

11. Wetland & Habitat

Holley Park Subdivision La Center, Washington Critical Areas Assessment

Date: March 14, 2019

Applicant: Compass Group, LLC
Contact: Kevin Tapani
1904 SE 6th Place
Battle Ground, WA 98604

Prepared By: Stacey Reed, PWS, Senior Wetland Scientist
Taya K. MacLean, PWS, Senior Biologist

Site Information: Parcel No. 209059-000, 62965-242, 209055-
Section 02, T4N, R1E, W.M.
45.860301, -122.660134
La Center, Clark County, Washington



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Introduction

AKS Engineering & Forestry, LLC (AKS) was contracted by Compass Group, LLC (Applicant) to conduct a critical areas assessment on a 14.52 acre site located at 33105 NE Ivy Avenue in La Center, Clark County, Washington (Figures 1 and 2 of Appendix A). The project includes a single-family residential subdivision, including stormwater, a public trail, and open space tracts.

AKS Engineering & Forestry, LLC (AKS) conducted a site visit on November 14, 2018 to determine whether any critical areas (i.e. potentially jurisdictional wetlands, waters, and/or priority habitats) were present in the study area. The on-site boundaries of three potentially jurisdictional non-fishbearing intermittent streams (referred to as Waters 1, 2, and 3; Type Ns streams) were delineated within the study area. According to the City of La Center's Municipal Code (LCMC) Critical Areas Ordinance (LCMC Table 18.300.090.2.f), Type Ns streams require a 75-foot wide fish and wildlife habitat conservation area (ie riparian) buffer.

Oregon white oak (*Quercus garryana*) individual priority trees that meet the Washington Department of Fish and Wildlife's (WDFW) definition of a priority habitat feature were also identified within the study area. These individual priority habitat trees are protected by the City (LCMC Table 18.300.090.2.a). AKS met with WDFW on-site on February 21, 2019 to verify the priority status of all oaks on the site.

The project avoids impacts to individual priority oaks and waters delineated on the site. The project also avoids encroachment within the 75-foot wide riparian buffers associated with Waters 2 and 3. The project requires a 50% buffer reduction, in accordance with LCMC 18.300.090 (2)(l), to a portion of the 75 foot wide buffer associated with Water 1 to accommodate an 8 foot wide gravel trail and a portion of rear lots. On-site enhancement of remaining "degraded condition" riparian buffer is proposed to ensure the reduced buffer will not have an adverse impact on the buffer's water quality and habitat functions.

This report addresses the City of La Center's Chapter 18.300 Critical Areas Code report and mitigation plan requirements. This study does not include an assessment of other critical areas defined under La Center's (City) Critical Areas Ordinance (CAO), including aquifer recharge areas, frequently flooded areas, or geologic hazard areas.

Background Mapping and Site Information

AKS reviewed existing literature, maps, and other materials to identify critical areas having the potential to occur on the subject property or within 300 feet. AKS reviewed the following background information databases:

- Clark County MapsOnline
- Historical aerial imagery from Clark County
- Natural Resources Conservation Service (NRCS) Web Soil Survey
- USFWS National Wetland Inventory (NWI)
- Washington Department of Ecology 2011 Wetlands Inventory
- WDFW Priority Habitats and Species
- Washington National Heritage Program (WNHP) Wetlands of High Conservation Value Map Viewer (Rare Plants and High-Quality Wetlands)
- DNR Water Typing
- DNR SalmonScape

The NRCS, NWI, Clark County wetlands, DNR waters, and priority habitat and species maps are provided as Figures 3, 4, 5, 6, and 7 in Appendix A.

The study area mainly consists of a grazed horse pasture, with non-grazed forested areas along the northern and southern boundaries of the site. The site includes a house and small detached farm structures. Vegetation observed within the pasture includes bentgrass (*Agrostis* sp.; FAC), meadow foxtail (*Alopecurus pratensis*; FAC), hairy cat's ear (*Hypochaeris radicata*; FACU), Queen Anne's lace (*Daucus carota*; FACU), bluegrass (*Poa* sp.; FAC), and Tyrol knapweed (*Centaurea nigrescens*; NOL). The forested area along the northern boundary is dominated by Douglas-fir (*Pseudotsuga menziesii*; FACU), big-leaf maple (*Acer macrophyllum*; FACU), and red alder (*Alnus rubra*; FAC) with scattered Oregon white oak (FACU) trees. Himalayan blackberry (*Rubus armeniacus*; FAC) was dominant in the forest understory.

Site topography gently slopes southwest with the highest elevation in the northeastern corner at 132 feet to the lowest elevation at 95 feet in the southwestern corner. The East Fork Lewis River is located approximately 0.5 mile to the south of the site.

According to the Natural Resources Conservation Service (NRCS) Soil Survey Map for Clark County (Figure 3), the following soils are mapped within the study area (Figure 3 in Appendix A):

- Gee silt loam (0% to 8% slopes, Unit GeB; non-hydric)
- Gee silt loam (30%-60% slopes, Unit GeF; non-hydric)
- Odne silt loam (0% to 5% slopes, Unit OdB; hydric)

According to the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) online mapping, there are no wetlands or riverine features mapped on-site (Figure 4, Appendix A).

According to Clark County's online mapping, there are mapped modeled wetlands adjacent to Water 1 in the northwestern portion of the site. The County map does not show any other wetlands mapped on the site (Figure 5, Appendix A). There was no hydrophytic vegetation observed above the OHWM of Water 1.

According to the DNR online mapping tool, a Type N stream is mapped along the northern portion of the site. AKS identified this stream as Water 1, a Type Ns stream (Figure 6, Appendix A). Two "unknown" streams are mapped by DNR, including one immediately off-site to the east and one in the southeastern portion of the study area (Figure 6, Appendix A). AKS identified these features as Water 2 and 3, Type Ns streams.

Based on Clark County's online mapping, there is mapped riparian habitat in the vicinity of Water 1 (Figure 7, Appendix A). We generally agree with the riparian habitat mapping adjacent to Water 1. The County maps also illustrates a portion of the 200 foot riparian buffer associated with an off-site Type F stream extending onto the southeast portion of the study area. This stream is located greater than 200 feet from the project site; therefore, riparian habitat buffer associated with the off-site mapped stream does not appear to extend onto the site.

According to WDFW's PHS mapping, Oregon white oak woodland priority habitat is mapped within 300 feet of the study area, but priority oak habitat is not mapped on the project site (Figure 8 of Appendix A). No other priority habitat species are mapped on the site. According to DNR's SalmonScape mapping,

on-site waters do not support fish listed as threatened or endangered under the Endangered Species Act (ESA).

Based on a review of the Washington Natural Heritage Program (WNHP) mapping, there are no documented occurrences of rare plants or species of high conservation value listed as threatened or endangered under the ESA mapped on-site, nor were any observed by AKS during the November 2018 site visit.

Historical aerial photographs dating from 1955 to 2018 were reviewed from Google earth and Clark County Online Mapping. The site has remained relatively unchanged since the 1994 aerial. Per the property owner, the site has been actively grazed by cattle, sheep, and horse for decades. According to review of aerials, there are no consistent evidence of potential hydrology signatures on the site.

Methodology

Taya MacLean, Senior Biologist and Sonya Templeton, Natural Resource Specialist, conducted the critical areas assessment site visit on November 14, 2018. A follow up site visit was conducted by Stacey Reed, PWS, Senior Wetland Scientist on March 11, 2019 to confirm lack of wetland hydrology indicators during the early portion of the growing season.

The methodology used to determine the presence of wetlands followed *the Corps of Engineers Wetlands 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) (Wakeley et al. 2010). *The National Wetland Plant List 2016* (Lichvar 2016) was used to assign wetland indicator status for the appropriate region. Plots 1-4 were recorded on standardized data forms. Their locations were flagged in the field and were professionally land surveyed.

The OHWM were delineated using methodology described in *ECY's Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (2016).

Streamflow duration assessments Waters 1, 2 and 3 were determined using the US Environmental Protection Agency's *Streamflow Duration Assessment Method for the Pacific Northwest* (Nadeau, 2015; Appendix B). Water typing was assigned using DNR's water typing system (Washington Administrative Code (WAC) 222-16-031).

The locations of oaks were professionally land surveyed. The dripline of individual priority oaks were digitized using 2012 and 2018 aerials.

The critical areas map, including surveyed topography, water boundaries, plot locations, and trees by AKS, is included as Figure 9. Representative ground-level site photographs and a photograph location map are included in Appendix C.

Precipitation Prior to Site Visit

Observed precipitation data were obtained from the Battle Ground, Washington weather station via the National Oceanic Atmospheric Administration (NOAA) Applied Climate Information System (AgACIS). The closest wetlands climate analysis (WETS) station to the project site is the Battle Grounds station.

According to the AgACIS Battle Ground station, 0.03 inches of rainfall was received the day of the site visit and 1.75 inches of rainfall was received for the two weeks prior to the November 14, 2018 site visit.

According to the National Weather Service (NWS) Vancouver station, 0.26 inches of rainfall was recorded on the day of the site visit, and 0.27 inches of rainfall was received for the two weeks prior to March 11th, 2019. Data from the NWS Vancouver weather station was used to calculate precipitation for March 11th and two weeks prior, as current AgACIS Battle Ground station data was unavailable.

Tables 1 and 2 show antecedent rainfall according to the WETS for the three months prior to the site visits.

Table 1. Precipitation Data Prior to November 14, 2018 Site Visit (Battle Ground WETS)

Prior Months	Observed Precipitation (Inches)	30% Chance Will Have		Condition Dry, Wet, Normal	Condition Value (1=dry, 2=normal, 3=wet)	Month Weight	Multiply Previous Two Columns
		Less Than	More Than				
October 2018	5.52	2.26	5.17	Wet	3	3	9
September 2018	1.51	1.16	2.97	Normal	2	2	4
August 2018	0.40	0.48	1.37	Dry	1	1	1
Sum							14
Normal							
Rainfall of prior period was: drier than normal (sum is 6-9), normal (sum is 10-14), wetter than normal (sum is 15-18)							

Table 2. Precipitation Data Prior to March 11, 2019 Site Visit (Battle Ground WETS).

Prior Months	Observed Precipitation (Inches)	30% Chance Will Have		Condition Dry, Wet, Normal	Condition Value (1=dry, 2=normal, 3=wet)	Month Weight	Multiply Previous Two Columns
		Less Than	More Than				
February 2019	6.87	4.43	7.16	Normal	2	3	6
January 2019	4.43	4.40	8.27	Normal	2	1	2
December 2018	8.03	5.76	8.94	Normal	2	1	2
Sum							10
Normal							
Rainfall of prior period was: drier than normal (sum is 6-9), normal (sum is 10-14), wetter than normal (sum is 15-18)							

Observed precipitation for the area prior to our site visit was within the normal range according to WETS; however, the site visit was conducted at the end of the growing season. Therefore, a follow up site visit was conducted on March 11, 2019 to document hydrology in the pasture during the early portion of the growing season. The soil temperature recorded during the March 11, 2019 site visit was 42 degrees Fahrenheit at 12-inches below the ground surface, indicating the site visit was conducted during the early growing season.

Results

Water 1

Water 1 is an intermittent, non-fishbearing (DNR Water Type Ns) stream which flows westerly along the northern boundary. Water 1 extends off-site to the west via an 18-inch diameter culvert under NE Ivy Avenue, where it appears to have a direct hydrologic connection to wetlands adjacent to the East Fork Lewis River. Water 1 originates immediately off-site to the northeast.

Within the study area, the upper reach of the channel bed averages approximately 4-feet wide with 2-foot tall banks. Approximately 4-inches of continuous flow was present in the entire on-site channel reach during the November 2018 site visit. The downstream end contained scour at the culvert inlet under NE Ivy Avenue. The channel is generally unvegetated with scattered giant horsetail (*Equisetum telmateia*; FACW), western lady fern (*Athyrium cyclosorum*; FAC), and Himalayan blackberry growing along the banks. Dominant channel bed substrate consisted of silt loam with scattered gravels and cobbles with some large wood debris.

Water 1 was determined to have an intermittent flow regime (lacks continuous year-round flow), Type Ns stream and therefore has a riparian buffer of 75 feet (LCMC Table 18.300.090.2.f).

Water 2

Water 2 is an intermittent, non-fishbearing (DNR Water Type Ns) stream which is mapped in the south-central portion of the study area. Water 2 extends off-site to the south and appears to have a direct hydrologic connection to wetlands adjacent to the East Fork Lewis River. Within the study area, the channel bed averages approximately 5-8-feet wide and had approximately 2-inches of continuous flow during the November 2018 site visit. The channel bed was unvegetated with scattered giant horsetail, western lady fern, and stinging nettle (*Urtica dioica*; FAC) growing along the banks and below the OHWM.

Water 2 was determined to be have an intermittent flow regime, Type Ns stream and therefore has a riparian buffer of 75 feet.

Water 3

Water 3 is an intermittent, non-fishbearing (DNR Water Type Ns) stream which originates on-site at the bottom of a ravine in the southeastern portion of the study area. Water 3 extends off-site to the south and appears to have a direct hydrologic connection to wetlands adjacent to the East Fork Lewis River. The channel bed is approximately 4-feet wide with 1 foot tall channel banks. Approximately 0.25-inch deep of continuous flow was observed within Water 3 during the November 2018 site visit. The channel is generally unvegetated with western lady fern and Himalayan blackberry growing along the banks.

Water 3 was determined to be an intermittent, Type Ns stream and therefore has a riparian buffer of 75 feet.

Uplands

Plots 1-4 document conditions within pasture located in NRCS mapped hydric soils. Only Plot 2 met hydric soil indicator F6, Redox Dark Surface. Other plots lacked hydric soil indicators. Soils documented on the site did not meet the typical soil profile for the hydric Odne series, which typically consists of a very dark gray (10YR 4/1) chroma containing common, coarse redox concentrations.

The groundwater table at Plots 1-4 was below 12-inches during both the November 14, 2018 and March 11, 2019 site visits, which were conducted during normal rainfall periods. The soil temperature recorded during the March 11, 2019 site visit was 42 degrees Fahrenheit at 12-inches below the ground surface, indicating the site visit was conducted during the early growing season.

The pasture field is relatively flat, lacking topography likely to hold water sufficient to develop wetland characteristics. According to the Geotech report conducted for the site by GeoDesign, January 14, 2019, groundwater in the pasture was encountered between depths of 10 and 14 feet below the surface during their December 2018 site visit. According to their report, based on their experience, the perched groundwater table may rise to only within 5 feet of the ground surface during the wet season.

A small scattered patch of pennyroyal (*Mentha pulegium*) was observed near Plot 2. Pennyroyal is a stoloniferous, creeping plant that is not deeply rooted. The pennyroyal appears to have sustained in areas where the surface soil was compacted from grazing, and not indicative of a high groundwater table. Pennyroyal did not appear to be dominant on the site.

Priority Oregon White Oaks

AKS biologist Taya MacLean met on-site with WDFW biologists David Howe and Julie Grobelny, on February 21, 2019 to verify priority individual oaks on the site. AKS observed six Oregon white oaks with diameters at breast height (DBH) varying from 10 inches to 30 inches throughout the study area that meet WDFW's definition of a priority individual oak tree. The locations of the surveyed priority oaks and associated driplines are shown on attached Figure 9, Appendix A.

WDFW confirmed the large oak located immediately adjacent to the existing house does not meet the definition for a priority oak tree because of its location within a highly disturbed area (residence, nonnative landscaping).

Per LCMC Table 18.300.090.2.a, with consultation with WDFW, the City may allow for a reduced protective buffer around individual priority oak. WDFW confirmed during the February 2019 site visit, 300 foot wide buffers are not required adjacent to on-site priority oaks. The oaks are only priority to the dripline, as delineated by AKS.

Riparian Habitat Area

The riparian buffer adjacent to Water 1 was dominated by a cluster of Douglas fir trees in the northeast. The remainder of the buffer lacked closed tree canopy, with scattered red alder trees. The understory was generally dominated by invasive English ivy (*Hedera helix*) and Himalayan blackberry. Lesser amounts of western sword fern (*Polystichum munitum*) was present scattered throughout the understory. The riparian buffer adjacent to Waters 2, and 3 are predominantly forested, dominated by Douglas fir and bigleaf maple trees. The understory was generally dominant in Himalayan blackberry.

Project

The project avoids impacts to the drainages delineated on the site and the 75-foot riparian buffer associated with Waters 2 and 3. The project also avoids impacts to individual priority oaks mapped on the site. To avoid impact to priority oaks, the drip lines of oaks will be marked in the field with construction fencing prior to the start of construction. The Site Plan is depicted on Figure 10 of Appendix A.

The stormwater pond will avoid encroachment into the 75 foot riparian buffer associated with Water 2. The stormwater outfall pipe will be buried within the riparian buffer to discharge above Water 2. Below ground utilities, such as storm systems, are considered allowed uses within buffers per 18.300.050 (4)(b) of LAMC. The temporary ground disturbance within buffer to install the storm pipe will be replanted with native shrubs to ensure no net loss of buffer functions. No native trees with greater than 6-inch

diameter breast height will be removed to install the storm line. The temporary buffer impacts planting specification table is included in Appendix E.

The site plan requires a buffer reduction adjacent to Type Ns Water 1 in the northern portion of the site. Reduction of the riparian buffer width is necessary to accommodate a well-laid out site plan that meets density requirements and provides a public trail which connects to the City's trail system. A buffer reduction up to 50% of the required buffer width (up to 37.5 feet wide) is allowed per LCMC 18.300.090 (2)(l). The existing condition of the riparian buffer adjacent to Water 1 requiring reduction is primarily dominated by nonnative invasive vegetation (English ivy and Himalayan blackberry). Portions of the buffer reduction area contains gravel driveway and a shop. The reduced buffer width will not significantly reduce the water quality and habitat functions of the remaining buffer. Enhancement to a portion of the remaining buffer, including removal of non-native invasive vegetation species and densely planting with native trees and shrubs, will occur to ensure compliance with City code.

Riparian Buffer Enhancement Plan

To ensure no net loss of riparian buffer function, the site plan includes enhancement to a minimum 0.34 acres of remaining on-site riparian buffer adjacent to Water 1 (riparian buffer enhancement area shown on attached Figure 10, Appendix A). The enhancement area ratio is approximately 1.5 times the riparian habitat buffer encroachment.

The existing condition of the buffer proposed for enhancement can be described as being "degraded", lacking closed canopy of native trees and native shrubs in the understory. The proposed buffer enhancement includes removal of non-native invasive vegetation and densely planting native trees and shrubs to provide a higher quality functioning buffer. The addition of native trees and shrubs will provide shading to improve thermoregulation water quality function, as well as structural diversity to increase wildlife habitat functional opportunity.

A buffer enhancement planting specification table, including recommended plant species and quantities is provided in Appendix D. Appropriate native plant substitutions should be approved by a qualified professional with expertise in native plants.

The buffer enhancement shall occur within the same growing season as the buffer encroachment.

If required, the applicant shall provide a financial security mechanism acceptable to the City.

Performance Standards

The goal of the buffer enhancement is to ensure no net loss of water quality and habitat functions to Water 1. Specific performance standards to ensure that the project is successfully meeting prescribed goals and objectives should be monitored in Years 1, 2, 3, and 5 and will include:

1. Invasive plants, including Class A-C noxious weeds listed by Clark County and Himalayan blackberry, will not exceed 20% cover in enhancement areas during all monitoring years.
2. Tree and Shrub plant survival rates:
 - Year 1: 90% survival
 - Year 2: 80% survival
 - Year 3: 75% survival OR at least 70% combined cover of native shrubs and trees (planted and volunteer)
 - Years 4 and 5: 75% survival OR 80% combined cover of native shrubs and trees (planted and volunteer)

Buffer Enhancement Monitoring Plan

Woody enhancement plantings will be monitored and maintained for a minimum of 5 full growing seasons beginning after installation of plantings. Monitoring will consist of establishing an appropriate number of monitoring plot locations across the enhancement area to be assessed in Years 1, 2, 3, and 5. At each plot, the survivorship of planted shrubs and trees; cover of planted or naturally recruited native shrubs and trees; cover of invasive and nonnative vegetation species; and general site observations will be recorded. Representative site photographs will be taken from established photo points across the enhancement area. Vegetation monitoring plot and photo point locations will be determined during the first monitoring year.

Monitoring reports will be submitted to the City by November 1 following the growing seasons of Years 1, 2, 3, and 5. The monitoring report will consist of photographs and a discussion of performance standards, maintenance activities, problems and successes, and any maintenance needs or contingency actions necessary to ensure success of the mitigation project. Success will be achieved when monitoring results indicate that performance standards are being met at the end of the five year monitoring period.

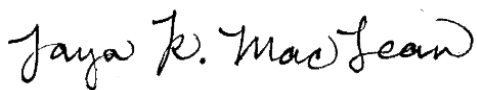
Buffer Enhancement Maintenance Plan

Routine maintenance of the site is necessary to ensure the integrity and success of the mitigation plan. Maintenance and management of the site may include replacement woody plantings, invasive plant management, irrigation (if needed), and garbage removal. Maintenance activities will be guided by scientific results of annual monitoring, corrective measures, and adaptive management recommendations. Adaptive management measures, such as selecting different species for replacement plantings, may be considered if plantings appear to have massive failures.

Statement of Preparation

The information in this report was compiled and prepared under the supervision and direction of the undersigned, qualified professionals per applicable City regulations, including the La Center Critical Areas Ordinance. Information contained in this document should be considered preliminary and used at your own risk until it has been reviewed and approved in writing by the appropriate agencies with jurisdiction over potentially jurisdictional features within the study area.

Fieldwork and report preparation were conducted by the following individuals:



Taya K. MacLean, MS, PWS
Senior Biologist
Fieldwork, Report Preparation



Stacey Reed, PWS
Senior Wetland Scientist
Site Visit and Report QA/QC

Literature Cited and Referenced

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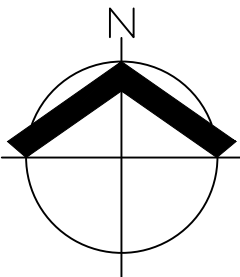
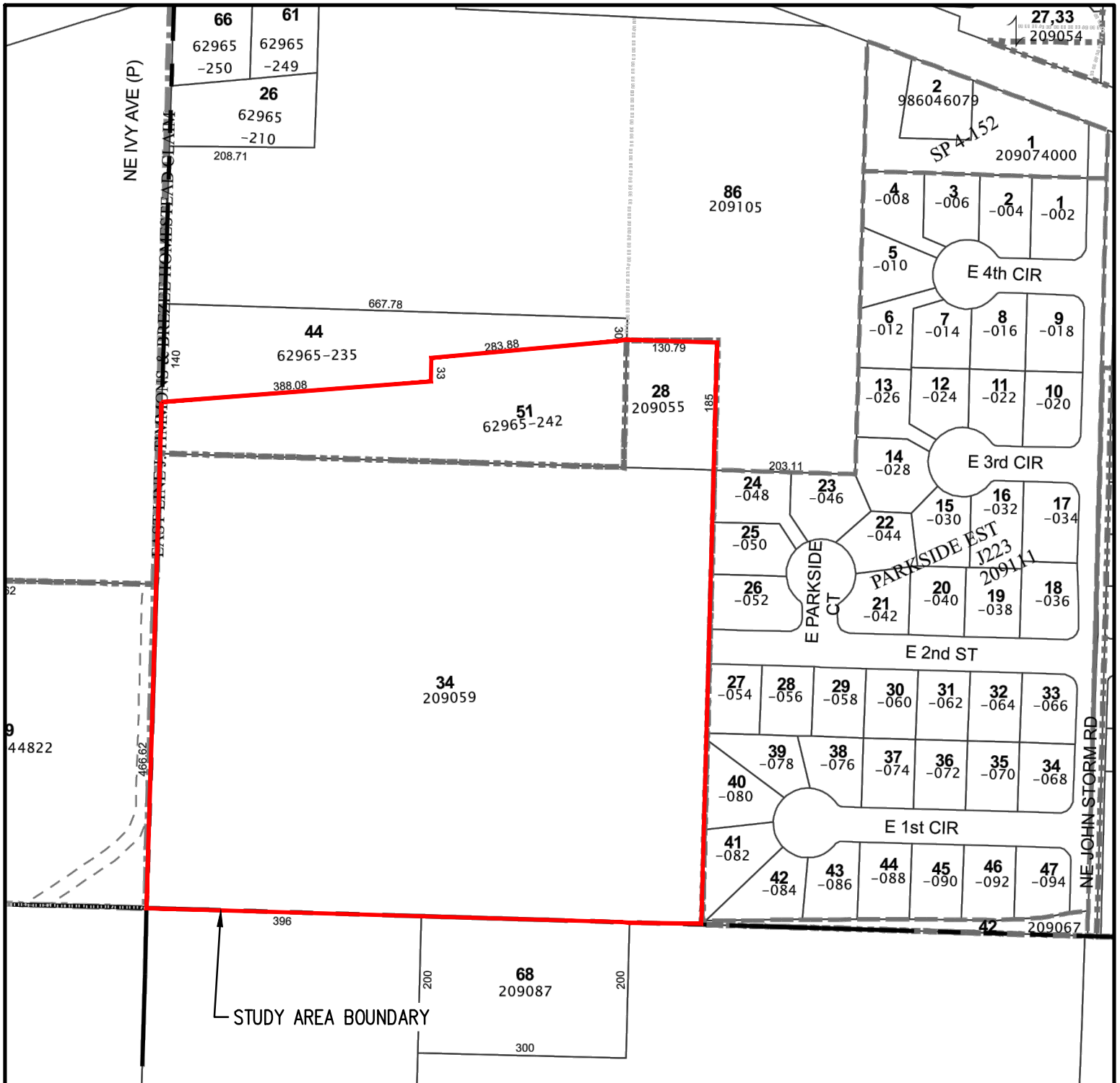
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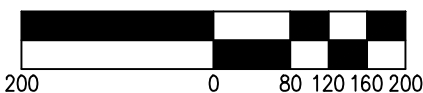
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Appendix A: Figures



SCALE: 1" = 200 FEET



CLARK COUNTY
 NW QTR OF SEC. 02, T. 4N., R. 1E., W.M.
 PARCEL NO. 209059-000, 209055-000,
 AND 62965242

DATE: 12/26/2018

PARCEL MAP
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT

FIGURE
2

AKS ENGINEERING & FORESTRY, LLC
 12965 SW HERMAN RD, STE 100
 TUALATIN, OR 97062

P: 503.563.6151 F: 503.563.6152 aks-eng.com

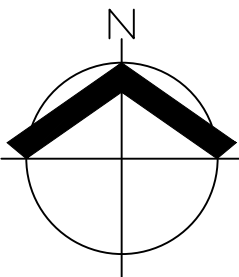


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 CHKD: SAR
 AKS JOB:
 6962

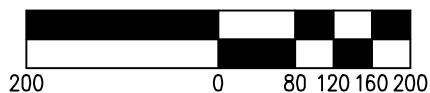


MAP UNIT SYMBOL	MAP UNIT NAME
GeB	GEE SILT LOAM, 0% TO 8% SLOPES; NON-HYDRIC
GeF	GEE SILT LOAM, 30% TO 60% SLOPES; NON-HYDRIC
OdB	ODNE SILT LOAM, 0% OT 5% SLOPES; HYDRIC

NRCS WEB SOIL SURVEY FOR
CLARK COUNTY



SCALE: 1" = 200 FEET



DATE: 12/26/2018

**NRCS SOIL SURVEY MAP
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT**

FIGURE
3

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
P: 503.563.6151 F: 503.563.6152 aks-eng.com











DRWN: SKT
CHKD: SAR
AKS JOB:
6962

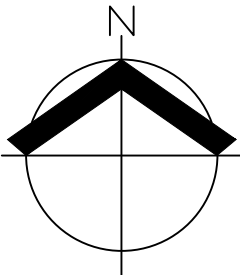


NE IVY AVE

STUDY AREA BOUNDARY

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

US FISH & WILDLIFE SERVICE
NATIONAL WETLAND INVENTORY (2017)



SCALE: 1" = 200 FEET



DATE: 12/26/2018

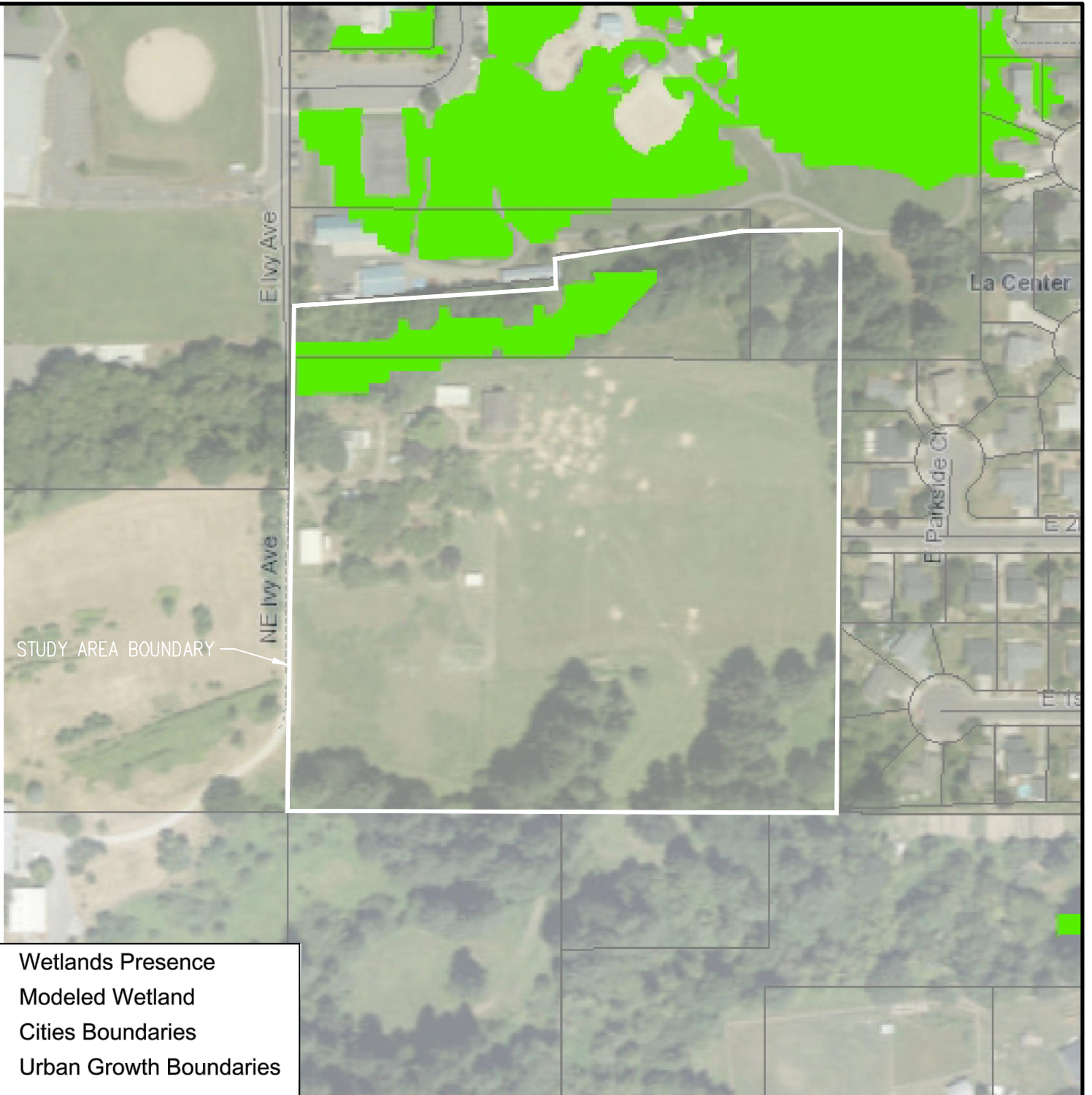
**NATIONAL WETLAND INVENTORY MAP
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT**

FIGURE
4

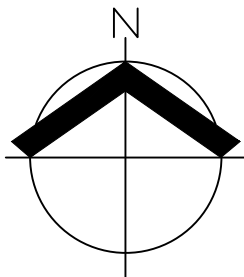
AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
P: 503.563.6151 F: 503.563.6152 aks-eng.com



DRWN: SKT
CHKD: SAR
AKS JOB:
6962



CLARK COUNTY MAPS ONLINE (2018)



SCALE: 1" = 200 FEET



DATE: 12/26/2018

**MODELED AND PRESENT WETLANDS MAP
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT**

FIGURE
5

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CHKD: SAR
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Water Bodies

- Flats/Gravel Bars
- Ice
- Man Made Features
- Open Water
- Wet Area

Streams

Streams

- Type S
- Type F
- Type N, Np, Ns
- U, unknown
- X, non-typed per WAC 222-18

Roads

Roads

- Unpaved Road/Surface Unknown
- Paved Road

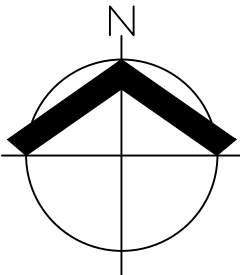
Water Type Break

Water Type Break

-

STUDY AREA BOUNDARY

WASHINGTON DEPARTMENT OF NATURAL RESOURCES (2018)

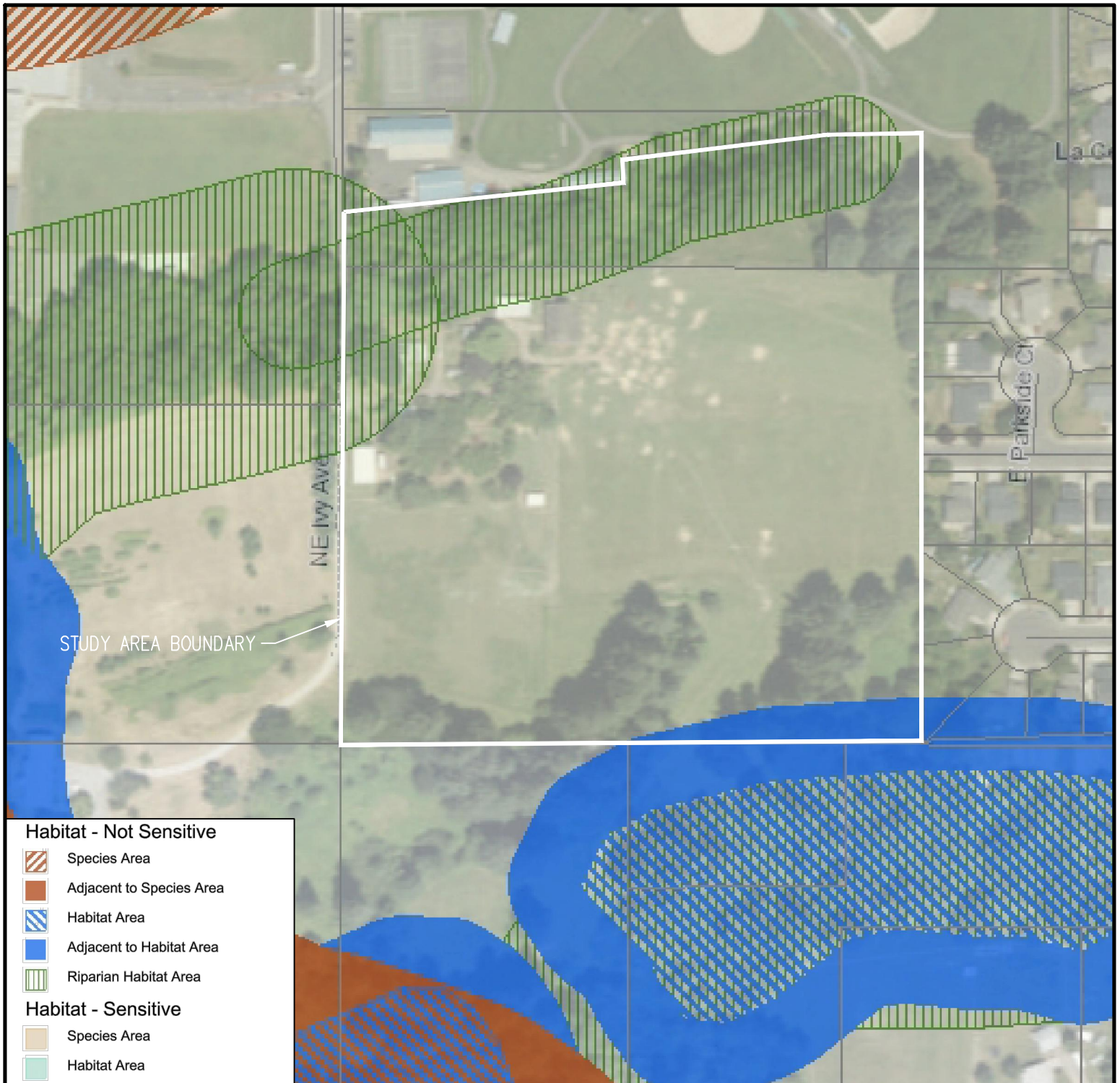


SCALE: 1" = 200 FEET

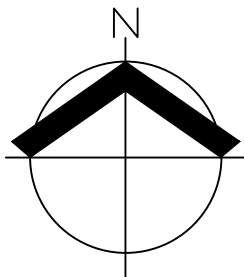


DATE: 12/26/2018

DNR WATERS MAP		FIGURE 6
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT		
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com		DRWN: SKT CHKD: SAR AKS JOB: 6962



CLARK COUNTY MAPS ONLINE (2018)



SCALE: 1" = 200 FEET



DATE: 12/26/2018

**PRIORITY HABITAT AND SPECIES MAP
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT**

FIGURE
7






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TUALATIN, OR 97062

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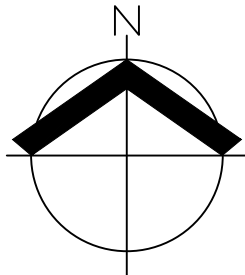


DRWN: SKT
CHKD: SAR
AKS JOB:
6962

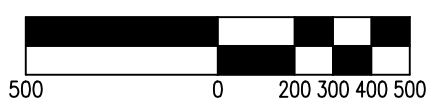


 PHS Report Clip Area
 PT
 LN
POLY
 AS MAPPED
 SECTION

WDFW PHS MAPS ONLINE (2018)

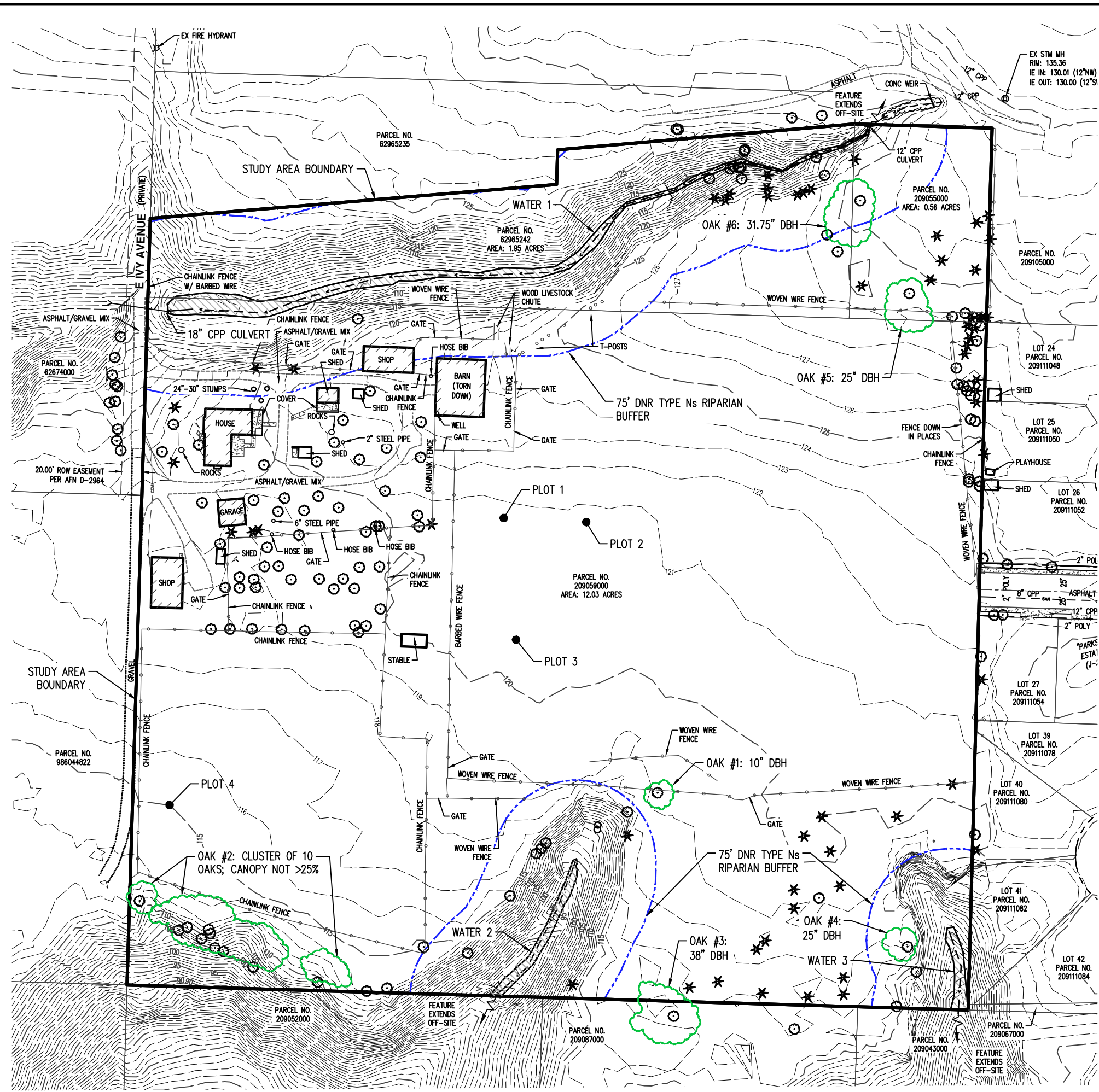


SCALE: 1" = 500 FEET

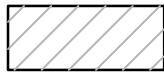




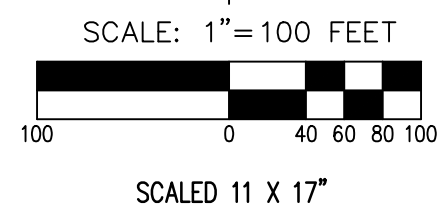
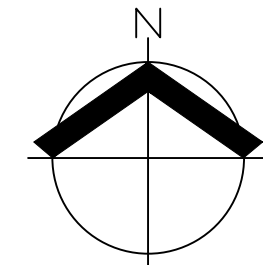
DATE: 12/26/2018

WDFW PRIORITY HABITAT AND SPECIES MAP HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT		FIGURE 8
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com		DRWN: SKT CHKD: SAR AKS JOB: 6962
		



LEGEND




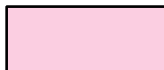



-  TOTAL ON-SITE WATER AREA: 7,911 SF± (0.18 ACRES±)
- WATER 1 (NS): 5,753 SF± (0.13 ACRES±)
- WATER 2 (NS): 1,271 SF± (0.03 ACRES±)
- WATER 3 (NS): 887 SF±
-  TOTAL ON-SITE 75' RIPARIAN BUFFER: 146,943 SF± (3.37 ACRES±)
-  TOTAL INDIVIDUAL PRIORITY OREGON WHITE OAK DRIPLINE- BASED OFF OF SUMMER 2012 AERIAL: 15,148 SF± (0.35 ACRES±)



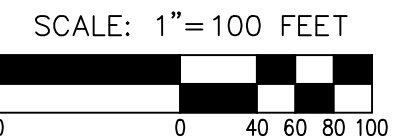
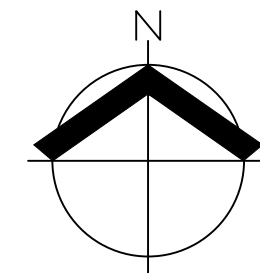
DATE: 03/14/2019

CRITICAL AREAS MAP	FIGURE
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT	9
AKS ENGINEERING & FORESTRY, LLC 9600 NE 126TH AVE, STE 2520 VANCOUVER, WA 98682 P: 360.882.0419 F: 360.882.0426 aks-eng.com	DRWN: KMK CHKD: SAR AKS JOB: 6962

LEGEND

-  TOTAL ON-SITE WATER AREA: 7,911 SF± (0.18 ACRES±)
-  75' BASE RIPARIAN BUFFER
-  TOTAL INDIVIDUAL PRIORITY OREGON WHITE OAKS TO BE PRESERVED: 15,148 SF± (0.35 ACRES±)
-  RIPARIAN HABITAT BUFFER ENHANCEMENT AREA: 22,038 SF± (0.51 ACRES±)
-  RIPARIAN HABITAT BUFFER ENCROACHMENT INTO BASE BUFFER AREA: 14,691 SF± (0.34 ACRES±)
-  TEMPORARY IMPACTS TO BASE BUFFER AREA TO BE RESTORED: 1,475 SF± (0.03 ACRES±)
-  TOTAL REMAINING ON-SITE RIPARIAN BUFFER (NOT INCLUDING ENHANCEMENT AREA): 108,740 SF± (2.50 ACRES±)

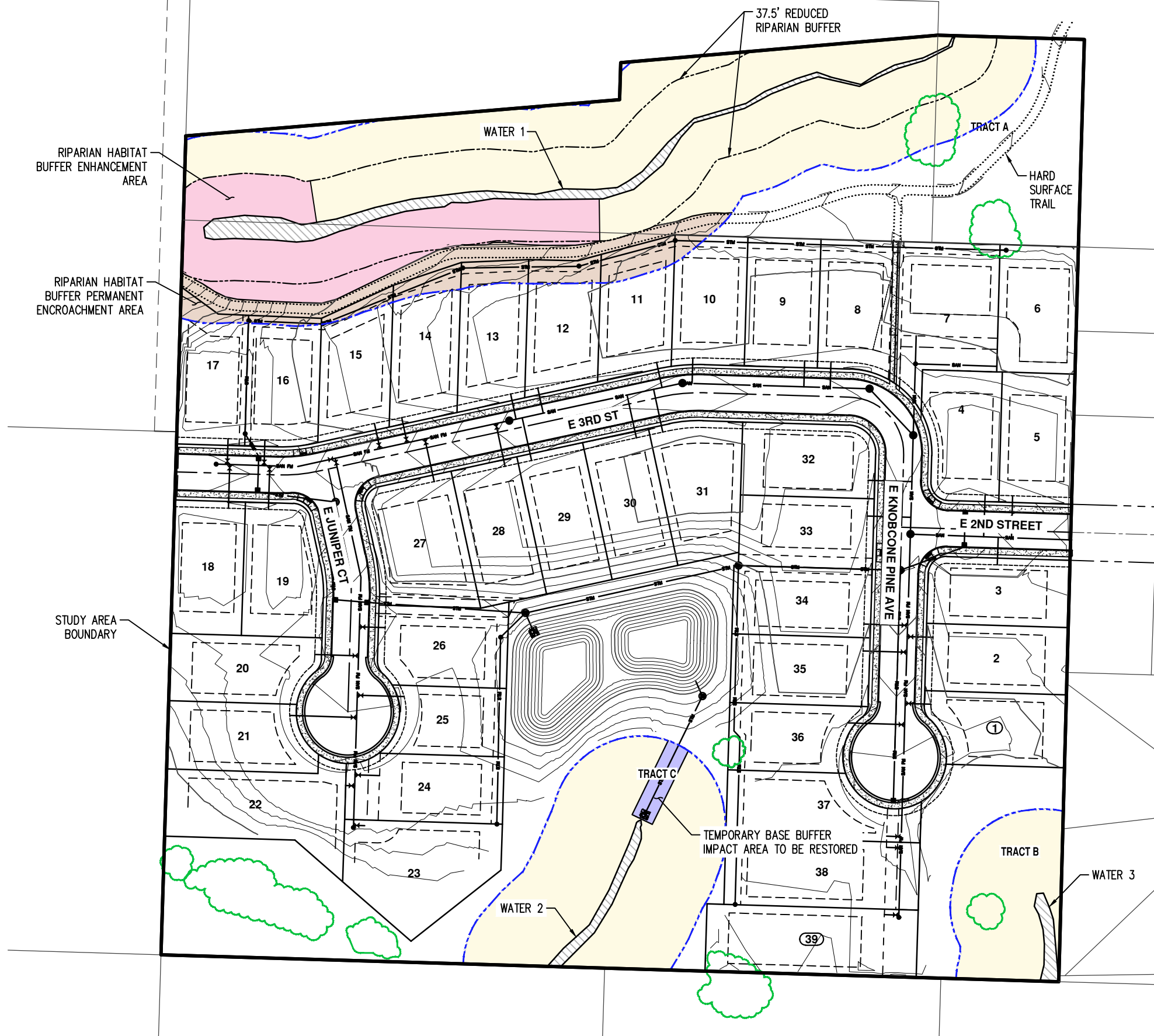
NOTE: OAK DRIPLINE AVOIDANCE AREAS WILL BE NOTED ON CONSTRUCTION DRAWINGS.



SCALED 11 X 17"

DATE: 03/14/2019

SITE PLAN	FIGURE
HOLLEY PARK SUBDIVISION CRITICAL AREAS ASSESSMENT	
AKS ENGINEERING & FORESTRY, LLC 9600 NE 126TH AVE, STE 2520 VANCOUVER, WA 98682 P: 360.882.0419 F: 360.882.0426 aks-eng.com	10 DRWN: KMK CHKD: SAR AKS JOB: 6962





Appendix B: Wetland Determination Data Sheets

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

Project/Site: Holley Park Subdivision City/County: La Center / Clark Sampling Date: 11/14/2018
 Applicant/Owner: Compass Group LLC State: WA Sampling Point: 2
 Investigator(s): Taya MacLean and Sonya Templeton Section, Township, Range: Sect 02, T4N, R3E
 Landform (hillslope, terrace, etc.): Shoulder Slope Local relief (concave, convex, none): None Slope (%): <3%
 Subregion (LRR): A, Northwest Forests and Coast Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Unit OdB, Odne silt loam, 0-5% slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Precipitation:
 According to the AgACIS Battle Ground station, 0.03 inches of rainfall was received the day of the site visit and 1.75 inches of rainfall was received for the two weeks prior

Remarks:
 Plot located in pasture.

VEGETATION

Tree Stratum (Plot Size: 30' r or _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>2</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	<u>2</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100%</u> (A/B)
4. _____	_____	_____	_____	Prevalence Index worksheet:	
_____ = Total Cover				Total % Cover of:	Multiply by:
0% = Total Cover				OBL species	<u>5</u> x 1 = <u>5</u>
_____ = Total Cover				FACW species	<u>0</u> x 2 = <u>0</u>
0% = Total Cover				FAC species	<u>90</u> x 3 = <u>270</u>
_____ = Total Cover				FACU species	<u>5</u> x 4 = <u>20</u>
_____ = Total Cover				UPL species	<u>0</u> x 5 = <u>0</u>
_____ = Total Cover				Column Totals:	<u>100</u> (A) <u>295</u> (B)
_____ = Total Cover				Prevalence Index = B/A =	<u>2.95</u>
Hydrophytic Vegetation Indicators:					
1 - Rapid Test for Hydrophytic Vegetation					
X 2 - Dominance Test is >50%					
X 3 - Prevalence Index is ≤3.0 ¹					
4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)					
5 - Wetland Non-Vascular Plants ¹					
_____ Problematic Hydrophytic Vegetation (Explain) ¹					
¹ Indicators of hydric soil and wetland hydrology must be present.					
Hydrophytic Vegetation Present? Yes <u>X</u> No _____					

Remarks:

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

Project/Site: Holley Park Subdivision City/County: La Center / Clark Sampling Date: 11/14/2018
 Applicant/Owner: Compass Group LLC State: WA Sampling Point: 3
 Investigator(s): Taya MacLean and Sonya Templeton Section, Township, Range: Sect 02, T4N, R3E
 Landform (hillslope, terrace, etc.): Shoulder Slope Local relief (concave, convex, none): None Slope (%): <3%
 Subregion (LRR): A, Northwest Forests and Coast Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Unit OdB, Odne silt loam, 0-5% slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Precipitation:
 According to the AgACIS Battle Ground station, 0.03 inches of rainfall was received the day of the site visit and 1.75 inches of rainfall was received for the two weeks prior

Remarks:

VEGETATION

Tree Stratum (Plot Size: 30' r or _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
0% = Total Cover				
Sapling/Shrub Stratum (Plot Size: 10' r or _____)				Prevalence Index worksheet:
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	OBL species <u>0</u> x 1 = <u>0</u>
3. _____	_____	_____	_____	FACW species <u>0</u> x 2 = <u>0</u>
4. _____	_____	_____	_____	FAC species <u>82</u> x 3 = <u>246</u>
5. _____	_____	_____	_____	FACU species <u>20</u> x 4 = <u>80</u>
0% = Total Cover				UPL species <u>0</u> x 5 = <u>0</u>
Herb Stratum (Plot Size: 5' r or _____)				Column Totals: <u>102</u> (A) <u>326</u> (B)
1. <u>Agrostis species</u>	<u>80%</u>	<u>Yes</u>	<u>FAC ?</u>	Prevalence Index = B/A = <u>3.20</u>
2. <u>Hypochaeris radicata</u>	<u>20%</u>	<u>Yes</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators:
3. <u>Trifolium species</u>	<u>2%</u>	<u>No</u>	<u>FAC ?</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
102% = Total Cover				
Woody Vine Stratum (Plot Size: 10' r or _____)				1 Indicators of hydric soil and wetland hydrology must be present.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes _____ No <u>X</u>
0% = Total Cover				
% Bare Ground in Herb Stratum	<u>0%</u>			

Remarks:

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

Project/Site: Holley Park Subdivision City/County: La Center / Clark Sampling Date: 11/14/2018
 Applicant/Owner: Compass Group LLC State: WA Sampling Point: 4
 Investigator(s): Taya MacLean and Sonya Templeton Section, Township, Range: Sect 02, T4N, R3E
 Landform (hillslope, terrace, etc.): Shoulder Slope Local relief (concave, convex, none): None Slope (%): <3
 Subregion (LRR): A, Northwest Forests and Coast Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Unit OdB, Odne silt loam, 0-5% slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Precipitation:
 According to the AgACIS Battle Ground station, 0.03 inches of rainfall was received the day of the site visit and 1.75 inches of rainfall was received for the two weeks prior

Remarks:
 Plot located in pasture actively grazed by horse.

VEGETATION

Tree Stratum (Plot Size: 30' r or _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
0% = Total Cover				
Sapling/Shrub Stratum (Plot Size: 10' r or _____)				Prevalence Index worksheet:
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	OBL species <u>0</u> x 1 = <u>0</u>
3. _____	_____	_____	_____	FACW species <u>0</u> x 2 = <u>0</u>
4. _____	_____	_____	_____	FAC species <u>100</u> x 3 = <u>300</u>
5. _____	_____	_____	_____	FACU species <u>0</u> x 4 = <u>0</u>
0% = Total Cover				UPL species <u>0</u> x 5 = <u>0</u>
Herb Stratum (Plot Size: 5' r or _____)				Column Totals: <u>100</u> (A) <u>300</u> (B)
1. <u>Agrostis species</u>	<u>90%</u>	<u>Yes</u>	<u>FAC ?</u>	Prevalence Index = B/A = <u>3.00</u>
2. <u>Poa species</u>	<u>10%</u>	<u>No</u>	<u>FAC ?</u>	Hydrophytic Vegetation Indicators:
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	<u>X</u> <u>2</u> - Dominance Test is >50%
5. _____	_____	_____	_____	<u>X</u> <u>3</u> - Prevalence Index is ≤3.0 ¹
6. _____	_____	_____	_____	<u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
7. _____	_____	_____	_____	<u>5</u> - Wetland Non-Vascular Plants ¹
8. _____	_____	_____	_____	_____ Problematic Hydrophytic Vegetation (Explain) ¹
9. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present.
10. _____	_____	_____	_____	Hydrophytic Vegetation Present?
11. _____	_____	_____	_____	
100% = Total Cover				
Woody Vine Stratum (Plot Size: 10' r or _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
0% = Total Cover				
% Bare Ground in Herb Stratum	<u>0%</u>			

Remarks:



Appendix C: Streamflow Duration Assessment Forms

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 6962 Holley Park Subdivision		Assessor Sonya Templeton								
Address NE Ivy Avenue, La Center, Washington			Date 11/14/2018							
Waterway Name Water 1		Coordinates at downstream end (ddd.mm.ss)	Lat. 45.861040 N Long. -122.660153 W							
Reach Boundaries 60 feet downstream from rip-rap lined swale		<input type="checkbox"/> Disturbed Site / Difficult Situation (Describe in "Notes")								
Precipitation w/in 48 hours (cm) 0.0762		Channel Width (m) 1								
Observed Hydrology	% of reach w/observed surface flow <u>70%</u>									
	% of reach w/any flow (surface or hyporheic) <u>70%</u>									
# of pools observed <u>4</u>										
Observations	Observed Wetland Plants (and indicator status):		Observed Macroinvertebrates:							
	giant horsetail (Equisetum telmateia; FACW)		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Taxon</th> <th style="width: 15%;">Indicator Status</th> <th style="width: 15%;">Ephemeroptera?</th> <th style="width: 15%;"># of Individuals</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">N/A</td> </tr> </tbody> </table>	Taxon	Indicator Status	Ephemeroptera?	# of Individuals	N/A		
Taxon	Indicator Status	Ephemeroptera?	# of Individuals							
N/A										
Indicators	1. Are aquatic macroinvertebrates present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	2. Are 6 or more individuals of the Order Ephemeroptera present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	3. Are perennial indicator taxa present? (refer to Table 1)		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
	5. What is the slope? (In percent, measured for the valley, not the stream)		<u>5</u> %							
Conclusions										
	Single Indicators: <input type="checkbox"/> Fish <input type="checkbox"/> Amphibians		Finding: <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Perennial							

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- Prolonged Abnormal Rainfall / Snowpack
 - Below Average
 - Above Average
- Natural or Anthropogenic Disturbance
- Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Channel bed is approximately 4-feet wide with 2-foot tall banks. Approximately 4 inches of continuous flow was present in the entire on-site channel reach during the November 2018 site visit.
Substrate in the channel is composed of a silt loam with gravels and cobbles and large wood debris.

Ancillary Information:

- Riparian Corridor *Alnus rubra*, *Rubus armeniacus*, *Athyrium cyclosorum*
- Erosion and Deposition
- Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 6962 Holley Park Subdivision		Assessor Sonya Templeton	
Address NE Ivy Avenue, La Center, Washington			Date 11/18/2018
Waterway Name Water 2		Coordinates at downstream end (ddd.mm.ss)	Lat. N
Reach Boundaries 20 feet upstream from study area boundary			Long. W
Precipitation w/in 48 hours (cm) 0.0762	Channel Width (m) 2.4	<input type="checkbox"/> Disturbed Site / Difficult Situation (Describe in "Notes")	
Observed Hydrology	% of reach w/observed surface flow <u>20</u>		
	% of reach w/any flow (surface or hyporheic) <u>20</u>		
	# of pools observed <u>3</u>		
Observations	Observed Wetland Plants (and indicator status):	Observed Macroinvertebrates:	
	giant horsetail (Equisetum telmateia; FACW)	Taxon	Indicator Status Ephemer-optera? # of Individuals
		N/A	
Indicators	1. Are aquatic macroinvertebrates present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	2. Are 6 or more individuals of the Order Ephemeroptera present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	3. Are perennial indicator taxa present? (refer to Table 1)		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	5. What is the slope? (In percent, measured for the valley, not the stream)		<u>10</u> %
Conclusions			
	Single Indicators: <input type="checkbox"/> Fish <input type="checkbox"/> Amphibians	Finding: <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Perennial	

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- Prolonged Abnormal Rainfall / Snowpack
 - Below Average
 - Above Average
- Natural or Anthropogenic Disturbance
- Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

channel bed is approximately 8-5 feet wide and had approximately 2 inches of water with flow present during the site visit. Substrate in the channel is composed of a silt loam.

Ancillary Information:

- Riparian Corridor *Alnus rubra*, *Rubus armeniacus*, *Athyrium cyclosorum*, *Urtica dioica*
- Erosion and Deposition
- Floodplain Connectivity

Observed Amphibians, Snake, and Fish:			
Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 6962 Holley Park Subdivision		Assessor Sonya Templeton	
Address NE Ivy Avenue, La Center, Washington			Date 11/14/2018
Waterway Name Water 3		Coordinates at downstream end (ddd.mm.ss)	Lat. 45.861040 N
Reach Boundaries Headwaters			Long. -122.660153 W
Precipitation w/in 48 hours (cm) 0.0762	Channel Width (m) 1	<input type="checkbox"/> Disturbed Site / Difficult Situation (Describe in "Notes")	
Observed Hydrology	% of reach w/observed surface flow <u>70%</u>		
	% of reach w/any flow (surface or hyporheic) <u>70%</u>		
	# of pools observed <u>4</u>		
Observations	Observed Wetland Plants (and indicator status):	Observed Macroinvertebrates:	
		Taxon	Indicator Status Ephemer-optera? # of Individuals
		N/A	
Indicators	1. Are aquatic macroinvertebrates present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	2. Are 6 or more individuals of the Order Ephemeroptera present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	3. Are perennial indicator taxa present? (refer to Table 1)		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)		<input type="checkbox"/> Yes <input type="checkbox"/> No
	5. What is the slope? (In percent, measured for the valley, not the stream)		<u>5</u> %
Conclusions			
	Single Indicators: <input type="checkbox"/> Fish <input type="checkbox"/> Amphibians	Finding: <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Perennial	

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- Prolonged Abnormal Rainfall / Snowpack
 - Below Average
 - Above Average
- Natural or Anthropogenic Disturbance
- Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Channel bed is approximately 4-feet wide with 1-foot tall banks. Approximately 0.25 inches of continuous flow was present in the on-site portion of the channel during the November 2018 site visit. Bed substrate is composed of silt loam. Determined intermittent because at same elevation as Water 2 though no evidence of FACW or OBL veg growing adjacent to stream channel in study area.

Ancillary Information:

- Riparian Corridor *Alnus rubra*, *Rubus armeniacus*, *Athyrium cyclosorum*
- Erosion and Deposition
- Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed



Appendix D: Representative Site Photographs



Photo A. View facing north up NE Ivy Avenue. Photo taken by AKS survey crew on 11/28/18.



Photo B. View facing east of Water 1 from NE Ivy Avenue.



Photo C. View southeast of gravel driveways and residential house. Photo taken by AKS survey crew on 11/28/18.



Photo D. View facing north of upland area surrounding barn. Photo taken by AKS survey crew on 11/28/18.



Photo E. View facing northwest of Water 1 riparian corridor.
Photo taken by AKS survey crew on 11/28/18.



Photo F. View facing east of Water 1 riparian corridor. Photo taken by AKS survey crew on 11/28/18.



Photo G. View facing east of Water 1. Water flows west. Photo taken by AKS survey crew on 12/02/18.



Photo H. View facing northeast of rip-rap lined swale off-site where Water 1 originates. Photo taken by AKS survey crew on 12/02/2018.



Photo I. View facing southwest of open field.



Photo J. View south of open field looking toward Water 3.



Photo K. View north of open field toward Water 1.



Photo L. View north within open area between Water 2 and Water 3.



Photo M. View facing southeast of Water 3 corridor. Photo taken by AKS survey crew on 11/20/18.



Photo N. View south of Water 2 corridor. Photo taken by AKS survey crew on 11/20/18.



Photo O. View facing south of Water 2. No wetlands found above the OHWM



Photo P. View east of forested area with Oregon white oaks near Water 3. Photo taken by AKS survey crew on 11/20/18.



Photo Q. View facing east along edge of Oregon white oak forested habitat. Photo taken by AKS survey crew on 11/29/18.



Photo R. View facing west along edge of Oregon white oak forested habitat. Photo taken by AKS survey crew on 11/29/18.



Photo OS View northwest of horse pasture area. Photo taken by AKS survey crew on 11/29/18.



Photo T. View southeast of horse pasture area toward Water 2 and Oregon white oak habitat area. Photo taken by AKS survey crew on 11/29/18.



Appendix E: Riparian Buffer Enhancement Planting Specifications

**Holley Park Subdivision
Riparian Habitat Buffer Enhancement Planting Specification**

Riparian Buffer Enhancement Planting Area (adjacent Water 1) = 22,037 SF (0.51 AC)

Common Name	Scientific Name	Facultative Class	Spacing (feet; triangular pattern)	Size	Quantity
Douglas fir (tree)	<i>Pseudotsuga menziesii</i>	FACU	12'	1 gallon or bare root	51
bigleaf maple (tree)	<i>Acer macrophyllum</i>	FACU	12'	1 gallon or bare root	51
vine maple (tree)	<i>Acer circinatum</i>	FAC	12'	1 gallon or bare root	51
baldhip rose (shrub)	<i>Rosa gymnocarpa</i>	FACU	6'	1 gallon or bare root	102
common snowberry (shrub)	<i>Symphoricarpos albus</i>	FACU	6'	1 gallon or bare root	102
Lewis' mock orange (shrub)	<i>Philadelphus lewisii</i>	NOL	6'	1 gallon or bare root	102
oceanspray (shrub)	<i>Holodiscus discolor</i>	FACU	6'	1 gallon or bare root	102
serviceberry (shrub)	<i>Amelanchier alnifolia</i>	FACU	6'	1 gallon or bare root	102
tall Oregon grape (shrub)	<i>Mahonia aquifolium</i>	FACU	6'	1 gallon or bare root	102
TOTAL:					765

*Any areas left bare should be seeded using an appropriate native upland grass seed mix.

Temporary Riparian Buffer Impact Restoration Planting Area (Adjacent Water 2) = 1,475 SF (0.03 AC)

Common Name	Scientific Name	Facultative Class	Spacing (feet; triangular pattern)	Size	Quantity
common snowberry (shrub)	<i>Symphoricarpos albus</i>	FACU	6'	1 gallon or bare root	10
oceanspray (shrub)	<i>Holodiscus discolor</i>	FACU	6'	1 gallon or bare root	10
serviceberry (shrub)	<i>Amelanchier alnifolia</i>	FACU	6'	1 gallon or bare root	10
tall Oregon grape (shrub)	<i>Mahonia aquifolium</i>	FACU	6'	1 gallon or bare root	10
TOTAL:					40

*Any areas left bare should be seeded using an appropriate native upland grass seed mix.

Planting Notes

- 1) Plantings should preferably be installed between February 1 and May 1 for bare roots and seeds and between October 1 and November 15 for containers. Plants may be installed at other times of the year; however, additional measures may be necessary to ensure plant survival. Bare root plants must be installed during the late winter/early spring dormancy period.
- 2) All non-native invasive vegetation (except for existing pasture grasses) shall be removed from planting areas prior to installing native enhancement plantings.
- 3) Temporary irrigation may be necessary for the survival of the enhancement plantings. Irrigation is recommended during the first two years as the plants become established. Watering shall be provided at a rate of at least one inch per week between June 15 and October 15 or as needed.
- 4) Plantings shall be mulched a minimum of three inches in depth and 18 inches in diameter to retain moisture and discourage weed growth around newly installed plant material.
- 5) Depending on nursery stock availability, appropriate plant substitutions must be approved by a qualified professional with expertise in wetland and habitat mitigation.