rock, compacted dense soil covered with vegetation, and vegetated hedge rows. Design depends on flow control goals, local regulations for structures within road rights-of-way, and aesthetics. Optimum spacing is determined by flow control benefit (modeling) in relation to cost considerations. See the *Low Impact Development Technical Guidance Manual for Puget Sound* (Hinman and Wulkan 2012) for typical designs.

UIC Discharge

Where bioretention facilities discharge to UICs, Underground Injection Control (UIC) regulations are applicable and must be followed (Chapter 173-218 WAC). See Appendix 7C.

Planting

In general, the predominant plant material utilized in bioretention BMPs are species adapted to stresses associated with wet and dry conditions. Soil moisture conditions will vary within the BMP from saturated (bottom of cell) to relatively dry (rim of cell). Accordingly, wetland plants may be used in the lower areas, if saturated soil conditions exist for appropriate periods, and drought-tolerant species planted on the perimeter of the BMP or on mounded areas.

The minimum requirements associated with the vegetation design include the following:

- The design plans must specify that vegetation coverage of selected plants will achieve 90 percent coverage within 2 years or additional plantings will be provided until this coverage requirement is met
- For BMPs receiving runoff from 5,000 square feet or more impervious surface, plant spacing and plant size must be designed to achieve specified coverage by a certified landscape architect
- The plants must be sited according to sun, soil, wind, and moisture requirements
- The side slopes for the bioretention BMP (vertical or sloped) can affect the plant selection and must be considered.
- At a minimum, provisions must be made for supplemental irrigation during the first 2 growing seasons following installation and in subsequent periods of drought.
- If a bioretention BMP will be located in a full shade area (i.e., receiving less than 3 hours of direct sunlight per day), then a licensed landscape architect shall provide input on the plant selection and layout. If a licensed landscape architect determines that plants will not survive in the fully shaded location, 3 inches of washed sandy gravel backfill (see DG&PWS) or mulch may be used as a top dressing in lieu of plants.

Additionally, trees can be planted along the side slopes or bottom of bioretention cells that are unlined.

Refer to the *Low Impact Development Technical Guidance Manual for Puget Sound* (Hinman and Wulkan 2012) for additional planting guidance, including:

- Guidance and recommendations for plant selection and increasing survival rates
- Planting zone descriptions
- Optimum planting times
- Plant selection for planting zones based on sun exposure

Mulch Layer

Bioretention BMPs shall be designed with a mulch layer or a dense groundcover. Properly selected mulch material also reduces weed establishment, regulates soil temperatures and moisture, and adds organic matter to soil. Mulch shall be:

- Medium compost in the bottom of the BMP (compost is less likely to float during cell inundation). Compost shall not include biosolids of manures.

- Wood chip mulch composed of shredded or chipped hardwood or softwood on cell slopes above ponding elevation and rim area. Arborist mulch is mostly woody trimmings from trees and shrubs and is a good source of mulch material. Wood chip operations are a good source for mulch material that has more control of size distribution and consistency. Do not use shredded construction wood debris or any shredded wood to which preservatives have been added.

- Free of weed seeds, soil, roots, and other material that is not trunk or branch wood and bark.

- A minimum of 2 and a maximum of 3 inches thick (thicker applications can inhibit proper oxygen and carbon dioxide cycling between the soil and atmosphere).

Mulch shall not include weed seeds, soil, roots, and other material that are not from the above ground components of a tree, grass clippings (decomposing grass clippings are a source of nitrogen and are not recommended for mulch in bioretention BMPs), or pure bark (bark is essentially sterile and inhibits plant establishment).

In bioretention BMPs where higher flow velocities are anticipated, an aggregate mulch may be used to dissipate flow energy and protect underlying bioretention soil mix. Aggregate mulch varies in size and type, but 1- to 1.5-inch gravel (rounded) decorative rock is typical. The area covered with aggregate mulch must not exceed one-third of the BMP bottom area.

As an alternative to mulch, a dense groundcover may be used. Mulch is required in conjunction with the groundcover until groundcover is established.

Hydraulic Restriction Layer

For infiltrating bioretention BMPs adjacent to roads, foundations, or other sensitive infrastructure, it may be necessary to restrict lateral infiltration pathways to prevent excessive hydrologic loading using a restricting layer (for the sides of the bioretention BMP only). Geomembrane liners are a type of restricting layer that can be incorporated into bioretention designs. Geomembrane liners completely block infiltration. The liner shall have a minimum thickness of 30 mils and be ultraviolet (UV) resistant.

Note: only the infiltrating bottom area (i.e., unlined) shall be used in sizing calculations or hydrologic modeling.

If it is necessary to prevent infiltration to underlying soils (e.g., contaminated soils or steep slope areas), the BMP must include a hydraulic restriction layer across the entire BMP. The BMP may be composed of a low permeability (e.g., concrete) container with a closed bottom, or may be lined with a low permeability material (e.g., geomembrane liner) to prevent infiltration. In these cases, underdrains are required.

Signage

The City recommends that bioretention installations used to meet Core Requirement #5, #6, and/or #7 include informational signage upon completion of the installation to help identify the vegetated area as a stormwater BMP and to inform maintenance crews and the general public about protecting the BMP's function.

Construction Criteria

See Chapter 5, Section 5.3, for infiltration BMP construction requirements. The minimum requirements associated with bioretention BMP construction include the following:

- Bioretention BMPs that infiltrate into the underlying soil (i.e., do not include a liner) rely on water movement through the surface soils as infiltration and interflow to underlying soils. Therefore, it is important to always consider the pathway of interflow and ensure that the pathway is maintained in an unobstructed and uncompacted state. This is true during the construction phase as well as postconstruction.

- During construction, it is critical to prevent clogging and over-compaction of the subgrade and bioretention soils.

- Place bioretention soil per the requirements of bioretention soil mix requirements specified in this section.

Acceptance Testing

The project engineer or designee shall inspect bioretention BMPS before, during, and after construction to ensure BMPs are built to design specifications, that proper procedures are employed in construction, that the infiltration surface is not compacted, and that protection from sedimentation is in place. Prior to placement of the bioretention soil mix, the project engineer shall verify that the finished subgrade is scarified and meets the designed infiltration rate.

Before release of the maintenance bond, the project engineer shall perform a minimum of two acceptance tests after construction to determine if the BMP will operate as designed. The type of test will depend on specific BMP and site constraints, and therefore shall be determined by the project engineer on a case-by-case basis, and must be submitted for approval by the City prior to testing. The City must be notified of the scheduled infiltration testing at least 2 working days in advance of the test. See Appendix 7A for infiltration testing requirements. If the tests indicate the BMP will not function as

designed, this information must be brought to the immediate attention of the City along with any reasons as to why not and how it can be remedied.

Operations and Maintenance Criteria

See Core Requirement #9 in Chapter 2, Section 2.2.9 and Chapter 10 for information on maintenance requirements.

APPENDIX D

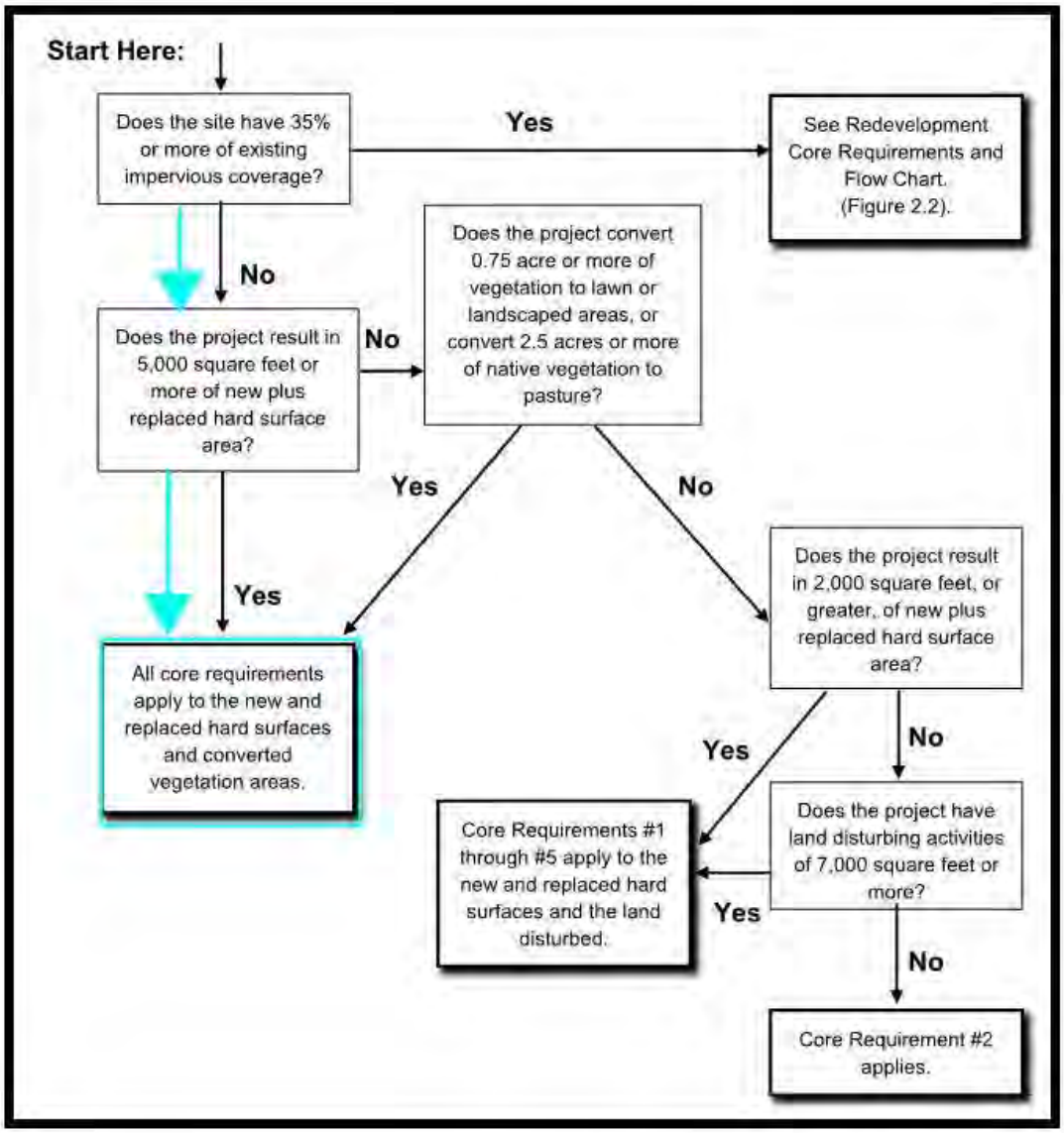


Figure 6: Determining Requirements for New Development

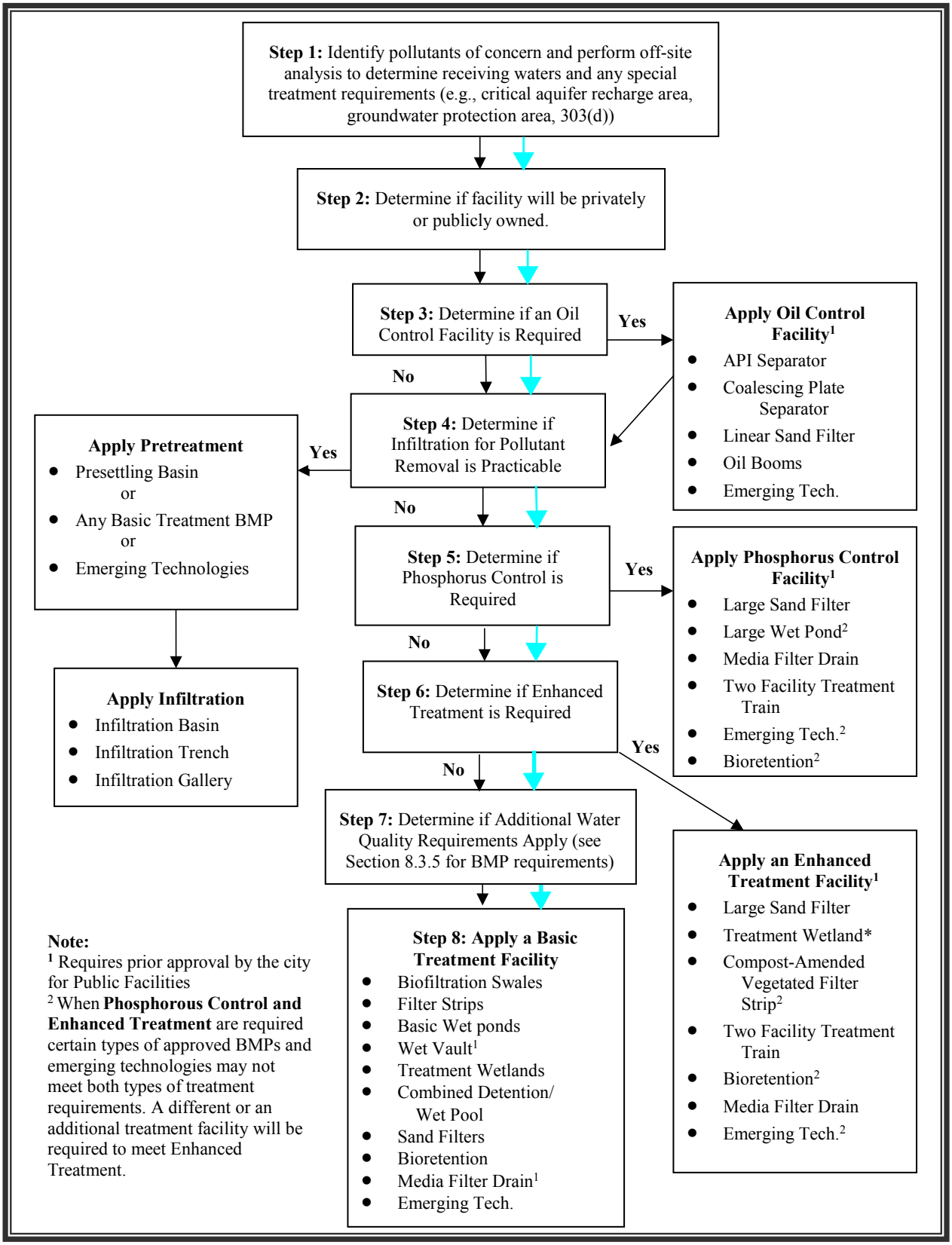


Figure 8.1. Treatment Facility Selection Flow Chart.

- **Voids behind geotextile:** Voids between the geotextile and excavation sides must be avoided. Removing boulders or other obstacles from the trench walls is one source of such voids. Place natural soils in these voids at the most convenient time during construction to ensure geotextile conformity to the excavation sides. This remedial process helps to avoid soil piping, geotextile clogging, and possible surface subsidence.

- **Unstable excavation sites:** Vertically excavated walls may be difficult to maintain in areas where the soil moisture is high or where soft or cohesionless soils predominate. Trench boxes or trapezoidal, rather than rectangular, cross-sections may be needed.

Operations and Maintenance Criteria

See Core Requirement #9 in Chapter 2, Section 2.2.9 and Chapter 10 for information on maintenance requirements.

Acceptance Testing

To demonstrate that the BMP performs as designed, it may be required that the constructed BMP is tested and monitored per the Acceptance Testing requirements in Section 7.2.2.

7.4.8 Infiltration Galleries

Description

The term "infiltration galleries" refers to manufactured detention structures, commonly referred to as "infiltration chambers," within a broad gravel trench. Infiltration chambers are buried structures, typically arch-shaped, within which collected stormwater is temporarily stored and then infiltrated into the underlying soil. Infiltration chambers create an underground cavity that can provide a greater void volume than infiltration trenches and often require a smaller footprint. Infiltration galleries may be allowed on a case-by-case basis and must be sized per the manufacturer's guidance.

Applications and Limitations

- Infiltration galleries can be used to meet the flow control standards of Core Requirement #7.

- When used in combination with other on-site stormwater management BMPs, they can also help achieve compliance with the LID Performance Standard option of Core Requirement #5.

- Infiltration galleries can be used to help meet the runoff treatment requirements of Core Requirement #6 if the underlying soil meets the requirements provided in Chapter 8, Section 8.6.

- Infiltration galleries require adequate separation from seasonally-high groundwater and adequate setback distances, per Section 7.2

  In order to find adequate infiltration rates, an engineer may propose to excavate through a till layer or low permeability layer when designing a stormwater BMP. This results in a deep UIC, which is described in Appendix 7C, Section 7C.15. Since excavating through this low permeability layer creates a new condition, more extensive geotechnical assessments, runoff treatment BMPs, and monitoring are required by the City.

Modeling and Sizing

See Section 7.2.3 for guidance on modeling and sizing of infiltration BMPs.

Infiltration Gallery Design Criteria

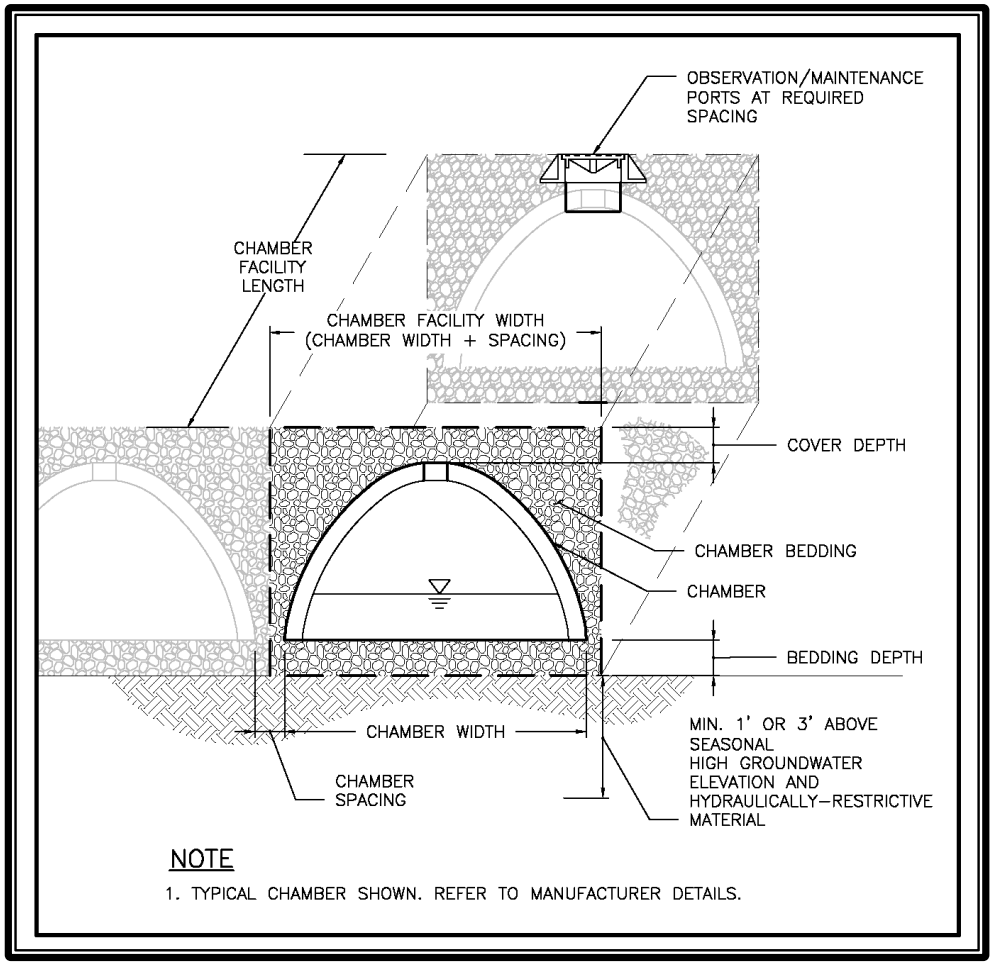
Refer to Section 7.2 for general procedures and design criteria applicable to infiltration basins, trenches, and galleries. Refer to Figure 7.14 for a schematic of a typical infiltration chamber. This section provides additional design criteria specific to infiltration trenches:

- Gallery layout
- Access
- Gallery bedding
- Subgrade
- Overflow

Gallery Layout

- Infiltration chambers can be constructed of a variety of different materials (e.g., plastic, concrete, aluminum, steel) and shapes (i.e., arch, box).
- Chamber spacing and depth of cover shall be per the manufacturer's requirements, unless otherwise directed by the City.
- **Surface cover:** An infiltration chamber may be placed under a porous or impervious surface cover to conserve space. If located under pavement, the following are required:
  - Observation wells must be placed no further than 100 feet apart.
  - The plans, details, and the Maintenance and Source Control Manual must all clearly state that the pavement may have to be removed and/or other site improvements impacted due to maintenance, repair, or replacement of the stormwater infiltration system(s).

- No infiltration galleries shall be allowed under any private or public streets.



Source: City of Seattle

Figure 7.14. Typical Infiltration Chamber.

Access

- A catch basin or manhole is required at the inlet of each chamber of the infiltration gallery, for inspection and maintenance access to the entire gallery.

- An access port, cleanout, or catch basin is required at the distal end for accessibility to conduct inspections and maintenance.

- **Observation well:** Install an observation well near the center of the gallery (if level) or near the lower end of each chamber, to check water levels, drawdown time, sediment accumulation, and conduct water quality monitoring. See Figure 7.13 for an example observation well detail. It should consist of a perforated PVC pipe which is a minimum of 6 inches in diameter and it should be constructed flush with the ground elevation. For larger galleries a 12- to 36-inch diameter well can be installed to facilitate maintenance operations such as

pumping out the sediment. The top of the well must be equipped with a secure well cap to discourage vandalism and tampering.

Gallery Bedding

- Minimum bedding shall be from 6 inches below the infiltration chamber to an elevation one-half the outside height of the chamber.

- Infiltration gallery bedding is specified by the manufacturer. The aggregate material for the infiltration gallery must consist of a clean aggregate and meet WSDOT Standard Specification 9-03.12(5) that nominally ranges from 0.75-inch to 1.5-inch diameter. A maximum diameter of 3 inches and a minimum diameter of 1.5 inches may be approved if void space is maintained. Void space for these aggregates must be in the range of 30 to 40 percent.

Subgrade

The minimum underlying native soil initial infiltration rate for infiltration galleries is 0.6 inches per hour.

During construction the subgrade soil surface can become smeared and sealed by excavation equipment. The design shall require scarification or raking of the side walls and bottom of the BMP excavation to a minimum depth of 4 inches after excavation to restore infiltration rate.

Freeboard

A minimum of 1 foot of freeboard is required when establishing the design chamber depth. Freeboard is measured from the rim of the chamber to the maximum ponding level or from the rim down to the overflow point if overflow or a spillway is included.

Construction Criteria

During construction, it is critical to prevent clogging and over-compaction of the subgrade. Refer to the minimum construction requirements for infiltration trenches in Section 7.4.7.

Operations and Maintenance Requirements

See Core Requirement #9 in Chapter 2, Section 2.2.9 and Chapter 10 for information on maintenance requirements. Manufacturers of specific infiltration chambers may have additional operation and maintenance recommendations, which shall be included in the Maintenance and Source Control Manual for the finished project site.

Acceptance Testing

To demonstrate that the BMP performs as designed, it may be required that the constructed BMP is tested and monitored per the Acceptance Testing requirements in Section 7.2.2.

- For grid systems, refer to manufacturer's testing recommendations.

The City must be notified of the scheduled infiltration testing at least two working days in advance of the test. If the tests indicate the BMP will not function as designed, this information must be brought to the immediate attention of the City along with any reasons as to why not and how it can be remedied.

Operations and Maintenance Criteria

- See Core Requirement #9 in Chapter 2, Section 2.2.9 and Chapter 10 for information on maintenance requirements.

- Where run-on flows onto permeable pavement, these areas shall be identified in the Maintenance and Source Control Manual as requiring more frequent cleaning and inspection to ensure that the overall BMP is performing.

- Clogging is the primary mechanism that degrades infiltration rates. However, as discussed above, the surface design can have a significant influence on clogging of void space.

- Studies have indicated that infiltration rates on moderately degraded porous asphalts and pervious concrete can be partially restored by suctioning and sweeping of the surface. Highly degraded porous asphalts and concrete require high pressure washing with suction.

- For large scale cleaning use vacuum surface cleaning machines (such as Cyclone, Elgin, etc.) for cleaning pervious concrete and porous asphalt.

- Maintenance frequencies of suctioning and sweeping shall be specified in the Maintenance and Source Control Manual, or as specified in Chapter 10, whichever is more stringent.

- Permeable pavement systems designed with pavers have advantages of ease of disassembly when repairs or utility work is necessary. However, it is important to note that the paver removal area should be no greater than the area that can be replaced at the end of the day. If an area of pavers is removed, leaving remaining edges unconfined, it is likely that loading in nearby areas will create movement of the remaining pavers thereby unraveling significantly more area than intended.

7.4.7 Infiltration Trenches (Ecology BMP T7.20)

Description

Infiltration trenches are most appropriate for small contributing areas and retrofit situations where space is limited. Infiltration trenches are generally at least 24 inches wide, and are backfilled with a coarse stone aggregate, allowing for temporary storage of stormwater runoff in the voids of the aggregate material. Stored runoff then gradually infiltrates into the surrounding soil. The surface of the trench can consist of stone, gabion,

sand, or a grassed covered area with a surface inlet. Perforated rigid pipe of at least 8-inch diameter can also be used to distribute the stormwater in a stone trench.

Note that an infiltration trench with a perforated pipe is considered a UIC well and is required to be registered with Ecology unless the infiltration trench is located at a single-family home (or duplex) and only receives residential roof runoff or is used to control basement flooding (per WAC 173-218-070 (1)(e). See also Section 7.3 for more information on UIC well registration.

See Figures 7.11a, 7.11b, and 7.12 for examples of infiltration trench BMPs in various configurations and site settings. Included in the details are infiltration trenches with a grass buffer, as well as an example of a parking lot perimeter infiltration trench design. For trenches associated specifically with roof downspout infiltration, see Section 7.4.10.

Applications and Limitations

- Infiltration trenches can be used to meet the flow control standards of Core Requirement #7.

- When used in combination with other on-site stormwater management BMPs, they can also help achieve compliance with the LID Performance Standard option of Core Requirement #5.

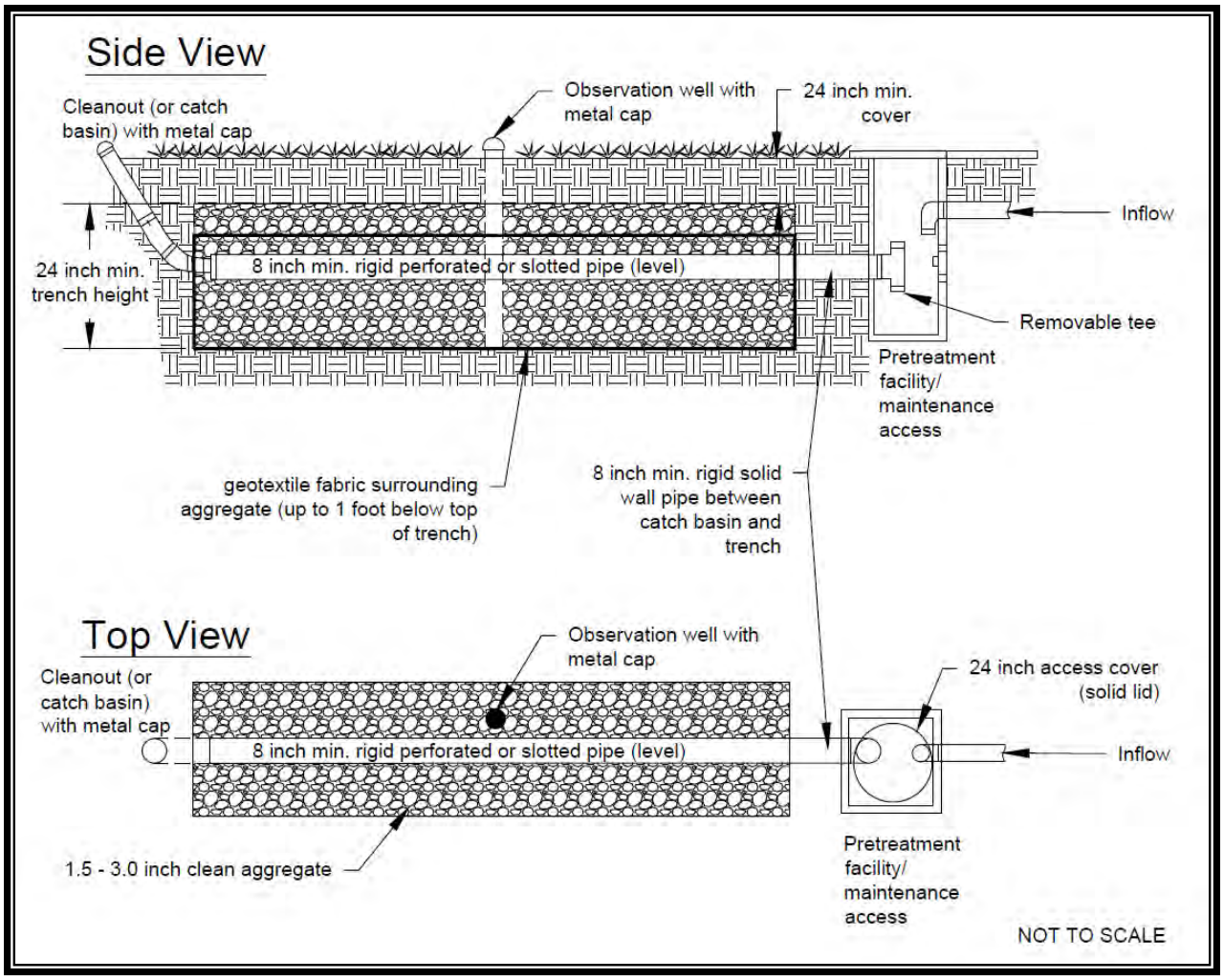
- Infiltration trenches can be used to meet some of the runoff treatment requirements of Core Requirement #6 if the underlying soil meets the requirements provided in Chapter 8, Section 8.6.

- Infiltration trenches require adequate separation from seasonally-high groundwater and adequate setback distances, per Section 7.2

- In order to find adequate infiltration rates, an engineer may propose to excavate through a till layer or low permeability layer when designing a stormwater BMP. This results in a deep UIC, which is described in Appendix 7C, Section 7C.15. Since excavating through this low permeability layer creates a new condition, more extensive geotechnical assessments, runoff treatment BMPs, and monitoring are required by the City.

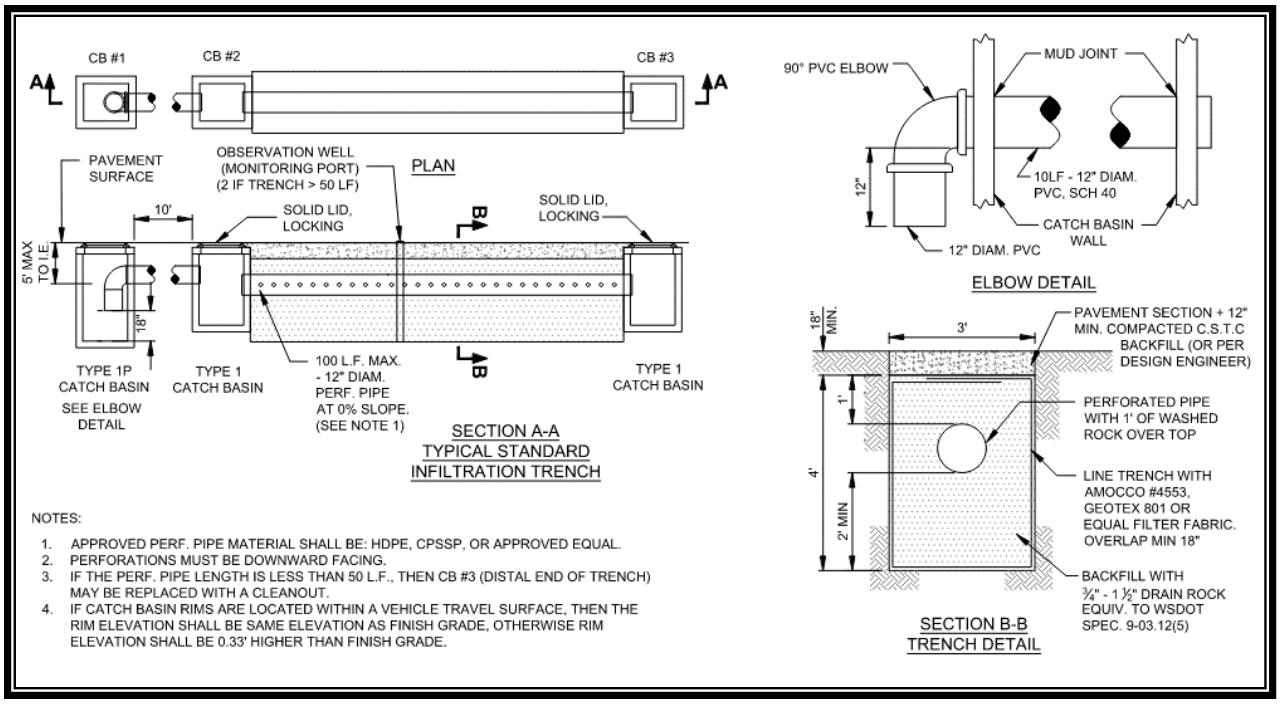
Modeling and Sizing

See Section 7.2.3 for guidance on modeling and sizing of infiltration BMPs.



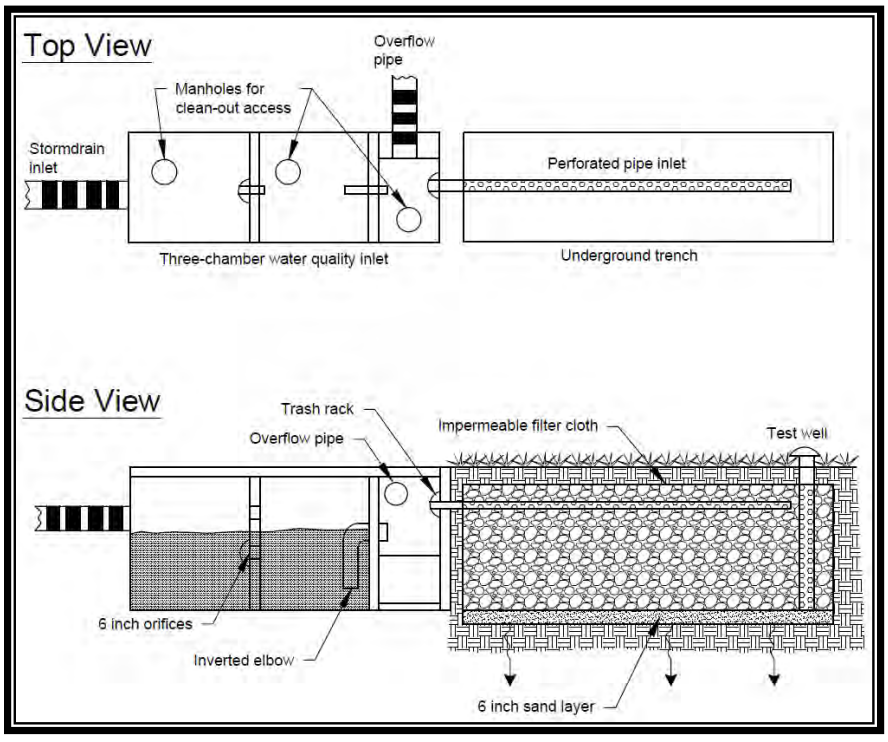
Source: Ecology

Figure 7.11a. Infiltration Trench Design.



Source: Pierce County

Figure 7.11b. Alternative Infiltration Trench Design.



Source: Ecology

Figure 7.12. Underground Trench with Oil/Grit Chamber.

Infiltration Trench Design Criteria

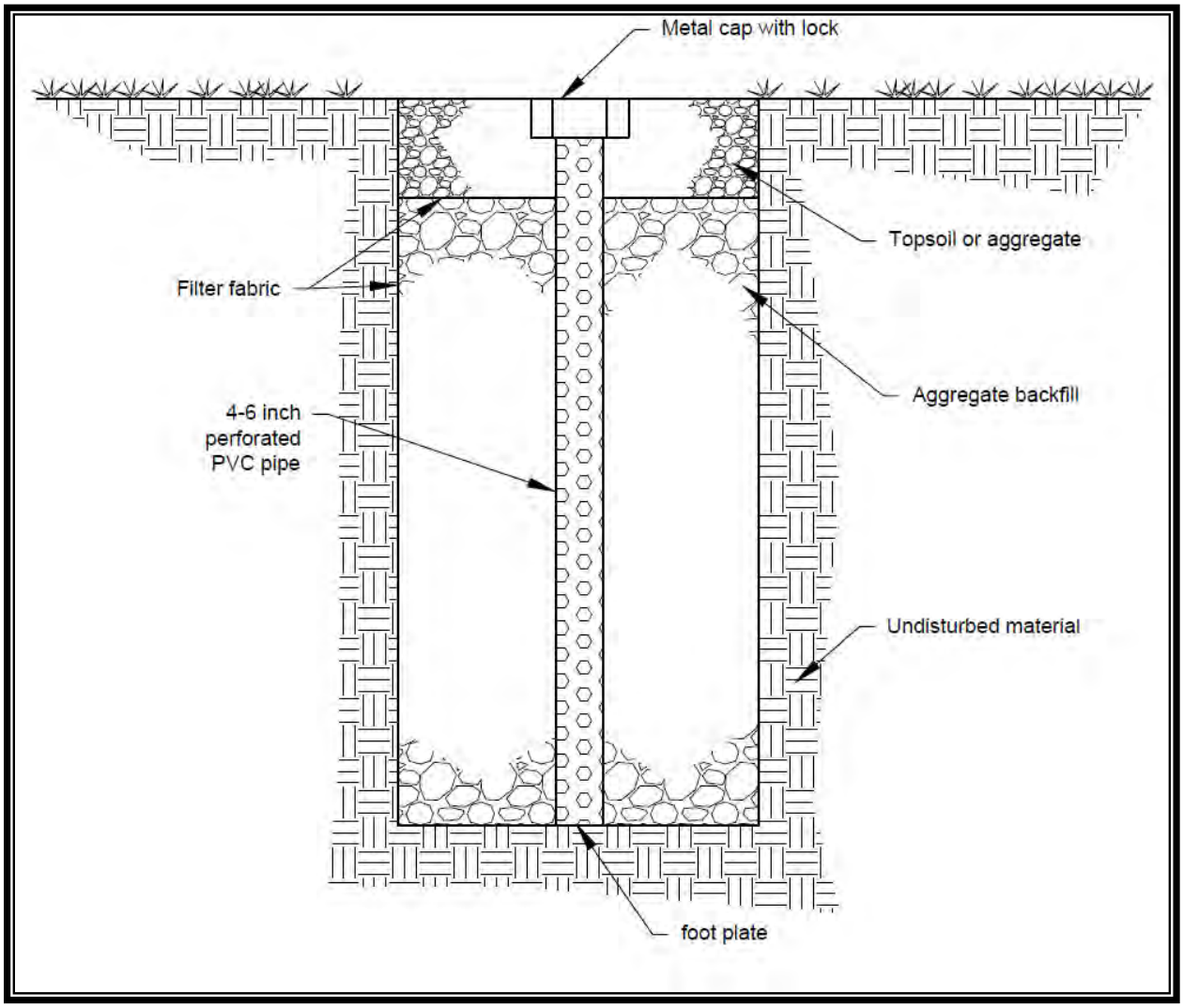
Refer to Section 7.2.3 for general procedures and design criteria applicable to infiltration basins, trenches, and galleries. This section provides additional design criteria specific to infiltration trench layout, access, bedding and geotextile, and overflow.

Trench Layout

- Surface cover: A stone filled trench can be placed under a porous or impervious surface cover to conserve space. If located under pavement, the following are required:
  - Observation wells must be placed no further than 100 feet apart.
  - The plans, details, and Maintenance and Source Control Manual must all clearly state that the pavement may have to be removed and/or other site improvements impacted due to maintenance, repair, or replacement of the stormwater infiltration system(s).
  - No infiltration trenches shall be allowed under any private or public streets.
- Flows must be evenly distributed across the trench to ensure that the trench will function as designed. Include appropriate measures to distribute flows (e.g., manifold system, level spreader).

Access

- A catch basin is required at the inlet of the infiltration trench for access.
- Provide a structure or cleanout at the end of each infiltration pipe for accessibility to conduct inspections and maintenance.
- Observation well: Install an observation well at the lower end of the infiltration trench to check water levels, drawdown time, sediment accumulation, and conduct water quality monitoring. See Figure 7.13 for an example observation well detail. It should consist of a perforated PVC pipe which is 4 to 6 inches in diameter, and it should be constructed flush with the ground elevation. For larger trenches a 12- to 36-inch-diameter well can be installed to facilitate maintenance operations such as pumping out the sediment. The top of the well must be equipped with a secure well cap to discourage vandalism and tampering.



Source: Ecology

Figure 7.13. Observation Well Details.

Trench Bedding and Geotextile

- Backfill material: The aggregate material for the infiltration trench must consist of a clean aggregate and meet WSDOT Standard Specification 9-03.12(5) that nominally ranges from 0.75-inch to 1.5-inch diameter. A maximum diameter of 3 inches and a minimum diameter of 1.5 inches may be approved if void space is maintained. Void space for these aggregates must be in the range of 30 to 40 percent.

- Geotextile fabric liner: Completely encase the aggregate fill material in an engineering geotextile material. Geotextile must surround all of the aggregate fill material except for the top 1 foot, which is placed over the geotextile. Carefully select geotextile fabric with acceptable properties to avoid plugging (see Chapter 8, Appendix 8A).

- A 6-inch minimum layer of sand may be used as a filter media at the bottom of the trench instead of geotextile.

- The bottom sand or geotextile fabric as shown in Figures 7.11 and 7.12.

  Refer to the *Geosynthetic Design and Construction Guidelines* (FHWA 1995) for design guidance on geotextiles in drainage applications. Refer *Long-Term Performance of Geosynthetics in Drainage Applications* (NCHRP 1994, for long-term performance data and background on the potential for geotextiles to clog, blind, or to allow piping to occur and how to design for these issues.

Overflow

- Because an infiltration trench is generally used for small drainage areas, an emergency spillway is not necessary. However, provide a nonerosive overflow channel leading to a stabilized watercourse.

Construction Criteria for Trenches

- Most of the construction requirements for small-scale infiltration BMPs included in Chapter 5, Section 5.3, apply to all infiltration BMPs. Additional specific construction criteria for infiltration trenches are provided below. Criteria for residential roof downspout infiltration trenches are provided in Section 7.4.10.

- **Trench preparation:** Excavated materials must be placed away from the trench sides to enhance trench wall stability. Take care to keep this material away from slopes, neighboring property, sidewalks, and streets. It is recommended that this material be covered with plastic (see erosion and sediment control criteria in Chapter 5, BMP C123 – Plastic Covering).

- **Stone aggregate placement and compaction:** Place the stone aggregate in lifts and compact using plate compactors. In general, a maximum loose lift thickness of 12 inches is recommended. The compaction process ensures geotextile conformity to the excavation sides, thereby reducing potential piping and geotextile clogging, and settlement problems.

- **Potential contamination:** Prevent natural or fill soils from intermixing with the stone aggregate. Remove all contaminated stone aggregate and replace with uncontaminated stone aggregate.

- **Overlapping and covering:** Following the stone aggregate placement, the geotextile must be folded over the stone aggregate to form a 12-inch minimum longitudinal overlap. When overlaps are required between rolls, the upstream roll must overlap a minimum of 2 feet over the downstream roll in order to provide a shingled effect.

- **Voids behind geotextile:** Voids between the geotextile and excavation sides must be avoided. Removing boulders or other obstacles from the trench walls is one source of such voids. Place natural soils in these voids at the most convenient time during construction to ensure geotextile conformity to the excavation sides. This remedial process helps to avoid soil piping, geotextile clogging, and possible surface subsidence.

- **Unstable excavation sites:** Vertically excavated walls may be difficult to maintain in areas where the soil moisture is high or where soft or cohesionless soils predominate. Trench boxes or trapezoidal, rather than rectangular, cross-sections may be needed.

Operations and Maintenance Criteria

See Core Requirement #9 in Chapter 2, Section 2.2.9 and Chapter 10 for information on maintenance requirements.

Acceptance Testing

To demonstrate that the BMP performs as designed, it may be required that the constructed BMP is tested and monitored per the Acceptance Testing requirements in Section 7.2.2.

7.4.8 Infiltration Galleries

Description

The term "infiltration galleries" refers to manufactured detention structures, commonly referred to as "infiltration chambers," within a broad gravel trench. Infiltration chambers are buried structures, typically arch-shaped, within which collected stormwater is temporarily stored and then infiltrated into the underlying soil. Infiltration chambers create an underground cavity that can provide a greater void volume than infiltration trenches and often require a smaller footprint. Infiltration galleries may be allowed on a case-by-case basis and must be sized per the manufacturer's guidance.

Applications and Limitations

- Infiltration galleries can be used to meet the flow control standards of Core Requirement #7.

- When used in combination with other on-site stormwater management BMPs, they can also help achieve compliance with the LID Performance Standard option of Core Requirement #5.

- Infiltration galleries can be used to help meet the runoff treatment requirements of Core Requirement #6 if the underlying soil meets the requirements provided in Chapter 8, Section 8.6.

APPENDIX E

GeoResources, LLC
Ph.253-896-1011
Fx.253-896-2633
5007 Pacific Hwy. E, Suite 16
Fife, Washington 98424-2649

September 20, 2013

Wig Properties, LLC
4811-134th PL SE
Bellevue, WA 98006

Attn: Leshya Wig

Geotechnical Engineering Services
Earthwork Recommendations
Parcels L, N & O
Lacey Gateway Project
Marvin Rd & Main St. NE
Lacey, Washington
Prop:.WigProp.Gateway.RG

INTRODUCTION & SCOPE

This report presents the results of our data review, site observations and monitoring of the recently completed borings/monitoring wells (by others) for the Lacey Gateway project. The purpose of our report is to provide geotechnical engineering recommendations and design criteria for the proposed earthwork activity at the site in preparation for commercial development. The proposed initial development will occur in the northeast portion of the site on the parcels listed above. The general location of the subject parcels is illustrated on the attached Site Vicinity Map, Figure 1.

We previously completed geotechnical reports for projects in the vicinity of the site. We also reviewed the existing geotechnical and environmental reports for the project site. This report provides site specific information for proposed earthwork/grading activities at the site, generally the filling of a localized depression which will create a more uniform or flatter ground surface.

Based on the information provided, we understand that the proposed commercial development will likely include the construction of a number of commercial buildings with associated asphalt parking, asphalt/concrete driveways, and typical underground utilities. Stormwater considerations are being addressed by others. The project will be constructed in phases, Phase 1 being the northeast portion of the site. The specific project area is included as Figure 2.

As indicated, the purpose of our report is to provide geotechnical engineering recommendations and design criteria for the proposed earthwork activity at the site in preparation for commercial development. Specifically, the scope of services for this project will include the following:

1. Reviewing the available geotechnical data for the site area.
2. Monitoring at least one of the planned environmental borings at the site.
3. Providing geotechnical earthwork recommendations for the expected site grading activities; including site preparation, subgrade preparation, fill placement criteria, suitability of on-site soils for use as structural fill, temporary and permanent cut and fill slopes, and drainage/erosion control measures.
4. Summarizing our observations, data review and exploration data in a written geotechnical earthwork report.

SITE CONDITIONS

Surface Conditions

The site is situated in the central portion of the Lacy glacial outwash plain that formed as the Vashon glacial ice receeded from the area. The site is bounded by other commercial development on the north, east and west, and by Interstate Highway 5 on the south. The ground surface at the site is gently to moderately sloping with localized small hills, ridges and depressions. The proposed earthwork activity for the site is to regrade the east portion of the site to a flatter overall configuration by moving the native soil materials from the hills/ridges into a depression.

The site is currently vegetated with scattered young second growth timber, primarily evergreens, with a moderate to dense understory of native and invasive brush and grasses. The site is traversed by a number of gravel roads and trails, including several that reflect the proposed final road configuration. The general condition of the site is illustrated on the Site Aerial Photograph, Figure 3.

Subsurface Conditions

To provide the necessary geotechnical engineering information for the project, we reviewed the available surface and subsurface data for the site, which included a numerous previous test pit excavations. We also monitored and reviewed the data from three new borings with monitoring wells completed in the east portion of the three subject parcels.

Based on our data review, our site observations and experience in the area, subsurface conditions in this area generally consist of outwash sand and gravel with intermittent layers of fine sand and silty sand, which is the mapped stratigraphy for the area. The soils encountered in the borings generally consisted of very dense sandy gravel over sandy gravel with variable silt content. No groundwater seepage was encountered in Boring MW-2 completed at a depth of approximately 75 feet below the adjacent ground surface. Groundwater was measured at depths of 15 feet and 10 feet below the adjacent ground surfaces in MW-1 and MW-2, respectively. The approximate locations of the explorations at the site are illustrated on the Site Plan, Figure 2. Soil logs of the three recent borings are included in Appendix "A".

We expect that there will be localized areas of the site that are mantled by a thin, intermittent veneer of recessional outwash overlying a discontinuous thin layer of glacial till. The till, where present, or the recessional outwash where the till is absent, are underlain by advance outwash sand and gravel that was encountered to the full depth explored in the deeper explorations.

Groundwater Conditions

Groundwater conditions in site area are similar to those in the surrounding areas of Hawks Prairie. In general, there are two groundwater zones in this area; a shallow seasonal perched water table and a deeper glacial advance outwash aquifer. The shallow seasonal perched water table is related to rainfall that infiltrates through the surficial permeable soils and perches on the underlying very dense soils. The shallow perched seepage at the site was encountered at or just above the surface of the dense advance outwash in borings MW-1 and MW-3, where present, and locally on silt lenses near the outwash channel. The shallow perched water also resulted in slight to moderate seepage in several of the test pits at the time of excavation, and in the borings. No groundwater seepage was observed in MW-2, indicating that the perched water is intermittent across the site. MW-2 extended to a depth of 75 feet without encountering groundwater seepage, indicating that the regional water table is greater

than this depth. We expect that once the site is developed, the amount of seasonal perched water at the site will be significantly reduced.

Relative to the deeper regional groundwater aquifer, we reviewed the available water well logs from the Washington State Department of Ecology website. The wells were grouped in areas near the intersection of Britton Parkway and Carpenter Road (west of the site), near the Hawks Prairie Landfill (southeast of the site), and on some of the nearby parcels. In general, most of the well logs did not encountered static water within the upper 15 to 30 feet. Instead, water was generally encountered at depths of 90 to 230 feet.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our data review, site reconnaissance, subsurface exploration monitoring, and our experience in the area, it is our opinion that the site may be graded using conventional earthwork equipment and methodology. The site soils generally consist of sand and gravel with variable silt, cobble and boulder content. These soils are comparable to commercial aggregate materials and may be utilized for structural fill during virtually any type of weather. Where silty lenses of soil material (till) are encountered, these soils may require blending during wet weather conditions. Pertinent conclusions and geotechnical recommendations regarding earthwork are presented below.

Structural Fill

All material placed as fill associated with mass grading, as utility trench backfill, under building areas, or under roadways should be placed as structural fill. The structural fill should be placed in horizontal lifts of appropriate thickness to allow adequate and uniform compaction of each lift. Fill should be compacted to at least 95 percent of MDD (maximum dry density as determined in accordance with ASTM D-1557).

The appropriate lift thickness will depend on the fill characteristics and compaction equipment used. We recommend that the appropriate lift thickness be evaluated by our field representative during construction. We recommend that our representative be present during site grading activities to observe the work and perform field density tests.

The suitability of material for use as structural fill will depend on the gradation and moisture content of the soil. As the amount of fines (material passing US No. 200 sieve) increases, soil becomes increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult to achieve. During wet weather, we recommend use of well-graded sand and gravel with less than 5 percent (by weight) passing the US No. 200 sieve based on that fraction passing the 3/4-inch sieve, such as Gravel Backfill for Walls (9-03.12(2)). If prolonged dry weather prevails during the earthwork and foundation installation phase of construction, higher fines content (up to 10 to 12 percent) will be acceptable.

Material placed for structural fill should be free of debris, organic matter, trash and cobbles greater than 6-inches in diameter. The moisture content of the fill material should be adjusted as necessary for proper compaction.

Suitability of On-Site Materials as Fill

During dry weather construction, any non-organic on-site soil may be considered for use as structural fill; provided it meets the criteria described above in the structural fill section and can be compacted as recommended. If the soil material is over-optimum in

moisture content when excavated, it will likely be necessary to blend, aerate or dry the soil prior to placement as structural fill. We did not observe the shallow site soils to be excessively moist while monitoring the subsurface exploration program. No significant seepage was reported in the test pits previously excavated at the site.

The near surface recessional outwash do not appear to contain significant amount of silts, and as such would likely be suitable for reuse as structural fill during extended periods of wet weather. The localized areas of native glacial till soils at the site generally consisted of silty gravel with fine sand. These soils are generally comparable to "common borrow" material and will be suitable for use as structural fill provided the moisture content is maintained within 4 percent of the optimum moisture level. However, due to the high fines content, the till soils encountered across the site will likely be unsuitable during extended periods of wet weather.

We recommend that completed graded-areas be restricted from traffic or protected prior to wet weather conditions. The graded areas may be protected by paving, placing asphalt-treated base, a layer of free-draining material such as pit run sand and gravel or clean crushed rock material containing less than 5 percent fines, or some combination of the above.

Temporary Excavations

All excavations at the site associated with confined spaces, such as utility trenches and retaining walls, must be completed in accordance with local, state, or federal requirements. Based on current Washington State Safety and Health Administration (WSHA 296-155-66401) regulations, the shallow upper soils on the site would be classified as Type B soils while the deeper sandy glacial till soils would be classified as Type A soils.

According to WSHA, for temporary excavations of less than 20 feet in depth, the side slopes in Type A soils should be laid back at a slope inclination of ¾H:1V (Horizontal: Vertical) while Type B soils should be laid back at a slope inclination of 1H:1V. It should be recognized that slopes of this nature do ravel and require occasional maintenance. All exposed slope faces should be covered with a durable reinforced plastic membrane, jute matting, or other erosion control mats during construction to prevent slope raveling and rutting during periods of precipitation. These guidelines assume that all surface loads are kept at a minimum distance of at least one half the depth of the cut away from the top of the slope and that significant seepage is not present on the slope face. Flatter cut slopes will be necessary where significant raveling or seepage occurs, or if construction materials will be stockpiled along the slope crest.

All job site safety issues and precautions are the responsibility of the contractor providing services/work. The following cut/fill slope guidelines are provided for planning purposes only. Temporary cut slopes will likely be necessary during grading operations or utility installation.

This information is provided solely for the benefit of the owner and other design consultants, and should not be construed to imply that GeoResources assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

Pavement Subgrade

Based on the granular nature of the site soils, we expect that the native soils can be utilized for the roadway subbase material. Where the native soils are "clean" or have

limited fines content, it may be necessary to mix sand into the coarser material for binder. Without binder material, the soils may be difficult to drive on.

All pavement subgrades should be proof-rolled with a loaded dump truck or heavy compactor to verify the density. Any areas where this proof-rolling operation reveals soft, organic, or pumping soils at or closely beneath the pavement subgrade should be overexcavated to a maximum depth of 8 inches and replaced with a suitable structural fill material. All structural fill should be compacted according to our recommendations given in the "**Structural Fill"** section above. Specifically, the upper 2 feet of soils underlying pavement section should be compacted to at least 95 percent of ASTM: D-1557, and all soils below 2 feet should be compacted to at least 90 percent.

For the top course, we recommend using imported, clean, crushed rock, such as "Crushed Surfacing Top Course" per WSDOT Standard Specification 9-03.9(3). For the base course, we recommend using imported, clean, well-graded sand and gravel, such as "Ballast" or "Gravel Borrow" per WSDOT Standard Specifications 9-03.9(1) and 9-03.14, respectively.

All top course and base course material should be compacted to at least 95 percent of the modified Proctor maximum dry density (based on ASTM:D-1557), and all asphalt concrete should be compacted to at least 92 percent of the Rice value (ASTM:D-2041). We recommend that a GeoResources representative be retained to verify the compaction of each course before the successive course is placed. For the subbase course and pavement course, this is best accomplished by means of frequent density testing. For the base course, methodology observations and hand probing are more appropriate than density testing.

LIMITATIONS

We have prepared this report for Wig Properties, and project team members for use in design and construction of the various components of this project. The data and report can be utilized for bidding or estimating purposes, but our report, conclusions and recommendations should not be construed as a warranty of the subsurface conditions, as they may vary both vertically and laterally.

If there are changes in the locations or assumptions stated for this project, the conclusions and recommendations presented may not be fully applicable. If design changes are made, we should review the proposed changes to verify the applicability of our conclusions and recommendations.

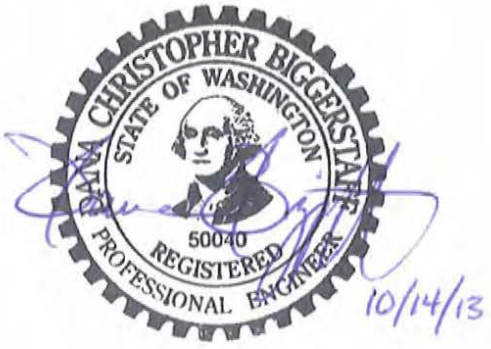
Within the limitations of scope, schedule and budget, our services were executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty, express or implied, should be understood.

We appreciate the opportunity to be of service to you on this project. Please call if you have any questions regarding this submittal, or if we can provide additional services.

Yours very truly,
GeoResources, LLC

Dana C. Biggerstaff, PE
Senior Engineer

Bradley P. Biggerstaff, LEG, LHG
Principal



10/14/13

10/6

BPB:DCB/bpb
Doc ID:WigProperties.Gateway.RG

Not to Scale

Approximate Site Location

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

Site Vicinity Map

Proposed Lacey Gateway Commercial Project
Parcels k, L, M, N, & O
Marvin Road NE & Britton Parkway NE
Lacey, Washington

DocID: WigProp.Gateway.F	July 2013	Figure 1

Notes
1) Test pits TP-1 through TP-62 were hand excavated by Terra Assoc. in 2012
2) Samples SPO 1 through SPO 4 were taken by Olympic Environmental in 1994
3) Lead values are shown for each sample location, a single number reflects the upper 6 inches, the second value is the sample at 12 inches.
4) The location of the trap stands and houses are schematic and are based on a sketch by GeoDesign.
5) The extent of AOC 2 is shown for planning purposes only. The final limits will be determined during remedial action

BASIS OF BEARING:
SURVEY RECORDED UNDER AUDITOR'S FILE NO. 3349084

SCALE: 1"=150 FEET
0 50 100 200

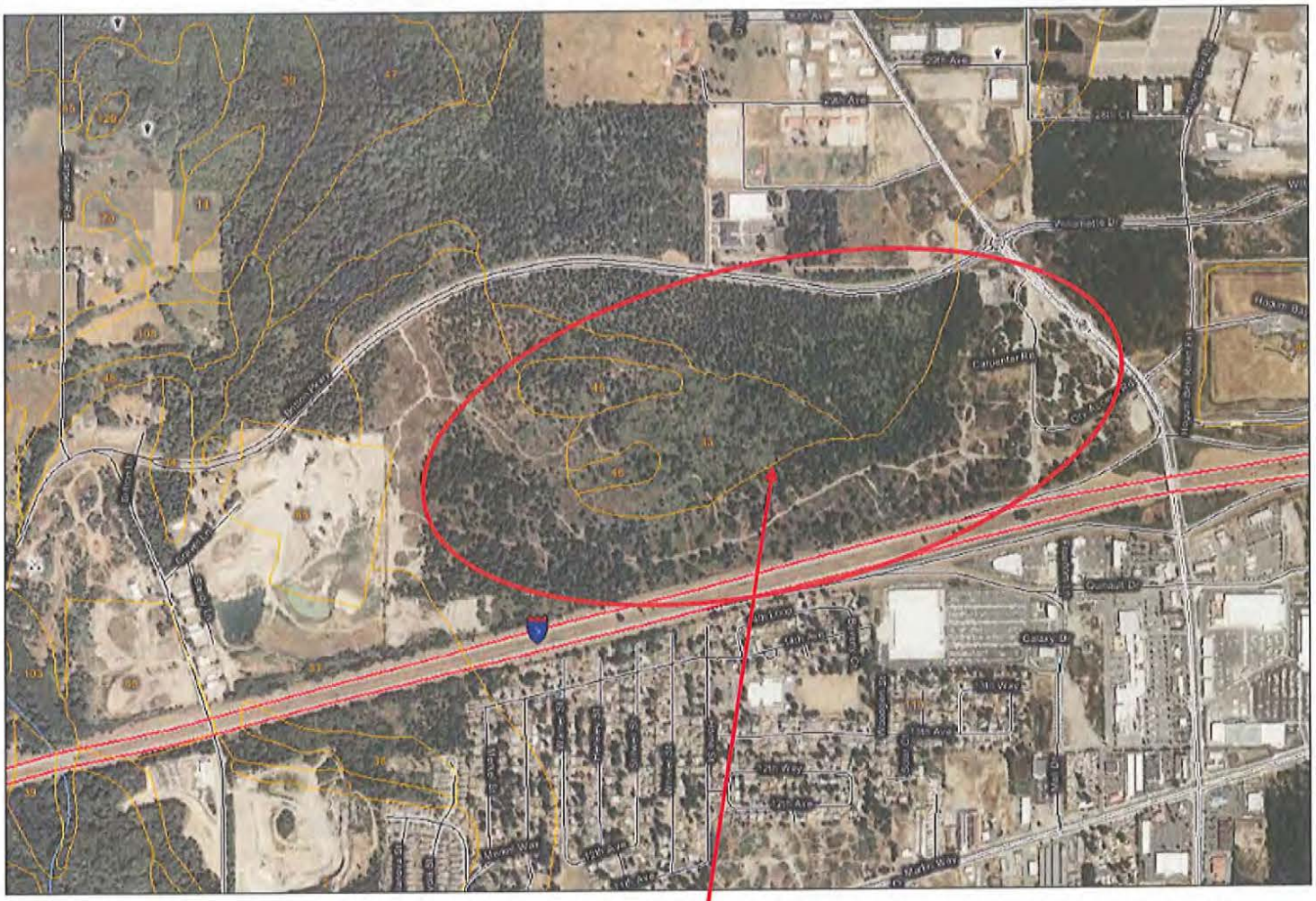
AOC 2 shown in Red
AOC 3 shown in Green

This figure has elements that are in color, greyscale copies may not fully convey the information.

TERRA ASSOCIATES
Geotechnical Consultants

Exploration Location Plan
37 Acres Project
Lacey, Washington

Proj. No. T-6537-3	Date July 2013	Figure 1



Approximate Site Location

(map created from the USDA Natural Resource Conservation Service Web Soil Survey)

Soil Type	Soil Name	Parent Material	Slopes	Erosion Hazard	Hydrologic Soils Group
2	Alderwood gravelly sandy loam	Glacial Till	3 to 15	Moderate	B (D at depth)
33	Everett gravelly sandy loam	Glacial Till	3 to 15	Moderate	B (D at depth)
46	Indianola loamy sand	Sandy glacial outwash	0 to 3	Slight	A
85	Pits, Gravel	-	-	-	-
110	Spanaway gravelly sandy loam	Volcanic ash over gravelly glacial outwash	0 to 3	Slight	A

N W E S

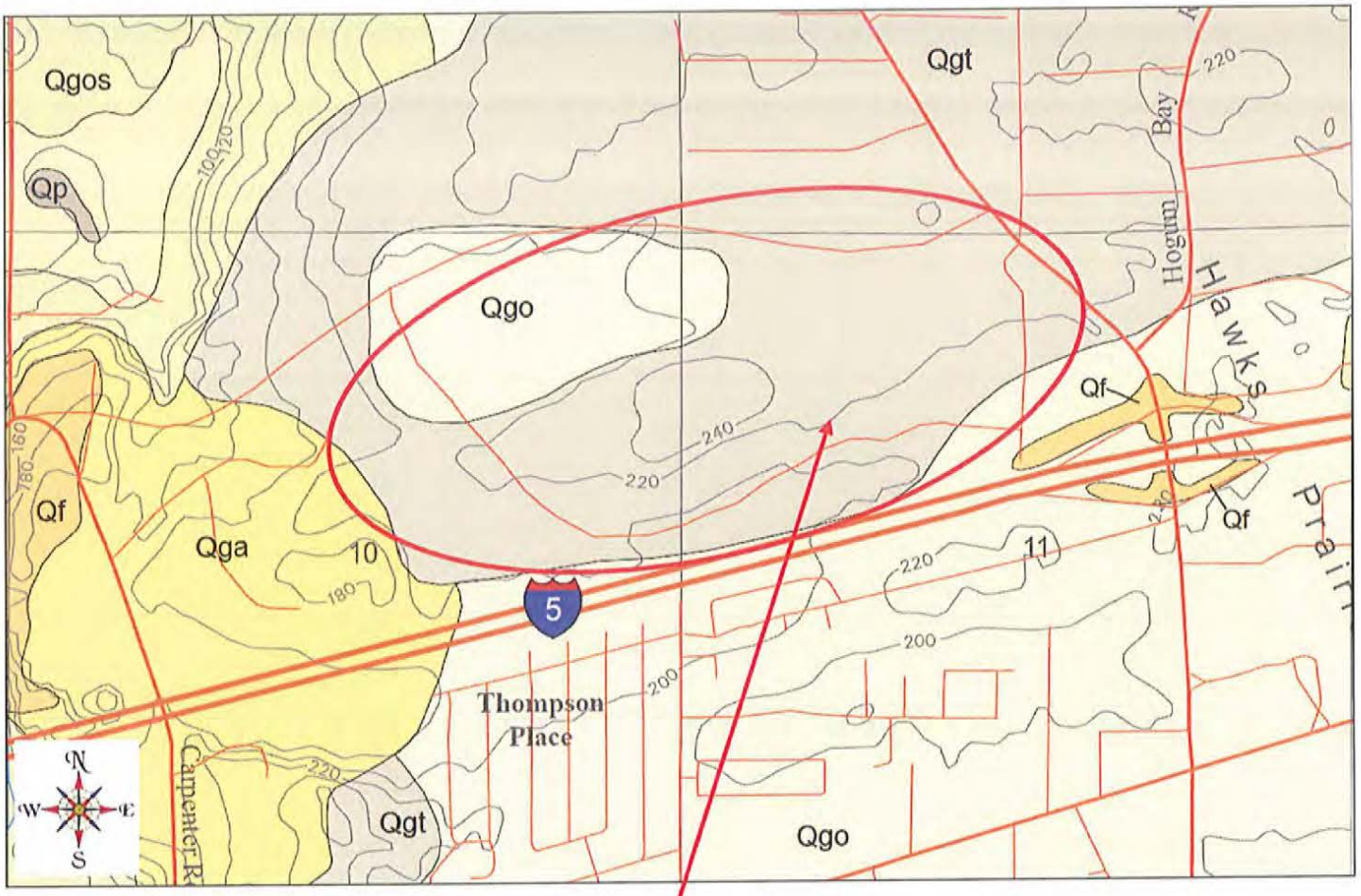
Not to Scale

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

NRCS SCS Soils Map

Proposed Lacey Gateway Commercial Project
Parcels k, L, M, N, & O
Marvin Road NE & Britton Parkway NE
Lacey, Washington

DocID: WigProp.Gateway.F	July 2013	Figure 3



Approximate Site Location

An excerpt from the *Geologic Map of the Lacey 7.5-minute Quadrangle, Thurston County, Washington* by Robert L. Logan, Timothy J. Walsh, Henry W. Schasse, and Michael Polenz (2003)

Qf — **Fill**—Clay, silt, sand, gravel, organic matter, rip-rap, and debris; includes engineered and non-engineered fills; shown only where fill placement is extensive, sufficiently thick to be of geotechnical significance, and readily verifiable.

Qgo — **Vashon recessional outwash**—Recessional and proglacial stratified, moderately to well-rounded, poorly to moderately sorted outwash sand and gravel of northern or mixed northern and Cascade source, locally containing silt and clay; also contains lacustrine deposits and ice-contact stratified drift. Some areas mapped as unit Qgo may instead be advance outwash (unit Qga), as it is difficult to tell the difference between the two without the presence of an intervening till

Qgt — **Vashon till**—Unstratified and, in most exposures, highly compacted mixture of clay, silt, sand, and gravel deposited directly by glacier ice; gray where fresh and light yellowish brown where stained; unsorted and, in most exposures, of very low permeability; most

Not to Scale

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

USGS Geologic Map
Proposed Lacey Gateway Commercial Project
Parcels k, L, M, N, & O
Marvin Road NE & Britton Parkway NE
Lacey, Washington

DocID: WigProp.Gateway.F	July 2013	Figure 4

APPENDIX "A"

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More than 50% Retained on No. 200 Sieve	GRAVEL More than 50% Of Coarse Fraction Retained on No. 4 Sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More than 50% Of Coarse Fraction Passes No. 4 Sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% Passes No. 200 Sieve	SILT AND CLAY Liquid Limit Less than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY Liquid Limit 50 or more	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
2. Soil classification using laboratory tests is based on ASTM D2487-90.
3. Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

SOIL MOISTURE MODIFIERS:

Dry- Absence of moisture, dry to the touch

Moist- Damp, but no visible water

Wet- Visible free water or saturated, usually soil is obtained from below water table

GeoResources, LLC
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Fife, Washington 98424
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Fax: 253-896-2633

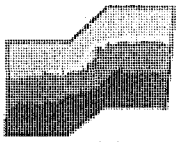
Soil Classification System
Proposed Lacey Gateway Commercial Project
Parcels k, L, M, N, & O
Marvin Road NE & Britton Parkway NE
Lacey, Washington

Client: Wig Properties LLC-Nisqually **Driller:** Cascade Drilling **Logged By:** CRL

Location: Lacey, Washington **Approx. Elev:** 307 +/- Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |-----x-----| Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(12 inches SOD and TOPSOIL)				
2		Gray sandy GRAVEL, dry.		2.9	50/6"	
3			Very Dense			
4						
5				6.0	50/6"	
6						
7		Gray sandy GRAVEL with silt, moist becoming wet below 10 feet.	Very Dense			
8						
9						
10				8.5	50/2"	
11						
12						
13						
14		Seepage observed at 15 feet.				
15 ▽				11.6	50/6"	
16						
17						
18						
19						
20				8.5	50/6"	
21		Monitoring well terminated at 20 feet. Groundater observed at 15 feet during drilling. 2-inch PVC monitoring well constructed as shown. (WDOE Well Tag BIC 548)				
22						
23						
24						
25						

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site.



Terra Associates, Inc.

Consultants in Geotechnical Engineering, Geology and Environmental Earth Sciences

LOG OF MONITORING WELL MW-2

Figure No. A-2

Project: 37 Acre Site **Project No:** T-6537-3 **Date Drilled:** 6/23/13

Client: Wig Properties LLC-Nisqually **Driller:** Cascade Drilling **Logged By:** CRL

Location: Lacey, Washington **Approx. Elev:** 200 +/- Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |——x-----| Wl 10 30 50 70 90	Pocket Penetrometer △ TSF △ 1 2 3 4 / SPT (N) • Blows/ft • 10 20 30 40	Monitor Well
46–75		Brown gray sandy GRAVEL with silt to sandy GRAVEL, moist.	Very Dense	7.1	50/6"	
				5.5	50/6"	
				7.4	50/6"	
				7.2	50/5"	
76–90		Monitoring well terminated at 75.5 feet. No groundwater observed during drilling. 2-inch PVC monitoring well constructed as shown. (WDOE Well Tag BIC 549)				

LOG OF MONITORING WELL MW-3

Figure No. A-3

Project: 37 Acre Site **Project No:** T-6537-3 **Date Drilled:** 6/24/13

Client: Wig Properties LLC-Nisqually **Driller:** Cascade Drilling **Logged By:** CRL

Location: Lacey, Washington **Approx. Elev:** 200 +/- Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |-----x-----| Wl 10 30 50 70 90	Pocket Penetrometer △ TSF △ 1 2 3 4 / SPT (N) • Blows/ft • 10 20 30 40	Observ. Well
1		(Upper 18 inches removed prior to drilling)				
2		Brown-gray sandy GRAVEL with silt, dry.				
3						
4						
5			Dense to	5.6 x	36 •	
6			Very Dense			
7						
8						
9						
▼ 10				10.3 x	50/6" •	
11						
12		Brown gravelly SAND with silt, wet.				
13			Very Dense			
14						
15				8.3 x	50/6" •	
16		Monitoring well terminated at 15.5 feet. Groundwater observed below 10 feet. 2-inch PVC monitoring well constructed as shown. (WDOE Well Tag BIC 550)				
17						
18						
19						
20						

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site.

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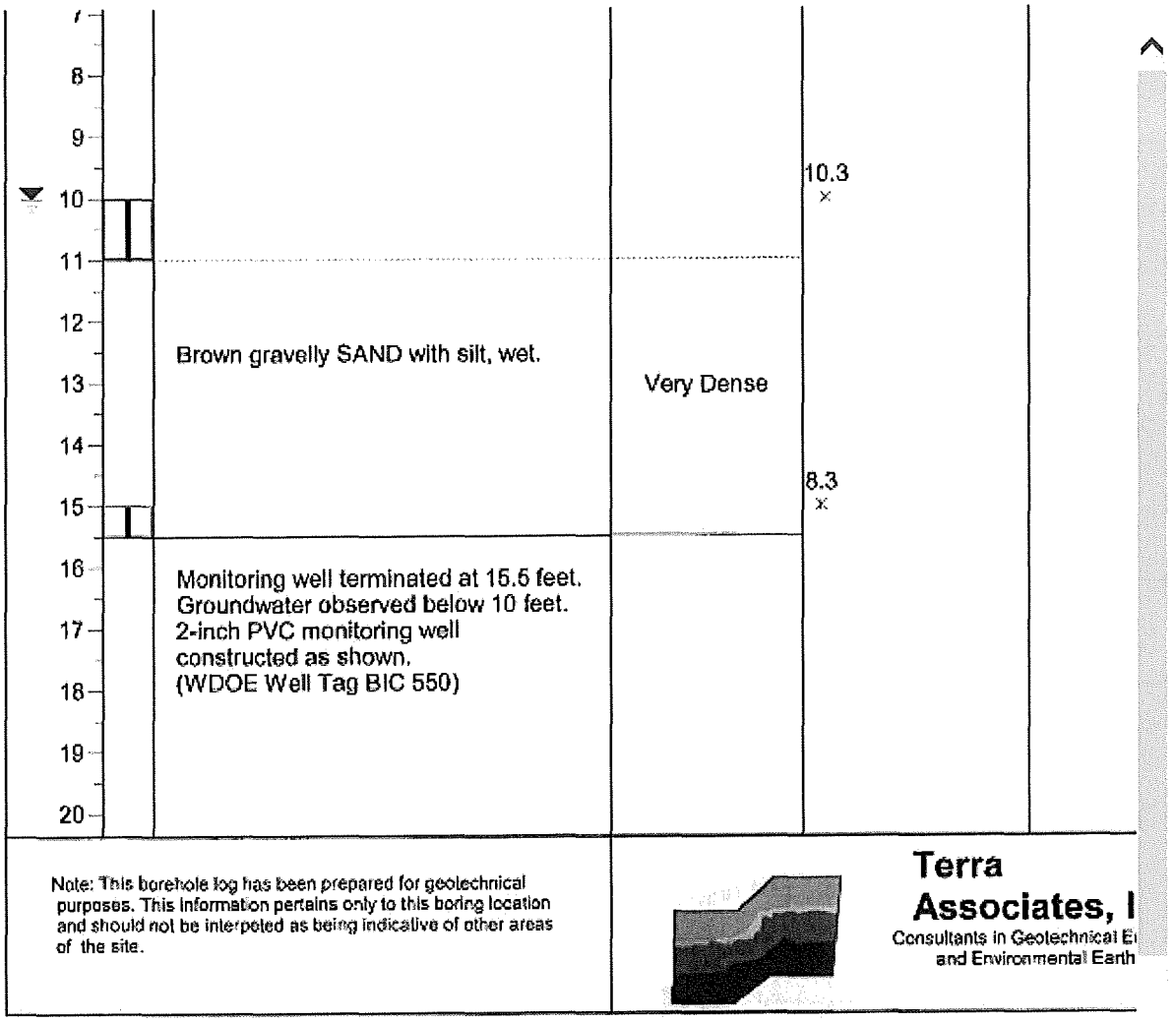
Consultants in Geotechnical Engineering, Geology and Environmental Earth Sciences


8
9
10
11
12
13
14
15
16
17
18
19
20
Brown gravelly SAND with silt, wet.
Very Dense
10.3
8.3
Monitoring well terminated at 15.5 feet.
Groundwater observed below 10 feet.
2-inch PVC monitoring well
constructed as shown.
(WDOE Well Tag BIC 550)
Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site.
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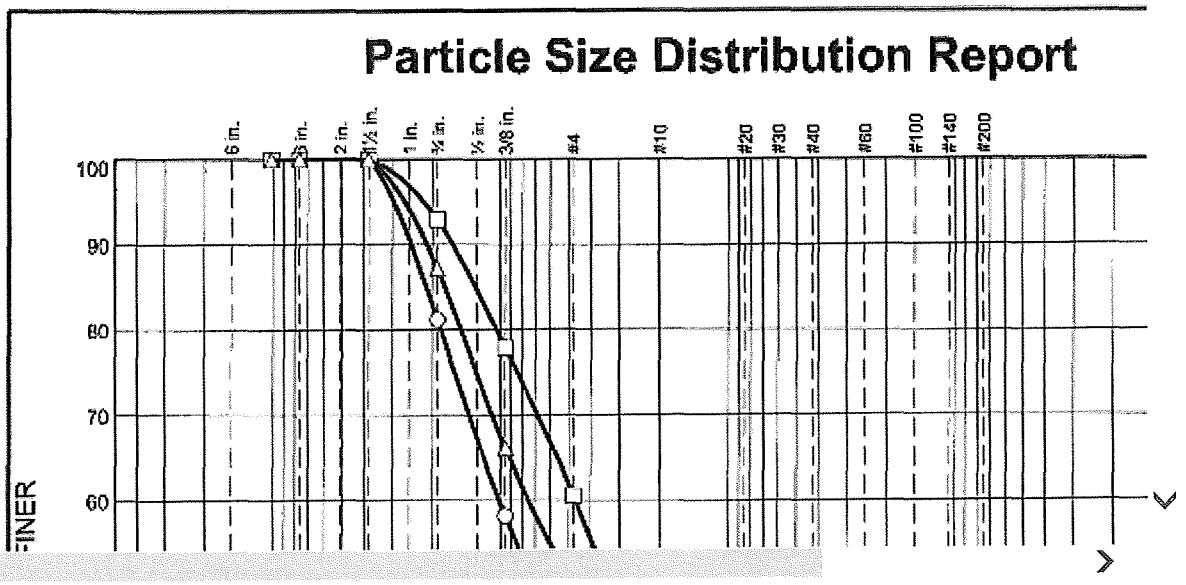
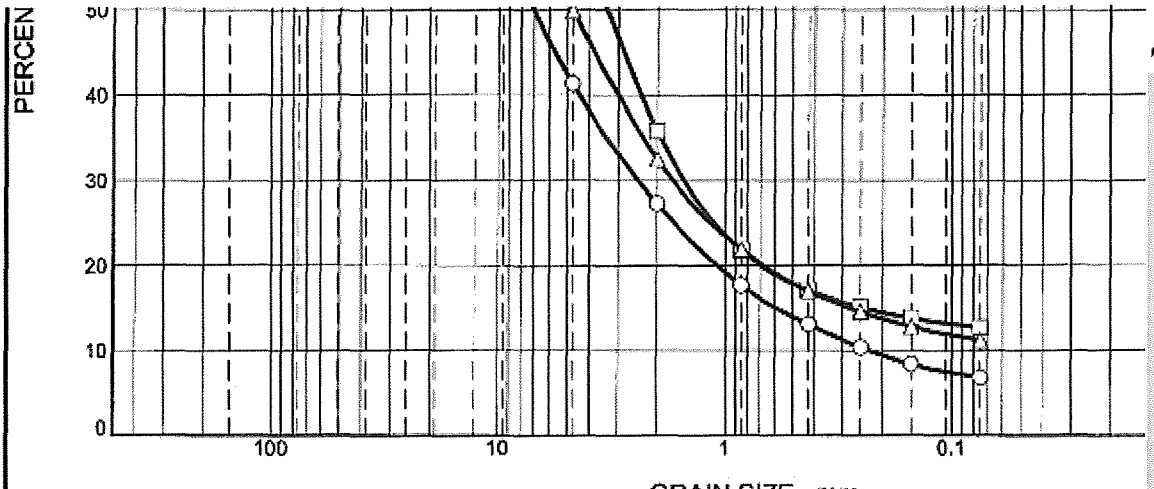
and Environmental Earth


Particle Size Distribution Report
6 in.
3 in.
2 in.
1½ in.
1 in.
¾ in.
½ in.
3/8 in.
#4
#10
#20
#30
#40
#60
#100
#140
#200
100
90
80
70
60
FINER



	% +3"	% Gravel		% Sand			Silt
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	18.8	39.8	14.1	14.2	6.3	
□	0.0	7.1	32.4	24.7	18.7	4.4	
△	0.0	12.8	37.3	17.4	15.5	5.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}
○			21.2620	10.1172	7.0177	2.4243	0.5879	0.2287
□			12.8972	4.6660	3.3229	1.5256	0.2419	
△			17.6422	7.5184	4.7724	1.7081	0.2762	

Material Description

○ Gravelly sand with silt
□ Silty gravel with sand
△ Sandy gravel with silt

Project No. 6537-3 **Client:** Wig Properties

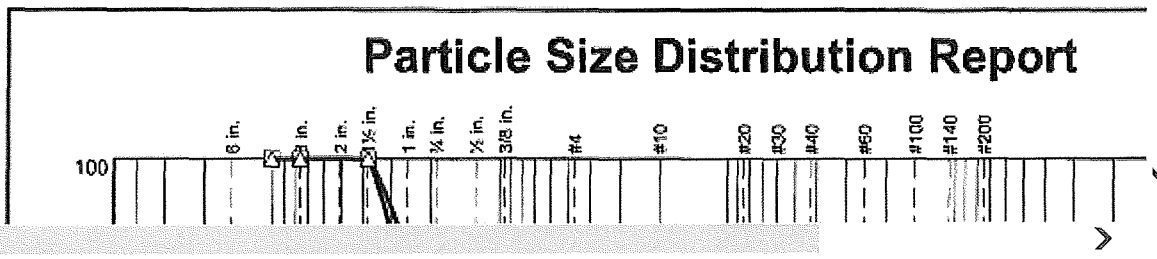
Project: 37-acre Parcel

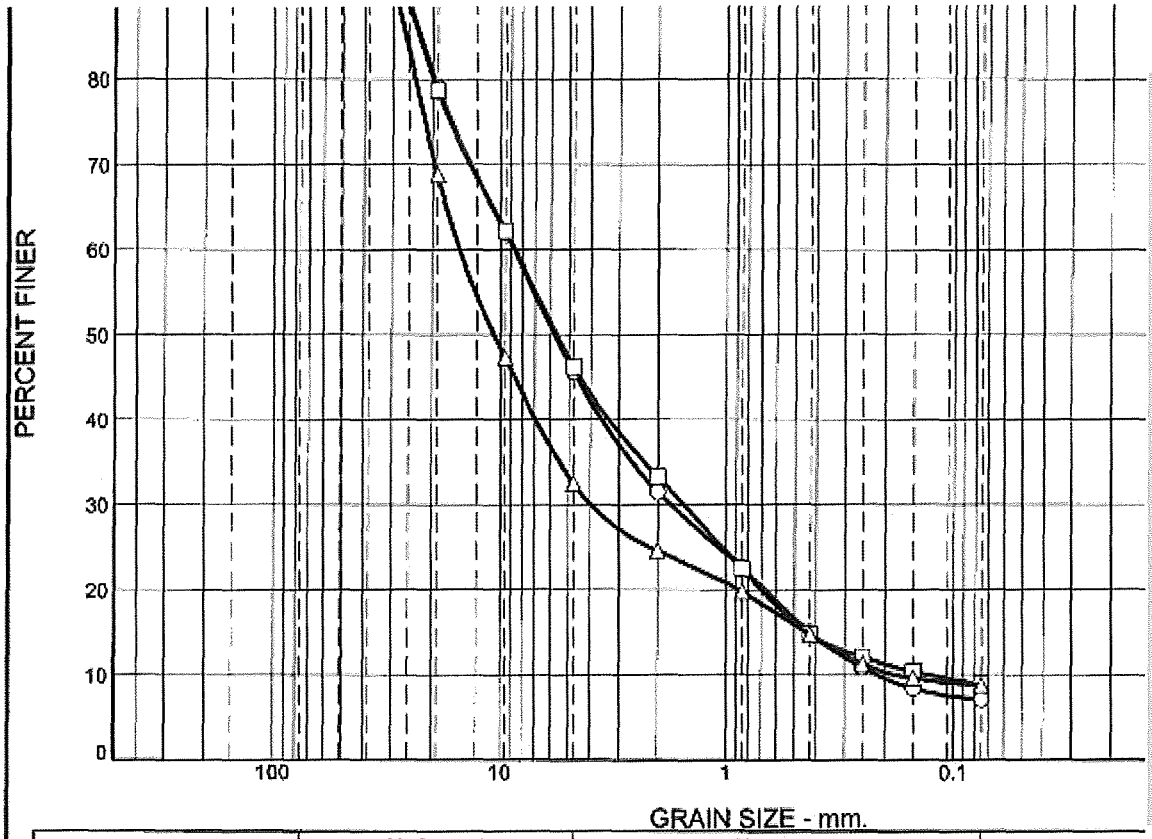
○ **Location:** MW-1 **Depth:** 2.5/4.0'
□ **Location:** MW-1 **Depth:** 5/6.0'
△ **Location:** MW-1 **Depth:** 10/11'

Terra Associates, Inc.

Kirkland, WA

Tested By: FQ





	% +3"	% Gravel		% Sand			Silt
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	20.9	33.5	14.1	16.5	7.9	
□	0.0	21.3	32.5	12.9	18.5	5.9	
△	0.0	31.2	36.3	7.9	9.9	5.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}
○			22.6945	8.7416	5.7703	1.7550	0.4250	0.2143
□			22.9311	8.6472	5.6652	1.5358	0.4359	0.1287
△			26.2718	15.2024	10.6529	3.9752	0.4425	0.1773

Material Description	L
○ Sandy gravel with silt	
□ Sandy gravel with silt	
△ sandy gravel with silt	

Project No. 6537-3 **Client:** Wig Properties

Project: 37-acre Parcel

○ **Location:** MW-1 **Depth:** 20'

□ **Location:** MW-2 **Depth:** 15'

△ **Location:** MW-2 **Depth:** 45'

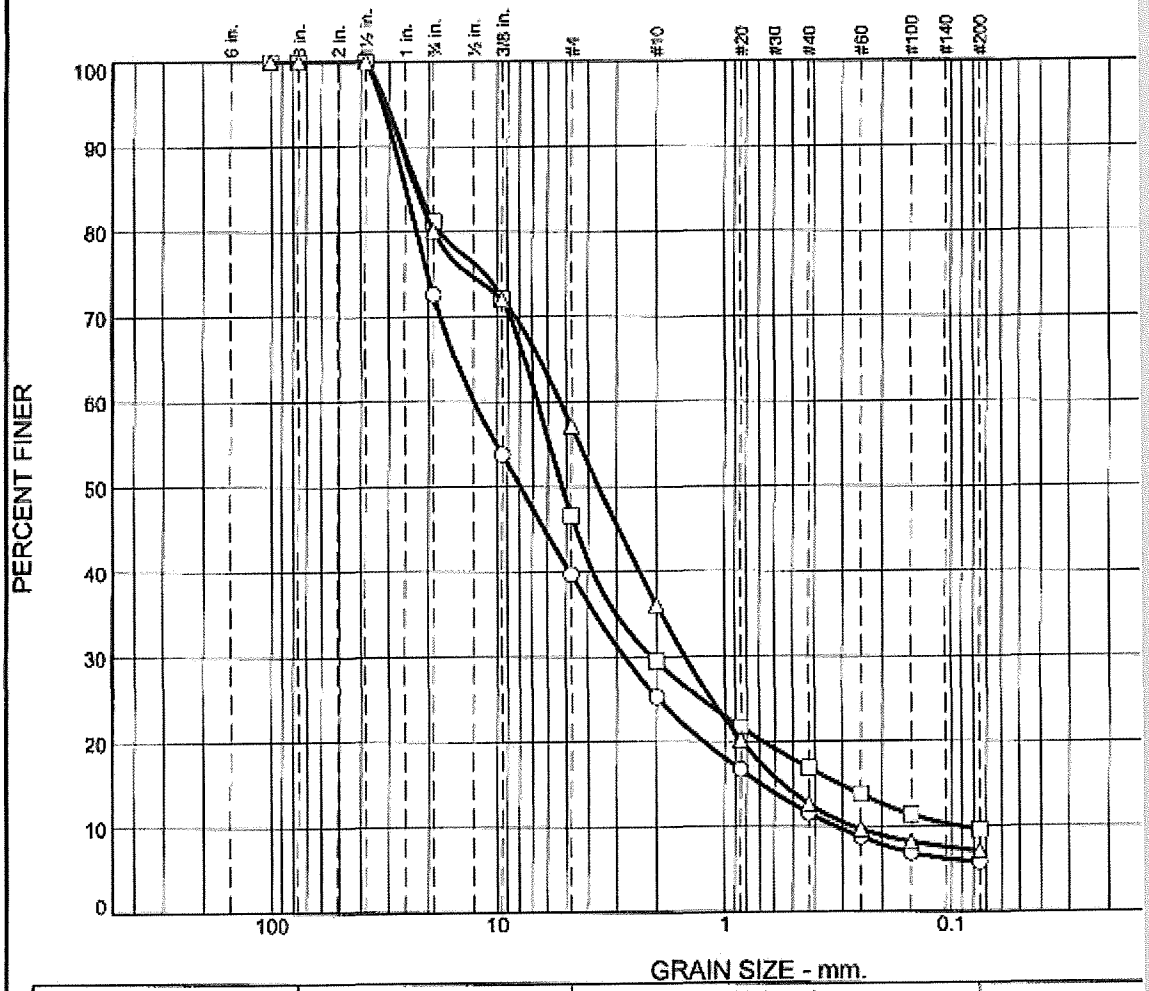
Terra Associates, Inc.

Kirkland, WA

Remark

Tested By: FQ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			Silt
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	27.4	32.9	14.4	13.7	5.8	
□	0.0	18.8	34.6	17.1	12.6	7.3	
△	0.0	19.9	23.0	21.0	23.4	5.6	

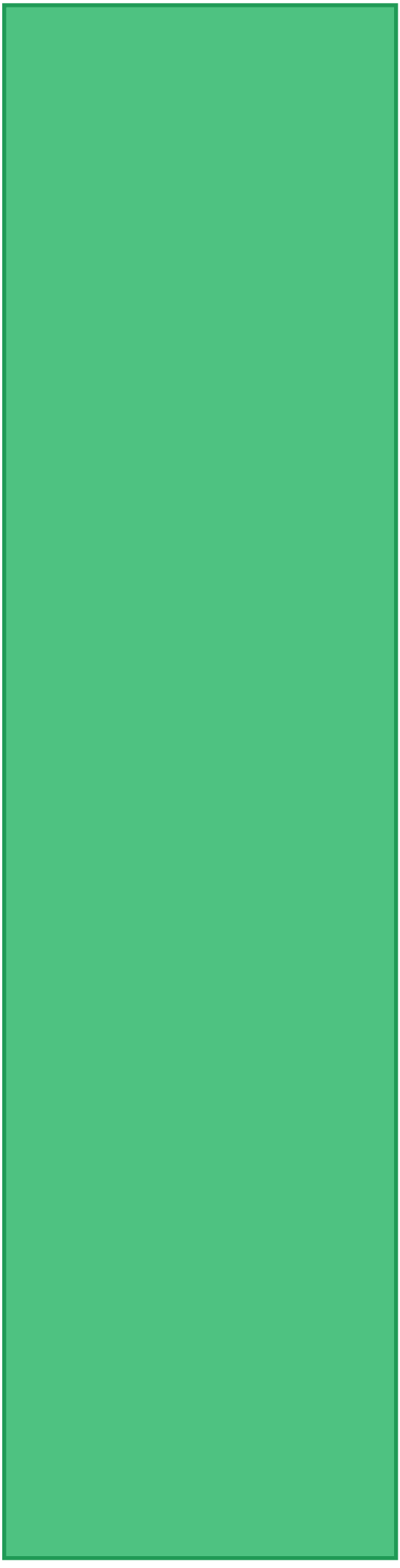
	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}
○			25.2337	12.6426	7.9314	2.7567	0.6872	0.3206
□			22.1920	6.6737	5.2112	2.0912	0.3100	0.0909
△			22.7158	5.3213	3.5895	1.4974	0.5530	0.2685

Material Description

○ Sandy gravel with silt
□ Sandy gravel with silt
△ Gravelly sand with silt

Project No. 6537-3 **Client:** Wig Properties
Project: 37-acre Parcel

○ **Location:** MW-2 **Depth:** 55'
□ **Location:** MW-2 **Depth:** 65'



HALEY ALDRICH

www.haleyaldrich.com

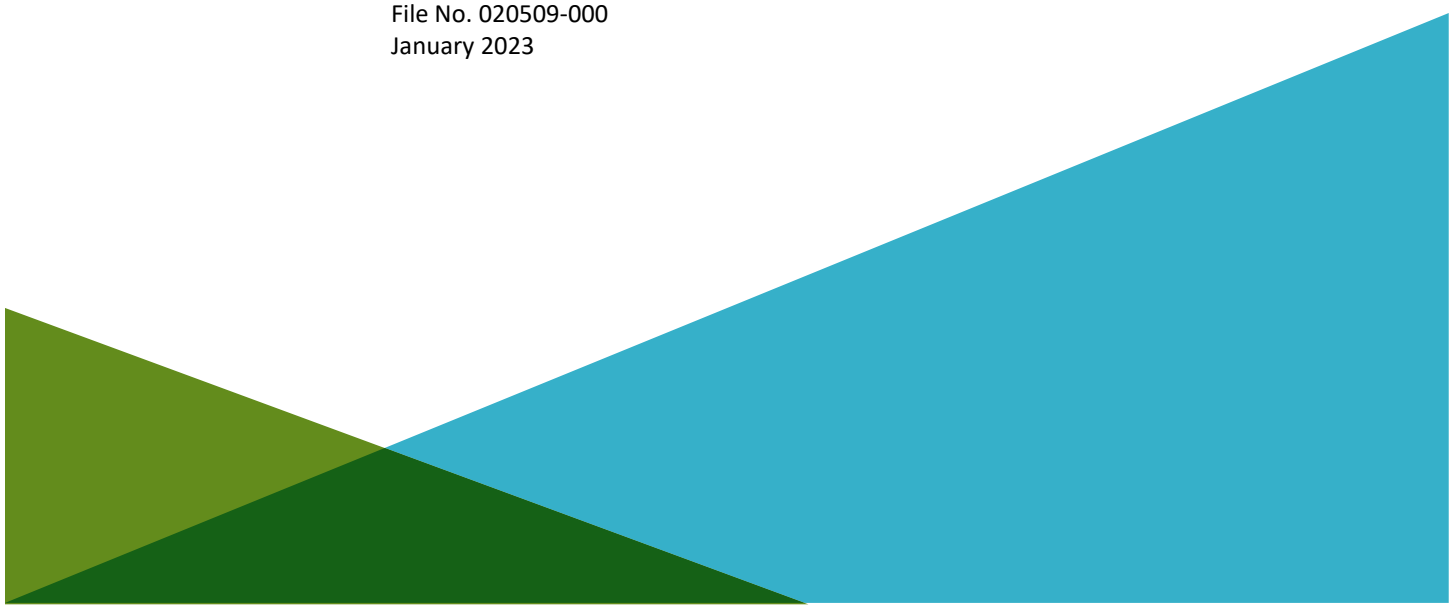
PRELIMINARY GEOTECHNICAL REPORT ON

NISQUALLY QUIEMUTH VILLAGE
BRITTON PARKWAY NE AND MARVIN ROAD NE
LACEY, WASHINGTON

by
Haley & Aldrich, Inc.
Seattle, Washington

for
Olson Engineering, a division of MacKay & Sposito, Inc.
Vancouver, Washington

File No. 020509-000
January 2023



HALEY & ALDRICH, INC.
3131 ELLIOTT AVENUE
SUITE 600
SEATTLE, WA 98121
206.324.9530

SIGNATURE PAGE FOR

REPORT ON

NISQUALLY QUIEMUTH VILLAGE
BRITTON PARKWAY NE AND MARVIN ROAD NE
LACEY, WASHINGTON

PREPARED FOR

OLSON ENGINEERING, A DIVISION OF MACKAY & SPOSITO, INC.
VANCOUVER, WASHINGTON

PREPARED BY:

James Jacobe, P.E.
Senior Project Geotechnical Engineer
Haley & Aldrich, Inc.

REVIEWED AND APPROVED BY:

Daniel Trisler, P.E.
Principal Geotechnical Engineer
Haley & Aldrich, Inc.

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B	Laboratory Test Results
C	Historical Exploration Logs
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1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this report on our preliminary geotechnical assessment for the proposed Nisqually Quiemuth Village mixed-use development. The approximately 200-acre site is located west of Marvin Road NE, north of Interstate 5 (I-5), and south of Britton Parkway NE in Lacey, Washington. Our work was completed in general accordance with our agreement with Olson Engineering, a division of MacKay & Sposito, Inc. (Olson), dated 20 March 2022, and our supplemental infiltration testing agreement, dated 22 July 2022.

This report presents our preliminary geotechnical engineering findings and recommendations to aid with planning and design of the project. Figures are presented at the end of the text. The location of the site is shown on Figure 1, and the existing site layout and topography with the location of historical explorations is shown on Figures 2 and 3. Supporting information is provided in the appendices. Appendix A contains historical subsurface exploration logs completed by others, and Appendix B contains the results of historical laboratory testing completed by others.

1.1 PROJECT UNDERSTANDING

The proposed Lacey project area is approximately 200 acres, located northwest of the I-5 and Marvin Road interchange. The site is bound to the north by Britton Parkway NE, to the south by I-5, to the east by Marvin Road NE, and to the west by the Britton Place apartment complex, and a sand and gravel pit. A short segment of Main Street NE bisects the northeast site boundary and Gateway Boulevard NE crosses through the western portion of the property.

Several parcels adjacent to the site include the following: a Cabela's store in the southwest corner of the project site, a 7-Eleven in the northeast corner, and a retail store, former (demolished) gas station, and former storage yard in the southeast corner. The Cabela's, 7-Eleven, and retail store are not part of the study area shown on Figure 2. The remainder of the property generally consists of undeveloped level to gently rolling ground that is lightly to heavily wooded with grasses and low ground cover.

2. Scope of Services

This geotechnical site evaluation was performed to obtain preliminary geotechnical information on subsurface conditions at the site and to develop preliminary geotechnical design recommendations for the subject project. Specifically, our scope of services included the following tasks:

- Reviewed relevant, readily available geologic maps and geotechnical reports that cover the site vicinity and nearby to evaluate geologic hazards, regional soil mapping, and local soil and groundwater conditions.
- Conducted a reconnaissance of the site to observe relevant surface features (e.g., signs of past grading).
- Conducted a limited site exploration program consisting of:
  - Six test pits advanced to depths between 8 and 12.5 feet below ground surface (bgs) using a mini-excavator; and
  - Six falling head infiltration tests.
- Conducted a limited laboratory testing program on select soil samples consisting of moisture content, grain size, and fines content tests.
- Presented historical and current infiltration testing results at and near the site.
- Evaluated seismic design criteria and preliminarily identifying seismic hazards, including ground shaking, ground shaking amplification, and liquefaction.
- Identified appropriate conceptual foundation, retaining wall, and infiltration system types for use at the site, including discussing key constraints to design and construction for such improvements.
- Prepared this report summarizing our preliminary findings, conclusions, and recommendations.

3. Soil Conditions

3.1 GEOLOGY AND SOIL MAPPING

3.1.1 Geologic Mapping

Geology in the vicinity of the project site is mapped in the Washington Geologic Information Portal at the 1:24,000 scale, as shown on Figure 4. The geology of the site has been mapped as Quaternary glacial till, Quaternary glacial advance outwash, and Quaternary glacial outwash. The glacial till deposits are described as Vashon Stade till consisting of a "highly compacted mixture of clay, silt, sand, and gravel deposited directly by glacier ice." The glacial advance outwash deposits are described as Vashon Stade Advance Outwash consisting of "sand and gravel and lacustrine clay, silt, and sand of northern or mixed northern and Cascadian source, deposited during glacial advance." The glacial outwash deposits are described as Vashon Stade recessional outwash consisting of "recessional and proglacial, sand and gravel of northern or mixed northern and Cascade source, locally containing silt and clay." Mapping indicates that locally the surficial geology may include modified land and artificial fill (Washington State Department of Natural Resources 2022).

Based on our review of the United States Geological Survey's (USGS') Quaternary Fault and Fold Database of the United States, mapped faults near the site include the Olympia Structure faults located 4 miles west of the site, the Tacoma faults located 20.5 miles north of the site, and the Lucky Dog fault located 24 miles northwest of the site. The Cascadia Subduction Zone (CSZ; referred to in the database as the Cascadia fold and fault belt) is mapped as close as 60 miles west of the site.

3.1.2 Soils Mapping

The near-surface native soils at the site are mapped in the U.S. Department of Agriculture (USDA) web soil survey (USDA 2018), as shown on Figure 5. The survey indicates the surficial soils at the site primarily consist of Spanaway gravelly sandy loam (0 to 3 percent slopes), Alderwood gravelly sandy loam (8 to 15 percent slopes), and Everett very gravelly sandy loam (8 to 15 percent slopes). Indianola loamy sand (0 to 5 percent slopes) is mapped in the central-western portion of the site, along Gateway Boulevard NE.

The Spanaway soils are described as gravelly to extremely gravelly sandy loam derived from gravelly outwash with an estimated hydraulic conductivity in the most restrictive layer of high (approximately 2 to 6 inches per hour) and are described as somewhat excessively drained. The Alderwood soils are described as very gravelly sandy loam derived from gravelly outwash with an estimated hydraulic conductivity in the most restrictive layer of very low to moderately low (approximately 0.0 to 0.06 inches per hour) and are described as moderately well drained. The Everett soils are described as very gravelly sandy loam to loamy sand derived from sandy and gravelly glacial outwash with an estimated hydraulic conductivity in the most restrictive layer of high (approximately 2 to 6 inches per hour) and are described as somewhat excessively drained. The Indianola soils are described as loamy sand to sand derived from sandy glacial outwash with an estimated hydraulic conductivity in the most limiting layer of high to very high (approximately 6 to 100 inches per hour) and are described as somewhat excessively drained.

3.2 SURFACE CONDITIONS

The ground surface at the site is generally flat to gently rolling topography and lightly to heavily wooded with brambles to low ground cover. The northern portion of the site is more heavily wooded and generally more trees are located along the existing roadways around the site. Gateway Boulevard NE, an asphalt-paved road, and the Cabela's store partially bisects the site in a north-south alignment, near the western site boundary. Main Street NE, an asphalt-paved road, partially bisects the site in an east-west alignment, along the eastern site boundary. A future I-5 off-ramp and outer road is located along the southern boundary of the site. Surficial soils appear to typically consist of sandy gravel and gravelly sand. Several vehicle pathways are present across the site consisting of gravel and quarry spalls. Construction debris and signs of previous grading are present at the surface in localized areas across the site, especially on the east portion of the site near Main Street NE, and the existing retail stores and associated parking areas.

The natural ground elevations vary from approximately Elevation (El.) 210 to 225 feet North American Vertical Datum 1988 (NAVD88) along the east side of the site adjacent to Marvin Road NE. Elevations vary from approximately El. 210 to 190 feet along the south side of the site adjacent to I- 5. Elevations vary from approximately El. 225 to 210 feet along the north side of the site adjacent to Britton Parkway NE. Generally, the site grades gradually down from north to south and from east to west, except for a mound near the middle of the site with a peak elevation of approximately El. 255 feet. Just west of the site, the grade slopes down to the adjacent sand and gravel pit.

Existing slopes on site are generally gradual slopes of 5 horizontal to 1 vertical (5H:1V) or flatter, with large portions of the site being relatively level. However, there may be small, localized slopes steeper than 5H:1V.

3.3 SUBSURFACE CONDITIONS

Our understanding of subsurface conditions at the site was developed from interpretation of geologic maps, our explorations, and historical explorations, in conjunction with soil properties inferred from field observations and laboratory tests. This understanding of subsurface conditions formed the basis for the conclusions and preliminary recommendations provided in this report.

Subsurface explorations performed at the site include the current exploration program performed by Haley & Aldrich in August 2022, and seven other geotechnical and environmental exploration programs performed on or near the site by Hart Crowser, Inc. (now Haley & Aldrich, Inc.) and others between 1966 and 2018 (Appendix C). The approximate locations and designations of the current and historical subsurface explorations are shown on Figures 2 and 3. The following serves as a summary of the various historical exploration programs:

1966 Carney-Gleason Road Undercrossing Subgrade Investigation (Pacific Testing Laboratories)

- Three exploratory borings (designated C2-1 to C2-3) were drilled near the site to depths ranging from 53.5 to 58 feet bgs.

1989 ULID No. 11 Sanitary Sewer Geotechnical Study (Hart Crowser)

- Six exploratory borings (designated HC-1 to HC-6) were drilled on and near the site to depths ranging from 27.8 to 37.8 feet bgs.

1996 Northeast Area LID Geotechnical Study (Hart Crowser)

- Eighteen (18) test pits (designated as TP-1 to TP-17) were excavated on and near the site to depths of 5 to 10.5 feet bgs using a tractor-mounted backhoe; and
- Four double-ring infiltration tests (at test pit locations TP-1, TP-2, TP-3, and TP-7) were performed to test the rate of hydraulic conductivity of the soils within the upper 1 to 6 feet of the site.

1997 SR-510, I-5 to Pacific Avenue Geotechnical Report (Hong West & Associates)

- Seven exploratory borings (designated as BH-1 to BH-7) were drilled near the site to depths of 14.4 to 45.6 feet bgs using a CME-55 or CME-850 drill rig; and
- One test pit (designated as TP-1) was excavated near the site to a depth of 8.8 feet bgs using a Case 580L backhoe.

1999 SR-510, SR-5 to Martin Way Geotechnical Report (GN Northern)

- One exploratory boring (designated as TH-1) was drilled near the site to a depth of 16.5 feet bgs using a drill rig.

2014 Lacey Gateway Geotechnical Report (GeoResources, LLC)

- Three monitoring wells performed by Terra Associates (designated as MW-1 to MW-3) were installed on the site to depths of 15.5 to 75 feet bgs. The logs from these wells were included in the 2014 GeoResources report.

2018 I-5/SR 510 Interchange Geotechnical Data Report (Washington State Department of Transportation [WSDOT])

- Twenty-one (21) exploratory borings (designated as H-1p-17 through H-21-17) were drilled near the site to depths of 20.4 to 100.4 feet bgs using a CME-55 drill rig.

The approximate locations of the borings, monitoring wells, test pits, and infiltration tests are indicated on Figures 2 and 3.

3.3.1 Soils

Subsurface conditions in the site vicinity and expected at the site are typically defined by a layer of organics (topsoil/forest duff) and/or loose to medium dense artificial fill and weathered native soils, overlying native dense to very dense glacial soils. The glacial soils typically consist of sandy gravel or gravelly sand with varying amounts of silt and occasional silt layers.

Generally current and historical borings and test pits encountered loose to medium dense fill or native soils to depths of up to about 10 feet bgs before encountering denser native materials. However, some historical explorations encountered dense glacial soils at or very near the ground surface such as: test pits TP-16 and TP-16A in the northwest corner of the site; and monitoring wells MW-1 and MW-2 in the southeast corner of the site.

Below the fill material, native glacial soils consisting of dense to very dense silty sand, sandy gravel and gravelly sand with occasional sandy silt layers typically extended to the bottom of borings, test pits, and wells around the site. Cobbles and boulders were also encountered in the glacial soils.

3.3.2 Groundwater

Depth to groundwater appears variable in the site vicinity and across the site according to the historical explorations. Historical test pits TP-2, TP-4, and TP-15 encountered groundwater seepage at depths of 7.5, 2.5, and 4.5 feet bgs, respectively, perched above the glacial till. Most of the reported seepage elevations on and near the site are within several feet of the interpreted fill-native (glacial till) contact, suggesting that several feet of perched water may typically be present above the glacial till across the site. However, as many of the test pits did not encounter seepage, the presence of perched water is interpreted to be variable across the site, and may vary with seasonal precipitation and other factors.

Historical boring and well logs reported encountering water at various elevations. Terra Associates monitoring wells MW-1 and MW-3 encountered free water at approximate El. 192 and El. 190 (depths of 15 and 10 feet bgs), respectively. WSDOT borings H-4p-17 and H-12-17 encountered free water at El. 202 and 186 (depths of 27 and 12 feet bgs), respectively. Hart Crowser borings HC-2 and HC-3 encountered free water at approximate El. 188 and 192 (depths of 22 and 30 feet bgs), respectively. As many of the borings did not report free water at or below these elevations, we interpret that the regional groundwater table varies across the site, and may vary according to seasonal precipitation and other factors.

3.3.3 Infiltration

We performed six *in-situ* infiltration tests at the project site between 16 and 18 August 2022. The tests were completed in shallow excavations adjacent to the test pits. The infiltration tests consisted of open-pipe, falling head tests performed by placing a 6-inch-diameter PVC pipe approximately 6 inches into the bottom of the excavation. The results of the field testing and associated fines content and soil type of tested soils are provided in Table 1. The drawdown values presented in Table 1 are not to be used for design but are provided to show the direct results of the field measurement.

Table 1. Infiltration Test Data – Haley & Aldrich 2022

Infiltration Test No.	**Test Pit No.**	**Approximate Test Depth (feet)** (Approximate Excavation Depth, feet)	**Field Drawdown Rate (inches per hour)**	**Soil Type (USCS)**	**Fines Content (percent)**
IT1	TP1	2.5 (2)	200	GP	3.7
IT2	TP2	2.5 (2)	22	SP	2.5
IT3	TP3	2.5 (2)	50	GP	0.7
IT4	TP4	2.5 (2)	200	GW	1.2
IT5	TP5	2.5 (2)	8.5	SM	21.3
IT6	TP6	2.5 (2)	15	SP	0.9

Hart Crowser performed four *in-situ* infiltration tests adjacent to the project site in 1996, near Britton Parkway NE on the north side of the site (NE Area LID Geotechnical Study). The tests were completed in

shallow pits at or adjacent to select test pits. The infiltration tests consisted of double-ring infiltrometer falling head tests, based on ASTM International (ASTM) D3385. The results of the field testing and soil type of tested soils are provided in Table 2. The infiltration values presented in Table 2 are not intended to be used for design but are provided to show the direct results of the historical field measurements.

Table 2. Historical Infiltration Test Data – NE Area LID 1996

Test Pit No.	Approximate Test Depth (feet)	Average Field Infiltration Rate (inches per hour)	Soil Type
TP-1	1	13	Loose, silty, very gravelly SAND
TP-2	6	0	Dense, silty, gravelly SAND
TP-3	4	1.2	Dense, silty, very gravelly SAND
TP-7	3	1.4	Loose, silty, slightly gravelly SAND

Hart Crowser performed four *in-situ* infiltration tests near the project site in 1993, for a proposed infiltration pond along Willamette Drive NE, approximately 1 mile northeast of the site (Commerce Place PID, Meridian Campus Geotechnical Study). The tests were completed in shallow pits with the infiltrometer rings driven approximately 4 to 6 inches below grade; however, depth of the pits was not indicated. The infiltration tests consisted of double-ring infiltrometer constant head tests, based on ASTM D3385. The results of the field testing and soil type of tested soils are provided in Table 3. The infiltration values presented in Table 3 are not intended to be used for design but are provided to show the direct results of the historical field measurements.

Table 3. Historical Infiltration Test Data – Commerce Place PID/Meridian Campus 1993

Test Pit No.	Average Field Infiltration Rate (inches per hour)	Soil Type (Geologic Unit)
IT-1	9	Slightly silty, sandy GRAVEL (Recessional Outwash)
IT-2	3	Slightly silty, gravelly SAND (Recessional Outwash)
IT-3	0.25	Slightly silty, slightly gravelly SAND (Recessional Outwash)
IT-4	13	Slightly silty, slightly sandy GRAVEL (Recessional Outwash)

Hart Crowser also performed five *in-situ* infiltration tests near the project site in 1988, near Willamette Drive NE approximately 1 mile northeast of the site (Meridian Campus Geotechnical Report). The tests were completed in shallow pits at or adjacent to select test pits. The infiltration tests consisted of double-ring infiltrometer falling head tests. The results of the field testing and soil type of tested soils are provided in Table 4. The infiltration values presented in Table 4 are not intended to be used for design but are provided to show the direct results of the historical field measurements.

Table 4. Historical Infiltration Test Data – Meridian Campus 1988			
Test No. (Test Pit No.)	**Approximate Test Depth (feet)**	**Range of Field Infiltration Rate (inches per hour)**	**Soil Type**
IT-1 (TP-3)	1.7	9.4	Loose, silty, very gravelly SAND
IT-2 (TP-20)	1.2	45 to 60	Loose, sandy GRAVEL with occasional cobbles
IT-3 (TP-19)	1.5	63 to 120	Medium dense, slightly silty, sandy GRAVEL
IT-4 (TP-21)	1.3	62 to 220	Loose, very sandy GRAVEL with occasional cobbles
IT-5 (TP-16)	0.8	4.1	Loose, sandy, very silty GRAVEL

3.4 GEOLOGIC AND SEISMIC HAZARDS

3.4.1 Seismic Shaking

We evaluated potential seismic shaking at the site using guidelines presented by American Society of Civil Engineers (ASCE) 7-16, as referenced by the currently adopted 2018 International Building Code (IBC; ICC 2018). Code-based seismic design values for design-level recommendations for the proposed structures may vary if the subsequent version of the ASCE 7 guidelines (ASCE 7-22) is adopted at the time of design.

The expected peak bedrock acceleration having a 2 percent probability of exceedance in 50 years (2,475-year return period) is 0.585g per ASCE 7-16. This value represents the peak acceleration on bedrock beneath the site and does not account for ground motion amplification due to site-specific effects. The peak ground acceleration (PGA) is determined by applying a site class factor to the peak bedrock acceleration. The PGA accounting for site amplification is PGA_M = 0.64g for ASCE 7-16, and 0.71g for ASCE 7-22. Refer to *Section 4.4.2 Site Classification* for a discussion of ground motion amplification.

We obtained a deaggregation of the seismic sources contributing to the expected peak bedrock acceleration shown above from the USGS' Unified Hazard Tool website (USGS 2022). Seismic sources contributing to this potential ground shaking include the CSZ megathrust and intraplate sources. The data indicated that the "modal source" for shaking at the site at all potential periods of interest (0.0 to 2.0 seconds) is a magnitude 7.1 quake epicentered at the CSZ approximately 53 kilometers from the site. The modal source generally signifies the earthquake with the highest contribution to the site earthquake hazard, in this instance a rupture along the CSZ.

3.4.2 Site Classification

Thick sequences of unconsolidated, soft sediments typically amplify the shaking of long-period ground motions, such as those associated with subduction zone earthquakes; whereas areas underlain by shallow soil profiles are not likely to amplify seismic waves.

The "Site Class" is a designation used by the 2018 IBC and ASCE 7-16 and 7-22 to quantify ground motion amplification. The classification is based on the stiffness in the upper 100 feet of soil and bedrock materials at a site. Artificial fill and weathered glacial soils are likely present within the upper 10 feet of subsurface stratigraphy throughout much of the site, and is generally characterized by sand and gravel with varying fines content that ranges from loose to medium dense across the site. The artificial fill and weathered glacial soils are typically underlain by glacial till and outwash composed of dense to very

dense granular soils. Based on our review of available local geologic conditions, it is reasonable to extrapolate the consistency of the materials encountered at the base of the borings to 100 feet. Based on these conditions and currently available information, the property has a **Site Class D**. However, with more detailed study and exploration at the site it is possible that the dense to very dense glacial soils may be sufficient for a Site Class C.

Refer to *Section 5.3 Seismic Design* of this report for additional discussion regarding the recommended site class value for design of structures.

3.4.3 Liquefaction

Liquefaction is a phenomenon caused by a rapid increase in pore water pressure that reduces the effective stress between soil particles, resulting in the sudden loss of shear strength in the soil. Granular soils, which rely on interparticle friction for strength, are susceptible to liquefaction until the excess pore pressures can dissipate. Sand boils and flows observed at the ground surface after an earthquake are the result of excess pore pressures dissipating upwards, carrying soil particles with the draining water. In general, loose, saturated sand soils with low silt and clay contents are the most susceptible to liquefaction. Silty soils with low plasticity are moderately susceptible to liquefaction under relatively higher levels of ground shaking. For any soil type, the soil must be saturated for liquefaction to occur.

The Washington State Geologic Information Portal website maps the site as having a very low susceptibility to liquefaction. Based on the shallow depth to dense or very dense native glacial soils, we conclude that the liquefaction hazard within materials submerged by the regional groundwater table is low.

While the loose to medium dense artificial fill and weathered glacial soils that covers portions of the site is likely above the design groundwater table and is therefore assumed to be unsaturated, much of this material would be subject to liquefaction under saturated conditions. Perched groundwater has been identified at various depths throughout the site during previous subsurface exploration programs. Fill and loose to medium dense native soils saturated by perched water may be subject to localized liquefaction and liquefaction-induced settlements. While we consider the potential for such an occurrence to be low, the potential for localized liquefaction settlement will be further evaluated during a detailed geotechnical site assessment. We note that if the looser materials are removed or recompacted, then the potential for liquefaction would be low.

3.4.4 Dry Cyclic Densification

Seismically induced compaction or densification of non-saturated granular soil (such as sand above the groundwater table) due to earthquake vibrations can result in settlement of the ground surface. The non-engineered artificial fill at the site is largely composed of loose to medium dense granular soils with potential for susceptibility to cyclic densification. However, historical borings in the vicinity of the project site indicate the loose to medium dense fill and weathered glacial soil layer is approximately 10 feet or less in thickness.

We evaluated the potential for cyclic densification within the loose surficial soils logged at borings W-2-17, H-4p-17, H-5p-17, H-9p-17, H-14-17, and H-15-17, using the procedure described by Pradel (1998) and incorporating the refinements presented by Yee, Duku, and Stewart (2014). Our analyses indicate that the granular soils present within the upper approximately 10 feet bgs in the southern

portion of the site may experience cyclic densification on the order of 0.5 inches or less, under seismic shaking from the design earthquake. We assume that fill and loose to medium dense native soils present in other portions of the site are similarly susceptible to cyclic densification. Overall, we conclude that the potential for cyclic densification at the site is low. However, due to lack of historical boring data in portions of the site, there is some uncertainty as to depth of loose soils and fill across the entire site, and the potential for cyclic densification may be variable across the site. However, if the looser materials are removed or recompacted, then the potential for cyclic densification would be further reduced.

3.4.5 Fault Rupture

There are no mapped earthquake faults passing through or near the site. The nearest mapped faults are the Olympia Structure faults located 4 miles west of the site, the Tacoma faults located 20.5 miles north of the site, and the Lucky Dog fault located 24 miles northwest of the site.

4. Conclusions

Based on research and experience with similar soils, it is our opinion that the site is suitable for the proposed development. The following provides a summary of key preliminary geotechnical findings and conclusions.

- Site soils are expected to include a layer (up to 10 feet in places) of loose to medium dense fill and native soils predominantly composed of sand and gravel with varying amounts of fines. The fill and loose to medium dense native soils are underlain by dense soils composed of sand and gravel with varying amounts of silt and occasional silt layers. Cobbles and boulders are present in both fill and native soil layers.
- Perched groundwater is expected to be present at various depths across the site, often near the ground surface. Areas of perched groundwater over the glacial till soils are likely to be encountered during construction. Localized pockets of "confined" water may be encountered where water upwells when exposed (e.g., artesian conditions).
- We anticipate the soils present at shallow depths beneath the existing ground surface will be suitable for support of conventional building foundations, building floor slabs, and pavements, once prepared and compacted in conformance with geotechnical recommendations.
  - Due to the variable and loose nature of the upper soils, replacement or recompaction of 1 to 3 feet of looser material materials will be required below building foundation/slab and pavement subgrades, unless that material is removed during site grading.
- Site soils have low to high hydraulic conductivity rates that are expected to vary significantly across the site, due to the preponderance of artificial fill, loose to medium dense surficial soils, and the relatively impermeable glacial till soils present at the site. We anticipate that areas of highly permeable soils will be present, but are potentially underlain at depth by dense till soils which may be relatively impermeable and may perch water or retard infiltration.
  - The use of stormwater infiltration systems is likely to be feasible; however, the use of deep or high-volume systems should be avoided. The use of small, disperse, low volume systems, such as bio-swales and infiltration trenches are preferred.
  - Where site grading significantly lowers site grades, relatively impermeable till soils may be exposed (or found at shallower depth) that will not infiltrate.
  - The preliminary design of infiltration systems should account for the potential for zones of impermeable soil at or near the bases of the systems. Therefore, systems should have overflows or be interconnected to one another.
  - Incorporation of infiltration systems into the stormwater design will require supplemental detailed site characterization and *in situ* infiltration testing to better characterize the infiltration capacity of site soils.
- The on-site soils are typically suitable for reuse as structural fill, provided they are properly moisture conditioned and oversized, deleterious, and organic materials are removed. We note that:
  - The presence of cobbles and boulders across the site may pose challenges for excavation.

- The fines content of the soils may cause them to be easily disturbed during construction. The use of wet soil/weather earthwork practices will likely be required during construction.

The following sections present our preliminary design and construction considerations that can be used for initial planning of future development. These guidelines should not be used for final design of future improvements.

5. Preliminary Geotechnical Design Considerations

5.1 FOUNDATIONS

As discussed above, much of the site vicinity is underlain by variable (loose to medium dense) artificial fill and native soils that are expected to require removal and replacement, or reworking and recompaction. The potential for settlement may feasibly be addressed by performing overexcavation and/or recompaction of the artificial fill and loose native soils to provide an engineered fill subgrade that provides relatively uniform foundation support. Where site grading removes the loose soils and exposes the underlying dense materials, no reworking of the foundation subgrade would be required.

Based on the results of our investigation, it is our opinion that one- to three-story structures can be supported on conventional spread foundations or slabs-on-grade designed to gain support on a zone of overexcavated and recompacted structural fill or the native dense glacial soils.

Preliminary recommendations for spread foundations bearing are discussed below.

- Allowable bearing pressure: 4,000 pounds per square foot.
- Minimum footing width: 12 inches for strip footings and 24 inches for isolated footings.
- Minimum footing depth: 18 inches below exterior grade and 12 inches below interior grade.
- Allowable base friction coefficient: 0.4.
- Allowable passive resistance: 350 pounds per cubic foot acting as an equivalent fluid density.
- Any existing loose to medium dense soils that remain beneath proposed footings and slabs should be overexcavated and replaced with structural fill, or reworked and recompacted. The exact depth and lateral extent of reworking will be determined in the future based on actual building location, loads, configuration, and supplemental explorations (if completed).

5.2 FLOOR SLABS

We anticipate that most buildings will have concrete slab-on-grade floors. Due to the variable nature of the site soils, we recommend that the upper 12 to 18 inches of soil beneath floor slabs be recompacted, or consist of 12 to 18 inches of new structural fill over the existing subgrade, to provide a uniform bearing surface.

To reduce water moisture transmission through floor slabs, we recommend installing a capillary moisture break and a water vapor retarder beneath floors. Typically, finished spaces with slab-on-grade floors, such as offices, will utilize capillary moisture breaks and vapor retarders to reduce the potential for water vapor transmission through the floor, which can adversely impact flooring materials and carpeting. Depending upon the depth to perched groundwater and building floor elevations, it is conceivable that a sub-slab drainage system may be required, particularly if existing grades are lowered and expose areas which may perch water.

5.3 RETAINING WALLS

We anticipate that various retaining walls, primarily site landscaping walls, but possibly some building walls, will be required for the proposed development. For buildings and site walls, the use of

conventional cast-in-place concrete walls supported by spread footings (as described above) will be feasible. For site walls, the use of mechanically stabilized earth walls and large block walls (e.g., Keystone, Ultrablock, etc.) can also be considered. The need to use specialized walls such as soldier pile and lagging, soil nails, etc. is deemed to be unlikely unless dictated by unique construction features.

5.4 SEISMIC DESIGN

We obtained the preliminary design parameters for the spectral acceleration from the U.S. Seismic Design Maps (USGS 2021a) for Latitude 47.0648 and Longitude -122.7784. The parameters provided in Table 5 are associated with the current code, ASCE 7-16, and with ASCE-7-22, in the event design occurs when it has been adopted by the State.

Table 5. Preliminary Seismic Design Values for Site Class D Conditions

Seismic Parameter	ASCE 7-16 Design Values	ASCE 7-22 Design Values
Site Class	D[1]	D
MCE_R[2] Ground Motion (Period = 0.2 seconds), S_s	1.39 g[3]	1.5 g
MCE_R Ground Motion (Period = 1.0 seconds), S_1	0.504 g	0.5 g
Peak Ground Acceleration, PGA	0.585 g	*See Note 7*
Site Amplification Factor at 0.2 seconds, F_a	1.0	*See Note 8*
Site Amplification Factor at 1.0 seconds, F_v	*See Note 4*	*See Note 8*
Site Amplification Factor for PGA, F_{PGA}	1.1	*See Note 7*
Site-Modified Peak Ground Acceleration, PGA_M	0.644 g	0.71 g
Site-Modified Spectral Acceleration Value at 0.2 seconds, S_{MS}	1.39 g	1.76 g
Site-Modified Spectral Acceleration Value at 1.0 seconds, S_{M1}	*See Note 4*	1.04 g
Design Spectral Acceleration at 0.2 seconds, S_{DS}	0.927 g	1.17 g
Design Spectral Acceleration at 1.0 seconds, S_{D1}	*See Note 4*	0.7 g

Notes:

1) *Per ASCE 7-16 Table 20.3-1.*
2) *MCER = Risk-targeted maximum considered earthquake.*
3) *g = acceleration of gravity.*
4) *Per ASCE 7-16 Supplement 1, Site Class D values for Fv, SM1, and SD1 are only valid for calculation of Ts = SD1 / SDS for the purpose of developing seismic response coefficients (Cs). Using Fv = 1.8, SM1 = 0.905, SD1 = 0.603, and Ts = 0.651.*
5) *Per ASCE 7-16 Section 11.4.8, Site Class D sites with S1 greater than or equal to 0.6g; Site Class E sites with Ss greater than or equal to 1.0 g; or Site Class D or E sites with S1 greater than or equal to 0.2g shall have a site-specific ground motion hazard analysis performed in accordance with Section 21.2 unless exceptions are taken, per Section 11.4.8.*
6) *Per Exception 2 of ASCE 7-16, Section 11.4.8, structures on Site Class D sites with S1 greater than or equal to 0.2g, a ground motion hazard analysis is not required provided the value of the seismic response coefficient Cs is determined by Eq. (12.8-2) for values of T ≤ 1.5Ts and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for TL ≥ T > TS or Eq. (12.8-4) for T > TL.*
7) *For ASCE 7-22, PGAm is directly calculated without the need for PGA and FPGA.*
8) *Multi-period response spectrum data for ASCE 7-22 eliminates the need for Fa and Fv coefficients.*

5.5 STORMWATER INFILTRATION SYSTEMS

The results of current and historical field infiltration testing in the project vicinity are described in *Section 3.3.3 Infiltration*. In general, we find that the tested soils generally have poor to good infiltration properties, although highly variable, exhibiting unfactored drawdown rates of 0.0 to approximately 200 inches per hour. These rates are quite low in some cases and are reflective of the moderate fines

content and dense nature of the various soils. Other tests are quite high and are reflective of the more gravelly outwash soils found above the till soils. The tests are representative only of the soils at the location and elevation of the tests, and are unlikely to be representative of deeper, denser till soils which may underlie the test depths. We anticipate deeper soils will generally have lower permeability than surficial soils. However, the logs from deeper historical borings indicate fines content generally decreasing at greater depths. This suggests that deep infiltration systems may be possible as lower fines content could indicate increased permeability.

Considering the presence of shallow granular soils, the use of shallow or surface stormwater infiltration systems such as bioswales and shallow trenches are likely feasible around much of the site. Due to the high variability of the permeability of soils, we recommend the use of multiple low volume systems, as opposed to fewer large, high-volume infiltration systems. Also, the use of permeable pavements may be feasible. Because we anticipate that zones of impermeable soil will be encountered at the site, particularly in areas where site grades are lowered, the stormwater system design should be flexible to allow for the interconnection of systems or overflow of stormwater to surface detention features. If cut slopes are created on site and infiltration systems are installed proximate to them, then consideration should be given to the potential for lateral seepage to daylight through the slopes if a perching soil layer is present.

The nearby historical and on-site field infiltration rates range from 0 to 200 inches per hour, with an average value of approximately 38 inches per hour. When the two highest (200 inches per hour) and two lowest (0 and 0.25 inches per hour) rates are removed, the average rate is approximately 20 inches per hour. **Based on this data, for preliminary design purposes, we recommend using an average infiltration rate of 20 inches per hour as an unfactored rate.**

Once preliminary designs are completed, we recommend additional detailed site characterization and further *in-situ* infiltration testing to better characterize the infiltration capacity of site soils at the actual locations and elevations of the proposed infiltration systems.

As an alternative to the use of shallow infiltration systems, it may be feasible to consider deep infiltration systems that penetrate through the upper outwash and till soils, and penetrate into deeper advance outwash soils. We note that historical boring information from WSDOT (2018) indicates soils with lower fines content are typically encountered below a depth of 25 feet. This was the case in borings H-1p-17, H-12-17, H-16-17, H-17-17, and H-21-17, where a dense soil layer classified as “silty sand” was underlain by sandy or gravelly soils with lower fines content below 25 feet depth. Although the historical WSDOT borings do not indicate geologic units for the various soils encountered, we anticipate deep infiltration could be feasible in what we anticipate is deep advance outwash soils. However, additional exploration would be needed to determine the depth of the groundwater table and to verify the presence of more permeable soils at depth.

5.6 RIGID AND FLEXIBLE PAVEMENTS

Site pavements are expected to include flexible asphalt concrete (AC) sections and rigid Portland cement concrete (PCC) sections. The site soils are generally suitable for the support of such pavements, though looser materials may require some removal and/or recompaction to provide a stable pavement subgrade. The general preparation of subgrades is discussed in *Section 5.6 Earthwork*.

If the use of permeable pavements is proposed, they will need to be carefully evaluated as a stormwater infiltration system, as discussed above in *Section 5.4 Infiltration Systems.*

Design-level pavement recommendations will depend on expected traffic volumes at the site. However, based on the granular nature of the soils on site, we anticipate that a 6- to 8-inch aggregate base layer will be suitable for support of both flexible and rigid pavements. This assumes that the upper 12 to 18 inches of soil subgrade consists of new engineered fill or recompacted *in-situ* soil. The recommended AC pavement thicknesses will likely be on the order of 2.5 inches in parking stalls, 3 to 4 inches in parking lot drive aisles, and 4 to 6 inches in areas with heavy duty truck traffic (e.g., delivery routes). Recommended PCC pavement thicknesses are likely to be approximately 6 inches for reinforced and 5 inches for unreinforced.

5.7 EARTHWORK

Based on available information, we anticipate that earthwork will likely include moderate mass grading with cuts and fills up to 10 feet to level the site, with some deeper excavation and backfilling for utilities and foundations. We recommend that earthwork activities be conducted in accordance with the WSDOT *Standard Specifications* (WSS) (WSDOT 2022). We note the following conditions and recommendations relevant to earthwork:

- We noted a thick forest duff layer in the wooded/treed areas. We anticipate this forest duff layer will be about 1 to 3 feet thick in the more heavily wooded areas of the site.
- We expect that conventional earthmoving equipment in proper working condition should be capable of making necessary excavations for utilities, footings, and other earthwork at the site. However, the dense to very dense glacial soils that are present at the site will likely be more difficult and/or slower to excavate with conventional earthmoving equipment.
- The presence of oversize materials within the artificial fill and native soils may reduce the pace of earthwork activities and enlarge trench, footing, and other excavations beyond their planned limits. These oversize materials may require individual handling and their presence may inhibit usage of scrapers for mass grading operations.
- The artificial fill soils, and potentially some of the upper loose native soils, will need to be removed and/or recompacted beneath proposed foundations, slabs, and pavements.
  - Depending upon the proposed usage, composition of the existing fill, moisture content and relative density of the existing fill, and thickness of new fill (if any), the thickness of the recompacted layer will vary.
  - The soil can be reworked via a combination of removal and replacement, or scarification followed by compaction.
- The on-site near-surface artificial fill and native soils are expected to be suitable for reuse as structural fill, provided they are stripped of organics including wood debris, properly moisture conditioned, and screened for removal of oversize and deleterious material, such as roots, cobbles, boulders, and construction debris.
- While the *in-situ* soils are typically granular, they can have significant fines content and will be moderately susceptible to disturbance from construction activities, particularly when wet and/or during the rainy season. Due to the presence of perched water, wet soil conditions may be present even during dry weather.

  - Earthwork planning should include considerations for minimizing subgrade disturbance and employing wet weather/wet soil construction methodologies.
- The soils are generally granular and may have a tendency to run or slough when left in vertical cuts, and the contractor should anticipate that sloughing material could include large cobbles and boulders. Shoring or temporary cut-back slopes will be required for excavation stability.
- In general, we anticipate the local groundwater table is within native materials near El. 185 to 200 feet. However, higher perched groundwater layers are likely to be present around the site, as observed at many subsurface exploration locations. Excavations through perched water layer(s) are likely to experience seepage and may require the use of localized sump pumps. In some cases, it is possible that sump pumps may not be sufficient for dewatering and the use of well points may be required.

It is possible that zones of seepage will be encountered that require the installation of permanent passive dewatering system (e.g., French drains, sub-slab drains, etc.). The need for such systems should be evaluated as design progresses and at the time of construction.

6. Limitations

We have prepared this preliminary report for the exclusive use of Olson Engineering, a division of MacKay & Sposito, Inc., and their authorized agents, for the proposed Nisqually Quiemuth Village mixed-use development in Lacey, Washington. Our work was completed in general accordance with our agreement with Olson Engineering, a division of MacKay & Sposito, Inc., dated 20 March 2022, and our supplemental infiltration testing agreement, dated 22 July 2022. Our report is intended to provide our opinion of geotechnical conditions for planning purposes only. Site-specific investigation will be required in order to develop parameters for design and construction of the proposed improvements.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty, express or implied, should be understood.

Any electronic form, facsimile, or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by Haley & Aldrich and will serve as the official document of record.

References

1. American Society of Civil Engineers (ASCE), 2017. Minimum design loads and associated criteria for buildings and other structures: ASCE/SEI 7-16.

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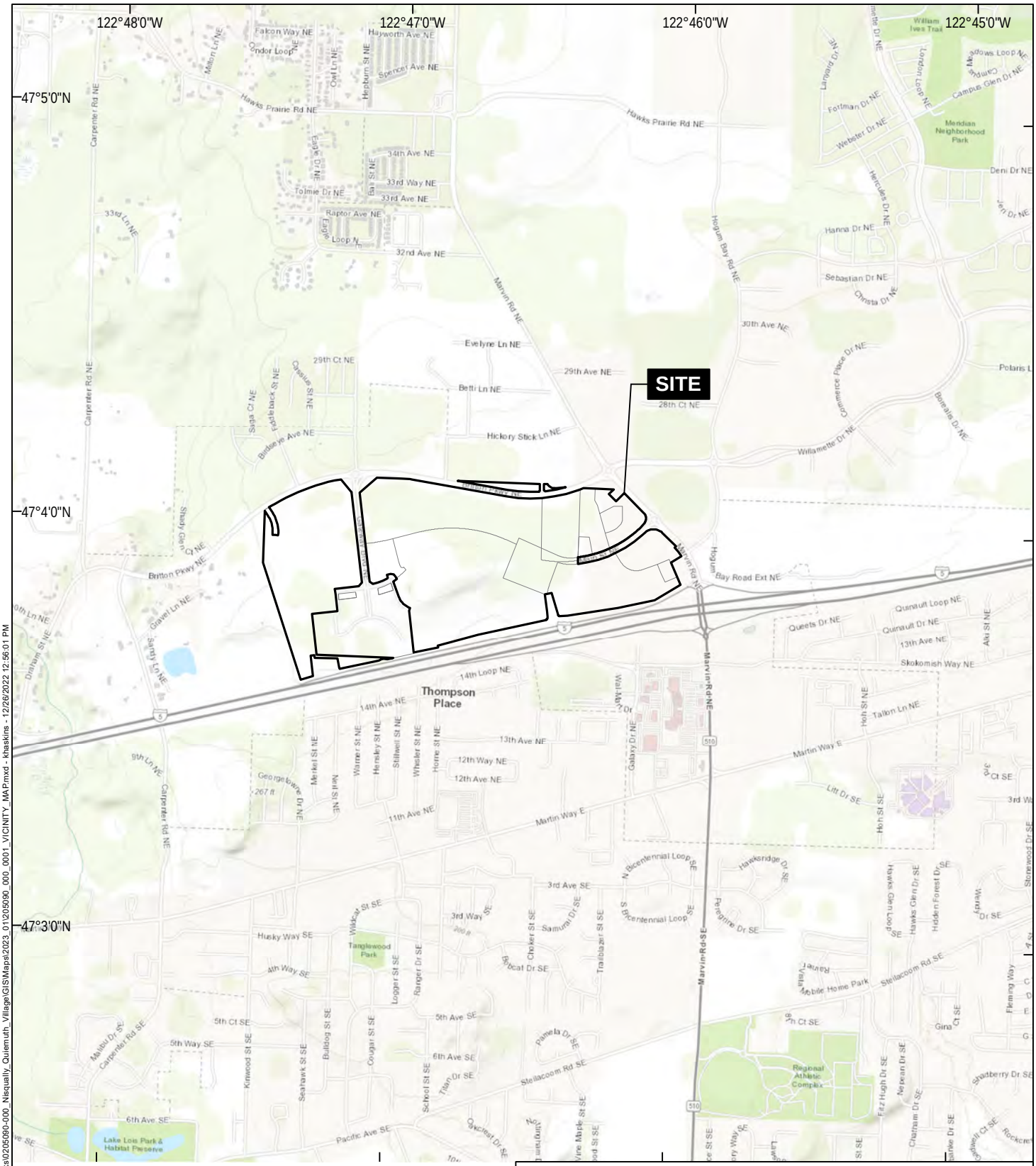
FIGURES



MAP SOURCE: ESRI
SITE COORDINATES: 47°03'55"N, 122°46'46"W

HALEY ALDRICH

NISQUALLY QUIEMUTH VILLAGE
LACEY, WASHINGTON

VICINITY MAP

APPROXIMATE SCALE: 1 IN = 2000 FT
JANUARY 2023

FIGURE 1

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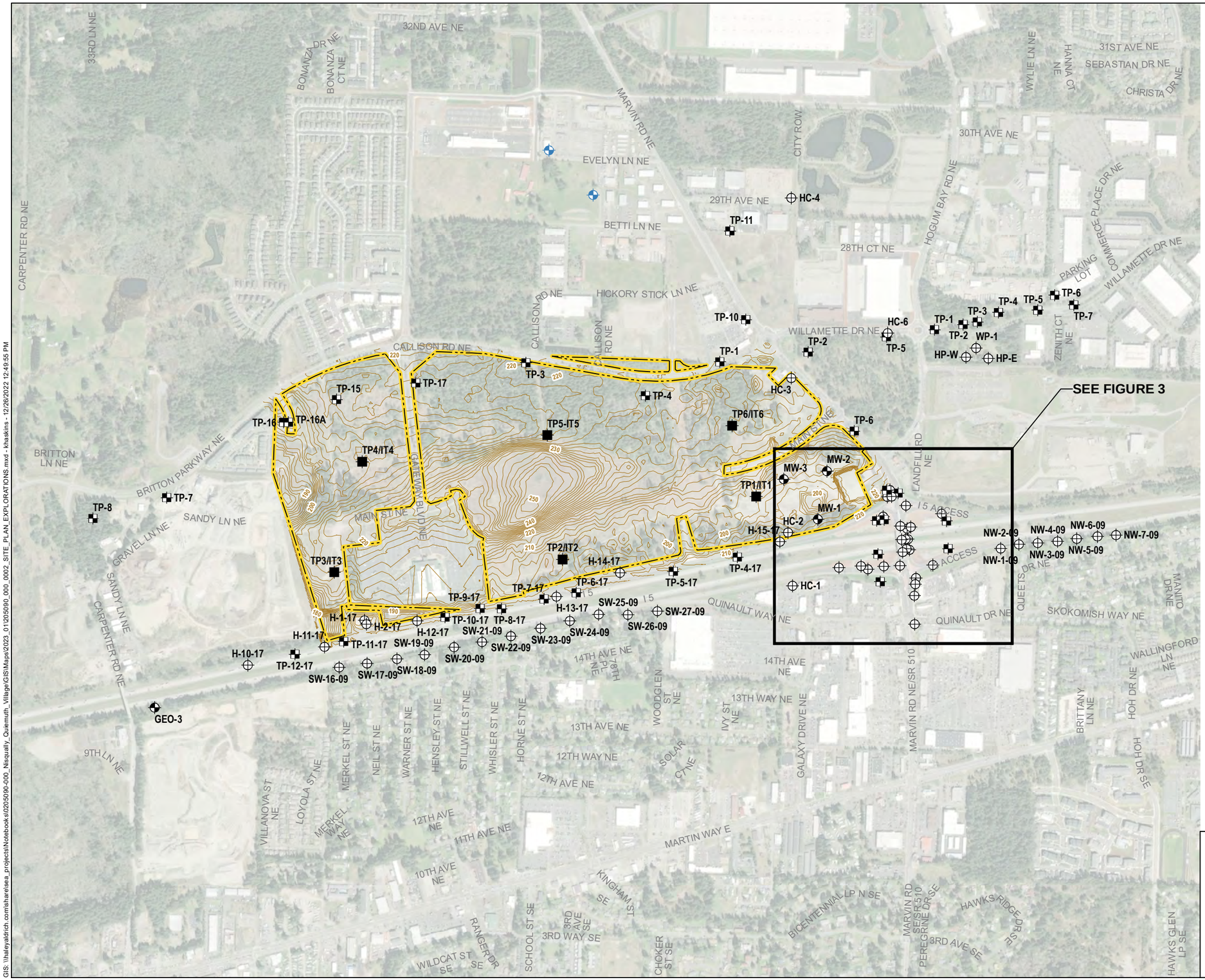

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LEGEND

- TEST PIT WITH INFILTRATION TEST (2022)
- MONITORING WELL (HISTORICAL)
- WATER WELL (HISTORICAL)
- SOIL BORING (HISTORICAL)
- TEST PIT (HISTORICAL)
- TOPOGRAPHIC ELEVATION CONTOUR, 2-FT INTERVAL
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. CONTOUR DATA SOURCE: OLSON ENGINEERING
3. HISTORICAL EXPLORATIONS DONE BY OTHERS BETWEEN 1966 AND 2018.
4. AERIAL IMAGERY SOURCE: ESRI

N

0 1,000 2,000

SCALE IN FEET

HALEY ALDRICH

NISQUALLY QUIEMUTH VILLAGE
LACEY, WASHINGTON

SITE PLAN AND EXPLORATIONS

JANUARY 2023

FIGURE 2

LEGEND

- MONITORING WELL
- WATER WELL
- SOIL BORING
- TEST PIT
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 21 SEPTEMBER 2021

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SCALE IN FEET

HALEY ALDRICH

NISQUALLY QUIEMUTH VILLAGE
LACEY, WASHINGTON

SITE PLAN DETAIL AND HISTORICAL EXPLORATIONS

JANUARY 2023

FIGURE 3

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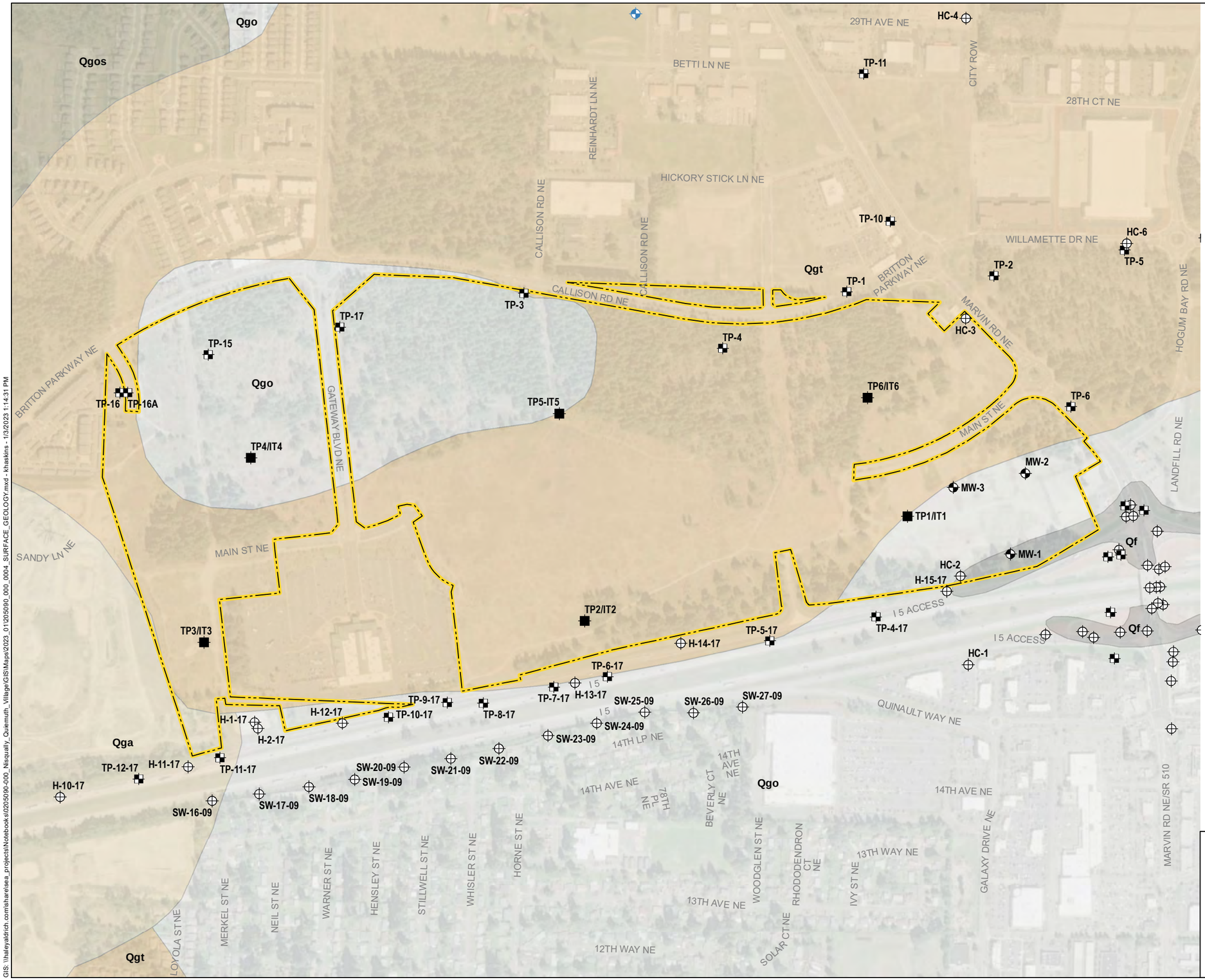

LEGEND

- TEST PIT WITH INFILTRATION TEST (2022)
- MONITORING WELL (HISTORICAL)
- WATER WELL (HISTORICAL)
- SOIL BORING (HISTORICAL)
- TEST PIT (HISTORICAL)
- HOLOCENE ARTIFICIAL FILL AND MODIFIED LAND (Qf)
- PLEISTOCENE CONTINENTAL GLACIAL TILL (Qgt)
- PLEISTOCENE CONTINENTAL GLACIAL DRIFT (Qga)
- PLEISTOCENE CONTINENTAL GLACIAL DRIFT (Qgo)
- PLEISTOCENE CONTINENTAL GLAICAL DRIFT (Qgos)
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GEOLOGIC DATA SOURCE: WASHINGTON DEPARTMENT OF NATURAL RESOURCES (DNR) GEOLOGIC INFORMATION PORTAL

3. HISTORICAL EXPLORATIONS DONE BY OTHERS BETWEEN 1966 AND 2018.

4. AERIAL IMAGERY SOURCE: ESRI

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SCALE IN FEET

HALEY ALDRICH

NISQUALLY QUIEMUTH VILLAGE
LACEY, WASHINGTON

SURFACE GEOLOGY

JANUARY 2023

FIGURE 4

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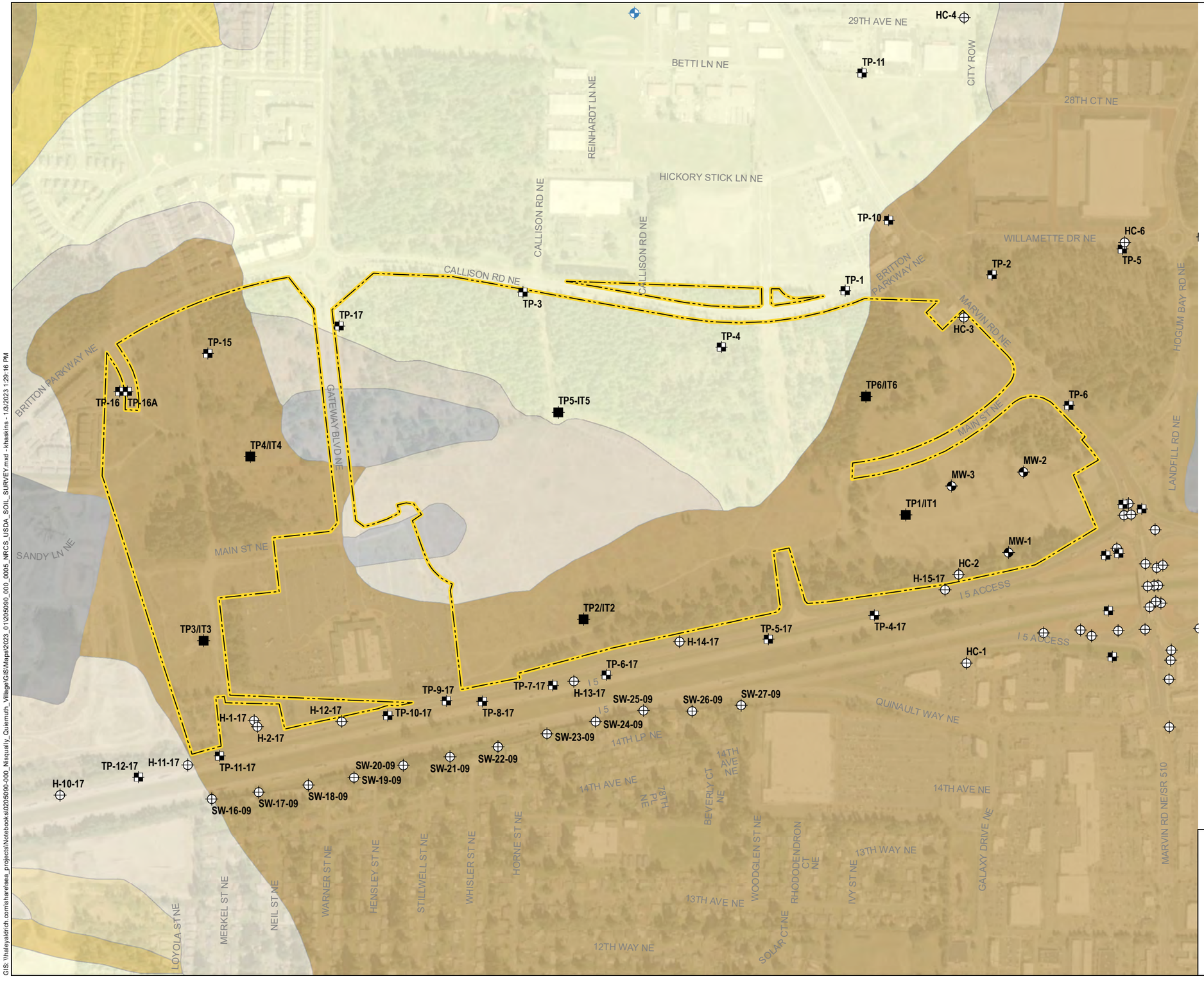

LEGEND

- TEST PIT WITH INFILTRATION TEST (2022)
- MONITORING WELL (HISTORICAL)
- WATER WELL (HISTORICAL)
- SOIL BORING (HISTORICAL)
- TEST PIT (HISTORICAL)
- PITS, GRAVEL
- GILES SILT LOAM, 0 TO 3 PERCENT SLOPES
- SPANAWAY GRAVELLY SANDY LOAM, 0 TO 3 PERCENT SLOPES
- INDIANOLA LOAMY SAND, 0 TO 5 PERCENT SLOPES
- GILES SILT LOAM, 3 TO 15 PERCENT SLOPES
- INDIANOLA LOAMY SAND, 5 TO 15 PERCENT SLOPES
- ALDERWOOD GRAVELLY SANDY LOAM, 8 TO 15 PERCENT SLOPES
- EVERETT VERY GRAVELLY SANDY LOAM, 8 TO 15 PERCENT SLOPES
- ALDERWOOD GRAVELLY SANDY LOAM, 15 TO 30 PERCENT SLOPES
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SOIL DATA SOURCE: UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) NATURAL RESOURCES CONSERVATION SERVICE (NRCS)
3. HISTORICAL EXPLORATIONS DONE BY OTHERS BETWEEN 1966 AND 2018.
4. AERIAL IMAGERY SOURCE: ESRI

N

0 600 1,200
SCALE IN FEET

HALEY ALDRICH

NISQUALLY QUIEMUTH VILLAGE
LACEY, WASHINGTON

USDA NRCS SOIL SURVEY

JANUARY 2023

FIGURE 5

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APPENDIX A

Field Explorations

APPENDIX A

Field Explorations

We evaluated subsurface conditions at the site by completing six test pits using a mini-excavator between 16 and 18 August 2022. The field explorations were coordinated and overseen by geotechnical staff from Haley & Aldrich, Inc., who classified the various soil units encountered, obtained representative soil samples for geotechnical testing, observed and recorded groundwater conditions, and maintained a detailed log of each test pit. Exploration logs are included in this appendix. Results of the laboratory testing are indicated on the exploration logs and are included in Appendix B.

Figure 2 of the report shows the approximate locations of the explorations. Explorations were located in the field using a hand-held Global Positioning System (GPS) unit.

TEST PITS

The test pits were excavated by Nisqually Construction of Lacey, Washington, using a Kubota mini-excavator. The test pit dimensions were approximately 10-feet-long by 3-feet-wide with total depths of approximately 8 to 12.5 feet.

SOIL SAMPLING AND CLASSIFICATION

Materials encountered in the explorations were classified in the field in general accordance with ASTM International Standard Practice D 2488 “Standard Practice for the Classification of Soils (Visual-Manual Procedure).”

The exploration logs in this appendix show our interpretation of the exploration, sampling, and testing data. The logs indicate the depths where the soil composition appeared to change; note that the actual changes in soil composition may be gradual. In the field, we classified the samples taken from the explorations according to the methods presented on the Figure A - 1, Key to Exploration Logs. This figure also provides a legend explaining the symbols and abbreviations used in the logs.

Sampling of soils was completed at each soil strata within the test pits. The samples were collected by hand from the spoils pile as the test pits were dug.

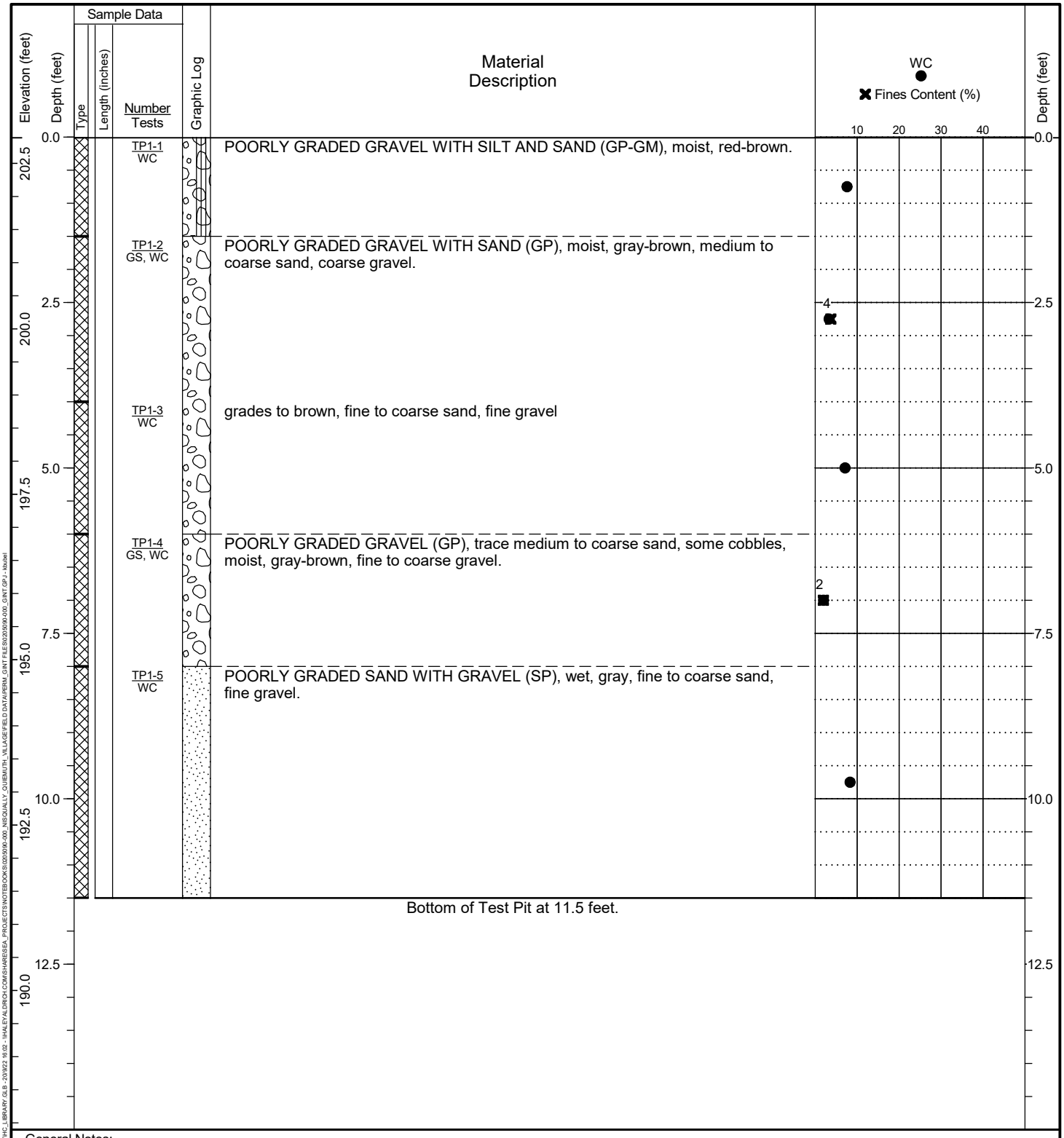
Date Started: 08/16/2022 Date Completed: 08/16/2022 Contractor/Crew: Nisqually Construction

Logged by: T. Tremain Checked by: J. Jacobe Rig Model/Type: Mini excavator

Location: Lat: 47.064625 Long: -122.771320 (WGS 84) Total Depth: 11.5 feet Depth to Seepage: Not Encountered

Ground Surface Elevation: 202.90 feet (NAVD 88)

Comments: Infiltration testing completed in an adjacent pit at a depth of 2.0 ft. bgs. See report text for additional information.



General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HALEY ALDRICH	Project: Nisqually Quiemuth Village Location: Lacey, Washington Project No.: 0205090-000	Test Pit Log **TP1/IT1**	Figure **A** Sheet **1 of 1**

HA TEST PIT - \\HALEYALDRICH.COM\SHARESEA_DATA\GINTWC_LIBRARY.GLB - 2/9/22 16:02 - \\HALEYALDRICH.COM\SHARESEA_PROJECTS\NOTEBOOK\0205090-000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090-000_GINT.GPJ - Master

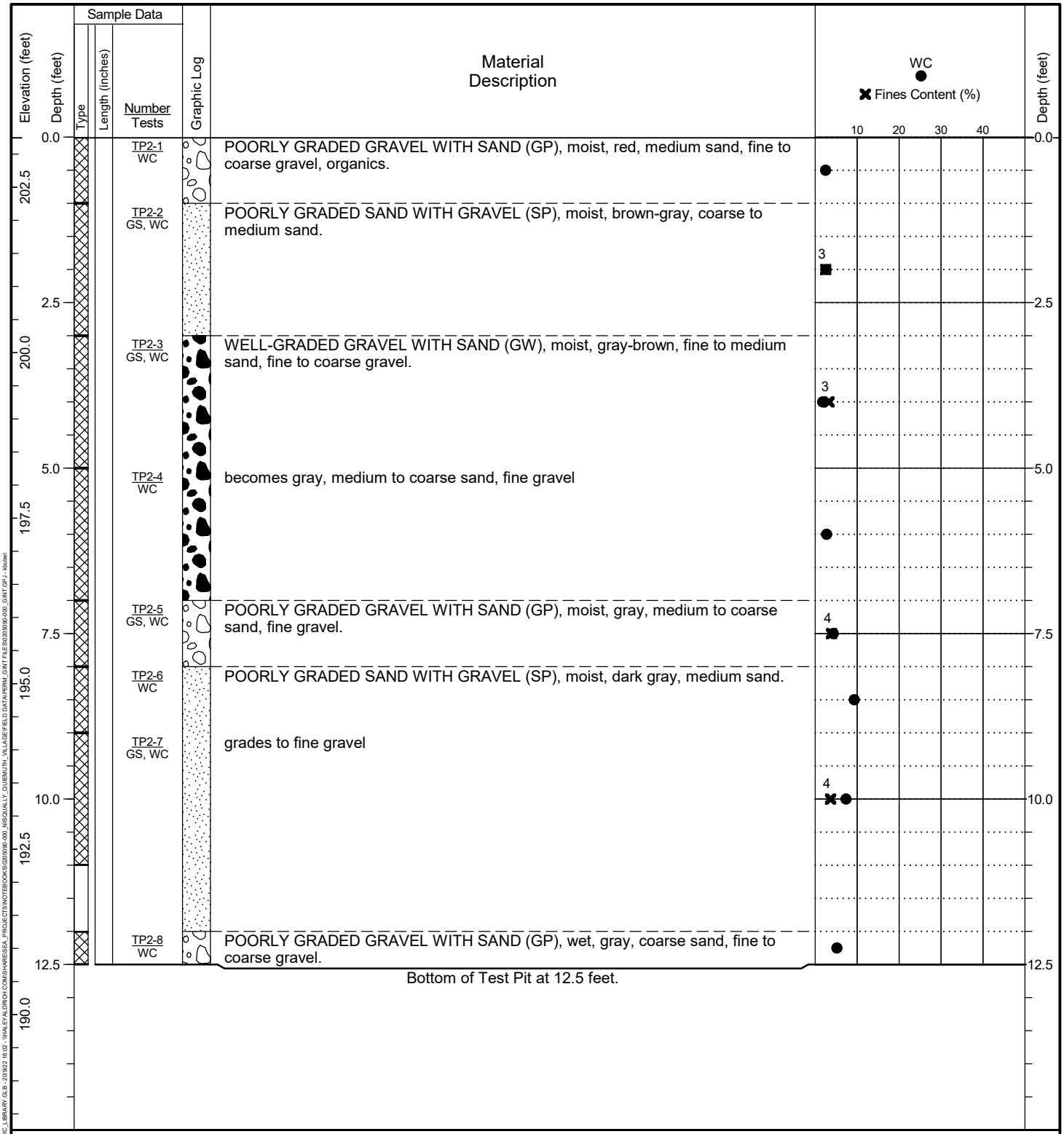
Date Started: 08/16/2022 Date Completed: 08/16/2022 Contractor/Crew: Nisqually Construction

Logged by: T. Tremain Checked by: J. Jacobe Rig Model/Type: Mini excavator

Location: Lat: 47.062703 Long: -122.779216 (WGS 84) Total Depth: 12.5 feet Depth to Seepage: Not Encountered

Ground Surface Elevation: 203.26 feet (NAVD 88)

Comments: Infiltration testing completed in an adjacent pit at a depth of 2.0 ft. bgs. See report text for additional information.



General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Test Pit Log
TP2/IT2

Figure **A**
Sheet **1 of 1**

HA TEST PIT - \\HALEYALDRICH.COM\SHARESEA_DATA\GINT\HC_LIBRARY.GLB - 2/9/22 16:02 - \\HALEYALDRICH.COM\SHARESEA_PROJECTS\NOTEBOOK\0205090-000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\RBM_GINT FILES\0205090-000_GINT.GPJ - kbobel

Date Started: 08/16/2022 Date Completed: 08/16/2022 Contractor/Crew: Nisqually Construction
Logged by: T. Tremain Checked by: J. Jacobe Rig Model/Type: Mini excavator
Location: Lat: 47.062155 Long: -122.788604 (WGS 84) Total Depth: 10.5 feet Depth to Seepage: Not Encountered
Ground Surface Elevation: 214.25 feet (NAVD 88)
Comments: Infiltration testing completed in an adjacent pit at a depth of 2.0 ft. bgs. See report text for additional information.

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	Graphic Log	Material Description	WC ● / ✖ Fines Content (%) (10, 20, 30, 40)	Depth (feet)
	0.0			TP3-1 WC		POORLY GRADED GRAVEL WITH SAND (GP), moist, red-brown, fine to coarse sand, fine gravel.		0.0
212.5								
	2.5							2.5
				TP3-2 GS, WC		grades to medium to coarse sand		
210.0							1	
	5.0			TP3-3 GS, WC		WELL-GRADED GRAVEL WITH SAND (GW), moist, brown-gray, fine to coarse sand, fine gravel.		5.0
207.5								
	7.5						3	7.5
205.0								
	10.0							10.0
						Bottom of Test Pit at 10.5 feet.		
202.5								
	12.5							12.5
200.0								

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Test Pit Log
TP3/IT3

Figure **A**
Sheet **1 of 1**

HA TEST PIT - \\HALEYALDRICH.COM\SHARE\SEA_DATA\GINT\HC_LIBRARY.GLB - 20/9/22 16:02 - \\HALEYALDRICH.COM\SHARE\SEA_PROJECTS\NOTEBOOKS\0205090-000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090-000_GINT.GPJ - kbubel

Date Started: 08/17/2022 Date Completed: 08/17/2022 Contractor/Crew: Nisqually Construction

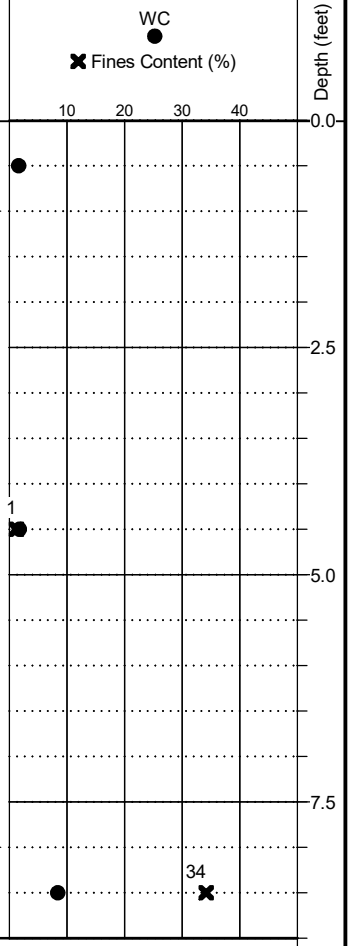
Logged by: T. Tremain Checked by: J. Jacobe Rig Model/Type: Mini excavator

Location: Lat: 47.065290 Long: -122.787585 (WGS 84) Total Depth: 9 feet Depth to Seepage: Not Encountered

Ground Surface Elevation: 208.64 feet (NAVD 88)

Comments: Infiltration testing completed in an adjacent pit at a depth of 2.0 ft. bgs. See report text for additional information.

Elevation (feet)	Depth (feet)	Sample Data: Type	Sample Data: Length (inches)	Sample Data: Number / Tests	Graphic Log	Material Description
208.64	0.0			TP4-1 WC		POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), moist, red-brown.
207.5	1.1			TP4-2 GS, WC		WELL-GRADED GRAVEL WITH SAND (GW), moist, gray, fine to medium sand, fine gravel.
205.0	3.6			TP4-3 GS, WC		SANDY SILT WITH GRAVEL (ML), moist, light gray.
199.64	9.0					Bottom of Test Pit at 9.0 feet.



General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Test Pit Log
TP4/IT4

Figure **A**
Sheet **1 of 1**

HA TEST PIT - \\HALEYALDRICH.COM\SHARESEA_DATA\GINT\HC_LIBRARY.GLB - 2/9/22 16:02 - \\HALEYALDRICH.COM\SHARESEA_PROJECTS\NOTEBOOK\0205090-000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090-000_GINT.GPJ - kbobel

Date Started: 08/17/2022 Date Completed: 08/17/2022 Contractor/Crew: Nisqually Construction

Logged by: T. Tremain Checked by: J. Jacobe Rig Model/Type: Mini excavator

Location: Lat: 47.066189 Long: -122.779989 (WGS 84) Total Depth: 8 feet Depth to Seepage: Not Encountered

Ground Surface Elevation: 220.39 feet (NAVD 88)

Comments: Infiltration testing completed in an adjacent pit at a depth of 2.0 ft. bgs. See report text for additional information.

Elevation (feet)	Depth (feet)	Sample Data: Type	Sample Data: Length (inches)	Sample Data: Number / Tests	Graphic Log	Material Description
220.0	0.0			TP5-1 GS, WC		SILTY SAND WITH GRAVEL (SM), moist, red-brown, organics.
217.5	2.5					
215.0	5.0			TP5-2 AL, GS, WC		SANDY SILT (ML), moist, light gray.
212.5	7.5					Bottom of Test Pit at 8.0 feet.
210.0	10.0					
207.5	12.5					

PL WC LL

✖ Fines Content (%)

10 20 30 40

21

57

Depth (feet) 0.0 2.5 5.0 7.5 10.0 12.5

General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Test Pit Log
TP5/IT5

Figure **A**
Sheet **1 of 1**

HA TEST PIT - \\HALEYALDRICH.COM\SHARESEA_DATA\GINT\HC_LIBRARY.GLB - 2/9/22 16:02 - \\HALEYALDRICH.COM\SHARESEA_PROJECTS\NOTEBOOK\0205090-000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\BRM_GINT FILES\0205090-000_GINT.GPJ - Master

Date Started: 08/17/2022 Date Completed: 08/17/2022 Contractor/Crew: Nisqually Construction
Logged by: T. Tremain Checked by: J. Jacobe Rig Model/Type: Mini excavator
Location: Lat: 47.066606 Long: -122.772393 (WGS 84) Total Depth: 9.5 feet Depth to Seepage: Not Encountered
Ground Surface Elevation: 224.86 feet (NAVD 88)
Comments: Infiltration testing completed in an adjacent pit at a depth of 2.0 ft. bgs. See report text for additional information.

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	Graphic Log	Material Description	WC ● / ✖ Fines Content (%) (10, 20, 30, 40)	Depth (feet)
	0.0			TP6-1 WC		SILTY SAND WITH GRAVEL (SM), moist, dark gray-brown, fine to medium sand, organics.		0.0
				TP6-2 GS, WC		POORLY GRADED SAND WITH GRAVEL (SP), moist, gray, fine to coarse sand, fine gravel.		
222.5	2.5							2.5
							1	
220.0	5.0							5.0
217.5	7.5							7.5
				TP6-3 GS, WC			2	
						Bottom of Test Pit at 9.5 feet.		
215.0	10.0							10.0
212.5	12.5							12.5
210.0								

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Test Pit Log
TP6/IT6

Figure **A**
Sheet **1 of 1**

HA TEST PIT - \\HALEYALDRICH.COM\SHARE\SEA_DATA\GINT\HC_LIBRARY.GLB - 2/9/22 16:02 - \\HALEYALDRICH.COM\SHARE\SEA_PROJECTS\NOTEBOOKS\0205090-000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090-000_GINT.GPJ - kbubel

APPENDIX B

Laboratory Test Results

APPENDIX B

Laboratory Test Results

GENERAL

Soil samples obtained from the explorations were transported to our laboratory and evaluated to confirm or modify field classifications, as well as to assess engineering properties of the soils encountered. Representative samples were selected for laboratory testing. The tests were performed in general accordance with the test methods of the ASTM International (ASTM) or other applicable procedures. A summary of the test results is included as Figure B-1.

VISUAL CLASSIFICATIONS

Soil samples obtained from the explorations were visually classified in the field and in our geotechnical laboratory based on the Unified Soil Classification System and ASTM classification methods. ASTM Test Method D 2488 was used to classify soils using visual and manual methods. ASTM Test Method D 2487 was used to classify soils based on laboratory test results.

LABORATORY TEST RESULTS

Moisture Content

Moisture contents of samples were obtained in general accordance with ASTM Test Method D 2216. The results of the moisture content tests completed on samples from the explorations are presented on the exploration logs included in Appendix A and on Figure B-1 in this appendix.

Percent Fines

Fines content analyses were performed to determine the percentage of soils finer than the No. 200 sieve — the boundary between sand size particles and silt size particles. The tests were performed in general accordance with ASTM Test Method D 1140. The test results are indicated on the exploration logs included in Appendix A and on Figure B-1 in this appendix.

Particle Size Distribution

Sieve analysis tests were also performed to determine the quantitative distribution of particle sizes in the sample. The tests were performed in general accordance with ASTM Test Method D 6913. The "percent fines" portions of the test results are indicated on the appropriate exploration logs included in Appendix A and on Figure B-1 in this appendix. The full test results are shown on Figure B-2 in this appendix.

Exploration	Sample ID	Depth	Gravel (%)	Sand (%)	Fines (%)	Liquid Limit	Plastic Limit	Water Content (%)	USCS Group Symbol	Soil Description
TP1/IT1	TP1-1	0.0						7.6		
TP1/IT1	TP1-2	1.5	57.4	38.9	3.7			3.3	GP	POORLY GRADED GRAVEL WITH SAND
TP1/IT1	TP1-3	4.0						7.1		
TP1/IT1	TP1-4	6.0	83.5	14.6	1.9			2.0	GP	POORLY GRADED GRAVEL
TP1/IT1	TP1-5	8.0						8.3		
TP2/IT2	TP2-1	0.0						2.5		
TP2/IT2	TP2-2	1.0	21.6	75.8	2.5			2.6	SP	POORLY GRADED SAND WITH GRAVEL
TP2/IT2	TP2-3	3.0	70.0	26.7	3.3			1.8	GW	WELL-GRADED GRAVEL WITH SAND
TP2/IT2	TP2-4	5.0						2.7		
TP2/IT2	TP2-5	7.0	49.4	46.7	3.9			4.3	GP	POORLY GRADED GRAVEL WITH SAND
TP2/IT2	TP2-6	8.0						9.3		
TP2/IT2	TP2-7	9.0	47.0	49.3	3.7			7.3	SP	POORLY GRADED SAND WITH GRAVEL
TP2/IT2	TP2-8	12.0						5.2		
TP3/IT3	TP3-1	0.0						1.5		
TP3/IT3	TP3-2	3.0	58.3	41.0	0.7			1.8	GP	POORLY GRADED GRAVEL WITH SAND
TP3/IT3	TP3-3	5.0	64.1	32.7	3.2			2.5	GW	WELL-GRADED GRAVEL WITH SAND
TP4/IT4	TP4-1	0.0						1.6		
TP4/IT4	TP4-2	1.0	71.7	27.1	1.2			1.7	GW	WELL-GRADED GRAVEL WITH SAND
TP4/IT4	TP4-3	8.0	34.3	31.6	34.1			8.4	GM	SILTY GRAVEL WITH SAND
TP5/IT5	TP5-1	0.0	37.3	41.4	21.3			6.4	SM	SILTY SAND WITH GRAVEL
TP5/IT5	TP5-2	6.0	0.0	43.0	57.0	22	18	12.7	ML	SANDY SILT
TP6/IT6	TP6-1	0.0						3.0		
TP6/IT6	TP6-2	1.0	44.5	54.6	0.9			1.8	SP	POORLY GRADED SAND WITH GRAVEL
TP6/IT6	TP6-3	8.0	38.2	59.5	2.3			1.6	SP	POORLY GRADED SAND WITH GRAVEL

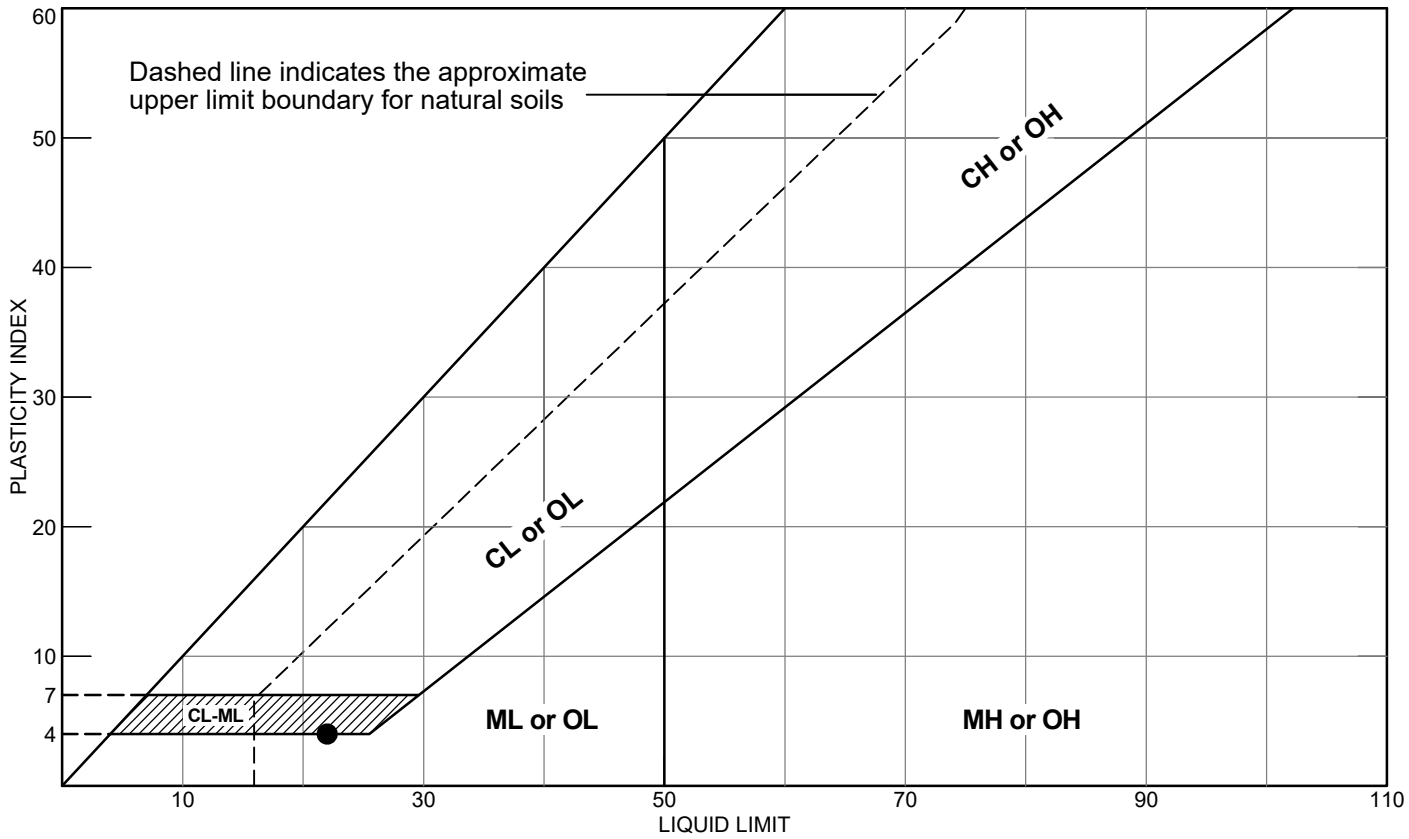
HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Summary of Laboratory Results

Figure **B-1**
Sheet **1 of 1**

SEATTLE - HA LAB SUMMARY (FOR REPORTS) - \\HALEYALDRICH.COM\SHARES\PDX_DATA\GEO\MATCS\GINT\HC_LIBRARY.GLB - 9/20/22 11:21 - \\HALEYALDRICH.COM\SHARES\SEA_PROJECTS\NOTEBOOKS\0205090.000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090.000_GINT.GPJ - phatsens



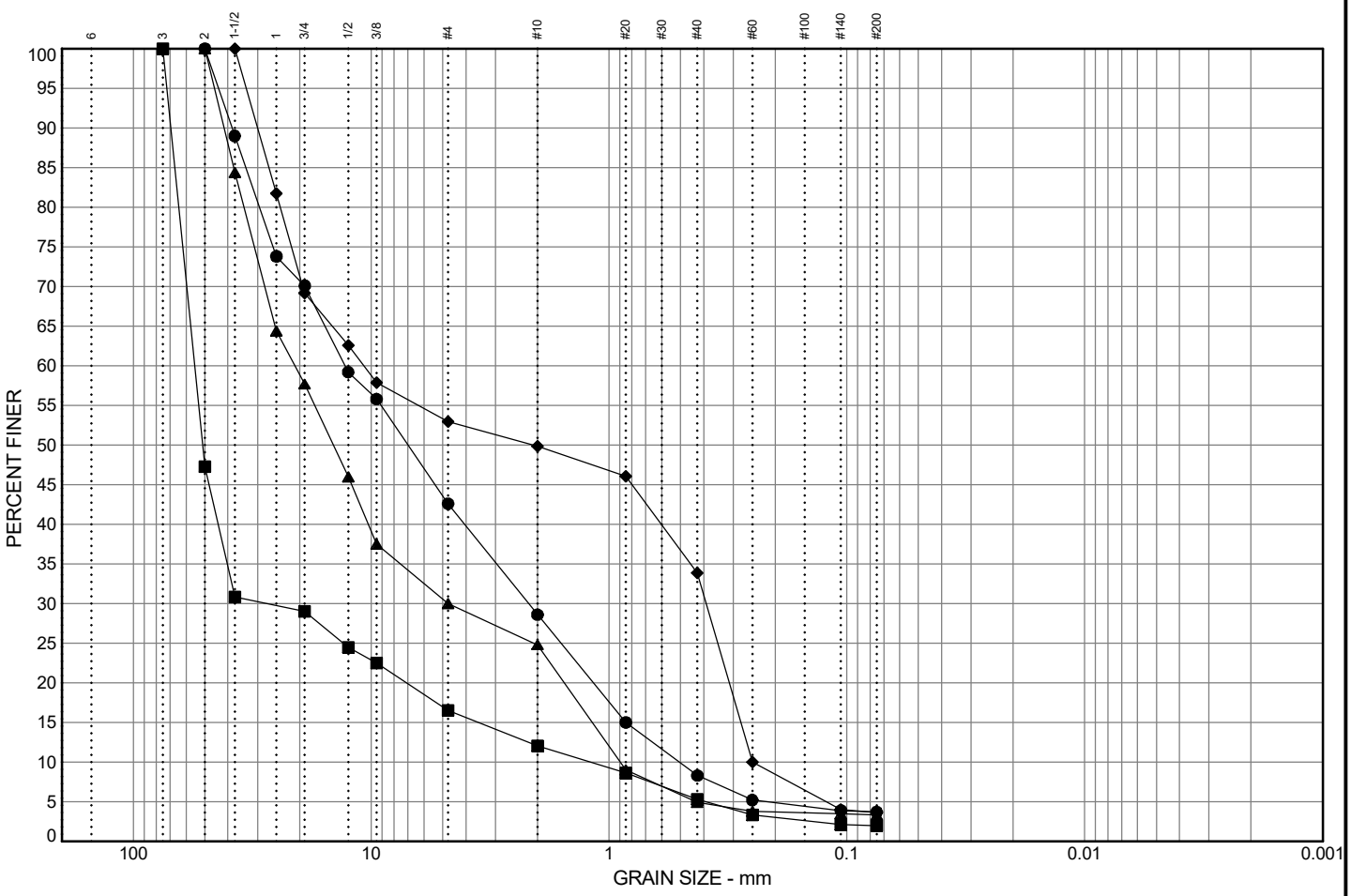
Location and Description	LL	PL	PI	#200	MC%	USCS
● **Source:** TP5/IT5 **Sample No.:** TP5-2 **Depth:** 6.0 to 8.0 SANDY SILT	22	18	4	57	13	ML

Remarks:

●

HALEY ALDRICH	Project: Nisqually Quiemuth Village Location: Lacey, Washington Project No.: 0205090-000	**Liquid Limit, Plastic Limit, and Plasticity Index**	Figure **B-2** Sheet **1 of 1**

HATTERBERG LIMITS \\HALEYALDRICH.COM\SHARE\RDX_DATA\GEOMATICS\GINT\HCL_LIBRARY.GLB - 9/20/22 11:20 - \\HALEYALDRICH.COM\SHARE\SEA_PROJECTS\NOTEBOOKS\0205090\000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090-000_GINT.GPJ - pkastern



Location and Description	% Cobbles	% Gravel	% Sand	% Silt	% Clay	MC%	USCS
● **Source:** TP1/IT1 **Sample No.:** TP1-2 **Depth:** 1.5 to 4.0 POORLY GRADED GRAVEL WITH SAND	0.0	57.4	38.9	3.7		3	GP
■ **Source:** TP1/IT1 **Sample No.:** TP1-4 **Depth:** 6.0 to 8.0 POORLY GRADED GRAVEL	0.0	83.5	14.6	1.9		2	GP
▲ **Source:** TP2/IT2 **Sample No.:** TP2-3 **Depth:** 3.0 to 5.0 WELL-GRADED GRAVEL WITH SAND	0.0	70.0	26.7	3.3		2	GW
◆ **Source:** TP2/IT2 **Sample No.:** TP2-7 **Depth:** 9.0 to 11.0 POORLY GRADED SAND WITH GRAVEL	0.0	47.0	49.3	3.7		7	SP

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			33.705	12.890	7.006	2.181	0.850	0.507	0.73	25.44
■			66.824	55.130	51.047	27.423	3.561	1.201	11.35	45.89
▲			37.917	20.877	14.424	4.750	1.176	0.897	1.20	23.27
◆			26.893	10.744	2.072	0.390	0.279	0.249	0.06	43.17

Remarks:

● ■ ▲ ◆

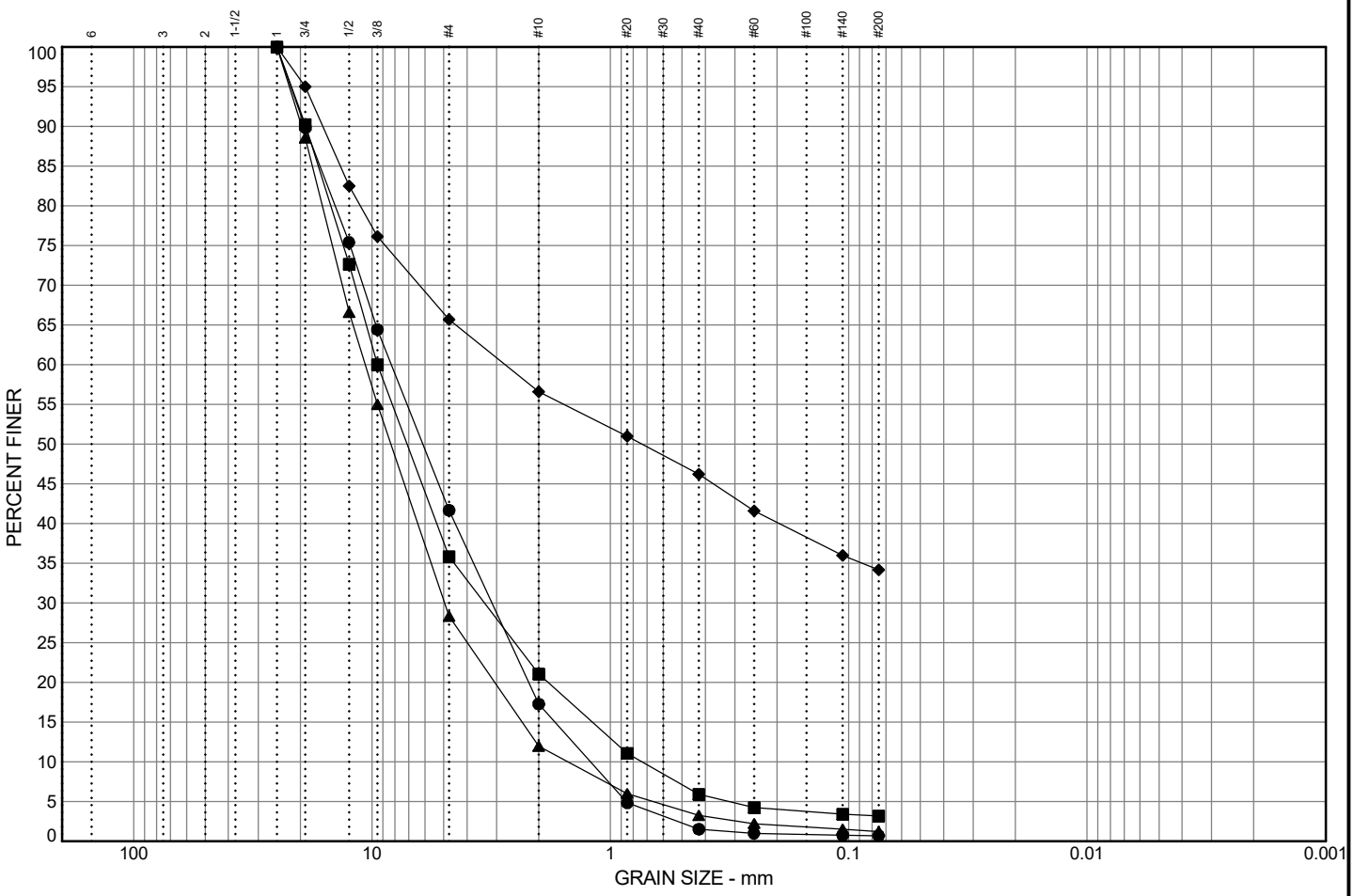
HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Particle-Size Analysis

Figure **B-3**
Sheet **1 of 3**

HA GRAIN SIZE - \\HALEYALDRICH.COM\SHARE\PDX_DATA\GEOMATICS\GINT\HC_LIBRARY.GLB - 9/16/22 15:10 - \\HALEYALDRICH.COM\SHARE\SEA_PROJECTS\NOTEBOOKS\0205090\000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090-000_GINT.GPJ - pfaterno



Location and Description	% Cobbles	% Gravel	% Sand	% Silt	% Clay	MC%	USCS
● **Source:** TP3/IT3 **Sample No.:** TP3-2 **Depth:** 3.0 to 5.0 POORLY GRADED GRAVEL WITH SAND	0.0	58.3	41.0	0.7		2	GP
■ **Source:** TP3/IT3 **Sample No.:** TP3-3 **Depth:** 5.0 to 10.5 WELL-GRADED GRAVEL WITH SAND	0.0	64.1	32.7	3.2		2	GW
▲ **Source:** TP4/IT4 **Sample No.:** TP4-2 **Depth:** 1.0 to 8.0 WELL-GRADED GRAVEL WITH SAND	0.0	71.7	27.1	1.2		2	GW
◆ **Source:** TP4/IT4 **Sample No.:** TP4-3 **Depth:** 8.0 to 9.0 SILTY GRAVEL WITH SAND	0.0	34.3	31.6	34.1		8	GM

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			16.520	8.303	6.123	3.141	1.711	1.213	0.98	6.84
■			16.765	9.497	7.128	3.374	1.190	0.735	1.63	12.92
▲			17.754	10.695	8.341	4.960	2.348	1.508	1.53	7.09
◆			13.582	2.769	0.735					

Remarks:

● ■ ▲ ◆

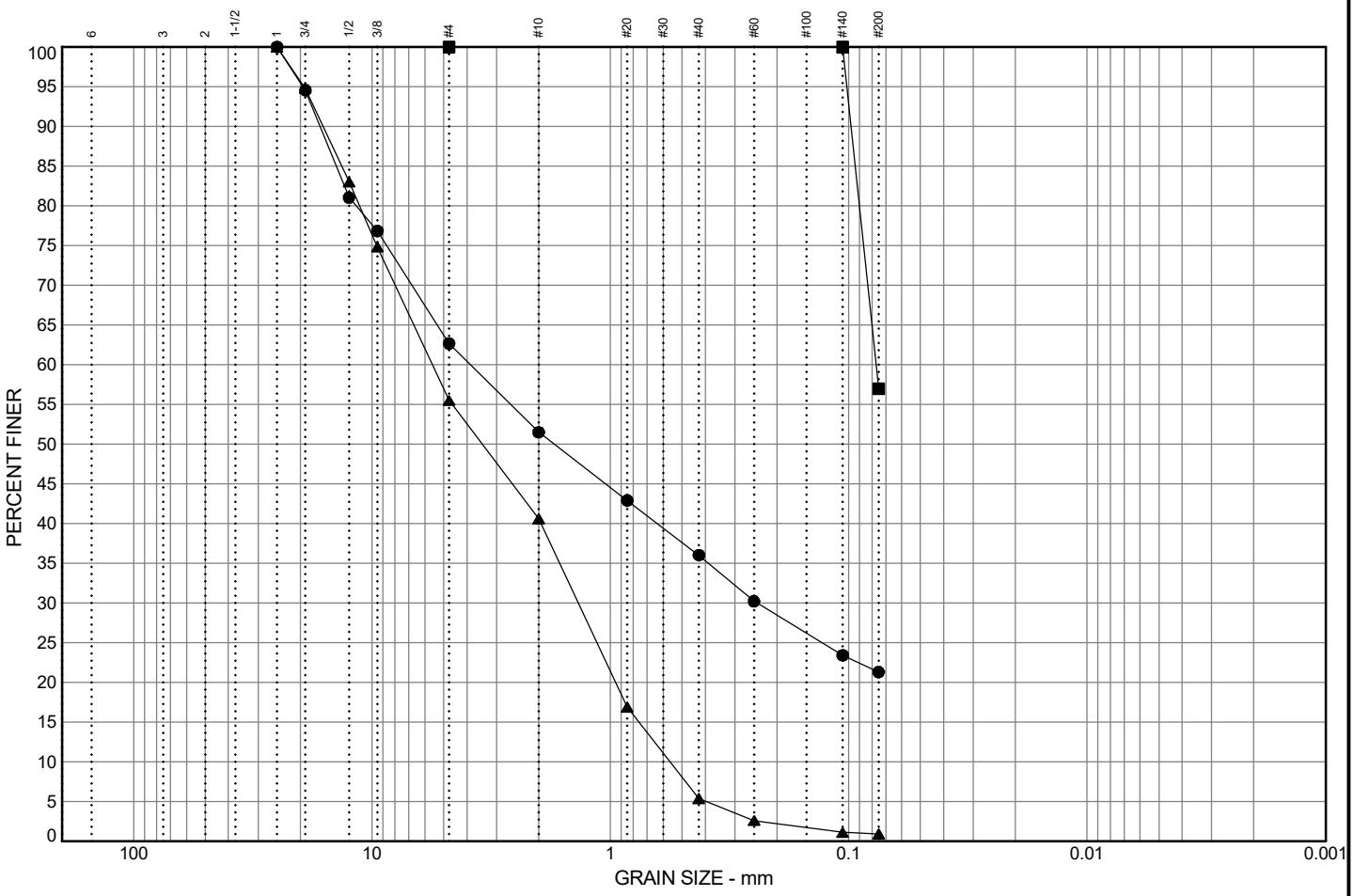
HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Particle-Size Analysis

Figure **B-3**
Sheet **2 of 3**

HA GRAIN SIZE - \\HALEYALDRICH.COM\SHARE\PDX_DATA\GEOMATICS\GINT\HC_LIBRARY.GLB - 9/16/22 15:11 - \\HALEYALDRICH.COM\SHARE\SEA_PROJECTS\NOTEBOOKS\0205090\000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090.000_GINT.GPJ - pfatterns



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Location and Description	% Cobbles	% Gravel	% Sand	% Silt	% Clay	MC%	USCS
● **Source:** TP5/IT5 **Sample No.:** TP5-1 **Depth:** 0.0 to 6.0 SILTY SAND WITH GRAVEL	0.0	37.3	41.4	21.3		6	SM
■ **Source:** TP5/IT5 **Sample No.:** TP5-2 **Depth:** 6.0 to 8.0 SANDY SILT	0.0	0.0	43.0	57.0		13	ML
▲ **Source:** TP6/IT6 **Sample No.:** TP6-2 **Depth:** 1.0 to 8.0 POORLY GRADED SAND WITH GRAVEL	0.0	44.5	54.6	0.9		2	SP

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			14.134	3.863	1.724	0.244				
■			0.094	0.077						
▲			13.419	5.583	3.452	1.364	0.758	0.561	0.59	9.96

Remarks:

●
■
▲

HALEY ALDRICH

Project: Nisqually Quiemuth Village
Location: Lacey, Washington
Project No.: 0205090-000

Particle-Size Analysis

Figure **B-3**
Sheet **3 of 3**

H:\GRAIN SIZE - I:\HALEYALDRICH.COM\SHARE\RDX_DATA\GEOMATICS\GINT\HC_LIBRARY.GLB - 9/16/22 15:11 - I:\HALEYALDRICH.COM\SHARE\SEA_PROJECTS\NOTEBOOKS\0205090\000_NISQUALLY_QUIEMUTH_VILLAGE\FIELD DATA\PERM_GINT FILES\0205090\000_GINT.GPJ - pfatterns

APPENDIX C

Historical Exploration Logs

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

COHESIONLESS SOILS			COHESIVE SOILS		
Density	N (blows/ft)	Approximate Relative Density(%)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	over 30	>4000

ASTM SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP DESCRIPTIONS	
Coarse Grained Soils	Gravel and Gravelly Soils	Clean Gravel (little or no fines)	GW	Well-graded GRAVEL
	More than 50% of Coarse Fraction Retained on No. 4 Sieve		GP	Poorly-graded GRAVEL
		Gravel with Fines (appreciable amount of fines)	GM	Silty GRAVEL
			GC	Clayey GRAVEL
More than 50% Retained on No. 200 Sieve Size	Sand and Sandy Soils	Clean Sand (little or no fines)	SW	Well-graded SAND
	50% or More of Coarse Fraction Passing on No. 4 Sieve		SP	Poorly-graded SAND
		Sand with Fines (appreciable amount of fines)	SM	Silty SAND
			SC	Clayey SAND
Fine Grained Soils	Silt and Clay	Liquid Limit Less than 50%	ML	SILT
			CL	Lean CLAY
			OL	Organic SILT/Organic CLAY
50% or More Passing No. 200 Sieve Size	Silt and Clay	Liquid Limit 50% or More	MH	Elastic SILT
			CH	Fat CLAY
			OH	Organic SILT/Organic CLAY
Highly Organic Soils			PT	PEAT

TEST SYMBOLS

GS	Grain Size Distribution
%F	Percent Fines
CN	Consolidation
TX	Triaxial Compression
UC	Unconfined Compression
DS	Direct Shear
M	Resilient Modulus
PP	Pocket Penetrometer Approx. Compressive Strength (tsf)
TV	Torvane Approximate Shear Strength (tsf)
CBR	California Bearing Ratio
MD	Moisture/Density Relationship
PID	Photoionization Device Reading
AL	Atterberg Limits: PL Plastic Limit LL Liquid Limit

SAMPLE TYPE SYMBOLS

- 2.0" OD Split Spoon (SPT) (140 lb. hammer with 30 in. drop)
- Shelby Tube
- 3.0" OD Split Spoon with Brass Rings
- Small Bag Sample
- Large Bag (Bulk) Sample
- Core Run
- Non-standard Penetration Test (with split spoon sampler)

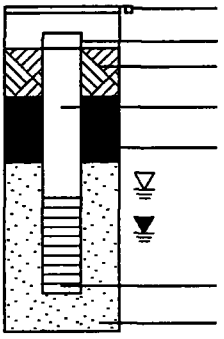
COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	0 - 5%
Few	5 - 10%
Little	15 - 25%
Some	30 - 45%
Mostly	50 - 100%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger then 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5 mm) to No. 200 (0.074 mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

GROUNDWATER WELL COMPLETIONS



- Locking Well Security Casing
- Well Cap
- Concrete Seal
- Well Casing
- Bentonite Seal
- Groundwater Level (measured at time of drilling)
- Groundwater Level (measured in well after water level stabilized)
- Slotted Well Casing
- Sand Backfill

NOTES: Soil classifications presented on exploration logs are based on visual and laboratory observation in general accordance with ASTM D 2487 and ASTM D 2488. Soil descriptions are presented in the following general order:

Density/consistency, color, modifier (if any) GROUP NAME, additions to group name (if any), moisture content. Proportion, gradation, and angularity of constituents, additional comments. (GEOLOGIC INTERPRETATION)

Please refer to the discussion in the report text as well as the exploration logs for a more complete description of subsurface conditions.

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
MOIST	Damp but no visible water.
WET	Visible free water, usually soil is below water table.

HWA HONGWEST & ASSOCIATES, INC.

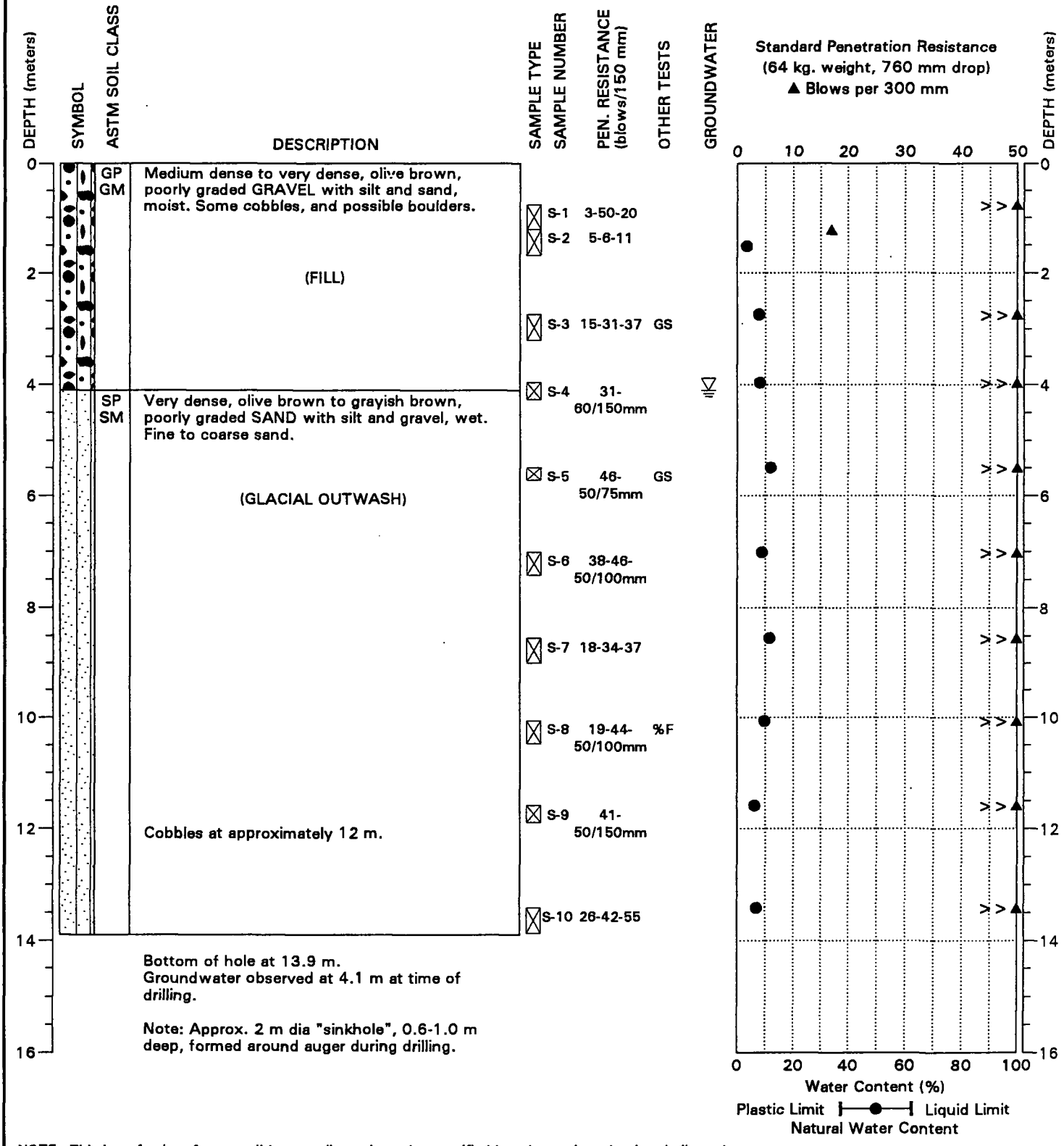
State Route 510
Lacey, WA

LEGEND OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

PROJECT NO.: 96178 FIGURE: A-1

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME 850, HSA, 21cm OD
SURFACE ELEVATION: 66.1 ± Meters

LOCATION: Sta 1+350.9, Offset 10.8 m Left
DATE COMPLETED: 3/17/97
LOGGED BY: Arnie Sugar



Bottom of hole at 13.9 m.
Groundwater observed at 4.1 m at time of drilling.

Note: Approx. 2 m dia "sinkhole", 0.6-1.0 m deep, formed around auger during drilling.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

BORING: BH-1

PAGE: 1 of 1

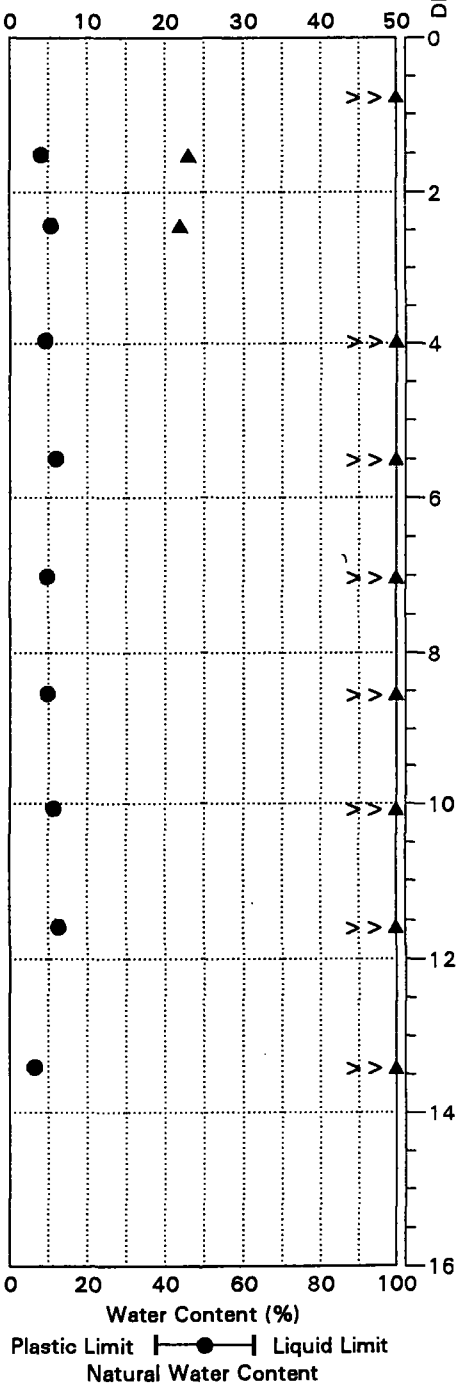
PROJECT NO.: 96178 FIGURE: A-2

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME 850, HSA, 21cm OD
SURFACE ELEVATION: 67.0 ± Meters

LOCATION: Sta 1+319.9, Offset 10.4 m Left
DATE COMPLETED: 3/18/97
LOGGED BY: Arnie Sugar

DEPTH (meters)	SYMBOL	ASTM SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/150 mm)	OTHER TESTS	GROUNDWATER
0		GW GM	Medium dense to very dense, very dark brown, well graded GRAVEL with silt and sand, moist. (FILL)		S-1	6-34-50/125mm		
2					S-2	3-8-15	GS	
		SP	Medium dense, olive brown, poorly graded fine SAND, moist. (GLACIAL OUTWASH)		S-3	7-10-12		
4		SP	Very dense, olive brown, poorly graded SAND with gravel, moist. Fine to coarse sand, fine gravel grading to coarse gravel with depth.		S-4	19-34-56/150mm		
6		SP SM	Very dense, light olive brown, poorly graded SAND with silt, wet. Fine to coarse sand.		S-5	13-23-42	GS	▽
					S-6	17-33-39		
8		GP GM	Light olive brown, poorly graded GRAVEL with silt and sand, wet.		S-7	18-29-36	%F	
10					S-8	42-50/75mm		
12			Some cobbles, and possible boulders.		S-9	18-50/75mm		
14					S-10	10-35-50/75mm		
16			Bottom of hole at 13.9 m. Groundwater observed at 5.2 m at time of drilling.					

Standard Penetration Resistance
(64 kg. weight, 760 mm drop)
▲ Blows per 300 mm



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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State Route 510
Lacey, WA

BORING: BH-2

PAGE: 1 of 1

PROJECT NO.: 96178 FIGURE: A-3

BORINGM 96178 4/9/97

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME 850, HSA, 21cm OD
SURFACE ELEVATION: 67.5 ± Meters

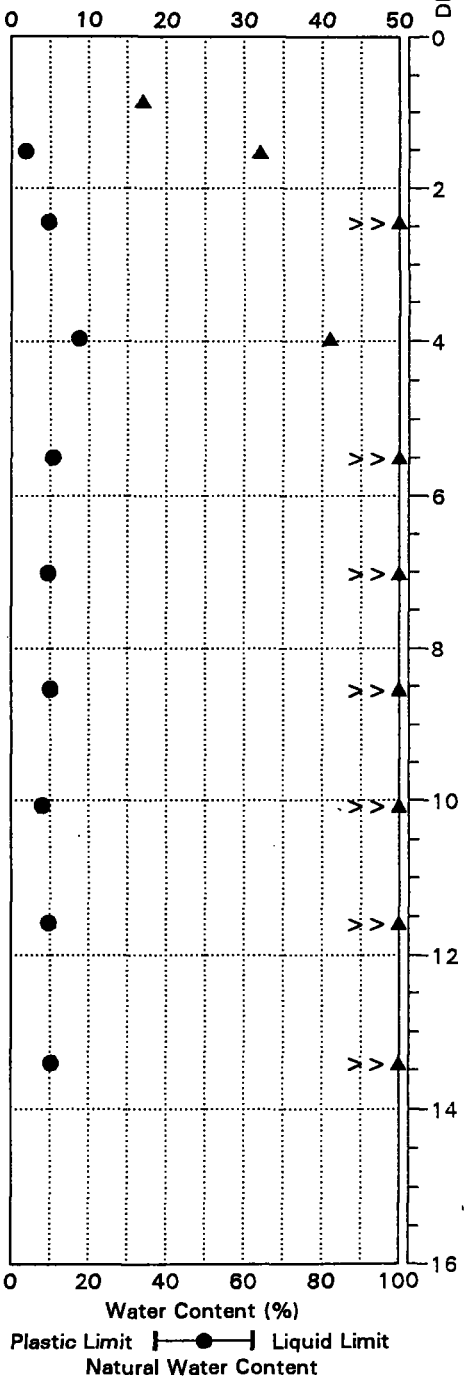
LOCATION: Sta 1+283.3, Offset 21.3 m Left
DATE COMPLETED: 3/19/97
LOGGED BY: Erik Andersen

DEPTH (meters)	SYMBOL	ASTM SOIL CLASS	DESCRIPTION	SAMPLE TYPE / SAMPLE NUMBER	PEN. RESISTANCE (blows/150 mm)	OTHER TESTS
0		GW GM	Medium dense to dense, olive brown, well graded GRAVEL with silt and sand, moist. Fine to coarse sand, some cobbles.	S-1	6-7-10	
			(FILL)	S-2	9-19-13	GS
2		SM	Dense to very dense, olive brown, silty SAND, moist. Fine sand.	S-3	20-31-25	
			(GLACIAL OUTWASH)			
4			Some fine gravels.	S-4	16-13-28	GS
				S-5	22-33-41	
6				S-6	24-42-50/25mm	
8		GP GM	Very dense, olive gray, poorly graded GRAVEL with silt and sand, wet.	S-7	22-43-50/100mm	
		SP SM	Very dense, olive gray, poorly graded SAND with silt and gravel, wet.	S-8	38-47-50/125mm	%F
10				S-9	45-50/75mm	
12		GW	Very dense, olive gray, well graded GRAVEL with sand.			
				S-10	17-34-36	
14						
16						

Bottom of hole at 13.9 m.
Groundwater observed at 4.0 m at time of drilling.

GROUNDWATER

Standard Penetration Resistance
(64 kg. weight, 760 mm drop)
▲ Blows per 300 mm



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

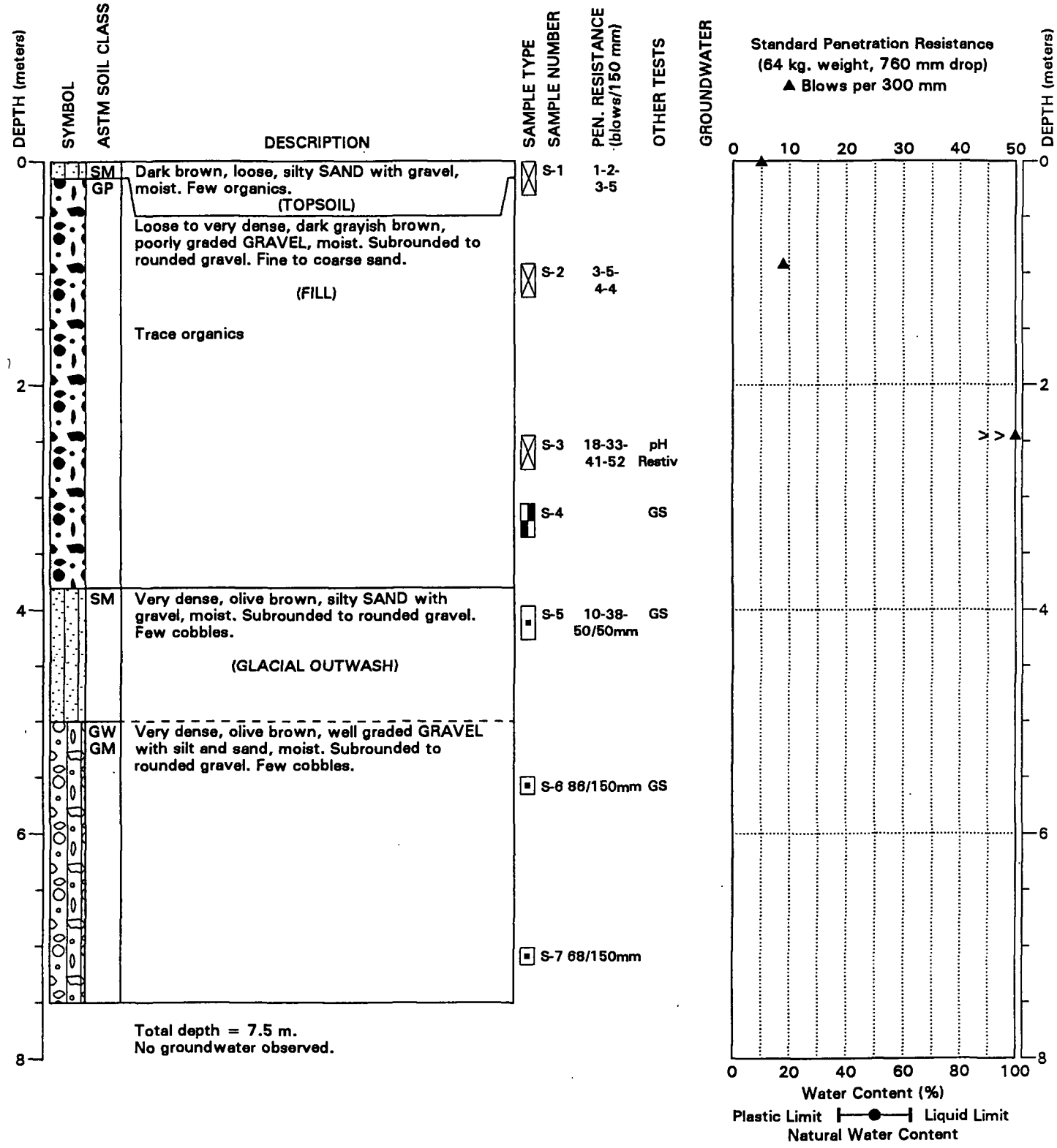
BORING: BH-3

PAGE: 1 of 1

PROJECT NO.: 96178 FIGURE: A-4

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME 55, HSA, 21cm OD
SURFACE ELEVATION: ± Meters

LOCATION: Pond Area, See Fig. 3
DATE COMPLETED: 6/3/97
LOGGED BY: Erik Andersen



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

BORING: BH-4

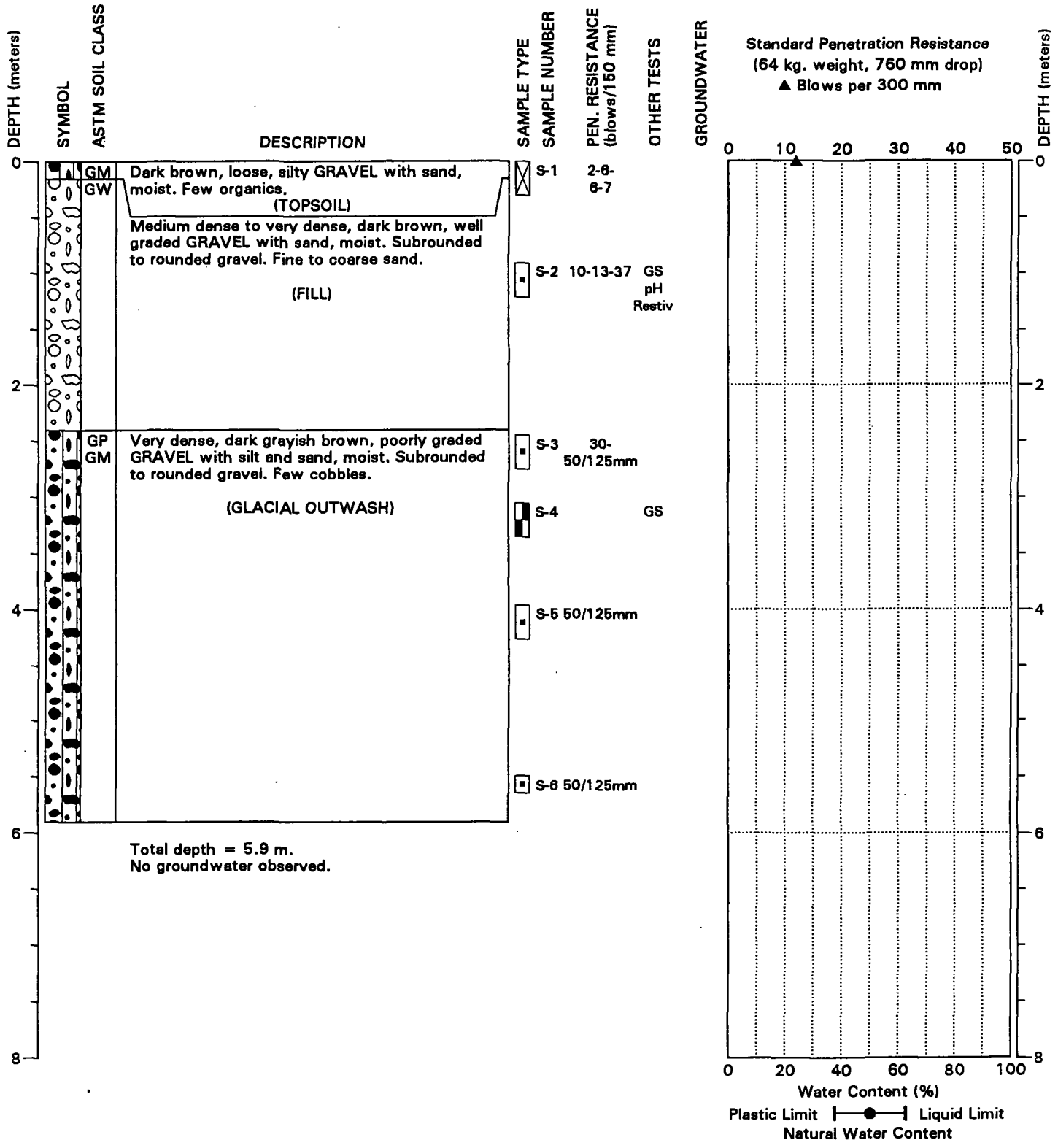
PAGE: 1 of 1

PROJECT NO.: 96178 FIGURE: A-5

BORINGM 96178 6/18/97

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME 55, HSA, 21cm OD
SURFACE ELEVATION: ± Meters

LOCATION: Pond Area, See Fig. 3
DATE COMPLETED: 6/3/97
LOGGED BY: Erik Andersen



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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State Route 510
Lacey, WA

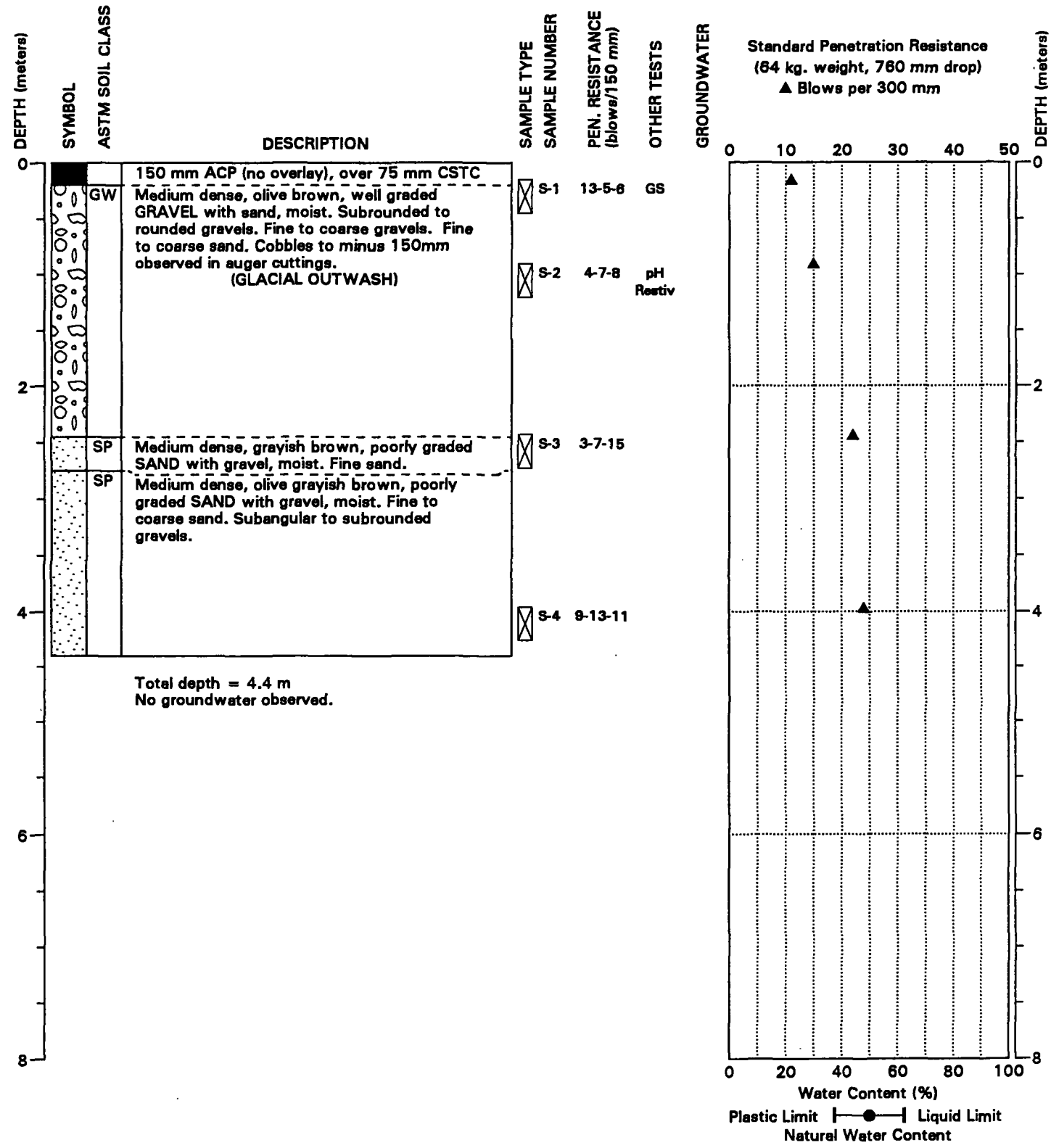
BORING: BH-5

PAGE: 1 of 1

PROJECT NO.: 96178 FIGURE: A-6

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME 55, HSA, 21cm OD
SURFACE ELEVATION: 69 ± Meters

LOCATION: STA 3+025, Offset 3.2 L
DATE COMPLETED: 6/4/97
LOGGED BY: Erik Andersen



Total depth = 4.4 m
No groundwater observed.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

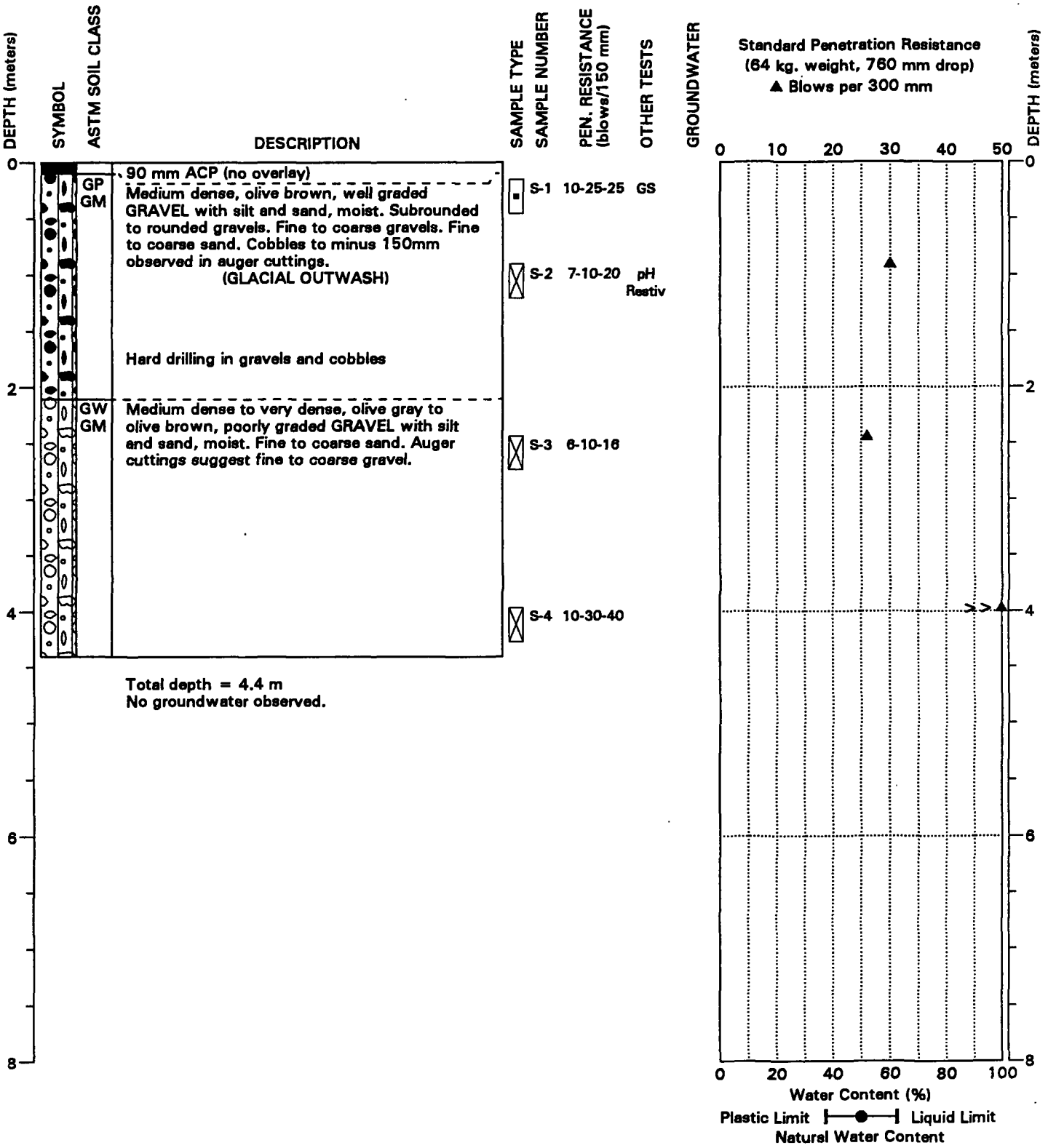
BORING: BH-6

PAGE: 1 of 1

PROJECT NO.: 96178 FIGURE: A-7

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME 55, HSA, 21cm OD
SURFACE ELEVATION: 65 ± Meters

LOCATION: STA 2+464, Offset 2.4 L
DATE COMPLETED: 6/4/97
LOGGED BY: Erik Andersen



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

BORING: BH-7

PAGE: 1 of 1

PROJECT NO.: 96178 FIGURE: A-8

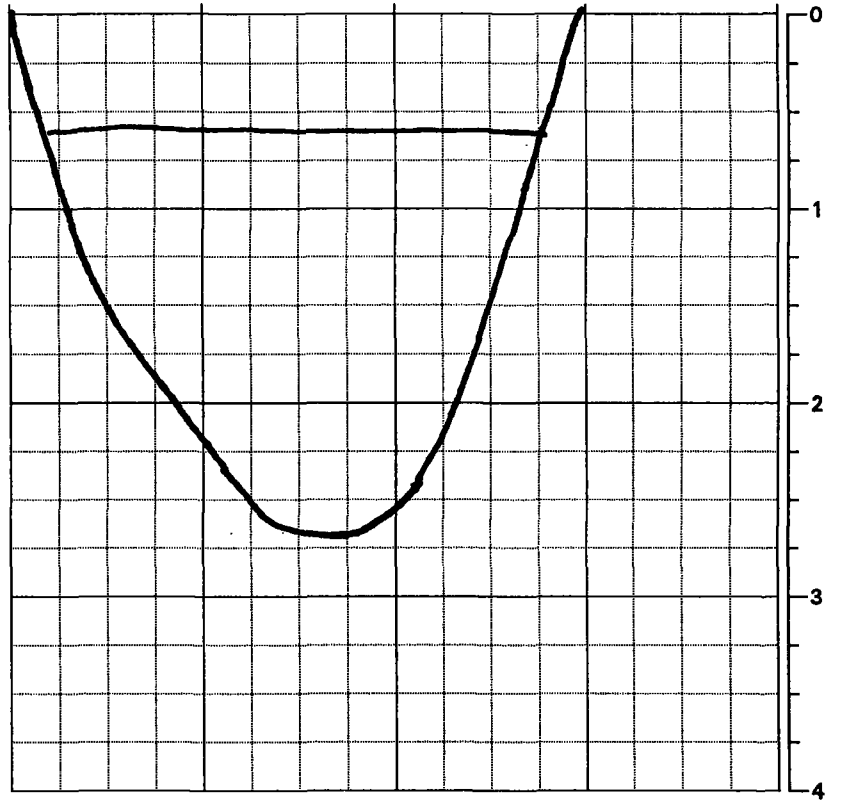
EXCAVATION COMPANY: WSDOT
EXCAVATING EQUIPMENT: Case 580L,
SURFACE ELEVATION: ± Meters

LOCATION: SN-W Ramp
DATE COMPLETED: 5/20/97
LOGGED BY: SRW

DEPTH (meters)	SYMBOL	ASTM SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		SM	Loose to medium dense, dark brown, silty SAND with gravel, moist. (FILL)		S-1			
1		GP	Medium dense, light olive brown, well graded GRAVEL, moist. Trace cobbles. (GLACIAL OUTWASH)		S-2		GS	
2								
3								
4								

Total depth = 2.7 m.
No groundwater observed.

SKETCH OF SIDE OF PIT



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

LOG OF TEST PIT
TP-1

PAGE: 1 of 1

PROJECT NO.: 96178 FIGURE: A-9

TPIT4M 96178 6/18/97

Northern, Inc.
Kirkland, Yakima, Kennewick, Hermiston (OR)

KEY CHART

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

COARSE-GRAINED SOILS			FINE-GRAINED SOILS		
DENSITY	N (BLOWS/FT)	FIELD TEST	CONSISTENCY	N (BLOWS/FT)	FIELD TEST
Very Loose	0 – 4	Easily penetrated with ½-inch reinforcing rod pushed by hand	Very Soft	0 – 2	Easily penetrated several inches by thumb
Loose	4 – 10	Difficult to penetrate with ½-inch reinforcing rod pushed by hand	Soft	2 – 4	Easily penetrated one inch by thumb
Medium -Dense	10 – 30	Easily penetrated with ½-inch rod driven with a 5-lb hammer	Medium-Stiff	4 – 8	Penetrated over ½-inch by thumb with moderate effort
Dense	30 – 50	Difficult to penetrate with ½-inch rod driven with a 5-lb hammer	Stiff	8 – 15	Indented about ½-inch by thumb but penetrated with great effort
Very Dense	> 50	penetrated only a few inches with ½-inch rod driven with a 5-lb hammer	Very Stiff	15 – 30	Readily indented by thumb
			Hard	> 30	Indented with difficulty by thumbnail

USCS SOIL CLASSIFICATION

MAJOR DIVISIONS				GROUP DESCRIPTION	
Coarse-Grained Soils <50% passes #200 sieve	**Gravel** and **Gravelly Soils** <50% coarse fraction passes #4 sieve	**Gravel** (with little or no fines)	GW	Well-graded **Gravel**	
			GP	Poorly Graded **Gravel**	
		Gravel (with >12% fines)	GM	Silty **Gravel**	
			GC	Clayey **Gravel**	
	Sand and **Sandy Soils** >50% coarse fraction passes #4 sieve	**Sand** (with little or no fines)	SW	Well-graded **Sand**	
			SP	Poorly graded **Sand**	
		Sand (with >12% fines)	SM	Silty **Sand**	
			SC	Clayey **Sand**	
Fine-Grained Soils >50% passes #200 sieve	**Silt** and **Clay** Liquid Limit < 50		ML	**Silt**	
			CL	Lean **Clay**	
			OL	Organic **Silt** and **Clay** (low plasticity)	
	Silt and **Clay** Liquid Limit > 50		MH	Inorganic **Silt**	
			CH	Inorganic **Clay**	
			OH	Organic **Clay** and **Silt** (med. to high plasticity)	
Highly Organic Soils			PT	**Peat**	**Top Soil**

LOG SYMBOLS

	2S	2" OD Split Spoon (SPT)
	3S	3" OD Split Spoon
	NS	Non-Standard Split Spoon
	ST	Shelby Tube
	CR	Core Run
	BG	Bag Sample
	TV	Torvane Reading
	PP	Penetrometer Reading
	NR	No Recovery
	GW	Groundwater Table

MODIFIERS

DESCRIPTION	RANGE
Trace	<5%
Little	5% – 12%
Some	>12%

MOISTURE CONTENT

DESCRIPTION	FIELD OBSERVATION
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but not visible water
Wet	Visible free water

SOIL CLASSIFICATION INCLUDES

1. Group Name
2. Group Symbol
3. Color
4. Moisture content
5. Density / consistency
6. Cementation
7. Particle size (if applicable)
8. Odor (if present)
9. Comments

MAJOR DIVISIONS WITH GRAIN SIZE

SIEVE SIZE						
12"	3"	3/4"	4	10	40	200
GRAIN SIZE (INCHES)						
12	3	0.75	0.19	0.079	0.0171	0.0029

Boulders	Cobbles	Gravel		Sand			Silt and Clay
		Coarse	Fine	Coarse	Medium	Fine	

Conditions shown on boring and testpit logs represent our observations at the time and location of the fieldwork, modifications based on lab test, analysis, and geological and engineering judgment. These conditions may not exist at other times and locations, even in close proximity thereof. This information was gathered as part of our investigation, and we are not responsible for any use or interpretation of the information by others.

Northern, Inc.

Boring No. TH-1

SR-510
SR-5 to Martin Way
Lacey, Washington

Geo/Eng.: J.H.	**Project No.:** 298-811
Driller: W.S.D.O.T.	**Boring Date:** 04/16/99
Drilling Method: Auger / SPT	**Elevation:** N/A
Diameter: 4.25" I.D. **Water Table (BGS):** N/E	**Logged By:** J.H.

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
1				2,6,15	21		0		0.- 1.5' TOPSOIL: Gravel with sand, brown, moist.		
2				5,7,8	15				1.5' - 5.0' UNCONTROLLED FILL: Gravel with sand, brown, medium dense, moist.		
13				7,6,4	10		5		**GW-GM** 5.0' - 16.5' WELL GRADED GRAVEL WITH SILT AND SAND: Dark-brown, medium dense, moist.		
4				8,3,15	18						
		0		22,10,8	18		10				Bulk Sample
		0		6,15,11	16						
5				5,8,11	19		15				
									END End of Boring at 16.5' BGS		Sample is moist to wet from 16.2' BGS
							20				
							25				
							30				
							35				

F. 26.66 (Rev. 10-64)

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
LOG OF TEST BORING

Original to Materials Engr.
Copy to Bridge Engr.
Copy to District Engr.

S.R. No. 5 — PSH #1-S. Martins to Old Nisqually Rd. — Copy to Pac. Testing Lab. Y-888
P.S.H. S.S.H. No. 1 — Section Gleason - Carney Rd. U-Xing — Job No. L-1048
Hole No. C2-1 — Station E 7+48 — Offset 15' Lt. — Ground Elev. 180'
Type of Boring Hollow stem auger — Water Table 21' below grade — Casing —
Inspector G. O. Teague — Date 3/22/66 — Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
0				Dk. brown organic topsoil
	10		↑4 5 ↓10	D-1, Drove 2-3½', Rec. 6" Brown coarse gravel, dominantly ½' to 3", with 30-40% sand and organic topsoil
			B 4899-1	
5				
	121		↑44 64 ↓57	D-2, Drove 7-8½', Rec. 1½'
				-2
10				
	70		↑12 24 ↓46	D-3, Drove 12-13½', Rec: 1'
				-3
15				
	44		↑22 106	D-4, Drove 17-18', Rec. 6"
				(note - rock jammed in shoe) Yellow-brown coarse gravel, dominantly ½" to 3", with 40-60% silty sand. (Auger encounters occasional large boulders)
20				-4
	46		↑16 23 ↓105	D-5, Drove 22-23½', Rec. 8"
				-5
25				
	84		↑27 42 ↓95	D-6, Drove 27-28½', Rec. 1'
				-6
30				
	173		↑45 76 ↓99	D-7, Drove 32-33½', Rec. 1'
				-7
35				

Ps

F. 26.66 (Rev. 10-64)

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DEPARTMENT OF HIGHWAYS

LOG OF TEST BORING

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Copy to District Engr.
Copy to Pac. Testing Lab.

S.R. No. 5
P.S.H. / S.S.H. No. 1
Section PSH#1 - St. Martins to Old Nisqually Rd. Gleason - Carney Rd. U-Xing
Job No. Y-888 L-1048
Hole No. C2-1
Station ℄ 7+48
Offset 15' Lt.
Ground Elev. 180'
Type of Boring Hollow stem auger
Water Table 21' below grade
Casing —
Inspector G.O. Teague
Date 3/22/66
Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
35				
	105		45 / 45 / 60	D-8, Drove 37-38½', Rec. 1½' —8
40				
	142		48 / 68 / 74	D-9, Drove 42-43½', Rec. 1½' —9
				See ~~last page~~ sheet 1 for description
45				
	88		31 / 38 / 50	D-10, Drove 47-48½', Rec. 1½' —10
50				
	102		58 / 52 / 50	D-11, Drove 52-53½', Rec. 6" —11
55				Black medium to coarse water-bearing sand
	85/6"	Bottom of hole 58'	35 / 85	D-12, Drove 57-58', Rec. 1' —12
60				

H. F. 26.66 (Rev. 10-64)

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DEPARTMENT OF HIGHWAYS
LOG OF TEST BORING

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Copy to District Engr.
Copy to Pac. Testing Lab. Y-888

S.R. No. 5 PSH #1 - St. Martins to Old Nisqually Rd.
P.S.H. S.S.H. No. 1 Section Gleason - Carney Rd. U-Xing Job No. L-1048
Hole No. C2-2 Station ℄CG 9+18 Offset 15' Lt. Ground Elev. 178'
Type of Boring Hollow stem auger Water Table 18' below grade Casing —
Inspector G. O. Teague Date 3/23/66 Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
0				Dark-brown organic topsoil
	22		3 6 16	D-1, Drove 2-3½', Rec. 8" R 4900 - 1
5				Brown coarse gravel with
	28		6 14 14	D-2, Drove 7-8½', Rec. 6" 30-40% silty sand -2-
10				
	12		4 5 7	D-3, Drove 12-13½', Rec. 4" -3
15				
	48		15 17 31	D-4, Drove 17-18½', Rec. 6" -4
20				
	157		52 63 94	D-5, Drove 22-23½', Rec. 1½' -5
25				Yellow-brown coarse gravel, 40-50% coarse silty sand. Gravel dominantly ½" to 3" with numerous large boulders encountered by auger.
	114		52 64 50	D-6, Drove 27-28½', Rec. 1½' -6
30				
	100/6"		43 100	D-7, Drove 32-33', Rec. 1' -7
35				

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WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
LOG OF TEST BORING

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Copy to Pac. Testing Lab.

S.R. No. 5
P.S.H. PSH #1 - St. Martins to Old Nisqually Rd. Y-888
S.S.H. No. 1 Section Gleason-Carney Rd. U-Xing Job No. L-1048
Hole No. C2-2 Station ~~C~~CG9 + 18 Offset 15' Lt. Ground Elev. 178'
Type of Boring Hollow stem auger Water Table 18' below grade Casing —
Inspector G.O. Teague Date 3/23/66 Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE · TUBE NOS.	DESCRIPTION OF MATERIAL
35				
	152		39 / 56 / 96	D-8, Drove 37-38½', Rec. 1½'
				—8
40				
				sheet 1 of 2
				See ~~last page~~ for description
	180		51 / 80 / 100	D-9, Drove 42-43½', Rec. 1½'
				—9
45				
	98		51 / 48 / 50	D-10, Drove 47-48½', Rec. 1½'
				—10
50				
	73		14 / 22 / 51	D-11, Drove 52-53½', Rec. 1½'
				—11
55		Bottom of hole 53½'		Blue-gray clayey-silt
60				

Ps

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S.R. No. 5 — PSH #1 - St. Martins to Old Nisqually Rd. — Copy to Pac. Testing Lab. Y-888
P.S.H.
S.S.H. No. 1 — Section Gleason - Carney Rd. U-Xing — Job No. L-1048
Hole No. C2-3 — Station CGE 11+04 — Offset 15' Lt. — Ground Elev. 187'
Type of Boring Hollow stem auger — Water Table 30' below grade — Casing —
Inspector G.O. Teague — Date 3/23/66 — Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
0				Dark-brown organic topsoil
				B4901-1
	21		↑10 11 ↓10	D-1, Drove 2-3½', Rec. -NONE
				(note - Auger in coarse gravel with minimum sand matrix)
5				
	46		↑6 15 ↓31	D-2, Drove 7-8½', Rec. 6"
				-2
10				Dark brown coarse gravel dominantly ½" to 3" with minimum coarse sand matrix, and occasional large boulders.
	71		↑16 33 ↓38	D-3, Drove 12-13½', Rec. 1"
				-3
15				
	148		↑40 82 ↓66	D-4, Drove 17-18½', Rec. 1½'
				-4
20				
	70		↑21 30 ↓40	D-5, Drove 22-23½', Rec. 1'
				-5
				Grey-brown sand with 10-15% gravel to ¼"
25				
	84		↑35 40 ↓44	D-6, Drove 27-28½', Rec. 1'
				-6
30				Grey-brown coarse gravel, 40-50% coarse sand.
	167		↑43 67 ↓100	D-7, Drove 32-33½', Rec. 6"
				-7
35				

Ps

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LOG OF TEST BORING

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S.R. No. 5 — PSH #1 - St. Martins to Old Nisqually Rd.
P.S.H.
S.S.H. No. 1 — Section Gleason - Carney Rd. U-Xing — Job No. L-1048
Hole No. C2-3 — Station ℄CG11 + 04 — Offset 15' Lt. — Ground Elev. 187'
Type of Boring Hollow stem auger — Water Table 30' below grade — Casing —
Inspector G. O. Teague — Date 3/23/66 — Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
35				
	102		↑32 37 ↓65	D-8, Drove 37-38½', Rec. 1'
				-8
40				
				-9 — See ~~last page~~ Sheet 1 of 2 for description
	125		↑75 50 ↓	D-9, Drove 42-43', Rec. 2"
				(note) Driving against boulder
45				
	118		↑23 58 ↓60	D-10, Drove 47-48½', Rec. 1'
				-10
50				
	125		↑44 44 ↓81	D-11, Drove 52-53½', Rec. 1'
				-11
55		Bottom of hole 53½'		
60				

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More than 50% Retained on No. 200 Sieve	GRAVEL More than 50% Of Coarse Fraction Retained on No. 4 Sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More than 50% Of Coarse Fraction Passes No. 4 Sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% Passes No. 200 Sieve	SILT AND CLAY Liquid Limit Less than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY Liquid Limit 50 or more	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
2. Soil classification using laboratory tests is based on ASTM D2487-90.
3. Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

SOIL MOISTURE MODIFIERS:

Dry- Absence of moisture, dry to the touch

Moist- Damp, but no visible water

Wet- Visible free water or saturated, usually soil is obtained from below water table

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

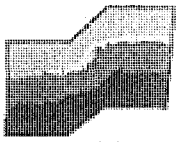
Soil Classification System
Proposed Lacey Gateway Commercial Project
Parcels k, L, M, N, & O
Marvin Road NE & Britton Parkway NE
Lacey, Washington

Client: Wig Properties LLC-Nisqually **Driller:** Cascade Drilling **Logged By:** CRL

Location: Lacey, Washington **Approx. Elev:** 307 +/- Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |-----x-----| Wl 10 30 50 70 90	Pocket Penetrometer TSF 1 2 3 4 / SPT (N) Blows/ft 10 20 30 40	Observ. Well
1		(12 inches SOD and TOPSOIL)				
2		Gray sandy GRAVEL, dry.		2.9	50/6"	
3			Very Dense			
4						
5				6.0	50/6"	
6						
7		Gray sandy GRAVEL with silt, moist becoming wet below 10 feet.	Very Dense			
8						
9						
10				8.5	50/2"	
11						
12						
13						
14		Seepage observed at 15 feet.				
15 ▽				11.6	50/6"	
16						
17						
18						
19						
20				8.5	50/6"	
21		Monitoring well terminated at 20 feet. Groundater observed at 15 feet during drilling. 2-inch PVC monitoring well constructed as shown. (WDOE Well Tag BIC 548)				
22						
23						
24						
25						

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site.



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LOG OF MONITORING WELL MW-2

Figure No. A-2

Project: 37 Acre Site **Project No:** T-6537-3 **Date Drilled:** 6/23/13

Client: Wig Properties LLC-Nisqually **Driller:** Cascade Drilling **Logged By:** CRL

Location: Lacey, Washington **Approx. Elev:** 200 +/- Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |——x-----| Wl 10 30 50 70 90	Pocket Penetrometer △ TSF △ 1 2 3 4 / SPT (N) • Blows/ft • 10 20 30 40	Monitor Well
46–75		Brown gray sandy GRAVEL with silt to sandy GRAVEL, moist.	Very Dense	7.1	50/6"	
				5.5	50/6"	
				7.4	50/6"	
				7.2	50/5"	
76–90		Monitoring well terminated at 75.5 feet. No groundwater observed during drilling. 2-inch PVC monitoring well constructed as shown. (WDOE Well Tag BIC 549)				

LOG OF MONITORING WELL MW-3

Figure No. A-3

Project: 37 Acre Site **Project No:** T-6537-3 **Date Drilled:** 6/24/13

Client: Wig Properties LLC-Nisqually **Driller:** Cascade Drilling **Logged By:** CRL

Location: Lacey, Washington **Approx. Elev:** 200 +/- Feet

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	Moisture Content % Wp |-----x-----| Wl 10 30 50 70 90	Pocket Penetrometer △ TSF △ 1 2 3 4 / SPT (N) • Blows/ft • 10 20 30 40	Observ. Well
1		(Upper 18 inches removed prior to drilling)				
2		Brown-gray sandy GRAVEL with silt, dry.				
3						
4						
5			Dense to	5.6 x	36 •	
6			Very Dense			
7						
8						
9						
▼ 10				10.3 x	50/6" •	
11						
12		Brown gravelly SAND with silt, wet.				
13			Very Dense			
14						
15				8.3 x	50/6" •	
16		Monitoring well terminated at 15.5 feet. Groundwater observed below 10 feet. 2-inch PVC monitoring well constructed as shown. (WDOE Well Tag BIC 550)				
17						
18						
19						
20						

Note: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site.

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Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual–manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance.
Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 – 4	Very soft	0 – 2	<0.125
Loose	4 – 10	Soft	2 – 4	0.125 – 0.25
Medium dense	10 – 30	Medium stiff	4 – 8	0.25 – 0.5
Dense	30 – 50	Stiff	8 – 15	0.5 – 1.0
Very dense	>50	Very stiff	15 – 30	1.0 – 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

	Estimated Percentage
Not identified in description	0 – 5
Slightly (clayey, silty, etc.)	5 – 12
Clayey, silty, sandy, gravelly	12 – 30
Very (clayey, silty, etc.)	30 – 50

Legends

Sampling Test Symbols

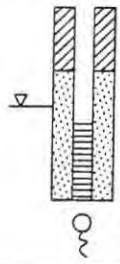
BORING SAMPLES

- ☒ Split Spoon
- ⧄ Shelby Tube
- ▥ Cuttings
- ◧ Core Run
- * No Sample Recovery
- P Tube Pushed, Not Driven

TEST PIT SAMPLES

- ☒ Grab (Jar)
- ⧸ Bag
- ⧄ Shelby Tube

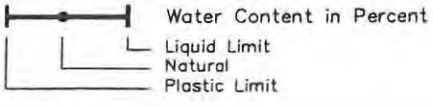
Groundwater Observations



- Surface Seal
- Groundwater Level on Date (ATD) At Time of Drilling
- Observation Well Tip or Slotted Section
- Groundwater Seepage (Test Pits)

Test Symbols

GS	Grain Size Classification
CN	Consolidation
TUU	Triaxial Unconsolidated Undrained
TCU	Triaxial Consolidated Undrained
TCD	Triaxial Consolidated Drained
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits



PID	Photoionization Reading
CA	Chemical Analysis

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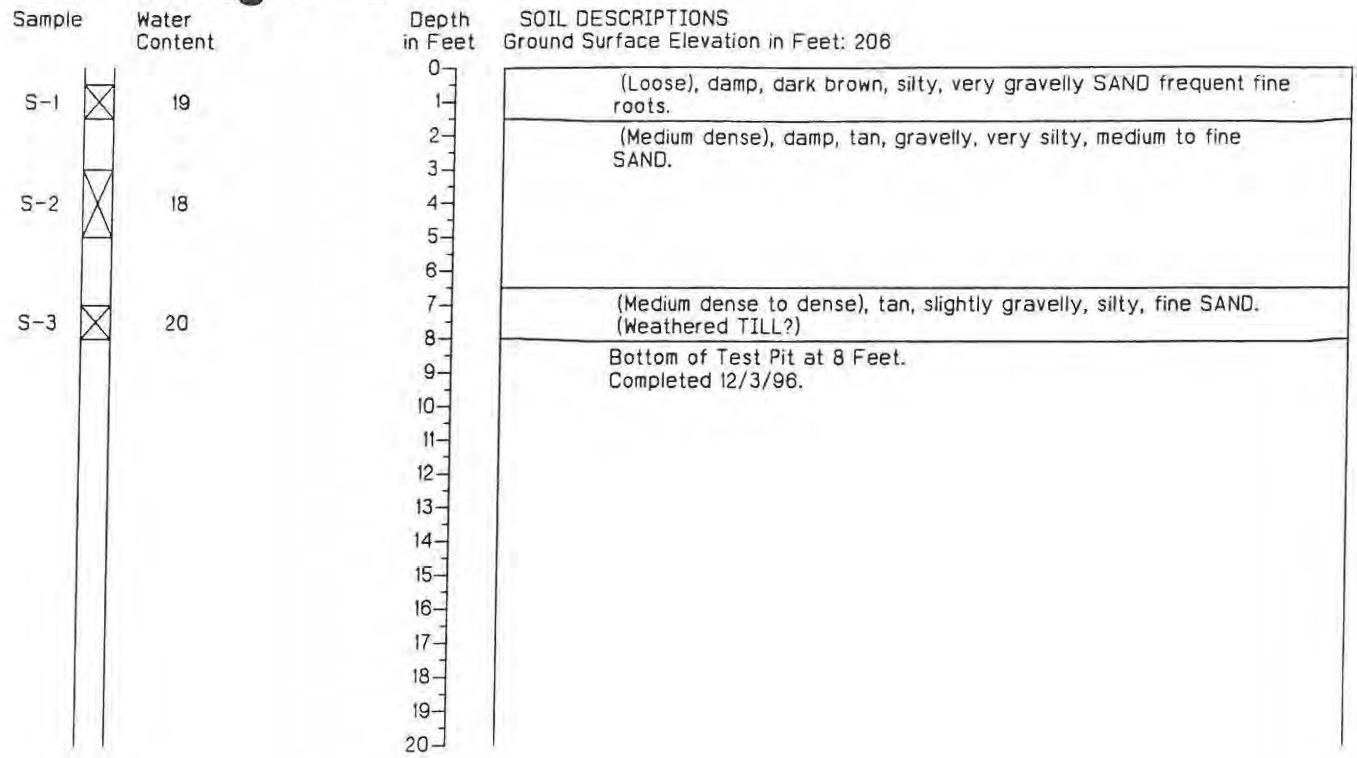
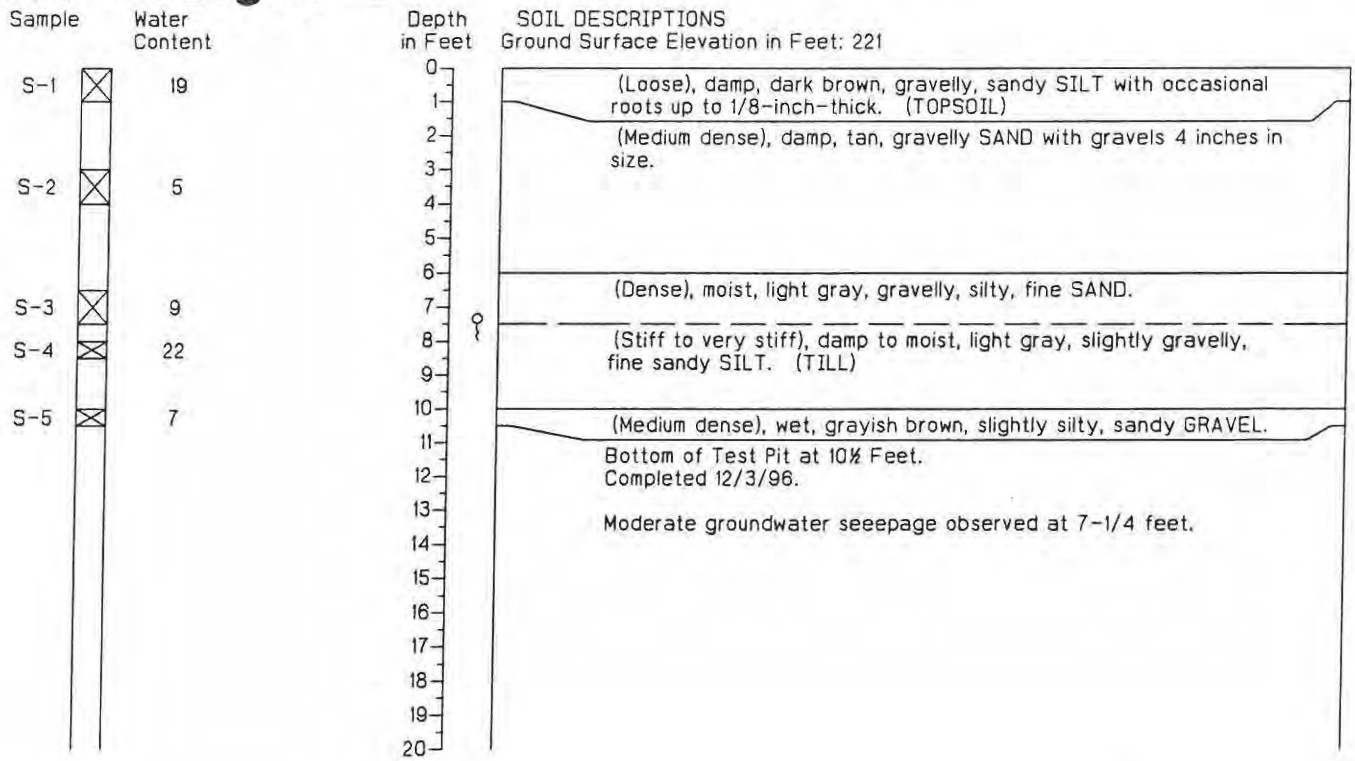
Figure A-1

1=1 A1\KEY 1

Test Pit Log TP-1



Test Pit Log TP-2



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

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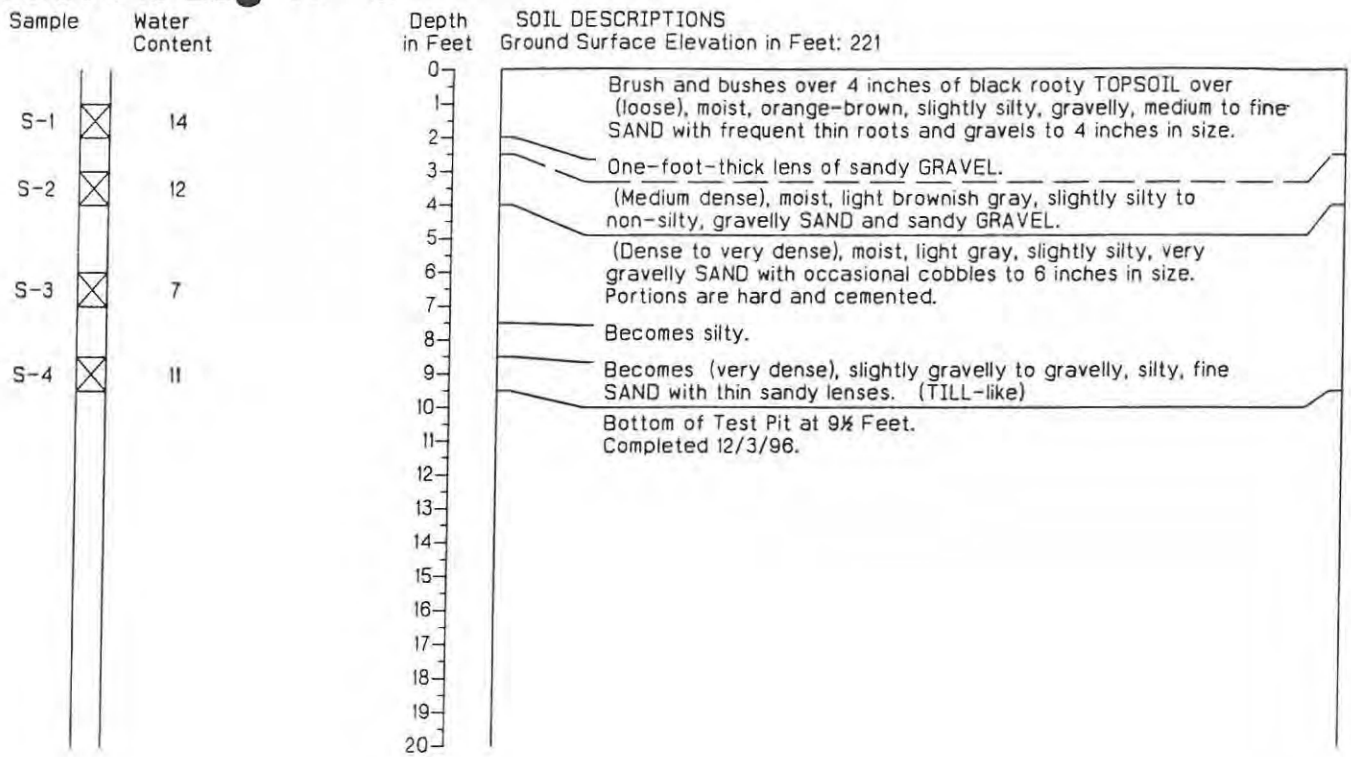
Figure A-2

Test Pit Log TP-3



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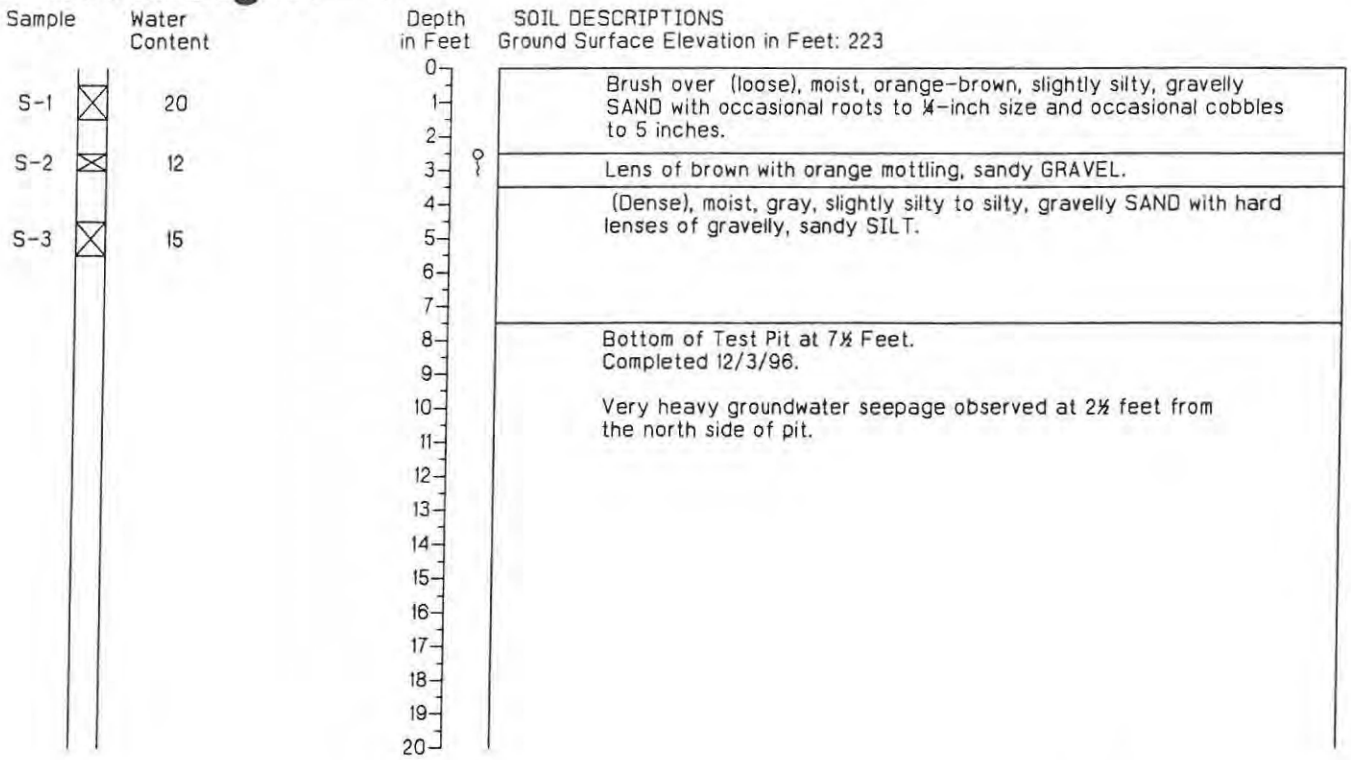

1. Refer to Figure A-1 for explanation of descriptions and symbols.
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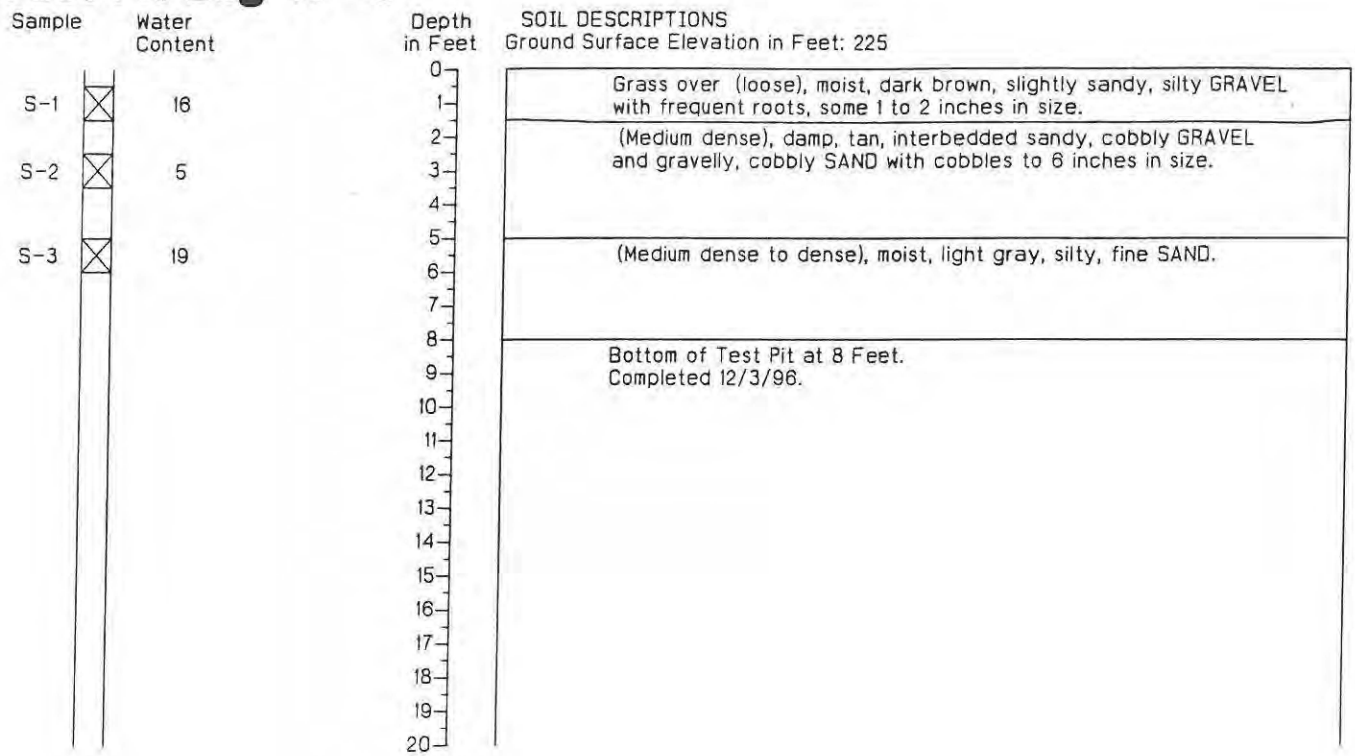
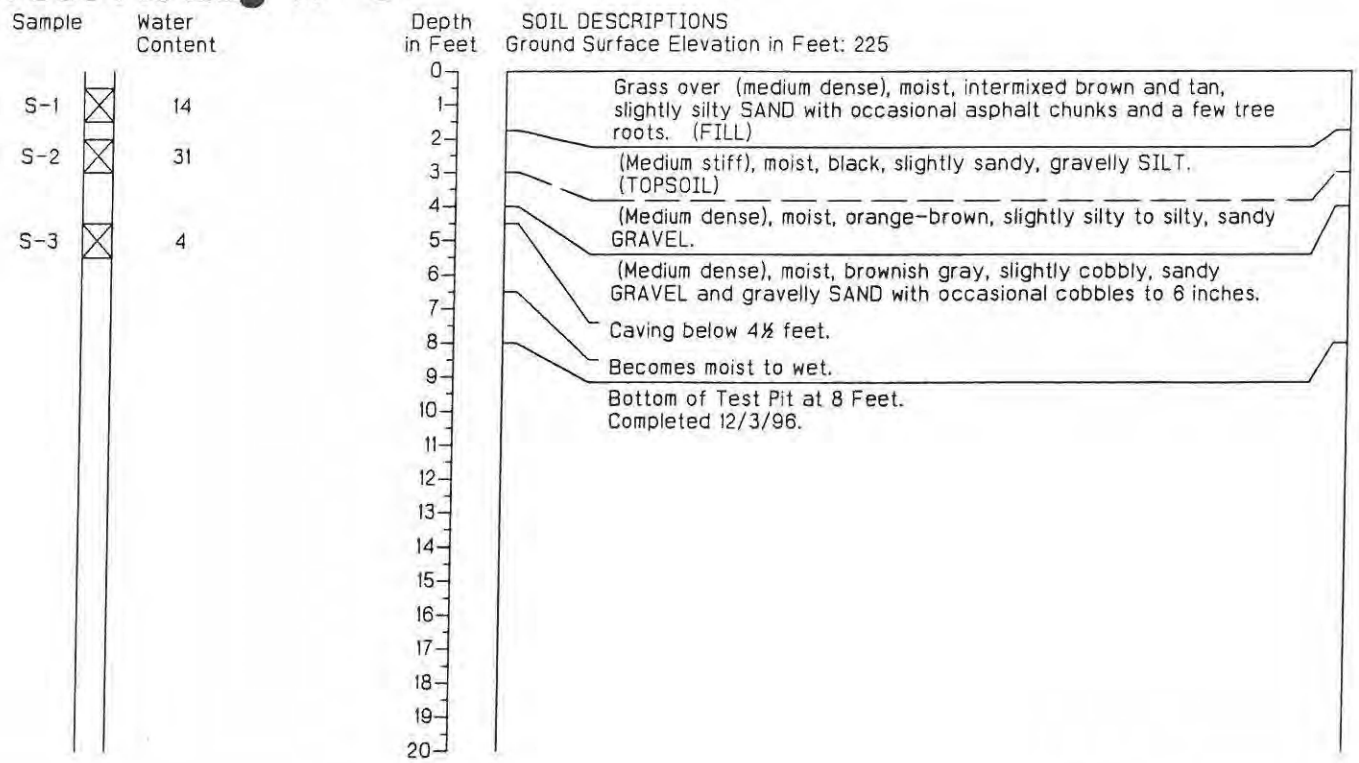
Figure A-3

Test Pit Log TP-5



Test Pit Log TP-6



1. Refer to Figure A-1 for explanation of descriptions and symbols.
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3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

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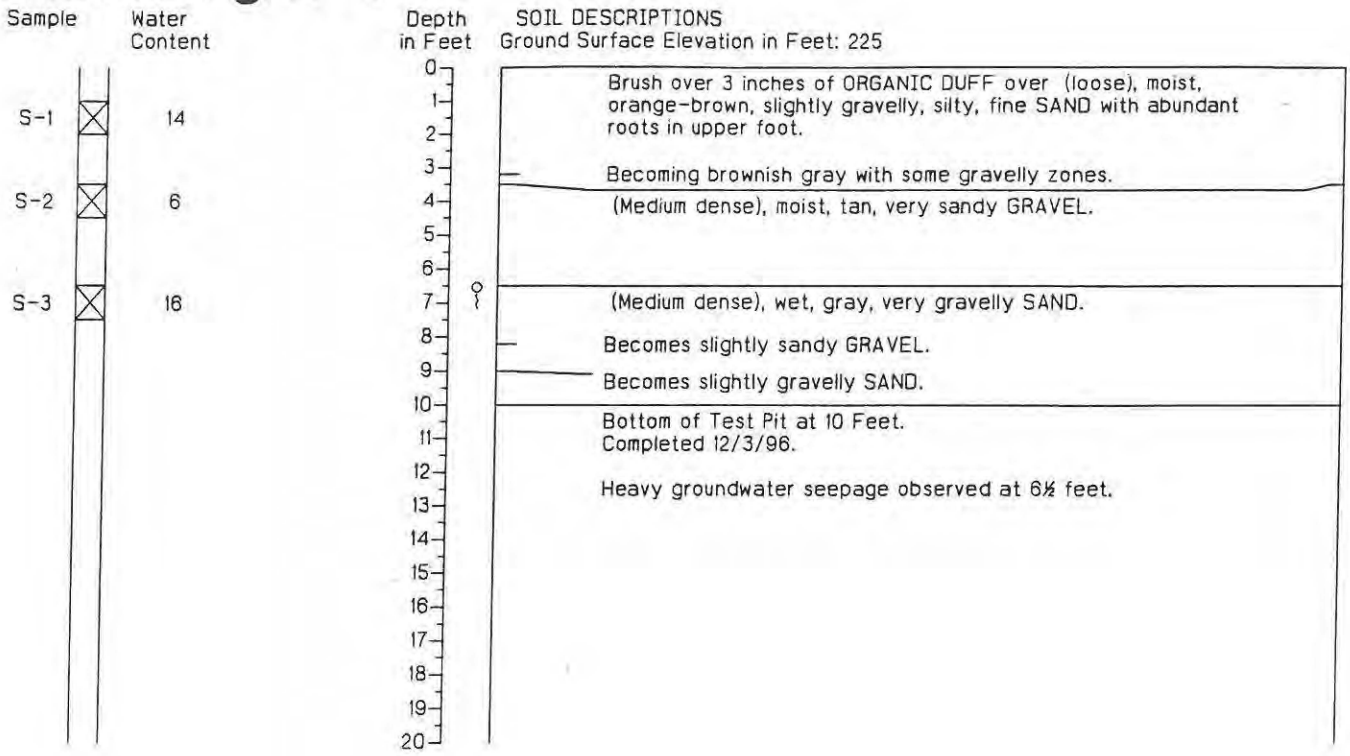
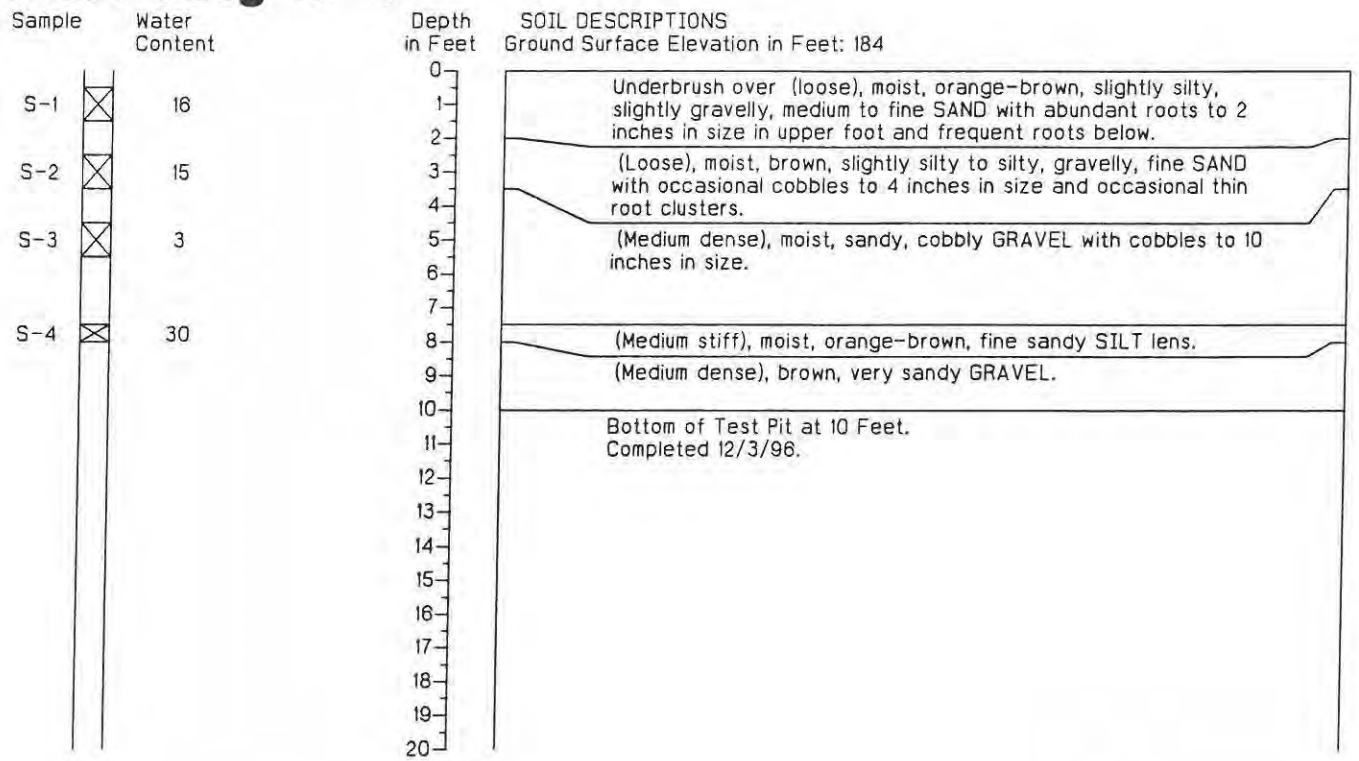
Figure A-4

Test Pit Log TP-7



Test Pit Log TP-8



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

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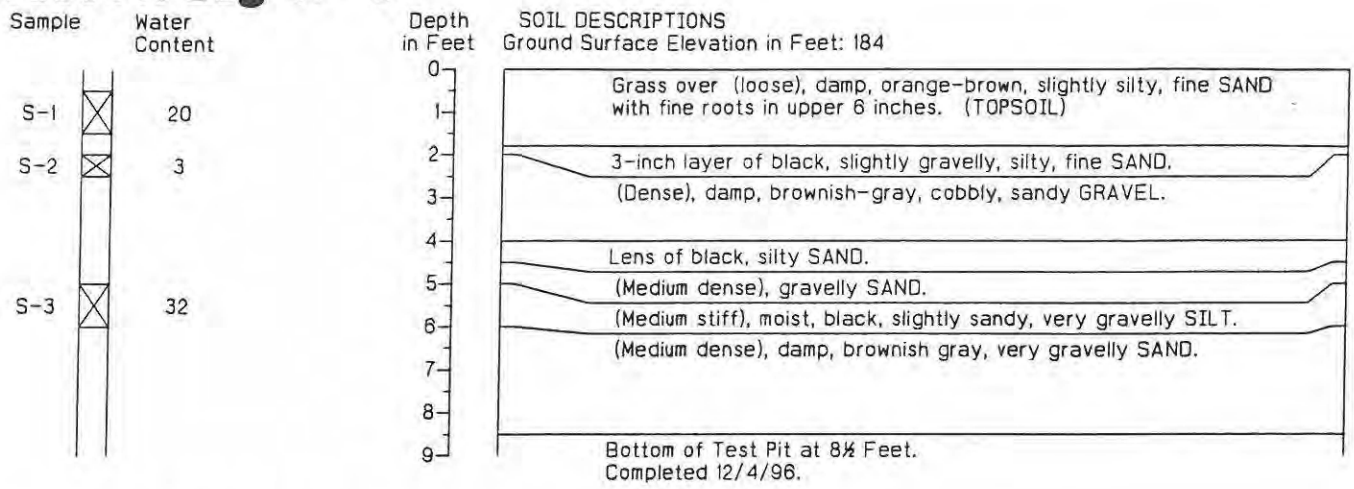
Figure A-5

Test Pit Log TP-9



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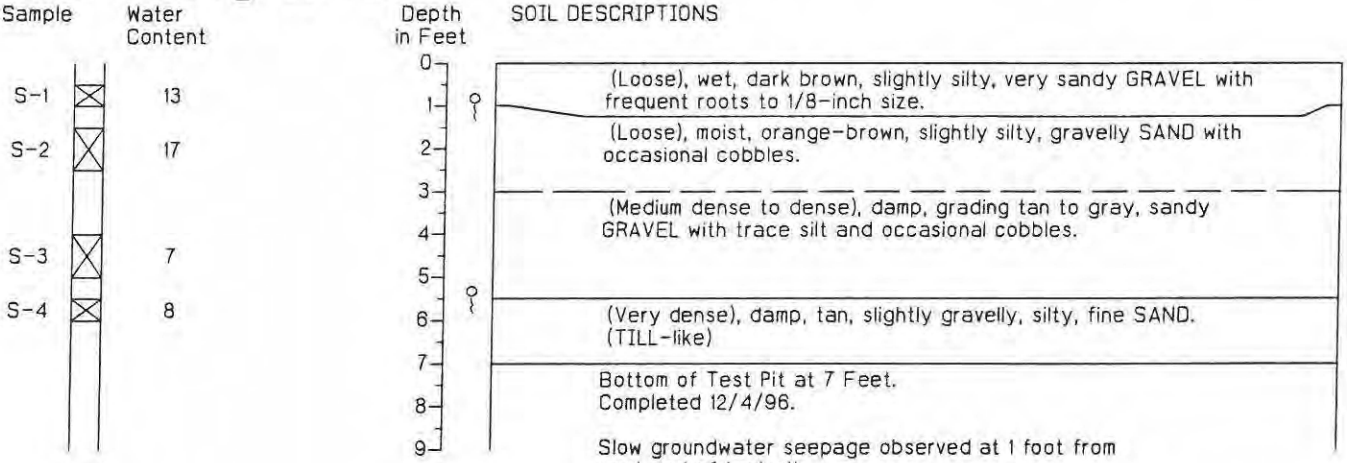
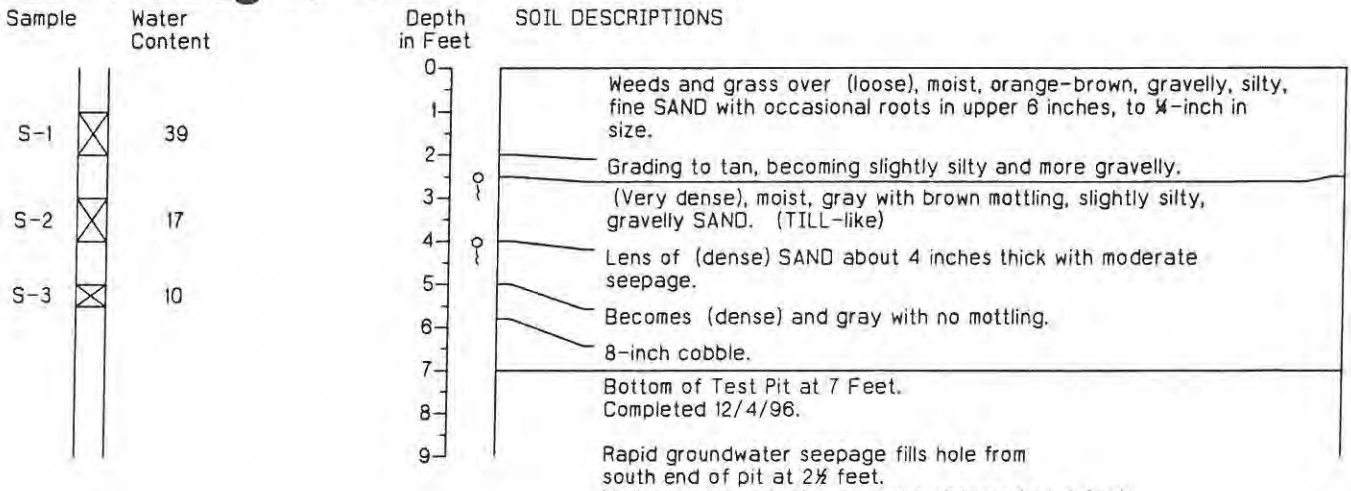


Test Pit Log TP-11



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

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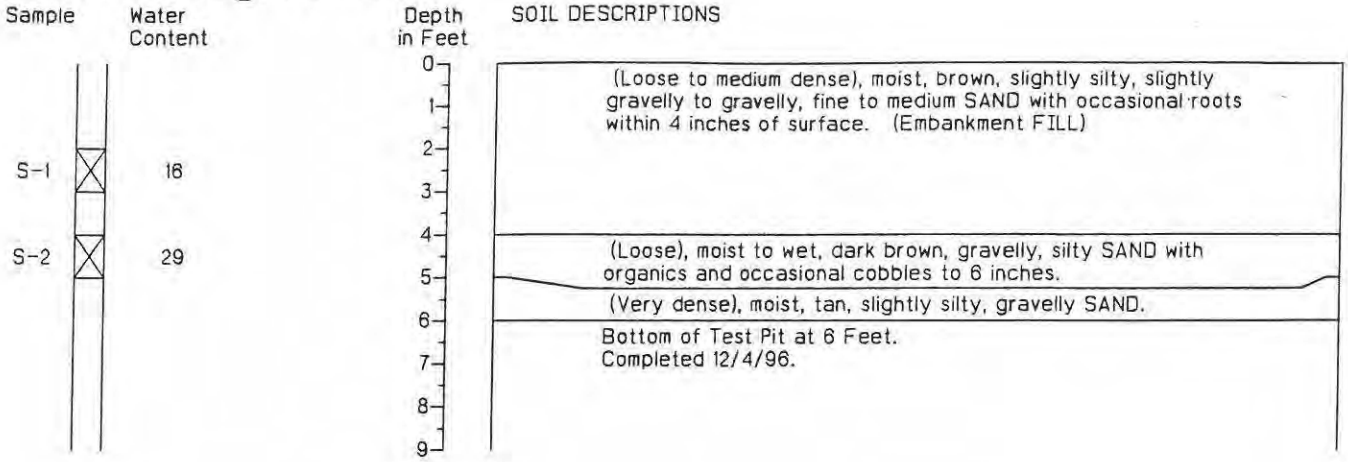
Figure A-8

Test Pit Log TP-12



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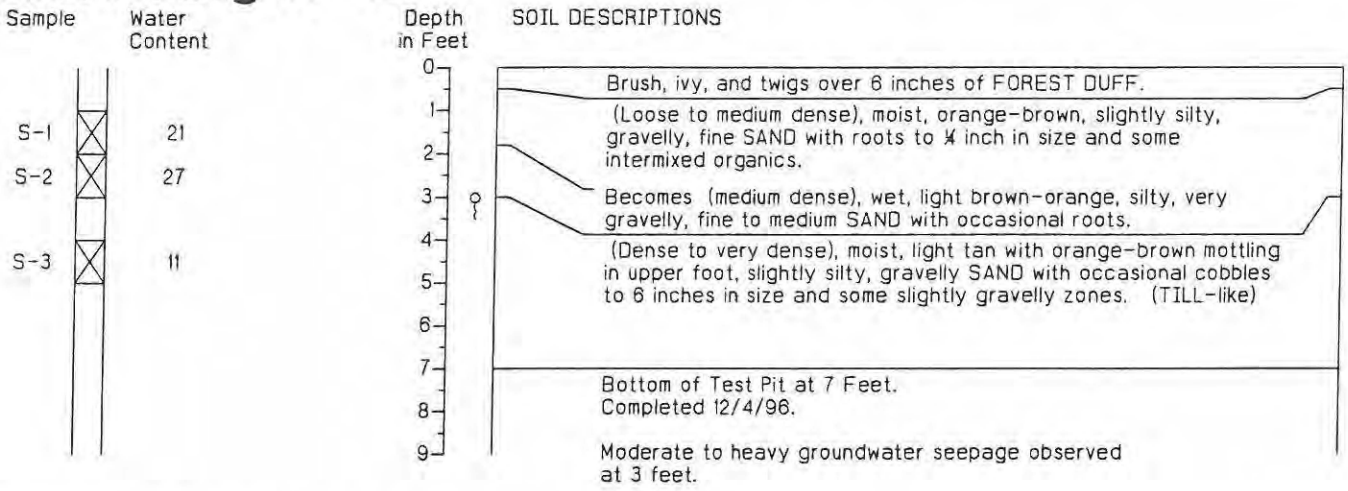
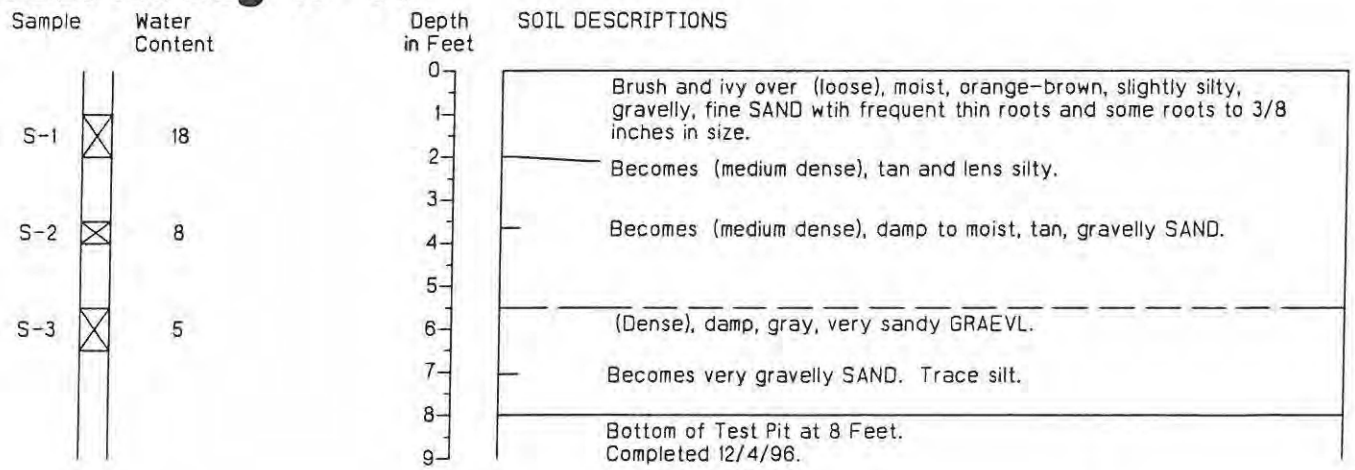


Test Pit Log TP-14



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

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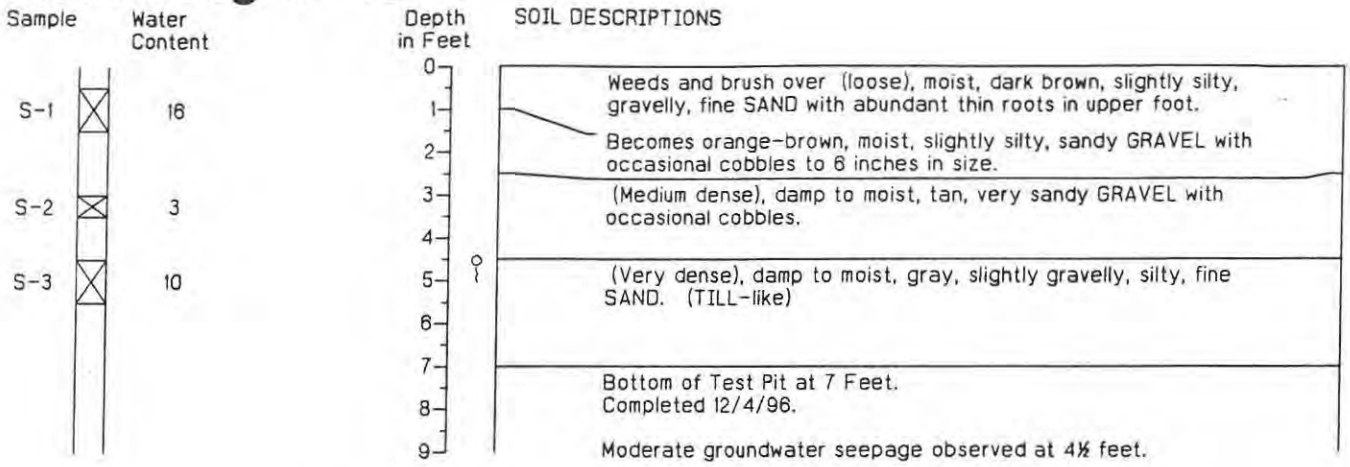
Figure A-7

Test Pit Log TP-15



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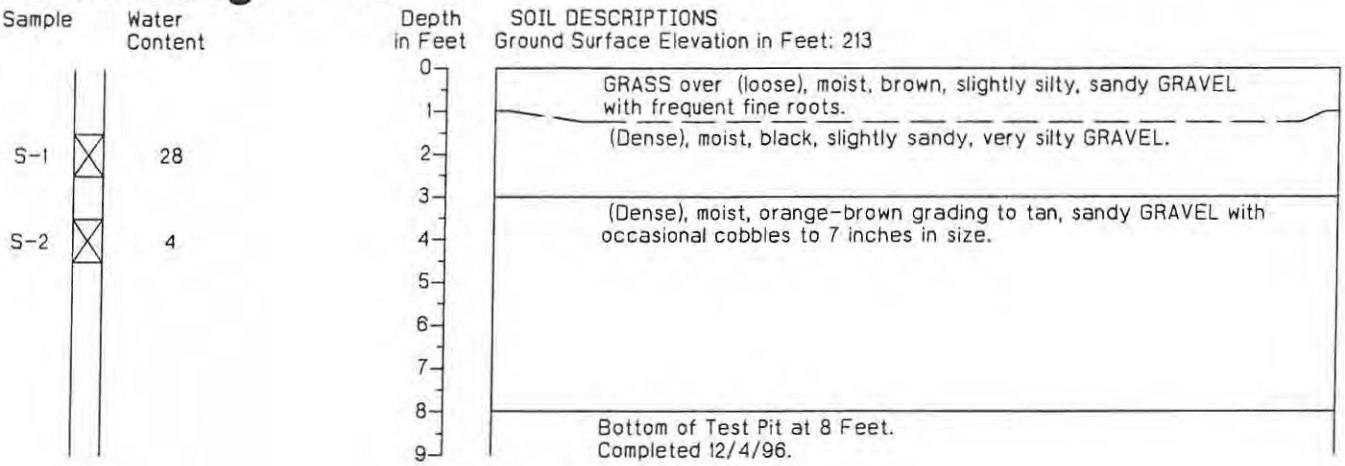

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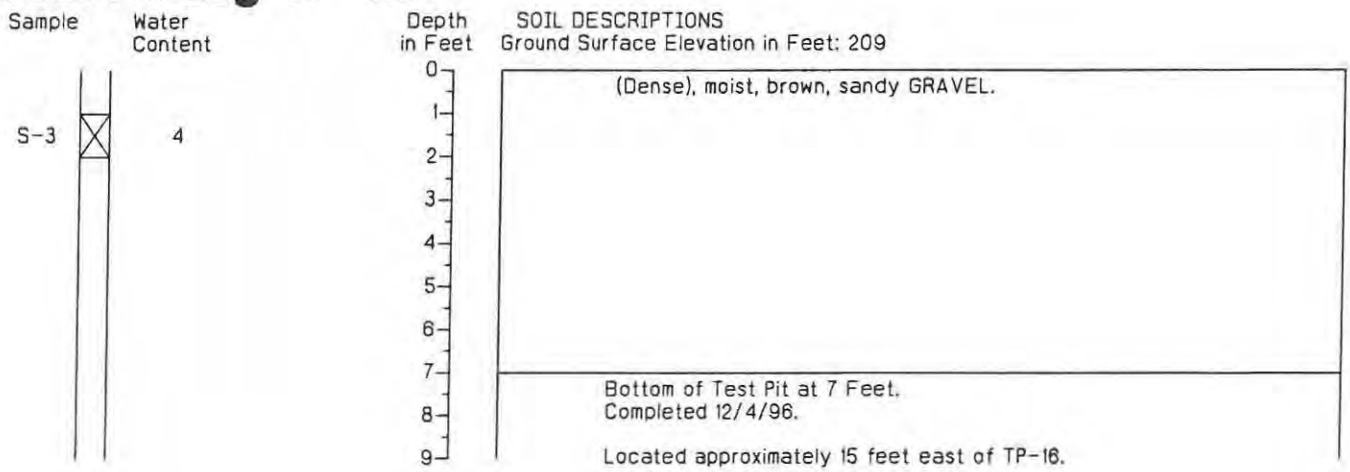

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

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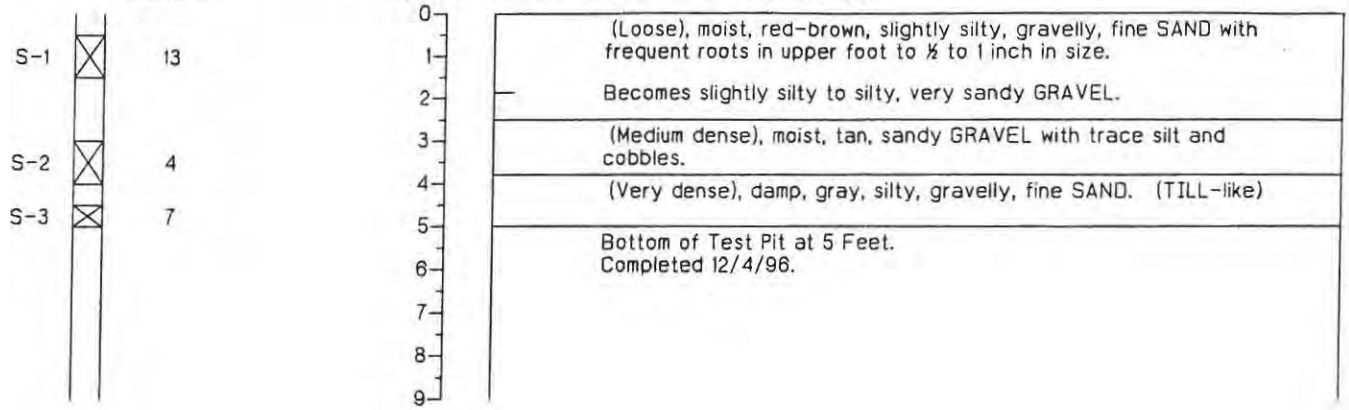
J-4668 12/96
Figure A-8

Test Pit Log TP-17



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

HARTCROWSER

J-4668 12/98

Figure A-9

Key to Exploration Logs

Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 - 4	Very soft	0 - 2	<0.125
Loose	4 - 10	Soft	2 - 4	0.125 - 0.25
Medium dense	10 - 30	Medium stiff	4 - 8	0.25 - 0.5
Dense	30 - 50	Stiff	8 - 15	0.5 - 1.0
Very dense	>50	Very stiff	15 - 30	1.0 - 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Legends

Sampling

BORING SAMPLES

- Split Spoon
- Shelby Tube
- Cuttings
- Core Run
- * No Sample Recovery
- P Tube Pushed, Not Driven

TEST PIT SAMPLES

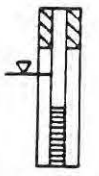
- Grab (Jar)
- Bag
- Shelby Tube

Test Symbols

GS	Grain Size Classification
CN	Consolidation
TUU	Triaxial Unconsolidated Undrained
TCU	Triaxial Consolidated Undrained
TCD	Triaxial Consolidated Drained
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits

Water Content in Percent
Liquid Limit
Natural
Plastic Limit

Ground Water Observations



Surface Seal

Ground Water Level on Date (ATD) At Time of Drilling

Observation Well Tip or Slotted Section

Ground Water Seepage (Test Pits)

HARTCROWSER

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Figure A-1

Boring Log HC-1

Soil Descriptions

Ground Surface Elevation in Feet 222.0

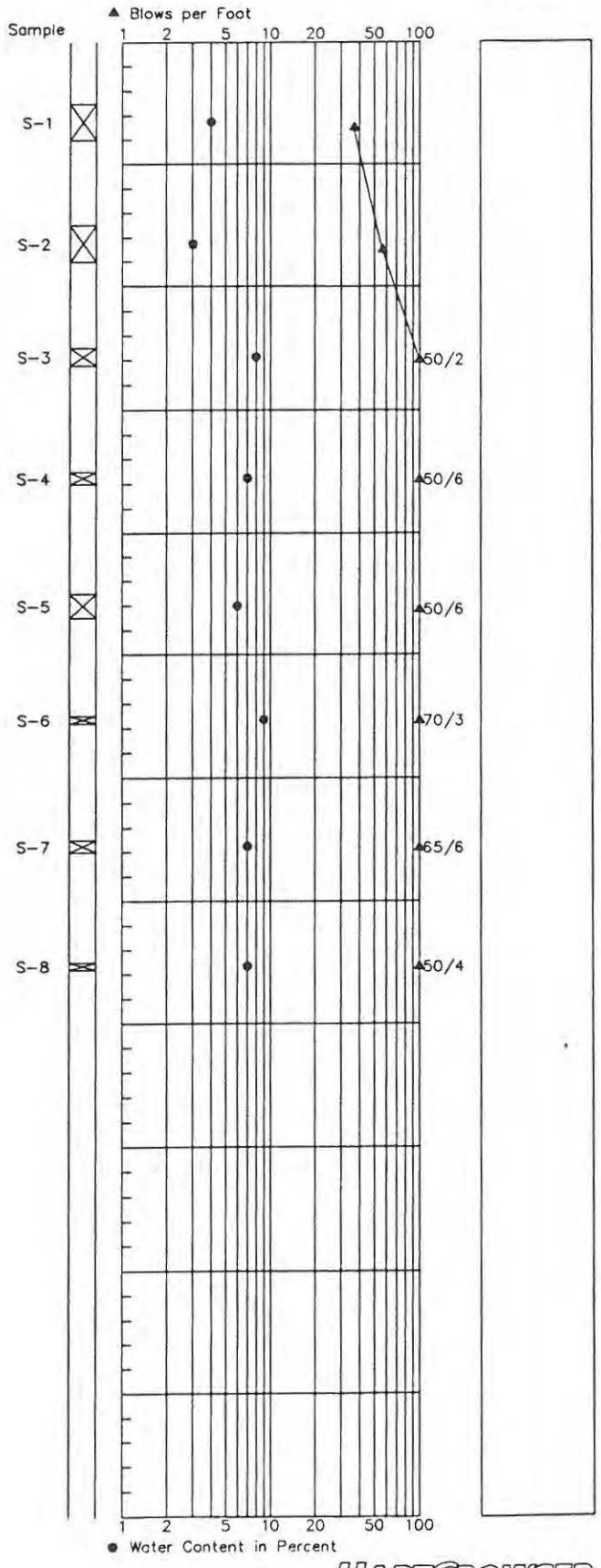
(Medium dense), dry, brown, slightly silty to silty, slightly sandy to sandy GRAVEL.

(Dense), moist, gray, slightly gravelly to gravelly, silty, fine to medium SAND.

Becomes wet.

(Dense), wet, tan, slightly gravelly to gravelly, silty SAND.

Bottom of Boring at 37.8 Feet.
Completed 8/11/89.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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J-2276 8/89

Figure A-2 1/1

Boring Log HC-2

Soil Descriptions

Ground Surface Elevation in Feet 210.0

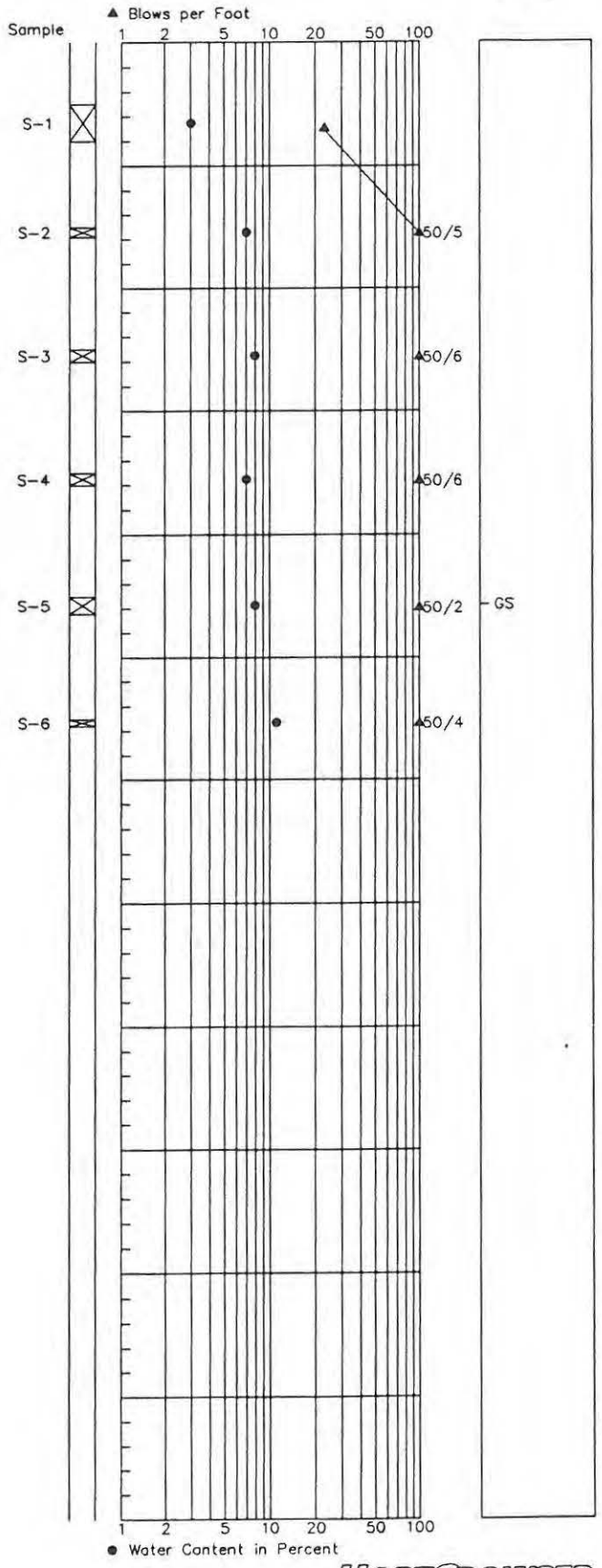
Medium dense, dry, brown, slightly sandy GRAVEL.

(Dense), wet, tan, slightly gravelly, silty SAND.

(Dense), wet, tan, slightly silty to silty, gravelly to very gravelly SAND.

(Dense), wet, tan, silty, sandy GRAVEL.

Bottom of Boring at 27.8 Feet.
Completed 8/11/89.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-2276 8/89

Figure A-3 1/1

Boring Log HC-3

Soil Descriptions

Ground Surface Elevation in Feet 222.0

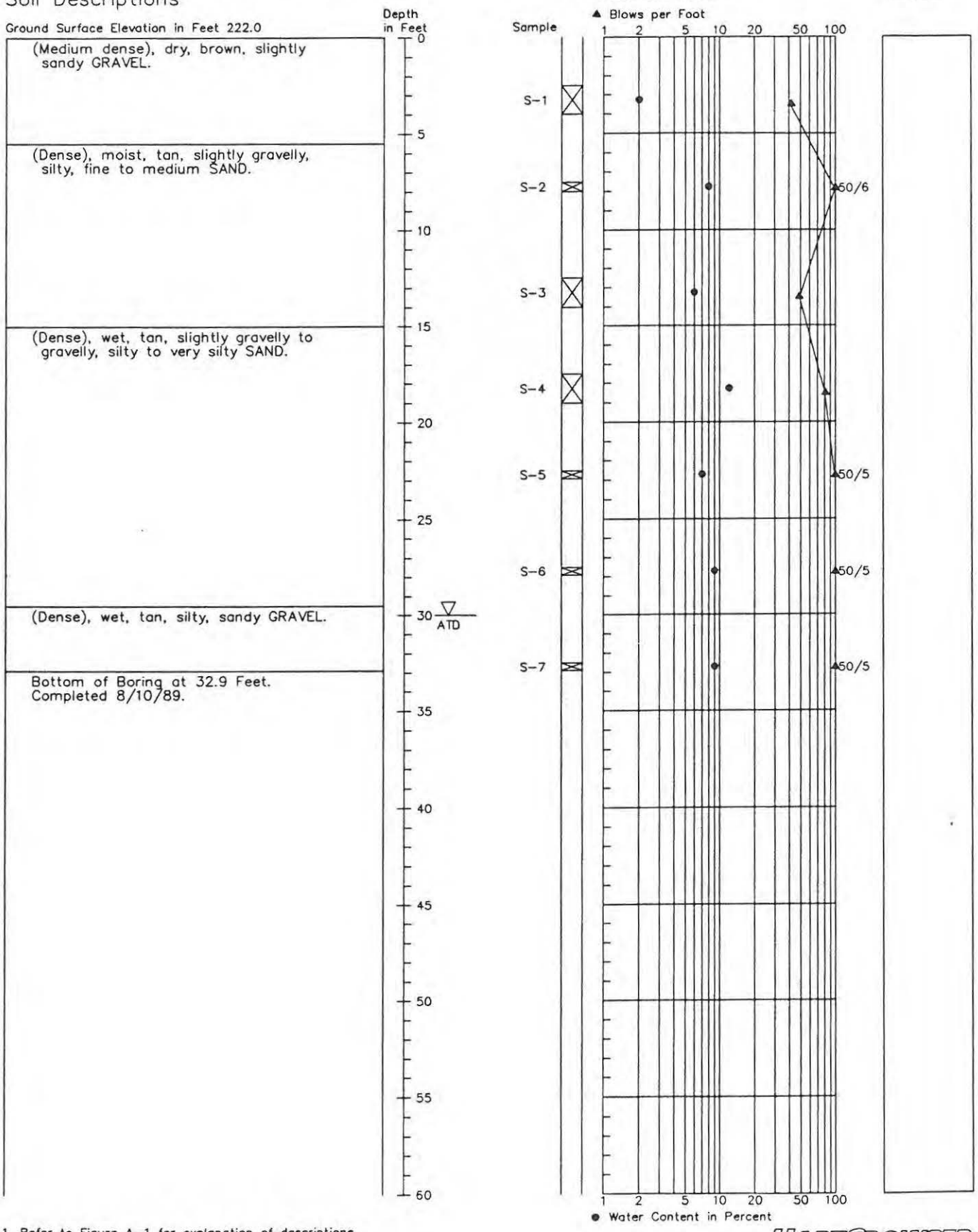
(Medium dense), dry, brown, slightly sandy GRAVEL.

(Dense), moist, tan, slightly gravelly, silty, fine to medium SAND.

(Dense), wet, tan, slightly gravelly to gravelly, silty to very silty SAND.

(Dense), wet, tan, silty, sandy GRAVEL.

Bottom of Boring at 32.9 Feet.
Completed 8/10/89.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-2276 8/89

Figure A-4 1/1

Boring Log HC-4

Soil Descriptions

Ground Surface Elevation in Feet 221.0

Medium dense, dry, brown, slightly sandy GRAVEL with interbeds of silty, gravelly SAND.

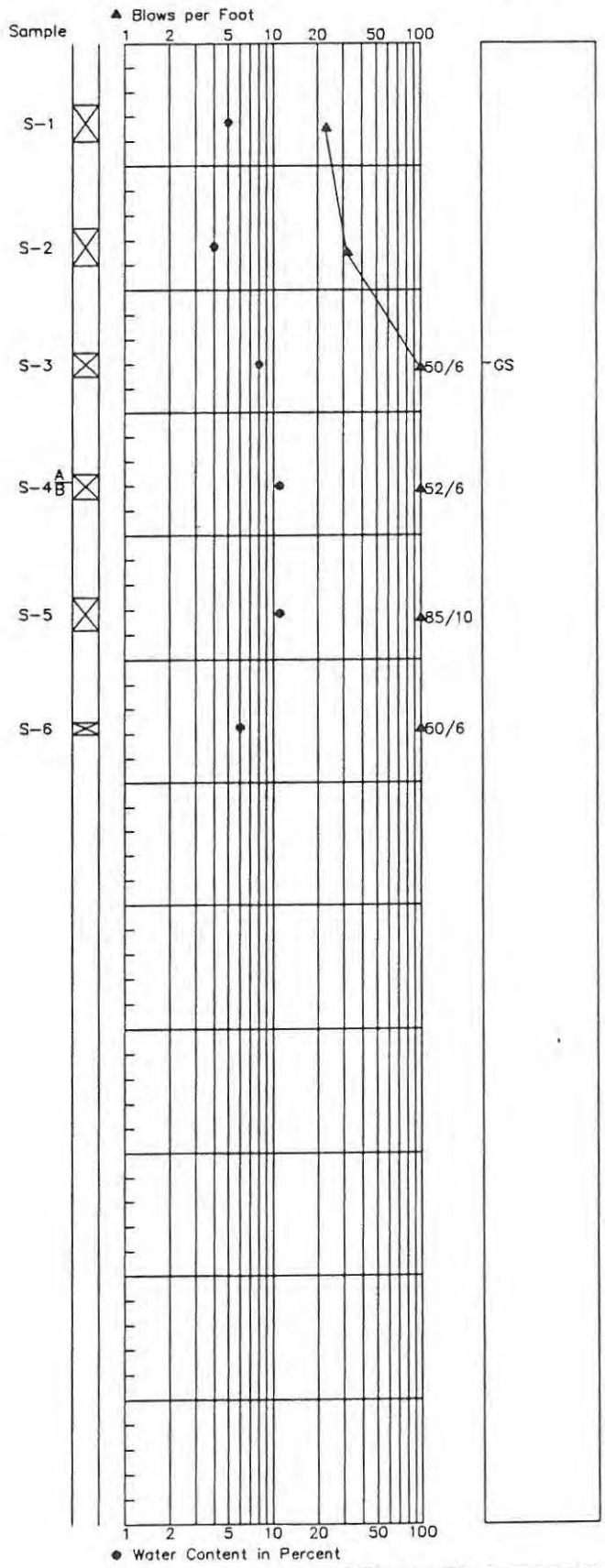
(Dense), moist, tan, slightly gravelly to gravelly, silty to very silty SAND.

Becomes wet.

(Very stiff), moist, tan, sandy SILT.

(Dense), wet, tan, slightly gravelly to gravelly, silty SAND.

Bottom of Boring at 28.0 Feet.
Completed 8/10/89.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-2276 8/89

Figure A-5 1/1

Boring Log HC-5

Soil Descriptions

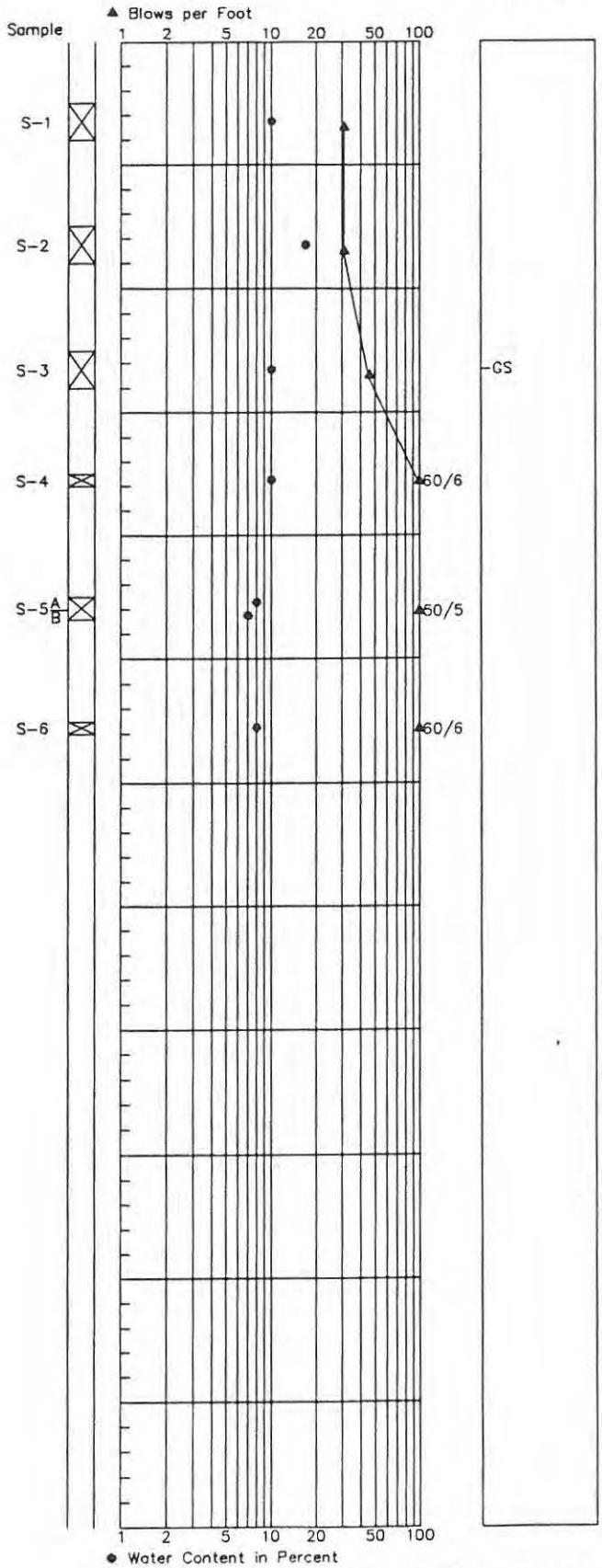
Ground Surface Elevation in Feet 222.0

(Medium dense), moist, brown to gray, slightly gravelly, silty SAND with interbeds of very silty, fine SAND.

Dense, moist, gray, slightly silty, fine to medium SAND.

(Dense), wet, gray, slightly silty to silty, slightly gravelly to gravelly SAND.

Bottom of Boring at 28.0 Feet.
Completed 8/10/89.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-2276 8/89

Figure A-6 1/1

Boring Log HC-6

Soil Descriptions

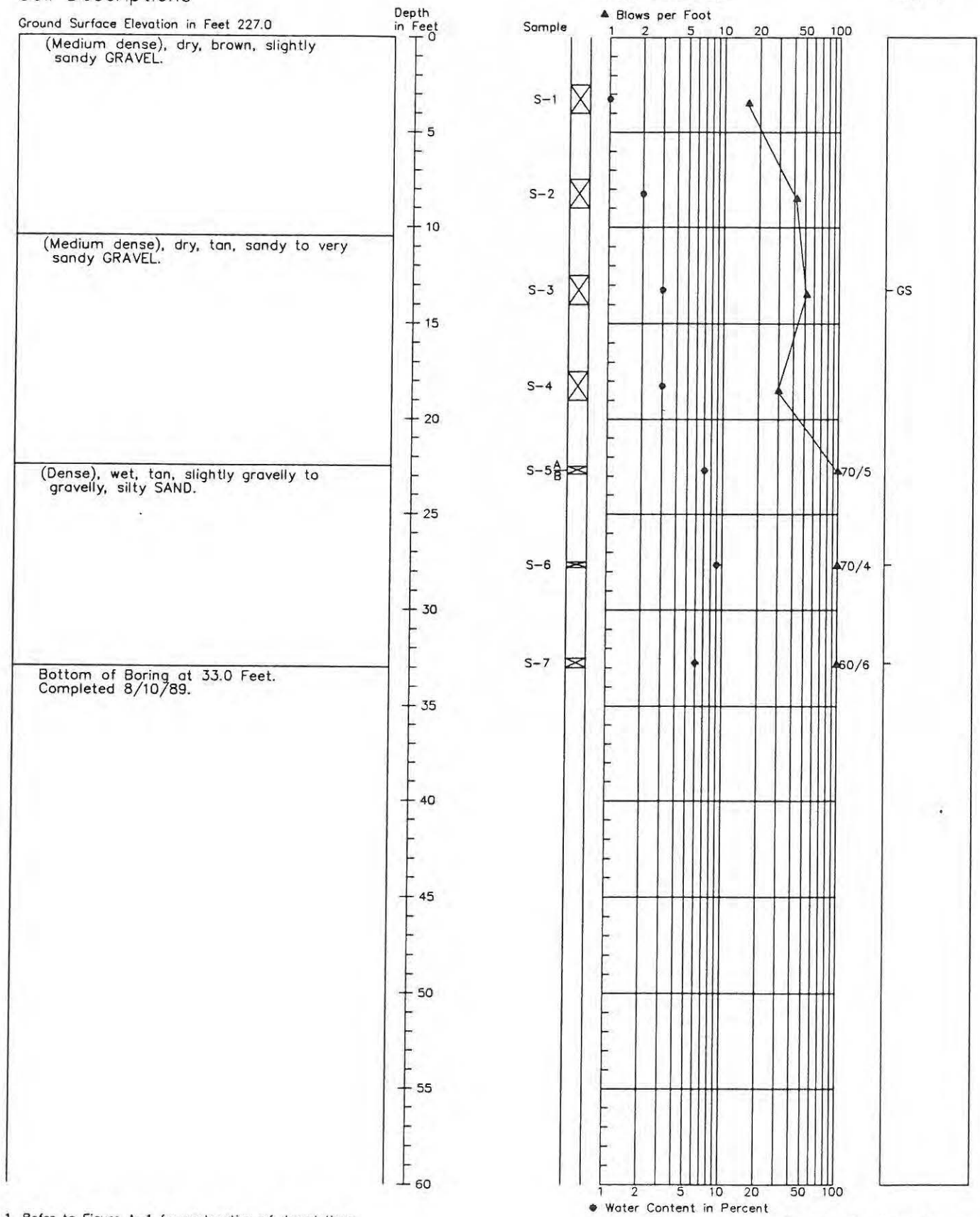
Ground Surface Elevation in Feet 227.0

(Medium dense), dry, brown, slightly sandy GRAVEL.

(Medium dense), dry, tan, sandy to very sandy GRAVEL.

(Dense), wet, tan, slightly gravelly to gravelly, silty SAND.

Bottom of Boring at 33.0 Feet.
Completed 8/10/89.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-2276 8/89

Figure A-7 1/1

WSDOT Boring and Test Pit Legend

Sampler Symbols

	Standard Penetration Test
	Non-Standard Sized Penetration Test
	Shelby Tube
	Piston Sample
	Washington Undisturbed
	Vane Shear Test
	Core
	Becker Hammer
	Bag Sample

Well Symbols

	Cement Surface Seal
	Piezometer Pipe in Granular Bentonite Seal
	Piezometer Pipe in Sand
	Well Screen in Sand
	Granular Bentonite Seal
	Inclinometer Casing or PVC Pipe in Cement Bentonite Grout
	Sand
	Vibe Wire in Grout
	Miscellaneous, noted on boring log

Laboratory Testing Codes

AL	Atterberg Limits
CD	Consolidated Drained Triaxial
CN	Consolidation Test
CSS	Cyclic Simple Shear
CU	Consolidated Undrained Triaxial
DG	Degradation
DN	Density
DS	Direct Shear Test
DSS	Direct Simple Shear
GS	Grain Size Distribution
HT	Hydrometer Test
JS	Jar Slake
LA	LA Abrasion
LOI	Loss on Ignition
MC	Moisture Content
pH	pH of Soil
PT	Point Load Compressive Test
RES	Resistivity
RM	Resilient Modulus
RS	Torsional Ring Shear Test
SG	Specific Gravity
SL	Slake Test
UC	Unconfined Compression Test
UU	Unconsolidated Undrained Triaxial
HC	Hydraulic Conductivity

Soil Density Modifiers

Gravel, Sand & Non-plastic Silt		Elastic Silts and Clay	
SPT Blows/ft	Density	SPT Blows/ft	Consistency
0 - 4	Very Loose	0 - 1	Very Soft
5 - 10	Loose	2 - 4	Soft
11 - 24	Medium Dense	5 - 8	Medium Stiff
25 - 50	Dense	9 - 15	Stiff
> 50	Very Dense	16 - 30	Very Stiff
(REF)	Refusal	31 - 60	Hard
		> 60	Very Hard

Angularity

Angular	Coarse particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Coarse grained particles are similar to angular but have rounded edges.
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges.
Rounded	Coarse grained particles have smoothly curved sides and no edges.

Soil Moisture Modifiers

Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

Soil Structure

Stratified	Alternating layers of varying material or color at least 6 mm thick; note thickness and inclination.
Laminated	Alternating layers of varying material or color less than 6 mm thick; note thickness and inclination.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into smaller angular lumps which resist further breakdown.
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous	Same color and appearance throughout.

HCl Reaction

No HCl Reaction	No visible reaction.
Weak HCl Reaction	Some reaction with bubbles forming slowly.
Strong HCl Reaction	Violent reaction with bubbles forming immediately.

Degree of Vesicularity of Pyroclastic Rocks

Slightly Vesicular	5 to 10 percent of total
Moderately Vesicular	10 to 25 percent of total
Highly Vesicular	25 to 50 percent of total
Scoriaceous	Greater than 50 percent of total

WSDOT Boring and Test Pit Legend

Grain Size

Fine Grained	< 0.04 in	Few crystal boundaries/grains are distinguishable in the field or with hand lens.
Medium Grained	0.04 to 0.2 in	Most crystal boundaries/grains are distinguishable with the aid of a hand lens.
Coarse Grained	> 0.2 in	Most crystal boundaries/grains are distinguishable with the naked eye.

Weathered State

Term	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition.	II
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric is destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

Relative Rock Strength

Grade	Description	Field Identification	Uniaxial Compressive Strength approx
R1	Very Weak	Specimen crumbles under sharp blow from point of geological hammer, and can be cut with a pocket knife.	0.15 to 3.6 ksi
R2	Moderately Weak	Shallow cuts or scrapes can be made in a specimen with a pocket knife. Geological hammer point indents deeply with firm blow.	3.6 to 7.3 ksi
R3	Moderately Strong	Specimen cannot be scraped or cut with a pocket knife, shallow indentation can be made under firm blows from a hammer.	7.3 to 15 ksi
R4	Strong	Specimen breaks with one firm blow from the hammer end of a geological hammer.	15 to 29 ksi
R5	Very Strong	Specimen requires many blows of a geological hammer to break intact sample.	Greater than 29 ksi

Discontinuities

Spacing	
Very Widely	Greater than 10 ft
Widely	3 ft to 10 ft
Moderately	1 ft to 3 ft
Closely	2 inches to 12 inches
Very Closely	Less than 2 inches

RQD (%)

$$\frac{100(\text{length of core in pieces} > 100\text{mm})}{\text{Length of core run}}$$

Condition	
Excellent	Very rough surfaces, no separation, hard discontinuity wall
Good	Slightly rough surfaces, separation less than 0.05 in, hard discontinuity wall.
Fair	Slightly rough surfaces, separation greater than 0.05 in, soft discontinuity wall.
Poor	Slickensided surfaces, or soft gouge less than 0.2 in thick, or open discontinuities 0.05 to 0.2 in.
Very Poor	Soft gouge greater than 0.2 in thick, or open discontinuities greater than 0.2 in.

Fracture Frequency (FF) is the average number of fractures per 1 ft of core. This does not include mechanical breaks caused by drilling or handling.

Datum:
NAD 83/91 HARN = North American Datum of 1983/1991 High Accuracy Reference Network
NAVD88 = North American Vertical Datum of 1988
SPN (ft) = State Plane North (ft)
SPS (ft) = State Plane South (ft)

WSDOT

LOG OF TEST BORING

Start Card RE-14607

HOLE No. H-1p-17

Sheet 1 of 3

Job No. XL-5001 SR 005 Elevation 229.4 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Henderson, Ted Lic# 2902

Component Retaining Wall 1 Inspector Brun, Mike #1711

Start September 22, 2017 Completion September 23, 2017 Well ID# BJT-730 Equipment CME 55 (9C7-1)

Station MRW 104+59.95 Offset 77.0 feet left Hole Dia (inches) 4 Historical SPT Efficiency 87.2%

Northing 638667.0478 Easting 1076093.1799 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0624603 Long -122.7646415 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Bentonite and Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								NOTE: From 0.0 to 4.0 ft, pot holed with vacuum truck. Well graded SAND with gravel, cobbles, and boulders, sub-rounded gravel, brown, dry, homogeneous. NOTE: From 0.0 to 49.5 ft, drilling action indicates cobbles.		
5	225.0			20 32 22 (54)		D-1	MC GS	GW-GM, MC=9% Well graded GRAVEL with silt, sand, and cobbles, sub-angular, very dense, light brown, dry, homogeneous. Recovered: 1.3 ft Retained: 1.3 ft		
				12 18 36 (54)		D-2	MC GS	GP-GM, MC=9% Poorly graded GRAVEL with silt, sand, and cobbles, sub-rounded, very dense, dark brown, dry, homogeneous. Recovered: 1.5 ft Retained: 1.5 ft		
10	220.0			19 23 32 (55)		D-3		Well graded GRAVEL with silt and sand, sub-rounded, very dense, brown, moist, homogeneous. Recovered: 0.7 ft Retained: 0.7 ft		
				10 14 29 (43)		D-4	MC GS	GW-GM, MC=7% Well graded GRAVEL with silt, sand, and cobbles, sub-rounded, dense, light brown, moist, homogeneous. Recovered: 0.9 ft Retained: 0.9 ft		
15	215.0			15 23 32 (55)		D-5	MC GS AL	ML, MC=20%, LL=NA, PL=NP Sandy SILT, sub-rounded, very dense, light brown, moist, homogeneous. Recovered: 1.5 ft Retained: 1.5 ft		
								NOTE: At 15.0 ft, becomes poorly graded SAND with gravel, sub-rounded gravel, very dense, light brown, moist, homogeneous.		
			>>	50/5" (REF)		D-6		NO RECOVERY.		
	210.0		>>	26 50/6"		D-7		Silty SAND with gravel and cobbles, sub-rounded gravel, very dense, light brown, moist, homogeneous.		
20										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 229.4 ft HOLE No. H-1p-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Henderson, Ted

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		(REF)				Recovered: 1.0 ft Retained: 1.0 ft		
		28 41 50/6" (91)		D-8	MC GS	SM, MC=9% Silty SAND with gravel and cobbles, sub-rounded gravel, very dense, light brown, moist, homogeneous. Recovered: 1.1 ft Retained: 1.1 ft		
25	205	36 50/6" (REF)		D-9		Silty SAND with gravel and cobbles, sub-rounded gravel, very dense, light brown, moist, homogeneous. Recovered: 0.7 ft Retained: 0.7 ft		
30	200	50/4" (REF)		D-10		Well graded SAND with gravel and cobbles, sub-rounded gravel, very dense, light brown, moist, homogeneous. Recovered: 0.3 ft Retained: 0.3 ft		
35	195	50/4" (REF)		D-11		Well graded SAND with gravel and cobbles, sub-rounded gravel, very dense, light brown, moist, homogeneous. Recovered: 0.1 ft Retained: 0.1 ft		
40	190	50/6" (REF)		D-12		Poorly graded SAND with silt, gravel, and cobbles, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. Recovered: 0.5 ft Retained: 0.5 ft		
45	185	10 9		D-13	MC GS	SP-SM, MC=11% Poorly graded SAND with silt, gravel, and cobbles,		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 229.4 ft HOLE No. H-1p-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				43 (52)				sub-rounded gravel, very dense, grayish brown, moist, homogeneous. Recovered: 0.7 ft Retained: 0.7 ft		
	180		>>◆	50/6" (REF)		D-14		Well graded SAND with gravel and cobbles, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. Recovered: 0.4 ft Retained: 0.4 ft		
50								A flush mount monument was installed on this boring.		
								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
	175									
55								End of test hole boring at 49.5 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
								Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 49.5 ft. Depth of casing during bail test: 49.0 ft. Water depth before bailing: 14.0 ft. Bailed bore hole water level to 35.5 ft. Recharge after 16 hours and 40 minutes: 32.0 ft.		
	170									
60								Manual Piezometer Readings: 9-28-2017: Dry to 45.0 ft. (bottom of piezometer screen). 10-30-2017: Dry to 45.0 ft. 12-13-2017: Dry to 45.0 ft. 1-22-2018: Dry to 45.0 ft.		
	165									
65										
	160									
70										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Start Card SE-62760 / AE-44015

HOLE No. W-2-17

Job No. XL-5001 SR 005 Elevation 221.8 ft

Sheet 1 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Retaining Wall 1

Inspector Harvey, Thomas #2599

Start August 9, 2017 Completion August 9, 2017 Well ID# N/A

Equipment CME 45 (9C4-3)

Station MRW 105+10.23 Offset 61.0 feet left Hole Dia (inches) 4

Historical SPT Efficiency 86.1%

Northing 638604.25 Easting 1076082.5134 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0622873 Long -122.7646770 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite and Polymer

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	220.0	10 8 7 (15)		D-1		Well graded GRAVEL with silt and sand, sub-rounded, medium dense, gray, wet, stratified. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
5		5 4 5 (9)		D-2		Well graded GRAVEL with silt and sand, sub-rounded, loose, gray, wet, stratified. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	215.0	>> 17 59/6" (REF)		D-3	MC GS	SM, MC=11% Silty SAND with gravel, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
10		>> 42 50/3" (REF)		D-4		Silty SAND with gravel, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
	210.0	>> 27 52/6" (REF)		D-5		Silty SAND with gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
15		29 37 27 (64)		D-6	MC GS	SM, MC=12% Silty SAND with gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	205.0							
20		>>						

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 221.8 ft HOLE No. W-2-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		21 51/6" (REF)		D-7	MC GS	SW-SM, MC=10% Well graded SAND with silt and gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
25	200	32 50/4" (REF)		D-8		Well graded GRAVEL with silt and sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
30	195	41 50/2" (REF)		D-9		Well graded GRAVEL with silt and sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
35	190	41 50/3" (REF)		D-10	MC GS	GW-GM, MC=8% Well graded GRAVEL with silt and sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.3 ft		
40	185	53/6" (REF)		D-11		Well graded GRAVEL with silt and sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.4 ft		
45	180					The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 40.5 ft below ground surface. This is a summary Log of Test Boring.		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 221.8 ft HOLE No. W-2-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
50	175							Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 40.5 ft. Depth of casing during bail test: 35.0 ft. Water depth before bailing: 9.2 ft. Bailed bore hole water level to 38.3 ft. Recharge after 5 minutes: 38.1 ft. Recharge after 10 minutes: 38.1 ft. Recharge after 15 minutes: 38.0 ft. Recharge after 20 minutes: 37.9 ft. Recharge after 25 minutes: 37.9 ft. Recharge after 30 minutes: 37.9 ft.		
55	170									
60	165									
65	160									
70	155									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card RE-14607

HOLE No. H-3p-17

Sheet 1 of 3

Job No. XL-5001 SR 005 Elevation 219.6 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie Lic# 2941

Component Retaining Wall 1 Inspector Harvey, Thomas #2599

Start August 8, 2017 Completion August 14, 2017 Well ID# BJT-731 Equipment CME 55 (9C7-1)

Station MRW 106+24.12 Offset 52.3 feet left Hole Dia (inches) 4 Historical SPT Efficiency 87.2%

Northing 638488.8689 Easting 1076073.4769 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0619704 Long -122.7647000 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
0	219.6	18 24 28 (52)	D-1			Well graded GRAVEL with sand, sub-angular, very dense, light brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft
5	215.0	15 24 31 (55)	D-2		MC GS	SM, MC=4% Silty SAND with gravel and organics, sub-rounded, very dense, light brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft
		2 3 3 (6)	D-3			Well graded GRAVEL with sand, sub-rounded, loose, brown, wet, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft
10	210.0	4 11 41 (52)	D-4			Silty SAND with gravel, sub-angular, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft
		24 44 49 (93)	D-5		MC GS	SM, MC=8% Silty SAND with gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft
15	205.0	>> 21 53/6" (REF)	D-6			Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft
20	200.0					

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Groundwater: Groundwater readings were taken from 08-14-2017 to 01-22-2018

Instrument

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/9/18

WSDOT

LOG OF TEST BORING

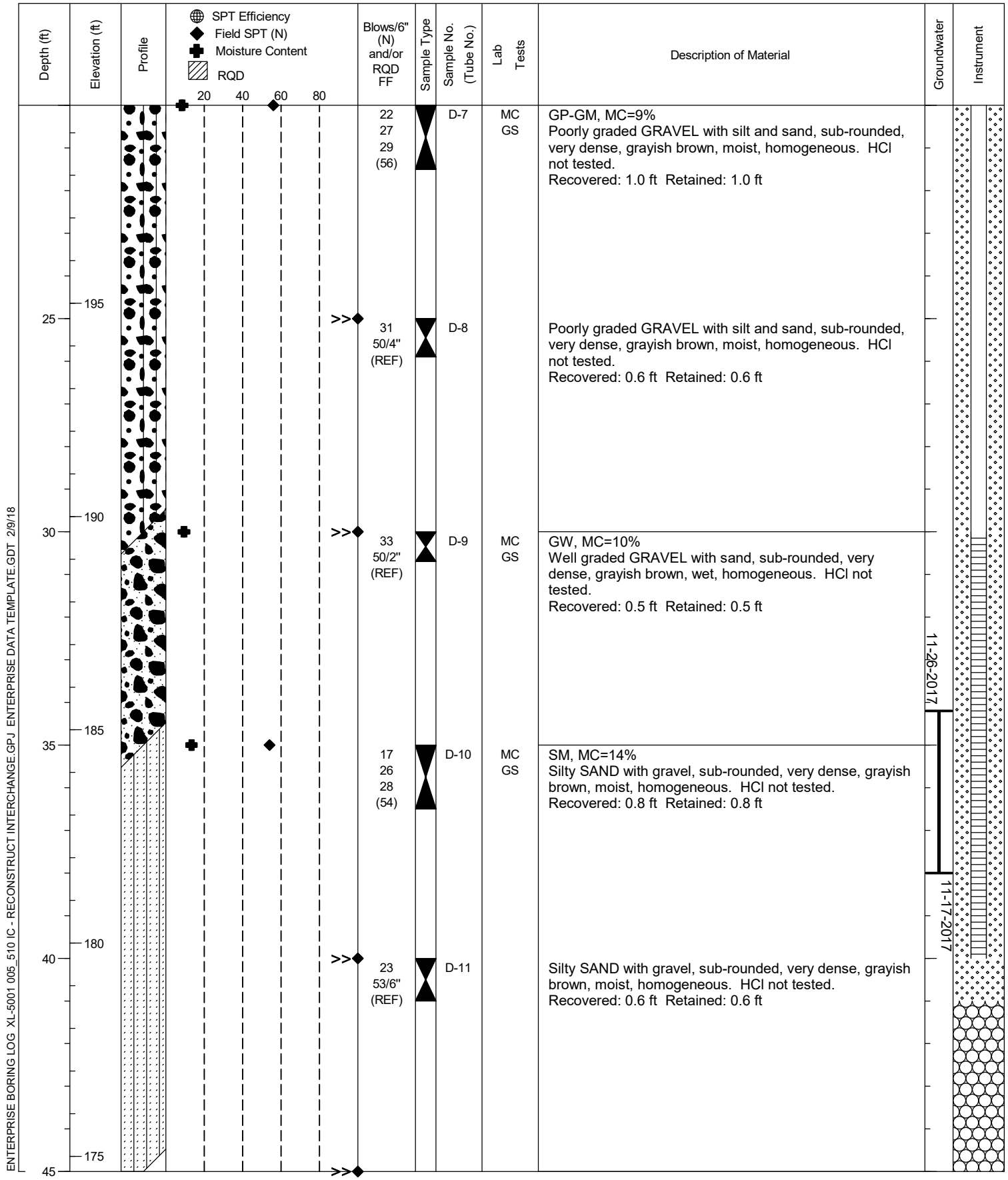
Job No. XL-5001 SR 005 Elevation 219.6 ft

HOLE No. H-3p-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie



Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		22 27 29 (56)		D-7	MC GS	GP-GM, MC=9% Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
25	195	31 50/4" (REF)		D-8		Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
30	190	33 50/2" (REF)		D-9	MC GS	GW, MC=10% Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft	11-26-2017	
35	185	17 26 28 (54)		D-10	MC GS	SM, MC=14% Silty SAND with gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft	11-17-2017	
40	180	23 53/6" (REF)		D-11		Silty SAND with gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
45	175							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/9/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 219.6 ft HOLE No. H-3p-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				29 50/3" (REF)		D-12		Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
50	170							A flush mount monument was installed on this boring. The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 45.8 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 45.8 ft. Depth of casing during bail test: 45.0 ft. Water depth before bailing: 11.9 ft. Bailed bore hole water level to 40.0 ft. Recharge after 5 minutes: 39.1 ft. Recharge after 10 minutes: 38.2 ft. Recharge after 15 minutes: 37.6 ft. Recharge after 20 minutes: 37.1 ft. Recharge after 25 minutes: 36.5 ft. Recharge after 30 minutes: 36.6 ft. Recharge after 35 minutes: 36.6 ft. Manual Piezometer Readings: 9-25-2017: Dry to 40.0 ft. (bottom of piezometer screen). 10-30-2017: Dry to 40.0 ft. 12-13-2017: 37.4 ft. 1-22-2018: 37.1 ft.		
55	165									
60	160									
65	155									
70	150									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/9/18

WSDOT

LOG OF TEST BORING

Start Card RE-14607

HOLE No. H-4p-17

Sheet 1 of 3

Job No. XL-5001 SR 005 Elevation 229.5 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert Lic# 2779

Component Retaining Wall 2 Inspector Harvey, Thomas #2599

Start August 2, 2017 Completion August 2, 2017 Well ID# BJT-732 Equipment CME 55 (9C7-1)

Station MRW 94+94.48 Offset 81.7 feet right Hole Dia (inches) 4 Historical SPT Efficiency 87.2%

Northing 639573.8608 Easting 1075792.8861 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0649219 Long -122.7659504 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Bentonite

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
						Groundwater readings were taken from 08-14-2017 to 01-22-2018		
		8 21 11 (32)		D-1	MC GS	GP-GM, MC=10% Poorly graded GRAVEL with silt and sand, sub-rounded, dense, dark brown, moist, stratified. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
5	225.0	6 7 5 (12)		D-2		Silty SAND with gravel and organics, sub-rounded, medium dense, dark brown, wet, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
		16 27 37 (64)		D-3	MC GS	GW-GM, MC=8% Well graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
10	220.0	13 34 43 (77)		D-4		Well graded GRAVEL with silt and sand, sub-angular, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft NOTE: At 12 ft, lost drilling fluid.		
		17 15 15 (30)		D-5		Well graded GRAVEL with silt and sand, sub-angular, dense, gray, moist, stratified. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
15	215.0	11 9 11 (20)		D-6		Well graded GRAVEL, sub-rounded, medium dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
		12 15 24 (39)		D-7	MC GS	NOTE: At 18 ft, regain drilling fluid. GW, MC=8% Well graded GRAVEL with sand and organics, sub-rounded, dense, brown, wet, homogeneous. HCl not tested.		
20	210.0							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 229.5 ft HOLE No. H-4p-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		15 31 47 (78)		D-8		Recovered: 0.8 ft Retained: 0.8 ft Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
25	205	13 21 27 (48)		D-9		Well graded GRAVEL with sand, sub-rounded, dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft	11-24-2017	
30	200	15 31 41 (72)		D-10		Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft	08-23-2017	
35	195	13 15 25 (40)		D-11	MC GS	GW-GM, MC=10% Well graded GRAVEL with silt and sand, sub-rounded, dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
40	190	17 43 50/2" (REF)		D-12		Well graded SAND with silt and gravel, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
45	185							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 229.5 ft HOLE No. H-4p-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Profile	20 40 60 80	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			>>	41 53/6" (REF)		D-13	MC GS	SW-SM, MC=11% Well graded SAND with silt and gravel, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
50	180		>>	27 50/3" (REF)		D-14		Well graded SAND with silt and gravel, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
								A flush mount monument was installed on this boring. The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 50.8 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 50.8 ft. Depth of casing during bail test: 50.0 ft. Water depth before bailing: 12.3 ft. Bailed bore hole water level to 48.2 ft. Recharge after 5 minutes: 47.7 ft. Recharge after 10 minutes: 47.4 ft. Recharge after 15 minutes: 47.3 ft. Recharge after 20 minutes: 47.3 ft. Recharge after 25 minutes: 47.3 ft. Recharge after 30 minutes: 47.3 ft. Manual Piezometer Readings: 8-14-2017: 31.9 ft. 9-28-2017: 33.7 ft. 10-30-2017: 29.4 ft. 12-13-2017: 30.0 ft. 1-22-2018: 29.3 ft.		
55	175									
60	170									
65	165									
70	160									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card RE-14607

HOLE No. H-5p-17

Sheet 1 of 3

Job No. XL-5001 SR 005 Elevation 218.0 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert Lic# 2779

Component Retaining Wall 2 Inspector Harvey, Thomas #2599

Start July 31, 2017 Completion August 1, 2017 Well ID# BJT-733 Equipment CME 55 (9C7-1)

Station MRW 96+01.22 Offset 112.1 feet right Hole Dia (inches) 4 Historical SPT Efficiency 87.2%

Northing 639500.6575 Easting 1075764.8406 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0647191 Long -122.7660545 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	215.0			3 4 4 (8)		D-1	MC GS AL	SP-SM, MC=14%, LL=NA, PL=NP Poorly graded SAND with silt and gravel, sub-angular, loose, dark brown, wet, stratified. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
5				4 4 4 (8)		D-2		Silty SAND with gravel, sub-rounded, loose, grayish brown, wet. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft NOTE: At 7 ft, lost drilling fluid.		
	210.0			10 16 21 (37)		D-3		Well graded GRAVEL, sub-rounded, dense, brown, wet, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
10				11 15 11 (26)		D-4	MC GS	GW, MC=8% Well graded GRAVEL with sand, sub-rounded, dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
	205.0			7 11 9 (20)		D-5		Well graded GRAVEL with sand, sub-rounded, medium dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
15				11 12 15 (27)		D-6	MC GS	GW, MC=10% Well graded GRAVEL with sand, sub-rounded, dense, brown, wet, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
	200.0									
20										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

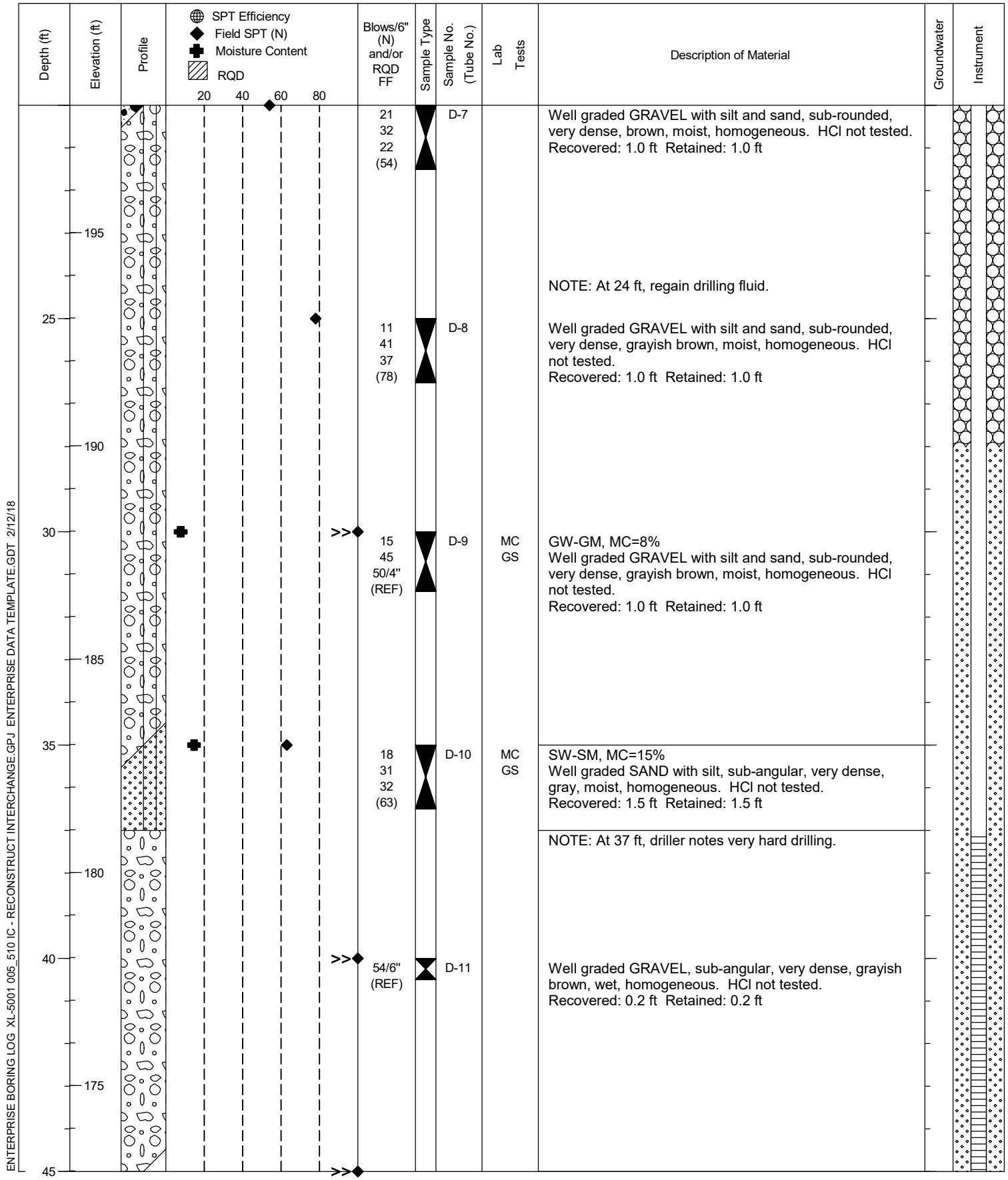
WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 218.0 ft HOLE No. H-5p-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert



Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		21 32 22 (54)		D-7		Well graded GRAVEL with silt and sand, sub-rounded, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	195							
						NOTE: At 24 ft, regain drilling fluid.		
25		11 41 37 (78)		D-8		Well graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	190							
30		15 45 50/4" (REF)		D-9	MC GS	GW-GM, MC=8% Well graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	185							
35		18 31 32 (63)		D-10	MC GS	SW-SM, MC=15% Well graded SAND with silt, sub-angular, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft		
						NOTE: At 37 ft, driller notes very hard drilling.		
	180							
40		54/6" (REF)		D-11		Well graded GRAVEL, sub-angular, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
	175							
45								

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 218.0 ft HOLE No. H-5p-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Profile	RQD 20 40 60 80	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				13 50/6" (REF)		D-12		Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
50	170			35 60/6" (REF)		D-13	MC GS	GP-GM, MC=10% Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		

A flush mount monument was installed on this boring.

The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.

End of test hole boring at 51.0 ft below ground surface.
This is a summary Log of Test Boring.
Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
Note: REF = SPT Refusal

Bail/Recharge test:
Hole Diameter: 4 in.
Depth of boring during bail test: 50.0 ft.
Depth of casing during bail test: 49.0 ft.
Water depth before bailing: 21.5 ft.
Bailed bore hole water level to 47.0 ft.

Bail test not complete.

A water level of 47.5 ft below ground surface was observed on the morning of 8-1-2017, prior to the start of drilling operations.

Manual Piezometer Readings:
8-14-2017: 43.3 ft.
9-28-2017: Dry to 49.5 ft. (bottom of piezometer screen).
10-30-2017: 45.5 ft.
12-13-2017: Dry to 49.5 ft.
1-22-2018: Dry to 46.2 ft.

WSDOT

LOG OF TEST BORING

Start Card SE-62760 / AE-44015

HOLE No. H-6-17

Sheet 1 of 3

Job No. XL-5001 SR 005 Elevation 233.0 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert Lic# 2779

Component Retaining Wall 2 Inspector Harvey, Thomas #2599

Start August 1, 2017 Completion August 1, 2017 Well ID# N/A Equipment CME 55 (9C7-1)

Station MRW 95+92.23 Offset 68.9 feet right Hole Dia (inches) 4 Historical SPT Efficiency 87.2%

Northing 639504.3053 Easting 1075808.8483 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0647326 Long -122.7658784 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Bentonite

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	230.0	11 24 36 (60)		D-1	MC GS	GW-GM, MC=7% Well graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
5		11 38 48 (86)		D-2		Well graded GRAVEL with silt and sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
	225.0	27 50/6" (REF)		D-3	MC GS	GW-GM, MC=7% Well graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
10		21 35 41 (76)		D-4		Well graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	220.0	7 7 14 (21)		D-5		Well graded GRAVEL with organics, sub-angular, medium dense, dark brown, wet, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
15		11 15 16 (31)		D-6		Well graded GRAVEL, sub-rounded, dense, brown, wet, homogeneous. HCl not tested. Recovered: 0.1 ft Retained: 0.1 ft NOTE: At 17 ft, lost drilling fluid.		
	215.0	23 50/2" (REF)		D-7		Well graded GRAVEL, sub-rounded, very dense, gray, wet, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
20								

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 233.0 ft HOLE No. H-6-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			15 20 21 (41)		D-8	MC GS	SW-SM, MC=10% Well graded SAND with silt and gravel, sub-rounded, dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
	210		13 21 23 (44)		D-9		Well graded SAND with silt and gravel, sub-rounded, dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
25			12 24 33 (57)		D-10		Well graded SAND with silt and gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	205								
30			15 32 41 (73)		D-11		Well graded SAND with silt and gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	200								
35			26 31 33 (64)		D-12		Well graded SAND with silt and gravel, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
	195						NOTE: At 38 ft, driller notes very hard drilling.		
40		>>	21 50/3" (REF)		D-13		Poorly graded SAND with silt and gravel, sub-rounded, very dense, grayish brown, wet, stratified. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
	190								
45		>>							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 233.0 ft HOLE No. H-6-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Profile	20 40 60 80	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			>>	22 58/6" (REF)		D-14		Poorly graded SAND with silt and gravel, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
	185									
50			>>	36 50/6" (REF)		D-15	MC GS	SP-SM, MC=9% Poorly graded SAND with silt and gravel, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
	180							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
55								End of test hole boring at 51.0 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
	175							Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 51.0 ft. Depth of casing during bail test: 50.0 ft. Water depth before bailing: 30.2 ft. Bailed bore hole water level to 47.8 ft. Recharge after 5 minutes: 47.9 ft. Recharge after 10 minutes: 47.9 ft. Recharge after 30 minutes: 47.9 ft.		
60										
	170									
65										
	165									
70										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card RE-14608

HOLE No. H-7p-17

Sheet 1 of 5

Job No. XL-5001 SR 005 Elevation 223.8 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert Lic# 2779

Component Bridge Widening - Pier 3 (Abutment) Inspector Harvey, Thomas #2599

Start August 22, 2017 Completion August 24, 2017 Well ID# BJT-727 Equipment CME 45 (9C4-3)

Station MRW 101+53.78 Offset 93.2 feet left Hole Dia (inches) 4 Historical SPT Efficiency 86.1%

Northing 638950.2575 Easting 1076008.1422 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0632298 Long -122.7650152 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Varied

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5	220.0			50/4" (REF)		D-1		Well graded GRAVEL with sand, sub-angular, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
10	215.0			7 11 12 (23)		D-2		Well graded GRAVEL with sand, sub-angular, medium dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
				13 17 15 (32)		D-3	MC GS	GW-GM, MC=8% Well graded GRAVEL with silt and sand, sub-rounded, dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
15	210.0			13 24 31 (55)		D-4	MC GS	SM, MC=12% Silty SAND with gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft		
				18 33 32 (65)		D-5	MC GS	GM, MC=9% Silty GRAVEL with sand, sub-rounded, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft		
20	205.0			23 50/3" (REF)		D-6		Silty GRAVEL with sand, sub-rounded, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.8 ft HOLE No. H-7p-17

Sheet 2 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			65/6" (REF)		D-7		Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	200								
25			50/4" (REF)		D-8		Silty SAND with gravel, sub-rounded gravel, very dense, brown, wet, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	195								
30			20 52/6" (REF)		D-9	MC GS	GP-GM, MC=9% Poorly graded GRAVEL with silt and sand, sub-angular, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	190								
35			41 54/4" (REF)		D-10		Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	185								
40			53/6" (REF)		D-11		Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	180								
45									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.8 ft HOLE No. H-7p-17

Sheet 3 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			52/6" (REF)		D-12	MC GS	GP-GM, MC=9% Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
	175								
50			27 50/3" (REF)		D-13		Well graded GRAVEL with sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
	170								
55			29 50/4" (REF)		D-14	MC GS	GP-GM, MC=9% Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	165								
60			50/4" (REF)		D-15		Well graded GRAVEL with sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	160								
65			50/3" (REF)		D-16		Poorly graded SAND with silt and gravel, sub-angular gravel, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	155								
70									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

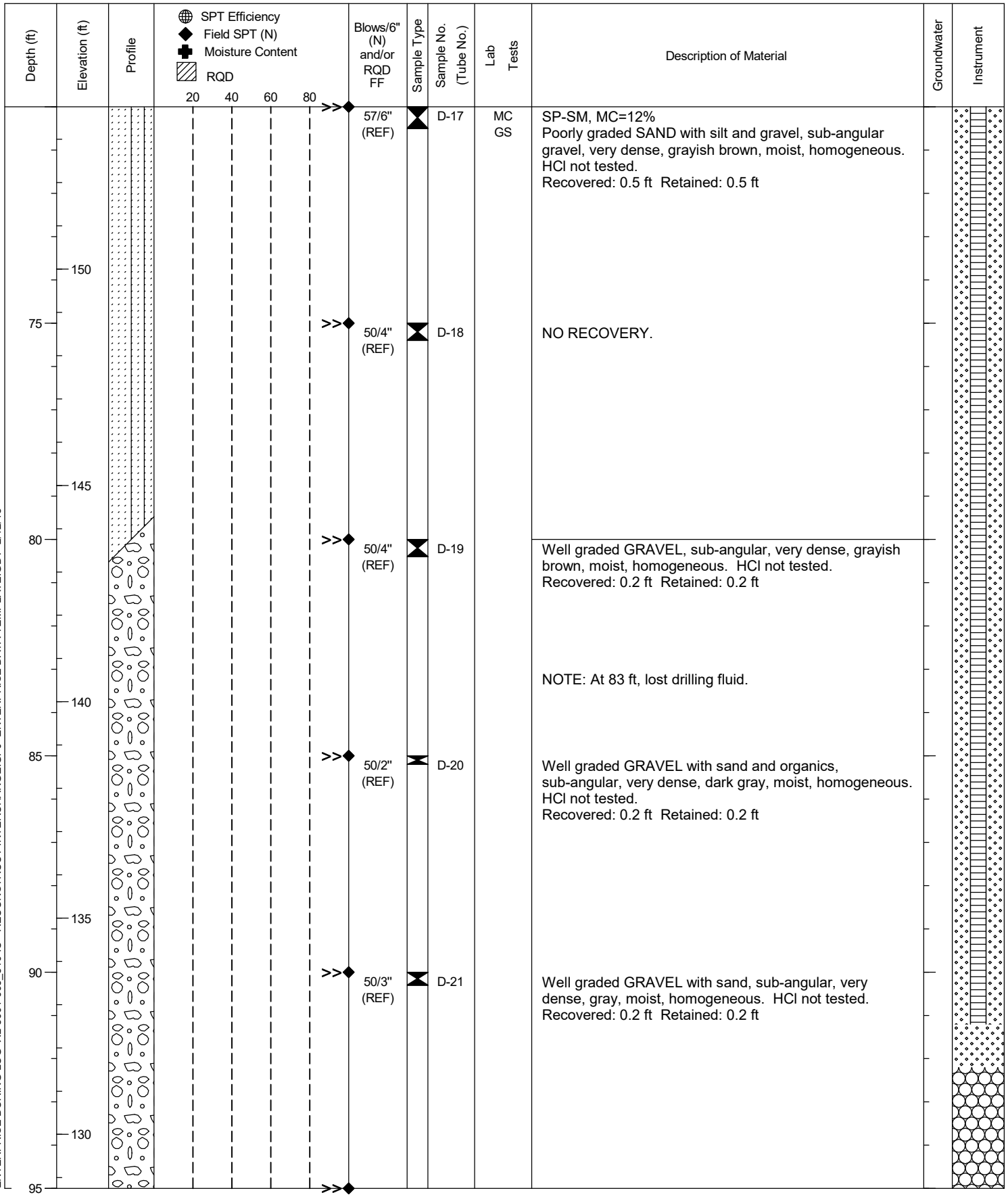
WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.8 ft HOLE No. H-7p-17

Sheet 4 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert



ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.8 ft HOLE No. H-7p-17

Sheet 5 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Haller, Robert

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				50/2" (REF)		D-22		Well graded GRAVEL with sand, sub-angular, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
100	125			50/3" (REF)		D-23		Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		

A standpipe monument was installed on this boring.

The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.

End of test hole boring at 100.3 ft below ground surface.
This is a summary Log of Test Boring.
Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
Note: REF = SPT Refusal

Bail/Recharge test:
Hole Diameter: 4 in.
Depth of boring during bail test: 100.3 ft.
Depth of casing during bail test: 90.0 ft.
Water depth before bailing: 27.7 ft.
Bailed bore hole water level to 90.0 ft.
Recharge after 5 minutes: 94.2 ft.
Recharge after 10 minutes: 94.2 ft.
Recharge after 15 minutes: 94.3 ft.
Recharge after 20 minutes: 94.3 ft.
Recharge after 25 minutes: 94.3 ft.
Recharge after 30 minutes: 94.3 ft.
Recharge after 45 minutes: 94.3 ft.

Manual Piezometer Readings:
8-30-2017: Dry to 91.2 ft. (bottom of piezometer screen).
9-25-2017: 85.1 ft.
10-30-2017: 88.2 ft.
12-13-2017: 90.3 ft.
1-22-2018: 90.1 ft.

WSDOT

LOG OF TEST BORING

Start Card RE-14608

HOLE No. H-8p-17

Sheet 1 of 5

Job No. XL-5001 SR 005 Elevation 223.7 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Shepherd, Robert Lic# 2710

Component Bridge Widening - Pier 2 (Center) Inspector Fetterly, Jamie #2507

Start August 14, 2017 Completion August 17, 2017 Well ID# BJT-728 Equipment CME 850 (9C2-5)

Station MRW 100+44.43 Offset 85.7 feet left Hole Dia (inches) 4 Historical SPT Efficiency 92.8%

Northing 639057.732 Easting 1075988.0182 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0635228 Long -122.7651083 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Bentonite

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5	220.0	23 18 27 (45)		D-1		Poorly graded GRAVEL with silt and sand, sub-angular, dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
		16 12 15 (27)		D-2	MC GS	GP-GM, MC=13% Poorly graded GRAVEL with silt and sand, sub-angular, dense, olive brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
10	215.0	16 15 23 (38)		D-3		Poorly graded GRAVEL with silt and sand, sub-rounded, dense, olive brown, moist, stratified. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
		6 6 6 (12)		D-4	MC GS	SM, MC=21% Silty SAND, medium dense, light brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
15	210.0	>> 26 42 50/2" (REF)		D-5		Poorly graded SAND with silt and gravel, sub-angular gravel, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
		>> 41 50/3" (REF)		D-6	MC GS	SP-SM, MC=11% Poorly graded SAND with silt and gravel, sub-angular gravel, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
20	205.0	>> 50/5"		D-7		Poorly graded SAND with silt and gravel, sub-rounded		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.7 ft HOLE No. H-8p-17

Sheet 2 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Shepherd, Robert

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			(REF)				gravel, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
25	200		29 33 45 (78)		D-8	MC GS	SW-SM, MC=10% Well graded SAND with silt and gravel, angular gravel, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
30	195		>> 37 50/6" (REF)		D-9		Well graded SAND with silt and gravel, angular gravel, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
35	190		>> 28 50/4" (REF)		D-10		Well graded SAND with silt and gravel, angular gravel, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
40	185		>> 30 50/5" (REF)		D-11	MC GS	GW-GM, MC=11% Well graded GRAVEL with silt and sand, sub-rounded, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
45	180		>> 50/4"		D-12		Well graded GRAVEL with sand, sub-rounded, very		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.7 ft HOLE No. H-8p-17

Sheet 3 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Shepherd, Robert

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				(REF)				dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
								NOTE: At 47.5 ft, lost drilling fluid.		
	175									
50				>> 34 50/4" (REF)		D-13		Well graded GRAVEL with silt and sand, sub-rounded, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
	170									
55				>> 50/4" (REF)		D-14		Well graded GRAVEL with silt and sand, sub-rounded, very dense, olive, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	165									
60				>> 50/2" (REF)		D-15		NO RECOVERY.		
	160									
65				>> 50/3" (REF)		D-16		Well graded GRAVEL with sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
	155									
70				30		D-17	MC	GW, MC=6%		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.7 ft HOLE No. H-8p-17

Sheet 4 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Shepherd, Robert

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				36 41 (77)			GS	Well graded GRAVEL with sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft NOTE: At 70 ft, lost drilling fluid. NOTE: From 71 to 74.5 ft, drilling action indicates cobbles and boulders.		
150										
75			>>	32 50/6" (REF)		D-18		Well graded GRAVEL with sand, sub-rounded, very dense, gray, wet, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
145										
80			>>	50/5" (REF)		D-19		Silty SAND with gravel, sub-rounded gravel, very dense, light gray, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
140										
85			>>	38 50/4" (REF)		D-20	MC GS	SM, MC=17% Silty SAND with gravel, sub-rounded gravel, very dense, light gray, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
135										
90			>>	41 50/4" (REF)		D-21	MC GS	SW-SM, MC=11% Well graded SAND with silt and gravel, sub-rounded gravel, very dense, light brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
130										
95			>>	50/5"		D-22		Well graded SAND with gravel, sub-rounded gravel, very		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.7 ft

HOLE No. H-8p-17

Sheet 5 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Shepherd, Robert

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				(REF)				dense, olive brown, wet, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	125									
100			>>	49 50/5" (REF)		D-23		Silty GRAVEL with sand, sub-rounded, very dense, olive brown, wet, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
								A flush mount monument was installed on this boring.		
								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
	120									
105								End of test hole boring at 100.4 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
	115							Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 100.4 ft. Depth of casing during bail test: 99.0 ft. Water depth before bailing: 74.0 ft. Bailed bore hole water level to 100.0 ft. Recharge after 1 minutes: 100.0 ft. Recharge after 2 minutes: 100.0 ft. Recharge after 3 minutes: 100.0 ft. Recharge after 4 minutes: 100.0 ft. Recharge after 5 minutes: 100.0 ft.		
110										
	110							Manual Piezometer Readings: 8-24-2017: 88.5 ft. 9-25-2017: 89.4 ft. 10-30-2017: Dry to 95.0 ft. (bottom of piezometer screen). 12-13-2017: Dry to 95.0 ft. 1-22-2018: 92.1 ft.		
115										
	105									
120										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/12/18

WSDOT

LOG OF TEST BORING

Start Card RE-14608

HOLE No. H-9p-17

Sheet 1 of 5

Job No. XL-5001 SR 005 Elevation 224.4 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie Lic# 2941

Component Bridge Widening - Pier 1 (Abutment) Inspector Harvey, Thomas #2599

Start August 15, 2017 Completion August 21, 2017 Well ID# BJT-729 Equipment CME 45 (9C4-3)

Station MRW 99+40.62 Offset 86.6 feet left Hole Dia (inches) 4 Historical SPT Efficiency 86.1%

Northing 639164.5196 Easting 1075976.4148 Collected by Region Survey Crew Method Casing Advancer

Lat 47.0638145 Long -122.7651671 Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Bentonite and Polymer

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		17 23 27 (50)		D-1		Well graded GRAVEL, sub-rounded, dense, gray, wet, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
5	220.0	11 21 23 (44)		D-2		Well graded GRAVEL with sand, sub-rounded, dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
		6 4 5 (9)		D-3		Well graded GRAVEL, sub-rounded, loose, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
10	215.0	4 2 2 (4)		D-4		Well graded GRAVEL, sub-rounded, very loose, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.1 ft Retained: 0.1 ft		
		>> 27 50/4" (REF)		D-5	MC GS	SM, MC=13% Silty SAND with gravel, sub-rounded gravel, very dense, light brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
15	210.0	>> 50/6" (REF)		D-6		Poorly graded SAND with silt and gravel, sub-rounded gravel, very dense, light brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
		>> 17 53/6" (REF)		D-7		Poorly graded SAND with silt and gravel, sub-rounded gravel, very dense, light brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
20	205.0	>>						

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

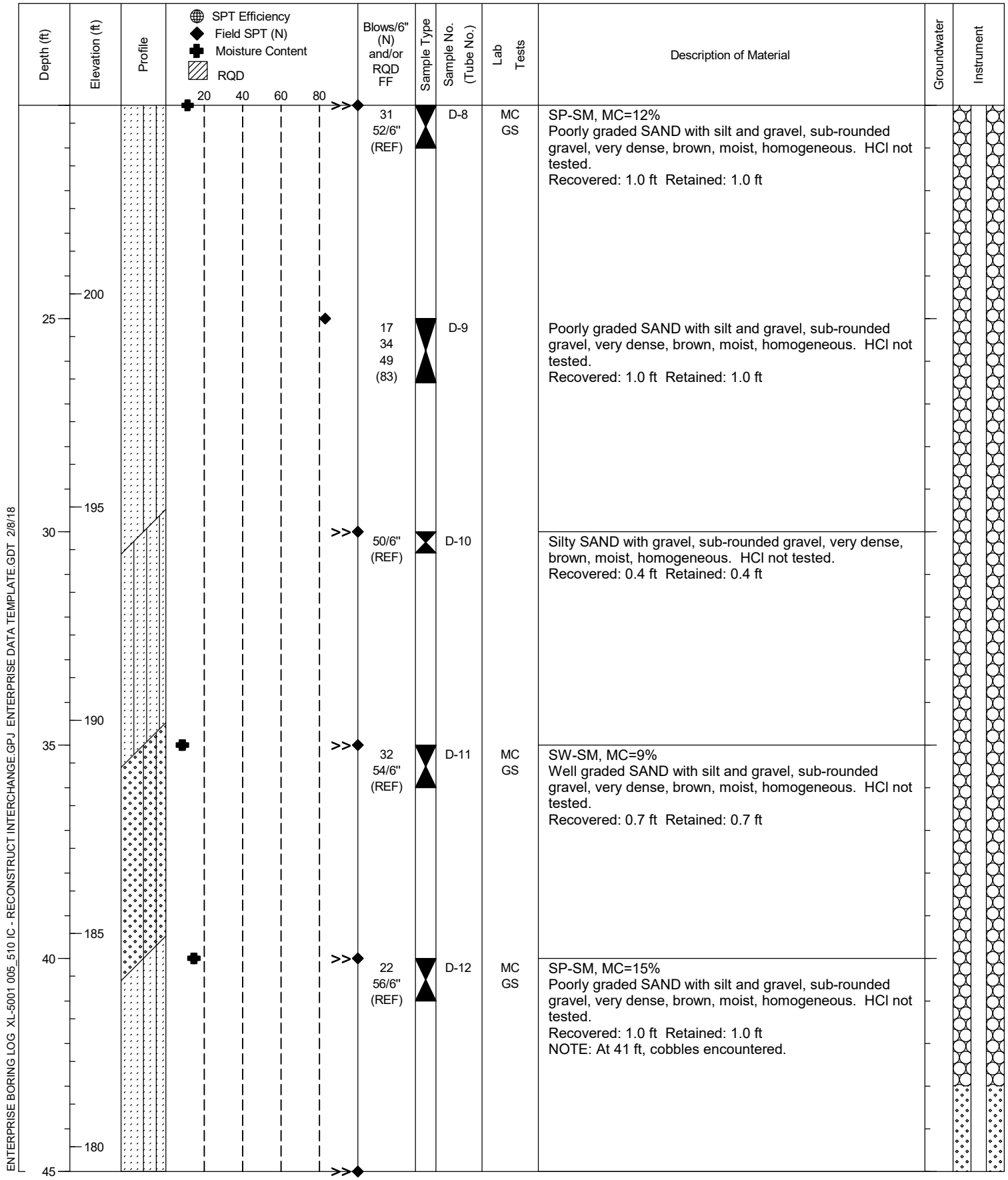
WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 224.4 ft HOLE No. H-9p-17

Sheet 2 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie



Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		31 52/6" (REF)		D-8	MC GS	SP-SM, MC=12% Poorly graded SAND with silt and gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	200							
25		17 34 49 (83)		D-9		Poorly graded SAND with silt and gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	195							
30		50/6" (REF)		D-10		Silty SAND with gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	190							
35		32 54/6" (REF)		D-11	MC GS	SW-SM, MC=9% Well graded SAND with silt and gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
	185							
40		22 56/6" (REF)		D-12	MC GS	SP-SM, MC=15% Poorly graded SAND with silt and gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft NOTE: At 41 ft, cobbles encountered.		
	180							
45								

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 224.4 ft HOLE No. H-9p-17

Sheet 3 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		60/6" (REF)		D-13		Well graded GRAVEL with silt and sand, sub-angular, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
50	175	42 50/4" (REF)		D-14	MC GS	GP-GM, MC=12% Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
55	170	50/1" (REF)		D-15		NO RECOVERY. NOTE: At 55.1 ft, drive with oversize sampler also attempted with no recovery. Sampler OD = 1.75 in, ID = 1.25 in		
60	165	50/1" (REF)		D-16		NO RECOVERY. NOTE: At 60.1 ft, drive with oversize sampler also attempted with no recovery. Sampler OD = 1.75 in, ID = 1.25 in		
65	160	89/5" (REF)		D-17		Poorly graded SAND with gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft Sampler OD = 1.75 in, ID = 1.25 in		
70	155							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 224.4 ft HOLE No. H-9p-17

Sheet 4 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		62/6" (REF)		D-18		Well graded GRAVEL, sub-rounded, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.1 ft Retained: 0.1 ft		
	150							
75		60/6" (REF)		D-19		Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
	145							
80		50/2" (REF)		D-20		NO RECOVERY. NOTE: At 80.2 ft, drive with oversize sampler also attempted with no recovery. Sampler OD = 1.75 in, ID = 1.25 in		
						NOTE: At 83.8 ft, cobble encountered.		
	140							
85		60/4" (REF)		D-21		Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
						NOTE: At 86 ft, cobble encountered.		
						NOTE: At 89 ft, cobble encountered.		
	135							
90		74/6" (REF)		D-22		Well graded GRAVEL, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	130							
95								

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 224.4 ft HOLE No. H-9p-17

Sheet 5 of 5

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				70/3" (REF)		D-23		Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
100	125			87/4" (REF)		D-24		Well graded GRAVEL with sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
105	120							A standpipe monument was installed on this boring. The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 100.4 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 100.4 ft. Depth of casing during bail test: 100.0 ft. Water depth before bailing: 27.8 ft. Bailed bore hole water level to 97.9 ft. Recharge after 5 minutes: 98.1 ft. Recharge after 10 minutes: 98.1 ft. Recharge after 15 minutes: 98.1 ft. Recharge after 20 minutes: 98.2 ft. Recharge after 25 minutes: 98.2 ft. Recharge after 30 minutes: 98.2 ft. Manual Piezometer Readings: 8-24-2017: 84.7 ft. 9-25-2017: Dry to 85.0 ft. (bottom of piezometer screen). 10-30-2017: Dry to 85.0 ft. 12-13-2017: Dry to 85.0 ft. 1-22-2018: 84.7 ft.		
110	115									
115	110									
120	105									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64049 / AE-45932

HOLE No. H-10-17

Sheet 1 of 2

Job No. XL-5001 SR 005 Elevation 178.6 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 9, 2017 Completion November 9, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LL 1371+03.63 Offset 57.9 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 637795.24 Easting 1069261.04 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0595300 Long -122.7919420 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				12 11 13 (24)		D-1	MC GS	GW, MC=12% Well graded GRAVEL with sand, sub-rounded, medium dense, brown, wet, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
	175.0									
5				12 13 11 (24)		D-2		Well graded GRAVEL with sand, sub-rounded, medium dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
								NOTE: At 8 ft, lost drilling fluid.		
	170.0									
10			>>	33 50/3" (REF)		D-3		Well graded GRAVEL with sand, sub-angular, very dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	165.0									
15			>>	60/6" (REF)		D-4		Well graded GRAVEL with sand, sub-angular, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
	160.0									
20			>>							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 178.6 ft HOLE No. H-10-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				50/4" (REF)		D-5		Well graded GRAVEL with sand, sub-angular, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	155									
25								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
	150							End of test hole boring at 20.4 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
30								Borehole was dry at the end of drilling.		
	145									
35										
	140									
40										
	135									
45										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64049 / AE-45932

HOLE No. H-11-17

Sheet 1 of 2

Job No. XL-5001 SR 005 Elevation 191.1 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 7, 2017 Completion November 7, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LL 1378+80.96 Offset 76.8 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 637977.34 Easting 1070017.07 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0600892 Long -122.7889311 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	190.0	4 7 9 (16)		D-1	MC GS	GW, MC=6% Well graded GRAVEL with sand, sub-rounded, medium dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft NOTE: At 3 ft, lost drilling fluid.		
5	185.0	9 11 11 (22)		D-2	MC GS	GW, MC=8% Well graded GRAVEL with sand, sub-rounded, medium dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
10	180.0	13 17 17 (34)		D-3		Well graded GRAVEL with sand, sub-rounded, dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
15	175.0	12 14 24 (38)		D-4		Well graded GRAVEL with sand, sub-rounded, dense, grayish brown, moist, stratified. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
20								

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 191.1 ft

HOLE No. H-11-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				39 50/6" (REF)		D-5	MC GS	SM, MC=8% Silty SAND with gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
25	170			29 37 43 (80)		D-6		Silty SAND with gravel, sub-rounded gravel, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
30	165							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 26.5 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Borehole was dry at the end of drilling.		
35	160									
40	155									
45	150									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64049 / AE-45932

HOLE No. H-12-17

Sheet 1 of 2

Job No. XL-5001 SR 005 Elevation 198.4 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 7, 2017 Completion November 7, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LL 1388+79.25 Offset 135.4 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 638244.77 Easting 1070974.41 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0608983 Long -122.7851226 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				6 8 8 (16)		D-1		Silty SAND with gravel, sub-rounded gravel, medium dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
5	195.0			8 15 22 (37)		D-2	MC GS AL	GM, MC=16%, LL=NA, PL=NP Silty GRAVEL with sand, sub-rounded, dense, reddish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
10	190.0			26 27 22 (49)		D-3		Silty SAND with gravel, sub-angular gravel, dense, light brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft	11-07-2017	
15	185.0			14 15 28 (43)		D-4	MC GS AL	SM, MC=13%, LL=NA, PL=NP Silty SAND with gravel, sub-rounded gravel, dense, light brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
20	180.0									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 198.4 ft HOLE No. H-12-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Profile	20 40 60 80	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				16 29 32 (61)		D-5		Silty SAND with gravel, sub-rounded gravel, very dense, light brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
25	175			18 27 31 (58)		D-6	MC GS	SW-SM, MC=8% Well graded SAND with silt and gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
30	170							End of test hole boring at 26.5 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
35	165							Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 26.5 ft. Depth of casing during bail test: 20.0 ft. Water depth before bailing: 7.9 ft. Bailed bore hole water level to 20.1 ft. Recharge after 5 minutes: 17.3 ft. Recharge after 10 minutes: 16.1 ft. Recharge after 15 minutes: 15.2 ft. Recharge after 20 minutes: 14.4 ft. Recharge after 25 minutes: 13.2 ft. Recharge after 30 minutes: 12.5 ft. Recharge after 35 minutes: 11.9 ft. Recharge after 40 minutes: 11.9 ft. Recharge after 50 minutes: 11.8 ft. Recharge after 60 minutes: 11.9 ft.		
40	160									
45	155									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-13-17

Job No. XL-5001 SR 005 Elevation 201.4 ft

Sheet 1 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 6, 2017 Completion November 6, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LL 1403+12.74 Offset 59.9 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 638476.9 Easting 1072396.77 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0616473 Long -122.7794449 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
0	200.0	4 5 5 (10)		D-1		Well graded GRAVEL with sand and organics, sub-rounded, loose, dark gray, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
5	195.0	7 9 5 (14)		D-2		Well graded GRAVEL, sub-rounded, medium dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft NOTE: At 7 ft, lost drilling fluid.		
10	190.0	8 12 8 (20)		D-3		Well graded GRAVEL, sub-rounded, medium dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft NOTE: At 12 ft, drilling becomes more difficult.		
15	185.0	>> 50/2" (REF)		D-4		NO RECOVERY.		
20		>>						

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 201.4 ft HOLE No. H-13-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Profile	20 40 60 80	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				58/6" (REF)		D-5	MC GS	GP-GM, MC=8% Poorly graded GRAVEL with silt and sand, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
	180									
25	175							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 20.5 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Borehole was dry at the end of drilling.		
30	170									
35	165									
40	160									
45										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-14-17

Sheet 1 of 2

Job No. XL-5001 SR 005 Elevation 207.6 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 2, 2017 Completion November 6, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LL 1410+04.10 Offset 173.3 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 638733.62 Easting 1073049.08 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0624025 Long -122.7768584 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				3 3 2 (5)		D-1		Silty SAND with gravel and organics, sub-rounded gravel, loose, dark brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
	205.0									
5				10 13 12 (25)		D-2	MC GS	GW, MC=6% Well graded GRAVEL with sand, sub-rounded, dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
	200.0									
10				9 7 7 (14)		D-3		Well graded GRAVEL with sand, sub-rounded, medium dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	195.0									
15				18 20 25 (45)		D-4	MC GS	SP-SM, MC=12% Poorly graded SAND with silt and gravel, angular gravel, dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	190.0									
20			>>	47		D-5		Well graded GRAVEL with sand, sub-rounded, very		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 207.6 ft

HOLE No. H-14-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		50/4" (REF)				dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
25	185	39 50/5" (REF)		D-6	MC GS	GP-GM, MC=9% Poorly graded GRAVEL with silt and sand, sub-angular, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
30	180	50/4" (REF)		D-7		Well graded GRAVEL with sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
35	175	50/6" (REF)		D-8	MC GS	GW, MC=8% Well graded GRAVEL with sand, sub-angular, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
40	170					The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
45	165					End of test hole boring at 35.0 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
						Borehole was dry at the end of drilling.		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-15-17

Sheet 1 of 2

Job No. XL-5001 SR 005 Elevation 213.3 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Fetterly, Jamie #2507

Start November 2, 2017 Completion November 2, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LL 1426+71.19 Offset 136.0 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 639050.4 Easting 1074685.65 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0634000 Long -122.7703311 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Polymer

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		3 4 5 (9)		D-1		Silty SAND with gravel and organics, angular, loose, dark brown, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft NOTE: At 2 ft, lost drilling fluid.		
	210.0							
5		3 5 6 (11)		D-2	MC GS	GP, MC=4% Poorly graded GRAVEL, rounded, medium dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
	205.0					NOTE: At 9 ft, regain drilling fluid.		
10		20 28 40 (68)		D-3	MC GS	SW-SM, MC=7% Well graded SAND with silt and gravel, angular, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 1.2 ft Retained: 1.2 ft		
	200.0							
15		>> 40 50/4" (REF)		D-4		Well graded SAND with silt and gravel, angular, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
	195.0							
20		40		D-5		Well graded SAND with silt and gravel, sub-angular, very		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 213.3 ft HOLE No. H-15-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		42 40 (82)				dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
25	190	>> 50/6" (REF)		D-6		Silty GRAVEL with sand, sub-rounded, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft NOTE: At 26 ft, drilling indicates larger gravels.		
30	185	>> 50/6" (REF)		D-7		Well graded GRAVEL with sand, sub-angular, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.3 ft Retained: 0.3 ft		
35	180	>> 50/6" (REF)		D-8	MC GS	SW-SM, MC=10% Well graded SAND with silt and gravel, sub-angular, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft Sampler OD = 2.5 in, ID = 2 in The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 35.0 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 35.0 ft. Depth of casing during bail test: 34.5 ft. Water depth before bailing: 0.0 ft. Bailed bore hole water level to 34.0 ft. Recharge after 45 minutes: 34.0 ft.		
40	175							
45	170							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-16-17

Job No. XL-5001 SR 005 Elevation 223.5 ft

Sheet 1 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Cooper, Richard Lic# 2964

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 13, 2017 Completion November 14, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LR 1431+68.56 Offset 127.1 feet right Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 638777.88 Easting 1075295.42 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0627012 Long -122.7678539 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				8 15 19 (34)		D-1	MC GS	SW-SM, MC=15% Well graded SAND with silt, gravel, and organics, sub-rounded gravel, dense, dark brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	220.0									
5				9 9 11 (20)		D-2		Well graded SAND with silt, gravel, and organics, sub-rounded gravel, medium dense, dark brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
	215.0									
10				15 21 19 (40)		D-3	MC GS AL	SW-SM, MC=13%, LL=NA, PL=NP Well graded SAND with silt and gravel, sub-rounded gravel, dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	210.0									
15				27 33 36 (69)		D-4	MC GS AL	SM, MC=16%, LL=NA, PL=NP Silty SAND, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft		
	205.0									
20										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

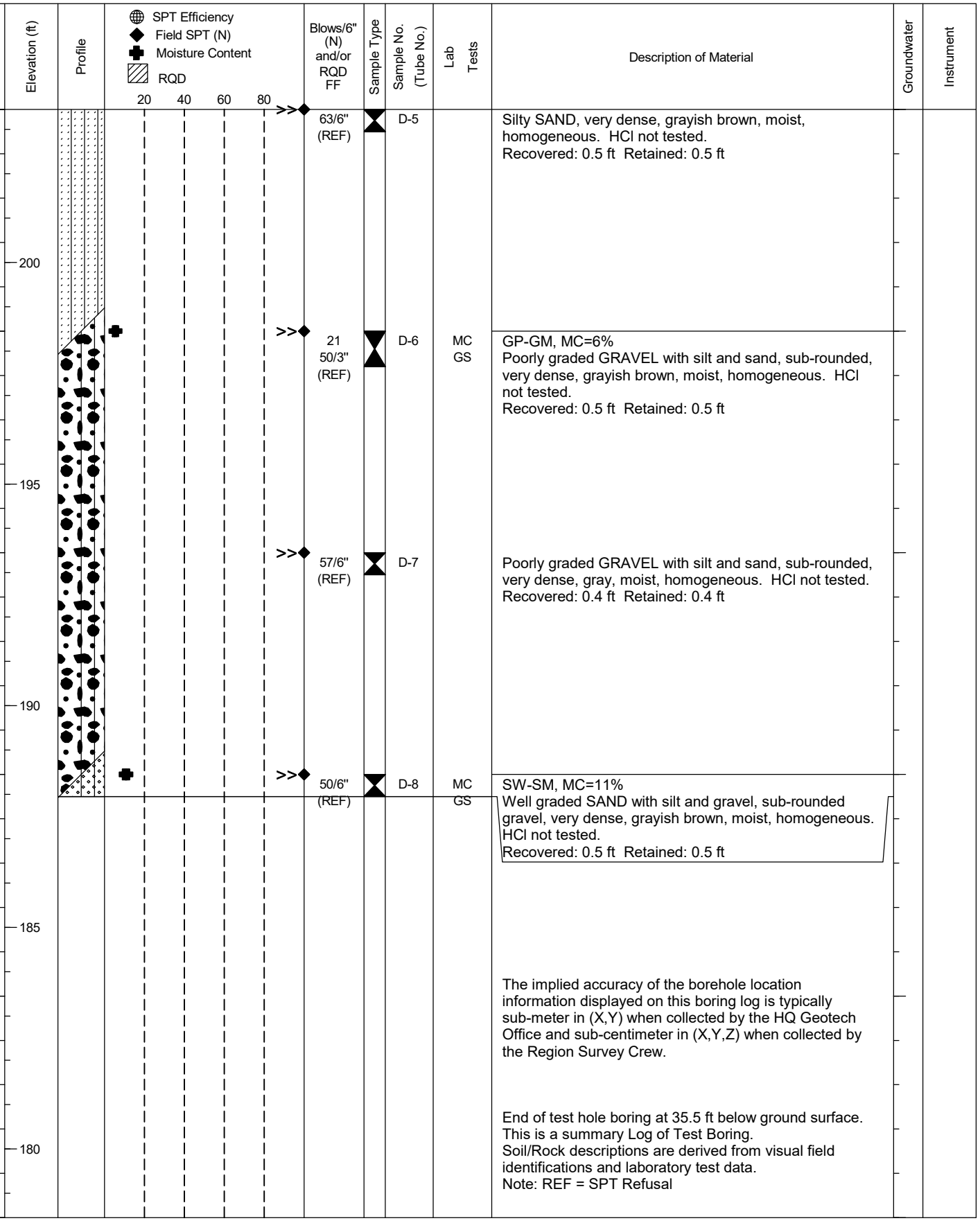
Job No. XL-5001 SR 005 Elevation 223.5 ft

HOLE No. H-16-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Cooper, Richard



Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		63/6" (REF)		D-5		Silty SAND, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
25	200	21 50/3" (REF)		D-6	MC GS	GP-GM, MC=6% Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
30	195	57/6" (REF)		D-7		Poorly graded GRAVEL with silt and sand, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
35	190	50/6" (REF)		D-8	MC GS	SW-SM, MC=11% Well graded SAND with silt and gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
40	185					The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
45	180					End of test hole boring at 35.5 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 223.5 ft HOLE No. H-16-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Cooper, Richard

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
50	175							Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 35.5 ft. Depth of casing during bail test: 30.0 ft. Water depth before bailing: 6.5 ft. Bailed bore hole water level to 27.1 ft. Recharge after 5 minutes: 27.8 ft. Recharge after 10 minutes: 28.7 ft. Recharge after 15 minutes: 29.1 ft. Recharge after 20 minutes: 29.2 ft. Recharge after 25 minutes: 29.2 ft. Recharge after 30 minutes: 29.2 ft.		
55	170									
60	165									
65	160									
70	155									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-17-17

Sheet 1 of 2

Job No. XL-5001 SR 005 Elevation 225.4 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Cooper, Richard Lic# 2964

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 14, 2017 Completion November 14, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LR 1434+50.32 Offset 210.4 feet right Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 638747.93 Easting 1075582.21 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0626417 Long -122.7667002 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	225.0							
		13 15 13 (28)		D-1	MC GS	GW-GM, MC=12% Well graded GRAVEL with silt and sand, sub-rounded, dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft NOTE: At 4 ft, lost drilling fluid.		
5	220.0	11 9 13 (22)		D-2	MC GS	GP, MC=15% Poorly graded GRAVEL with sand, sub-rounded, medium dense, grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
10	215.0	>> 54/6" (REF)		D-3		Silty SAND with gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
15	210.0	>> 41 50/6" (REF)		D-4	MC GS AL	SM, MC=12%, LL=22 Silty SAND with gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
20		>>						

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 225.4 ft HOLE No. H-17-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Cooper, Richard

SPT Efficiency
Field SPT (N)
Moisture Content
RQD

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	205		50/3" (REF)		D-5		Silty SAND with gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
25	200		18 50/4" (REF)		D-6	MC GS	SW-SM, MC=6% Well graded SAND with silt and gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
30	195						The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
35	190						End of test hole boring at 25.9 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
40	185						Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 25.9 ft. Depth of casing during bail test: 20.0 ft. Water depth before bailing: 3.5 ft. Bailed bore hole water level to 22.0 ft. Recharge after 2 minutes: 21.5 ft. Recharge after 5 minutes: 20.5 ft. Recharge after 10 minutes: 21.3 ft. Recharge after 15 minutes: 22.7 ft. Recharge after 20 minutes: 23.5 ft. Recharge after 30 minutes: 25.1 ft.		
45									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-18-17

Sheet 1 of 3

Job No. XL-5001 SR 005 Elevation 239.5 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Haller, Robert #2779

Start November 30, 2017 Completion November 30, 2017 Well ID# N/A

Equipment CME 45 (9C4-2)

Station LR 1438+00.55 Offset 213.6 feet right Hole Dia (inches) 4

Historical SPT Efficiency 89.3%

Northing 638789.5 Easting 1075914.94 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0627819 Long -122.7653705 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Polymer

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		11 35 37 (72)		D-1		Well graded SAND with silt and gravel, sub-angular gravel, very dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
		14 32 30 (62)		D-2	MC GS	SW-SM, MC=9% Well graded SAND with silt and gravel, sub-angular gravel, very dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
5	235.0							
		8 12 15 (27)		D-3	MC GS	GP-GM, MC=14% Poorly graded GRAVEL with silt and sand, sub-angular, dense, dark grayish brown, moist, homogeneous. HCl not tested.		
		12 12 17 (29)		D-4		Recovered: 0.9 ft Retained: 0.9 ft Well graded GRAVEL with sand, sub-rounded, dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
10	230.0							
		>> 50/5" (REF)		D-5		Well graded GRAVEL, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.1 ft Retained: 0.1 ft		
		12 20 35 (55)		D-6	MC GS	SW-SM, MC=13% Well graded SAND with silt and gravel, sub-angular gravel, very dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
15	225.0							
		8 10 5 (15)		D-7		Well graded SAND with silt and gravel, sub-angular gravel, medium dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
		13 13		D-8		Well graded SAND with silt and gravel, sub-rounded gravel, dense, dark grayish brown, moist, homogeneous.		
20	220.0							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 239.5 ft HOLE No. H-18-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		12 (25)				HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
25	215	14 17 25 (42)		D-9	MC GS	SW-SM, MC=9% Well graded SAND with silt and gravel, sub-angular gravel, dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
30	210	>> 50/5" (REF)		D-10		Well graded SAND with silt and gravel, sub-angular gravel, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
35	205	>> 50/5" (REF)		D-11		Well graded SAND with silt and gravel, sub-angular gravel, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
40	200	>> 16 50/5" (REF)		D-12	MC GS	SW-SM, MC=9% Well graded SAND with silt and gravel, sub-angular gravel, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
						NOTE: Had 50% water loss throughout the boring.		
45	195					The implied accuracy of the borehole location information displayed on this boring log is typically		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 239.5 ft HOLE No. H-18-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
								End of test hole boring at 40.0 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
50	190							Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 40.0 ft. Depth of casing during bail test: 39.0 ft. Water depth before bailing: 7.6 ft. Bailed bore hole water level to 33.0 ft. Pull casing to 34.0 ft. Water level at 33.0 ft. Pull casing to 29.0 ft. Water level at 38.5 ft. Recharge after 5 minutes: 38.5 ft. Recharge after 10 minutes: 38.5 ft. Recharge after 15 minutes: 38.5 ft. Recharge after 20 minutes: 38.5 ft.		
55	185									
60	180									
65	175									
70	170									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-19-17

Sheet 1 of 2

Job No. XL-5001 SR 005 Elevation 226.0 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Cooper, Richard Lic# 2964

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 15, 2017 Completion November 15, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station LR 1441+42.29 Offset 237.2 feet right Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 638798.07 Easting 1076255.65 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0628322 Long -122.7640049 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	225.0			7 11 13 (24)		D-1	MC GS AL	SM, MC=13%, LL=NA, PL=NP Silty SAND with gravel, sub-rounded gravel, medium dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
5	220.0			9 9 7 (16)		D-2	MC GS AL	GM, MC=17%, LL=NA, PL=NP Silty GRAVEL with sand, sub-rounded, medium dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
10	215.0			12 21 29 (50)		D-3	MC GS	GP-GM, MC=10% Poorly graded GRAVEL with silt and sand, sub-rounded, dense, dark brown, moist, homogeneous. HCl not tested. Recovered: 0.8 ft Retained: 0.8 ft		
15	210.0			19 21 29 (50)		D-4	MC GS AL	SC-SM, MC=11%, PI=6 Silty, clayey SAND, dense, brown, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft		
20										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 226.0 ft HOLE No. H-19-17

Sheet 2 of 2

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Cooper, Richard

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				50/4" (REF)		D-5		Silty, clayey SAND with gravel, sub-rounded gravel, very dense, brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
25	205							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
	200							End of test hole boring at 20.4 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
30	195							Borehole was dry at the end of drilling.		
35	190									
40	185									
45										

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-20-17

Sheet 1 of 3

Job No. XL-5001 SR 005 Elevation 239.7 ft

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Haller, Robert #2779

Start November 28, 2017 Completion November 28, 2017 Well ID# N/A

Equipment CME 45 (9C4-2)

Station LL 1439+71.66 Offset 305.6 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.3%

Northing 639408.35 Easting 1075961.24 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0644816 Long -122.7652561 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Polymer

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		12 21 46 (67)		D-1	MC GS	GW-GM, MC=7% Well graded GRAVEL with silt and sand, sub-angular, very dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
		24 29 40 (69)		D-2		Well graded GRAVEL with silt and sand, sub-angular, very dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
5	235.0							
		3 4 5 (9)		D-3	MC GS	GP-GM, MC=14% Poorly graded GRAVEL with silt and sand, sub-angular, loose, dark grayish brown, wet, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
10	230.0							
		9 26 25 (51)		D-4		Well graded GRAVEL, sub-rounded, very dense, gray, moist, homogeneous. HCl not tested. Recovered: 0.2 ft Retained: 0.2 ft		
		18 29 18 (47)		D-5		Well graded GRAVEL with sand, sub-rounded, dense, dark grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
15	225.0							
		10 6		D-6	MC GS	GP-GM, MC=17% Poorly graded GRAVEL with silt, sand, and organics/root		
20	220.0							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 239.7 ft HOLE No. H-20-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

SPT Efficiency
Field SPT (N)
Moisture Content
RQD
20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		10 (16)				hairs, sub-rounded, medium dense, dark brown, wet, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
25	215	18 27 32 (59)		D-7	MC GS AL	SM, MC=11%, LL=20 Silty SAND with gravel, sub-angular gravel, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
30	210	>> 25 50/5" (REF)		D-8		Well graded SAND with silt and gravel, sub-angular gravel, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
35	205	>> 17 50/5" (REF)		D-9	MC GS	SW-SM, MC=8% Well graded SAND with silt and gravel, sub-angular gravel, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.6 ft Retained: 0.6 ft		
40	200	>> 19 50/5" (REF)		D-10		Well graded SAND with silt and gravel, sub-angular gravel, very dense, olive gray, moist, homogeneous. HCl not tested. Recovered: 0.5 ft Retained: 0.5 ft		
						Had 50% water loss throughout the boring.		
45	195					The implied accuracy of the borehole location information displayed on this boring log is typically		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 239.7 ft HOLE No. H-20-17

Sheet 3 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
								End of test hole boring at 40.0 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
50	190							Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 40.0 ft. Depth of casing during bail test: 39.0 ft. Water depth before bailing: 8.0 ft. Bailed bore hole water level to 31.0 ft. Recharge after 20 minutes: 39.0 ft.		
55	185							Pull casing to 29.0 ft. Borehole was dry after casing was pulled.		
60	180									
65	175									
70	170									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Start Card SE-64048 / AE-45931

HOLE No. H-21-17

Job No. XL-5001 SR 005 Elevation 222.9 ft

Sheet 1 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange

Driller Wilson, Jamie Lic# 2941

Component Illumination, Signals, Signs, and Traffic Systems

Inspector Harvey, Thomas #2599

Start November 9, 2017 Completion November 9, 2017 Well ID# N/A

Equipment CME 850 (9A2-523)

Station 1443+33.94 Offset 175.9 feet left Hole Dia (inches) 4

Historical SPT Efficiency 89.7%

Northing 639326.18 Easting 1076337.31 Collected by Region Survey Crew

Method Casing Advancer

Lat 47.0642860 Long -122.7637382 Datum NAD 83/91 HARN, NAVD88, SPS (ft)

Drill Fluid Bentonite

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	220.0			13 17 27 (44)		D-1	MC GS	GP-GM, MC=16% Poorly graded GRAVEL with silt and sand, sub-rounded, dense, dark brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
5				13 15 15 (30)		D-2		Silty SAND with gravel and organics, sub-rounded gravel, dense, dark brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	215.0									
10			>>	39 50/5" (REF)		D-3		Silty SAND with gravel, sub-rounded gravel, very dense, grayish brown and iron stained, moist, stratified. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
	210.0									
15				31 37 40 (77)		D-4	MC GS AL	SC-SM, MC=9%, PI=6 Silty, clayey SAND with gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.0 ft Retained: 1.0 ft		
	205.0									
20			>>							

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

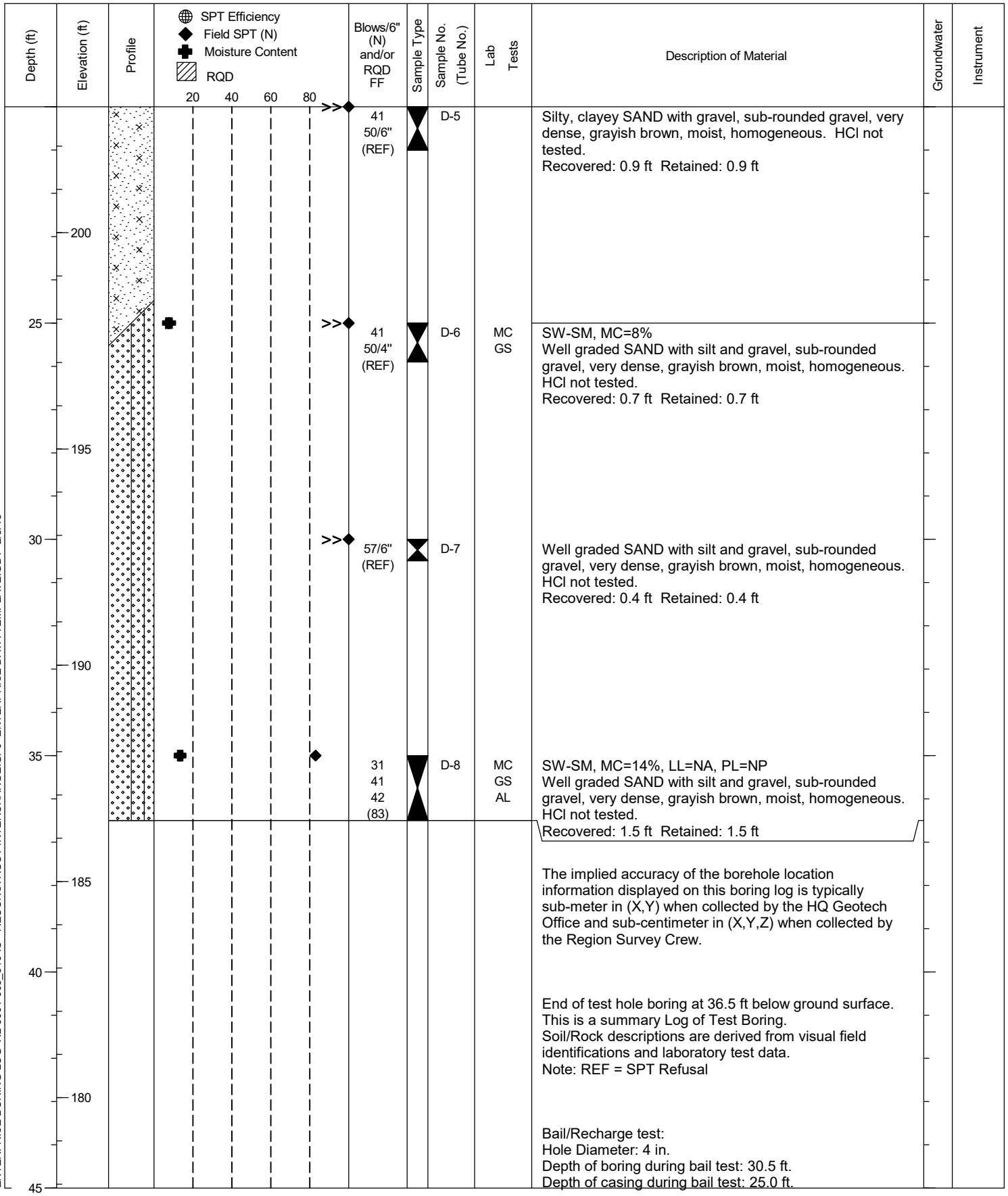
WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 222.9 ft HOLE No. H-21-17

Sheet 2 of 3

Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie



Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		41 50/6" (REF)		D-5		Silty, clayey SAND with gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.9 ft Retained: 0.9 ft		
25	200	41 50/4" (REF)		D-6	MC GS	SW-SM, MC=8% Well graded SAND with silt and gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.7 ft Retained: 0.7 ft		
30	195	57/6" (REF)		D-7		Well graded SAND with silt and gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 0.4 ft Retained: 0.4 ft		
35	190	31 41 42 (83)		D-8	MC GS AL	SW-SM, MC=14%, LL=NA, PL=NP Well graded SAND with silt and gravel, sub-rounded gravel, very dense, grayish brown, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft		
40	185					The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
	180					End of test hole boring at 36.5 ft below ground surface. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
45						Bail/Recharge test: Hole Diameter: 4 in. Depth of boring during bail test: 30.5 ft. Depth of casing during bail test: 25.0 ft.		

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

WSDOT

LOG OF TEST BORING

Job No. XL-5001 SR 005 Elevation 222.9 ft HOLE No. H-21-17

Sheet 3 of 3

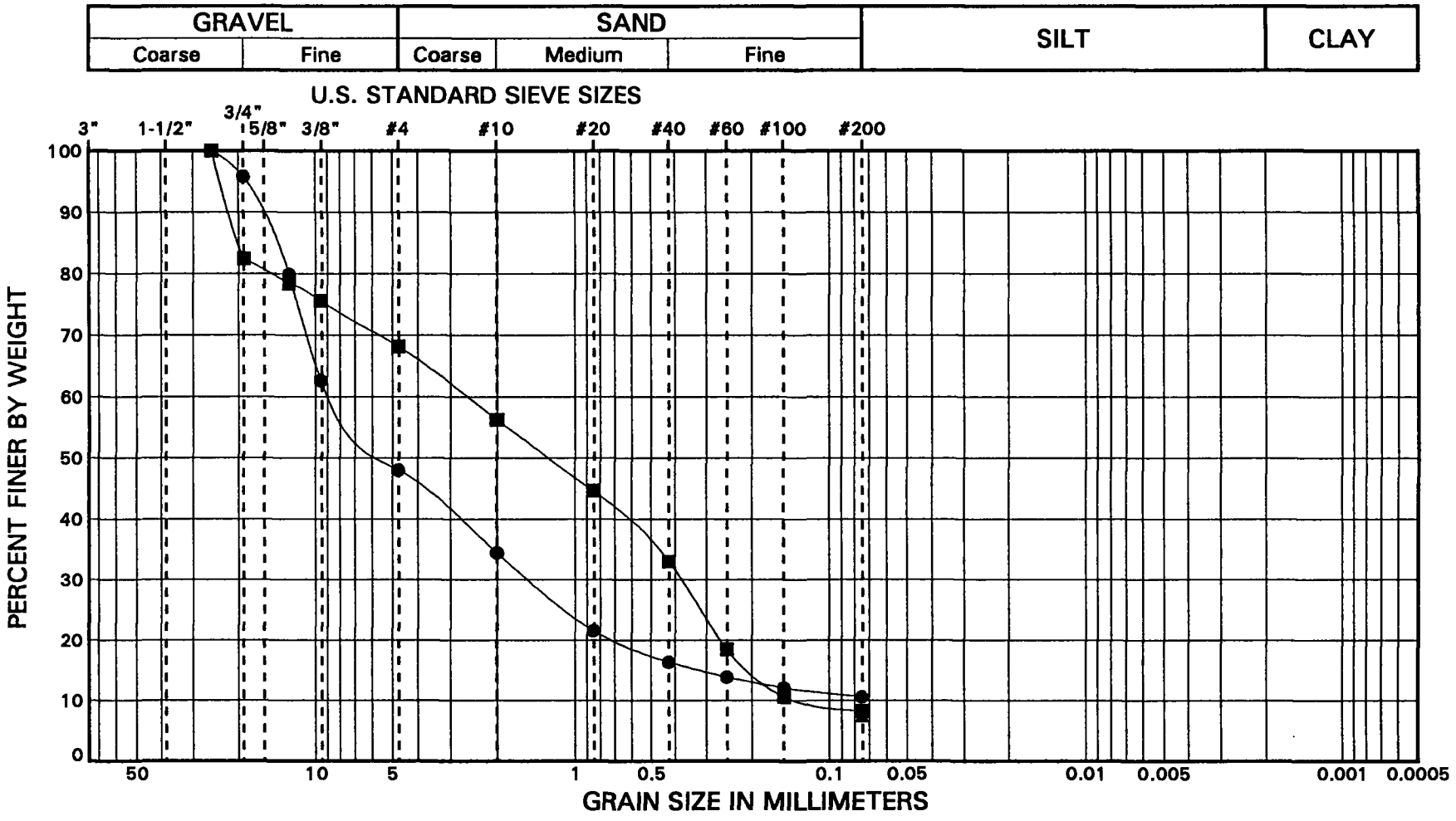
Project I-5/SR-510 Interchange - Reconstruct Interchange Driller Wilson, Jamie

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency / Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								Water depth before bailing: 7.9 ft. Bailed bore hole water level to 27.3 ft. Recharge after 5 minutes: 27.4 ft. Recharge after 10 minutes: 27.7 ft. Recharge after 15 minutes: 27.9 ft. Recharge after 20 minutes: 28.1 ft. Recharge after 25 minutes: 28.2 ft. Recharge after 30 minutes: 28.3 ft. Recharge after 40 minutes: 29.7 ft.		
50	175									
55	170									
60	165									
65	160									
70	155									

ENTERPRISE BORING LOG XL-5001 005_510 IC - RECONSTRUCT INTERCHANGE.GPJ ENTERPRISE DATA TEMPLATE.GDT 2/8/18

APPENDIX D

Historical Laboratory Testing Data



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	BH-1	S-3	2.7 - 3.2	(GP-GM) Olive brown, poorly graded GRAVEL with silt and sand.	8				52.0	37.4	10.6
■	BH-1	S-5	5.5 - 5.7	(SP-SM) Olive brown, poorly graded SAND with silt and gravel.	12				31.9	59.8	8.3
▲	BH-1	S-8	10.1 - 10.5	(SP-SM) Grayish brown, poorly graded SAND with silt and gravel.	10						7.4

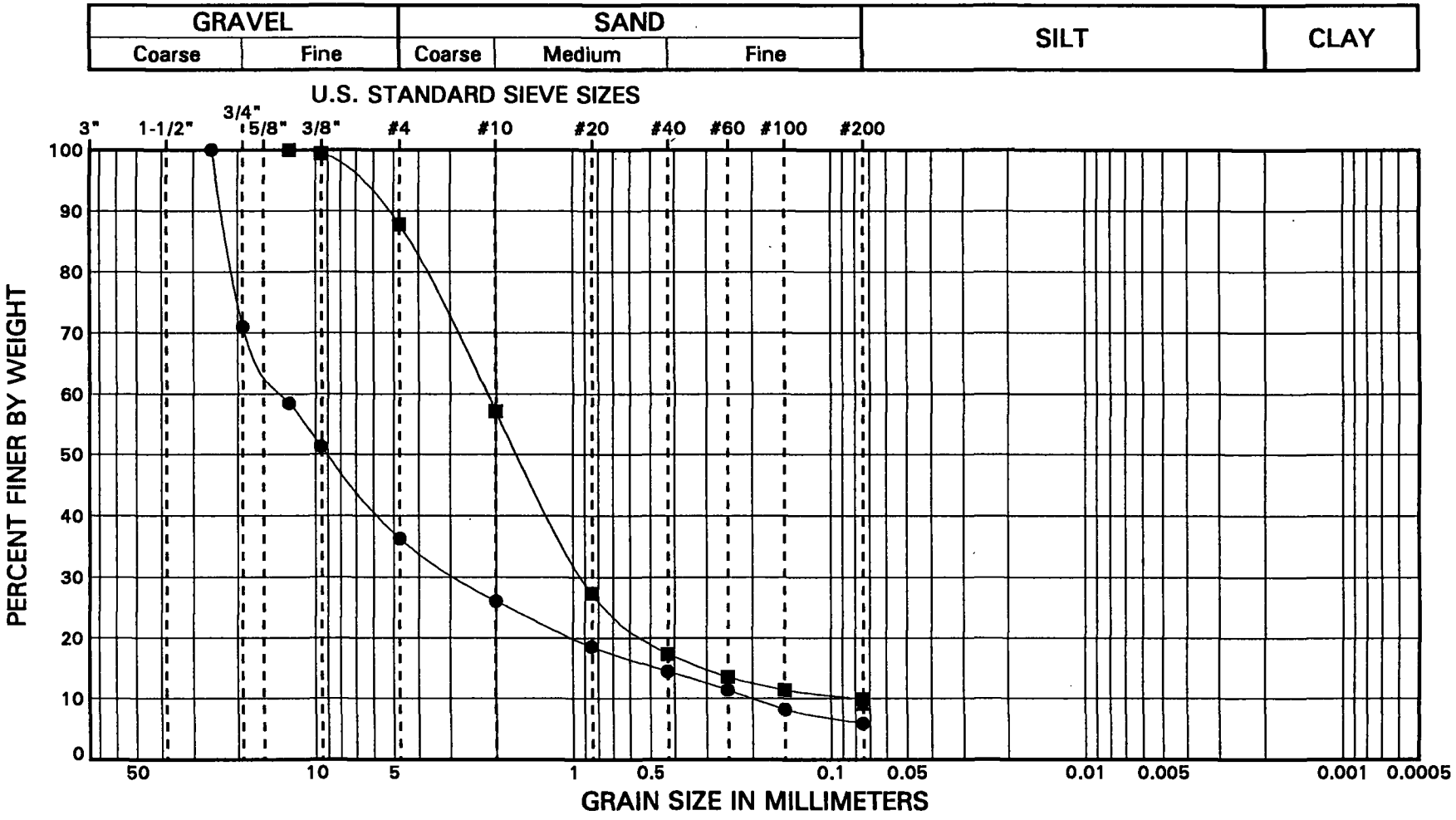
HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

GRAIN SIZE DISTRIBUTION TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-1

HWAGRSZM 96178 6/18/97



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	BH-2	S-2	1.5 - 2.0	(GW-GM) Very dark brown, well graded GRAVEL with silt and sand.	8				63.7	30.4	5.9
■	BH-2	S-5	5.5 - 6.0	(SP-SM) Light olive brown, poorly graded SAND with silt.	12				12.2	77.9	9.9
▲	BH-2	S-7	8.5 - 9.0	(GP-GM) Light olive brown, poorly graded GRAVEL with silt and sand.	10						9.0

HWA
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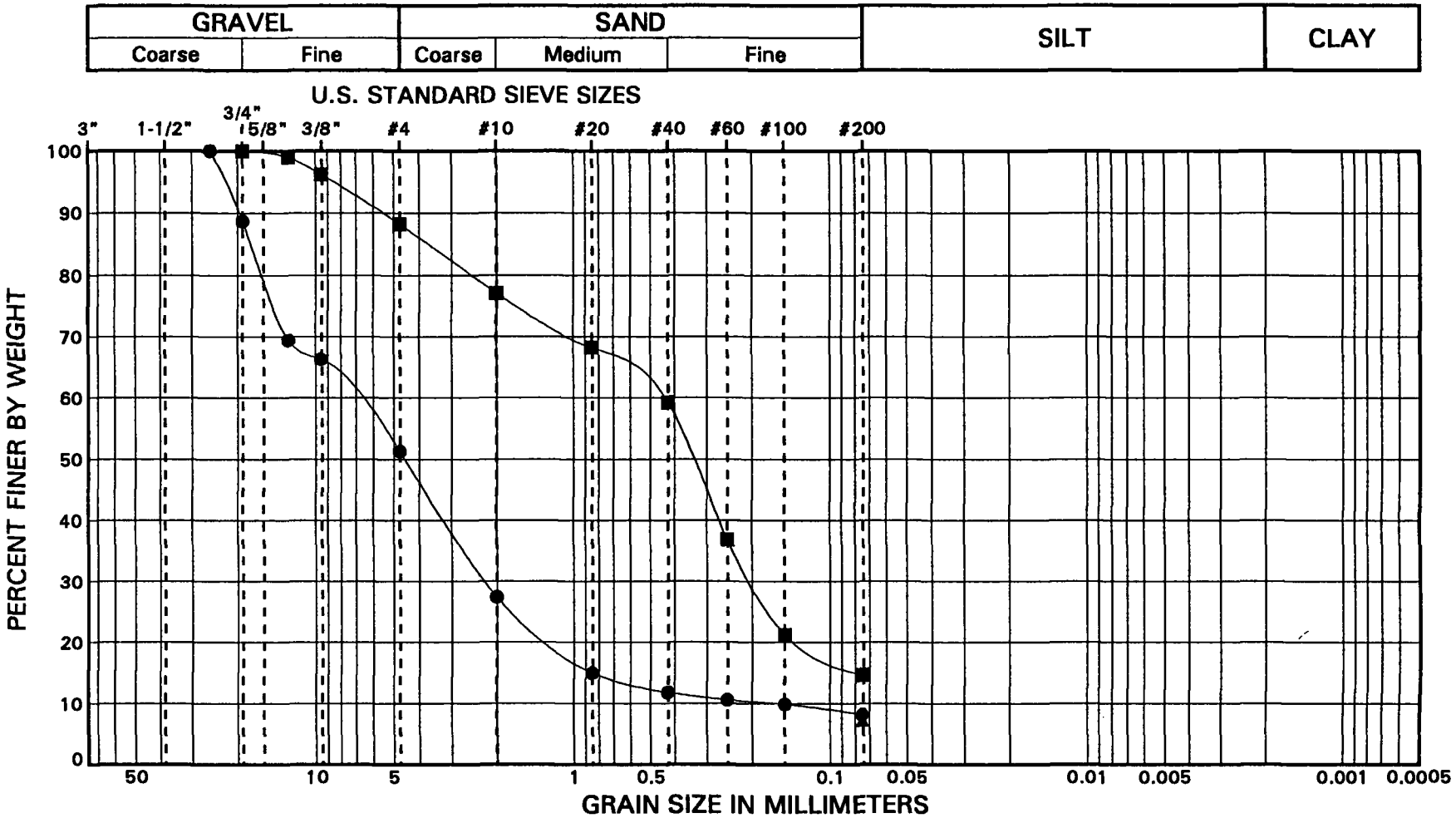
State Route 510
Lacey, WA

GRAIN SIZE DISTRIBUTION TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-2



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	BH-3	S-2	1.5 - 2.0	(GW-GM) Olive brown, well graded GRAVEL with silt and sand.	4				48.7	43.1	8.2
■	BH-3	S-4	4.0 - 4.4	(SM) Olive brown, silty SAND.	17				11.8	73.5	14.7
▲	BH-3	S-8	10.1 - 10.5	(SP-SM) Olive gray, poorly graded SAND with silt and gravel.	8						7.2

HWA
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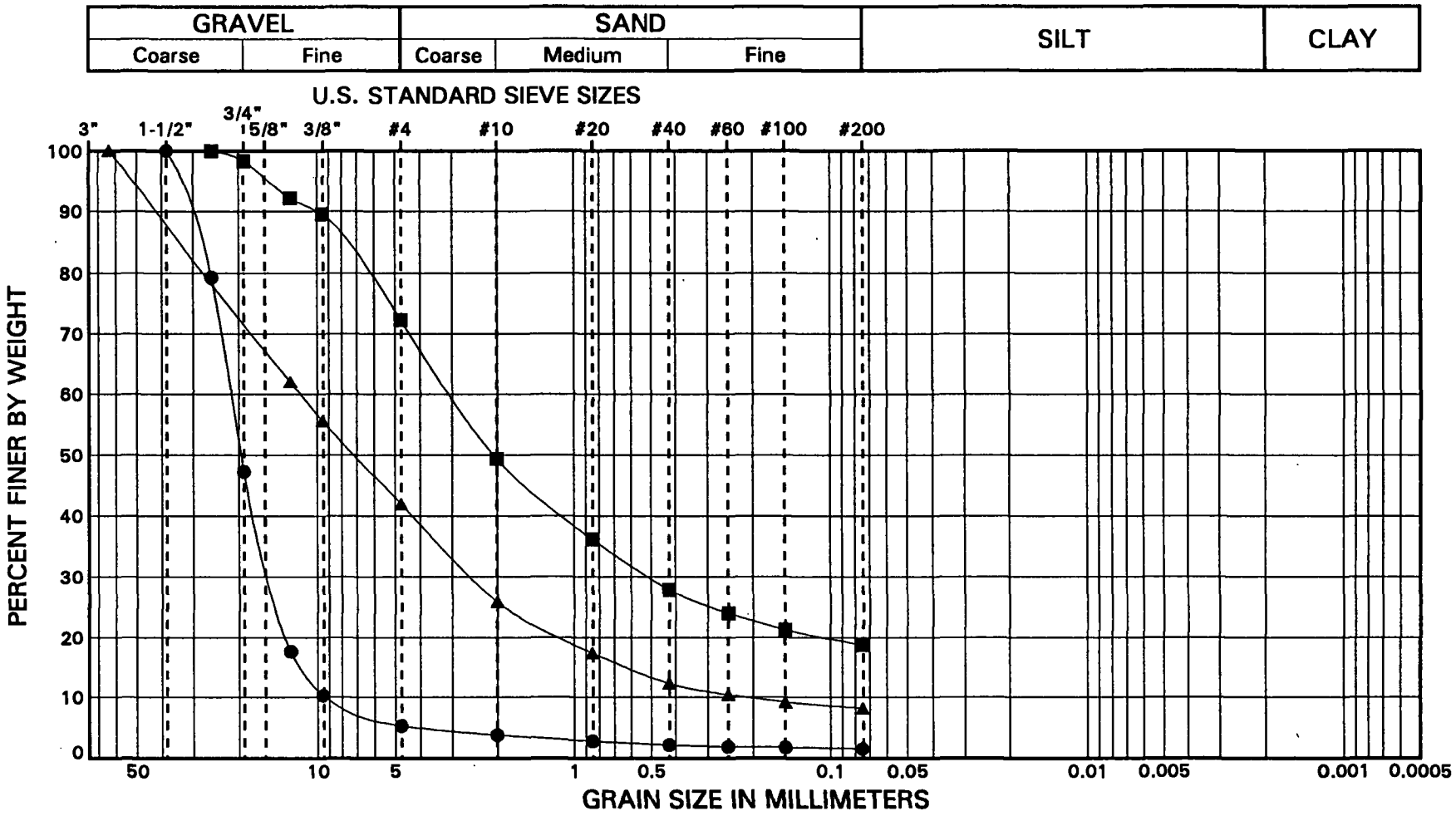
& ASSOCIATES, INC.

State Route 510
Lacey, WA

GRAIN SIZE
DISTRIBUTION
TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-3

HWAGRSZM 96178 6/18/97



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	BH-4	S-4	3.1 - 3.4	(GP) Dark grayish brown, poorly graded GRAVEL.					94.7	3.7	1.6
■	BH-4	S-5	4.0 - 4.3	(SM) Olive brown, silty SAND with gravel.					27.7	53.5	18.8
▲	BH-4	S-6	5.5 - 5.6	(GW-GM) Olive brown, well graded GRAVEL with silt and sand.					58.0	33.8	8.2

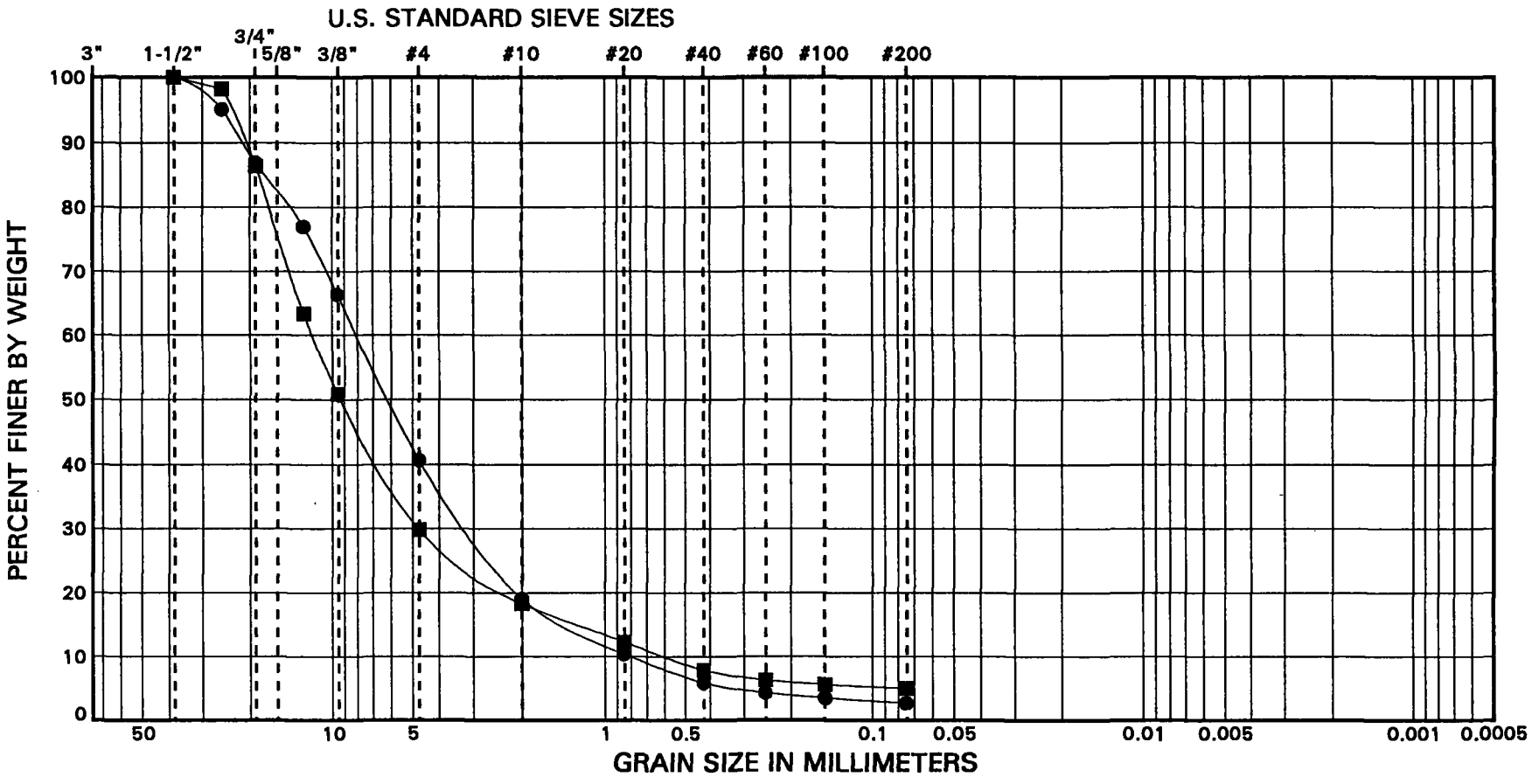
HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

GRAIN SIZE DISTRIBUTION TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-4

HWAGRSZM 96178 6/18/97



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	BH-5	S-2	0.9 - 1.2	(GW) Dark brown, well graded GRAVEL with sand.					59.3	38.0	2.7
■	BH-5	S-4	3.1 - 3.4	(GP-GM) Derk grayish brown, poorly graded GRAVEL w/silt and sand.					70.2	24.8	5.0

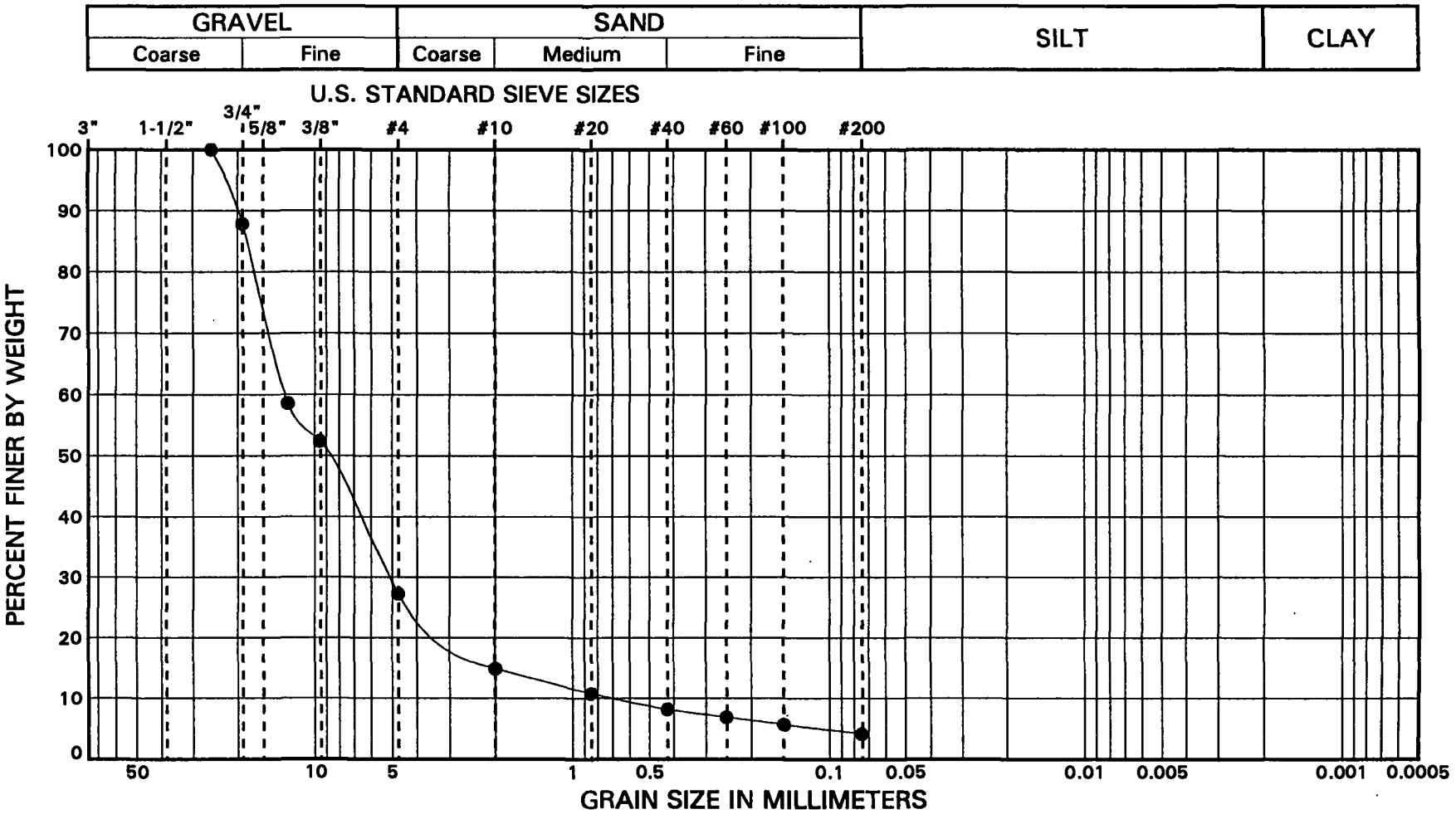
HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

GRAIN SIZE DISTRIBUTION TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-5

HWAGRSZM 96178 6/18/97



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	BH-6	S-1	0.2 - 0.5	(GW) Olive brown, well graded GRAVEL with sand.					72.7	23.1	4.2

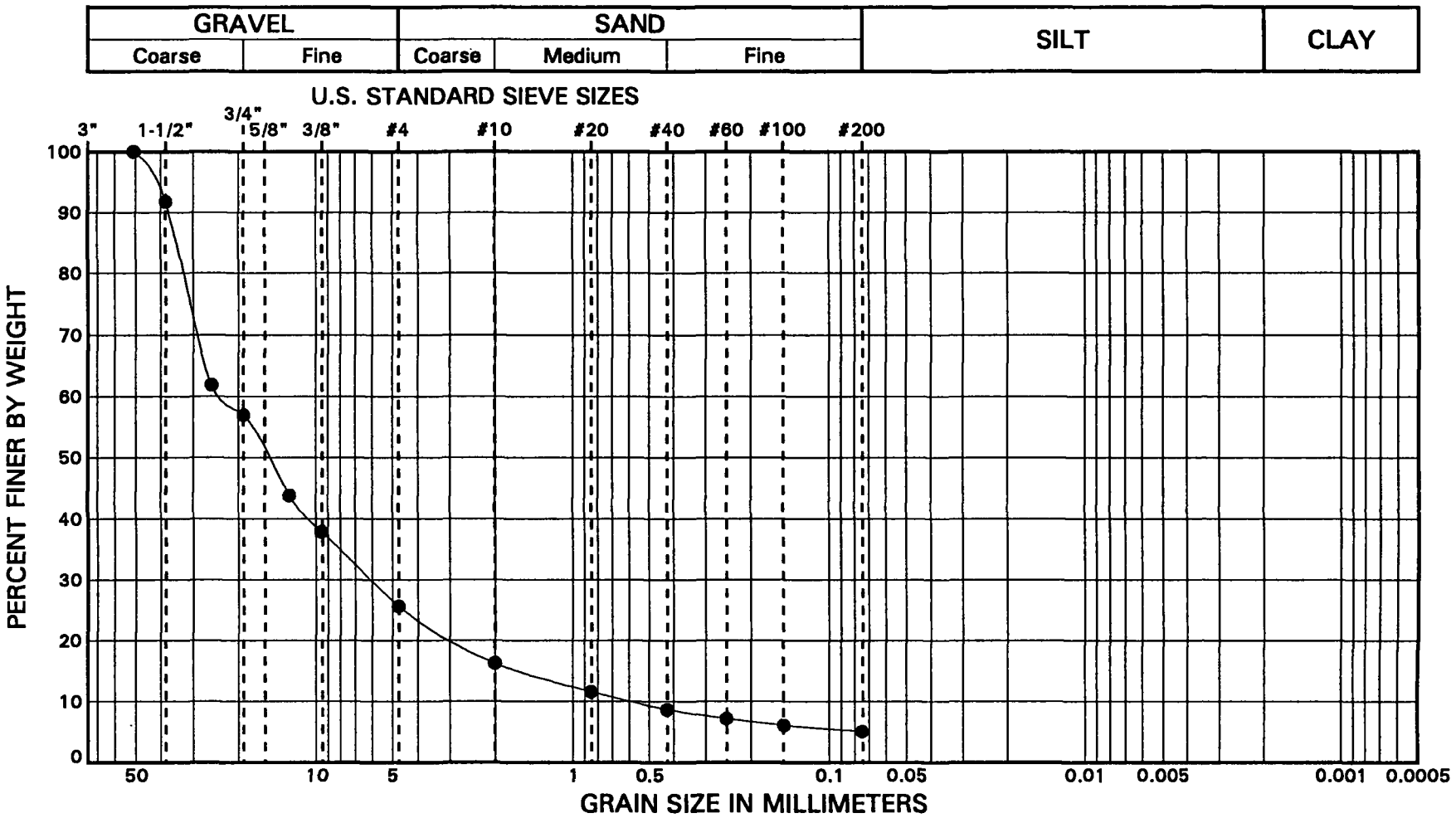
HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

GRAIN SIZE DISTRIBUTION TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-6

HWAGRSZM 96178 6/18/97



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	BH-7	S-1	0.2 - 0.5	(GW-GM) Olive brown, well graded GRAVEL with silt and sand.					74.3	20.6	5.1

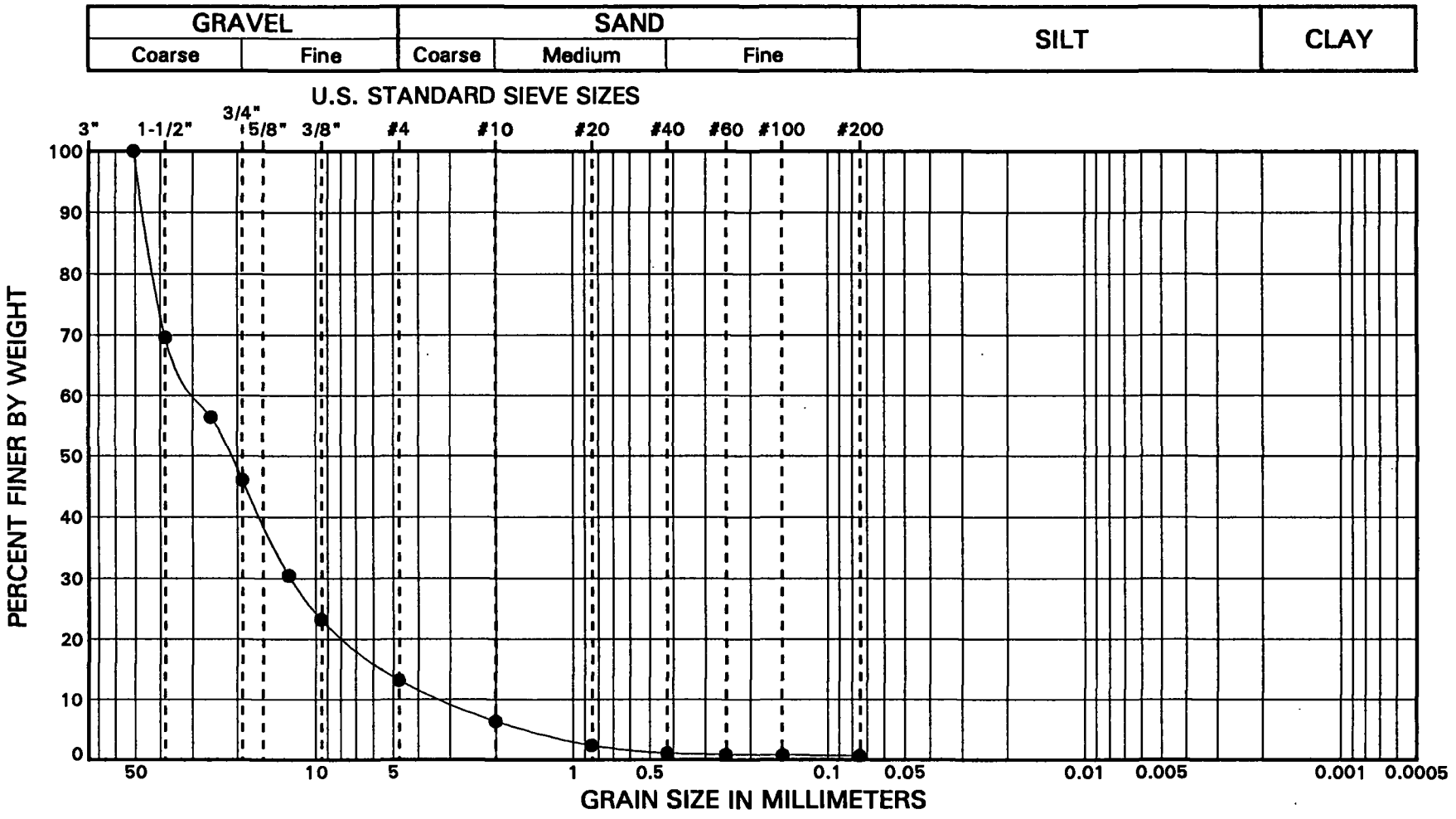
HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

GRAIN SIZE DISTRIBUTION TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-7

HWAGRSZM 96178 6/27/97



SYMBOL	SAMPLE		DEPTH (m)	CLASSIFICATION	% MC	LL	PL	PI	% Gravel	% Sand	% Fines
●	TP-1	S-2	1.5 - 1.8	(GW) Light olive brown, well graded GRAVEL.					86.8	12.5	0.7

HONGWEST & ASSOCIATES, INC.

State Route 510
Lacey, WA

GRAIN SIZE DISTRIBUTION TEST RESULTS

PROJECT NO.: 96178 FIGURE: B-8

HWAGRSZM 96178 6/27/97

Northern, Inc.

Kirkland, Yakima, Kennewick, Hermiston (OR)

Project No.: 298-811
SR-510
SR-5 to Martin Way
Lacey, Washington

PARTICLE SIZE ANALYSIS

(ASTM C-136-93; D-1140-92)

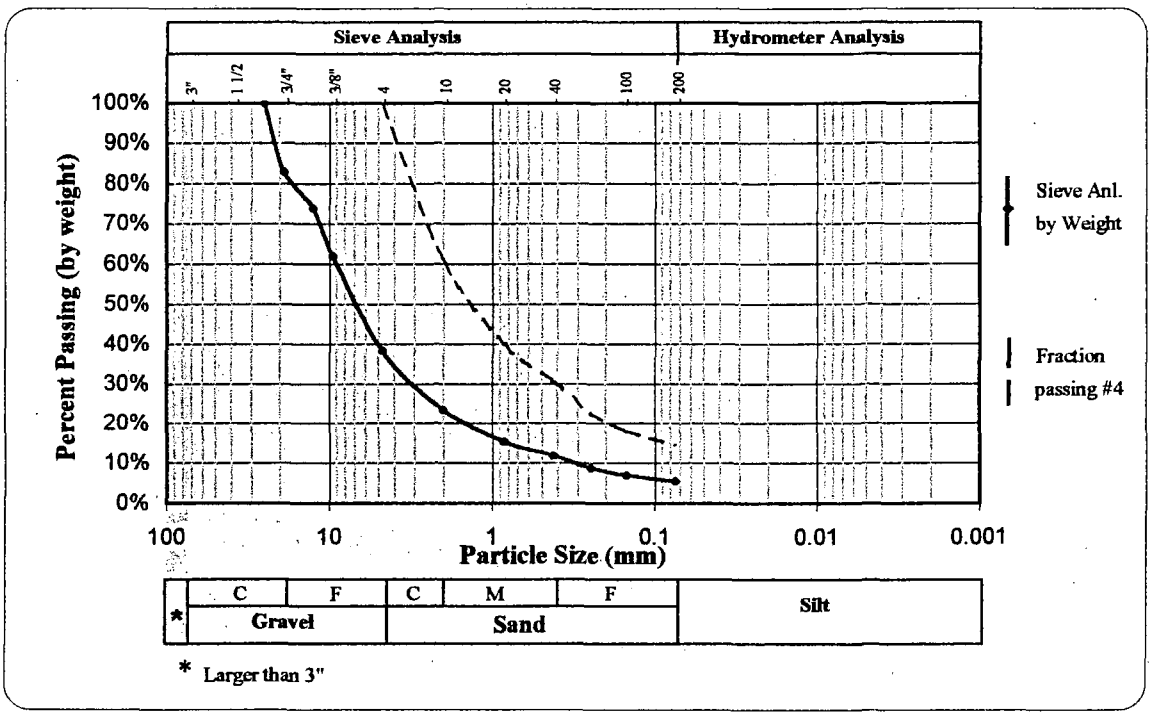
Test Boring/ Test Pit Number:	TH-1
Sample Identification:	S5
Sample Depth (ft. BGS):	15.0
Date Sampled:	04/15/99

Atterberg Limits (ASTM D 4318)

Liquid Limit:	N/A
Plastic Limit:	N/A
Plasticity Index:	N/A
Specific Gravity (ASTM C 127):	N/A
Moisture Content (ASTM D 2216):	N/A

Soil Classification (ASTM D 2487): GW-GM
Description: Well Graded Gravel with Silt and Sand

Major Divisions	Sieve Designation	% Passing by Weight	Fraction Passing #4
	3"		
	2"		
	1.5"		
Gravel	1"	100	
62%	3/4"	83	
	1/2"	74	
	3/8"	62	
	No. 4	38	100%
	No. 10	23	61%
Sand	No. 20	15	40%
33%	No. 40	12	31%
	No. 80	9	23%
	No. 100	7	18%
Fines	No. 200	6	15%



Reviewed by: Joseph Hard

Date: May 25, 1999

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
Materials Laboratory
Olympia

SOIL TEST DATA

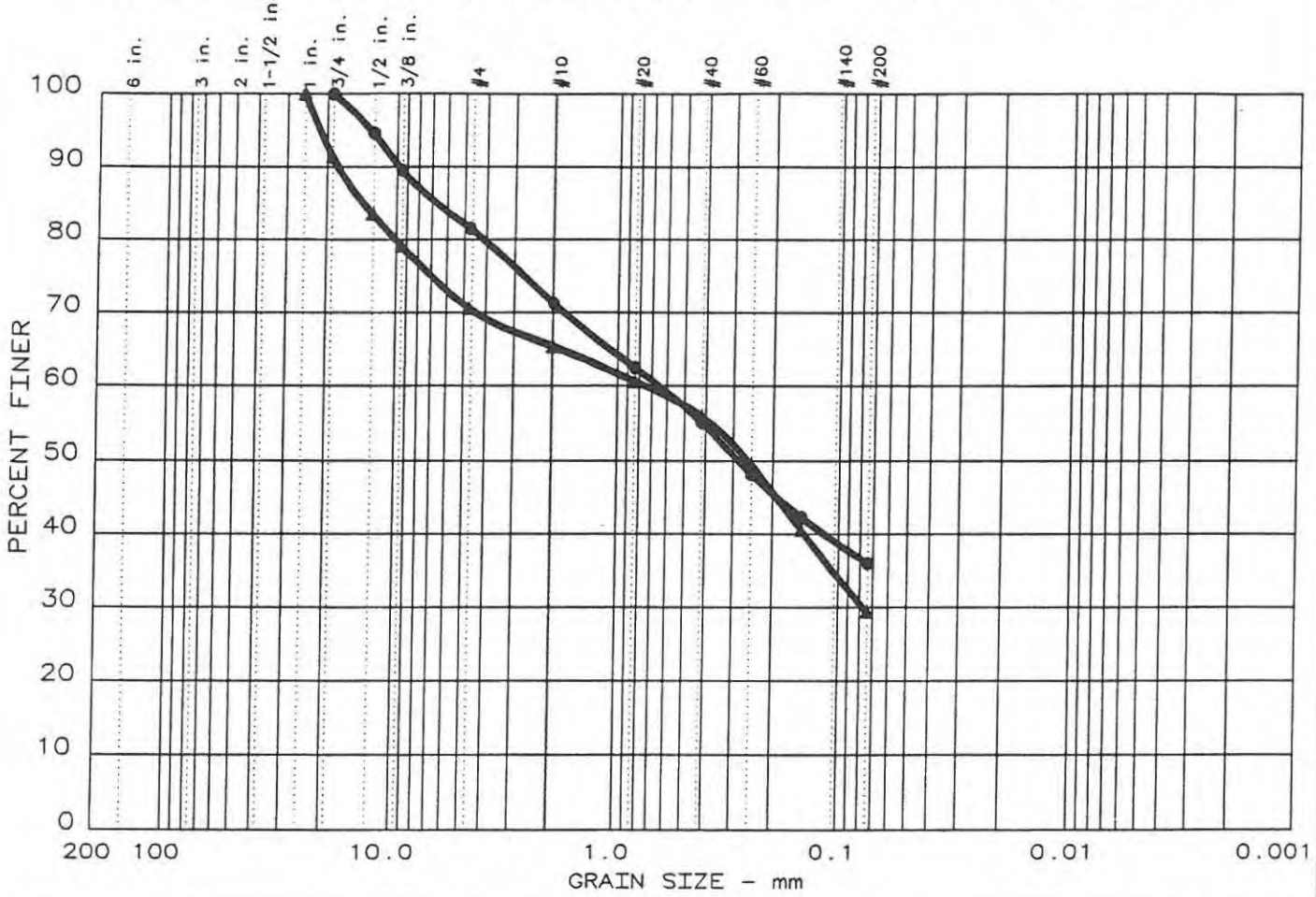
Job No. L-2055 PS.H. No. 1 Section Gleason - Carney Road - Channelization

Field Sample No.	2	4	5			
Laboratory No.	5-6161	5-6162	5-6163			
Sample from Station	191+15	196+05	200+50			
Offset	25' Rt.	25' Rt.	29' Rt.			
Depth	7"-36"	8"-11"	2"-16"			
Textural Classification	Gravel	Silty Sandy Gravel	Silty Sandy Gravel			
Liquid Limit	33	—	—			
Plasticity Index	14	N.P.	N.P.			
Grading - Maximum Size	2"	3"	2½			
% Passing 1½"	99	83	87			
1"	93	74	74			
3/4"	85	63	66			
3/8"	46	40	46			
#4	15	26	32			
10	8	22	26			
40	5	17	18			
200	3	11	11			
HRB Class. & Group Index	A-2-6 (0)	A-1-a (0)	A-1-a (0)			
Proctor (ASTM D698-42T): Opt. Moist. Cont.						
Max. Density						
Density in Place						
% of Max. Density						
Moist. Cont. in Place						
Hveem Stabilometer Test: Resistance Value "R"	10 coarse	75	71			
Equilibrium Swell Pressure (psi)						
Theoretical Total Surfacing and ~~Bituminous Mat~~, Design Curve T.I. 6.6		7"	8"			

DISTRIBUTION:
Materials Files X
General Files X
District Engineer (3) 3
Dist. Soils Engr. (3) X
Plan. & Contracts X
Hdq. Loc. Engr. X
Bureau Pub. Roads
Soils Lab. X
H.F. 26.02 (Rev.)

CARL E. MINOR
Principal Materials Engineer
By C. E. Minor
Date 4-21-58

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	0.0	18.5	45.6	35.9	
▲	0.0	29.4	41.2	29.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			6.68	0.65	0.29					
▲			13.80	0.74	0.26	0.077				

MATERIAL DESCRIPTION	USCS	NAT. MOIST.
● Gravelly, very silty SAND	SM	18%
▲ Gravelly, Silty SAND	SM	9%

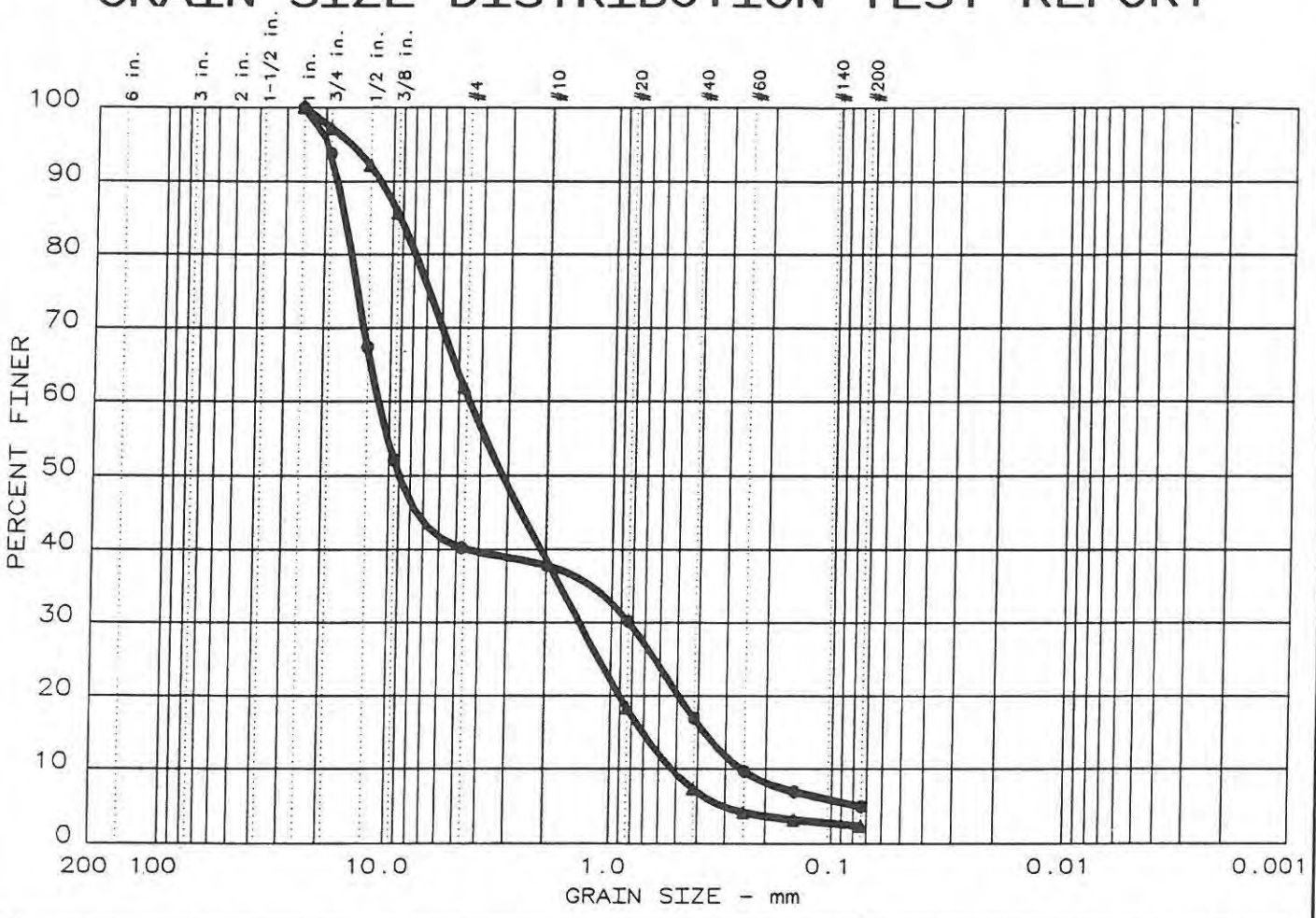
Remarks:

Project: Lacey L.I.D.
● Location: TP-1, S-2
▲ Location: TP-2, S-3

HARTCROWSER J-4668 12/9/96

Figure B-2

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	0.0	59.8	35.3	4.9	
▲	0.0	38.1	59.6	2.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			16.27	11.23	8.98	0.829	0.3745	0.2562	0.24	43.9
▲			9.23	4.47	3.16	1.396	0.7071	0.5182	0.84	8.6

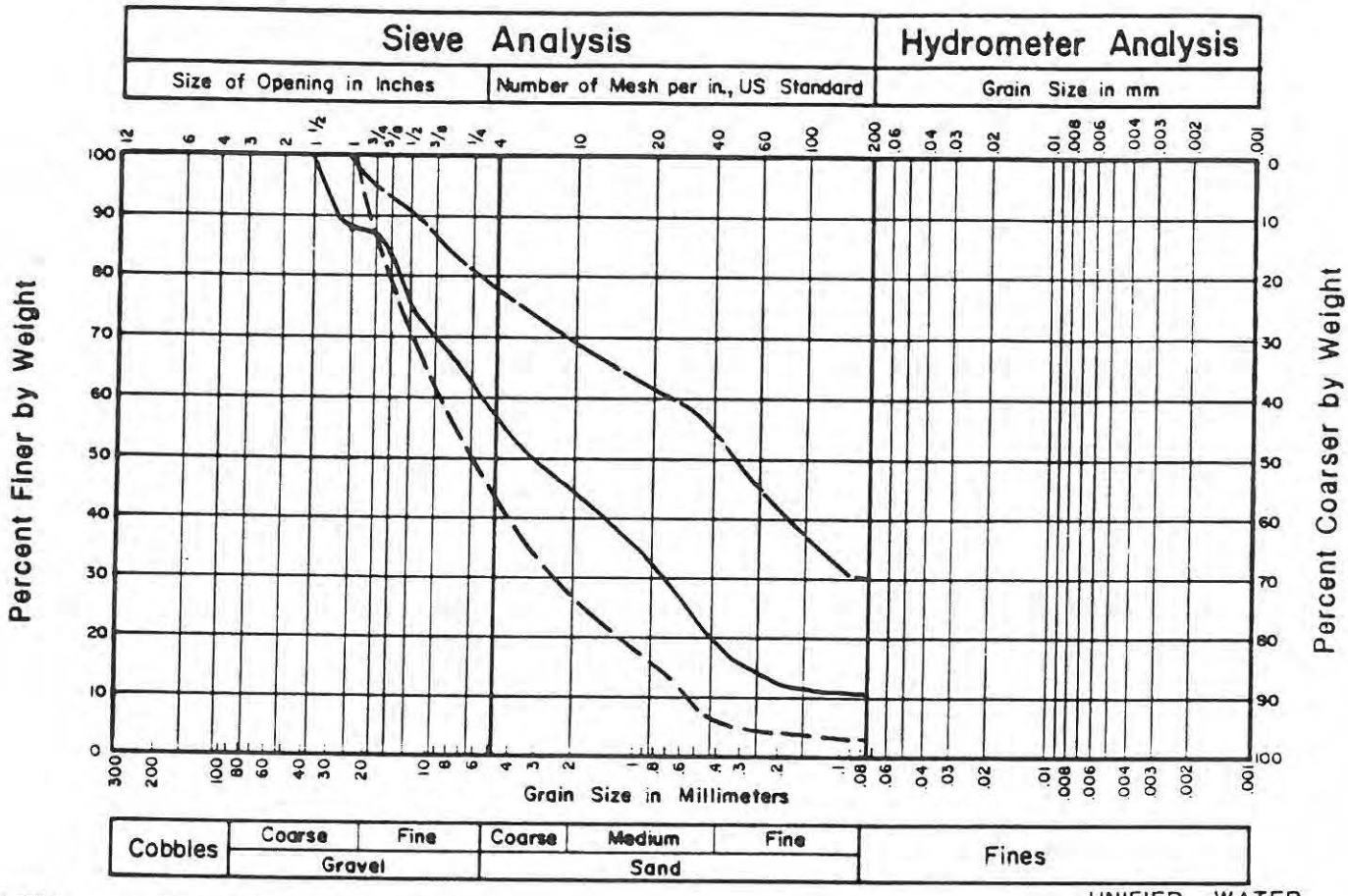
MATERIAL DESCRIPTION	USCS	NAT. MOIST.
● Very sandy GRAVEL	GP	6%
▲ Very gravelly SAND	SP	16%

Remarks:

Project: Lacey L.I.D.
● Location: TP-7, S-2
▲ Location: TP-7, S-3

HARTCROWSER J-4668 12/9/96
Figure B-3

Grain Size Classification



LINE SYMBOL	BORING NUMBER	SAMPLE NUMBER	DEPTH IN FEET	CLASSIFICATION	UNIFIED SOIL CLASS.	WATER CONTENT PERCENT
———	HC-2	S-5	22.5-23.2	Slightly silty, very gravelly, SAND	SM-SW	8
— —	HC-4	S-3	12.5-13.5	Gravelly, silty SAND	SM	8
— — —	HC-6	S-3	12.5-14.0	Very sandy GRAVEL	GW	3

HARTCROWSER
J-2276 8/89
Figure B-2

Appendix F

BRITTON PARKWAY NE

MARVIN ROAD NE

GATEWAY BOULEVARD

MAIN STREET

MAIN STREET

INTERSTATE 5

C101

C102

C103

C104

C105

C106

C107

C108

C109

CABELA'S

EXIST. STORMWATER FACILITY

4' BARBED WIRE FENCE

4' BARBED WIRE FENCE

Catchment #	Total Area Forested (AC)
C101	22.58
C102	22.97
C103	18.53
C104	32.50
C105	8.60
C106	28.45
C107	8.59
C108	24.31
C109	8.96
Total:	174.00

SCALE: 1"=200'

-200 0 200 400

CLIENT:

ACORN ENVIROMENTAL
5170 GOLDEN FOOTHILL PARKWAY
EL DORADO HILLS, CA 95762

PH: 916-235-8224
FX:
CONTACT: RYAN SAWYER
EMAIL: rsawyer@acorn-env.com

PRE-DEVELOPED CATCHMENT PLAN FOR:

QUIEMUTH VILLAGE

OLSON LAND SURVEYORS ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN, VANCOUVER, WA 98660 360-695-1385

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PETER A. TUCK
STATE OF WASHINGTON
31417
REGISTERED
PROFESSIONAL ENGINEER

6/01/2023

CHANGES / REVISIONS

DESCRIPTION:	DATE:

DESIGNED: GCO

DRAWN: GCO/TAS

CHECKED: PAT

DATE: NOVEMBER 2020

SCALE: H: 1"= XX'
V: N/A

QUIEMUTH VILLAGE

JOB NO.: 1234.01.01

SHEET

CP-1.0

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Catchment #	Total Area (AC)	Impervious Total Area (AC)	Paved Area (PGIS) (AC)	Roof Area (AC)	Landscape Area (AC)
C101	22.59	19.20	10.36	3.84	3.39
C102	22.97	19.52	15.62	3.90	3.45
C103	18.53	15.75	12.60	3.15	2.78
C104	32.50	27.64	22.09	5.55	4.86
C105	9.00	7.31	5.85	1.46	1.29
C106	29.45	24.18	19.35	4.83	4.27
C107	6.50	5.52	4.42	1.10	0.98
C108	24.91	21.17	16.94	4.23	3.74
C109	9.56	7.51	6.09	1.52	1.54
Total:	**174.00**	**147.90**	**118.32**	**29.58**	**26.10**

SCALE: 1"=200'

-200 0 200 400

CLIENT:
ACORN ENVIROMENTAL
5170 GOLDEN FOOTHILL PARKWAY
EL DORADO HILLS, CA 95762
PH: 916-235-8224
FX:
CONTACT: RYAN SAWYER
EMAIL: rsawyer@acorn-env.com

DEVLOPED CATCHMENT PLAN - ALTERNATIVE 1 FOR:

QUIEMUTH VILLAGE

OLSON LAND SURVEYORS ENGINEERS
ENGINEERING INC.222 E. EVERGREEN, VANCOUVER, WA 98660 360-695-1385

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DESCRIPTION:	DATE:

DESIGNED: GCO

DRAWN: GCO/TAS

CHECKED: PAT

DATE: NOVEMBER 2020

SCALE: H: 1"= XX'
V: N/A

QUIEMUTH VILLAGE

JOB NO.: 1234.01.01

SHEET

CP-2.0

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Catchment #	Total Area (AC)	Impervious Total Area (AC)	Paved Area (PGIS) (AC)	Roof Area (AC)	Landscape Area (AC)
C201	22.59	5.19	4.35	0.84	17.40
C202	22.97	19.52	15.62	3.90	3.45
C203	18.53	3.71	3.71	0.00	14.82
C204	32.50	27.64	22.09	5.55	4.86
C205	8.60	7.31	5.85	1.46	1.29
C206	28.45	24.18	19.35	4.83	4.27
C207	6.50	5.52	4.42	1.10	0.98
C208	24.91	4.98	4.98	0.00	19.93
C209	8.95	7.61	6.09	1.52	1.34
Total:	174.00	105.66	86.46	19.20	68.34

CLIENT:

ACORN ENVIROMENTAL
5170 GOLDEN FOOTHILL PARKWAY
EL DORADO HILLS, CA 95762

PH: 916-235-8224
FX:
CONTACT: RYAN SAWYER
EMAIL: rsawyer@acorn-env.com

DEVELOPED CATCHMENT PLAN - ALTERNATIVE 2 FOR:

QUIEMUTH VILLAGE

OLSON ENGINEERING INC.
LAND SURVEYORS
ENGINEERS
222 E. EVERGREEN, VANCOUVER, WA 98660
360-695-1385

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6/01/2023

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DESIGNED: GCO
DRAWN: GCO/TAS
CHECKED: PAT
DATE: NOVEMBER 2020
SCALE: H: 1"= XX'
V: N/A

QUIEMUTH VILLAGE

JOB NO.:1234.01.01

SHEET

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BRITTON PARKWAY NE

MARVIN ROAD NE

GATEWAY BOULEVARD

MAIN STREET

MAIN STREET

INTERSTATE 5

CABELA'S

BIORETENTION FACILITY (TOTAL AREA SHOWN)
THIS WILL ULTIMATELY CONSIST OF MULTIPLE
SMALLER FACILITIES DISPERSED THROUGHOUT
THE SITE (TYP.)

INFILTRATION FACILITY (TOTAL AREA SHOWN)
THIS MAY ULTIMATELY CONSIST OF MULTIPLE
SMALLER FACILITIES DISPERSED THROUGHOUT
THE SITE (TYP.)

EXIST. STORMWATER
FACILITY

TO BE RELINQUISHED TO WSDOT
AFN: 4636022

C101 C102 C103 C104 C105 C106 C107 C108 C109

LEGEND

TOTAL INFILTRATION TRENCH AREA REQUIRED

TOTAL BIORETENTION CELL AREA REQUIRED

Catchment #	Total Treatment Area (Acre)	Paved Area (SF)	Landscape Area (SF)	Bioretention Area Required (SF)
C101	18.75	15.36	3.39	25,700
C102	19.07	15.62	3.45	26,100
C103	15.38	12.60	2.78	21,100
C104	26.95	22.09	4.86	36,900
C105	7.14	5.85	1.29	9,800
C106	23.62	19.35	4.27	32,300
C107	5.40	4.42	0.98	7,400
C108	20.68	16.94	3.74	28,300
C109	7.43	6.09	1.34	10,200

Table5.1: Alternative 1 - Bioretention Treatment Area Required (total)

Catchment #	Total Area (Acre)	Paved Area (SF)	Roof Area (SF)	Landscape Area (SF)	Infiltration Trench Area Required (SF)
C101	22.59	15.36	3.84	3.39	35,800
C102	22.87	15.62	3.90	3.45	36,400
C103	18.53	12.60	3.15	2.78	29,400
C104	32.50	22.09	5.65	4.86	51,500
C105	8.60	5.85	1.46	1.29	13,700
C106	28.45	19.35	4.83	4.27	45,100
C107	6.50	4.42	1.10	0.98	10,300
C108	24.91	16.94	4.23	3.74	39,500
C109	8.95	6.09	1.52	1.34	14,200

Table7.1: Alternative 1 - Stormwater Infiltration Facility Footprint Area

SCALE: 1"=200'

-200 0 200 400

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CLIENT:

ACORN ENVIROMENTAL
5170 GOLDEN FOOTHILL PARKWAY
EL DORADO HILLS, CA 95762

PH: 916-235-8224
FX:
CONTACT: RYAN SAWYER
EMAIL: rsawyer@acorn-env.com

CONCEPTUAL STORMWATER PLAN - ALTERNATIVE 1 FOR:

QUIEMUTH VILLAGE

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STATE OF WASHINGTON
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6/01/2023

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DESCRIPTION:	DATE:

DESIGNED: GCO

DRAWN: GCO/TAS

CHECKED: PAT

DATE: NOVEMBER 2020

SCALE: H: 1"= XX'
V: N/A

QUIEMUTH VILLAGE

JOB NO.: 1234.01.01

SHEET

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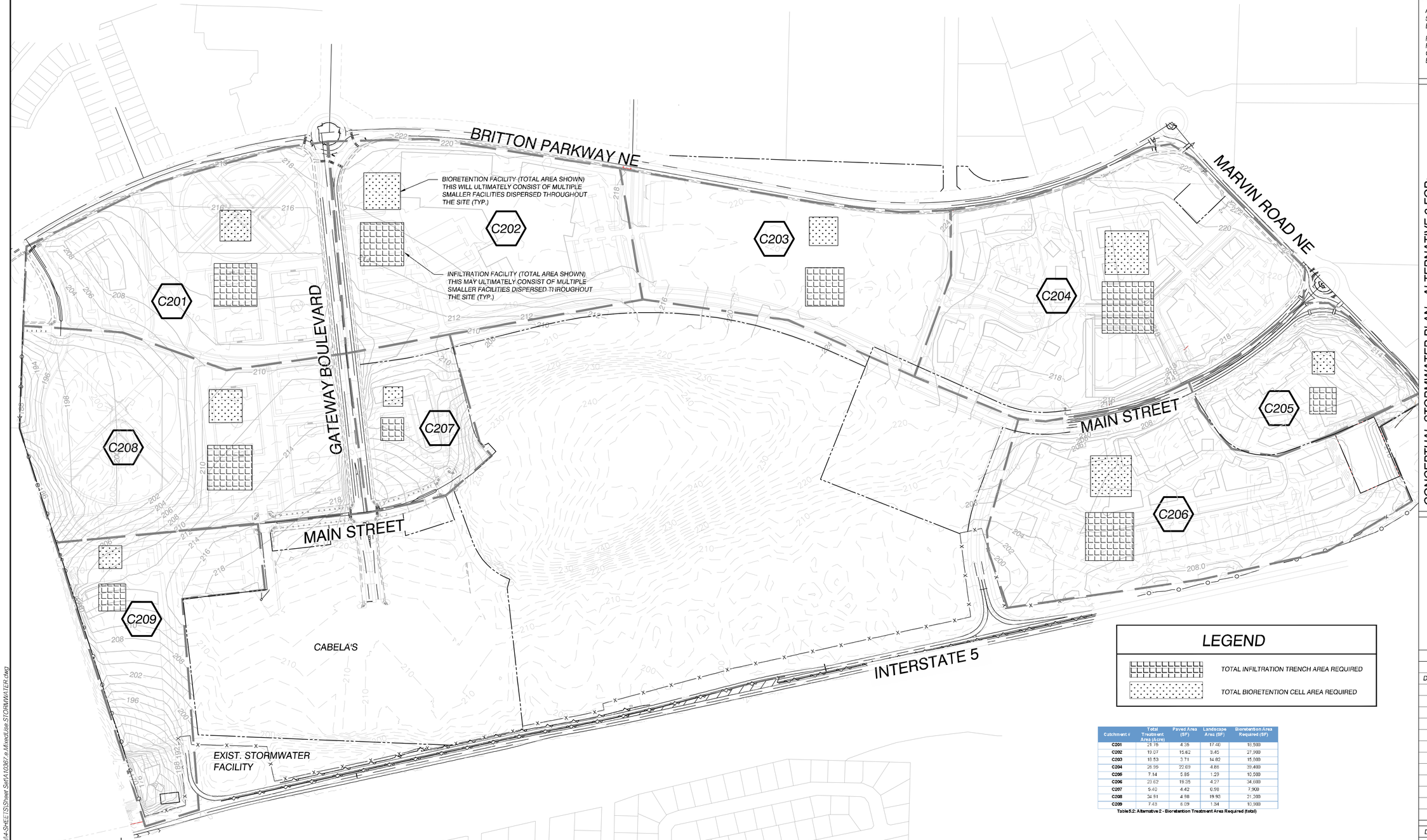

SCALE: 1"=200'

-200 0 200 400

LEGEND

TOTAL INFILTRATION TRENCH AREA REQUIRED

TOTAL BIORETENTION CELL AREA REQUIRED

Catchment #	Total Treatment Area (Acre)	Paved Area (SF)	Landscape Area (SF)	Bioretention Area Required (SF)
C201	21.75	4.35	17.40	18,500
C202	19.07	15.62	3.45	27,900
C203	18.53	3.71	14.82	15,800
C204	28.95	22.69	4.86	39,400
C205	7.14	5.86	1.29	10,500
C206	23.62	19.35	4.27	34,600
C207	5.40	4.42	0.98	7,900
C208	24.91	4.98	19.93	21,200
C209	7.43	6.09	1.34	10,900

Table 5.2: Alternative 2 - Bioretention Treatment Area Required (total)

Catchment #	Total Area (Acre)	Paved Area (SF)	Roof Area (SF)	Landscape Area (SF)	Infiltration Trench Area Required (SF)
C201	22.59	4.35	0.84	17.40	36,900
C202	22.97	15.62	3.90	3.45	42,100
C203	18.53	3.71	0.00	14.82	29,500
C204	32.50	22.69	5.55	4.86	59,600
C205	8.60	5.85	1.46	1.29	15,800
C206	28.45	19.35	4.83	4.27	52,200
C207	6.90	4.42	1.10	0.98	12,000
C208	24.91	4.98	0.00	19.93	36,900
C209	8.95	6.09	1.52	1.34	16,400

Table 7.1: Alternative 2 - Stormwater Infiltration Facility Footprint Area

CLIENT:

ACORN ENVIROMENTAL
5170 GOLDEN FOOTHILL PARKWAY
EL DORADO HILLS, CA 95762

PH: 916-235-8224
FX:
CONTACT: RYAN SAWYER
EMAIL: rsawyer@acorn-env.com

CONCEPTUAL STORMWATER PLAN - ALTERNATIVE 2 FOR:

QUIEMUTH VILLAGE

CLSON LAND SURVEYORS ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN, VANCOUVER, WA 98660 360-695-1385

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STATE OF WASHINGTON
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6/01/2023

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DESCRIPTION:	DATE:

DESIGNED: GCO

DRAWN: GCO/TAS

CHECKED: PAT

DATE: NOVEMBER 2020

SCALE: H: 1"= XX'
V: N/A

QUIEMUTH VILLAGE

JOB NO.: 1234.01.01

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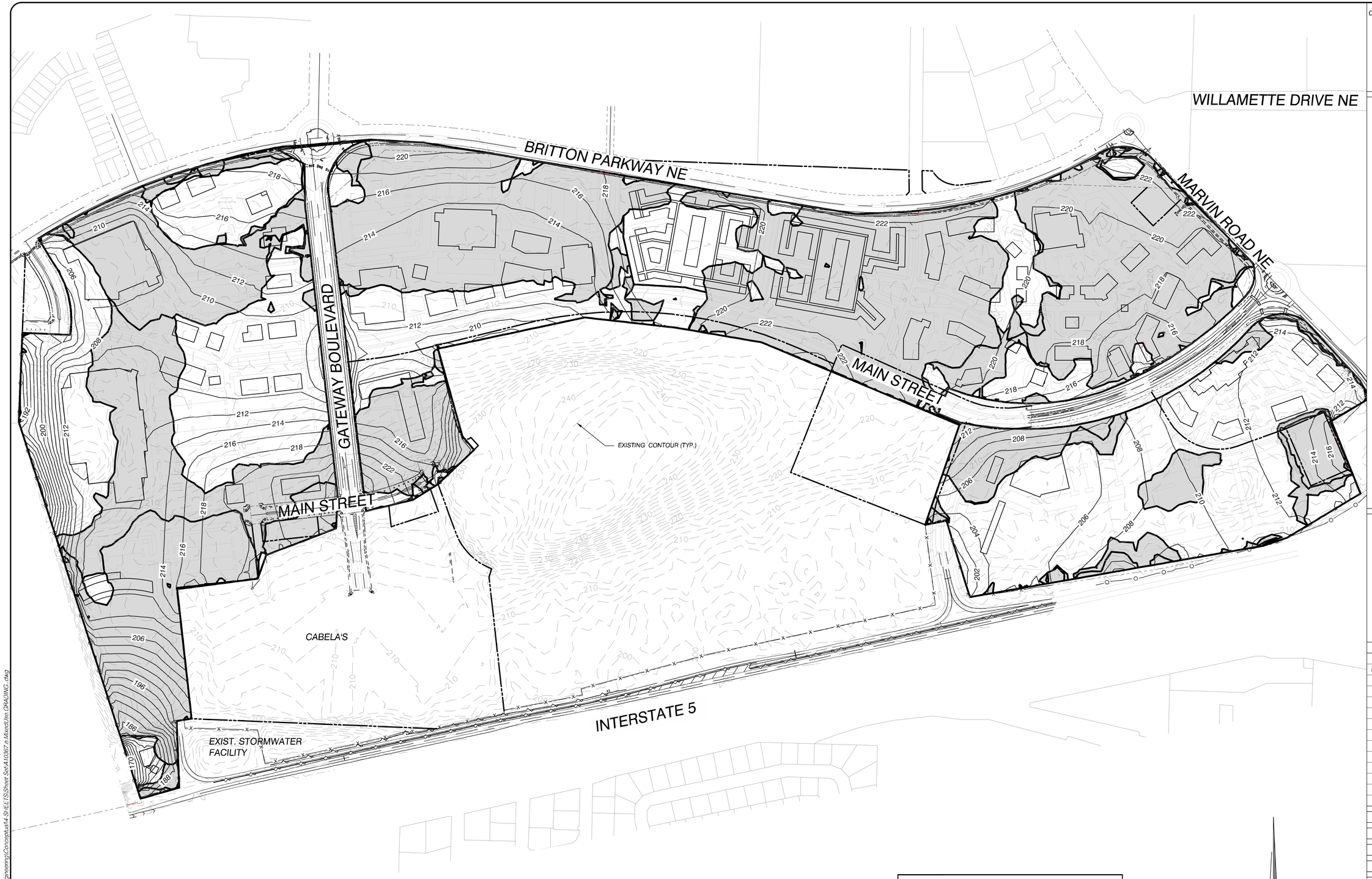

APPROXIMATE GRADING VOLUMES

EARTHWORK VOLUME ..... 370,000 CY

LEGEND

298	FINISHED GRADE CONTOUR
298	EXISTING CONTOUR
	SHADING REPRESENTS AREA OF CUT
	AREA OF CUT/FILL LINE

SCALE: 1"=200'

-100 0 100 200

CLIENT:
ACORN ENVIROMENTAL
5170 GOLDEN FOOTHILL PARKWAY
EL DORADO HILLS, CA 95762
PH: 916-235-8224
FX:
CONTACT: RYAN SAWYER
EMAIL: rsawyer@acorn-env.com

GRADING PLAN ALTERNATIVE 1 FOR:

QUIEMUTH VILLAGE

OLSON LAND SURVEYORS ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN, VANCOUVER, WA 98660
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6/01/2023

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DESCRIPTION:	DATE:

DESIGNED: GCO
DRAWN: GCO/TAS
CHECKED: PAT
DATE: NOVEMBER 2020
SCALE: H: 1"= XX'
V: N/A

QUIEMUTH VILLAGE

JOB NO.:1234.01.01

SHEET

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APPROXIMATE GRADING VOLUMES

EARTHWORK VOLUME ..... 362,000 CY

LEGEND

- 298 — FINISHED GRADE CONTOUR
- 298 — EXISTING CONTOUR
- SHADING REPRESENTS AREA OF CUT
- AREA OF CUT/FILL LINE

SCALE: 1"=200'

-100 0 100 200

CLIENT:
ACORN ENVIROMENTAL
5170 GOLDEN FOOTHILL PARKWAY
EL DORADO HILLS, CA 95762
PH: 916-235-8224
FX:
CONTACT: RYAN SAWYER
EMAIL: rsawyer@acorn-env.com

GRADING PLAN ALTERNATIVE 2 FOR:

QUIEMUTH VILLAGE

OLSON LAND SURVEYORS ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN, VANCOUVER, WA 98660 360-695-1385

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6/01/2023

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DESCRIPTION:	DATE:

DESIGNED: GCO
DRAWN: GCO/TAS
CHECKED: PAT
DATE: NOVEMBER 2020
SCALE: H: 1"= 200'
V: N/A

QUIEMUTH VILLAGE

JOB NO.:1234.01.01

SHEET
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Attachment B

USFWS IPaC Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
Phone: (360) 753-9440 Fax: (360) 753-9405

In Reply Refer To:
Project Code: 2023-0054110
Project Name: Nisqually Mixed Use

March 09, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

PROJECT SUMMARY

Project Code: 2023-0054110
Project Name: Nisqually Mixed Use
Project Type: Mixed-Use Construction
Project Description: Thurston County, City of Lacey Washington
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@47.064129199999996,-122.7883459838829,14z

Counties: Thurston County, Washington

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Yelm Pocket Gopher *Thomomys mazama yelmensis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7257	Threatened

BIRDS

NAME	STATUS
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Streaked Horned Lark *Eremophila alpestris strigata* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

FISHES

NAME	STATUS
Bull Trout *Salvelinus confluentus*	Threatened

Population: U.S.A., conterminous, lower 48 states
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8212

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

Taylor's (=whulge) Checkerspot *Euphydryas editha taylori*	Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/5907

FLOWERING PLANTS

NAME	STATUS
Golden Paintbrush *Castilleja levisecta*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/7706

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPAC USER CONTACT INFORMATION

Agency: Nisqually Indian Tribe
Name: Kimberly Fuchs
Address: 5170 Golden Foothill Parkway
City: El Dorado Hills
State: CA
Zip: 95762
Email kfuchs@acorn-env.com
Phone: 3022229102

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Bureau of Indian Affairs

Attachment C

National Wetlands Inventory Map

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands

August 9, 2021

Wetlands

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Appendix I-3

Biological Technical Memorandum

AES - MONTROSE
1801 7TH STREET, SUITE 100
SACRAMENTO, CA 95811
(916) 447-3479 | FAX (916) 447-1665

BIOLOGICAL MEMORANDUM

To:	Nisqually Indian Tribe 4820 She-Nah-Num Dr SE Olympia, WA 98513
From:	Amy Gondran, Biologist AES-Montrose 1801 7th Street, Suite 100 Sacramento, CA 95811
Project:	Quiemuth Village Mixed Use Fee-to-Trust Project
Date:	3/10/2023

1.0 INTRODUCTION

This memorandum has been prepared for the Nisqually Indian Tribe for the Quiemuth Village Mixed Use Fee-to-Trust Project (Proposed Project) located in Thurston County, in the City of Lacey, WA on an approximate 172.4-acre Project Site (Project Site). The Project Site is north of I-5 and accessible from Marvin Road, Britton Parkway, and Gateway Boulevard. The Proposed Project consists of a Fee-to-Trust acquisition of the Project Site and anticipated mixed-use development. The purpose of this assessment is to identify sensitive biological resources that could occur within Project Site boundaries and be affected by the Proposed Project.

2.0 METHODOLOGY

The following information was obtained and reviewed:

- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species viewer (PHS), dated April 15, 2022, of special-status species with the potential to occur on or be affected by the Proposed Project (WDFW, 2022a; **Attachment A)**;
- Washington Natural Heritage Program *2021 Washington Vascular Plant Species of Conservation*;
- Burke Herbarium *Plants of Washington Identification Key* (Giblin and Legler, 2003);
- USFWS National Wetlands Inventory (NWI) map of wetland features on the Action Area (USFWS, 2022a; **Attachment B**);
- A custom soils report from the Natural Resources Conservation Service (NRCS) (NRCS, 2022; **Attachment C**); and
- A map of the nearest critical habitat (USFWS, 2022b).

A biological resources survey was conducted of the Project Site on April 12 to 14 and June 16 to 18, 2021. The survey was conducted by walking throughout the entirety of the Project Site. Surveys assessed habitat types, wetlands and waters of the U.S., federal and state listed species, and suitable habitat for

listed species. Species and habitat types were classified using the WDFW Priority Habitat and Species list and *The Jepson Manual* (Baldwin, 2012). Data was collected via a Trimble Geo XH hand-held GPS receiver. Habitat requirements of special-status species were compared to habitats observed, which were determined based on aerial photographs, ground-truthing, and background data review.

3.0 ENVIRONMENTAL SETTING

The Project Site is located on the Lacey United States Geological Survey (USGS) 7.5' quadrangle maps (**Figures 1, 2**, and **3**) within an area of minimal flood hazard (FEMA, 2022). The Project Site is disturbed as a result of historical logging, thinning, and gravel extraction. On-site elevations range from 55 meters to 70 meters above mean sea level. Soils, habitats, and special-status species are discussed herein.

3.1 SOIL TYPES

A custom soils report for the Project Site can be found in **Attachment C**. Soil types are summarized below:

- Alderwood gravelly sandy loam is derived from glacial parent material. It is moderately well drained, non-hydric, and considered prime farmland if irrigated.
- Everett very gravelly sandy loam is derived from sandy and gravelly glacial outwash. It is somewhat excessively drained, non-hydric, and is farmland of statewide importance.
- Indianola loamy sand is derived from sandy glacial outwash parent material. It is somewhat excessively drained, non-hydric, and considered prime farmland if irrigated.
- Spanaway gravelly sandy loam is derived from volcanic ash over gravelly outwash parent material. It is somewhat excessively drained, non-hydric, and considered prime farmland if irrigated.

3.2 HABITAT TYPES

Two habitat types were identified within the Project Site (**Figure 4**): ruderal/disturbed and mixed conifer – hardwood forest. The majority of the Project Site is heavily disturbed as a result of historical logging, thinning, and gravel extraction. It is now interspersed with forest stands. Ruderal/disturbed areas are a mixture of barren gravelly soils, shrubs, and weedy herbaceous cover. Scotch broom (*Cytisus scoparius*), oxeye daisy (*Leucanthemum vulgare*), foxglove (*Digitalis purpurea*), blackberry (*Rubus spp*.), and common St. John's wort (*Hypericum perforatum*) were common species. Mixed conifer – hardwood stands are sparse in the southern section of the Project Site. This habitat is comprised of Douglas fir (*Pseudotsuga menziesii*) and Oregon white oak (*Quercus garryana*). The understory is comprised of a mix of native and non-native weedy species, including blackberry, oceanspray (*Holodiscus discolor*), salal (*Gaultheria shallon*), hardhack (*Spiraea douglasii*) and Bermuda grass (*Cynodon dactylon*). A list of species observed during the April and June surveys is included in **Attachment D**.

Background review of the NWI database did not indicate the presence of any wetlands, waters of the U.S., or other aquatic features (**Attachment B**), though wetlands had previously been delineated within the Action Area (Chad Armour, 2013). Previous surveys conducted in November 2012 mapped eleven wetlands throughout the north section of the Action Area. The United States Army Corp of Engineers (USACE) determination of this previous delineation concluded that the wetlands were not jurisdictional but may still be under the purview of the Washington State Department of Ecology. This jurisdictional

determination was valid for five years and has since lapsed. Previously mapped wetlands were assessed during the 2021 site visit. Eight of the eleven previously mapped wetlands sites were able to be identified. Three wetland sites were not present and there were no indicators to suggest previous presence of these wetlands. The eight identifiable wetlands sites were disturbed with most occurring in obvious excavation pits, cuts, or similar features disturbed by heavy machinery. None of the previously mapped wetlands met required parameters (i.e., hydric soils, hydrophytic vegetation, and hydrology) to qualify as a wetland (USACE, 2008).

3.3 SPECIAL-STATUS SPECIES

Background data review and special-status species searches list 27 special-status plant species and 6 special-status wildlife species with the potential to occur in the region of the Project Site (**Attachment A**). State listed species are evaluated herein; federally listed species are addressed in the accompanying Biological Assessment (BA). The name, regulatory status, distribution, habitat requirements, period of identification, and potential to occur for each species are listed in **Table 1**.

Based on the site-specific habitats and special-status species habitat requirements, the Project Site contains suitable habitat to potentially support 11 special-status plant species and two special-status animal species. These species include tall bugbane (*Actaea elata var. elata*), tall agoseris (*Agoseris elata*), western wahoo (*Euonymus occidentalis var. occidentalis*), large St. Johns'wort (*Hypericum majus*), Pacific peavine (*Lathyrus vestitus var. ochropetalus*), Puget groundsel (*Packera macounii*), salmon Jacob's-ladder (*Polemonium carneum*), Scouler's catchfly (*Silene scouleri ssp. scouleri*), small-flowered trillium (*Trillium albidum ssp. parviflorum*), whipplevine (*Whipplea modesta*), narrow-leaf mule's-ears (*Wyethia angustifolia*), Oregon vesper sparrow (*Pooecetes gramineus affinis*), and western gray squirrel (*Sciurus griseus*). Species with no potential to occur on the Project Site were ruled out based on lack of suitable habitat, soils, elevation, and necessary substrate. Special-status plant surveys were conducted during the appropriate bloom period for each potentially occurring species. No mounds were observed which may indicate presence of pocket gopher. No special-status plant or animal species were observed during the site visits.

3.4 WILDLIFE MOVEMENT

Wildlife movement is currently restricted through the Project Site by surrounding urban development. I-5 bounds the Project Site to the south, aggregate mining operations to the west, and the Britton Parkway/Marvin Road interchange to the north and east. No wildlife corridors were observed connecting the Project Site to off-site habitats when surveyed.

3.5 CRITICAL HABITAT

There is no designated critical habitat on the Project Site. The nearest designated critical habitat occurs approximately 3.0 miles east of the Project Site for bull trout.

TABLE 1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES

SCIENTIFIC NAME COMMON NAME	FEDERAL/STATE /CNPS LIST	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
PLANTS					
Actaea elata var. elata Tall bugbane	--/WS/--	Known to occur west of the Cascades crest and in the Columbia River Gorge.	Found in moist, shady woods at lower elevations.	June-August	**Yes**, may occur in mixed conifer-hardwood habitat on the Project Site.
Agoseris elata Tall agoseris	--/WS/--	Known to occur on both sides of the Cascades crest in Washington.	Found in meadows and open woods from valleys to middle elevations in the mountains.	June-July	**Yes**, may occur in mixed conifer-hardwood habitat on the Project Site.
Cicuta bulbifera Bulb-bearing water-hemlock	--/WS/--	Known to occur in scattered locations on both sides of the Cascades crest in Washington.	Found in marshes, bogs, wet meadows and standing water from lowlands to mountain valleys.	July-September	**No**, suitable habitat not present to support this species.
Cirsium remotifolium var. remotifolium Weak thistle	--/WE/--	Known to occur west of the Cascades crest and east in the Columbia River Gorge in Washington.	Found in meadows, stream banks, open forest, and brushy slopes from low to middle elevations in the mountains.	June-September	**No**, suitable habitat not present to support this species.
Erythronium revolutum Coast fawn-lily	--/WS/--	Known to occur west of the Cascades crest in Washington.	Found along river banks and the edge of woods, in open areas or in moderate shade.	April-May	**No**, suitable habitat not present to support this species.
Euonymus occidentalis var. occidentalis Western wahoo	--/WS/--	Known to occur west of the Cascades crest in southwestern Washington.	Found in moist woods at low to middle elevations.	May-June	**Yes**, may occur in mixed conifer-hardwood habitat on the Project Site.
Githopsis specularioides Common bluecap	--/WS/--	Known to occur on both sides of the Cascades in Washington.	Found in dry, open places in the valleys and foothills.	May-June	**No**, suitable habitat not present to support this species.
Heterotheca oregona Oregon goldenweed	--/WS/--	Known to occur east of the base of the Cascades to the coast in Washington.	Found in sand and gravel bars along rivers from low to moderate elevations.	June-September	**No**, suitable habitat not present to support this species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/STATE /CNPS LIST	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Howellia aquatilis Water howellia	--/WT/--	Known to occur west of the Cascades in Washington.	Found in ponds and lakes.	May-July	**No**, suitable habitat not present to support this species.
Hypericum majus Large St. Johns'wort	--/WS/--	Known to occur throughout Washington.	Found in areas with wet ground.	June-August	**Yes**, may occur in mixed conifer-hardwood habitat on the Project Site.
Isoetes nuttallii Nuttall's quillwort	--/WS/--	Known to occur in western Washington.	Found in seasonal wetland and temporary stream habitats.	May-June (when spores mature)	**No**, suitable habitat not present to support this species.
Lathyrus vestitus var. ochropetalus Pacific peavine	--/WE/--	Known to occur in Thurston, King, Lewis, and Cowlitz counties.	Found in moist woodlands, open slopes, and roadsides.	April-June	**Yes**, may occur in mixed conifer-hardwood or ruderal habitat on the Project Site.
Leptosiphon minimus True babystars	--/WT/--	Known to occur west of the Cascades crest in Washington in the Puget Trough lowlands.	Found in prairies, balds, and open, grassy, rocky areas near the coast.	May-June	**No**, suitable habitat not present to support this species.
Nuttallanthus texanus Large-flowered blue toadflax	--/WS/--	Known to occur west of the Cascades crest in Washington.	Found in prairies, grasslands, and balds.	May-June	**No**, suitable habitat not present to support this species.
Packera macounii Puget groundsel	--/WS/--	Known to occur west of the Cascades crest in Washington.	Found in open woods and dry, open places at low elevations.	May-July	**Yes**, may occur in mixed conifer-hardwood or ruderal habitat on the Project Site.
Pityopus californicus California pinefoot	--/WS/--	Known to occur in western Washington.	Found in mature, moist and shaded mixed-conifer or conifer forests at elevations up to 1,800 meters.	June-July	**No**, mature forest stands are not present on the Project Site.
Polemonium carneum Salmon Jacob's-ladder	--/WT/--	Known to occur in the Olympic and Grays Harbor region of Washington.	Found in thickets, woodlands, and forest openings. Elevations range from near sea level to moderate elevations in mountain areas.	May-July	**Yes**, may occur in mixed conifer-hardwood habitat on the Project Site.
Polystichum californicum California sword-fern	--/WS/--	Known to occur west of the Cascades crest in Washington.	Found in moist forest understory, streambanks, and rocky opens slopes at low elevations.	May-August (once sori develop)	**No**, suitable habitat not present to support this species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/STATE /CNPS LIST	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Sericocarpus rigidus Columbia white-topped aster	--/WS/--	Known to occur west of the Cascades crest in lowland Washington.	Found in prairies and open areas at low elevations.	July-August	**No**, suitable habitat not present to support this species.
Sidalcea virgata Rose checkermallow	--/WS/--	Known to occur in Thurston County.	Found in moist prairies and meadows at low elevations.	April-June	**No**, suitable habitat not present to support this species.
Silene scouleri ssp. scouleri Scouler's catchfly	--/WS/--	Known to occur on both sides of the Cascades crest in Washington.	Found in prairies and forest openings; rarely montane.	June-August	**Yes**, may occur in mixed conifer-hardwood habitat on the Project Site.
Spiranthes diluvialis Ute ladies'-tresses	--/WE/--	Known to occur east of the Cascades crest in Washington.	Found in moist to wet meadows, marshes, and riparian areas.	July-September	**No**, suitable habitat not present to support this species.
Trillium albidum ssp. parviflorum Small-flowered trillium	--/WS/--	Known to occur west of the Cascades crest in Washington.	Found in moist forests, oak-ash woodlands, thickets, and fields at low elevations.	March-May	**Yes**, may occur in mixed conifer-hardwood habitat and open areas on the Project Site.
Symphyotrichum hallii Hall's aster	--/WS/--	Known to occur west of the Cascades crest in Washington.	Found in dry, open places in the valleys and plains.	July-October	**No**, suitable habitat not present to support this species.
Whipplea modesta Whipplevine	--/WS/--	Known to occur on the Olympic Peninsula in Washington.	Found in dry, rocky, open to lightly forested areas.	April-June	**Yes**, may occur in mixed conifer-hardwood habitat on the Project Site.
Woodwardia fimbriata Chain-fern	--/WS/--	Known to occur west of the Cascades crest in lowland western Washington.	Found in mixed conifer and mixed conifer-hardwood forests, in moist habitat including stream banks, springs, and seepy rocky outcrops.	May-August (once sori develop)	**No**, suitable habitat not present to support this species.
Wyethia angustifolia Narrow-leaf mule's-ears	--/WS/--	Known to occur west of the Cascades crest in southwestern Washington.	Found in meadows and moist, open hillsides at low elevations.	May-July	**Yes**, may occur in open areas on the Project Site.

SCIENTIFIC NAME COMMON NAME	FEDERAL/STATE /CNPS LIST	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
ANIMALS					
Amphibians					
Anaxyrus boreas Western Toad	--/WC/--	Known to occur in all nine Washington ecoregions being abundant in some areas and declining in others.	Found in prairies, forests, canyon grasslands, and ponderosa pine-Oregon oak habitats. Breeding waters are permanent and include wetlands, ponds, lakes, reservoir covers, and river edges.	April- June	**No**, suitable habitat not present to support this species.
Birds					
Pooecetes gramineus affinis Oregon Vesper Sparrow	--/WE/--	Known to occur in western Washington in Pierce and Thurston Counties.	Found in open habitats such as grassland, shrub-steppe, and agricultural areas. Require dry, open landscapes for nesting.	April- September	**Yes,** may occur in ruderal habitat on the Project Site.
Fish					
Clupea pallasii Pacific Herring (Georgia Basin DPS)	--/WC/**--**	Known to occur in Puget Sound.	Found in marine shorelines.	Year-round	**No**, suitable habitat not present to support this species.
Novumbra hubbsi Olympic Mudminnow	--/WS/--	Known to occur in the southern and coastal drainages of the Olympic Peninsula, the Chehalis River basin, south Puget Sound west of the Nisqually River, and in Snohomish and King counties.	Found in slow-moving streams, wetlands, and ponds with a muddy bottom, little or no water flow, and aquatic vegetation.	Year-round	**No**, suitable habitat not present to support this species.
Mammals					
Sciurus griseus Western Gray Squirrel	--/WT/--	In Washington, this species occupies oak woodlands and conifer forests in Klickitat and Yakima Counties, low to mid-elevation conifer forests in Okanogan and Chelan Counties, and oak woodlands and conifer forests in Pierce and Thurston Counties. The North Cascades population is the only one living outside the range of Oregon white oak in Washington	Pine trees and oak trees are preferred for cover, foraging, and natal dens. In Washington, they will also use mixed Douglas fir-oak-pine habitats. Require a diverse selection of vegetation for multiple food sources.	Year-round	**Yes**, may occur in mixed conifer-hardwood habitat of the Project Site.

SCIENTIFIC NAME COMMON NAME	FEDERAL/STATE /CNPS LIST	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Reptiles					
Emys marmorata western pond turtle	--/WT/--	Distribution ranges from Washington to northern Baja California.	Inhabit rivers, streams, lakes, ponds, reservoirs, stock ponds, and permanent wetland habitats with basking sites.	Year-round	**No**, suitable habitat not present to support this species.

SOURCES: WDFW, 2022a; WDFW, 2022b; WNHP, 2021.

STATUS CODES:

STATE: Washington Department of Fish and Wildlife
WE Washington Listed Endangered
WT Washington Listed Threatened
WS Washington Listed Sensitive

4.0 RESULTS AND RECOMENDATIONS

4.1 SENSITIVE HABITAT

Habitat types on the Project Site include ruderal/disturbed and mixed conifer-hardwood forest. The majority of the Project Site consists of ruderal/disturbed habitat with the north and south borders consisting of mixed conifer-hardwood forest. These habitat types are not identified as priority habitats by WDFW and are not afforded protection by a federal agency; thus, these habitats are not considered sensitive. Additionally, previously mapped wetlands were determined to either be absent or do not qualify as a wetland per the USACE three-parameter criteria (USACE, 2008). There would be no impact to sensitive habitat.

4.2 NESTING MIGRATORY BIRDS

Migratory birds and their nests are protected from "take" by the Migratory Bird Treaty Act (16 U.SC. 703-711), which makes it unlawful to "…pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess or any part, nest, or egg of any such bird…" (50 CFR 10). Potentially occurring nesting migratory birds (including streaked horned lark and Oregon vesper sparrow) within 500 feet of the Project Site could be affected if vegetation removal or loud noise-producing activities associated with construction occur during the general nesting season (February 15 through September 15). **Mitigation Measure 1** is recommended to reduce potential impacts to nesting migratory birds.

Mitigation Measure 1

- If construction activities (e.g., building, grading, ground disturbance, removal of vegetation) are scheduled to occur during the general nesting season (February 15 - September 15), a preconstruction nesting bird survey shall be conducted by a qualified biologist throughout accessible areas of suitable habitat within 500 feet of proposed construction activity. The survey shall occur no more than 7 days prior to the scheduled onset of construction. If construction is delayed or halted for more than 7 days, another preconstruction survey for nesting bird species shall be conducted. If no nesting birds are detected during the preconstruction survey, no additional surveys or mitigation measures are required.
- If nesting bird species are observed within 500 feet of construction areas during the survey, appropriate "no construction" buffers shall be established. The size and scale of nesting bird buffers shall be determined by a qualified biologist and shall be dependent upon the species observed and the location of the nest. Buffers shall be established around active nest locations. The nesting bird buffers shall be completely avoided during construction activities. The buffers may be removed when the qualified wildlife biologist confirms that the nest is no longer occupied, and all birds have fledged.

4.3 SPECIAL-STATUS SPECIES

Based on survey observations and site characteristics, the Project Site contains suitable habitat to support 11 special-status plant species and two special-status animal species (**Table 1**). No special-status species were observed. The April and June surveys were conducted during the appropriate bloom periods for the 11 special-status plants with the potential to occur on the Project Site. No special-status plants were observed during the surveys; thus, there would be no impact to special-status plants.

Although western gray squirrel was not observed at the time of survey, the Project Site contains suitable

habitat, including mixed conifer-hardwood habitat for this species. However, this species' current range is limited to three populations within the state of Washington (Linders et al., 2010). The nearest population is located in Pierce County, approximately 14 miles from the Project Site. WDFW PHS identifies observations outside of the current range, including observations within Thurston County. With implementation of **Mitigation Measure 2**, the Proposed Project would have a less than significant impact on western gray squirrel.

Mitigation Measure 2

- If tree removal is to occur within the mixed conifer-hardwood habitat on the Project Site, a preconstruction survey for western gray squirrel shall be conducted by a qualified biologist. The survey shall be conducted in accordance with WDFW's survey protocol for nest sites (Vander Haegenet et al., 2004).
- If an active western gray squirrel nest is observed a 50-foot no-cut buffer shall be established around each nest tree. A 400-foot no-disturbance buffer shall be established for all active nest trees during the western gray squirrel breeding season (1 March – 30 September). Nest site locations shall be documented and flagged.

4.4 Wildlife Movement

Wildlife movement is restricted by surrounding urban development. No wildlife corridors were observed connecting the Project Site to off-site habitats when surveyed. There would be a less than significant impact to wildlife movement.

4.5 Critical Habitat

There is no designated critical habitat on or adjacent to the Project Site. There would be no impact to critical habitat.

5.0 CONCLUSION

The Project Site contains ruderal/disturbed and mixed conifer-hardwood forest habitat. The Project Site has potential to support 11 special-status plant species and two special-status animal species. No special-status species were observed during the site surveys. As nesting migratory birds are protected by the Migratory Bird Treaty Act, should construction occur during the nesting season (February 15 - September 15), a preconstruction nesting bird survey would be required by the USFWS. Implementation of **Mitigation Measure 1** will reduce potential impacts to migratory birds to a less-than-significant level. The Project Site contains suitable habitat for western gray squirrel; thus, implementation of **Mitigation Measure 2** would reduce potential impacts to western gray squirrel to a less-than-significant level.

6.0 REFERENCES

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ATTACHMENT A

WDFW PHS SPECIES LIST

Priority Habitats and Species on the Web

Buffer radius: 5 Miles

Report Date: 04/15/2022, Parcel ID: 11810101100

User Comments/Notes:

PHS Species/Habitats Overview:

Occurence Name	Federal Status	State Status	Sensitive Location
Mountain quail	N/A	N/A	No
Mazama (Western) pocket gopher	Threatened	Threatened	No
Olympic mudminnow	N/A	Sensitive	No
Western gray squirrel	N/A	Threatened	No
Purple martin	N/A	N/A	No
Harbor seal	N/A	N/A	No
California myotis	N/A	N/A	No
California sea lion	N/A	N/A	No
Western toad	N/A	Candidate	No
Oregon vesper sparrow	N/A	Candidate	No
Winter Steelhead	N/A	N/A	No
Pacific Sand Lance	N/A	N/A	No
Surf Smelt	N/A	N/A	No
Cutthroat	Not Warranted	N/A	No
Coho	Candidate	N/A	No
Winter Chum	N/A	N/A	No
Pink Salmon Odd Year	N/A	N/A	No
Dolly Varden/ Bull Trout	N/A	N/A	No
Fall Chum	N/A	N/A	No
Chum	Not Warranted	N/A	No
Resident Coastal Cutthroat	N/A	N/A	No
Coho	N/A	N/A	No
Steelhead	Threatened	N/A	No
Pink	Not Warranted	N/A	No
Sockeye	N/A	N/A	No
Chinook	Threatened	N/A	No
Fall Chinook	N/A	N/A	No
Rainbow Trout	N/A	N/A	No
Hardshell Clam	N/A	N/A	No
Pandalid Shrimp	N/A	N/A	No
Dungeness crab	N/A	N/A	No
Pacific geoduck	N/A	N/A	No
Pacific Herring (Georgia Basin DPS)	N/A	Candidate	No
Band-tailed pigeon	N/A	N/A	No
Wood duck	N/A	N/A	No
Waterfowl Concentrations	N/A	N/A	No
Biodiversity Areas And Corridor	N/A	N/A	No
Wetlands	N/A	N/A	No
Shorebird Concentrations	N/A	N/A	No
Esturine Zone	N/A	N/A	No
Great blue heron	N/A	N/A	No

Estuarine and Marine Wetland	N/A	N/A	No
Freshwater Emergent Wetland	N/A	N/A	No
Lake	N/A	N/A	No
Freshwater Pond	N/A	N/A	No
Freshwater Forested/Shrub Wetland	N/A	N/A	No
Riverine	N/A	N/A	No
Western Pond Turtle	N/A	Endangered	Yes
Big brown bat	N/A	N/A	Yes
Little Brown Bat	N/A	N/A	Yes
Yuma myotis	N/A	N/A	Yes

PHS Species/Habitats Details:

Mountain quail	
Scientific Name	*Oreortyx pictus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	MOUNTAIN QUAIL: 3 MALES AND 4 MALES OBSERVED AT CORNER OF PACIFIC AND MARVIN RD IN LACEY, WA. 10 OR 11 INDIVIDUALS OBSERVED AT SAME LOCATION IN 1988.
Source Record	68555
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HUNS, ED/UNKNOWN
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN SEED ORCHARD
Accuracy	GPS
Notes	GOPHER CAPTURE SITE FOR GENETIC HAIR SAMPLE COLLECTION
Source Record	141190
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	GPS
Notes	FREEWAY CULVERT
Source Record	108317
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HALLOCK, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER - MARVIN RD
Accuracy	GPS
Notes	GOPHER CAPTURE SITE FOR GENETIC HAIR SAMPLE COLLECTION.
Source Record	141161
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN GRAY SQUIRREL RAN ACROSS RD ON HOQUM BAY RD.
Source Record	71272
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	DAVIS,J. AND A.,B.H.A.S./UNKNO
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Mountain quail	
Scientific Name	*Oreortyx pictus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	MOUNTAIN QUAIL: STILL CALLING AT THE SITE NEAR NISQUALLY
Source Record	68478
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HUDSON,R & P MATTOCKS SEATTLE
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Site Name	SOUTHWICK LAKE
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN GRAY SQUIRREL IN OAK HABITAT.
Source Record	71445
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	CARNEVALI, DEBBIE, WDFW/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Purple martin	
Scientific Name	*Progne subis*
Priority Area	Breeding Area
Site Name	BILLY FRANK JR NISQUALLY NWR
Accuracy	GPS
Notes	SNAGS PLANTED AT REFUGE IN 2009 AS PART OF ESTUARY/DELTA RESTORATION PROJECT. FIRST REPORTED USE BY MARTINS IN 2016. POTENTIALLY FIRST USE OF INSTALLED SNAG BY MARTINS IN N. AMERICA.
Source Record	141529
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	BAILEY, M/USFWS;KOSTKA, S/WEST
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	1/4 mile (Quarter Section)
Notes	NW CORNER FREEWAY INTECHANGE
Source Record	108314
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HALLOCK, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Harbor seal	
Scientific Name	*Phoca vitulina*
Priority Area	Haulout
Site Name	WOODARD BAY LOGBOOMS
Accuracy	1/4 mile (Quarter Section)
Source Record	111886
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	JEFFRIES, S/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	GPS
Notes	GOPHER CAPTURE SITE FOR GENETIC HAIR SAMPLE COLLECTION.
Source Record	141156
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Mountain quail	
Scientific Name	*Oreortyx pictus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	MOUNTAIN QUAIL: UNKNOWN NUMBER OBSERVED EAST OF LONG LAKE
Source Record	68592
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHIRATO, G/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN GRAY SQUIRREL 4 AT CAPITAL CITY BOWMAN ARCHERY RANGE, MERIDIAN RD.
Source Record	71270
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	STRICKLAND,GARY 151 CHERRY LAN
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

California myotis	
Scientific Name	*Myotis californicus*
Priority Area	Communal Roost
Site Name	DNR BAT SHACK
Accuracy	GPS
Notes	LIBBY ROAD | NEW STRUCTURE ON DNR LAND COMPLETED IN 2012
Source Record	131089
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	FALXA, G/CASCADIA RESEARCH
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605
Geometry Type	Points

California sea lion	
Scientific Name	*Zalophus californianus*
Priority Area	Haulout
Site Name	NISQUALLY DELTA BUOY
Accuracy	1/4 mile (Quarter Section)
Source Record	111881
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	JEFFRIES, S/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Points

Western toad	
Scientific Name	*Anaxyrus boreas*
Priority Area	Breeding Site
Site Name	LAKE ST CLAIR
Accuracy	1/4 mile (Quarter Section)
Notes	THOUSANDS OF METAMORPHS | MANY KILLED ON ROAD
Source Record	13951
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	LEONARD, B/WDOE/ WDOT /WADNR*;
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Candidate
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00025
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Site Name	NISQUALLY RESERVATION
Accuracy	GPS
Notes	WESTERN GRAY SQUIRREL NEST USING RAPTOR PLATFORM NEST WITH MOSS PILED HIGH.
Source Record	133348
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	ORTH, G./WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Mountain quail	
Scientific Name	*Oreortyx pictus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	MOUNTAIN QUAIL: UNKNOWN NUMBER OBSERVED BY LOST LAKE IN THURSTON COUNTY.
Source Record	68598
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	WALTER, G/USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	GPS
Notes	WETLAND OFF DAYTON ST
Source Record	108320
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HALLOCK, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN GRAY SQUIRREL .5 TO .75MI S OF STEILICOOM-OLYMPIA RD ON UPLANDS,LEFT BANK MCALLISTER CK, FORAGING ALONG ABANDON LOGGING RD NEAR SECOND GROWTH DOUGLAS FIR & RED ALDER.
Source Record	71273
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	CHAMBERS,CM 4116 CANDLEWOOD SE
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Site Name	HAWK'S PRAIRIE ROAD
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN GRAY SQUIRREL OBSERVED.
Source Record	72416
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	FORT LEWIS PERSONNEL. DATA SRC
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN POCKET GOPHER SKELETON WAS FOUND ON PARKING LOT ISLAND AT CHURCH; PROBABLY DROPPED THERE BY PREDATOR. CHURCH ADJACENT TO LARGE, UNDEVELOPED FIELD AND STAND OF OAK, APPEARS TO BE HISTORIC PRAIRIE.
Source Record	73845
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	PERSONS, T. - WDFW FISH DA
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	AMTRAK - YELM HWY
Accuracy	GPS
Notes	GOPHER CAPTURE SITE FOR GENETIC HAIR SAMPLE COLLECTION
Source Record	141192
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	ST. MARTIN'S
Accuracy	GPS
Notes	CARCASS FOUND ON CAMPUS BY PROFESSOR. SKELETON PROVIDED TO USFWS. BROKEN AND DISPLACED RIBS. CAUSE OF DEATH UNKNOWN.
Source Record	143408
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	BODE, R/ST. MARTIN'S
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	1/4 mile (Quarter Section)
Notes	ENSIGN ROAD PROTECTED AREA
Source Record	108315
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HALLOCK, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN POCKET GOPHER. ONE ADULT FEMALE TRAPPED IN WEEDY LOT ON S. SIDE OF RIVER RIDGE COVENANT CHURCH, .2 MI W OF INTERSECT. OF STEILACOOM AND MARVIN RD. SPECIMEN TO BE DEPOSITED AT BURKE MUSEUM.
Source Record	73846
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	MCALLISTER, K/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Site Name	TROTTER WOODS
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN GRAY SQUIRREL OBSERVED CROSSING ROAD.
Source Record	72417
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	JONES, L. PNW. DATA SRC: 93000
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Harbor seal	
Scientific Name	*Phoca vitulina*
Priority Area	Haulout
Site Name	NISQUALLY DELTA BUOY
Accuracy	1/4 mile (Quarter Section)
Source Record	112087
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	JEFFRIES, S/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	CATE FARM - YELM HWY
Accuracy	GPS
Notes	GOPHER CAPTURE SITE FOR GENETIC HAIR SAMPLE COLLECTION
Source Record	141182
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Mountain quail	
Scientific Name	*Oreortyx pictus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	MOUNTAIN QUAIL: 2 COVEYS OF UNKNOWN SIZE SEEN IN LACEY
Source Record	68629
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HAWKS, JONATHAN/UNKNOWN
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Accuracy	GPS
Notes	MAZAMA POCKET GOPHER BIOTIC DETECTIONS.
Source Record	114280
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	COVEN, S./WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	GPS
Notes	NEXT TO TRAIL
Source Record	108318
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HALLOCK, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Oregon vesper sparrow	
Scientific Name	*Pooecetes gramineus affinis*
Priority Area	Occurrence
Site Name	BILLY FRANK JR NISQUALLY NWR
Accuracy	1/8 mile (Quarter/Quarter Section)
Notes	LOCATION ACCURACY UNKNOWN
Source Record	148221
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	MOTLEY, J/PRIVATE
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Candidate
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER - MARVIN RD
Accuracy	GPS
Notes	GOPHER CAPTURE SITE FOR GENETIC HAIR SAMPLE COLLECTION.
Source Record	141162
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

California myotis	
Scientific Name	*Myotis californicus*
Priority Area	Breeding Area
Site Name	CARPENTER - LONG LAKE
Accuracy	GPS
Notes	OWNER REPORTS BATS IN BARN, SHOP AND HOUSE. EMERGENCE COUNT FROM BARN
Source Record	174899
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	BUTLER, E/WDFW;TOBIN, A/WDFW;T
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN GRAY SQUIRREL NORTH END OF LK ST CLAIR, IN YARD.
Source Record	71265
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	POELSTRA, J/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Mountain quail	
Scientific Name	*Oreortyx pictus*
Priority Area	Occurrence
Accuracy	1/4 mile (Quarter Section)
Notes	MOUNTAIN QUAIL: 1 SEEN, 3 OTHERS HEARD ON NISQUALLY RIVER DELTA. PERCH ON FALLEN LOG AND SINGING. ONE MILE SOUTH OF THE NISQUALLY WRA OFF DURKIN ROAD.
Source Record	68475
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	BERGMAN, C/TAHOMA AUDUBON
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	JBLM - TRAINING AREAS
Accuracy	GPS
Source Record	147876
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	UNKNOWN/JBLM
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	1/4 mile (Quarter Section)
Notes	OLYMPIC MUDMINNOW. 2 FISH.
Source Record	68099
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	MONGILLO, P/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Western gray squirrel	
Scientific Name	*Sciurus griseus*
Priority Area	Occurrence
Accuracy	GPS
Notes	WESTERN GRAY SQUIRREL INDIVIDUAL IN D. FIR. THERE IS A NEST ~20 M AWAY.
Source Record	133347
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	ORTH, G./WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	GPS
Notes	EAST SIDE STORMWATER POND
Source Record	108319
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HALLOCK, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Olympic mudminnow	
Scientific Name	*Novumbra hubbsi*
Priority Area	Occurrence
Site Name	WOODARD CREEK
Accuracy	1/4 mile (Quarter Section)
Notes	26TH AND SOUTH BAY
Source Record	108316
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	HALLOCK, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	Sensitive
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Points

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MARVIN RD
Accuracy	GPS
Notes	GOPHER CAPTURE SITE FOR GENETIC HAIR SAMPLE COLLECTION.
Source Record	141160
Source Dataset	WS_OccurPoint
Source Date	WS_OccurPoint
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Points

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	53277
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	52843
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 33
Accuracy	NA
Source Record	5243
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 11
Accuracy	NA
Source Record	3816
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 15
Accuracy	NA
Source Record	4837
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226765470354, Stock Name: Nisqually Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7420
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228132470719, Stock Name: Deep South Sound Tribs Coho, Run: Unspecified, Status: Healthy
Source Record	3193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	51228
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Accuracy	NA
Notes	LLID: 1226822470495, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	50176
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227216470432, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	51121
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226765470354, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	50086
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Dolly Varden/ Bull Trout	
Scientific Name	*Salvelinus malma/S. confluentus*
Priority Area	Occurrence/Migration
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Bull Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50426
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Stock Name: Deep South Sound Tribs Coho, Run: Unspecified, Status: Healthy
Source Record	3193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 7
Accuracy	NA
Source Record	4920
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228132470719, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52674
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1227334470386, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Site Name	Medicine Creek
Accuracy	NA
Notes	LLID: 1227259470546, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	51197
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226889470810, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227216470432, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	51116
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228760469962, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	53624
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1227216470432, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226827470435, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50197
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50296
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470435, Stock Name: Nisqually Pink, Run: Odd-Year, Status: Unknown
Source Record	4585
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226747470340, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226765470354, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	50093
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470442, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	52839
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 2
Accuracy	NA
Source Record	3722
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50416
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 13
Accuracy	NA
Source Record	3818
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Sockeye	
Scientific Name	*Oncorhynchus nerka*
Priority Area	Occurrence/Migration
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Sockeye Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	51231
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Sockeye	
Scientific Name	*Oncorhynchus nerka*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226822470495, Fish Name: Sockeye Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50179
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226765470354, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 8
Accuracy	NA
Source Record	4822
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 18
Accuracy	NA
Source Record	3586
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Breeding Area
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	50435
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228243471011, Stock Name: Henderson Inlet Fall Chum, Run: Fall, Status: Unknown
Source Record	2193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 9
Accuracy	NA
Source Record	25757
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228204470767, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	52808
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Stock Name: Nisqually Pink, Run: Odd-Year, Status: Unknown
Source Record	4585
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 35
Accuracy	NA
Source Record	4814
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	50302
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 4
Accuracy	NA
Source Record	25688
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 13
Accuracy	NA
Source Record	25701
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 12
Accuracy	NA
Source Record	25699
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226992470809, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226847470810, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50285
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228760469962, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470442, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 24
Accuracy	NA
Source Record	5298
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	51225
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	53272
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226827470435, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	50200
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Stock Name: Nisqually Chinook, Run: Sum/Fall, Status: Depressed
Source Record	1200
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Breeding Area
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	52840
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 9
Accuracy	NA
Source Record	4825
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	53274
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 12
Accuracy	NA
Source Record	3817
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227216470432, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	51118
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226765470354, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50083
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 8
Accuracy	NA
Source Record	26448
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226822470495, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50174
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 12
Accuracy	NA
Source Record	4947
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228250471267, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Stock Name: Henderson Inlet Fall Chum, Run: Fall, Status: Unknown
Source Record	2193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227150470934, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	51005
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 37
Accuracy	NA
Source Record	5247
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Sockeye	
Scientific Name	*Oncorhynchus nerka*
Priority Area	Occurrence/Migration
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Sockeye Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50432
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 15
Accuracy	NA
Source Record	3583
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52833
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	51226
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 18
Accuracy	NA
Source Record	4958
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 30
Accuracy	NA
Source Record	5496
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470442, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226847470810, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50287
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Site Name	Indian Creek
Accuracy	NA
Notes	LLID: 1228866470390, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 1
Accuracy	NA
Source Record	28947
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1227216470432, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Sockeye	
Scientific Name	*Oncorhynchus nerka*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226827470435, Fish Name: Sockeye Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50201
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470435, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228243471011, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52880
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Stock Name: Nisqually Pink, Run: Odd-Year, Status: Unknown
Source Record	4585
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	51229
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226765470354, Stock Name: Nisqually Chinook, Run: Sum/Fall, Status: Depressed
Source Record	1200
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227216470432, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	51124
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	50420
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226765470354, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50088
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Breeding Area
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	50429
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228132470719, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	52676
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 17
Accuracy	NA
Source Record	3585
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227105470930, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	50900
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 3
Accuracy	NA
Source Record	28949
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	53269
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470435, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52837
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 4
Accuracy	NA
Source Record	4916
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226827470435, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	50198
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	50298
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226889470810, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50387
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Site Name	Ellis Creek
Accuracy	NA
Notes	LLID: 1228974470716, Stock Name: Deep South Sound Tribs Coho, Run: Unspecified, Status: Healthy
Source Record	3193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	51232
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226822470495, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	50180
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226908470810, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Site Name	Ellis Creek
Accuracy	NA
Notes	LLID: 1228974470716, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	53990
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Breeding Area
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50423
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228195470874, Stock Name: Deep South Sound Tribs Coho, Run: Unspecified, Status: Healthy
Source Record	3193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228243471011, Stock Name: Deep South Sound Tribs Coho, Run: Unspecified, Status: Healthy
Source Record	3193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226765470354, Stock Name: Nisqually Pink, Run: Odd-Year, Status: Unknown
Source Record	4585
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228204470767, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	52806
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	50434
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 2
Accuracy	NA
Source Record	3663
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228195470874, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52783
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470442, Stock Name: Nisqually Chinook, Run: Sum/Fall, Status: Depressed
Source Record	1200
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 19
Accuracy	NA
Source Record	3587
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228760469962, Stock Name: Deschutes Coho, Run: Unspecified, Status: Critical
Source Record	3199
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227105470930, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	50903
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52838
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226908470810, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50412
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226827470435, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50199
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226889470810, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	50390
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226949470841, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Rainbow Trout	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Rainbow Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	52842
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Breeding Area
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	53275
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226822470495, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50177
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228204470767, Stock Name: Deep South Sound Tribs Coho, Run: Unspecified, Status: Healthy
Source Record	3193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228960470673, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	53944
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227216470432, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	51119
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 2
Accuracy	NA
Source Record	28948
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 26
Accuracy	NA
Source Record	4894
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1227273470755, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227150470934, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	51009
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 3
Accuracy	NA
Source Record	26655
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 31
Accuracy	NA
Source Record	5497
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228760469962, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	53621
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Breeding Area
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52834
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Medicine Creek
Accuracy	NA
Notes	LLID: 1227259470546, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	51199
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226889470810, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 13
Accuracy	NA
Source Record	4948
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1227216470432, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470435, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226765470354, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	50090
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470442, Stock Name: Nisqually Pink, Run: Odd-Year, Status: Unknown
Source Record	4585
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Stock Name: Nisqually Coho, Run: Unspecified, Status: Healthy
Source Record	3180
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 15
Accuracy	NA
Source Record	25703
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	50421
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence/Migration
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	51230
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226822470495, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	50178
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228250471267, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	52894
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226765470354, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	*Oncorhynchus gorbuscha*
Priority Area	Breeding Area
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	50428
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228243471011, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	52882
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Breeding Area
Accuracy	NA
Notes	LLID: 1226889470810, Fish Name: Chum Salmon, Run Time: Winter, Life History: Anadromous
Source Record	50386
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227105470930, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	50899
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	52835
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226889470810, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Medicine Creek
Accuracy	NA
Notes	LLID: 1227259470546, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	51204
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	50299
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227334470386, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	51367
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 1
Accuracy	NA
Source Record	27252
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Breeding Area
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	50418
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1227216470432, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Site Name	Nisqually River
Accuracy	NA
Notes	LLID: 1226913471008, Stock Name: Nisqually Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7420
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Site Name	Indian Creek
Accuracy	NA
Notes	LLID: 1228866470390, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	53830
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 8
Accuracy	NA
Source Record	28954
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 14
Accuracy	NA
Source Record	4951
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Ellis Creek
Accuracy	NA
Notes	LLID: 1228974470716, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	53992
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226765470354, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	50084
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1228132470719, Stock Name: Henderson Inlet Fall Chum, Run: Fall, Status: Unknown
Source Record	2193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 9
Accuracy	NA
Source Record	26669
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226822470495, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	50175
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Site Name	Red Salmon Creek
Accuracy	NA
Notes	LLID: 1226858470964, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226765470354, Stock Name: Nisqually Winter Steelhead, Run: Winter, Status: Depressed
Source Record	6203
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Site Name	Woodard Creek
Accuracy	NA
Notes	LLID: 1228512471268, Stock Name: Deep South Sound Tribs Coho, Run: Unspecified, Status: Healthy
Source Record	3193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1227150470934, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	51003
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Stock Name: Henderson Inlet Fall Chum, Run: Fall, Status: Unknown
Source Record	2193
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1226827470435, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	50202
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Site Name	Woodland Creek
Accuracy	NA
Notes	LLID: 1228214470935, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	52832
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pacific Sand Lance	
Scientific Name	*Ammodytes hexapterus*
Priority Area	Breeding Area
Site Name	Station Number: 14
Accuracy	NA
Source Record	25834
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1227239470852, Stock Name: Nisqually Winter Chum, Run: Winter, Status: Healthy
Source Record	2189
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1228195470874, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	52785
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Breeding Area
Site Name	McAllister Creek
Accuracy	NA
Notes	LLID: 1227271470864, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	51227
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 29
Accuracy	NA
Source Record	5495
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Surf Smelt	
Scientific Name	*Hypomesus pretiosus*
Priority Area	Breeding Area
Site Name	Station Number: 14
Accuracy	NA
Source Record	3582
Source Dataset	Forage_Fish_Survey
Source Date	Forage_Fish_Survey
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Species or Habitat
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Lines

Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence
Accuracy	NA
Notes	LLID: 1226827470435, Stock Name: Nisqually Chinook, Run: Sum/Fall, Status: Depressed
Source Record	1200
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Hardshell Clam	
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Hardshell Clam	
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Pandalid Shrimp	
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Dungeness crab	
Scientific Name	*Cancer magister*
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Dungeness crab	
Scientific Name	*Cancer magister*
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Pacific geoduck	
Scientific Name	*Panopea abrupta*
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Pacific geoduck	
Scientific Name	*Panopea abrupta*
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Pacific geoduck	
Scientific Name	*Panopea abrupta*
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Pacific geoduck	
Scientific Name	*Panopea abrupta*
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Pacific geoduck	
Scientific Name	*Panopea abrupta*
Priority Area	Presence
Site Name	Not Given
Accuracy	NA
Notes	Not Given
Source Dataset	Shellfish_Summary
Source Name	Not Given
Source Entity	WDFW
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Pacific Herring (Georgia Basin DPS)	
Scientific Name	*Clupea pallasi*
Priority Area	Regular Concentration
Site Name	Squaxin-*
Accuracy	NA
Notes	Not Given
Source Dataset	HerrHold
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	N/A
State Status	Candidate
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Polygons

Pacific Herring (Georgia Basin DPS)	
Scientific Name	*Clupea pallasi*
Priority Area	Regular Concentration
Site Name	Squaxin-*
Accuracy	NA
Notes	Not Given
Source Dataset	HerrHold
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	N/A
State Status	Candidate
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Polygons

Band-tailed pigeon	
Scientific Name	*Columba fasciata*
Priority Area	Regular Concentration
Site Name	RED SALMON CREEK
Accuracy	1/4 mile (Quarter Section)
Notes	BAND-TAILED PIGEON MINERAL SITE
Source Record	900931
Source Dataset	PHSREGION
Source Name	SCHIRATO, GREG
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Band-tailed pigeon	
Scientific Name	*Columba fasciata*
Priority Area	Regular Concentration
Site Name	MCALLISTER CREEK
Accuracy	1/4 mile (Quarter Section)
Notes	BAND-TAILED PIGEON MINERAL SITE AND ADJACENT FEEDING AREA
Source Record	900932
Source Dataset	PHSREGION
Source Name	SCHIRATO, GREG
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Wood duck	
Scientific Name	*Aix sponsa*
Priority Area	Breeding Area
Accuracy	1/4 mile (Quarter Section)
Notes	WOOD DUCK PAIR OBSERVED WITH BROOD
Source Record	900936
Source Dataset	PHSREGION
Source Name	SKRILETZ, JEFF
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Wood duck	
Scientific Name	*Aix sponsa*
Priority Area	Breeding Area
Site Name	WEST OLYMPIA
Accuracy	1/4 mile (Quarter Section)
Notes	WOOD DUCK BREEDING AREA
Source Record	900987
Source Dataset	PHSREGION
Source Name	SKRILETZ, JEFF
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Waterfowl Concentrations	
Priority Area	Regular Concentration
Site Name	PATTISON LAKE
Accuracy	1/4 mile (Quarter Section)
Notes	WATERFOWL CONCENTRATING ONE-TWO HUNDRED WIDGEON.
Source Record	900997
Source Dataset	PHSREGION
Source Name	GUFLER, DAVE
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Wood duck	
Scientific Name	*Aix sponsa*
Priority Area	Breeding Area
Site Name	NISQUALLY/MCALLISTER CREEK
Accuracy	1/4 mile (Quarter Section)
Notes	WOOD DUCK NESTING AND BROOD AREAS
Source Record	901002
Source Dataset	PHSREGION
Source Name	SCHIRATO, GREG
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Biodiversity Areas And Corridor	
Priority Area	Terrestrial Habitat
Site Name	PUYALLUP STEEP OPEN SPACES
Accuracy	1/4 mile (Quarter Section)
Notes	UNDEVELOPED STEEP SLOPES WITH NATIVE VEGETATION-UNSUITABLE FOR DEVELOPMENT BUT STILL PROVIDE WILDLIFE HABITAT.
Source Record	902552
Source Dataset	PHSREGION
Source Name	NAUER, DON WDW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00023
Geometry Type	Polygons

Waterfowl Concentrations	
Priority Area	Breeding Area
Site Name	NISQUALLY DELTA WATERFOWL AREA
Accuracy	1/4 mile (Quarter Section)
Notes	NON-FARMED WETLANDS AND WET PASTURE LANDS ON THE NISQUALLY RIVER DELTA. LARGENUMBERS OF WATERFOEL NEST HERE EACH BREEDING SEASON.
Source Record	902429
Source Dataset	PHSREGION
Source Name	TED MULLER WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Wood duck	
Scientific Name	*Aix sponsa*
Priority Area	Breeding Area
Site Name	LACEY
Accuracy	1/4 mile (Quarter Section)
Notes	WOOD DUCK BREEDING AREA
Source Record	902432
Source Dataset	PHSREGION
Source Name	FURRER, STEVE; SKRILETZ,J
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Waterfowl Concentrations	
Priority Area	Regular Concentration
Site Name	PIERCE COUNTY LARGE WATERFOWL AREAS, AGRICULTURAL
Accuracy	1/4 mile (Quarter Section)
Notes	LARGE REGULAR WATERFOWL CONCENTRATION AREAS, AGRICULTURAL, PIERCE COUNTY.
Source Record	902554
Source Dataset	PHSREGION
Source Name	NAUER, DON WDW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Biodiversity Areas And Corridor	
Priority Area	Terrestrial Habitat
Site Name	PIERCE COUNTY CANDIDATE OPEN SPACE AREAS
Accuracy	1/4 mile (Quarter Section)
Notes	NATURALLY VEGETATED LAND AREAS IN PIERCE COUNTY WHICH SHOULD BE CONSIDERED FORCONSERVATION AND NATURAL AREA PROTECTION. SOME ARE UNDEVELOPED STEEP SLOPESCOVERED WITH NATIVE VEGETATION AND SERVE AS HIGH QUALITY WILDLIFE HABITAT.
Source Record	902061
Source Dataset	PHSREGION
Source Name	TED MULLER WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00023
Geometry Type	Polygons

Wetlands	
Priority Area	Aquatic Habitat
Site Name	NISQUALLY RIVER WETLANDS
Accuracy	1/4 mile (Quarter Section)
Notes	WETLANDS IN PIERCE COUNTY ASSOCIATED WITH THE NISQUALLY RIVER. VARIOUS RIVERINE, FORESTED, EMERGENT MARSH, SCRUB-SHRUB, AND AGRICULTURAL WETLANDS PROVIDING FISH HABITAT, WATERFOWL USE, AND GENERAL WILDLIFE HABITAT INCLUDES HORN, ROCKY CREEK
Source Record	902589
Source Dataset	PHSREGION
Source Name	NAUER, DON WDW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Shorebird Concentrations	
Priority Area	Regular Concentration
Site Name	NISQUALLY DELTA
Accuracy	1/4 mile (Quarter Section)
Notes	HIGH COUNTS FOR SHOREBIRDS WERE 2400+ IN WINTER 1994 AND 1600+ IN SPRING 1994.DUNLINS WERE MOST NUMEROUS AND GREATER YELLOWLEGS AND LONG-BILLED DOWITCHERS WERE ALSO PRESENT.
Source Record	920116
Source Dataset	PHSREGION
Source Name	BUCHANAN, JOE
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Wetlands	
Priority Area	Aquatic Habitat
Site Name	REGION 6 SALTWATER WETLANDS
Accuracy	1/4 mile (Quarter Section)
Notes	COASTAL SALT MARSHES SALT MEADOWS AND BRACKISH MARSHES
Source Record	904451
Source Dataset	PHSREGION
Source Name	GUFLER DAVE
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Esturine Zone	
Priority Area	Aquatic Habitat
Accuracy	1/4 mile (Quarter Section)
Notes	ESTVARINE ZONE-COASTAL ZONE ATLAS OF WASHINGTON-STRONGLY INFLUENCED BY THE MARINE ENVIRONMENT AND CAN BE DISTINGUISHED BY A BRANCHING CHANNEL PATTERN IN A BROAD FLAT VALLEY. CZA CODE 511.
Source Record	904711
Source Dataset	PHSREGION
Source Name	JOHNSON, TERRY
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Polygons

Esturine Zone	
Priority Area	Aquatic Habitat
Accuracy	1/4 mile (Quarter Section)
Notes	BAY/ESTUARY-COASTAL ZONE ATLAS CODE 54-MODERATELY PROTECTED MARINE EMBAYMENTS WITH FREE CONNECTIONS WITH THE OPEN SEA. BLUFFS, REACH SUBSTRATES MARSHES, EELGRASS BEDS, AND OTHER INTERTIDAL HABITATS ARE ASSOCIATED WITH IT.
Source Record	904754
Source Dataset	PHSREGION
Source Name	JOHNSON, TERRY
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/conservation/habitat/planning/ahg/index.html
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MAANAO
Accuracy	GPS
Notes	MAZAMA POCKET GOPHER MOUND CONCENTRATION AREA. LOCATION IS STNDRD. BUFFER AT ~CENTER OF MOUND DISTRIBUTION.
Source Record	3855
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	WALKER, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN SEED ORCHARD
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3878
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;WALKER, M./WD
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN SEED ORCHARD
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3893
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;WALKER, M./WD
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN SEED ORCHARD
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3896
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;WALKER, M./WD
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN SEED ORCHARD
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3904
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;WALKER, M./WD
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN SEED ORCHARD
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3905
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;WALKER, M./WD
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN SEED ORCHARD
Accuracy	1/4 mile (Quarter Section)
Notes	WESTERN POCKET GOPHER MOUND SYSTEM, IOS TRAPPED FROM NURSERY WHERE SEEDLING DAMAGE OCCURS. STILL PRESENT IN 2001 PER K. MCALLISTER - WDFW. SITE LOCATION UPDATED 2009 FROM PHS FEATURE. MOUNDS PRESENT IN 2008 AND 2012.
Source Record	3181
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Great blue heron	
Scientific Name	*Ardea herodias*
Priority Area	Breeding Area
Site Name	SANDY POINT BEACH RD
Accuracy	GPS
Notes	GREAT BLUE HERON COLONY IN LG. ALDERS. FIRST MAPPED IN 2005; PREV. REPORTED ACTIVE. HERONRY SPLIT ACROSS WETLAND. SINGLE NEST IN ALDER BORDERING MAIN CREEK THAT FEEDS WETLAND. 2009: GPS COLLECTED BY SCHMIDT (WDFW). DATA UPDATED 2010.
Source Record	495
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	YELM HIGHWAY/CATE FARM ROAD
Accuracy	Map 1:12,000 <= 33 feet
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUND SYSTEM. POLY DELINEATION ON PG 2066012. MOUND SYSTEMS BETWEEN N. SIDE OF YELM HWY TO N. OF CATE FARM RD. LOC UPDATED 2/2011. 2012: MOUND CLUSTERS ALONG BOTH SIDES OF CATE FARM RD.
Source Record	3305
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	OLYMPIA PRESBYTERIAN CHURCH
Accuracy	Map 1:12,000 <= 33 feet
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUND SYSTEM BEHIND CHURCH ON CHURCH PROPERTY. PART OF AN INTERACTING POPULATION WITH 10-1 AND 34-1,2. LOCATION AND NAME UPDATED 2/2011 (PREVIOUSLY MUSHROOM CORNER).
Source Record	3653
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	MCALLISTER, K/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	RIVER RIDGE COVENANT CHURCH
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT. NAME AND LOCATION UPDATED 2011.
Source Record	3955
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;ANDERSON, S./
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	LACEY ATHLETIC COMPLEX
Accuracy	Map 1:12,000 <= 33 feet
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUND CONCENTRATION. PART OF AN INTERACTING POPULATION WITH 10-1 AND 33-1. NAME UPDATED FROM 'MUSHROOM CORNER' AND LOCATION UPDATED 3/2011.
Source Record	3654
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	TIRHI, M/WDFW;BUTLER, E/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	ST. MARTINS COLLEGE
Accuracy	Map 1:12,000 <= 33 feet
Notes	MAZAMA POCKET GOPHER MOUND CONCENTRATION AREA.
Source Record	4358
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	MCALLISTER, K/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Purple martin	
Scientific Name	*Progne subis*
Priority Area	Breeding Area
Site Name	RED SALMON CREEK MOUTH
Accuracy	GPS
Notes	PURPLE MARTIN BOXES FIRST REPORTED BY MCALLISTER - DATE UNKNOWN (9 BOXES). 2010: 7 BOXES AVAILABLE.
Source Record	4374
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Great blue heron	
Scientific Name	*Ardea herodias*
Priority Area	Breeding Area
Site Name	NISQUALLY - MCALLISTER CREEK
Accuracy	Standard buffer
Notes	GREAT BLUE HERON COLONY. ACTIVE AT LEAST SINCE 1976. MOVING NORTHWARD BECAUSE OF BALD EAGLES. HISTORY FOR GENERAL COLONY: 82: 16 NSTS; 84: 53 NSTS; 91: 53 NSTS; 92: 61 NSTS; 93: 65 NSTS; 94: 95 ACTIVE NSTS; 96: AT LEAST 24 NSTS (SEQ 3?)
Source Record	69
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	BAILEY, M/USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Great blue heron	
Scientific Name	*Ardea herodias*
Priority Area	Breeding Area
Site Name	NISQUALLY - MCALLISTER CREEK
Accuracy	Standard buffer
Notes	GREAT BLUE HERON COLONY. ACTIVE AT LEAST SINCE 1976. MOVING NORTHWARD DUE TO BALD EAGLES. HISTORY FOR GENERAL COLONY: 82: 16 NSTS; 84: 53 NSTS; 91: 53 NSTS; 92: 61 NSTS; 93: 65 NSTS; 94: 95 NESTS; 96: MIN 24 NESTS (53-3?). 2014: COLONY GONE.
Source Record	70
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	BAILEY, M/USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Great blue heron	
Scientific Name	*Ardea herodias*
Priority Area	Breeding Area
Site Name	NISQUALLY - MCALLISTER CREEK
Accuracy	Standard buffer
Notes	GREAT BLUE HERON COLONY. 1996: AT LEAST 24 NESTS COUNTED OFF AIR PHOTO. 2014: COLONY GONE.
Source Record	71
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	BAILEY, M/USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Purple martin	
Scientific Name	*Progne subis*
Priority Area	Breeding Area
Site Name	LUHR BEACH
Accuracy	Map 1: 63, 360 <= 106 feet
Notes	PURPLE MARTIN BREEDING AREA AT DOCK AT THE MOUTH OF MCALLISTER CREEK. 2000: KEVIN LI REFURBISHED BOXES AND GOURDS, NO REPORT OF OCCUPANCY. 2011: 14 BOXES; 1 NEEDS REPLACEMENT.
Source Record	4452
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Purple martin	
Scientific Name	*Progne subis*
Priority Area	Breeding Area
Site Name	SCHINKE ROAD
Accuracy	Map 1:12,000 <= 33 feet
Notes	PURPLE MARTIN - 7 PRS IN BOXES IN WOODARD BAY, SCHINKE RD, 211: NEST BOXES ON POLES IN FRESHWATER WETLAND ON PRIVATE PROPERTY. LOCATION APPROX. NEEDS CONFIRMATION. THIS WAS PREV. COLONY #99 & MAY BE THE SAME SITE AS CURRENT COLONY #99.
Source Record	4456
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MERIDIAN RD SE - GOSS
Accuracy	GPS
Notes	MAZAMA (YELM) POCKET GOPHER MOUND CONCENTRATION AREA. PARTIAL SITE DISTURBANCE BY NEW ROAD CONSTRUCTION. SITE BOUNDARY DOES NOT REFLECT THE ENTIRE OCCUPIED AREA.
Source Record	4555
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3958
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;ANDERSON, S./
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3959
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;ANDERSON, S./
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3960
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;ANDERSON, S./
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3961
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;ANDERSON, S./
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3962
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;ANDERSON, S./
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MUSHROOM CORNER
Accuracy	GPS
Notes	MAZAMA (WESTERN) POCKET GOPHER MOUNDS IN WDFW RESEARCH PLOT.
Source Record	3963
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	SCHMIDT, T./WDFW;ANDERSON, S./
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	YELM HWY SE - INTERCITY TRANSIT
Accuracy	Map 1:12,000 <= 33 feet
Notes	MAPPED TO EXPANDED PARCEL BOUNDARIES AT 6600 YELM HWYY SE AND INTERCITY TRANSIT PARCEL.
Source Record	4795
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	CATE FARM DR SE
Accuracy	Map 1:12,000 <= 33 feet
Notes	MAPPED TO EXPANDED PARCEL BOUNDARY AT 6908 CATE FARM DR SE.
Source Record	4796
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	ST. MARTINS ABBEY
Accuracy	Map 1:12,000 <= 33 feet
Notes	MAPPED BOUNDARIES PROVIDED BY USFWS. MOUND INFORMATION NOT PROVIDED IN 2014.
Source Record	4806
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	ST. MARTINS - DESMOND DR.
Accuracy	Map 1:12,000 <= 33 feet
Notes	PARTIAL PARCEL SEARCH ASSOCIATED WITH AFC ERADICATION EFFORT RECON. MOUND CLUSTERS (5) SPACED THROUGHOUT DELINEATED AREA. 2017: BOUNDARY EXPANDED TO COVER OUTER EXTENT OF GOPHER MOUNDS PER WDFW SURVEY 2016.
Source Record	4744
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	TIRHI, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	ST. MARTINS
Accuracy	GPS
Notes	PARTIAL PARCEL SEARCH ASSOCIATED WITH AFC ERADICATION EFFORT RECON. MOUND CLUSTERS (15) SPACED THROUGHOUT DELINEATED AREA. BOUNDARY UPDATED 2016 PER WDFW SURVEY.
Source Record	4745
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	TIRHI, M/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	PACIFIC AVE SE OLYMPIA
Accuracy	GPS
Notes	SITE DELINEATED BY PARCEL BOUNDARY
Source Record	4871
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	THURSTON CO PW2 ROADSIDE
Accuracy	GPS
Notes	SITE DELINEATED BY MOUND LOCATIONS
Source Record	4906
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	ST MARTINS COLLEGE
Accuracy	GPS
Notes	SITE DELINEATED BY PARCEL BOUNDARY
Source Record	4907
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Mazama (Western) pocket gopher	
Scientific Name	*Thomomys mazama*
Priority Area	Occurrence
Site Name	MORIHARA
Accuracy	1/8 mile (Quarter/Quarter Section)
Notes	SITE DELINEATED BY PARCEL BOUNDARY.
Source Record	5201
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CAPELLI, C./USFWS
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	Threatened
State Status	Threatened
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	Y
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=01175
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/UBF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/UBF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L2ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L2ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L2ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L2ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L2ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L2ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1Fx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1Fx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/EM1Fx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PAB/UBH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABHh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABHh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABHh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1N
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1P
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1P
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1P
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2EM1P
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ad
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ah
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ah
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ah
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ah
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1B
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABHx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Pond	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Pond - NWI Code: PABHx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSFh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/ABF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/ABF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSFh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSFh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1AB/UBH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1AB/UBH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Lake	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Lake - NWI Code: L1ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Cx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Cx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Cx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Cx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Fh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1R
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1R
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1R
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFO/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFO/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFO/USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
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Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
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State Status	N/A
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Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
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State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
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State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
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Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
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Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
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Sensitive	N
SGCN	N
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
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Freshwater Forested/Shrub Wetland	
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Freshwater Forested/Shrub Wetland	
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
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SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
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SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/USCx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
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Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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PHS Listing Status	PHS Listed Occurrence
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SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
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Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
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Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
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Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
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Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
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Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
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SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
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Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
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SGCN	N
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Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
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Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
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Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
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Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
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Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
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ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
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State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
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SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
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SGCN	N
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Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
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Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
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PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
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Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
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SGCN	N
Display Resolution	AS MAPPED
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Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
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Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSCh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSCh
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSCx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSF
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSR
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Estuarine and Marine Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Estuarine and Marine Wetland - NWI Code: E2AB/USN
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSA
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSAd
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSAd
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSAd
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSB
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1/SSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1A
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ad
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ad
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ah
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1F
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSS/EM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1Ch
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Riverine	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Riverine - NWI Code: R2ABH
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Riverine	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Riverine - NWI Code: R3USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Riverine	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Riverine - NWI Code: R3USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Riverine	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Riverine - NWI Code: R3USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Riverine	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Riverine - NWI Code: R3USC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Riverine	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Riverine - NWI Code: R4SBCx
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Western Pond Turtle	
Scientific Name	*Actinemys marmorata*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	Endangered
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	QTR-TWP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00025

Big brown bat	
Scientific Name	*Eptesicus fuscus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Big brown bat	
Scientific Name	*Eptesicus fuscus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Yuma myotis	
Scientific Name	*Myotis yumanensis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Big brown bat	
Scientific Name	*Eptesicus fuscus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Yuma myotis	
Scientific Name	*Myotis yumanensis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Big brown bat	
Scientific Name	*Eptesicus fuscus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Yuma myotis	
Scientific Name	*Myotis yumanensis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Big brown bat	
Scientific Name	*Eptesicus fuscus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Yuma myotis	
Scientific Name	*Myotis yumanensis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necesssary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

ATTACHMENT B

NWI MAP

U.S. Fish and Wildlife Service
National Wetlands Inventory

NWI

April 20, 2022

Wetlands

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

ATTACHMENT C

NRCS SOIL REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Thurston County Area, Washington

June 9, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:10,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 15, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 18, 2020—Jul 30, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Alderwood gravelly sandy loam, 8 to 15 percent slopes	55.8	29.9%
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	12.9	6.9%
46	Indianola loamy sand, 0 to 5 percent slopes	7.6	4.1%
110	Spanaway gravelly sandy loam, 0 to 3 percent slopes	110.1	59.1%
Totals for Area of Interest		**186.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Thurston County Area, Washington

2—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA)

Other vegetative classification: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA)
Hydric soil rating: No

Minor Components

Indianola
Percent of map unit: 5 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Shalcar
Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

33—Everett very gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2t62b
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Everett and similar soils: 80 percent

Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Moraines, eskers, kames
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA)
Other vegetative classification: Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XF403WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit: 10 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Riser

Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

46—Indianola loamy sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t62k
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Terraces, kames, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A

Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XV402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XV402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 8 percent
Landform: Hills, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

110—Spanaway gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2ndb6
Elevation: 330 to 1,310 feet
Mean annual precipitation: 35 to 65 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Spanaway and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spanaway

Setting

Landform: Terraces, outwash plains
Parent material: Volcanic ash over gravelly outwash

Typical profile

H1 - 0 to 15 inches: gravelly sandy loam
H2 - 15 to 20 inches: very gravelly loam
H3 - 20 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R002XA006WA - Puget Lowlands Prairie
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

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ATTACHMENT D

SPECIES OBSERVED

Species Observed During Biological Resources Surveys

April 12 to 14 and June 16 to 18, 2021

Scientific Name	Common Name
Plants	
Cytisus scoparius	Scotch broom
Leucanthemum vulgare	Oxeye daisy
Digitalis purpurea	Foxglove
Rubus spp.	Blackberry
Hypericum perforatum	St. John's wort
Pseudotsuga menziesii	Douglas fir
Quercus garryana	Oregon white oak
Cynodon dactylon	Bermuda grass
Lolium multiflorum	Italian ryegrass
Holodiscus discolor	Oceanspray
Gaultheria shallon	Salal
Spiraea douglasii	Hardhack
Wildlife	
Cathartes aura	Turkey vulture
Buteo jamaicensis	Red-tailed hawk
Turdus migratorius	American robin
Falco sparverius	American kestrel
Corvus corax	common raven
Poecile rufescens	Chestnut-backed chickadee
Junco hyemalis	Dark-eyed junco
Zonotrichia leucophrys	White-crowned sparrow
Haemorhous mexicanus	House finch
Spinus tristis	American goldfinch

Appendix I-4

Section 7 Consultation Letters

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
Northwest Regional Office
911 NE 11th Avenue
Portland, Oregon 97232-4169

6/24/2024

Kim Kratz, Assistant Regional Administrator
Oregon/Washington Coastal Area Office
NOAA Fisheries West Coast Region
U.S. Department of Commerce

Re: Bureau of Indian Affairs' Request for National Marine Fisheries Service ***Informal*** Consultation under Section 7 of the Endangered Species Act on the Nisqually Indian Tribe Fee-to-Trust and Quiemuth Village Mixed Use Project

Dear Kim Kratz:

In accordance with *50 CFR § 402.13 Informal consultation*, the Bureau of Indian Affairs (BIA), Northwest Region, is requesting to initiate informal Section 7 Endangered Species consultation for the proposed Nisqually Indian Tribe (Tribe) Fee-to-Trust and Quiemuth Village Mixed Use Project. With this letter, we are submitting for your review the attached *Aquatic Biological Assessment: Nisqually Quiemuth Mixed-Use Fee-to-Trust Project* (BA), dated June 2024.

We have determined the proposed actions may affect, but are not likely to adversely affect, the following species: Steelhead Trout (*Oncorhynchus mykiss),* Chinook Salmon (*Oncorhyncus tshawytscha*), and their associated Critical Habitats. We seek your concurrence with our determinations.

The attached BA provides a detailed description of the proposed federal action and effects to listed species, which is summarized with additional information herein:

1) **Description of the proposed action (including any measures intended to avoid, minimize, or offset effects of the action on listed species and critical habitat).**

   Purpose: Proposal is for BIAs approval of fee-to-trust conversion into federal trust status (Proposed Action) and the subsequent development of the site with mixed use development and related facilities. The Tribe has proposed two alternative site plans for the Proposed Project, a Commercial-Heavy Alternative that would develop the entire Project Site and a Recreation-Heavy Alternative that would develop most of the Project Site except for approximately 19.03-acres of the mixed conifer-hardwood forest in the northern portion of the Project Site. To be conservative, this consultation is based on the analysis of the Commercial-Heavy Alternative as it has the biggest development footprint.

Duration and Timing: Construction activities associated with the Proposed Action are anticipated to commence in 2026. Although buildout of the site will likely take place over a time span of three to eight years, depending on market conditions and other factors, it is conservatively assumed construction of the site will occur over a period of 24 months consistent with the Environmental Assessment. Additional detail regarding the proposed grading and drainage plan and water supply /wastewater treatment facilities is provided Attachment A: Stormwater and Grading Strategies (Aquatic BA).

Location: The project site is approximately 174-acres located in the City of Lacey, Thurston County, Washington. The project site is located directly north of Interstate 5 (I-5), and west of the Marvin Road / I-5 interchange. The property is adjacent to a 1-acre parcel currently in federal trust for the Tribe, which is developed with the Nisqually Markets Tobacco Outlet store.

Specific Components of the Action and how they will be carried out: The Proposed Action includes the transfer of the approximately 174-acre proposed trust property into federal trust status. Following the acquisition of the Project Site into trust, the Tribe proposes to develop the following components within the Action Area under the Commercial-Heavy Alternative (Figure 3, BA):

- Approximately 929,500 square feet of commercial retail, including grocers, retail and dining;
- Approximately 7.4 acres of recreational facilities, including a golf entertainment facility, bowling center, and movie theater;
- A 4-story, 200 room hotel;
- 320 units of housing, including high density multi-family apartments and onsite live/work housing;
- A 28-acre travel center, to include 26 diesel and gasoline fuel pumps;
- Approximately 4,655 parking spaces provided by several surface parking areas; and
- Infrastructure, including electrical, natural gas, water supply, wastewater treatment and/or collection facilities, and stormwater drainage, treatment, and infiltration facilities (note that offsite infrastructure is described and analyzed in Section 4.5 of the BA).

Conservation measures part of the Proposed Action to avoid or minimize potential adverse impacts to the environment, critical habitat, essential fish habitat, and federally listed fish species are discussed in Section 4.5 of the BA.

Maps, Drawings, or Schematics of the Action: Proposed site plans are attached in the Figures Section of the BA along with the Stormwater and Grading Strategies**.**

Any other available information related to the nature and scope of the proposed action relevant to its effects on listed species or designated critical habitat: Not Applicable.

2) **A map or description of all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action (*i.e.,* the action area as defined at §402.02).**

The 174-acre property is directly north of Interstate 5 (I-5), and west of the Marvin Road / I-5 interchange in the City of Lacey, Thurston County, Washington. The Action Area is depicted in Figures 1-6 attached to the BA.

3) **Information obtained by or in the possession of the Federal agency and any applicant on the listed species and designated critical habitat in the action area (as required by paragraph (c)(1)(ii) of this section), including available information such as the presence, abundance, density, or periodic occurrence of listed species and the condition and location of the species' habitat, including any critical habitat.**

Two terrestrial habitat types were identified within the Action Area: ruderal/disturbed and mixed conifer – hardwood forest. There are no aquatic habitats identified within the Action Area. There are several riverine habitats located within the watershed of the Action Area that support significant fish species. The Action Area is located within the Woodland Creek Drainage Basin. The nearest flowing water features to the Action Area are an unnamed stream system approximately 0.13 miles northwest, Woodland Creek approximately 3,500 feet west, which provides fish habitat for steelhead and Chinook Salmon, and McAllister Creek approximately 1.7 miles east of the Action Area. McAllister Creek flows into the nearby Nisqually Flats that are part of the Billy Frank Jr. Nisqually National Wildlife Refuge. In addition, the Nisqually River is approximately 2.08 miles east of the Action Area and terminates into the Nisqually Flats that eventually drains into the Puget Sound, and provides fish habitat for Chinook salmon, coho salmon, and Puget Sound pink salmon. There are no surface water features in the Action Area itself. Surface water features in close proximity to the Action Area can be seen in Figure 12 attached to the BA.

There is no designated critical habitat for federally listed species within the Action Area, nor are there any surface waters or aquatic habitats within the Action Area. Critical habitat was identified approximately 3,500 feet west of the Action Area in Woodland Creek for the threatened Steelhead. This Creek runs from Long Lake into Henderson Inlet. McAllister Creek, approximately 1.7 miles to the east of the Action Area, which leads to the Nisqually Reach contains critical habitat for the following species, the threatened Chinook Salmon and threatened steelhead; however, the Action Area is not within the drainage watershed of McAllister Creek (Figure 9 in BA).

4) A description of the effects of the action and an analysis of any cumulative effects.

The Proposed Action has the potential to impact groundwater and surface water levels using approximately 363,129 gallons per day (gpd) of water (or 226,750 gpd if reclaimed water is used) for the proposed development. The Action Area is located within the Woodland Creek Watershed and effects to groundwater could impact flows in Woodland Creek. As described in Section 4.2 of the Aquatic BA, the Proposed Action could result in indirect effects to off-site water quantity in Woodland Creek from the use of groundwater under the Commercial-Heavy Alternative for water supply. With the conservation measures listed in Section 4.5 of the Aquatic BA, and bioretention and infiltration facilities incorporated into project design, the Proposed Action may affect but is not likely to adversely affect federally listed Chinook salmon, steelhead, coho salmon, and their designated critical habitats.

5) A summary of any relevant information provided by the applicant, if available.

Not Applicable.

6) Any other relevant available information on the effects of the proposed action on listed species or designated critical habitat, including any relevant reports such as environmental impact statements and environmental assessments.

The Stormwater and Grading Strategies are provided in Attachment A of the BA.

With the submittal of this letter and attached BA, the BIA is requesting concurrence on our determinations. The BIA staff contact is Regional Wildlife Biologist, Stefanie Kramer, Stefanie.kramer@bia.gov. Thank you for your continued assistance.

Sincerely,

Janine B. Van Dusen
Superintendent
BIA Puget Sound Agency

Attachment:

(1) *Aquatic Biological Assessment: Nisqually Quiemuth Mixed-Use Fee-to-Trust Project* (BA), dated June 2024

cc:

Brian Haug, BIA Regional Scientist
Stefanie Kramer, BIA Regional Wildlife Biologist

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
Northwest Regional Office
911 NE 11th Avenue
Portland, Oregon 97232-4169

6/24/2024

Brad Thompson
State Supervisor, Ecological Services
U.S. Fish and Wildlife Service, Washington Office
510 Desmond Drive SE, Suite 102
Lacey, Oregon 98503

Re: Bureau of Indian Affairs' Request for United States Fish and Wildlife Service ***Informal*** Consultation under Section 7 of the Endangered Species Act on the Nisqually Indian Tribe Fee-to-Trust and Quiemuth Village Mixed Use Project

Dear Brad Thompson:

In accordance with *50 CFR § 402.13 Informal consultation*, the Bureau of Indian Affairs (BIA), Northwest Region, is requesting to initiate informal Section 7 Endangered Species consultation for the proposed Nisqually Indian Tribe (Tribe) Fee-to-Trust and Quiemuth Village Mixed Use Project. With this letter, we are submitting for your review the attached *Aquatic Biological Assessment* (Aquatic BA), and the *Terrestrial Biological Assessment* (Terrestrial BA), for the *Nisqually Quiemuth Mixed-Use Fee-to-Trust Project*, both dated June 2024.

We have determined the proposed actions may affect, but are not likely to adversely affect, the following species: Yelm pocket gopher (*Thomomys mazama yelmensis*), streaked horned lark *(Eremophila alpestris strigata),* bull trout (*Salvelinus confluentus*), and bull trout critical habitat. We seek your concurrence with our determinations.

The attached BA provides a detailed description of the proposed federal action and effects to listed species, which is summarized with additional information herein:

1) **Description of the proposed action (including any measures intended to avoid, minimize, or offset effects of the action on listed species and critical habitat).**

   Purpose: Proposal is for BIA's approval of fee-to-trust conversion into federal trust status (Proposed Action) and the subsequent development of the site with a mixed-use development and related facilities. The Tribe has proposed two alternative site plans for the Proposed Project: 1) Commercial-Heavy Alternative that would develop the entire Project Site, and 2) Recreation-Heavy Alternative that would develop most of the Project Site except for approximately 19.03-acres of the mixed conifer-hardwood forest in the northern portion of the Project Site. To be conservative, this consultation is based on the analysis of the Commercial-Heavy Alternative as it has the biggest development footprint.

Duration and Timing: Construction activities associated with the Proposed Action are anticipated to commence in 2026 Although buildout of the site will likely take place over a time span of three to eight years, depending on market conditions and other factors, it is conservatively assumed construction of the site will occur over a period of 24 months consistent with the Environmental Assessment. Additional detail regarding the proposed grading and drainage plan and water supply /wastewater treatment facilities is provided in Attachment A: Stormwater and Grading Strategies (Aquatic BA).

Location: The project site is approximately 174-acres located in the City of Lacey, Thurston County, Washington. The project site is located directly north of Interstate 5 (I-5), and west of the Marvin Road / I-5 interchange. The property is adjacent to a 1-acre parcel currently in federal trust for the Tribe, which is developed with the Nisqually Markets Tobacco Outlet store. Two terrestrial habitat types were identified within the project site: ruderal/disturbed and mixed conifer – hardwood forest.

Specific Components of the Action and how they will be carried out: The Proposed Action includes the transfer of the approximately 174-acre proposed trust property into federal trust status. Following the acquisition of the Project Site into trust, the Tribe proposes to develop the following components within the Action Area under the Commercial-Heavy Alternative (Figure 3, BA):

- Approximately 929,500 square feet of commercial retail, including grocers, retail and dining;
- Approximately 7.4 acres of recreational facilities, including a golf entertainment facility, bowling center, and movie theater;
- A 4-story, 200 room hotel;
- 320 units of housing, including high density multi-family apartments and onsite live/work housing;
- A 28-acre travel center, to include 26 diesel and gasoline fuel pumps;
- Approximately 4,655 parking spaces provided by several surface parking areas; and
- Infrastructure, including electrical, natural gas, water supply, wastewater treatment and/or collection facilities, and stormwater drainage, treatment, and infiltration facilities (note that offsite infrastructure is described and analyzed in Section 4.5 of the BA).

Conservation measures part of the Proposed Action to avoid or minimize potential adverse impacts to the environment, critical habitat, and federally listed species are discussed in Section 4.5 of the Aquatic and Terrestrial BAs.

Maps, Drawings, or Schematics of the Action: Proposed site plans are attached in the Figures Section of the BA along with the Stormwater and Grading Strategies**.**

Any other available information related to the nature and scope of the proposed action relevant to its effects on listed species or designated critical habitat: Not Applicable.

2) A map or description of all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action (*i.e.,* the action area as defined at §402.02).

The 174-acre property is directly north of Interstate 5 (I-5), and west of the Marvin Road / I-5 interchange in the City of Lacey, Thurston County, Washington. The Action Area is depicted in Figures 1-6 attached to the BAs.

3) Information obtained by or in the possession of the Federal agency and any applicant on the listed species and designated critical habitat in the action area (as required by paragraph (c)(1)(ii) of this section), including available information such as the presence, abundance, density, or periodic occurrence of listed species and the condition and location of the species' habitat, including any critical habitat.

Yelm Pocket Gopher

There are no recent documented occurrences of Mazama pocket gophers within one mile of the Action Area. No pocket gophers, mounds or burrows indicating the presence of pocket gophers were observed at the time of survey of the Action Area. Although the Action Area has the correct habitat and soil types for pocket gopher species, the I-5 roadway creates a barrier that separates both sides of the roadway and inhibits gophers from passing. Therefore, the likelihood of gophers being in the project area is very low as discussed in Section 3.6.1 of the Terrestrial BA.

Streak Horned Lark

Streak horned lark may occur in the open grassy areas of the Action Area, primarily in ruderal habitat. Grasses are short and there are areas of bare and sparsely vegetated ground suitable for nesting. Overall, habitat quality is marginal due to site disturbance, limited native vegetation, and ongoing human activity.

Bull Trout

There are no aquatic habitats identified within the Action Area. Additionally, there is no designated critical habitat within the Action Area, nor are there any surface waters or aquatic habitats within the Action Area. The Action Area is located within the Woodland Creek Drainage Basin. There are several riverine habitats located within the watershed that support significant fish species. The nearest flowing water features to the Action Area are an unnamed stream system approximately 0.13 miles northwest, Woodland Creek approximately 3,500 feet west, and McAllister Creek approximately 1.7 miles east of the Action Area. The Nisqually Reach, within Puget Sound, occurs approximately 2.6 miles east of the Action Area and is designated critical habitat for bull trout (Aquatic BA, Figure 9).

4) A description of the effects of the action and an analysis of any cumulative effects.

Yelm Pocket Gopher

Although unlikely, if the Yelm pocket gophers were to be present at the time of construction of the Proposed Action, construction-related activities have the potential to cause mortality. Potential adverse effects would be discountable with the implementation of the avoidance and minimization measures discussed below in Section 4.5 of the Terrestrial BA. With implementation of these measures, the Proposed Action may affect, but is not likely to adversely affect the Yelm pocket gophers.

Streak Horned Lark

If the streaked horned lark were to be present in the area of impact at the time of construction of the Proposed Action, construction-related activities have the potential to cause mortality or nest abandonment**.** Potential adverse effects would be discountable with the implementation of the avoidance and minimization measures discussed below in Section 4.5 of the Terrestrial BA. With the implementation of these measures, the Proposed Action may affect, but is not likely to adversely affect the streaked horned lark.

Bull Trout

The Proposed Action has the potential to impact groundwater and surface water levels using approximately 363,129 gallons per day (gpd) of water (or 226,750 gpd if reclaimed water is used) for the proposed development. As described in Section 4.2 of the Aquatic BA, the Proposed Action could result in indirect effects to off-site water quantity in Woodland Creek from the use of groundwater under the Commercial-Heavy Alternative for water supply. Potential adverse effects would be insignificant with bioretention, and infiltration facilities incorporated into project design, and the conservation measures listed in Section 4.5 of the Aquatic BA. With the implementation of these measures, the Proposed Action may affect, but is not likely to adversely affect bull trout and their designated critical habitat.

5) A summary of any relevant information provided by the applicant, if available.

Not Applicable.

6) Any other relevant available information on the effects of the proposed action on listed species or designated critical habitat, including any relevant reports such as environmental impact statements and environmental assessments.

The Stormwater and Grading Strategies are provided in the Aquatic BA.

With the submittal of this letter and attached BA, the BIA is requesting concurrence on our determinations. The BIA staff contact is Regional Wildlife Biologist, Stefanie Kramer, Stefanie.kramer@bia.gov. Thank you for your continued assistance.

Sincerely,

Janine B. Van Dusen
Superintendent
BIA Puget Sound Agency

Attachment:

(1) *Aquatic Biological Assessment: Nisqually Quiemuth Mixed-Use Fee-to-Trust Project* (BA), dated June 2024
(2) *Terrestrial Biological Assessment: Nisqually Quiemuth Mixed-Use Fee-to-Trust Project* (BA), dated June 2024

cc:

Brian Haug, BIA Regional Scientist
Stefanie Kramer, BIA Regional Wildlife Biologist