



CRITICAL AREAS REPORT

September 6, 2023



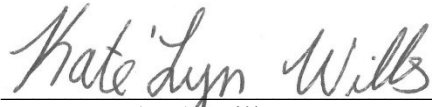
Lewis River Townhomes *Woodland, Washington*

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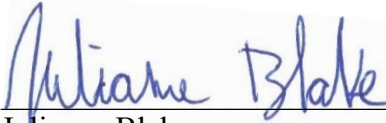
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INTRODUCTION

Ecological Land Services, Inc. (ELS) has completed this critical areas report on behalf of the applicant, Sterling Design, Inc., for the construction of 39 townhomes in Woodland, Washington near the Lewis River. The site consists of tax parcels 5009301 and 50492, located within a portion of Section 19, Township 5 North, and Range 1 East, of the Willamette Meridian (Figure 1). The site is located within Watershed Resource Inventory Area (WRIA) 27 Lewis and the 12-digit Hydrologic Unit Code (HUC) 170800020606 – Lewis River. This report summarizes ELS’ findings and associated research in accordance with the *City of Woodland Municipal Code (WMC) Title 15: Environment* and *The City of Woodland Shoreline Master Program (2021)*.

EXISTING CONDITIONS

Site Description

The approximately 9.4-acre site is comprised of parcel numbers 5009301 and 50492 is zoned as Medium Density Residential (MDR) and is in the Shoreline Environmental Designation (SED) High-Intensity. The site has been hydroseeded and the soil is loose and sandy. The site is undeveloped but shows signs of being actively managed as observed by the mostly bare ground and lack of vegetation likely due to plowing, mowing, and tilling that has been ongoing for what appears to be several decades as seen in historic aerial images accessed through Google Earth. Aerial review dating back to 1985 indicates the land has been undeveloped for decades. There is what appears to be an old dry well in the concave section of the property located in the northwest portion of parcel 5009301. A flood and utility easement are present in the northern portion of the site near a gravel road. The Lewis River is located along the eastern site boundary. The Lewis River is a Type S (shoreline) waterway that converges with the East Fork Lewis River in La Center, Washington before discharging into the Columbia River which is west of the site. Topographically the site is mostly flat with one depressional area near the remains of the historic dry wellhead (Figure 2).

Site History

Review of historical aerial imagery dating back to 1955 shows the section of the Lewis River in the vicinity of the site has been altered by manmade processes and the addition of structures and is no longer in a natural state. The Lewis River was realigned in 1940 to accommodate construction of the Woodland Airport and Interstate-5 (I-5) and manmade processes such as deposition of fill, riverbank armoring, and channel deepening occurred to support this realignment. Large concrete inclusions are present in the vicinity of the onsite shoreline and the embankments appear heavily disturbed, which further supports that manmade processes have altered the shoreline. Around the year 2007, permits were acquired, and additional fill was placed onsite to support future development, further decreasing the functionality of the shoreline. If approved by the City of Woodland, the Riparian Habitat Area (RHA) in the vicinity of the site shall be considered functionally isolated at the ordinary high water mark (OHWM) of the Lewis River according to *WMC 15.08.730(D)(11)*.

PROJECT DESCRIPTION

Proposed Development

The project proposes constructing 39 townhomes onsite, as well as paved roads and stormwater management facilities. There will be seven individual buildings consisting of 4-6 townhome units each (Figure 3). Two stormwater detention and treatment facilities will be located onsite to convey and detain stormwater runoff generated from new impervious surfaces and reduce runoff into the

Lewis River. After onsite management, stormwater will be released to natural flow routes downgrade of the development. The Tract B stormwater facility will also be held as an open space/preservation area to contain pedestrian trails in the future. Each of the 39 townhomes will have a designated private parking area in front of the unit and no additional parking is proposed. A paved private road that accesses the development via Sandalwood Road will provide residents with access to the townhomes. Utility and flood easements are present along the north end of the private access road. The private road will be a minimum of 26 feet wide to ensure safe maneuvering area for emergency vehicles, in compliance with *WMC Chapter 16.22.210 Streets*.

According to *WMC 15.08.700*, the RHA is the area within 75-feet of the OHWM of the Lewis River. This area functions as a buffer to protect the Lewis River from chemicals and other pollutants that may be present in runoff as well as providing a habitat corridor for wildlife. However, due to historic manmade embankment structural improvements, the RHA is no longer in a natural state and the functions of the RHA are degraded. As such, the RHA is functionally isolated at the OHWM. To provide an overall ecological lift, the applicant is proposing a voluntary 50-foot-wide RHA which will be enhanced by controlling invasive species and planting native trees and shrubs. Signs will be placed at the edge of the RHA, one per lot, stating: “Riparian Habitat Area beyond this sign, alteration is prohibited. Please contact the City of Woodland for information.” Best management practices (BMPs) will be used during construction to minimize impacts to the RHA. These BMPs include the use of silt curtains along the highest intact point of the riparian buffer during construction, storing heavy equipment in an upland area away from the RHA, fueling equipment offsite to prevent any fuel from being discharged into the river, work being completed during normal daytime hours to prevent nighttime noise disturbance, and having a spill kit onsite to contain any unintended fuel spills.

METHODOLOGY

The wetland delineation followed the Routine Determination Method according to the U.S. Army Corps of Engineers, *Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (U.S. Army Engineer Research and Development Center 2010).

The Routine Determination Method examines three parameters—vegetation, soils, and hydrology—to determine if wetlands exist in a given area. Hydrology is critical in determining what is wetland but is often difficult to assess because hydrologic conditions can change periodically (hourly, daily, or seasonally). Consequently, it is necessary to determine if hydrophytic vegetation and hydric soils are present, which would indicate that water is present for long enough duration to support a wetland plant community. By definition, wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are regulated as “Waters of the United States” by the U.S. Army Corps of Engineers (Corps), as “Waters of the State” by the Washington Department of Ecology (Ecology), and locally by *WMC Title 15: Environment*.

ELS biologists conducted site reconnaissance on May 14, 2019, and July 28, 2022, to evaluate the presence of critical areas onsite and to map the OHWM. Vegetation, soils, and hydrology

information were collected from two test plots (TPs) to determine if wetlands were present onsite (Appendix A). No wetlands were observed onsite. The OHWM the Lewis River was flagged with consecutively numbered orange flagging. OHWM flags and test plot locations were mapped using a hand-held GPS unit capable of sub-meter accuracy.

VEGETATION

General vegetation onsite consisted primarily of deciduous trees, shrubs, and herbaceous species. The indicator status, following the scientific names, indicates the likelihood of the species to be found in wetlands. Listed from most likely to least likely to be found in wetlands, the indicator status categories are:

- **OBL** (obligate wetland) - occur almost always under natural conditions in wetlands.
- **FACW** (facultative wetland) - usually occur in wetlands, but occasionally found in non-wetlands.
- **FAC** (facultative) - equally likely to occur in wetlands or non-wetlands.
- **FACU** (facultative upland) - usually occur in non-wetlands, but occasionally found in wetlands.
- **UPL** (obligate upland) - occur almost always under natural conditions in non-wetlands.
- **NI** (no indicator) - insufficient data to assign to an indicator category.

Riparian Habitat Area

General vegetation observed onsite consisted of **trees**: black cottonwood (*Populus trichocarpa*, FACW); **shrubs**: bay laurel (*Umbellularia californica*, FAC); **herbs**: orchard grass (*Dactylis glomerata*, FACU), chicory (*Cichorium intybus*, FAC), hairy cat's ear (*Hypochaeris radicata*, FACU), Queen Anne's lace (*Daucus carota*, FACU), narrow-leaf water plantain (*Alisma gramineum*, OBL), hares foot clover (*Trifolium arvense*, FAC), wild blue phlox (*Phlox divaricate*, FAC); and **woody vines**: Himalayan blackberry (*Rubus armeniacus*, FAC).

Dry well

The dry well located near TP-1 consisted of bare ground and herbaceous species. The herbaceous species consisted of hairy cat's ear, brome grass (*Vulpia bromoides*, FACU), field horsetail (*Equisetum arvense*, FAC), and common sheep sorrel (*Rumex acetosella*, FACU).

SOILS

The Natural Resources Conservation Service (NRCS) designates soils onsite as Newberg fine sandy loam 0-3 percent slopes (141), and Pilchuck loamy fine sand 0-8 percent slopes (160). Newberg fine sandy loam is found mainly in floodplains with the parent material being alluvium. A typical profile of Newberg fine sandy loam consists of fine sandy loam from 0 to 10 inches, very fine sandy loam from 10 to 28 inches, and fine sandy loam from 28 to 60 inches below ground surface (BGS). The typical depth to water table for Newberg fine sandy loam is more than 80 inches BGS and the soil is not listed as hydric by the NRCS (2022). Pilchuck loamy fine sand is found mainly in floodplains with the parent material being alluvium. The soil profile usually consists of loamy fine sand from 0 to 12 inches, fine sand from 12 to 36 inches, and gravelly sand from 36 to 60 inches BGS. The average depth to water table is more than 80 inches, and the soil is not listed as hydric (NRCS 2022). Redox features were observed in TP1 at depths of 6 to 16 inches with a Munsell soil color value of 10YR 4/2 for the matrix and 10YR 5/8 for the redoximorphic concentrations. Redoximorphic

features do not necessarily mean that an area is or is not a wetland – hydrology, hydrophytic wetland vegetation, and hydric soils must all be present to classify an area as a wetland. TP-1 is located near the historic dry well. Because water may leak from the well, it is expected that redox features may be found in nearby soils. Wetland determination data forms are in Appendix A.

HYDROLOGY

A historic dry well is located in the northcentral portion of the site in a small depression. The well consists of an elevated cement manhole surrounded by rock fill for support. The well and associated pipes have leaked or overflowed in this area historically on occasion, however, the area was dry at the time of the site visit. The Lewis River flows north to south adjacent to the eastern site boundary. There is approximately 20 to 30 feet difference in elevation from the top of the bank to the edge of the river. Additionally, the 100-year floodplain encompasses the site and the FEMA regulatory floodway follows the eastern site boundary. TP-1 was located in the small depression but did not meet any hydrology indicators other than the secondary indicator Geomorphic Position (D2).

NATIONAL WETLAND INVENTORIES

The National Wetland Inventory (NWI) indicates no wetlands onsite but shows palustrine, scrub-shrub, temporarily flooded wetlands (PSSA) just offsite to the east (Figure 5). ELS partially agrees with the NWI mapping as no wetlands were observed on or offsite. Wetland inventory maps are typically used to gather wetland information about a region and due to the large scale necessary for regional mapping are limited in accuracy for localized analyses.

CRITICAL AREAS SUMMARY

Lewis River

Lewis River is designated as a Type S (shoreline) by the Department of Natural Resources (DNR) and is considered a shoreline of statewide significance and as such is subject to shoreline regulations determined by the SMP (City of Woodland, 2021). Shoreline jurisdiction extends for 200 feet from the OHWM of the Lewis River. However, because of the degraded state of the shoreline and the implementation of manmade structures, the shoreline is no longer in a natural state. If approved by the City, the Federal Emergency Management Agency (FEMA) mapped regulatory floodway shall be considered the shoreline buffer, which is located in the vicinity of the OHWM of the Lewis River. Table 1 summarizes the critical areas onsite.

Lewis River is a fish and wildlife habitat conservation area according to *WMC Chapter 15.08.700*. According to *Table 15.08.730-1* of the *WMC* (2022), the designated RHA width for a Type S stream is 250 feet; however, the proposed project is in the Shoreline Jurisdiction High-Intensity and the buffer width is 75 feet according to *SMP Table B-4* (City of Woodland, 2021). According to *WMC 15.08.730 (d)(11)*, Functionally Isolated RHAs are areas which are functionally separated from an RHA due to preexisting roads, structures, or similar circumstances, and shall be excluded from buffers otherwise required by this chapter on a case-by-case basis subject to a critical area report and review as determined by the director. The onsite portion of the RHA of the Lewis River is functionally isolated at the OHWM due to historic manmade embankment structural improvements. If approved by the City, the RHA should not extend beyond the manmade structure. The applicant is proposing a voluntary 50-foot RHA from the OHWM of Lewis River. The proposed 50-foot RHA

shall be enhanced through the installation of native plantings as a means of providing an overall ecological lift.

Table 1. Summary of Critical Areas

Critical Area	Stream Type	Zoned RHA ¹	Shoreline Jurisdiction ²	Proposed Voluntary RHA ³
Lewis River	Type S (Shoreline of the State)	75 feet (High-Intensity SED)	200 feet	50 feet

¹WMC 15.08.730-1

²WSMP 3.1A.1

³WMC 15.08.730(D)(11).

Flood Designations

The entire site lies within Zone AE of the FEMA flood map special flood hazard areas and the eastern site boundary is designated as regulatory floodway (FEMA 2023). These designations mean the site is within FEMA’s regulatory floodway and there is a one percent chance of flooding each year. FEMA considers areas in the special hazards Zone AE as having a high risk of flooding.

LISTED SPECIES AND HABITATS IN THE PROJECT VICINITY

The potential presence of listed species that have a primary association with the habitat on or adjacent to the project area was evaluated by a site visit, aerial photographs, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (WDFW 2023a), U.S. Fish and Wildlife Service (USFWS) website (USFWS 2023a), and the National Marine Fisheries Service (NMFS) website (NMFS 2022). According to the NOAA fisheries protected resources mapper (NMFS 2022) the following anadromous endangered and threatened species are known to be present in the Lewis River; Eulachon distinct population segment (DPS), lower Columbia River (LCR) Steelhead DPS, LCR Chinook evolutionarily significant unit (ESU), Columbia River chum ESU and the LCR Coho ESU. Bull trout may also be present in the Lewis River.

In accordance with the WMC, this critical areas report will address the species and habitats that have a primary association with habitat on or adjacent to the project area. Table 2 shows federally or state-listed species, as well as state candidate species that may be present in or near the site, that have a primary association with habitat within 300 feet of the project. None of the species listed in the following table were observed during the time of the site visit.

Table 2. State Priority Habitats and Endangered, Threatened, Candidate, and Sensitive Species that have Primary Association with Habitat on or Adjacent to the Project Area

Species or State Priority Habitat	State Status ¹	Federal Status ¹	Suitable Habitat in Project Vicinity ²
<i>Fish</i>			
Chinook Salmon (<i>Oncorhynchus tshawytscha</i>) Lower Columbia River ESU	Not listed	Threatened	Yes
Coho Salmon (<i>Oncorhynchus kisutch</i>) Lower Columbia River ESU	Not listed	Threatened	Yes

Species or State Priority Habitat	State Status ¹	Federal Status ¹	Suitable Habitat in Project Vicinity ²
Steelhead (<i>Onchorhynchus mykiss</i>) Lower Columbia River ESU	Candidate	Threatened	Yes
Eulachon (<i>Thaleichthys pacificus</i>) Southern DPS	Not listed	Threatened	Yes
Chum Salmon (<i>Oncorhynchus keta</i>) Columbia River ESU	Not listed	Threatened	Yes
Bull Trout (<i>Salvelinus confluentus</i>)	Candidate	Threatened	Yes
Birds			
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	Endangered	Threatened	Yes
Mammals			
Big Brown Bats (<i>Eptesicus fuscus</i>)	Not listed	None	Yes

¹Endangered - In danger of becoming extinct or extirpated; Threatened - Likely to become endangered in the foreseeable future throughout all or a significant portion of its range and that has been formally listed as such in the Federal Register under the Federal Endangered Species Act; Sensitive - Vulnerable or declining and could become endangered or threatened in the state;

²WDFW 2021b

Fish

According to the WDFW Priority Habitat and Species (PHS) website (PHS 2023), Statewide Washington Integrated Fish Distribution (SWIFD 2023) and the NMFS protected resources application website, there are five listed ESUs/DPSs of salmon and steelhead along with bull trout in the Lewis River. These fish access the river at the confluence of the Lewis River and the Columbia River when returning to their natal spawning grounds as adults and or as juveniles migrating to the Pacific Ocean. WDFW indicates there are documented occurrences of all listed species in Table 2 in the Lewis River.

Birds

According to the United States Fish and Wildlife IPAC website there is one listed bird species that may be present in the area, the Yellow-billed Cuckoo. However, due to habitat segmentation and urbanization near the site, the site does not meet the necessary physical and biological requirements for habitat for yellow-billed cuckoos.

Mammals

The Lewis River is a Classification 1 fish and wildlife habitat conservation area for big brown bats (*Eptesicus fuscus*).

POTENTIAL IMPACTS OF THE PROJECT ON LISTED SPECIES AND HABITAT

Direct Impacts

There will be no direct impacts from the proposed project as all development activities will be located outside of the proposed voluntary RHA. The proposed building area has been filled with

dredge spoils and remains open and unvegetated. No woody vegetation will be removed as a result of the proposed construction and the vegetated portion of the RHA will be enhanced to provide an ecological lift to the RHA post construction.

Indirect Impacts

Indirect impacts will consist of increased runoff from new impervious surfaces and increased foot traffic from increased human presence. Construction of the stormwater retention and treatment facilities will abate increased runoff, as stormwater will be managed onsite before being released to natural flow routes downgrade of the development. Noise levels are already high from existing surrounding land uses and I-5 to the west, so noise levels aren't expected to increase above existing ambient noise. Constructing a pedestrian trail and placing restrictive signage along the boundary will allow the public to enjoy the shoreline, while decreasing impacts to natural areas in the RHA.

AVOIDANCE AND MINIMIZATION

The preferred mitigation sequencing of first avoidance, then minimization, and finally compensation for project impacts was taken into consideration during the project design process. Impacts to the RHA will be completely avoided by locating all proposed construction activities outside of critical areas and their associated buffers. Potential indirect impacts will be minimized by enhancing a voluntary 50-foot RHA by installing native vegetation and removing invasive vegetation. The RHA enhancement will provide an overall ecological lift for the RHA when compared to current conditions. Signs will be placed at the edge of the RHA, one per lot, that state "Riparian Habitat Area beyond this sign, alteration is prohibited. Please contact the City of Woodland for information". Best management practices (BMPs) will be utilized during construction to minimize impacts to the RHA. These BMPs include installing silt fencing along construction limits, having a water truck available to reduce dust blowing during construction, storing heavy equipment in an upland area away from the RHA, fueling equipment offsite to prevent any fuel from being discharged into the river, work being completed during daytime hours to prevent nighttime noise disturbance, and having a spill kit onsite to contain any unintended fuel spills.

VOLUNTARY ENHANCEMENT AND MONITORING PLAN

The applicant proposes a voluntary 50-foot RHA and will significantly enhance portions of the RHA by planting native species and removing invasive species. The enhanced area will be monitored for five years, and corrective actions will be taken if adverse effects to the RHA are discovered during the five-year monitoring period.

Goals, Objectives, and Performance Standards

The goal of this plan is to enhance the RHA for an overall functional lift (Figure 3). This area is currently comprised primarily of trees, herbaceous species, and invasive Himalayan blackberry. The enhancement area will undergo invasive species removal to reduce and prevent further spread of invasives onsite and will be planted with native shrubs and trees which will provide greater habitat diversity, refuge, and forage opportunities than currently exist onsite. To accomplish this goal, the following objectives and performance standards are appropriate to ensure the success of the RHA enhancement.

Objective 1. Enhance the RHA by controlling invasive species including, but not limited to, Tansy ragwort (Jacobaea vulgaris), English holly (Ilex aquifolium), reed canarygrass (Phalaris arundinacea), Canada thistle (Cirsium arvense), Scotch broom (Cytisus scoparius), evergreen blackberry (Rubus laciniatus), and Himalayan blackberry.

Performance Standard 1a: Control and remove to the greatest extent possible existing invasive species from the buffer enhancement area. Document any removal of invasive plants within the enhancement area in the as-built report.

Performance Standard 1b: In all years, invasive plant species will not exceed 10 percent aerial cover within the RHA enhancement areas. Percent cover of invasive species will be documented in annual monitoring reports.

Objective 2. Enhance the existing riparian buffer plant community by planting native shrubs within the buffer.

Performance Standard 2a: Native shrubs will be installed at spacing intervals of 6-foot on-center for shrubs and 10-foot-on-center for trees.

Performance Standard 2b: In Year 1, planted species will achieve 100 percent survival. If dead plants are replaced, this performance standard will be met. Document in annual monitoring report.

Performance Standard 2c: In Year 2, planted species will achieve 95 percent survival. If dead plants are replaced, this performance standard will be met. Document in annual monitoring report.

Performance Standard 2d: In Year 3, planted species will achieve 90 percent survival. If dead plants are replaced, this performance standard will be met. Document in annual monitoring report.

Performance Standard 2e: In Year 5 planted species will achieve 85 percent survival. If dead plants are replaced, this performance standard will be met. Document in annual monitoring report.

Planting Plan

Site Specifications

1. Stake or flag the RHA boundaries.
2. Stake or flag the enhancement area boundaries.
3. Install silt fencing at the edge of disturbance.
4. Remove invasive species.
5. Install native plantings according to plant specifications.
6. Install tree protection tubes and mulch around native plantings.
7. Remove silt fencing once bare ground has been stabilized.

Planting Implementation

1. Plant the specified trees and shrubs in the fall (October-November) or early spring (Feb-March) at the intervals listed in Table 3. Space the plants somewhat irregularly and in groups to create heterogeneity in the density and appearance of the enhancement areas. Plant the 1-gallon potted stock with a tree shovel or comparable tool.
2. Removed the plant from the pot and work the roots free from majority of potted soil.

3. Place the potted plant species in the planting holes so that their roots can extend down entirely and do not bend upward or circle inside the hole (no “J” or “U” roots).
4. Position the root crowns so that they are at or slightly above the level of the surrounding soil.
5. Compact the soil around the planted species to eliminate air spaces.
6. Irrigate all newly installed plants as site and weather conditions warrant.

Potted Stock

1. Plants will be purchased from a native plant nursery.
2. 1-gallon potted plants will be a minimum size of 18- to 36-inches tall.
3. Plants will be protected until installation by being refrigerated, covered with damp burlap, and placed in moist sand, peat, or other method of keeping the roots cool and moist.
4. Plants will have well-developed roots and sturdy stems, with an appropriate root-to-shoot ratio.
5. No damaged or desiccated roots or diseased plants will be accepted.
6. All potted stock must be kept cool and moist prior to installation.
7. Unused potted stock must be properly stored at the end of each planting day to prevent the roots from desiccating.
8. The planting technician will be responsible for inspecting the potted stock prior to and during planting; unacceptable plant materials will not be planted.

Planting Specifications

The enhancement area will be cleared of invasive species and planted with native trees and shrubs. Plants will be installed in the late fall to early spring when the site conditions are wettest, and the plants are dormant. Additionally, plants will be installed in mono-specific groups to better mimic the natural environment and enhance plant survival. The proposed species were selected due to being observed elsewhere onsite and appearing healthy, therefore environmental conditions onsite are likely ideal. Plants will be installed with tree protection tubes surrounded by mulch to discourage herbivory and further increase the survivability. Table 3 summarizes the plant species, spacing, and quantities for the riparian buffer enhancement area and Figure 3 details the enhancement area.

Table 3: Plant Specifications for RHA Enhancement Area

Common Name	Scientific Name	Stock	Spacing	Quantity
Shrubs				
Oceanspray	<i>Holodiscus discolor</i>	One gallon	6-foot on-center	282
Common snowberry	<i>Symphoricarpos albus</i>		6-foot on-center	282
Evergreen huckleberry	<i>Vaccinium ovatum</i>		6-foot on-center	282
Tall Oregon grape	<i>Mahonia aquifolium</i>		6-foot on-center	282
Total Shrubs				1,128
Trees				
Red alder	<i>Alnus rubra</i>	One gallon	10-foot on-center	102
Total Trees				102
Total Plants to be Installed				1,230

Monitoring, Maintenance, and Contingency Measures

Monitoring and maintenance of the enhancement area will occur for a 5-year period with annual monitoring and reporting occurring in Years, 1, 2, 3, and 5. Monitoring will be conducted by the applicant unless otherwise assigned. Following plant installation, monitoring plots will be established in the RHA enhancement area. Species will be identified and recorded within the plot to determine baseline conditions. Plot locations will be documented in the as-built report. Additionally, photostations will be established at each monitoring plot to photo-document vegetation establishment. Photostation location and the direction in which the picture is taken will also be recorded in the As-built.

The goal of monitoring will be to determine if the previously stated performance standards are met. Monitoring reports will be submitted to the City of Woodland by December 31st of each monitoring year. At minimum, the following items will be included in the report:

- Location map and as-built drawing, including any changes.
- Historic description of project, including dates of plant installation, current year of monitoring, and remedial actions taken (if any).
- Description of monitoring methods.
- Documentation of vegetative performance standards and overall development of plant communities.
- Assessment of invasive plant species and recommendations for management.
- Photographs from established photopoint.
- Observations of wildlife, including, amphibians, invertebrates, reptiles, birds, and mammals. If photographs are taken, they will be included.
- Summary of maintenance and contingency measures completed for the past year and proposed for the next year.

Vegetation

Monitoring will occur annually during the growing season, preferably during the same two-week period to better compare data. The following information will be gathered within the established monitoring plots:

- Percent survival of woody species in all monitoring years.
- Percent cover of non-native, invasive species in all monitoring years.
- General health of plants in the monitoring plot, noting specific problems and potential causes.
- Photographic documentation of vegetative changes over time from established photopoints.

Overall vegetative conditions outside monitoring plots will also be observed and discussed in the monitoring reports.

Maintenance

Maintenance will occur during the growing season and will include the following:

- Irrigating planting areas every other week or as needed in the dry season for the first three years. Taper watering in Years 2 and 3, watering approximately every 3 to 4 weeks in the dry season, or as needed.
- Remove competing herbaceous species at least three times yearly within a 3-foot radius of planted shrubs and re-apply mulch as needed.
- Weed-eat or mow invasive species as needed during the growing season.

- Replace dead or failed plants as described for the original installation to meet the minimum performance standards.

Contingency Plan

If the performance criteria are not met, steps will be taken to correct the situation in a timely manner. The following steps will be implemented when an area is identified as failing or potentially failing:

- Identify the cause(s) of the failure or potential failure.
- Identify the extent of the failure or potential failure.
- Implement corrective actions such as irrigating, fertilizing, and replanting.
- Document the activities and include this data in the monitoring reports.
- If a routine corrective action will not correct the problem, immediately consult with the appropriate agencies.
- Evaluate recommendations from resource agency staff and implement recommendations in a timely manner.

Funding for corrective actions will be the responsibility of the applicant.

LIMITATIONS

ELS bases this report's determinations on standard scientific methodology and best professional judgment. In our opinion, local, state, and federal regulatory agencies should agree with our determinations. However, the information contained in this report should be considered preliminary and used at your own risk until it has been approved in writing by the appropriate regulatory agencies. ELS is not responsible for the impacts of any changes in environmental standards, practices, or regulations after the date of this report.

REFERENCES

- City of Woodland. 2022. *City of Woodland Municipal Code (WMC) Title 15 The Environment*. May 5, 2022.
- City of Woodland. 2021. *Shoreline Master Program (SMP)*. June 2021.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1. U.S. Army Corps of Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- Federal Emergency Management Agency. (2015, December 16). FEMA Flood Map Service Center. FEMA Flood Map Service Center:
<https://msc.fema.gov/portal/search?AddressQuery=812+Sandalwood+rd+Woodland+WA#searchresultsanchor>. Accessed September 2023.
- National Oceanic and Atmospheric Administration. (2023). *NOAA Protected Resources Application*. ArcGIS web application.
<https://www.webapps.nwfsc.noaa.gov/portal/apps/webappviewer/index.html?id=7514c715b8594944a6e468dd25aaacc9>. Accessed September 2023.
- Natural Resource Conservation Service (NRCS). 2008. *Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service*. United States Department of Agriculture Technical Note, #190-8-76.
- Natural Resources Conservation Service (NRCS). 2023. *Web Soil Survey*.
<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>. Accessed September 2023.
- Parametrix and The Watershed Company. 2021. *Shoreline Master Program - City of Woodland*. Prepared by Parametrix and The Watershed Company.
- U.S. Army Corps of Engineers (USACE). 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-13. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- U.S. Fish and Wildlife Service (USFWS). 2023. *National Wetlands Inventory*.
<https://www.fws.gov/wetlands/data/mapper.html>. Accessed September 2023.
- United States Fish and Wildlife Service. (2023). *Information for Planning and consultation*. IPaC. Retrieved September 2023. <https://ipac.ecosphere.fws.gov/location/index>.
- Washington Department of Fish and Wildlife (WDFW). 2023. Statewide Washington Integrated Fish Distribution (SWIFD) open data portal. <https://geo.wa.gov/datasets/wdfw::statewide-washington-integrated-fish-distribution/explore?location=46.326224%2C-122.704565%2C12.00>. Accessed September 2023.

FIGURES AND PHOTOPLATES

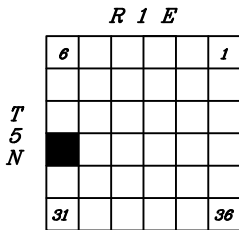
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WASHINGTON



Latitude: 45.9049°
Longitude: -122.7395°

LOCATION MAP



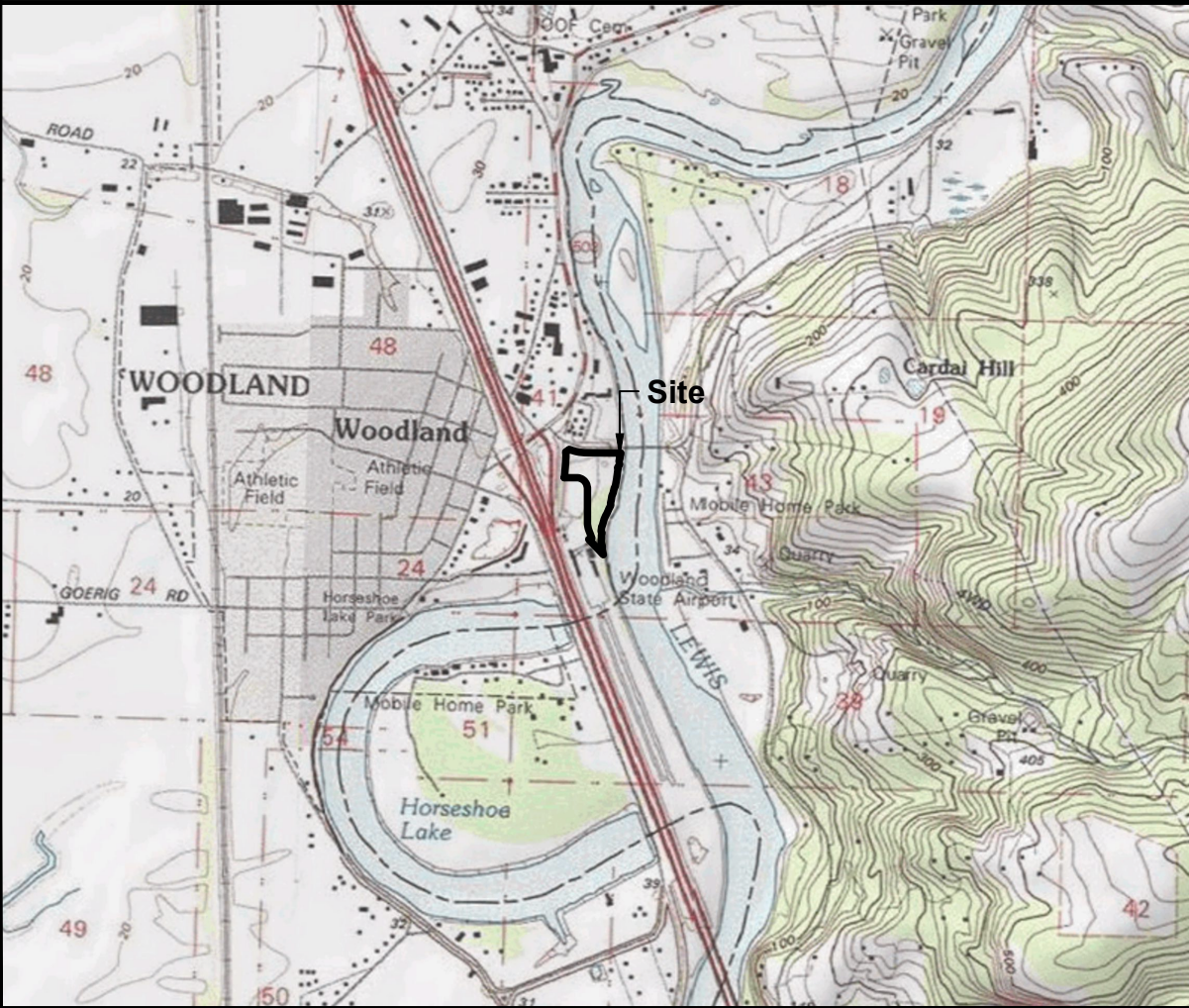
PROJECT VICINITY MAP



Site

NOTE:

Quadrangle topographic map from USGS.

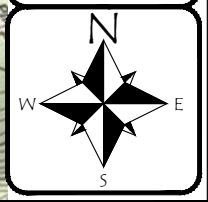


Site

Figure 1
VICINITY MAP
Lewis River Townhomes
Sterling Design, Inc.
City of Woodland, Cowlitz County, Washington
Section 19, Township 5N, Range 1E, W.M.

DATE: 9/6/23
DWN: EF
REQ. BY: JB
PRJ. MGR: KT
CHK: JJ
PROJECT NO:
1398.14

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com



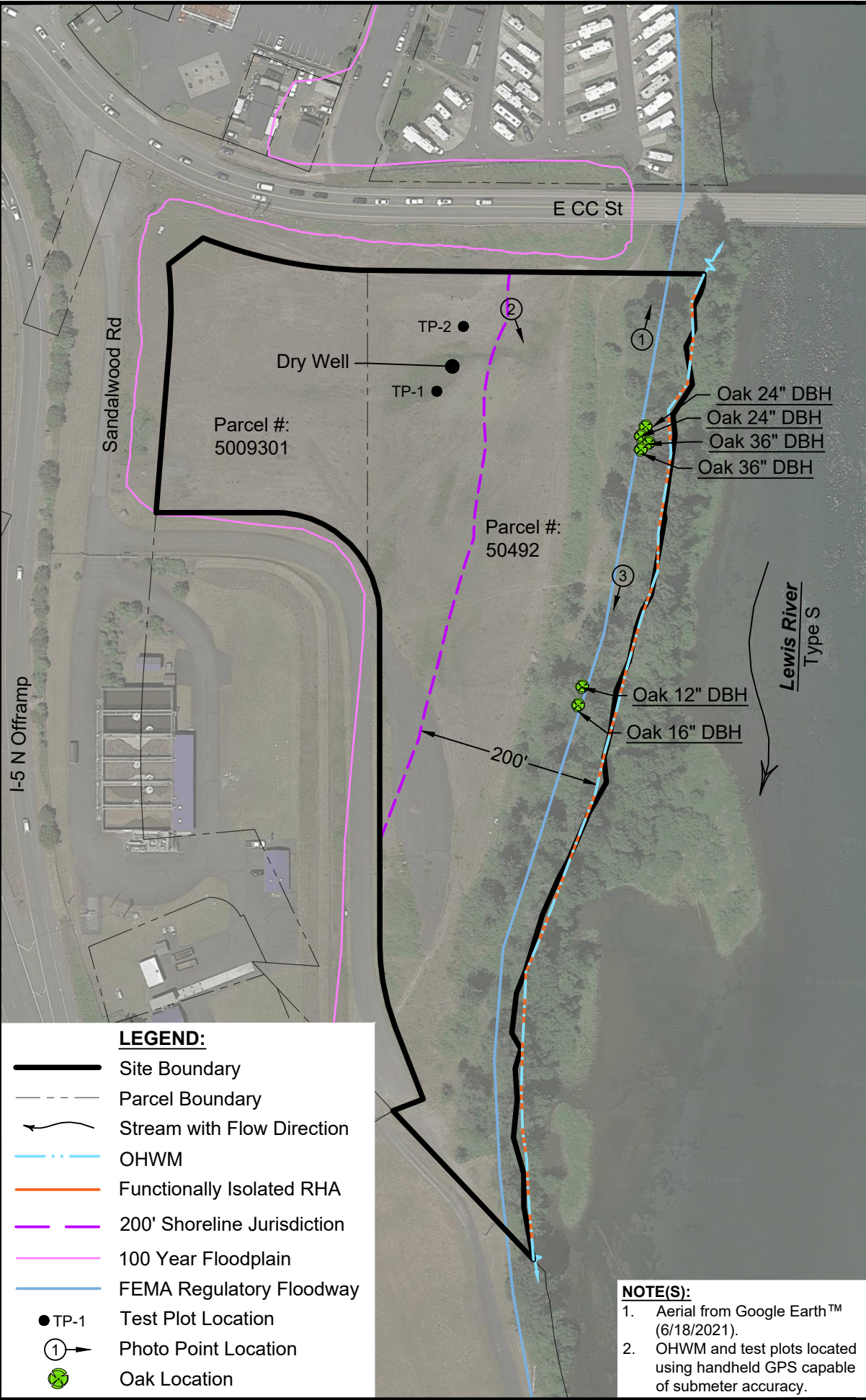


Figure 2
EXISTING CONDITIONS
 Lewis River Townhomes
 Sterling Design, Inc.
 City of Woodland, Cowlitz County, Washington
 Section 19, Township 5N, Range 1E, W.M.

DATE: 9/6/23
 DWN: EF
 REQ. BY: JB
 PRJ. MGR: KT
 CHK: JJ
 PROJECT NO:
 1398.14

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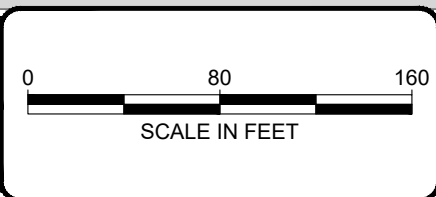
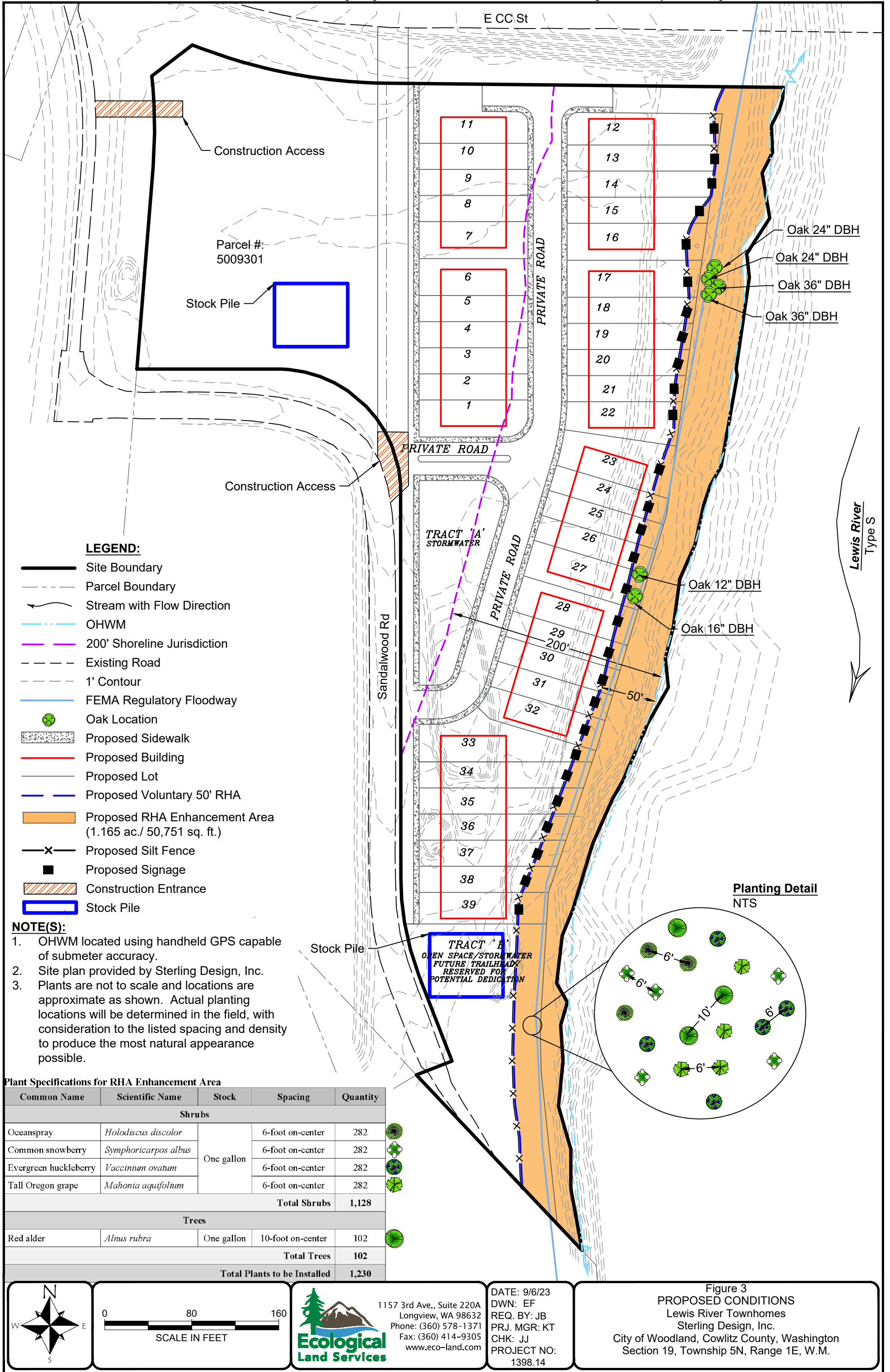
**Ecological
Land Services**



SCALE IN FEET



NOTE(S):
 1. Aerial from Google Earth™ (6/18/2021).
 2. OHWM and test plots located using handheld GPS capable of submeter accuracy.





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 1398.14

Figure 3
PROPOSED CONDITIONS
 Lewis River Townhomes
 Sterling Design, Inc.
 City of Woodland, Cowlitz County, Washington
 Section 19, Township 5N, Range 1E, W.M.

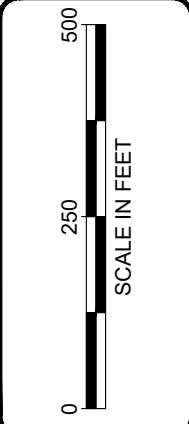


LEGEND:

-  Site Boundary
-  NRCS Soil Boundary
- 141** Newberg fine sandy loam, 0 to 3 percent slopes. Not hydric.
- 160** Pilchuck loamy fine sand, 0 to 8 percent slopes. Not hydric.

NOTE(S):

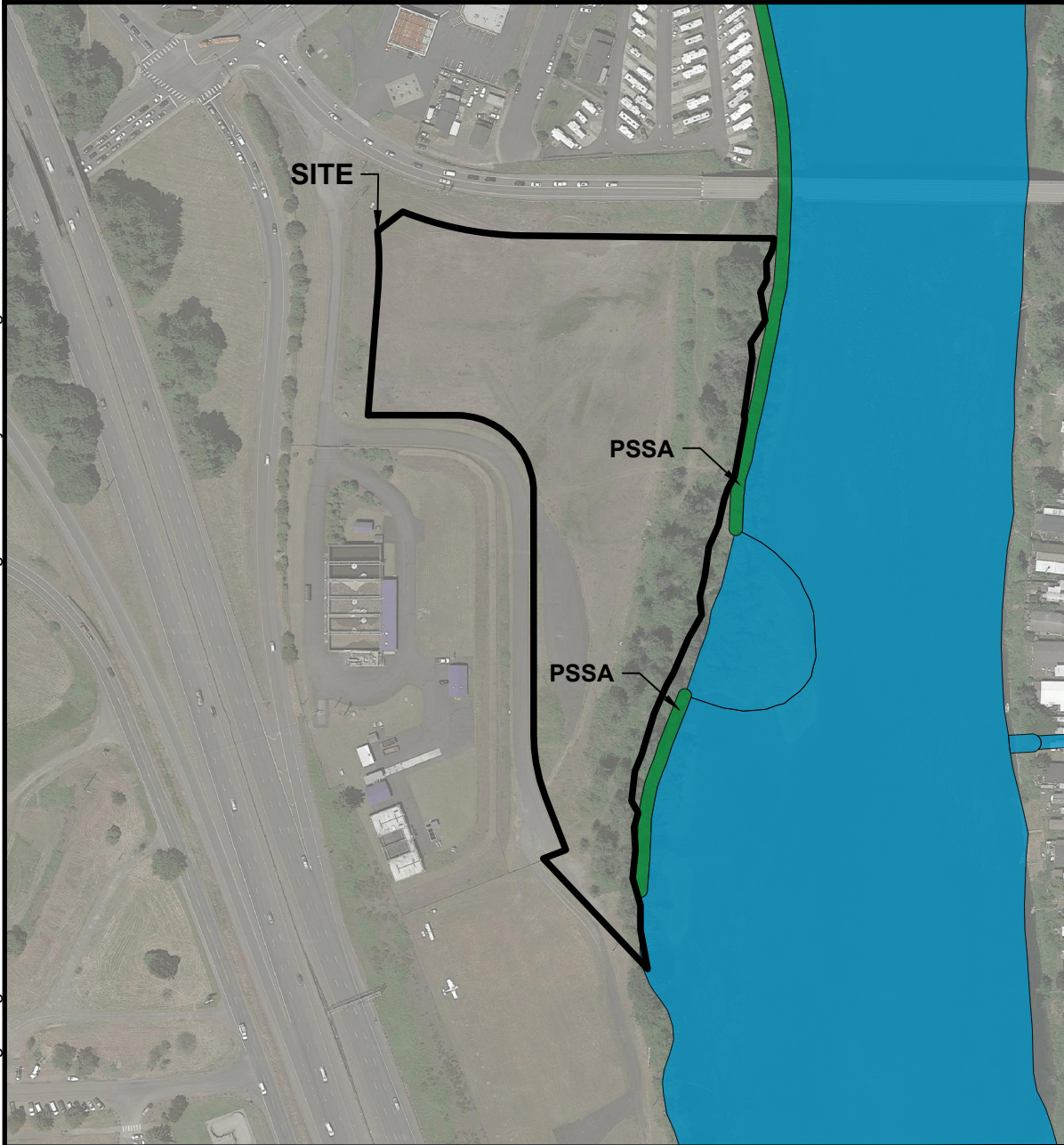
1. Map provided on-line by NRCS at web address:
<http://websoilsurvey.nrcs.usda.gov/app/>



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DATE: 9/6/23
 DWN: EF
 REQ. BY: JB
 PRJ. MGR: KT
 CHK: JJ
 PROJECT NO:
 1398.14

Figure 4
 NRCS SOIL SURVEY
 Lewis River Townhomes
 Sterling Design, Inc.
 City of Woodland, Cowlitz County, Washington
 Section 19, Township 5N, Range 1E, W.M.



Mapped wetlands indicated onsite by US Fish & Wildlife Service.

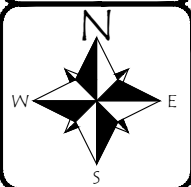
LEGEND:

-  Site Boundary
- Wetlands**
-  Freshwater Forested/Shrub Wetland
-  Riverine

PSSA Palustrine, scrub-shrub, temporary flooded.

NOTE(S):

1. Map provided on-line by US Fish & Wildlife Service at web address:
<https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper>




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DATE: 9/6/23
DWN: EF
REQ. BY: JB
PRJ. MGR: KT
CHK: JJ
PROJECT NO:
1398.14

Figure 5
USFWS NATIONAL WETLANDS INVENTORY
Lewis River Townhomes
Sterling Design, Inc.
City of Woodland, Cowlitz County, Washington
Section 19, Township 5N, Range 1E, W.M.



Photo 1. Facing northeast toward E CC St.



Photo 2. Facing southeast over proposed project area.



Photo 3. Facing south along the RHA of the Lewis river.



1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305

DATE: 07.28.2022
DWN: JB
PRJ. MGR: KW
PROJ.#: 1398.14

Photoplate 1
Site Photos
Lewis River Townhomes
Woodland, Washington
Section 41, Township 5N, Range 1E, W.M.

APPENDIX A: WETLAND DETERMINATION DATA FORMS

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

Project/Site: Lewis River Townhomes City/County: Woodland, Cowlitz Sampling Date: 07/28/2022
 Applicant/Owner: Sterling Design, Inc. State: WA Sampling Point: TP-1
 Investigator(s): Wills, KT and Gillen, Amanda Section, Township, Range: 41, 5N, 1E
 Landform (hillslope, terrace, etc.): Floodplain Local relief: (concave, convex, none): Concave Slope (%): 0-8 %
 Subregion (LRR): 2A Lat: 45 54' 18.81" Long: 122 44' 22.35" Datum: NAD83
 Soil Map Unit Name: Pilchuck Loamy Fine Sand NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: This test plot was located in parcel # 5009301. This test plot did not meet all three wetland indicators and is therefore not located in wetlands.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30</u> ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
1. _____	%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
50% = <u> </u> 20% = <u> </u>	%	=Total Cover		Prevalence Index worksheet Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A= _____
Sapling/Shrub Stratum (Plot size: <u>15</u> ft. radius)				
1. _____	%	_____	_____	
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
50% = <u> </u> 20% = <u> </u>	%	=Total Cover		
Herb Stratum (Plot size: <u>5</u> ft radius)				
1. <u>Bromus ciliatus</u>	10%	yes	FAC	
2. <u>Equisetum arvense</u>	10%	yes	FAC	
3. <u>Rumex acetosella</u>	5%	no	FAC	
4. <u>Hypochaeris radicata</u>	5%	no	FACU	
5. _____	%	_____	_____	
6. _____	%	_____	_____	
7. _____	%	_____	_____	
8. _____	%	_____	_____	
9. _____	%	_____	_____	
10. _____	%	_____	_____	
11. _____	%	_____	_____	
50% = <u>15</u> 20% = <u>6</u>	30%	=Total Cover		
Woody Vine Stratum (Plot size: <u>15</u> ft radius)				
1. _____	%	_____	_____	
2. _____	%	_____	_____	
50% = <u> </u> 20% = <u> </u>	%	=Total Cover		
% Bare Ground in Herb Stratum <u>70%</u>				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				

Remarks: The site is heavily disturbed and appears to have been filled and heavily plowed over a long period of time. An old dry well exists onsite near this test plot.

SOIL

Sampling Point: TP-1

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10 YR 4/1	100%		%			Sand	
6-16	10 YR 4/2	95%	10 YR 5/8	5%			Sand	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

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

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

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

Indicators for Problematic Hydric Soils

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

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes No Depth (Inches): _____
 Water Table Present? Yes No Depth (Inches): _____
 Saturation Present? Yes No Depth (Inches): _____
 (Includes Capillary fringe)

Wetland Hydrology Present? Yes No

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

Remarks:

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

Project/Site: Lewis River Townhomes City/County: Woodland, Cowlitz Sampling Date: 07/28/2022
 Applicant/Owner: Sterling Design, Inc. State: WA Sampling Point: TP-2
 Investigator(s): Wills, KT and Gillen, Amanda Section, Township, Range: 41, 5N, 1E
 Landform (hillslope, terrace, etc.): Floodplain Local relief: (concave, convex, none): convex Slope (%): 0-8 %
 Subregion (LRR): 2A Lat: 45 54' 18.81" Long: 122 44' 22.35" Datum: NAD83
 Soil Map Unit Name: Pilchuck Loamy Fine Sand NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: This test plot was located in the northern portion of parcel #5009301. This test plot does not meet all three wetland indicators and is therefore not in a wetland.	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30</u> ft radius)				Dominance Test Worksheet Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC _____ (A/B)
1. _____	%	_____	_____	
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
50% = ___ 20% = ___	%	=Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15</u> ft. radius)				Prevalence Index worksheet Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A= _____
1. _____	%	_____	_____	
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
50% = ___ 20% = ___	%	=Total Cover		
Herb Stratum (Plot size: <u>5</u> ft radius)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
1. _____	%	_____	_____	
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
6. _____	%	_____	_____	
7. _____	%	_____	_____	
8. _____	%	_____	_____	
9. _____	%	_____	_____	
10. _____	%	_____	_____	
11. _____	%	_____	_____	
50% = ___ 20% = ___	%	=Total Cover		
Woody Vine Stratum (Plot size: <u>15</u> ft radius)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
1. _____	%	_____	_____	
2. _____	%	_____	_____	
50% = ___ 20% = ___	%	=Total Cover		
% Bare Ground in Herb Stratum <u>100%</u>				

Remarks: No vegetation present.

SOIL

Sampling Point: TP-2

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10 YR 4/1	100%		%			Sand	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

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

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

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Minerals (S1)
- Sandy Gleyed Matrix (S4)

- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils

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

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes No Depth (Inches): _____
 Water Table Present? Yes No Depth (Inches): _____
 Saturation Present? Yes No Depth (Inches): _____
 (Includes Capillary fringe)

Wetland Hydrology Present? Yes No

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

Remarks: