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April 24, 2007  
#07010 - Task 4

B/H. K-N  
REC'D APR 25 2007

Todd Hansen  
9300 Kimmie Street SW  
Olympia, WA 98512

**RE: Wetland Reconnaissance - TPN #51850001200, #09520003000, #09520004000, #09230019000, and #09230006000.**

Dear Mr. Hansen:

I conducted a site visit of tax parcel #51850001200, #09520003000, #09520004000, #09230019000, and #09230006000 (Property) located along Kimmie Road in Tumwater, Washington on April 20, 2007 to determine the potential for on-site wetlands. This wetland reconnaissance was completed for Todd Hansen. The three-parameter approach as outlined in the Washington State Department of Ecology's Wetlands Delineation Manual (1997<sup>1</sup>) was followed. The manual's three-parameter approach used to identify wetlands relies on the presence of field indicators for hydrophytic (water-loving) vegetation, hydric soils, and hydrology.

During my site-visit, I conducted a meander survey of the Property, which totals approximately 53 acres in size. Thurston County ([www.geodata.org](http://www.geodata.org)) does not show any wetlands mapped on the Property. A reconnaissance of the Property was made to determine the position and extent of any wetlands present that may not have been mapped by Thurston County. The topography of the Property is generally flat, exhibiting minor changes in topography (hummocks and depressions).

The Property can be divided into five sections, based on vegetative communities and land use. The southern portion (Section A) is forested, the southern central portion (Section B) is dominated by shrubs, and the northern central portion (Section C) is also forested. The northern portion (Section D) contains a forested portion, but is being used as a staging area, and the extreme northern portion, which is triangular (Triangle Section), is a portion of an old railroad grade (Exhibit 1 - Site Map).

#### **Reconnaissance Findings**

Section A is undeveloped and is characterized by both forested upland and wetland communities. The upland portion of Section A is characterized by a vegetative community dominated by red alder (*alnus rubra*), big leaf maple (*acer macrophyllum*), shore pine (*pinus contorta*), common snowberry (*symphoricarpos albus*), hardhack (*spiraea douglasii*), red elderberry (*sambucus racemosa*), cascara (*rhamnus purshiana*), salal (*gaultheria shallon*), bleeding heart (*dicentra formosa*), bracken fern (*pteridium aquilinum*), and red currant (*ribes sanguineum*). Soils within upland areas were not saturated within 16 inches of the soil surface. A large wetland area was identified along the southern portion of Section A (Exhibit 1 - Site Map). The wetland area, which was inundated to a depth of at least two inches, was characterized by a vegetative community dominated by willow species (*salix spp.*), hardhack, common snowberry, salmonberry (*rubus spectabilis*), creeping buttercup (*ranunculus repens*), slough sedge (*carex obnupta*), false-lily-of-the-valley (*maianthemum dilatatum*), and crab apple (*malus fusca*). The area of the identified

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wetland is also mapped as containing Norma silt loam soils, which are listed as hydric (wetland soils) within Thurston County. Based on the dominance of wetland plants, and inundated, hydric soils, this area is determined to be a wetland.

Section B has historically been cleared. This section is characterized by a vegetative community dominated by common snowberry, hardhack, stinging nettle (*urtica dioica*), scotch broom (*cytiscus scoparius*), red alder saplings, himalayan blackberry (*rubus discolor*), and scattered cascara saplings. The small clumps of hardhack occurred in clumps. Soils within the hardhack communities were not saturated within 16 inches of surface and did not exhibit hydric soil indicators (soils exhibited a high soil chroma in the B-horizon). No wetlands were identified within Section B of the Property.

Section C is undeveloped and is characterized by forested vegetative cover. This Section is characterized by a vegetative community dominated by red alder, douglas fir (*pseudotsuga menziesii*), salmonberry, himalayan blackberry, big leaf maple, scotch broom, red currant, vine maple (*acer circinatum*), Oregon grape (*mahonia nervosa*), sword fern (*polystichum munitum*), hardhack, hemlock (*tsuga heterophylla*), and bleeding heart. Soils within this Section were not saturated within 16 inches of the soil surface and did not exhibit hydric soil indicators. No wetlands were identified within Section C of the Property.

Section D has been partially developed, containing a few commercial structures and large gravel parking area. The southern portion of Section D is undeveloped and is characterized by a vegetative community dominated by western red cedar (*thuja plicata*), scotch broom, red alder, big leaf maple, and common snowberry. Soils within this Section were not saturated within 16 inches of the soil surface and did not exhibit hydric soil indicators. No wetlands were identified within Section D of the Property.

The Triangle Section was historically part of a railroad grade. This section is characterized by a vegetative community dominated by heartleaf willow (*salix rigida*), scotch broom, red alder, and shore pine (*pinus contorta*). Vegetative cover within this section is limited. On the southern portion of the Triangle Section, a large pond was observed that appears to receive runoff from the developed portion of Section D. This pond appears to have been excavated from upland soils and does not exhibit other wetland characteristics. No wetlands were identified within the Triangle Section of the Property.

### **Soils**

Soils on the Property are mapped primarily as Cagey loamy sand and Everett very gravelly sandy loam. The northern and southern sections also contain areas mapped as Norma silt loam. Cagey silt loam and Everett very gravelly sandy loam are not listed as hydric on the Hydric Soils List for Thurston County, Washington<sup>ii</sup>. Norma silt loam is listed as hydric however, which is typically found in depressional areas. The area mapped as Norma silt loam corresponds to the area of the identified wetland.

### **Conclusion**

The focus of this wetland reconnaissance was to determine the potential for wetlands to occur on the Property. The dominance of upland vegetative species, the lack of wetland hydrology, and dominance of non-hydric soil indicates that no wetlands are present on the Property, with the exception of the wetland system observed along the southern portion of Section A (Exhibit 1). The



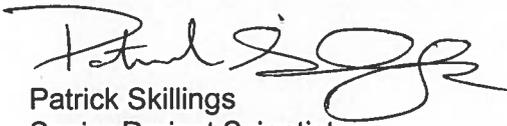
Mr. Todd Hansen  
April 24, 2007  
Page 3

location and size of the identified wetland has been approximated. The borders of the wetland were not delineated or surveyed. It is estimated that the identified wetland would be categorized as a class 2 or 3 wetland.

If you have any additional question, please give me a call at 360.491.3399.

Sincerely,

**SKILLINGS CONNOLLY, INC.**

  
Patrick Skillings  
Senior Project Scientist

PES:PES

G:\Project\2007\07010 Todd Hansen On-Call\Task No 4 Kimmie Road\Environmental\Draft\04-19-07 wetland recon ps.doc

<sup>i</sup> Washington State Department of Ecology. 1997. Washington State Wetlands Identification and Delineation Manual. Ecology Publication No. 96-94.

<sup>ii</sup> United States Department of Agriculture. 2001. Hydric Soils List for Thurston County, Washington. Natural Resources Conservation Service.



-  **Identified Wetland**
-  **Project Boundary**
-  **Break Between Sections**

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**Kimmie Road Wetland Recon.  
Exhibit 1- Site Map  
April 23, 2006**

**APPENDIX J**  
**RAPID SITE ASSESSMENT FEASIBILITY MEMORANDUM, AHBL INC., 2015**

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# PROJECT MEMO



**TO:** Thomas Skjervold  
Washington Military Department

**DATE:** Revised Sept. 30, 2015

**FROM:** Lisa Klein, AICP Matt Weber, PE  
Tacoma - (253) 383-2422

**PROJECT NO.:** 2140515.10/.30

**PROJECT NAME:** Thurston County Readiness Center

**SUBJECT:** Rapid Site Assessment, 83rd Avenue & Kimmie Street Site

AHBL has evaluated property located at 83<sup>rd</sup> Avenue SW & Kimmie Street SW in Tumwater, Washington for its potential for a future Thurston County Readiness Center. This Rapid Site Assessment was focused on identifying any potential fatal flaws with the property prior to its purchase. The following is a summary of the physical and regulatory features and requirements affecting site design and site development. The evaluation included research, a site visit, correspondence, and a meeting with City of Tumwater staff. Historical plans and documents made available to us for this study include the following:

- Figure 1 Depth to Groundwater, prepared by Pacific Groundwater Group in 1999
- Linear Regression Analysis, prepared by Robinson Noble, dated May 16, 2008
- Well Logs for Regression Analysis, dated January 2008
- Wetland Determination prepared by Skillings Connolly, dated April 2008
- Wetland Reconnaissance prepared by Skillings Connolly, dated April 2007

Note that a review of the title report and underlying documents was not requested. AHBL subcontracted to obtain additional environmental information about the property's development potential, including the following:

- Wetlands and pocket gopher habitat evaluation by Theresa Dusek Consulting, dated October 22, 2014
- Preliminary Geotechnical Analysis prepared by South Sound Geotechnical Consulting, dated January 16, 2015
- Transportation Feasibility Study prepared by The Transpo Group, Inc., dated February 25, 2015

## Executive Summary

The proposed use is allowed outright in the property's zoning. The property is adjacent to residential uses, and there is an organized and active neighborhood group. Primary access will likely occur from Kimmie Street SW in the vicinity of 85<sup>th</sup> Avenue SW. The City will allow the access to be designed to private road standards and will accept a higher level standard, if preferred. The development is expected to be located in the central portion of the site, and will likely use approximately 10 out of the available 53 acres. The remainder of the property can be used for stormwater infiltration, tree retention, and future maintenance facility, if desired.

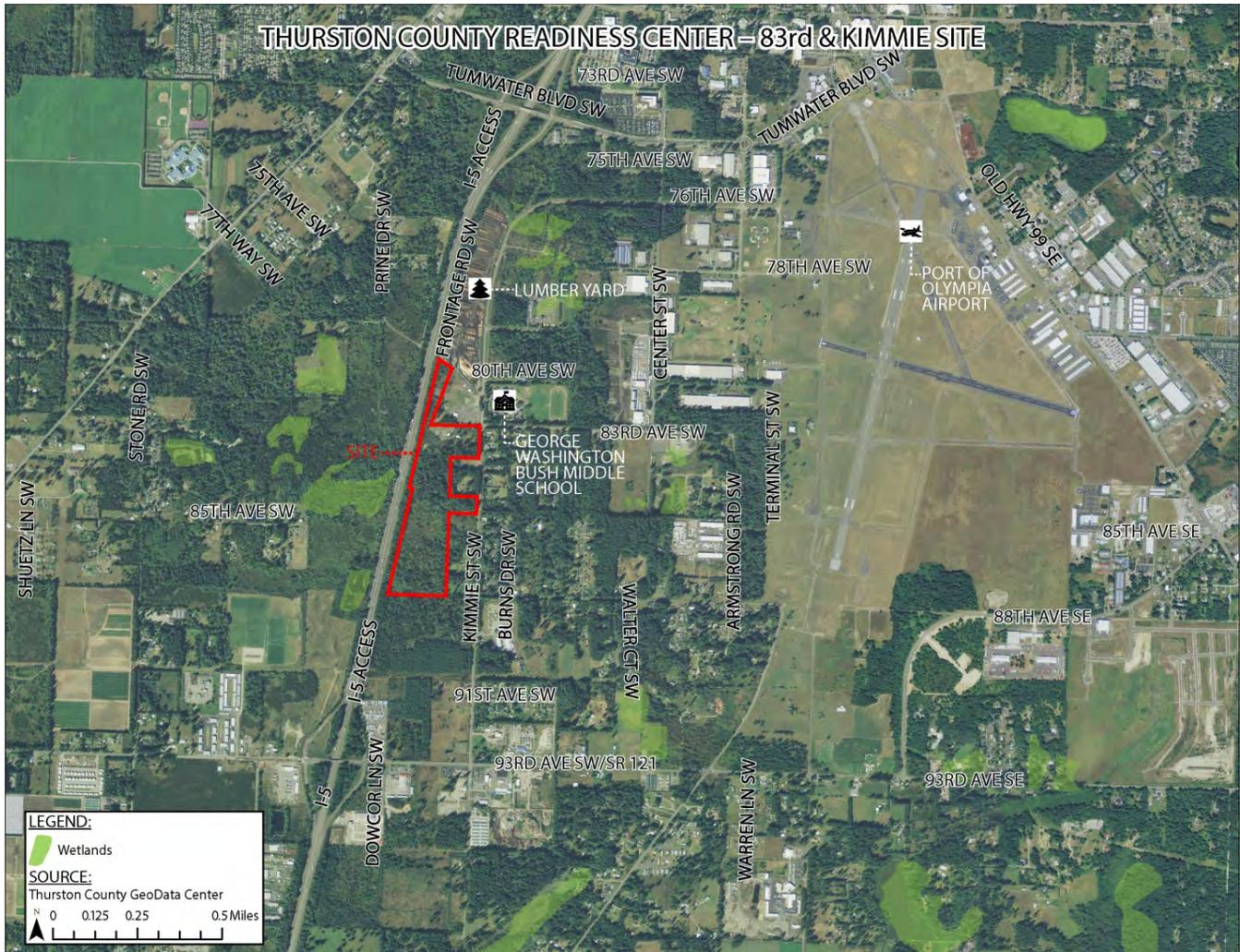
The primary issues associated with site development are twofold: high groundwater and offsite roadway improvements. AHBL evaluated how stormwater would be managed, given the high groundwater, and determined that it was feasible through stormwater dispersion. Under Tumwater's code for dispersion, 65 percent of the site must remain as native vegetation, which would correlate to a maximum developable area of 18.5 acres. Note that with final design, and if different stormwater techniques are determined to be feasible, the developable area may be able to be increased.

The Transpo Group completed an analysis of the potential offsite impacts and required roadway improvements and/or mitigation. Their analysis concluded that offsite roadway improvements should be limited to the payment of impact fees estimated to be \$217,366. It is also their opinion that a left-turn lane at the property access point should not be required.



## Property

The subject property is located at 83<sup>rd</sup> Avenue SW and Kimmie Street SW in Tumwater, Thurston County. The site comprises the following tax parcel numbers: 5185000400, 51850001200, 09230006000, 09230019000, 0952004000, and 09520003000. The property is approximately 53 acres in size and is bordered by Interstate 5 on the west, Kimmie Street SW and a number of residential properties on the east, undeveloped land to the south, and Frontage Road to the north.



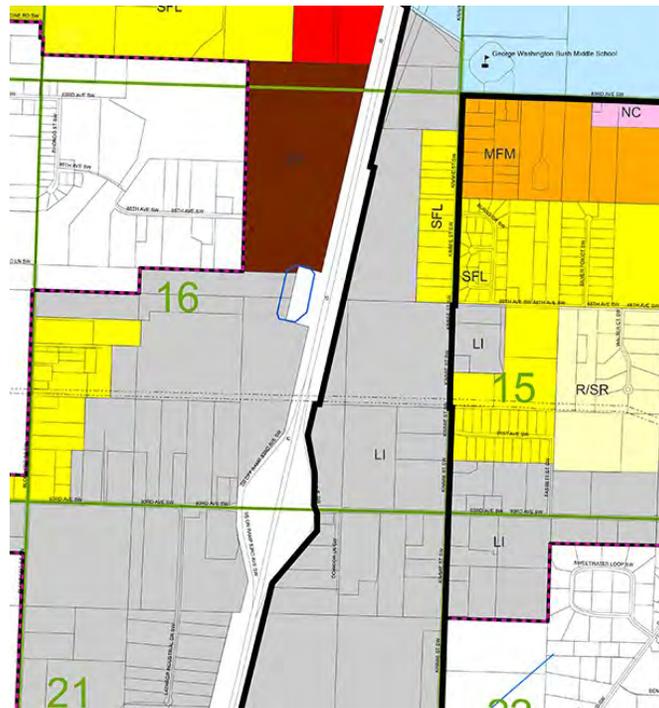
## Land Use and Zoning

The City's Comprehensive Plan land use designation for the property is Light Industrial, with the exception of two parcels adjacent to Kimmie Street SW that are designated Single Family Low Density. The designations are consistent with the property zoning described below.



## Zoning

As shown on the zoning map below, the property is zoned Light Industrial (LI), with the exception of about 2.7 acres that extend to Kimmie Street SW, which is zoned Single Family Low Density (SFL).



### Light Industrial Zone Uses and Requirements

LI zoning is intended to establish and preserve areas for industrial and other uses of such a nature that they do not create serious problems of compatibility with other kinds of land uses. Although a Readiness Center is not a type of use listed in the LI zone, in our meeting with City staff, they stated the use is permitted outright. It is their interpretation that the use is a compilation of several allowed uses, such as warehousing, storage, office, etc., all of which are allowed. The following summarizes the bulk dimension and zoning requirements of the LI Zone.

Light Industrial (LI) Zone	
Regulation	Bulk & Dimensional Requirements
Minimum lot area	No minimum
Minimum lot width	
Minimum lot depth	
Front yard setback	20 feet on all street frontages
Minimum interior yard setback	10 feet
Rear yard setback	10 feet
Setback adjacent to residential zone	20 feet*
Required landscaped setback along any common boundary with residential-zoned property	20 feet
Maximum lot coverage (buildings)	No maximum
Maximum building height	50 feet*

*\*Where structures are constructed over 25 feet, the setback of the structure from the adjacent property lines shall be increased by 1 foot for each additional foot in height above 25 feet in height of the proposed new building, and shall have screening in accordance with Tumwater Municipal Code (TMC) Chapter [18.47](#).*



Single Family Low Density

The SFL zone is intended to provide single-family residential use at a density of four to seven units per acre. In our meeting with City staff, it was determined that installation of a roadway for access to the future Readiness Center would be defined as a “support facility,” which is outright permitted in the zone, so the use of this property for building an entrance roadway to the new Readiness Center would be permissible.

Support facilities are defined as facilities such as “streets, roads, highways, sidewalks, street lighting systems, traffic signals, fire stations, electrical switching substations, electrical power transmission towers, natural gas pipelines, telephone exchanges, natural gas gate stations and regulating stations, domestic water systems, storm and sanitary sewer systems, park and ride facilities and wells or well fields, all of which are continuously related to public (or private) services.”

The following are the bulk and dimensional requirements for the SFL Zone:

<b>Single Family Low Density (SFL) Zone</b>	
<b>Regulation</b>	<b>Bulk &amp; Dimensional Requirements</b>
Minimum lot area	4,000 SF or 3,200 SF if clustering
Maximum lot area	None
Minimum lot width	50 feet or 40 feet if alley access
Minimum lot depth	
Front yard setback	10 feet from front property line
Minimum interior yard setback	5 feet
Rear yard setback	5 feet
Required landscaped setback along any common boundary with residential-zoned property	10 feet of Type 1 landscaping (sight barrier buffer) will be required adjacent to single-family residential zoned property and 8 feet of Type 2 landscaping (visual separation buffer) adjacent to other zones.
Maximum lot coverage (buildings)	60 percent
Maximum building height	35 feet
Noise, TMC 18.40.030	Maximum levels are as set forth in Chapter 173-60 WAC.
Light Trespass, TMC 18.40.035.D	Light trespass of no more than 0.1 foot candle (fc) to residential-zoned property or 0.5 fc to business-zoned property or public rights-of-way is allowed.
Landscaping, TMC 18.47.H	Landscaping planted in setback areas and around the perimeter of stormwater retention areas can be applied to the required landscaping amounts.
Landscaping, TMC 18.47.I	Natural vegetation or stands of trees existing prior to site development may be used toward meeting all or part of the landscaping requirements.
Tree Protection, TMC 16.08.R	No less than 20 percent of the trees, or not less than 12 trees per acre (whichever is greater), shall be retained. The City provides credit for larger trees and standards for counting other tree types based on size and health. The standards may be waived or modified by the code administrator if strict compliance is unreasonable due to certain factors listed in 16.08.070.R.2. When the standard is waived, tree replacement is required at no less than three trees for each tree cleared in excess of the standard.



### Access

The property is located on Kimmie Street SW between two Interstate 5 interchanges: Tumwater Boulevard, located approximately two miles to the north, and 93<sup>rd</sup> Avenue SW (SR 121), located approximately one mile to the south.





The property has three potential access points: one from the SFL-zoned property that abuts Kimmie Street SW (in the vicinity of 85<sup>th</sup> Avenue SW), one from Kimmie Street SW at 83<sup>rd</sup> Avenue SW, and a potential third access could be obtained from Frontage Road, located at the northern property boundary. It is our understanding that Washington Military Department (WMD) would prefer to use a single access point at 85<sup>th</sup> Avenue SW for the proposed Readiness Center development, but also needs to understand how other access could be used for future needs.

The City will require the access road to be built to private street requirements. It requires 26 feet of pavement and sidewalk on one side. The City will allow WMD to improve the road to a higher standard, if desired. The City will not require more than one access to serve the Readiness Center. The City would be supportive if WMD desired to provide a secondary access; however, it would likely trigger additional frontage improvements in the area of the secondary access that may not otherwise be required.

### **Frontage Improvements**

Frontage Improvements will be required along Kimmie Street SW for the portion of the property that is used for the project. For example, if a single access is proposed in the vicinity of 85<sup>th</sup> Avenue SW, the City will require frontage improvements be made to the parcel used for the access, but not to other property owned by WMD that is not used for development of the Readiness Center. The City will require that Kimmie Street SW be widened along the frontage to accommodate an ultimate three-lane section with bike lane, streetlights, and provisions for storm drainage. Minor dedication of right-of-way may be required for needed frontage improvements.

An analysis of site access operations could be required by City staff. Based on the rural development in the vicinity of the project site and along Kimmie Street SW, typical weekday traffic volumes are expected to be relatively low. As a result, turn lanes are unlikely to be necessary to provide acceptable traffic operations. WSDOT right and left turn lane guidelines were also reviewed and similarly suggest that turn lanes are unlikely to be recommended. Additional coordination with agency staff could be completed before completion of any formal submittal to agency staff. Minor dedication of right-of-way may be required for needed frontage improvements.

### **Potential Offsite Road Improvements**

There are several large industrial projects that have received land use approvals by the City of Tumwater that are located in the vicinity of the Interstate 5/93<sup>rd</sup> Avenue SW interchange. These include a large industrial park project proposed by Puget Western, located contiguous to the south of 93<sup>rd</sup> Avenue SW, and Tumwater Corporate Park, also a large industrial project, located contiguous to the north of 93<sup>rd</sup> Avenue SW. The requirements for offsite roadway improvements imposed on these projects are quite significant and include improvements to the interchange and signalization. In our meeting with City staff, they indicated that a traffic study would be required to fully evaluate and determine the impacts caused by the future Readiness Center and any potential mitigation requirements.

City staff referenced a letter received by Dale Severson of Washington State Department of Transportation (WSDOT), dated November 8, 2008, describing the 93<sup>rd</sup> Street SE (SR 121) interchange deficiencies (enclosed). It describes the need for widening of the northbound on ramp and off ramp, as well as a new signal at the interchange intersection. (The letter also discusses southbound ramp improvements, but it is our understanding that those improvements have been completed). These improvements were described in the letter as a requirement for the development planned for the area, which proposed a significant number of peak hour trips. Mr. Severson recommended that the developers in the area work cooperatively to design and construct the improvements or contribute their pro rata share toward the improvements.

Tumwater Municipal Code (TMC) Chapter 15.48, Transportation Concurrency, describes how development shall contribute and/or fund offsite roadway improvements when capacity is below the established level of service standard. TMC 15.48.090 requires that roadway improvements caused by new development be made at the time



of building permit issuance, or that the financial commitment be in place to complete the improvements within six years. The City of Tumwater 2014-2019 Capital Facilities Plan states:

*When concurrency cannot be achieved because of lack of financial resources, then the specific development upon which the concurrency test was applied will not be certified for construction or occupancy. It is also noted that a developer of a project is required to only pay for improvements associated with fair share, growth-related impacts identified. However, if the City or other parties do not have adequate funding available to match funds to construct the necessary infrastructure, the developer may voluntarily finance the construction with a recourse of remuneration through financing techniques such as a traditional latecomers process of future development.*

Based on the level of potential risk associated with the cost of the offsite improvements, The Transpo Group was engaged to complete a transportation feasibility study so that the mitigation costs are known prior to purchasing the property. The study concluded the following:

- The Readiness Center is anticipated to generate 25 new weekday PM peak hour trips and 300 weekend inbound and outbound trips on each monthly training weekend.
- The project is anticipated to be assessed mitigation fees up to \$217,366. This could potentially be reduced by conducting a trip generation study of the existing Olympia and Puyallup Armories.
- No mitigation or proportionate improvement cost is anticipated toward improvement at the 93<sup>rd</sup> Avenue SW interchange.
- No offsite mitigation or impact fees are anticipated to be required by Thurston County.
- In their opinion, a new left-turn lane at the proposed access in the vicinity of 85<sup>th</sup> Avenue SW should not be warranted.

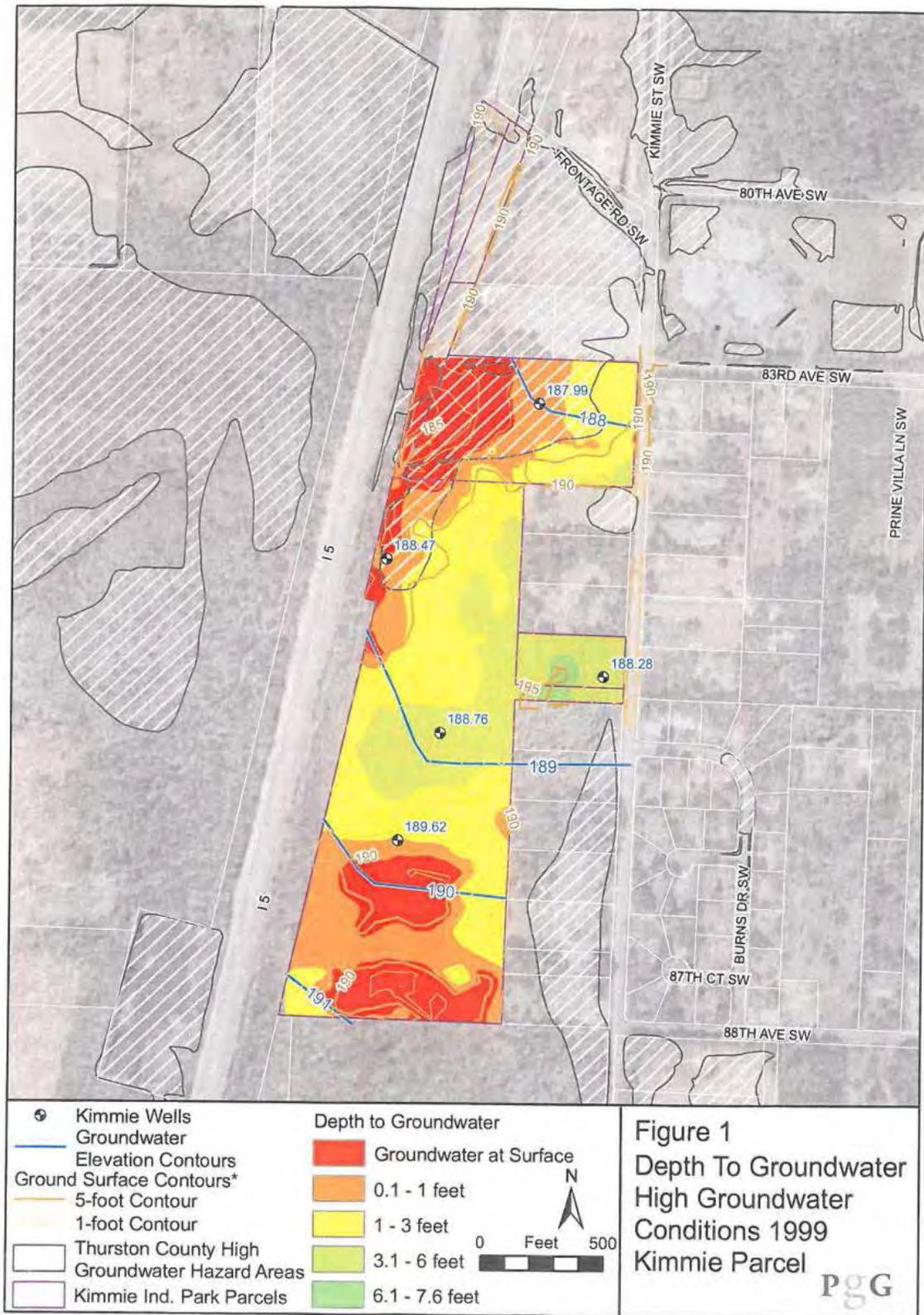
### **Geotechnical/Soils Conditions**

A preliminary geotechnical analysis was completed for the property by South Sound Geotechnical Consulting (SSGC), dated January 16, 2015. SSGC found that native soils consist of sand with variable silt. Coarser gravelly sand was observed below the top layer of sand in the northern portions of the site. The study concluded that most of the site is considered feasible for development from a geotechnical perspective. Groundwater was observed in two test pits at the time of excavation. Depth to groundwater was in the order of magnitude of 11 feet in the south-central portion and 7 feet in the most northerly test pit. See the enclosed geotechnical study for more detailed information.

### **High Groundwater**

The property is located within the Salmon Creek Basin and within an area of known high groundwater, which typically requires additional analysis including groundwater mounding, groundwater monitoring, and infiltration tests. A groundwater mounding and monitoring study was previously completed on the site by Robinson Noble. Our initial evaluation of that study has confirmed that the previous monitoring completed should be adequate for permitting of the proposed development.

The regression analysis suggests the high groundwater elevation across the site ranges from elevation 191 in the southwest corner to elevation 188 in the northeast corner. The ground surface on the parcel, based on 2-foot contour intervals, ranges from a high of 194 in the west-central portion of the site to 185 in the northwest corner of the site. During a high groundwater event, the groundwater may be at the surface in the northwest corner and at the south end of the property. The south end of the parcel is also encumbered with a wetland.





In our opinion, the parcel can be developed with the following considerations for stormwater and high groundwater:

1. Locate the buildings and parking areas in the central parcel of the site.
2. Minimize the extent of tree removal.
3. Elevate the buildings so they are a minimum of 3 feet above the high groundwater; 6 feet above the groundwater elevation is preferred. This would place the building at approximately elevation 195.
4. Utilize rain gardens to control and infiltrate stormwater runoff. The bottom of the rain garden soil can be 1 foot above the high groundwater elevation. The bottom of an infiltration pond should be 3 feet above the high groundwater elevation and should be assessed through a groundwater mounding analysis to confirm that this project does not cause a breakout of groundwater to the surface and that the increase in groundwater elevation at the property boundaries are less than 1 foot due to mounding from infiltration.
5. Grade the site to disperse stormwater from parking areas to the west and north, away from adjacent properties.
6. Large areas of undisturbed ground area will be required to remain undisturbed in order to disperse the stormwater into the existing forest.
7. Rain gardens and shallow infiltration ponds may be used to infiltrate the stormwater from building roofs.
8. The project should disturb 35 percent or less of the site.

While the site can be developed, when compared to a site without high groundwater, it will require additional construction cost. The additional construction expense will be for imported fill material to elevate the building, roadways, and stormwater facilities. Additionally, the project could not expand beyond approximately 18.5 acres of developed site with the full dispersion stormwater scenario.

#### Additional Considerations:

- The City of Tumwater will adopt a new drainage manual by 2016. They have not yet started on its development. We recommend design, review, and permitting under the current drainage manual, prior to 2016.
- A topographic survey of the site will be required to determine the best location for placement of the building and the extent and volume of imported fill.
- This opinion is based on a limited review of the above referenced documents, and was limited to the high groundwater impacts on the development of this total 53-acre property area.

#### **Stormwater and Fill Quantities**

We have prepared an initial review of the stormwater requirements. Attached is a summary of that analysis, dated December 11, 2014.



## **Wetlands**

The property was evaluated for the presence of wetlands on October 20 and 21, 2014, by Theresa Dusek Consulting. Ms. Dusek found a Category III system located in the south portion of the site, which likely extends offsite to the south. The wetland is in an area that is not intended for development of the Readiness Center, and is likely not developable due to high groundwater. The City requires an 80-foot buffer. The City will require a full wetland delineation report with development applications.

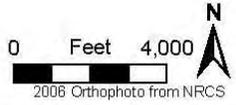
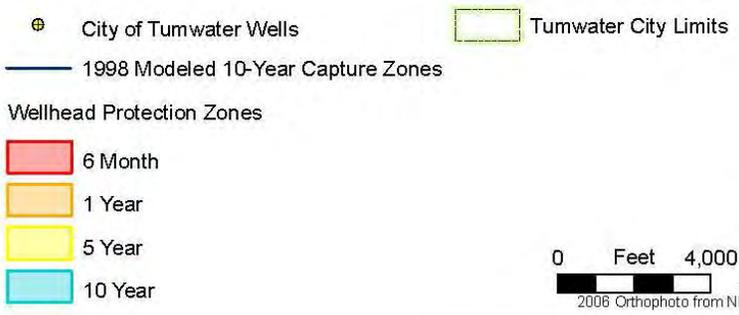
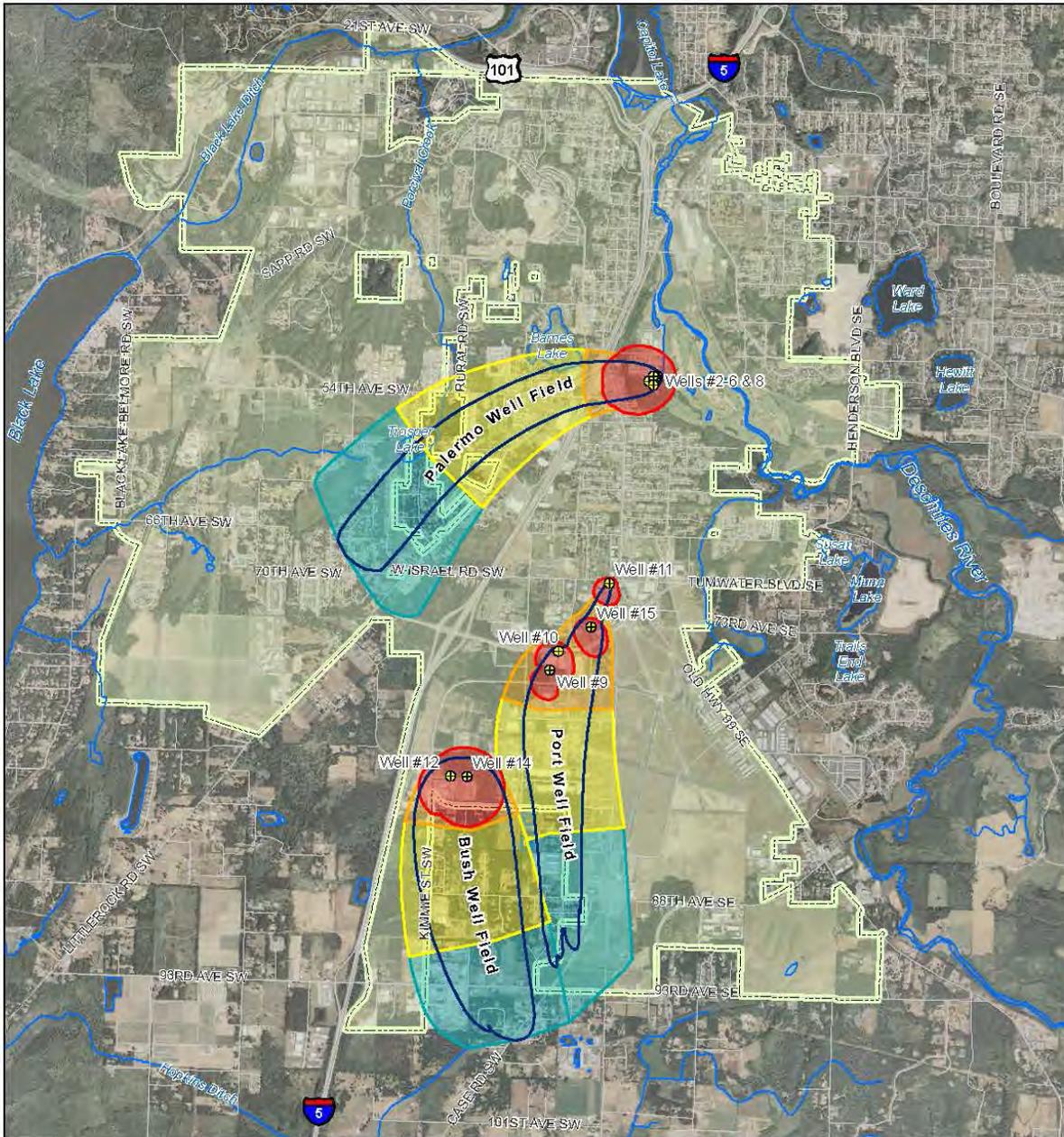
## **Mazama Pocket Gophers**

Ms. Dusek evaluated the site for presence of Mazama pocket gophers, a federal and state protected species. Prairie soils are mapped over the central portion of the site; however, these areas are dominated by existing buildings or shrub habitat, including snowberry, hazelnut, and rose species. Pocket gopher mounds were not observed on the site. A survey with the federal/state agency team may be required, but is unlikely due to the vegetation conditions. No other threatened or endangered species or habitat were observed or are mapped within 300 feet of the site. The City will require that a pocket gopher survey be provided for project approvals.

## **Other Critical Areas**

The property is located in a Wellhead Protection Area. A Wellhead Protection Area is the surface and subsurface area surrounding the water well or well field of a public water system. Contaminants may move toward the well or well field from this surrounding area over a period of time; accordingly, the City regulates property use to protect water quality.

Portions of the property are located in the 6-month, 1-year, and 5-year Time of Travel zone. For the new Readiness Center, this means that onsite fueling will likely not be allowed.



**Figure 1**  
Existing Wellhead Protection Areas for Currently Pumped Wells

City of Tumwater



## **Water**

Water Mains were installed in Kimmie Street SW in 2007. The water main is 16-inch PVC. New 8-inch water mains will need to be extended to the development and likely looped around the development area for hydrant coverage to the building.

Development of the site will be subject to a latecomer fee for the previous water extension in Kimmie Street SW. The latecomer's agreement identifies parcels 1, 2, and 13 on Exhibit "C" of the agreement which are tax parcels 09520003000, 51850001200, and 51850000400. Subject parcels 09520004000, 09230019000, and 09230006000 were not included in the agreement.

The latecomer fee is \$115,354.24 for this development.

## **Sewer**

Gravity sewer mains were installed in Kimmie Street SW in 2007. The sewer main is 12-inch PVC. The sewer main adjacent to the subject parcel (51650001200) at Kimmie Street SW is approximately 12 feet deep. The project will require approximately 900 LF of 8-inch sewer main extension to service the proposed Readiness Center Building.

The minimum building finish floor elevation required to maintain sewer 5 feet deep at the assumed Readiness Center location would be elevation 191 (using NGVD 1929 Datum). It appears that groundwater will be the controlling factor for building finish floor.

Black Hills High School had a lift station with a latecomer's agreement requirement, but that is no longer in operation or valid.

Development of the site will be subject to a latecomer fee for the previous sewer extension in Kimmie Street SW. The latecomer's agreement identifies parcels 1, 2, and 13 on Exhibit "D" of the agreement which are tax parcels 09520003000, 51850001200, and 51850000400. Subject parcels 09520004000, 09230019000, and 09230006000 were not included in the agreement.

The total latecomer fee is \$272,789.07 for this development.

## **Permits and Approvals**

The development of a new Thurston County Readiness Center is allowed outright in the property zone. The permitting process will require the following approvals:

- SEPA Environmental Review
- NEPA Environmental Assessment
- Critical Areas Review
- Site Design Review, including approval from the Design Commission
- National Pollutant Discharge Elimination System (NPDES) permit from Washington Department of Ecology
- Building Permit
- Site Development Permit

Additional environmental studies required for permitting and design include:

- Wetland Report and Buffer Enhancement Plan
- Geotechnical Engineering Study



- Traffic Impact Study
- Technical Information Report
- Forester's Report
- Tree Protection Plan
- Noise Study
- Pocket Gopher Survey

### **Recommendations and Next Steps**

The property appears feasible for development as the future Readiness Center. We recommend that the following additional steps be taken to reduce risk and costs for development:

- Submit a formal Transportation Impact Study to the City of Tumwater and WSDOT for confirmation of The Transpo Groups findings.
- Prior to project permitting, complete a trip generation study to potentially reduce forecasted trip generation and resulting mitigation fees.
- Recommend demolition and removal of existing structures on the site.

*Note: The information provided herein is based on a limited feasibility study for the purposes requested. Additional site-specific evaluation may be needed to confirm/verify information.*

LK/MW/Isk

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**APPENDIX K**  
**WETLANDS ASSESSMENT FOR THE TRC FACILITY PROJECT SITE, PBS ENGINEERING**  
**AND ENVIRONMENTAL, AUGUST 2016**

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Engineering +  
Environmental



## **Wetland Delineation Report Tumwater Readiness Center**

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## Wetland Delineation Summary

Project Name:	Thurston Readiness Center
Location:	8311, 8427 Kimmie St. SW. Thurston County, WA
Legal Description:	Section 16 of T 17 N, R 2 W. W.M. Parcel No. 09230006000, 09230019000, 09520003000, 09520004000, 51850000400, 51850001200,
Jurisdiction:	City of Tumwater, Thurston County, Washington
Study Area:	The study area encompasses 6 tax lots and approximately 53 acres.
Owner:	Washington State Military Department
Previous Delineations:	Skillings Connolly (2008) and a reconnaissance by Theresa Dusek Consulting (2014)
Elevation:	190 - 200 feet above sea level in study area.
Hydrology:	The primary hydrologic input is currently from high groundwater, direct precipitation and surface runoff.
Soils:	Everett very gravelly, sandy loam 0 to 8 percent slopes; Cagey loamy sand; Norma silt loam
Wetland Vegetation:	The wetland areas are primarily forested wetlands, with a small percentage of emergent and scrub/shrub wetland
Floodplain:	The study area is located outside the FEMA 100-year floodplain
Zoning:	Thurston County: Single Family Low Density Residential (SFL) and Light Industrial (LI)
Urban Growth Area:	Yes
Project Staff:	Katharine Lee (PWS) and Kate Knox Machata (PWS)
Field Dates:	May 19, 2016
Determination:	The study identified 1 depressional wetland and 1 slope/depressional wetland. The slope/depressional wetland is at least partially a constructed feature and may not be considered jurisdictional.
Categories and Buffers:	Two Category III Wetlands. Buffers are dependent on level of impact and habitat score from 2004 Wetland Rating System. Both Wetlands would have 80 foot buffers for high impact development since habitat scores are low to moderate.

## 1.0 INTRODUCTION

The Washington Military Department (Military Department) and the Washington Army National Guard (WAARG) recently purchased property just south of Tumwater, WA for construction of a future Thurston County Readiness Center. A rapid site assessment was conducted by ABHL in 2015 to evaluate the potential for the site to support the center. As part of that assessment, ABHL's wetland consultant (Theresa Dusek Consulting) identified a wetland in the southern portion of the property and recommended that a formal wetland delineation be conducted on the property to determine building setbacks. PBS Engineering and Environmental (PBS) was hired by the Military Department in spring 2016 to update wetland ratings and conduct wetland delineations on four Military Department installations across the state. The Tumwater site was included in that contract and this report details PBS's finding regarding waters of the US, including wetlands at the proposed Thurston Readiness Center.

## 2.0 PROPERTY DESCRIPTION

### 2.1 Location

The property is located along Interstate 5, approximately 5 miles south of Olympia, WA within the city limits of Tumwater, WA. It is in the east half of Section 16, Township 17 North, Range 2 West. The property consists of six tax parcels (51850000400, 51850001200, 09230006000, 09230019000, 0952004000, and 09520003000) totaling approximately 53 acres. It borders the freeway right-of-way to the west, Kimmie Street SW and several residential properties to the east between 80<sup>th</sup> and 88<sup>th</sup> Avenue SW, undeveloped land to the south and Frontage Road to the north (Figure 1). The approximate center of the site is at latitude 46.9635, longitude - 122.9327.

### 2.2 Site Description and Disturbance History

The site is relatively flat with elevations between 188 and 200 feet above sea level. There was evidence of development in the northern portion of the site consisting of gravel parking areas and a few small structures. All structures have been removed. Most of the rest of the site consists of a mix of relatively mature forest (50 plus years) and areas that were cleared and not reforested and that currently support a mix of native and non-native shrubs and grasses. Several dirt roads and trails are present. Mountain beavers (*Aplodontia rufa*) are very prevalent on the site with extensive burrow networks.

Figure 2 shows a current aerial and arials from 1996 and 2000. The 1991 aerial shows the north portion of parcel 3000 being used as some sort of storage yard. The gravel fill that is currently present in this area may date back to when this facility was constructed, which given the limited aerial coverage we were able to obtain, would have been between 1969 and 1991. The aerial from 2000 shows most of this area graded. A stormwater pond is visible at the very south end of parcel 4000.

### 2.3 Climate

Thurston County has a predominantly temperate marine climate typical of much of the Puget Sound area. The Tumwater Readiness Center is considered to be in the Puget Sound lowlands climatic region. Summers are warm and relatively dry, and winters tend to be mild, but rather wet. Mean high temperatures for Olympia, WA (5 miles north) range from 44.5°F in January to 77°F in July and August. Mean low temperatures range from 32°F in January to 49°F in July and August (US Climate Normals 1948-2006). Precipitation was below the normal range for June and July of 2015 and above average for August, October, November and December of 2015 and March of 2016. December rainfall was nearly twice the average for that month. The

yearly rainfall was above the normal range. Precipitation levels are considered normal when the probability of that rainfall amount for a given month is greater than or equal to 30% either side of the mean, as displayed in the table below (Table 1). Precipitation for the three months prior to the delineation was within the normal range, with higher than normal precipitation in March, but lower than normal precipitation in April and May.

Table 1. Monthly precipitation in inches for Olympia, WA and “normal” ranges and averages for Olympia, WA.

Month	Olympia*, WA 2015/16	Olympia, WA 1971-2000			Above or Below Normal
		30% chance will have		Average	
		Less than	More than		
June	0.14	1.20	2.13	1.78	Below
July	0.15	0.34	1.01	0.82	Below
August	2.84	0.36	1.33	1.10	Above
September	0.90	0.66	2.52	2.03	-
October	6.68	2.33	5.10	4.19	Above
November	11.82	5.44	9.73	8.13	Above
December	14.50	5.64	9.33	7.89	Above
January 16	8.44	4.61	9.13	7.54	-
February	6.49	3.80	7.47	6.17	-
March	8.51	3.84	6.23	5.29	Above
April	1.58	2.48	4.26	3.58	Below
May	0.15	1.37	2.75	2.27	Below
<b>Total</b>	<b>62.2</b>	<b>44.48</b>	<b>55.26</b>	<b>50.79</b>	<b>Above</b>

\*Location of weather station is less than 2 miles east of the proposed Readiness Center.

## 2.4 Hydrology

The project site is in WRIA 23, Upper Chehalis. The nearest waterbody is Salmon Creek located approximately 1.3 miles south of the property. Salmon Creek flows west to the Black River, which eventually flows into the Chehalis River near Rochester, WA. The property is very flat and there does not appear to be any surface water connection to Salmon Creek or any other waterbody. A map prepared by Pacific Groundwater Group shows groundwater elevations during a high groundwater event in 1999 within 6 feet of the surface across the entire site and at the surface in the northwest corner and in the southern portion of the site. Most of the site is shown as having groundwater within 3 feet of the surface during this event. Groundwater appears to be a major source of water for the on-site wetlands. Figure 3 shows the site topography and Figure 4 is the map of the groundwater elevations from the Pacific Groundwater Group study. The interval preceding the PBS field delineation in 2016 was marked by very high winter precipitation followed by very low spring precipitation making it very difficult to evaluate whether observed groundwater levels were normal at the time of the site visit. Additional site visits or groundwater monitoring would be needed to effectively evaluate site hydrology.

## 2.5 Soils

There are three soil types mapped on the property by the Natural Resource Conservation Service: Cagey loamy sand, Everett very gravelly sandy loam, 0 to 8 percent slopes, and Norma silt loam. The Cagey loamy sand is a deep, moderately well drained soil formed in sandy glacial drift. The Everett soils are deep, somewhat excessively drained soils that formed in gravelly and sandy glacial outwash. The Norma silt loam is a hydric soil and consists of deep, poorly drained

soils formed in old alluvium in depressions on glacial till plains. Figure 5 shows the NRCS soil mapping for the area.

## 2.6 Plant Communities

Undisturbed upland areas are dominated by mature Douglas-fir (*Pseudotsuga menziesii*) and big-leaf maple (*Acer macrophyllum*) forests with an understory of swordfern (*Polystichum munitum*) and snowberry (*Symphoricarpos albus*). Portions of the northern part of the site are heavily disturbed and dominated by shore pine (*Pinus contorta*) and a variety of non-native species including Himalayan blackberry (*Rubus armeniacus*) and reed canary grass (*Phalaris arundinacea*). The southern portion of the site supports a typical lowland forest community dominated by black cottonwood (*Populus balsamifera* var. *trichocarpa*), Oregon ash (*Fraxinus latifolia*) and red alder (*Alnus rubra*). The middle of the site has been logged and is dominated by a mix of native and non-native shrubs, grasses and forbs.

## 3.0 WETLAND DELINEATION METHODS

### 3.1 Rationale for Use of the Routine Delineation Methods

Based upon guidance provided in the *Corps of Engineers 1987 Wetland Delineation Manual* (1987 Manual) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Supplement (Version 2.0) (WMVC Regional Supplement), it is the best professional judgment of the PBS delineation team that the current wetlands in the study area exist under “normal circumstances” as defined in the 1987 Manual and supplement. Therefore, we delineated waters and wetlands on the project using methods recommended in the manual for routine situations.

### 3.2 Office Methods

Office preparation for the delineation consisted of reviewing the AHBL site assessment, other information provided by the Military Department and a variety of online sources.

### 3.3 Field Methods

A field visit occurred on May 19, 2016. Katharine Lee and Kate Machata, both Professional Wetland Scientists, conducted the field delineation. Wetlands were delineated using the three parameter approach as required in the WMVC Regional Supplement.

We mapped the perimeter of Wetlands A and B. Data plots were used to document the upland/wetland boundary. A total of 7 data plots were taken. Wetland flagging was used to mark the boundary and location of data plots. Data sheets are included in Appendix D.

#### 3.3.1 Hydrology

The presence of wetland hydrology was determined by evaluating a variety of direct and indirect indicators. In addition to hydrologic data and records pertaining directly to the study area, hydrologic indicators can be used to infer the wetland hydrology criterion. Field indicators of wetland hydrology listed in the Regional Supplement include, but are not limited to, visual observation of inundation or saturation, sediment deposition, hydric soil characteristics, watermarks, drift lines, oxidation around living roots and rhizomes, and water-stained leaves. To satisfy the hydrology criterion for wetlands, soils need to be inundated or saturated to the surface for at least 14 consecutive days during the

growing season. The delineation was conducted during the growing season, but past the optimum time for assessing wetland hydrology.

### 3.3.2 Soils

The presence of hydric soils was determined consistent with the WMVC Regional Supplement and current regulatory guidance. The supplement includes a number of hydric soil indicators specific to this region. Soils were evaluated based on these indicators.

### 3.3.3 Vegetation

The existing vegetation was characterized in wetlands and adjacent uplands. Species identifications and taxonomic nomenclature followed the USDA Plants Database. Each species' indicator status was assigned using the Western Mountains, Valleys, and Coast 2016 Regional Wetland Plant List (USAC 2016). A species indicator status refers to the relative frequency with which the species occurs in jurisdictional wetlands (Appendix C).

An area satisfies the hydrophytic vegetation criteria when, under normal circumstances, more than 50 percent of the dominant species from each stratum are obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC) species.

## 4.0 WETLAND RATING METHODS

The rating was conducted using the 2014 Wetland Rating System for Western Washington. This is the current Washington Department of Ecology approved rating for the area. The City of Tumwater code uses wetland rating to establish buffers and set mitigation ratios. Current Tumwater code (Chapter 16.28) references rating points established in the 2004 Wetland Rating System for Western Washington. It is not likely that the rating of any of the wetlands would differ between the two versions of the rating system. Tumwater will likely update their code to reflect the new rating system in the near future. Both the 2004 and 2014 rating systems classify wetlands using the Hydrogeomorphic Classification into wetland types that have similar functions. The classifications include Tidal Fringe, Flats, Lake Fringe, Slope, Riverine, and Depressional. The rating system then evaluates water quality, hydrology, and habitat functions specific to the wetland class. A combination of field assessment and office research is required to answer the questions in the rating system.

### 4.1 Office Methods

Office preparation for the rating consisted of reviewing a variety of on-line sources and information provided by the Military Department. The review included but was not limited to NWI mapping, soil mapping, topography, regional plant communities, priority habitats, water quality assessments and local regulations.

### 4.2 Field Methods

A field visit occurred on May 19, 2016. Professional Wetland Scientists Katharine Lee and Kate Machata conducted the field assessment portion of the rating. During the field assessment, observations were taken regarding levels of ponding, vegetation structure and communities, and presence of habitat features.

There are some questions in the rating system that are difficult to answer based on a single field visit. The distribution of hydroperiods and extent of seasonal ponding can be particularly difficult. At the Tumwater Readiness Center site, seasonal ponding in depressional wetlands likely extends from late November or December until late March or April but can be highly variable depending on the year. At our visit in late May ponding was observed in the excavated portion of one wetland but nowhere else. Since this was past the usual seasonal ponding window we have assumed that greater ponding would occur during the winter and early spring. To be conservative, we have estimated that slightly more than 1/2 of the wetlands stays ponded for more than 2 months.

## 5.0 DELINEATION RESULTS

### 5.1 National and Local Wetland Inventories

The National Wetland Inventory (NWI) does not map any wetlands within the property boundary. There is however, a large wetland complex shown just across Interstate 5 to the west consisting of palustrine forested, palustrine scrub-shrub and palustrine emergent components. There is also a constructed open water body to the south of the mapped wetland, also across Interstate 5 from the study site. Figure 6 shows the NWI mapping.

### 5.2 Previous Wetland Delineations and Assessments

A wetland reconnaissance survey was conducted by Theresa Dusek Consulting in 2015 as part of a rapid site assessment let by AHBL that was undertaken to evaluate suitability of the site for development of a readiness center. That reconnaissance survey identified a likely Category III wetland in the south portion of the property. The general location of this wetland is also shown in Figure 6.

### 5.3 Growing Season

The growing season is generally defined as that portion of the year when soil temperatures at approximately 20 inches below the soil surface are above biological zero or 5 degrees Celsius (US Department of Agriculture – Soil Conservation Service 1985). When soil temperature data are not available, the Wetland Delineation Manual allows using the closest and best available weather station data to estimate the length of the growing season based on a 50% probability of a temperature of 28°F or higher (Ecology 1997, paragraph 46). Using this approximation, the growing season in this region would be 264 days long at least 50% of the time. Generally this translates to the period of early February to the end of October. To meet the hydrology criteria at this site, soils would need to be saturated to the surface for at least 14 consecutive days during that interval.

### 5.4 Characterization of Delineated Wetlands

The following table lists all delineated waters/wetlands, their size, Cowardin classification, HGM classification, Washington State Wetland Rating Scores and Category, and probable buffer widths. All wetlands are assumed to be under Federal, State and City of Tumwater jurisdiction. A discussion of each wetland or group of wetlands is included below. Figure 7 shows the surveyed boundaries of the wetlands. Data sheets are included in Appendix D

Table 2. Wetland Characteristics

Name	Cowardin	HGM	Acres (sq ft)
Wetland A	Palustrine forest Palustrine emergent	Depressional	0.16 (7,066)
Wetland B	Palustrine forest	Depressional	1.54 (69,164)

#### 5.4.1 Wetland A

Wetland A is located near the western edge of the property just south of the existing gravel pad. This area has been highly disturbed through grading and hydrologic manipulation. The wetland consists of an excavated pond at the south end with a swale leading into it from the north. As mentioned above, the entire area north and east of the new pond was graded and possibly filled. It appears likely that any filling occurred prior to wetland regulations. Figure 2 shows aerial photos of the vicinity of Wetland A back to 1991 showing disturbance back to at least this date with new grading and the pond visible in the photo from 2000.

The excavated pond is more or less rectangular in shape with steep banks at the southern end. It appears that stormwater runoff from a large gravel pad to the north may have been directed through the swale to the excavated pond. The pond intersects groundwater and appears to have some standing water for much of the year, though probably dries up late in the summer. Marks of high water including adventitious roots on the willows (*Salix* sp) were several feet above the water level at the time of the site visit. This would indicate standing water for a prolonged period. There is no outlet but it appears that the pond may overflow to the east during high water. The area to the east was sand with very little vegetation. The pond has a maximum depth of approximately four or five feet. Vegetation in the swale area and around the pond consists of immature shore pine, black cottonwood and red alder with a few scattered bent grasses (*Agrostis* sp), sheep sorrel (*Rumex acetosella*) and sedges (*Carex* sp) in the swale, and willows present around the edge of the pond. There is also some reed canary grass in the ponded area. All vegetation has become established over the last 15 or 16 years and the trees are still quite small. Soils in the swale area were very sandy with streaking and met hydric soil indicator S5 – Sandy Redox.

#### 5.4.2 Wetland B

Wetland B is a forested wetland located along the southern edge of the property. The topography in this area is relatively flat with the wetland occurring in a mosaic of shallow depressions and swales. The difference between upland and wetland is generally less than a foot or two in elevation and there were only minor differences in the vegetation. The wetland does not appear to have an outlet and hydrologic inputs appear to be from high groundwater and direct precipitation with some surface runoff. There is a canopy of mature black cottonwoods, red alder and Oregon ash with an understory of salmonberry (*Rubus spectabilis*), willows, Douglas spirea (*Spirea douglasii*), slough sedge (*Carex obnupta*), false-lily-of-the-valley (*Maianthemum dilatatum*) and lady fern (*Athyrium filix-femina*). Soils were very sandy and met hydric soil indicators S5-Sandy Redox, F1-Loamy Mucky Mineral, and F3-Depleted Matrix. At the time of

the site visit, wetland hydrology was not evident except in the wettest areas. Shallow ponding was observed in the deeper depressions.

#### 5.4.3 Additional Survey Needed

There is an area north of the PBS mapped boundary of Wetland B that is a possible third wetland and that is shown on the groundwater map as being flooded in 1999. The area is dominated by black cottonwood and is similar in many regards to Wetland B. During our site visit in May, we found this area inconclusive and determined that an additional site visit was needed to make a final assessment. We have identified the area on the delineation map (Figure 7) as needing further study. An additional site visit is highly recommended during the winter or early spring to verify status of this area and also to confirm the boundaries of Wetland A.

#### 5.4.4 Characterization of Upland Areas

Undisturbed upland portions of the project area support a relatively mature forest of Douglas-fir and big-leaf maple with an understory of swordfern, snowberry, bracken-fern (*Pteridium aquilinum*), salmonberry and creeping blackberry (*Rubus ursinus*). The middle section of the site has been logged and is dominated by a mix of native and non-native shrubs (including a large area of Scot's broom) and grass species.

## 6.0 WETLAND RATING RESULTS

Both wetlands were rated as depressional wetlands. Wetland A has a slope component and an excavated pond, but was rated as depressional based on criteria in the rating system. Wetland B is more or less flat with small depressions but was again rated as a depressional wetland.

### 6.1 Rating Based on Functional Scores

Scores for each wetland unit for water quality, hydrology and habitat functions are shown below in Table 3. Please refer to the spreadsheet and figures in Appendix C for more detail. Funds were not available at the time of this study to conduct the 2004 ratings as well as the 2014 ratings so those scores are not provided.

Table 3. Scores Obtained from the Wetland Rating System for Western Washington

Function	Wetland A		Wetland B	
	2014 Rating	2004 Rating	2014 Rating	2004 Rating
Water Quality	6		7	
Hydrology	6		5	
Habitat	6		6	
Total	18		18	
Category	III		III	

#### 6.1.1 Water Quality

Water quality functions provided by the wetlands within the study area include nutrient cycling, removal of elements and compounds, and retention of particulates. Both wetlands rate moderate for water quality and likely remain ponded for at least two months during the year. Persistent woody vegetation within the wetlands is relatively

intact and provides filtration and nutrient uptake and transformations. Wetland B is in close proximity to homes with septic systems. The wetlands are located just up gradient from a reach of Salmon Creek west of Interstate 5 that is listed as 303d impaired for pH and the upper Chehalis watershed has an active TMDL for temperature.

### 6.1.2 Hydrology

Hydrologic functions of the depressional wetlands include short- and long-term water storage and groundwater recharge. Both wetlands are groundwater driven wetlands. Wetland A rates slightly higher than Wetland B because it has greater storage capacity. Thurston County has mapped the area around the site as having a high groundwater flooding potential.

### 6.1.3 Habitat

Habitat functions are moderate for both wetlands. Despite the proximity to the freeway, there is currently a fairly large area of accessible undisturbed or moderately disturbed potential habitat in this area. Relatively mature forest is present in Wetland B and in close proximity to Wetland A, though we did not think these forests were quite old enough to qualify under the definition of “mature forest” as a WDFW priority habitat.

## 6.2 Rating Based on Special Characteristics

Certain types of wetlands have been determined to have qualities that deserve special protection. The rating system identifies a number of unique wetland types or wetlands with special characteristics and assigns ratings based on their unique characteristics or value to society. Wetlands in western Washington with special characteristics include estuarine wetlands, wetlands with high conservation value, bogs, forested wetlands, coastal lagoons, and interdunal wetlands.

Wetland B is over an acre in size and forested with trees that appear to be relatively mature but which do not appear to quite meet the criteria in the rating system of being 80 to 200 years old or having an average diameter exceeding 21 inches. The earliest aerial we could find of the area dates to 1951 and is very low resolution. That photo seems to show the area in the vicinity of Wetland B as relatively recently logged, which would imply that the trees are at least 65 years old. To definitively answer this question would require obtaining ages and sizes on a number of the dominant trees, which was beyond the scope of this study. If it was determined that Wetland B met the definition of mature forest, it would be an automatic Category I wetland.

## 7.0 REGULATORY CONTEXT

### 7.1 Federal

The Army Corps of Engineers under Section 404 of the Clean Water Act has jurisdiction over wetlands and water bodies that have a significant nexus to jurisdictional waters. The on-site wetlands were likely part of a larger groundwater driven wetland complex that extended east of the freeway but was cutoff when the freeway was built. It is our professional opinion that a significant nexus exists on this site to the mapped waters/wetlands west of the freeway due to high groundwater. The Corps does not usually take jurisdiction over manmade wetlands that were created in uplands unless they either receive water from a jurisdictional water/wetland or discharge to a jurisdictional water/wetland. The excavated portion of Wetland A is definitely manmade, but it is difficult to determine whether the entire wetland was constructed and

whether this area would have been upland prior to site manipulation. Wetland A is not mapped as a wetland on the NWI maps and soils are mapped as either Cagey loamy sand or Everett very gravelly sandy loam, neither of which are hydric soils, though the Cagey loamy sand can have inclusions of hydric soils. A Jurisdictional Determination can be requested from the Corps of Engineers to determine jurisdictional status. Permits for impacts to jurisdictional waters/wetlands could be subject to review under Section 7 of the Threatened and Endangered Species Act and Section 106 of the National Historic Preservation Act.

### **7.2 Washington State**

The State Department of Ecology will review permits for impacts to waters/wetlands under Section 401 of the Clean Water Act, which regulates water quality. Even if the Corps of Engineers does not take jurisdiction over a wetland, it still could be subject to state jurisdiction. A certificate of Coastal Zone Consistency could be required from Washington Department of Ecology if a wetland permit is obtained from the Corps of Engineers.

### **7.3 City of Tumwater**

The City of Tumwater regulates wetlands and buffers through Title 16.28 of the Tumwater Municipal Code. Regulated wetlands include most wetlands considered jurisdictional by the Corps of Engineers but do not include some isolated wetlands less than 4,000 sq ft and wetlands intentionally created from non-wetland sites, such as drainage ditches, grass-lined swales and detention facilities. Both of the mapped wetlands are larger than 4,000 sq ft. The excavated portion of Wetland A is definitely a constructed feature and it is possible the entire delineated wetland is the result of site grading intersecting groundwater and collecting stormwater runoff. If the entire Wetland A was a constructed stormwater feature, it has not been maintained for a number of years as evidenced by the size of alders and shore pines in the swale portion of the wetland. The City of Tumwater puts the burden of proof on the applicant as to whether the manmade wetland was created in uplands or wetlands. Based on our single site visit, available data and limited aerial photography evidence, we cannot conclusively say whether or not a wetland existed at this location prior to grading. We do know from previous work that groundwater levels at this location have been documented above the surface several times. A site visit in March of 2016 documented standing water outside the limits of the excavated pond. A 1999 groundwater level study showed groundwater levels above the surface in the vicinity of Wetland A and extending north into the filled gravel pad area. However, both 1999 and the early winter of 2015 were exceptionally wet, so these years may not reflect normal conditions. The City of Tumwater would need to make the final determination as to whether Wetland A was considered a regulated wetland.

Both Wetland A and Wetland B were rated as Category III wetlands using the 2014 rating system. City of Tumwater identifies Category III wetlands as having a moderate level of function (scores between 30 and 50 points as obtained from the 2004 version of the rating system). We would assume that the wetlands would fall into this category. Buffer widths for Category III wetlands range from 40 to 75 feet for low impact land use, 60 to 110 feet for moderate impact land use, and 80 to 150 feet for high impact land use. Construction of the Readiness Center would qualify as a high impact land use. The higher end of the buffer width range is for wetlands that score 20 to 28 points for the habitat score in the 2004 rating system. The lower range is for wetlands that score below 20 points. A quick run through the 2004 habitat rating resulted in scores of less than 20 for both wetlands, however this should be verified. If the habitat scores are verified at less than 20, buffers would be 80 feet for both wetlands. Buffers can be reduced if measures are taken to minimize impacts such as directing light and noise away from the wetland, stormwater infiltration or dispersion, planting, and other best management practices.

Buffer averaging is also allowed under certain conditions as long as the total area is not reduced and the buffer is never less than three-fourths of the standard width.

All impacts to wetlands and buffers will require mitigation. Stormwater management may be allowed in the outer 25% of the wetland buffer using best management practices if no other location is feasible. There are opportunities on-site for wetland mitigation if impacts are unavoidable.

## 8.0 CONCLUSION

Two Category III wetlands were identified on the Tumwater Readiness Center site. A third possible wetland was also identified that needs further assessment. Wetland boundaries in the project area were delineated using the most recent Regional Supplement to the Corps Wetland Delineation Manual. Wetlands were rated using the 2014 Western Washington Wetland Rating System. While it is our professional opinion that Wetland B would definitely be considered jurisdictional at federal, state and local levels, it is possible that Wetland A could be considered non-jurisdictional. Wetland A is definitely man-made but its jurisdictional status at both the federal level and City of Tumwater would depend on the project proving that it was not constructed in wetlands. While hydric soils are not mapped in this area, it could be difficult to prove that wetlands weren't present given the high groundwater levels documented in this area, the proximity of wetlands immediately across the freeway, and the 1996 aerial which appears to show wetlands in this area. The final determination would be at the discretion of the Corps of Engineers and the City of Tumwater.

## 9.0 REFERENCES

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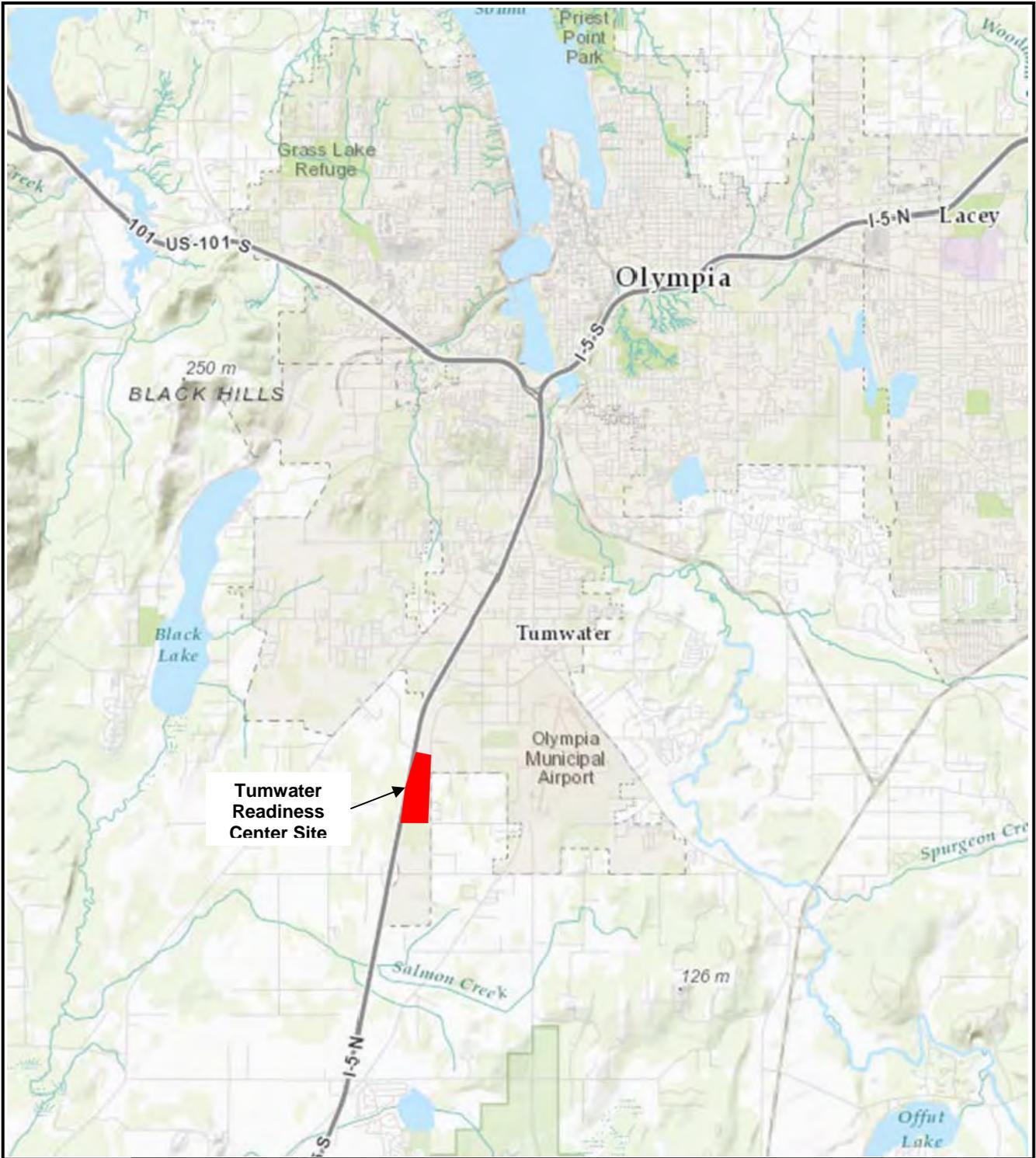
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## **APPENDIX A**

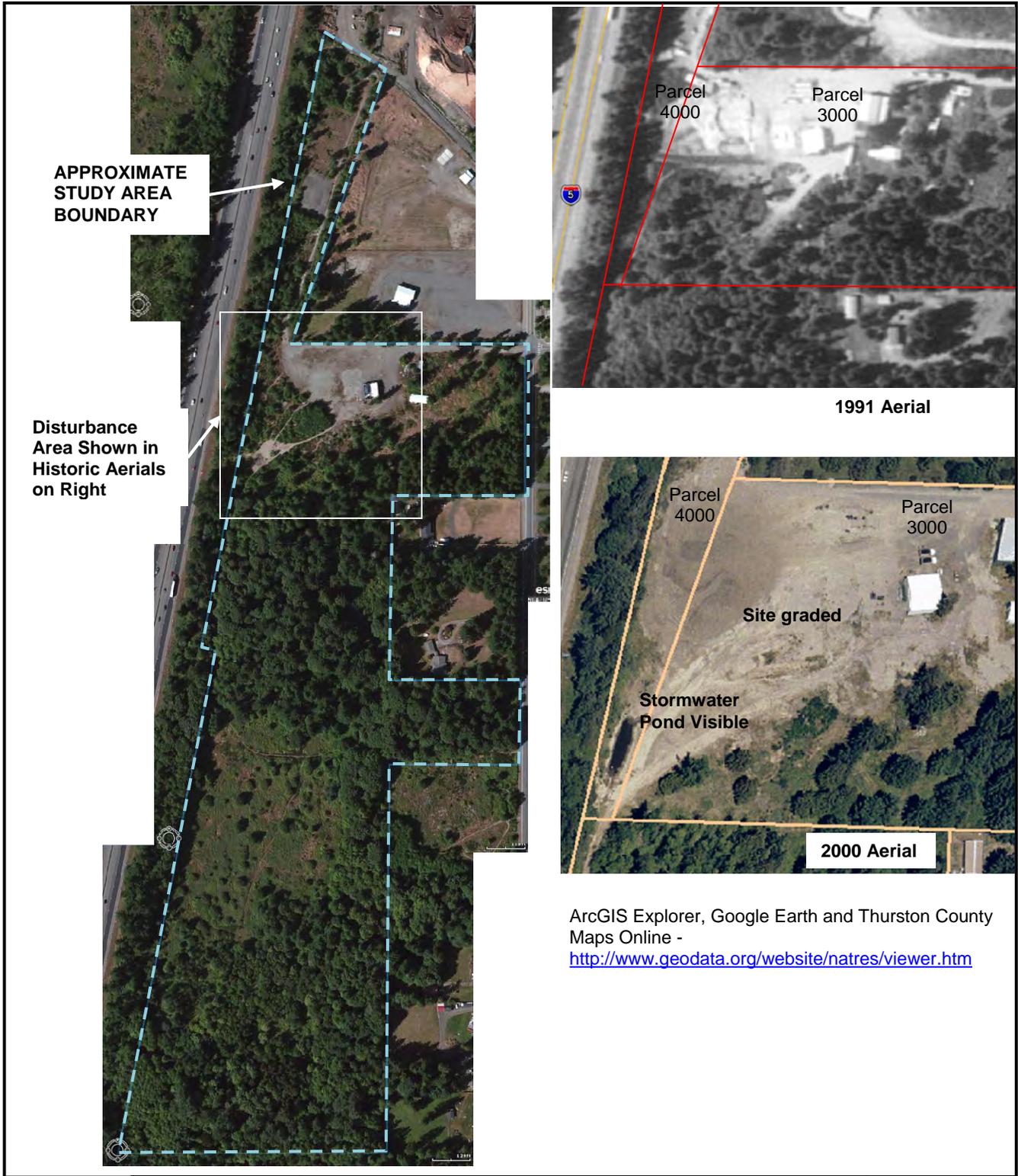
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Figures

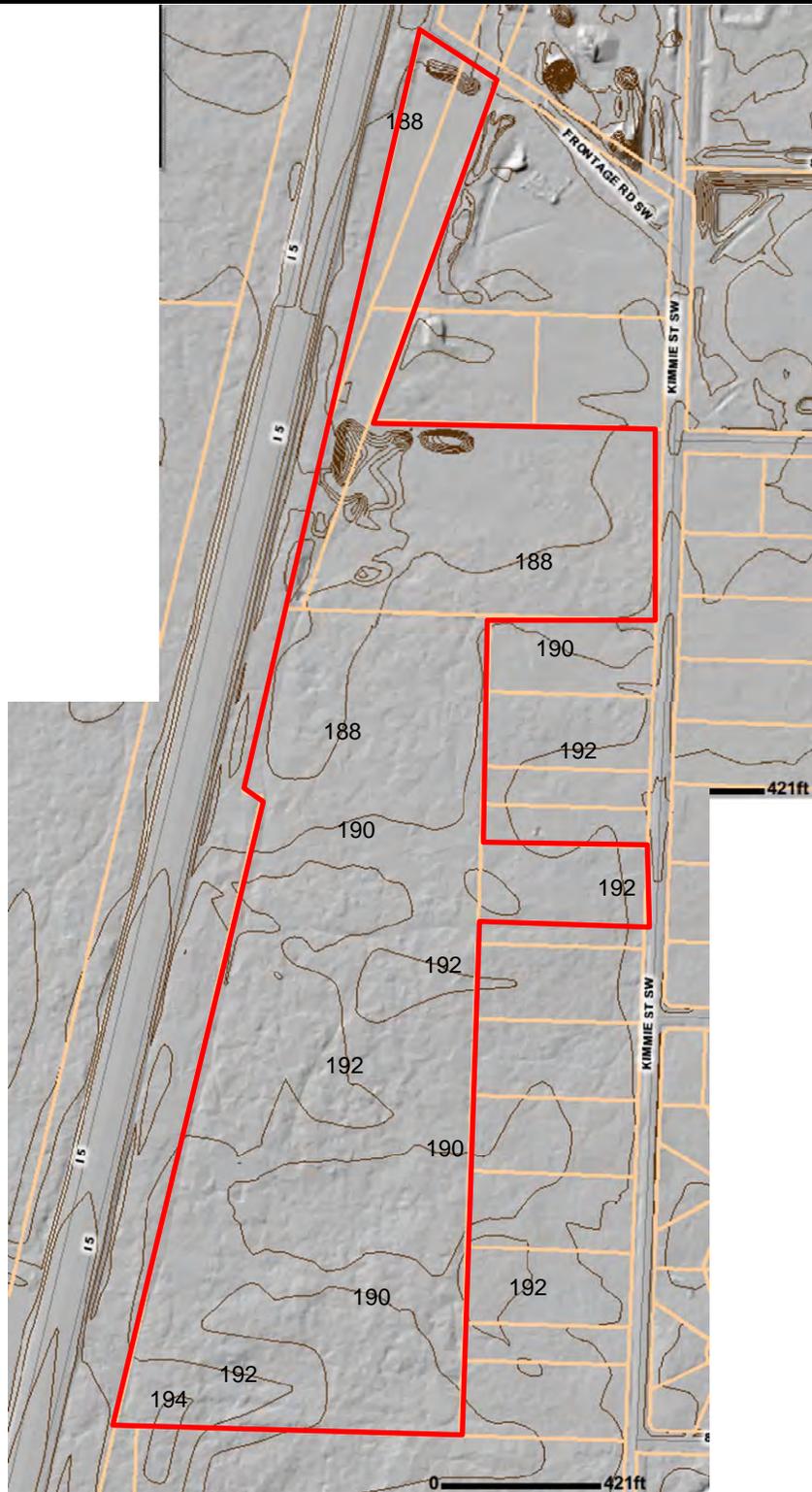


Project #  
40683.001  
Date:  
July, 2016

**SITE VICINITY MAP**  
**Washington Military Department**  
**Tumwater Readiness Center**  
Thurston County, WA



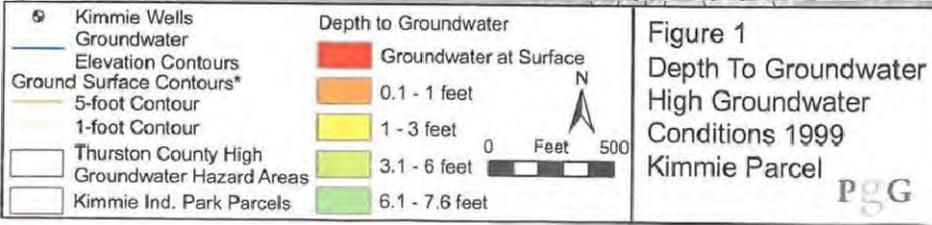
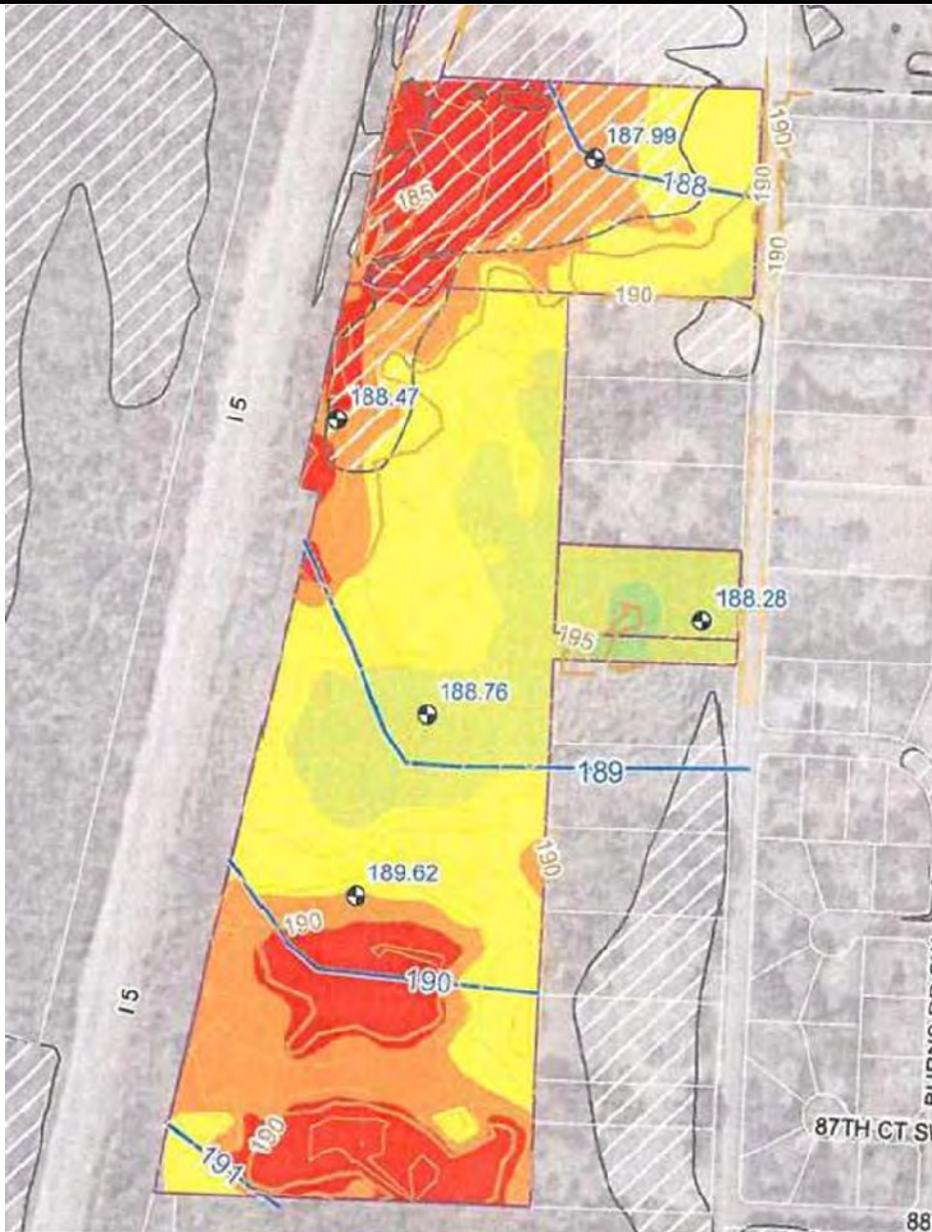
	Project # 40683.001	<b>AERIAL PHOTOGRAPHS / SITE HISTORY</b> <b>Washington Military Department</b> <b>Tumwater Readiness Center</b> Thurston County, WA	<b>FIGURE</b> <b>2</b>
	Date: July 2016		



Project #  
40683.001  
Date:  
July, 2016

**TOPOGRAPHIC MAP**  
**Washington Military Department**  
**Tumwater Readiness Center**  
Thurston County, WA

**FIGURE**  
**3**



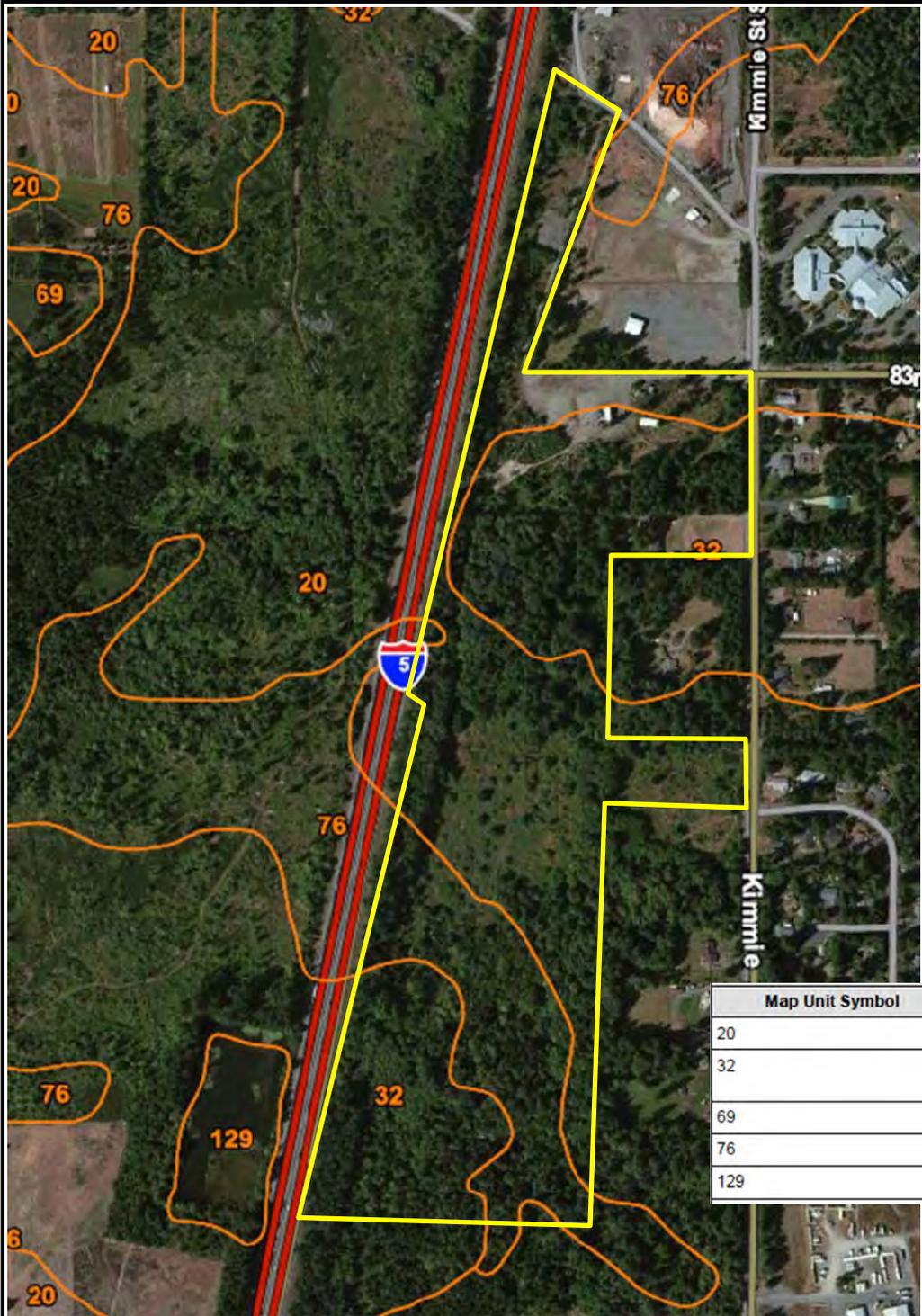
Source: Adapted from  
ABHL and Pacific  
Groundwater Group



Project #  
40683.001  
Date:  
July, 2016

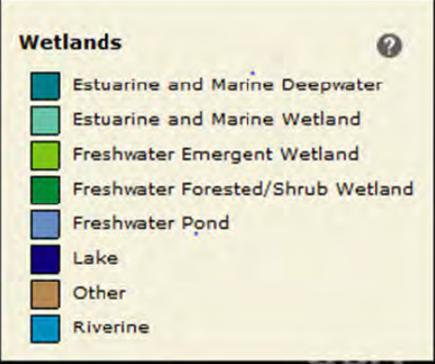
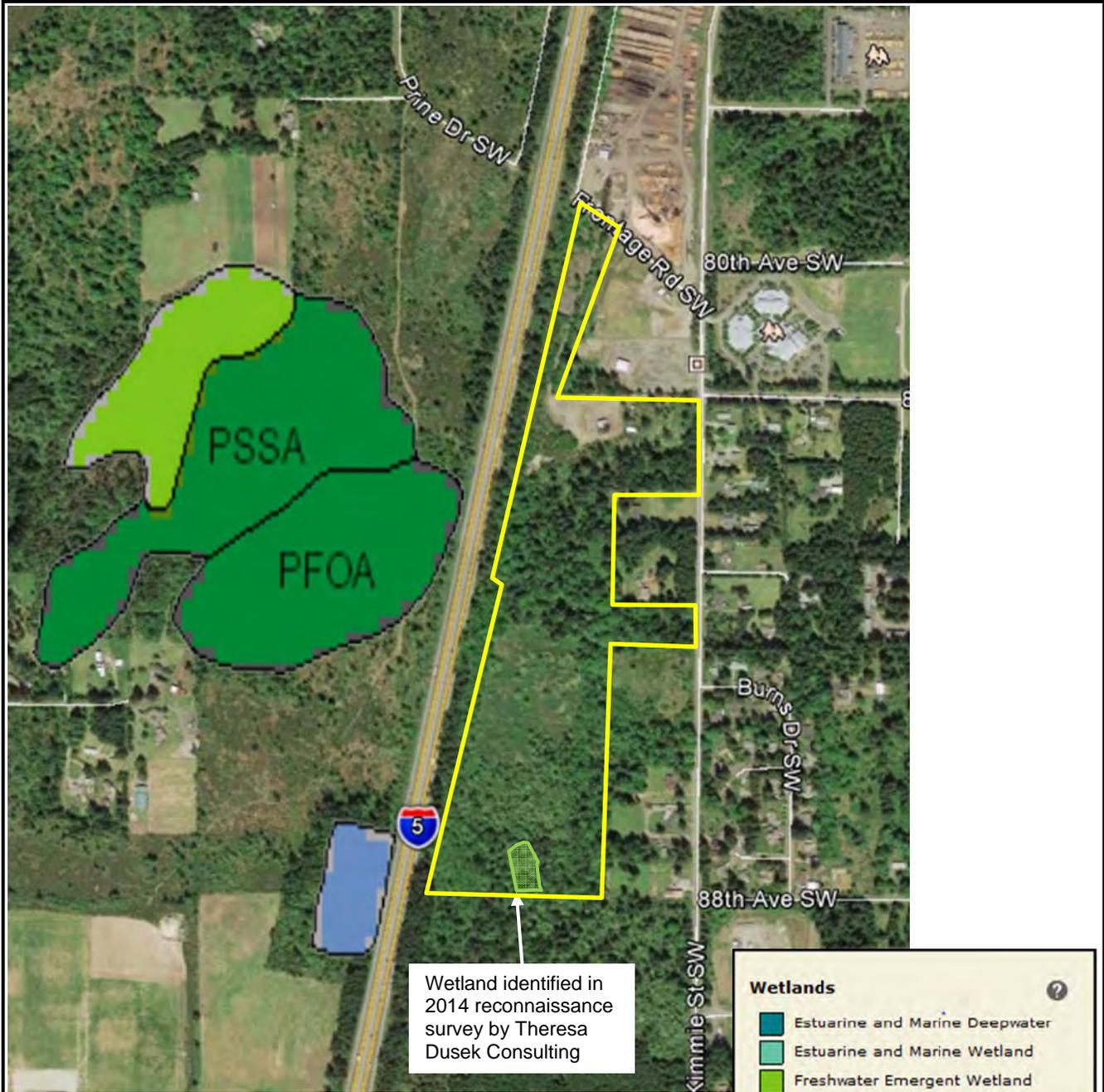
**1999 HIGH GROUNDWATER ELEVATIONS**  
**Washington Military Department**  
**Tumwater Readiness Center**  
Thurston County, WA

**FIGURE**  
**4**



Map Unit Symbol	Map Unit Name
20	Cagey loamy sand
32	Everett very gravelly sandy loam, 0 to 8 percent slopes
69	Mukilteo muck
76	Norma silt loam
129	Water

	Project # 40683.001	<b>NRCS SOIL SURVEY</b> <b>Washington Military Department</b> <b>Tumwater Readiness Center</b> Thurston County, WA	<b>FIGURE</b> <b>5</b>
	Date: July, 2016		



Project #  
40683.001

Date:  
July 2016

**NATIONAL WETLAND INVENTORY**  
**Washington Military Department**  
**Tumwater Readiness Center**  
 Thurston County, WA

**FIGURE**  
**6**



Project #  
40683.001  
Date:  
July 2016

**WETLAND DELINEATION MAP**  
 Washington Military Department  
 Tumwater Readiness Center

**FIGURE**  
**7**  
**FIGURE**

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**APPENDIX B**  
Site Photographs



Photo 1. Upland Forest



Photo 2. Wetland A excavated pond



Photo 3. Wetland A swale leading into excavated pond showing evidence of recent ponding



Photo 4. Area to east of Wetland A that looks like it may have recently flooded.



Photo 5. Adventitious roots on willows at edges of Wetland A excavated pond



Photo 6. View to southeast looking across Wetland A swale



Photo 7. View to southwest of Wetland A upland plot showing much greater vegetation diversity and brown soils.



Photo 8. Interior of Wetland B showing forest structure.



Photo 9. Large cottonwoods in Wetland B



Photo 10. Evidence of recent ponding in Wetland B



Photo 11. *Carex obnupta* growing in depression in Wetland B



Photo 12. Near the southwest corner of Wetland B

## **APPENDIX C**

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### Hydrophytic Vegetation Indicator Categories

## Hydrophytic Vegetation Indicator Categories

The NWPL is a list of wetland plants and their assigned indicator statuses. An indicator status reflects the likelihood that a particular plant occurs in a wetland or upland.

Indicator Code	Indicator Status	Designation	Comment
OBL	Obligate Wetland	Hydrophyte	Plants that always occur in standing water or in saturated soils
FACW	Facultative Wetland	Hydrophyte	Plants that nearly always occur in areas of prolonged flooding or require standing water or saturated soils but may, on rare occasions, occur in non-wetlands
FAC	Facultative	Hydrophyte	Plants that occur in a variety of habitats, including wetland and mesic to xeric non-wetland habitats but commonly occur in standing water or saturated soils
FACU	Facultative Upland	Nonhydrophyte	Plants that typically occur in xeric or mesic non-wetland habitats but may frequently occur in standing water or saturated soils
UPL	Obligate Upland	Nonhydrophyte	Plants that almost never occur in water or saturated soils

[http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/techbio/nwpl\\_may2012\\_factsheet.pdf](http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/techbio/nwpl_may2012_factsheet.pdf)

## **APPENDIX D**

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Data Sheets and Wetland Rating Form

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

Project/Site: WA Military - Tumwater Site City/County: Thurston Sampling Date: 5/19/2016  
 Applicant/Owner: WA Military State: WA Sampling Point: W-A Wet Plot 1  
 Investigator(s): Katharine Lee, Kate Machata Section/Township/Range: S16 T17N R2W  
 Landform (hillslope, terrace etc.): flat Local relief: concave Slope (%): -0%  
 Subregion (LRR): A Lat: 46.967 Long: -122.93254060 Datum: WGS 84  
 Soil Map Unit Name: 32 - Everett very gravelly sandy loam, 0 to 8 percent slo NWI classification: Upland  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks)  
 Are Vegetation     , Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? (If needed, explain any answers in remarks)  
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? Yes X No     

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

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

Remarks: Shallow swale upslope from excavated pond with standing water. Surface elevation in plot is about 12 inches higher than standing water in pond. Entire area was graded about 15 years ago. Existing condition is new normal.

**VEGETATION**

<u>Tree Stratum</u> (Plot size: 30 ft)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)  Total Number of Dominant Species Across All Strata: <u>3</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. <u>Pinus contorta</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Populus balsamifera</u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Alnus rubra</u>	<u>15</u>	<u>No</u>	<u>FAC</u>	
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>90</u>			
<u>Sapling/Shrub Stratum</u> (Plot size: 30 ft)				<b>Prevalence Index worksheet:</b> <u>Total % Cover of:</u> <u>    </u> <u>Multiply by:</u> <u>    </u> OBL species <u>0</u> x 1 = <u>    </u> FACW species <u>1</u> x 2 = <u>2</u> FAC species <u>116</u> x 3 = <u>348</u> FACU species <u>0</u> x 4 = <u>    </u> UPL species <u>0</u> x 5 = <u>    </u> Column Totals: <u>117</u> (A) <u>350</u> (B)  Prevalence Index = B/A = <u>2.99</u>
1. <u>Populus balsamifera</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
3. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>25</u>			
<u>Herb Stratum</u> (Plot size: 5 ft)				<b>Rapid Test for Hydrophytic Vegetation</b> <u>X</u> Dominance Test is >50% <u>X</u> Prevalence Index is ≤3.0 <sup>1</sup>  Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)  Wetland Non-Vascular Plants <sup>1</sup>  Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
1. <u>Carex species</u>	<u>1</u>	<u>No</u>	<u>OBL to NOL</u>	
2. <u>Rumex occidentalis</u>	<u>1</u>	<u>No</u>	<u>FACW</u>	
3. <u>Agrostis species</u>	<u>1</u>	<u>No</u>	<u>FAC</u>	
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
6. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
7. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
8. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>3</u>			
<u>Woody Vine Stratum</u> (Plot Size: 5 ft)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.  <b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No <u>    </u>
1. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
2. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>0</u>			
% Bare Ground in Herb Stratum	<u>98</u> %			

Remarks: About 98 percent bare ground in herb layer. Trace of each herbaceous species observed at less than 1% each so no herbs are considered dominants.

**SOIL**

Sampling Point: W-A Wet Plot 1

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

Depth (in.)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-0.5	None							duff
0.5-1.5	10YR 4/1	95	10YR 4/4	5	C	M	Sandy loam	more silt than lower layer
1.5-11	10YR 4/1	90	10YR 4/4	10	C	M	sand	greyer with depth
11-18+	2.5YR 4/1	80	10YR 4/4	20	C	M	sand	streaks in sand more prominent with depth

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup>Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

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

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth: \_\_\_\_\_

**Hydric Soil Present?**

Yes  X No

Remarks: Bottom layer has more prominent concentration streaks than 2nd layer and gets greyer with depth.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except NW coast)	<input type="checkbox"/> Water-Stained Leaves (B9) <b>(NW coast)</b>
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> X Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Frost-Heave Hummocks (D4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) <b>(LRR A)</b>	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Raised Ant Mounds (D6) <b>(LRR A)</b>
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

**Field Observations:**

Surface Water Present? Yes  No  X Depth (in): N/A

Water Table Present? Yes  No  X Depth (in): N/A

Saturation Present? Yes  X No  Depth (in): 11"

(includes capillary fringe)

**Wetland Hydrology Present?**

Yes  X No

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

Remarks: Damp sand in upper 11". Saturation begins at 11" in sand layer and below.

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

Project/Site: WA Military - Tumwater Site City/County: Thurston Sampling Date: 5/19/2016  
 Applicant/Owner: WA Military State: WA Sampling Point: W-A Up Plot 2  
 Investigator(s): Katharine Lee, Kate Machata Section/Township/Range: S16 T17N R2W  
 Landform (hillslope, terrace etc.): flat Local relief: 0 Slope (%): 0  
 Subregion (LRR): A Lat: 46-96656747 Long: -122.93264183 Datum: WGS 84  
 Soil Map Unit Name: 20- Cagey loamy sand NWI classification: Upland  
 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? (If needed, explain any answers in remarks) Yes      No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? Yes      No     

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

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

Remarks: Plot is about 40 feet northwest of wetland A Plot 1 and several inches higher in elevation.

**VEGETATION**

<u>Tree Stratum</u> (Plot size: 30 ft)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
1. <u>Alnus rubra</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Populus balsamifera</u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Pinus contorta</u>	<u>5</u>	<u>No</u>	<u>FAC</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>75</u>			<b>Prevalence Index worksheet:</b> <u>Total % Cover of:</u> <u>    </u> <u>Multiply by:</u> <u>    </u>
<u>Sapling/Shrub Stratum</u> (Plot size: 30 ft)				
1. <u>Spiraea douglasii</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>	FACW species <u>10</u> x <u>2</u> = <u>20</u>
2. <u>Rubus armeniacus</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	FAC species <u>90</u> x <u>3</u> = <u>270</u>
3. <u>Rubus ursinus</u>	<u>5</u>	<u>Yes</u>	<u>FACU</u>	FACU species <u>92</u> x <u>4</u> = <u>368</u>
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	UPL species <u>1</u> x <u>5</u> = <u>5</u>
5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Column Totals: <u>195</u> (A) <u>665</u> (B)
Total Cover:	<u>25</u>			Prevalence Index = B/A = <u>3.41</u>
<u>Herb Stratum</u> (Plot size: 5 ft)				<b>Rapid Test for Hydrophytic Vegetation</b>
1. <u>Hypericum perforatum</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>	Dominance Test is >50%
2. <u>Geranium robertianum</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>	Prevalence Index is ≤3.0 <sup>1</sup>
3. <u>Anthoxanthum odoratum</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>	Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
4. <u>Leucanthemum vulgare</u>	<u>5</u>	<u>No</u>	<u>FACU</u>	Wetland Non-Vascular Plants <sup>1</sup>
5. <u>Myosotis laxa</u>	<u>2</u>	<u>No</u>	<u>OBL</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
6. <u>Holcus lanatus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
7. <u>Galium aparine</u>	<u>2</u>	<u>No</u>	<u>FACU</u>	
8. <u>Senecio jacobaea</u>	<u>1</u>	<u>No</u>	<u>UPL</u>	
Total Cover:	<u>95</u>			
<u>Woody Vine Stratum</u> (Plot Size: 5 ft)				
1. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
2. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>0</u>			
% Bare Ground in Herb Stratum	<u>5</u> %			

Remarks:

**Hydrophytic Vegetation Present?** Yes      No X

**SOIL**

Sampling Point: W-A Up Plot 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (in.)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-1"	10YR 4/3	100	None				sandy loam	
1-3"	10YR 3/2	100	None				sandy loam	
3-17"	10YR 3/2	100	None				sandy loam	much gravel/cobble

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup>Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)			Indicators for Problematic Hydric Soils <sup>3</sup> :		
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)			
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)			
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very shallow dark surface (TF12)			
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)			
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)				
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)				
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present.			
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)				

<b>Restrictive Layer (if present):</b> Type: _____ Depth: _____	<b>Hydric Soil Present?</b> Yes _____ No <input checked="" type="checkbox"/>
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Remarks: Plot is near I-5 corridor and may have soil mixing due to construction in past.

**HYDROLOGY**

Wetland Hydrology Indicators:		
Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except NW coast)	<input type="checkbox"/> Water-Stained Leaves (B9) (NW coast)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Frost-Heave Hummocks (D4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

<b>Field Observations:</b> Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (in): N/A Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (in): >17" Saturation Present? (includes capillary fringe) Yes _____ No <input checked="" type="checkbox"/> Depth (in): >17"	<b>Wetland Hydrology Present?</b> Yes _____ No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  
Remarks: No saturation within 17". Soil is not moist.

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

Project/Site: WA Military - Tumwater Site City/County: Thurston Sampling Date: 5/19/2016  
 Applicant/Owner: WA Military State: WA Sampling Point: W-B Wet Plot 1  
 Investigator(s): Katharine Lee, Kate Machata Section/Township/Range: S16 T17N R2W  
 Landform (hillslope, terrace etc.): Swale in long depression Local relief: concave Slope (%): -0%  
 Subregion (LRR): A Lat: 46.960513 Long: -122.93296301 Datum: WGS 84  
 Soil Map Unit Name: 20- Cagey loamy sand NWI classification: Upland  
 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? (If needed, explain any answers in remarks) Yes      No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? Yes X No     

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

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

Remarks: Wetland plot is located in a shallow depression. No upland plot was paired with this plot. There is only a few inches change in elevation across surface. Slight depressions exhibiting hydric soils are separated by slightly elevated areas where no concentrations are observed in upper 12 inches.

**VEGETATION**

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
1. <u>Fraxinus latifolia</u>	<u>65</u>	<u>Yes</u>	<u>FACW</u>	
2. <u>Alnus rubra</u>	<u>10</u>	<u>No</u>	<u>FAC</u>	
3. <u>Populus balsamifera</u>	<u>5</u>	<u>No</u>	<u>FAC</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>80</u>			<b>Prevalence Index worksheet:</b> Total % Cover of: <u>    </u> Multiply by:
Sapling/Shrub Stratum (Plot size: 30 ft)				
1. <u>Rubus spectabilis</u>	<u>5</u>	<u>No</u>	<u>FAC</u>	OBL species <u>0</u> x 1 = <u>    </u>
2. <u>Symphoricarpos albus</u>	<u>2</u>	<u>No</u>	<u>FACU</u>	
3. <u>Rubus ursinus</u>	<u>5</u>	<u>No</u>	<u>FACU</u>	FAC species <u>35</u> x 3 = <u>105</u>
4. <u>Crataegus douglasii</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	FACU species <u>7</u> x 4 = <u>28</u>
5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	UPL species <u>0</u> x 5 = <u>    </u>
Total Cover:	<u>27</u>			Column Totals: <u>107</u> (A) <u>263</u> (B)
Herb Stratum (Plot size: 5 ft)				Prevalence Index = B/A = <u>2.46</u>
1. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Rapid Test for Hydrophytic Vegetation
2. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
3. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>X</u> Prevalence Index is ≤3.0 <sup>1</sup>
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
6. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Wetland Non-Vascular Plants <sup>1</sup>
7. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
8. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Total Cover:	<u>0</u>			
Woody Vine Stratum (Plot Size: 5 ft)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
1. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
2. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No <u>    </u>
Total Cover:	<u>0</u>			
% Bare Ground in Herb Stratum <u>100</u> %				

Remarks: No herbaceous species were observed. A thick leaf mat covers surface herb layer.

**SOIL**

Sampling Point: W-B Wet Plot 1

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

Depth (in.)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	7.5YR 2.5/1	100					loam	high organic content
7-15	10YR 4/1	80	10YR 4/4	5	C	M	sand	mixed matrix, fine sand
	7.5YR 2.5/1	15						
15-18	10YR 4/1.5	80	10YR 4/6	20	C	M	sand	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup>Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

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

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth: \_\_\_\_\_

**Hydric Soil Present?**

Yes  No

Remarks: Very dark loam layer on top with sand layer below. Second and third layer is starting at 13 inches.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except NW coast)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9) <b>(NW coast)</b>
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Frost-Heave Hummocks (D4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) <b>(LRR A)</b>	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Raised Ant Mounds (D6) <b>(LRR A)</b>
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

**Field Observations:**

Surface Water Present? Yes  No  Depth (in): N/A

Water Table Present? Yes  No  Depth (in): Below 18"

Saturation Present? Yes  No  Depth (in): Below 18"  
(includes capillary fringe)

**Wetland Hydrology Present?**

Yes  No

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

Remarks: Ponding in wet season is evidenced by leaf mat present only in depressions. No saturation was observed.

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

Project/Site: WA Military - Tumwater Site City/County: Thurston Sampling Date: 5/19/2016  
 Applicant/Owner: WA Military State: WA Sampling Point: W-B Wet Plot 2  
 Investigator(s): Katharine Lee, Kate Machata Section/Township/Range: S16 T17N R2W  
 Landform (hillslope, terrace etc.): slight depression on flat Local relief: concave Slope (%): 0  
 Subregion (LRR): A Lat: 46.960113 Long: -122.9334417 Datum: WGS 84  
 Soil Map Unit Name: 20- Cagey loamy sand NWI classification: Upland  
 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? (If needed, explain any answers in remarks) Yes      No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? Yes      No     

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

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

Remarks:

**VEGETATION**

<u>Tree Stratum</u> (Plot size: 30 ft)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>6</u> (A)
1. <u>Fraxinus latifolia</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>	
2. <u>Alnus rubra</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>86%</u> (A/B)
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover: <u>40</u>				<b>Prevalence Index worksheet:</b> <u>Total % Cover of:</u> <u>    </u> <u>Multiply by:</u> <u>    </u>
<u>Sapling/Shrub Stratum</u> (Plot size: 30 ft)				
1. <u>Salix species</u>	<u>40</u>	<u>Yes</u>	<u>OBL to FAC</u>	OBL species <u>40</u> x 1 = <u>40</u>
2. <u>Rubus spectabilis</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>	FACW species <u>40</u> x 2 = <u>80</u>
3. <u>Spiraea douglasii</u>	<u>10</u>	<u>No</u>	<u>FACW</u>	FAC species <u>60</u> x 3 = <u>180</u>
4. <u>Symphoricarpos albus</u>	<u>10</u>	<u>No</u>	<u>FACU</u>	FACU species <u>15</u> x 4 = <u>60</u>
5. <u>Corylus cornuta</u>	<u>5</u>	<u>No</u>	<u>FACU</u>	UPL species <u>0</u> x 5 = <u>    </u>
Total Cover: <u>85</u>				Column Totals: <u>155</u> (A) <u>360</u> (B)
<u>Herb Stratum</u> (Plot size: 5 ft)				Prevalence Index = B/A = <u>2.32</u>
1. <u>Carex obnupta</u>	<u>40</u>	<u>Yes</u>	<u>OBL</u>	<b>Rapid Test for Hydrophytic Vegetation</b>
2. <u>Maianthemum dilatatum</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Athyrium filix-femina</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	<u>X</u> Dominance Test is >50%
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>X</u> Prevalence Index is ≤3.0 <sup>1</sup>
5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
6. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Wetland Non-Vascular Plants <sup>1</sup>
7. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
8. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
Total Cover: <u>70</u>				
<u>Woody Vine Stratum</u> (Plot Size: 5 ft)				<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No <u>    </u>
1. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
2. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover: <u>0</u>				
% Bare Ground in Herb Stratum <u>30</u> %				

Remarks: Observed Polystichum munitum located on small mound at base of adjacent tree so is not included in plant species list for plot. Algal mat or leaf mat covers much of bare ground.

**SOIL**

Sampling Point: W-B Wet Plot 2

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

Depth (in.)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-13	7.5YR 2.5/1	100	None				sandy loam	high organic content
13-18	Black	100	None				organic muck	black, mucky, high organic, greasy very little sand

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup>Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

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

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth: \_\_\_\_\_

**Hydric Soil Present?**

Yes  No

Remarks: Possibly mucky modified soil layer. Soil is very greasy and stains hands in both layers. Second layer is very very dark black. No concentrations were observed. Soil is determined to be hydric given position and large difference from adjacent upland position soils.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except NW coast)	<input type="checkbox"/> Water-Stained Leaves (B9) <b>(NW coast)</b>
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Frost-Heave Hummocks (D4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) <b>(LRR A)</b>	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Raised Ant Mounds (D6) <b>(LRR A)</b>
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

**Field Observations:**

Surface Water Present? Yes  No  Depth (in): N/A  
 Water Table Present? Yes  No  Depth (in): 10"  
 Saturation Present? Yes  No  Depth (in): surface  
 (includes capillary fringe)

**Wetland Hydrology Present?**

Yes  No

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

Remarks: Water is still rising in pit above 10" after 10 minutes.

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

Project/Site: WA Military - Tumwater Site City/County: Thurston Sampling Date: 5/19/2016  
 Applicant/Owner: WA Military State: WA Sampling Point: W-B Up Plot 3  
 Investigator(s): Katharine Lee, Kate Machata Section/Township/Range: S16 T17N R2W  
 Landform (hillslope, terrace etc.): flat Local relief: convex Slope (%): -0%  
 Subregion (LRR): A Lat: 46.960068 Long: -122.93359802 Datum: WGS 84  
 Soil Map Unit Name: 20- Cagey loamy sand NWI classification: Upland  
 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? (If needed, explain any answers in remarks) Yes      No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? Yes      No     

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

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

Remarks: Plot is parallel to fence/property edge. Burrowing animal mounds (mountain beaver) and holes located between upland plot and wetland plot. Upland plot was moved beyond burrows to view undisturbed soil profile.

**VEGETATION**

<u>Tree Stratum</u> (Plot size: 30 ft)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>    5    </u> (A)
1. <u>Fraxinus latifolia</u>	<u>10</u>	<u>No</u>	<u>FACW</u>	
2. <u>Acer macrophyllum</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>	
3. <u>Alnus rubra</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>	
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>    71%    </u> (A/B)
Total Cover:	<u>80</u>			
<u>Sapling/Shrub Stratum</u> (Plot size: 30 ft)				<b>Prevalence Index worksheet:</b> <u>    </u> Total % Cover of: <u>    </u> Multiply by: <u>    </u>
1. <u>Rubus ursinus</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>	
2. <u>Rubus spectabilis</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>	FACW species <u>    30    </u> x 2 = <u>    60    </u>
3. <u>Rubus laciniatus</u>	<u>5</u>	<u>No</u>	<u>FACU</u>	FAC species <u>    145    </u> x 3 = <u>    435    </u>
4. <u>Fraxinus latifolia</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>	FACU species <u>    75    </u> x 4 = <u>    300    </u>
5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	UPL species <u>    0    </u> x 5 = <u>    </u>
Total Cover:	<u>75</u>			Column Totals: <u>    250    </u> (A) <u>    795    </u> (B)
<u>Herb Stratum</u> (Plot size: 5 ft)				Prevalence Index = B/A = <u>    3.18    </u>
1. <u>Urtica dioica</u>	<u>10</u>	<u>No</u>	<u>FAC</u>	Rapid Test for Hydrophytic Vegetation <u>    X    </u> Dominance Test is >50% Prevalence Index is ≤3.0 <sup>1</sup>
2. <u>Maianthemum dilatatum</u>	<u>5</u>	<u>No</u>	<u>FAC</u>	
3. <u>Dicentra formosa</u>	<u>10</u>	<u>No</u>	<u>FACU</u>	Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
4. <u>Claytonia sibirica</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>	
5. <u>Athyrium filix-femina</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>	Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
6. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
7. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
8. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>95</u>			
<u>Woody Vine Stratum</u> (Plot Size: 5 ft)				
1. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
2. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	
Total Cover:	<u>0</u>			
% Bare Ground in Herb Stratum	<u>5</u>	%		

Remarks:

**Hydrophytic Vegetation Present?** Yes     X     No

**SOIL**

Sampling Point: W-B Up Plot 3

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

Depth (in.)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-13	7.5YR 3/3	100	None				sandy loam	some gravel, few cobble
13-18+	10YR 4/2	85	10YR 4/6	10	C	M	silt loam	
			7.5YR 4/6	5	C	M		

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup>Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

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

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
 Depth: \_\_\_\_\_

**Hydric Soil Present?**

Yes \_\_\_\_\_ No **X**

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except NW coast)	<input type="checkbox"/> Water-Stained Leaves (B9) <b>(NW coast)</b>
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Frost-Heave Hummocks (D4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) <b>(LRR A)</b>	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Raised Ant Mounds (D6) <b>(LRR A)</b>
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

**Field Observations:**

Surface Water Present? Yes \_\_\_\_\_ No **X** Depth (in): \_\_\_\_\_  
 Water Table Present? Yes \_\_\_\_\_ No **X** Depth (in): \_\_\_\_\_  
 Saturation Present? Yes **X** No \_\_\_\_\_ Depth (in): **13"**  
 (includes capillary fringe)

**Wetland Hydrology Present?**

Yes \_\_\_\_\_ No **X**

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

Remarks:

Soil is saturated at 13" and below.



Project Name: **Tumwater Readiness Center Wetland Rating**  
 Date(s) of Site Visit(s): 5/19/2016  
 Rated by: Katharine Lee Trained by Ecology? Yes

**Figures**

	Wetlands 1
Cowardin plant classes	Figure 1
Hydroperiods / outlet	Figure 2
150' boundary	Figure 2
Contributing basin	Figure 3
1 km radius polygon	Figure 4 & 5
303(d) listed waters/ TMDLs	Figure 6

Source of base aerial photo or map for figures:

**Category of Wetland Based on Function**

Category I = 23 - 27                      Category III = 16 - 19  
 Category II = 20 - 22                    Category IV = 9 - 15

**Summary table of scores and corresponding categories**

		Depressional	Depressional
		A	B
<b>Water Quality</b>	Site Potential	M	M
	Landscape Potential	L	M
	Value	H	H
	<b>Rating</b>	<b>6</b>	<b>7</b>
<b>Hydrologic</b>	Site Potential	M	M
	Landscape Potential	M	L
	Value	M	M
	<b>Rating</b>	<b>6</b>	<b>5</b>
<b>Habitat</b>	Site Potential	M	M
	Landscape Potential	H	H
	Value	L	L
	<b>Rating</b>	<b>6</b>	<b>6</b>
<b>Total</b>		<b>18</b>	<b>18</b>
<b>Category</b>		<b>III</b>	<b>III</b>

**Category Based on Special Characteristics**

Special Characteristics	A	B
Estuarine		
High Conservation Value		
Bog		
Mature Forest		
Old Growth Forest		
Coastal Lagoon		
Interdunal		
None of the above	X	X

**Classification of Wetland Units in Western Washington**

WETLAND #		A	B
1. Are the water levels in the entire unit usually controlled by tides?			
No		X	X
Yes = <b>Tidal Fringe</b>			
2. The entire wetland is flat and precipitation is the only source (>90%) of water to it Groundwater and surface water are not sources of water			
No		X	X
Yes - <b>Flats</b>			
3. Does the entire wetland meet both of the following criteria?			
a. The vegetated part of the wetland is on the shores of a body of permanent open water			
b. At least 30% of the open water areas is deeper than 6.6 ft.			
No		X	X
Yes - <b>Lake-fringe</b>			
4. Does the entire wetland unit meet all of the following criteria?			
a. On a slope			
b. Unidirectional flow			
c. No impoundment			
No		X	X
Yes - <b>Slope</b>			
5. Does the entire wetland unit meet all of the following criteria?			
a. In valley or channel			
b. Flooding at least 2yrs			
No		X	X
Yes - <b>Riverine</b>			
6. Is the entire unit in a topographic depression in which water ponds or is saturated for s			
No		X	
Yes - <b>Depressional</b>			X
7. Is the entire wetland located in a very flat area with groundwater and no outlet			
No		X	
Yes - <b>Depressional</b>			X
8. Several Categories		X	
List Categories		S,D	
<b>Category for Rating</b>		D	D

Date(s) of Site Visit(s): 05/19/16  
Rated by: Katharine Lee

Trained by Ecology?  
Yes

**DEPRESSIONAL WETLANDS**

				Wetland Name			
				A	B		
<b>WATER QUALITY FUNCTIONS</b>				Total Size (acres)	0.16	1.59	Figure#
<b>Site Potential: Does the site have the potential to improve water quality?</b>							
D 1.1	Surface flow out	Depression/flat with no outlet = 3 Intermittent or constricted permanent outlet = 2 Un- or slightly constricted permanent outlet = 1 Flat with no outlet or outlet is a ditch = 1		3	1		
D 1.2	Surface soils	Soil is clay or organic Yes = 4 No = 0		0	0		
D 1.3	Persistent, Ungrazed, Unmowed Vegetation	> = 95% area = 5 > = 1/2 area = 3 > = 1/10 area = 1 < 1/10 area = 0		3	5		
D 1.4	Seasonal Ponding > 2 months	> 1/2 total area of wetland = 4 > 1/4 total area of wetland = 2 < 1/4 total area of wetland = 0		4	4	Fig 2	
<b>Total for D1 (H=12-16; M=6-11; L=0-5)</b>				10	10		
<b>Rating of Site Potential</b>				M	M		
<b>Landscape Potential: Does the landscape have the potential to support the water quality function of the site?</b>							
D 2.1	Stormwater discharges	Wetland receives stormwater discharge Yes = 1 No = 0		0	0	Fig 2	
D 2.2	Buffer land use	>10% of 150 ft buffer in pollutant generating land uses Yes = 1 No = 0		0	0	Fig 2	
D 2.3	Septic systems	Septic systems present within 250' Yes = 1 No = 0		0	1		
D 2.4	Other pollutants	Other pollutant sources present Yes = 1 No = 0		0	0		
<b>Total for D2 (H=3-4; M= 1-2; L=0)</b>				0	1		
<b>Rating of Landscape Potential</b>				L	M		
<b>Rating of Value: Is the water quality improvement provided by the site valuable to society?</b>							
D 3.1	Discharge to 303(d) list waters	Direct (<1 mi) discharge to 303(d) water Yes = 1 No = 0		0	0	Fig 6	
D 3.2	303(d) list Basin or sub-basin	Wetland in 303(d) list basin or sub-basin Yes = 1 No = 0		1	1	Fig 6	
D 3.3	TMDL watershed or local watershed plan	Site identified as important to water quality (i.e. TMDL ) Yes = 2 No = 0		1	1	Fig 6	
<b>Total for D3 (H=2-4; M=1; L=0)</b>				2	2		
<b>Rating of Value</b>				H	H		
<b>Improving Water Quality : Score Based on Ratings</b>				6	7		

HYDROLOGIC FUNCTIONS		Wetland Name	A	B	Figure#	
<b>Site Potential: Does the site have the potential to reduce flooding and erosion?</b>						
D 4.1	Surface water flow out	No surface water outlet = 4 Intermittent/ highly constricted outlet = 2 Flat with no outlet or outlet is ditch = 1 Unconstricted outlet = 0	4	1		
D 4.2	Depth of storage	3 ft or more = 7 2 ft to 3 ft = 5 0.5 to < 2 ft or headwater wetland = 3 flat w/small depressions = 1 < 0.5 ft = 0	5	3		
D 4.3	Watershed storage	Basin is < 10 X wetland area = 5 or entire wetland Flats = 5 Basin is 10 to 100 times bigger = 3 Basin is > 100 times bigger = 0	0	3	Fig 3	
<b>Total for D4 (H=12-16; M=6-11; L=0-5)</b>			9	7		
<b>Rating of Site Potential</b>			M	M		
<b>Landscape Potential: Does the landscape have the potential to support the hydrologic functions of the site?</b>						
D 5.1	Stormwater discharges	Wetland receives stormwater discharge	Yes = 1 No = 0	0	0	Fig 2
D 5.2	Buffer land use	>10% of 150 ft buffer in land uses that generate excess runoff	Yes = 1 No = 0	1	0	Fig 2
D 5.3	Contributing basin land use	>25% in intensive land use	Yes = 2 No = 0	0	0	Fig 3
<b>Total for D5 (H=3-4; M= 1-2; L=0)</b>			1	0		
<b>Rating of Landscape Potential</b>			M	L		
<b>Rating of Value: Are the hydrologic functions provided by the site valuable to society?</b>						
D 6.1	Flooding occurs:	In sub-basin immediately down-gradient = 2 In sub-basin farther down-gradient = 1 From groundwater in sub-basin = 1 Wetland outflow not related to flooding = 0 No problems with flooding downstream = 0	1	1		
D 6.2	Flood storage	Site is critical part of regional flood control plan	Yes = 2 No = 0	0	0	
<b>Total for D6 (H=2-4; M=1; L=0)</b>			1	1		
<b>Rating of Value</b>			M	M		
<b>Hydrologic : Score Based on Ratings</b>			6	5		

HABITAT FUNCTIONS		Wetland Name	A	B	Figure#	
<b>Site Potential: Does the site have the potential to provide habitat?</b>						
<b>H 1.1</b>	Vegetation structure Cowardin Classes	Covering >10% or >1/4 ac: - Aquatic bed - emergent plants - scrub/shrub - forested - forested with 3+ strata covering >20% area	>= 4 types = 4 3 types = 2 2 types = 1 1 type = 0	1	0	Fig 1
<b>H 1.2</b>	Hydro-period	a. Permanently flooded/ inundated b. Seasonally flooded/ inundated c. Occasionally flooded/ inundated d. Saturated only e. Permanent stream in/adjacent f. Seasonal stream in/adjacent	>=4 types = 3 3 types = 2 2 types = 1 lake-fringe= 2 tidal (fresh)= 2	2  b,c,d	2  b,c,d	Fig 2
<b>H 1.3</b>	Plant species diversity	Number of species with at least 10 sq ft. Not counting reed canarygrass, purple loosestrife, Canada thistle, Eurasian milfoil	> 19 = 2 5-19 = 1 < 5 = 0	1	1	
<b>H 1.4</b>	Habitat interspersion	If 4 or more plant classes rating is always high	none = 0 low = 1 mod. = 2 high = 3	1	1	
<b>H 1.5</b>	Special habitats Count number of special habitat features:	a. large downed woody debris (>4" dia & 6' long) b. standing snags (>4" dia) c. undercut banks (>2m) or overhanging vegetation (>1m) over stream/ditch d. stable steep banks of fine material for beaver or muskrat (>30% slope) or recent beaver activity. e. >1/3 ac thin-stemmed persistent vegetation or woody branches in areas perm. or seasonally inundated f. <25% cover by invasives in each stratum		2  c,d	4  a,b,e,f	
<b>Total for H1 (H=15-18; M=7-14; L=0-6)</b>			7	8		
<b>Rating of Site Potential</b>			M	M		
<b>Landscape Potential: Does the landscape have the potential to support the habitat functions of the site?</b>						
<b>H 2.1</b>	Accessible habitat	Habitat in 1km polygon abutting wetland using: % undisturbed + [(%mod+low intensity)/2]. Percent of area in polygon	>1/3 = 3 20-33 = 2 10-19 = 1 <10 = 0	1	1	Fig 4
<b>H 2.2</b>	Undisturbed Habitat	Undisturbed habitat in 1 km polygon using: % undisturbed + [(% mod + low intensity)/2]. Percent of area in polygon	>50 % = 3 10-50 % 1-3 patches= 2 >3 patches= 1 <10 % = 0	3	3	Fig 5
<b>H 2.3</b>	Land Use Intensity		>50% high intensity = (-2) < or = 50% high intensity = 0	0	0	
<b>Total for H2 (H=4-6; M= 1-3; L=&lt;1)</b>			4	4		
<b>Rating of Landscape Potential</b>			H	H		

**Rating of Value: Is the habitat provided by the site valuable to society?**

<b>H 3.1</b>	Habitat for species with legal status	Site meets any habitat criteria ( <b>below</b> ) = 2	0	0
		Site has 1 or 2 priority habitats within 100 m = 1		
		Site does not meet criteria above = 0		
		<b>Total for H3 (H=2; M= 1; L=0)</b>		
<b>Rating of Value</b>			L	L
<b>Habitat: Score Based on Ratings</b>			6	6

<b>TOTAL SCORE BASED ON RATINGS</b>	<b>18</b>	<b>18</b>
<b>OVERALL WETLAND CATEGORY</b>	<b>III</b>	<b>III</b>

<b>H.3.1</b>	<b>WDFW Priority Habitats</b>	<b>A</b>	<b>B</b>
	Aspen Stands		
	Biodiversity Areas and Corridors		
	Herbaceous Balds		
	Old Growth / Mature Forests		
	Oregon White Oak		
	Riparian		
	Westside Prairie		
	Instream		
	Nearshore		
	Caves		
	Cliffs		
	Talus		
	Snags & Logs		
	Site has 3 or more of the above within 100 meters	No	No
	It provides habitat for threatened or endangered species	No	No
	It is mapped as a location for an individual WDFW Priority Species	No	No
	It is a wetland of high conservation value as determined by DNR	No	No
	It has been categorized as an important habitat in local planning	No	No



Wetland  
A

KEY:

-  Palustrine Emergent
-  Palustrine Scrub-Shrub
-  Palustrine Forested
-  Wetland Boundary



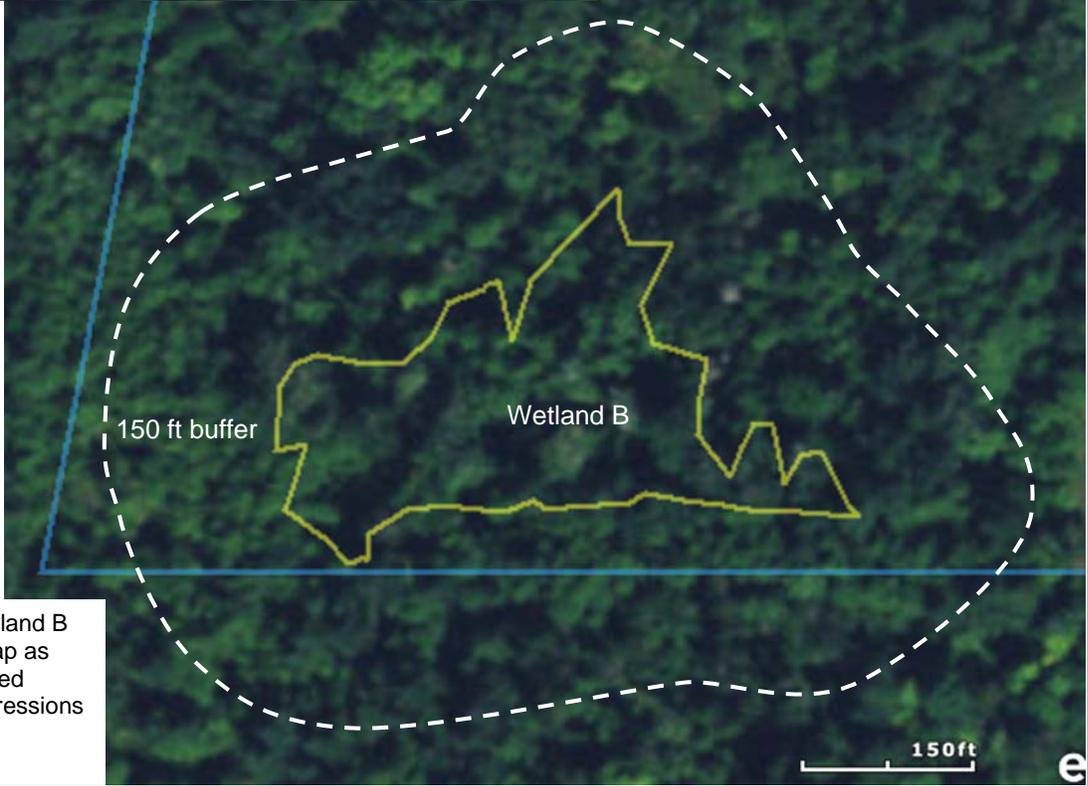
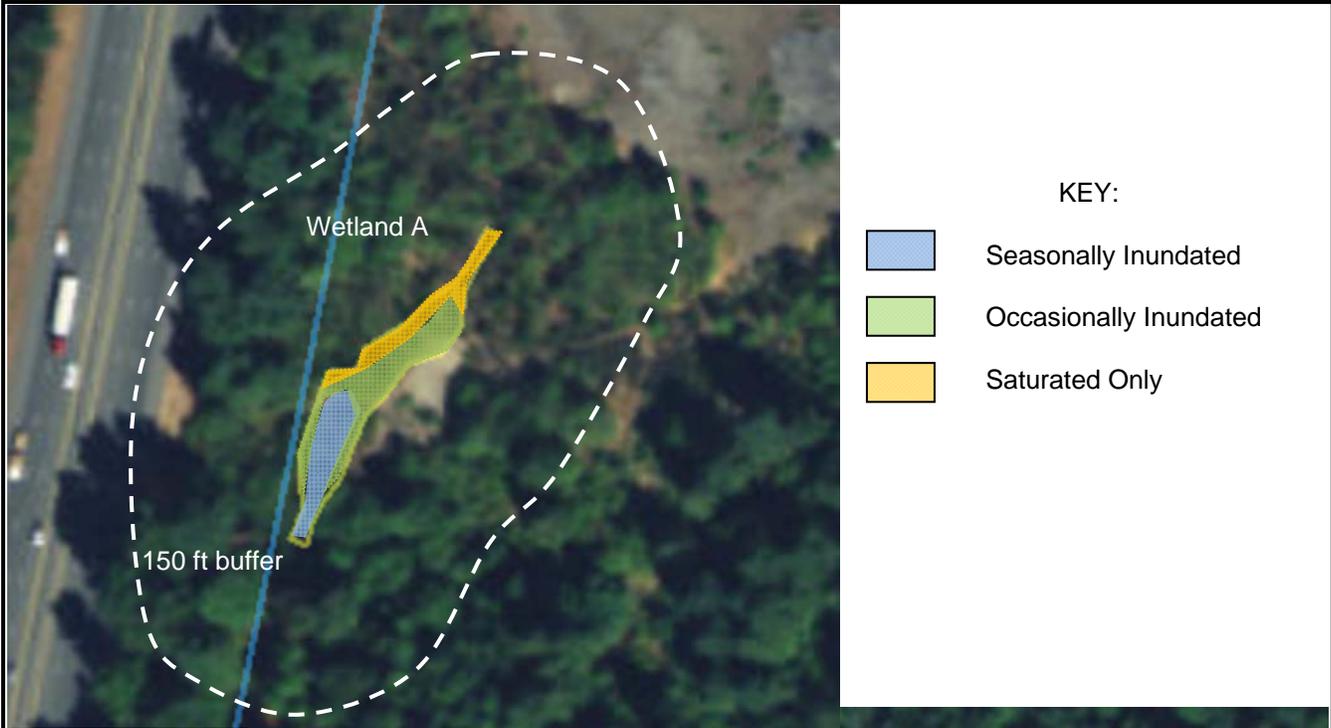
Wetland B



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Cowardin Classifications**  
**Washington Military: Tumwater Readiness Center**  
Tumwater, WA

**Rating**  
**Figure**  
**1**



Hydroperiods in Wetland B are impossible to map as they are a complicated mosaic of small depressions and interconnecting channels

	<p>Project # 40683.001 Date: July 2016</p>	<p><b>Wetland Rating – Hydroperiods and 150' Buffer</b> <b>Washington Military: Tumwater Readiness Center</b> Tumwater, WA</p>	<p><b>Rating</b> <b>Figure</b> <b>2</b></p>
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Base map and 2 foot contours from Thurston County Natural Resource Viewer. Mapped stockpiles north of Wetland A are no longer present.

Contributing basin is approximate as this area is very flat.



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Contributing Basin Wetland A**  
**Washington Military: Tumwater Readiness Center**  
Tumwater, WA

**Rating**  
**Figure**  
**3a**

Base map and 2 foot contours from Thurston County Natural Resource Viewer. Contours in the vicinity of Wetland B seem to be shifted somewhat from conditions on the ground.

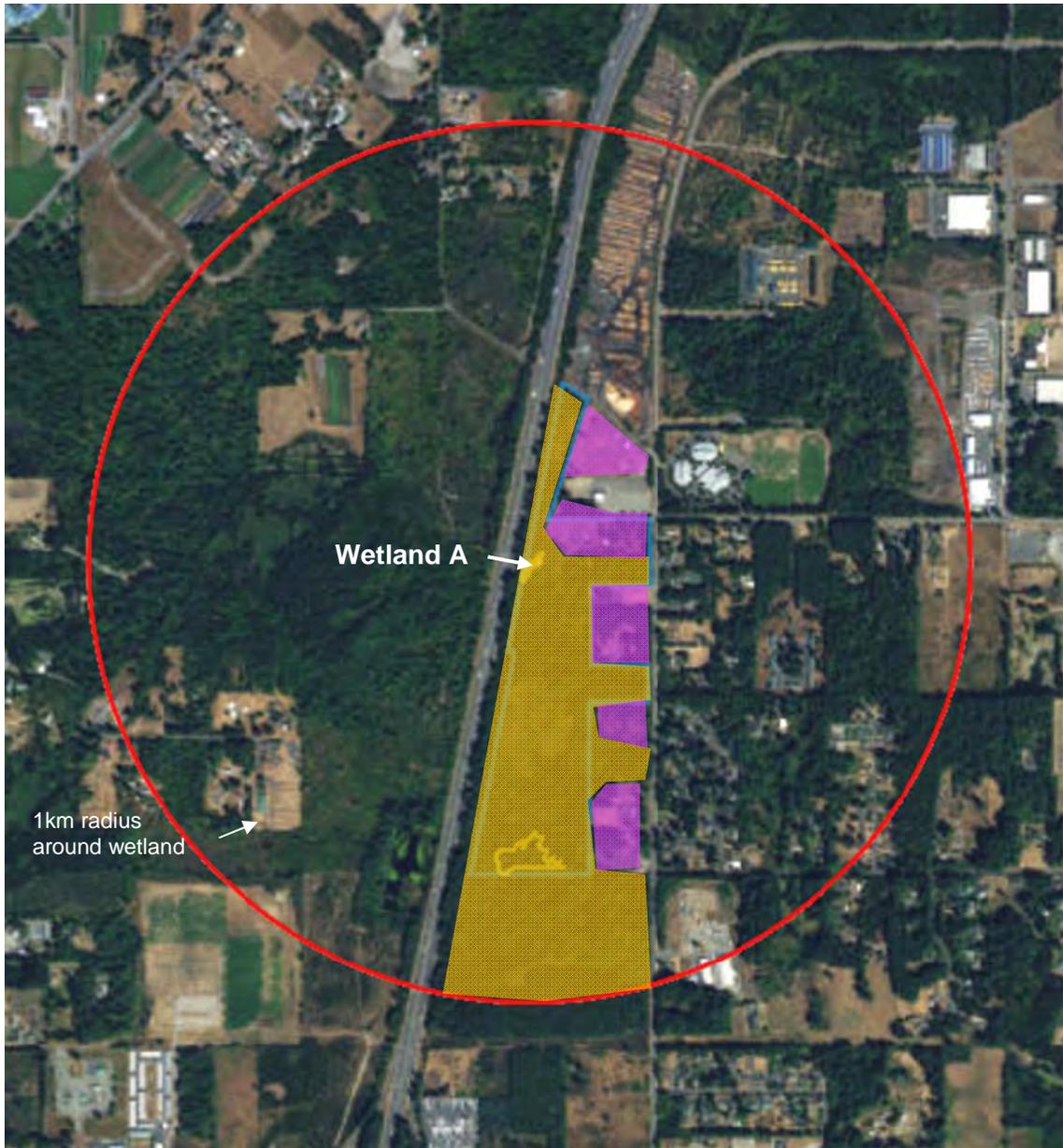
Contributing basin is approximate as site is very flat.



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Contributing Basin Wetland B**  
**Washington Military: Tumwater Readiness Center**  
Tumwater, WA

**Rating**  
**Figure**  
**3b**



KEY:

-  Relatively Undisturbed
-  Low to Moderate Disturbance

Total area 1km buffer = 790 acres

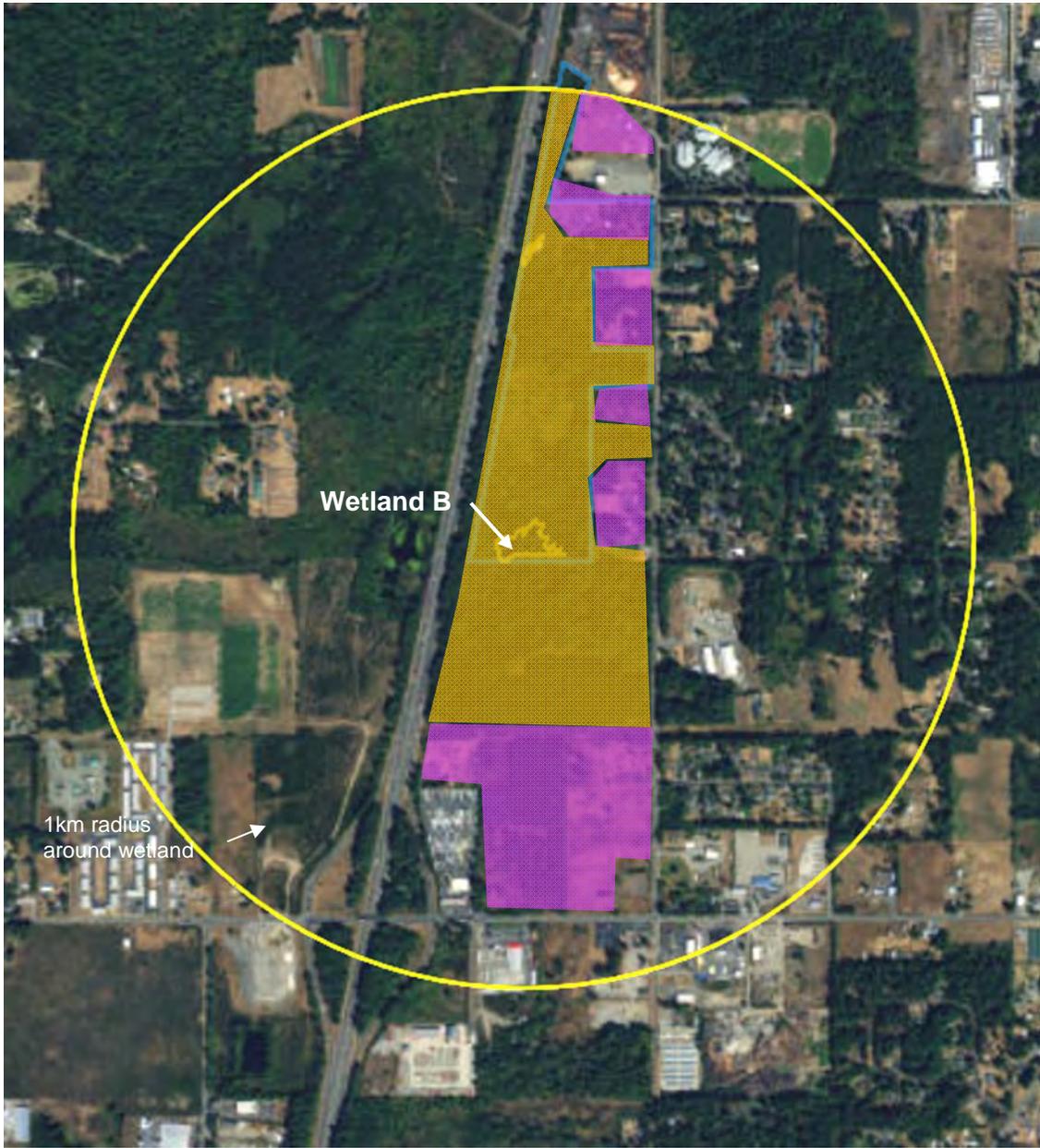
Accessible Habitat = (87 acres relatively undisturbed) +  
 (26 acres / 2 = 13 acres low to moderate ) = 100 acres =  
 13 percent



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Accessible Habitat Wetland A**  
**Washington Military: Tumwater Readiness Center**  
 Tumwater, WA

**Rating**  
**Figure**  
**4a**



KEY:



Relatively Undisturbed



Low to Moderate Disturbance

Total area 1km buffer = 790 acres

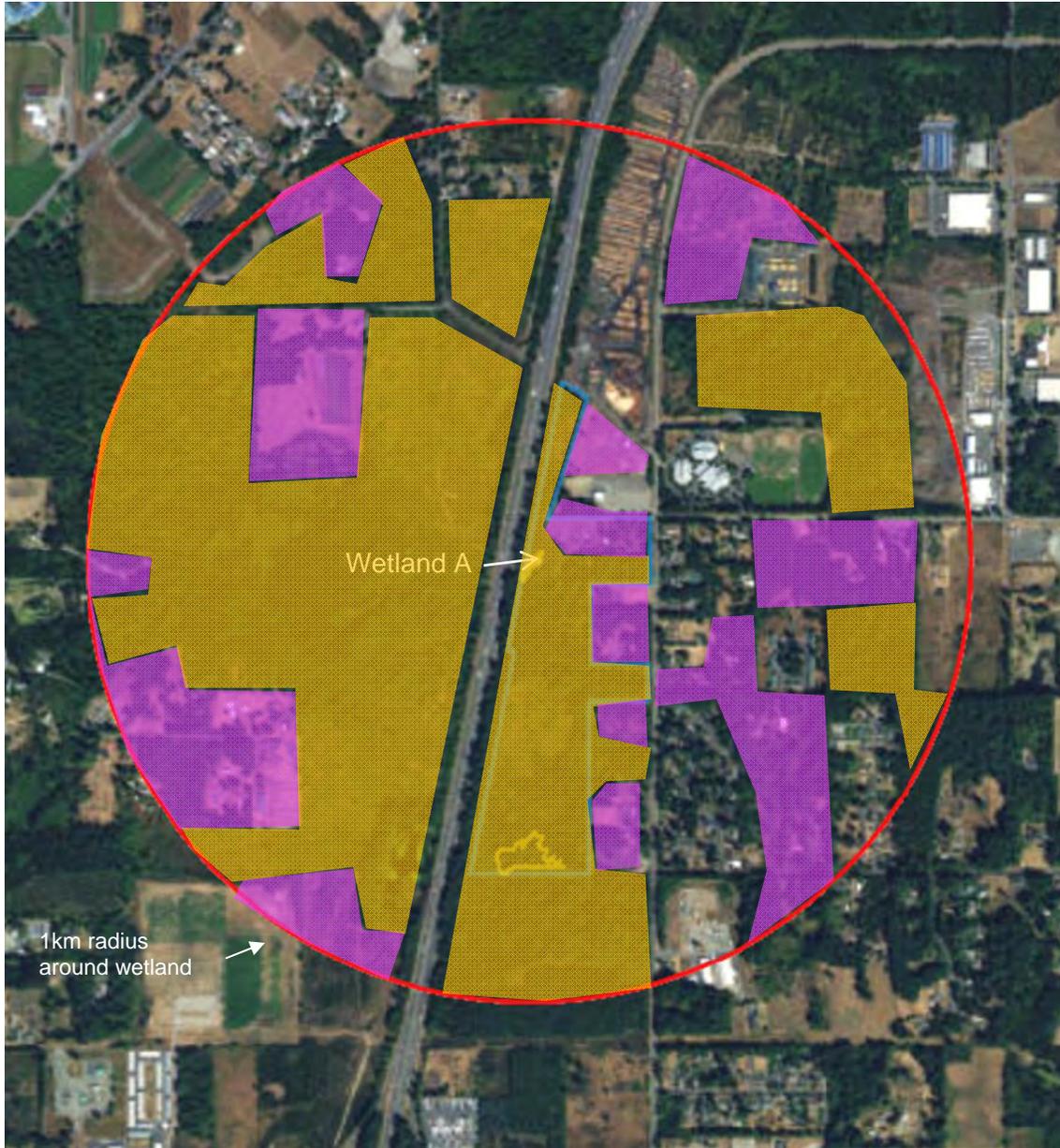
Accessible Habitat = (95 acres relatively undisturbed) +  
 (68 acres / 2 = 34 acres low to moderate ) = 129 acres = 16 percent



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Accessible Habitat Wetland B**  
**Washington Military: Tumwater Readiness Center**  
 Tumwater, WA

**Rating**  
**Figure**  
**4b**



KEY:



Relatively Undisturbed



Low to Moderate Disturbance

Total area 1km buffer = 790 acres

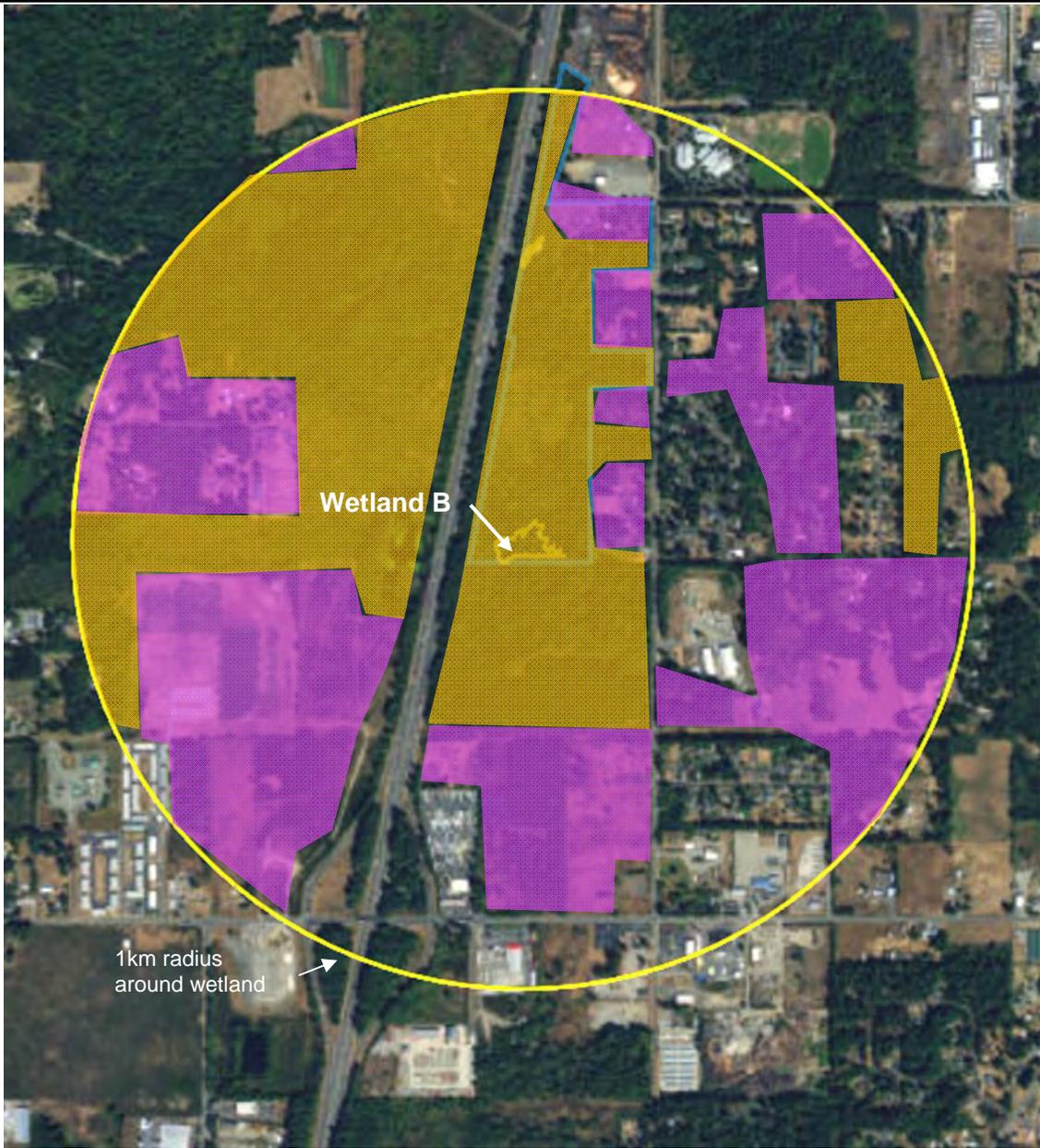
Relatively Undisturbed Habitat = (362 acres relatively undisturbed) + (192 acres / 2 = 96 acres low to moderate ) = 458 acres = 58 percent



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Undisturbed Habitat Wetland A**  
**Washington Military: Tumwater Readiness Center**  
Tumwater, WA

**Rating**  
**Figure**  
**5a**



KEY:



Relatively Undisturbed



Low to Moderate Disturbance

Total area 1km buffer = 790 acres

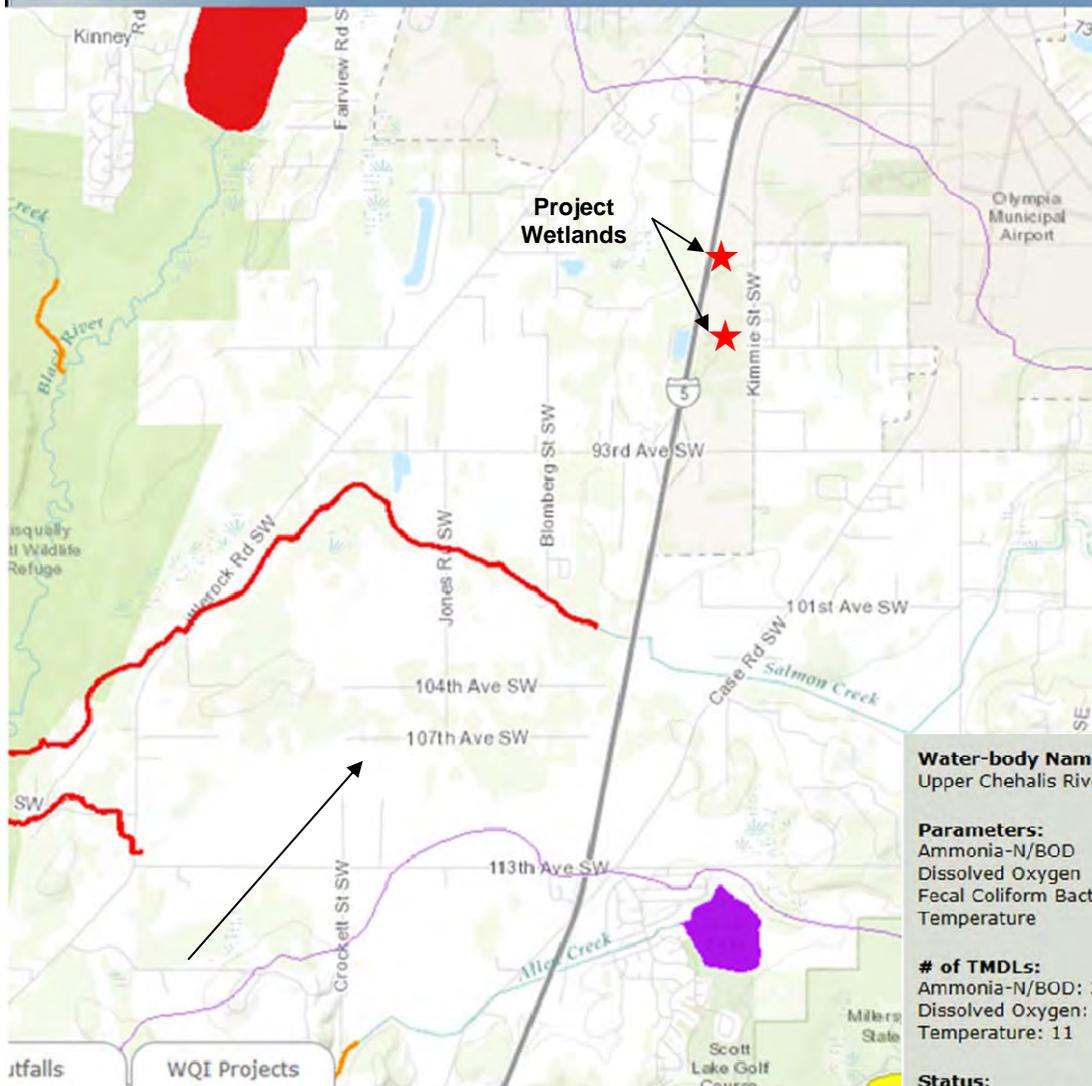
Relatively Undisturbed Habitat = (259 acres relatively undisturbed) + (288 acres / 2 = 144 acres low to moderate ) = 403 acres = 51 percent



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Undisturbed Habitat Wetland B**  
**Washington Military: Tumwater Readiness Center**  
Tumwater, WA

**Rating**  
**Figure**  
**5b**



**Water-body Name:**  
Upper Chehalis River

**Parameters:**  
Ammonia-N/BOD  
Dissolved Oxygen  
Fecal Coliform Bacteria  
Temperature

**# of TMDLs:**  
Ammonia-N/BOD: 34  
Dissolved Oxygen: 3  
Temperature: 11

**Status:**  
Approved by EPA

**Contact Info:**  
Andrew Kolosseus  
Phone: 360-407-7543  
Email: [Andrew.Kolosseus@ecy.wa.gov](mailto:Andrew.Kolosseus@ecy.wa.gov)

**Southwest Region**  
Department of Ecology  
P.O. Box 47775  
Olympia, WA 98504 -7775



Project #  
40683.001  
Date:  
July 2016

**Wetland Rating – Water Quality Assessment**  
**Washington Military: Tumwater Readiness Center**  
Tumwater, WA

**Rating**  
**Figure**  
**6**

**APPENDIX L**  
**BIOLOGICAL EVALUATION FOR THE TRC FACILITY PROJECT SITE (UPDATED**  
**NOVEMBER 2016)**

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## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Washington Fish and Wildlife Office  
510 DESMOND DRIVE SE, SUITE 102  
LACEY, WA 98503  
PHONE: (360)753-9440 FAX: (360)753-9405  
URL: [www.fws.gov/wafwo/](http://www.fws.gov/wafwo/)

Consultation Code: 01EWF00-2017-SLI-0162

February 21, 2017

Event Code: 01EWF00-2017-E-00646

Project Name: WAARNG's Tumwater Readiness Center

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

### To Whom It May Concern:

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

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. The species list is currently compiled at the county level. Additional information is available from the Washington Department of Fish and Wildlife, Priority Habitats and Species website:

<http://wdfw.wa.gov/mapping/phs/> or at our office website:

[http://www.fws.gov/wafwo/species\\_new.html](http://www.fws.gov/wafwo/species_new.html). Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

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

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether or not the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

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

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

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). You may visit our website at <http://www.fws.gov/pacific/eagle/for> information on disturbance or take of the species and information on how to get a permit and what current guidelines and regulations are. Some projects affecting these species may require development of an eagle conservation plan: ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Also be aware that all marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas. The importation of marine mammals and marine mammal products into the U.S. is also prohibited. More information can be found on the MMPA website: <http://www.nmfs.noaa.gov/pr/laws/mmpa/>.

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

Related website:

National Marine Fisheries Service:

[http://www.nwr.noaa.gov/protected\\_species/species\\_list/species\\_lists.html](http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html)

Attachment



United States Department of Interior  
Fish and Wildlife Service

Project name: WAARNG's Tumwater Readiness Center

## Official Species List

### Provided by:

Washington Fish and Wildlife Office  
510 DESMOND DRIVE SE, SUITE 102  
LACEY, WA 98503  
(360) 753-9440  
<http://www.fws.gov/wafwo/>

**Consultation Code:** 01EWF00-2017-SLI-0162

**Event Code:** 01EWF00-2017-E-00646

**Project Type:** DEVELOPMENT

**Project Name:** WAARNG's Tumwater Readiness Center

**Project Description:** WAARNG proposes to construct an ~90,000 SF 2-storey readiness center and associated supporting structures including FMS, vehicle storage building, parking, and stormwater basins. Property totals ~53 ac but only ~17 ac in northern portion would be used for the project. Remaining areas would be undeveloped and used for stormwater management and training. Property is located at 8311 KImmie St., Tumwater WA.

**Please Note:** The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.



United States Department of Interior  
Fish and Wildlife Service

Project name: WAARNG's Tumwater Readiness Center

### Project Location Map:



**Project Coordinates:** MULTIPOLYGON (((-122.93092846870421 46.96977676323772, -122.93214082717894 46.9674046461766, -122.92908310890196 46.96731678796884, -122.9291045665741 46.96596961071265, -122.9309606552124 46.96598425412609, -122.93110013008119 46.96441006423528, -122.92906165122986 46.96436613269019, -122.92909383773804 46.96355339259847, -122.931067943573 46.96355339259847, -122.93122887611389 46.96002405366471, -122.93519854545592 46.96005334374256, -122.93381452560425 46.96522279131212, -122.93210864067079 46.97034049163574, -122.93092846870421 46.96977676323772)))

**Project Counties:** Thurston, WA



United States Department of Interior  
Fish and Wildlife Service

Project name: WAARNG's Tumwater Readiness Center

## Endangered Species Act Species List

There are a total of 12 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Amphibians	Status	Has Critical Habitat	Condition(s)
Oregon Spotted frog ( <i>Rana pretiosa</i> ) Population: Wherever found	Threatened	Final designated	
<b>Birds</b>			
Marbled murrelet ( <i>Brachyramphus marmoratus</i> ) Population: U.S.A. (CA, OR, WA)	Threatened	Final designated	
Streaked Horned lark ( <i>Eremophila alpestris strigata</i> ) Population: Wherever found	Threatened	Final designated	
Yellow-Billed Cuckoo ( <i>Coccyzus americanus</i> ) Population: Western U.S. DPS	Threatened	Proposed	
<b>Fishes</b>			
Bull Trout ( <i>Salvelinus confluentus</i> ) Population: U.S.A., conterminous, lower 48 states	Threatened	Final designated	
<b>Flowering Plants</b>			
golden paintbrush ( <i>Castilleja</i> )	Threatened		



United States Department of Interior  
Fish and Wildlife Service

Project name: WAARNG's Tumwater Readiness Center

<i>levisecta</i> Population: Wherever found			
Kincaid's Lupine ( <i>Lupinus sulphureus</i> <i>ssp. kincaidii</i> ) Population: Wherever found	Threatened	Final designated	
Nelson's checker-mallow ( <i>Sidalcea</i> <i>nelsoniana</i> ) Population: Wherever found	Threatened		
Water howellia ( <i>Howellia aquatilis</i> ) Population: Wherever found	Threatened		
<b>Mammals</b>			
Olympia pocket gopher ( <i>Thomomys</i> <i>mazama pugetensis</i> ) Population: Wherever found	Threatened	Final designated	
Tenino pocket gopher ( <i>Thomomys</i> <i>mazama tumuli</i> ) Population: Wherever found	Threatened	Final designated	
Yelm pocket gopher ( <i>Thomomys</i> <i>mazama yelmensis</i> ) Population: Wherever found	Threatened	Final designated	



United States Department of Interior  
Fish and Wildlife Service

Project name: WAARNG's Tumwater Readiness Center

## **Critical habitats that lie within your project area**

There are no critical habitats within your project area.

**APPENDIX M**

**KIMMIE ROAD INDUSTRIAL PARK: POCKET GOPHER SURVEYS, ESA ADOLFSON, 2008**

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# memorandum

date April 28, 2008  
to Todd Hansen  
from Linda Krippner  
subject **Kimie Road Industrial Park: Pocket Gopher Surveys**

ESA Adolfson is pleased to present the results of our field survey for Mazama pocket gopher (*Thomomys mazama*) mounds at the 53-acre Kimie Road Industrial Park project site. This field survey was conducted for Todd A. Hansen, Inc. on March 20, 2008. The site is located between I-5 and Kimie Street SW and north of SR 121 (93<sup>rd</sup> Avenue SW) in the City of Tumwater, Thurston County, Washington (Figure 1).

## **SITE DESCRIPTION**

This site parallels I-5 and is mostly undeveloped. The southern and central portions of the site are densely forested, with some forest openings dominated by invasive shrubs and grasses. A large gravel parking area, a smaller paved lot, and three buildings are located on the north portion of the site.

## **PROJECT DESCRIPTION**

The proposed Kimie Road Industrial Park project would subdivide the 53-acre site into 11 industrial lots. An open space tract, access road, and stormwater facilities are also planned on the site.

## **STUDY METHODS**

This study included a review of existing information and a field survey. Databases and documents reviewed for this survey included the following:

- *Kimie Road Industrial Park: Presub Sketch* (Skillings Connolly, 2007);
- *Aerial photography* (US Department of Agriculture [USDA], 2006);
- *Thurston County Soil Survey* (Pringle, 1990);
- *Web Soil Survey* (Natural Resources Conservation Service [NRCS], 2006);
- *Living With Wildlife: Pocket Gophers* (WDFW, 2005);

- *Status Report for the Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot* (Stinson, 2005).
- *Proceedings of the First Mazama Pocket Gopher Workshop and Preliminary report on Needed Conservation Actions (2006-2010)*. (The Nature Conservancy and WDFW, 2006);
- *Habitats and Species Database* (Washington Department of Fish and Wildlife [WDFW], 2008);

On March 20, 2008, ESA Adolfsen ecologists Cathie Conolly, Linda Krippner, Sarah Hartung, and Abbey Paulsen conducted a survey for the Mazama pocket gopher at the Kimmie Road site. Information about habitat conditions was recorded, including vegetation community types and habitat features present. The site was surveyed for the presence of pocket gopher mounds by walking transects through all habitat types on the site, with more detailed inspection (transects with 30-foot or less intervals) given to preferred pocket gopher habitat areas, including patches dominated by grasses and herbs. All mounds encountered during the walking survey were examined to determine whether they were formed by Mazama pocket gophers or moles. Mazama pocket gopher mounds can be distinguished from mole-hills by a fan shape and the presence of a dirt "plug" within the mound (WDFW, 2005).

## FINDINGS

### Review of Existing Information

The north portion of the site is mapped as having high ground water (Skillings and Connolly, 2007). Most of the site is forested (USDA, 2006). Soils are mapped as Everett gravelly sandy loam, Cagey loamy sand, and Norma silt loam (NRCS, 2006). Norma loam located on the south portion of the site is considered to be hydric (Pringle, 1990).

No priority habitats or species including pocket gophers or pocket gopher habitat are mapped on the site (WDFW, 2008). However, Mazama pocket gopher mounds have been identified approximately 2,500 feet east of the site (WDFW, 2008). The Olympia Airport, located immediately northeast of the project site, contains approximately 700 acres of suitable habitat and a large population of gophers of between 2,000 and 7,000 individuals (The Nature Conservancy and WDFW, 2006).

### Field Survey

Most of the site is forested, with open areas scattered throughout the site that are relatively disturbed, with invading shrubs such as Scot's broom. In general, younger forest stands were present at the south end of the site, a more established forest community was located in the north central area, and open patches of thicket and grassland were located in the south central portion of the site. Several wetland areas were encountered near I-5 and in the south portion of the site.

#### *Vegetation Communities and Wildlife Observations*

The young forest communities on the south portion of the site had a closed canopy and were dominated by red alder, with an understory of salmonberry, snowberry, bleeding heart, and stinging nettle (Photo 1). Wildlife observations in this area included numerous mountain beaver tunnels, deer scat, a few mole hills, spotted towhee, black-capped chickadee, red-tailed hawk, song sparrow, and Steller's jay.

Older closed canopy forest on the north-central portion of the site was dominated by western red cedar, Douglas fir, western hemlock, and grand fir (Photo 2). Understory vegetation included sword fern, salal, trailing blackberry, Oregon grape, bleeding heart, salmonberry, red huckleberry, and bracken fern.

Wildlife observations included mountain beaver tunnels, deer tracks, black-capped chickadee, and ruby-crowned kinglet.

The central portion of the site contained dense Douglas spiraea and Scot's broom thickets (Photo 3). Other shrubs present included snowberry and salal. Small grassy patches between these thickets were searched carefully for pocket gopher mounds (Photo 3). Dominant plants in these areas included tall fescue and bracken fern. The north end of the site also had grassy, disturbed areas that were searched with closely spaced transects. A few mole hills were observed in these disturbed areas.

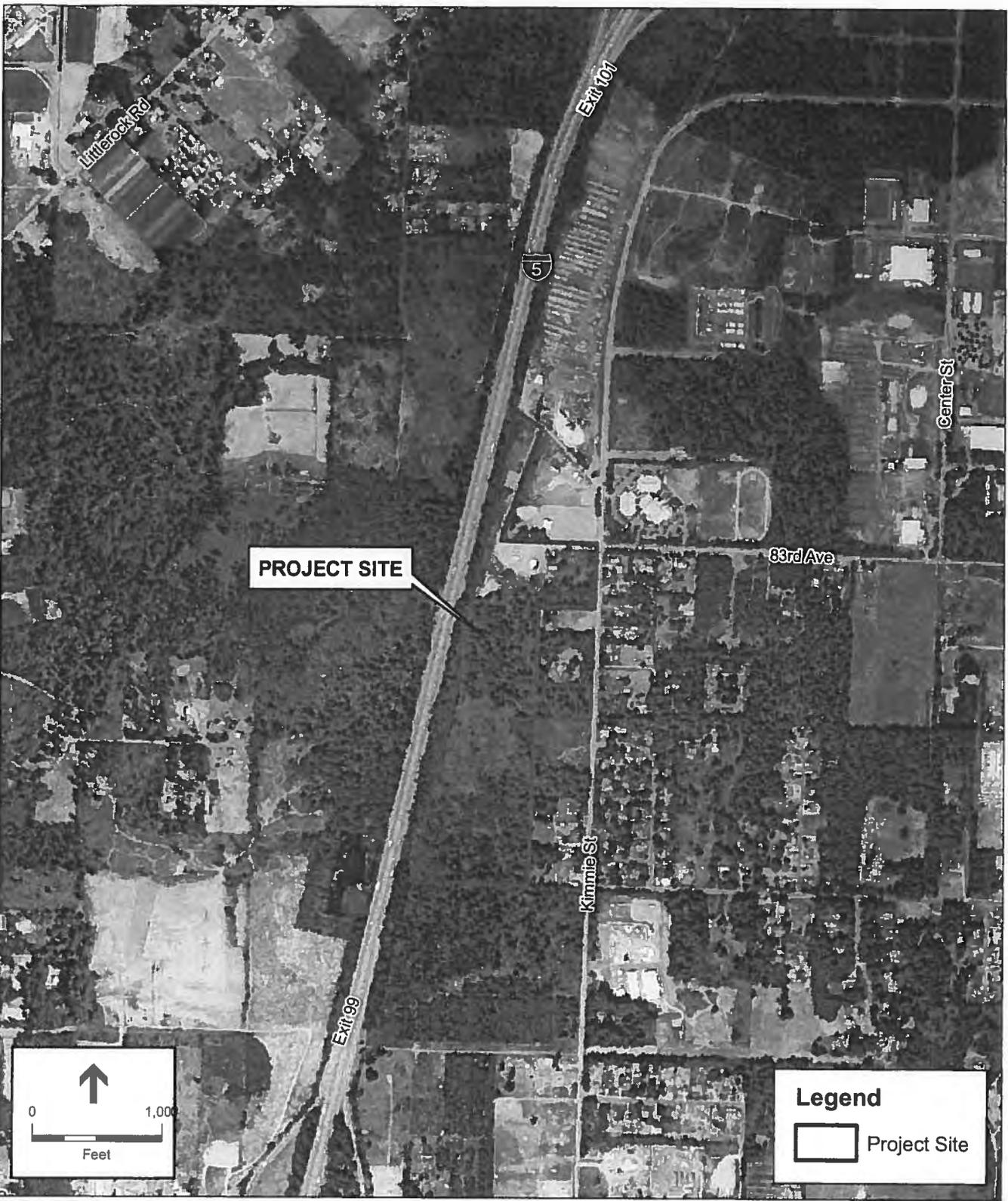
#### *Pocket Gopher Mound Surveys*

No *Mazama* pocket gopher mounds were identified and only small, disturbed patches of potential habitat for pocket gophers were observed at the Kimmie Road Industrial Park project site.

There are several reasons why potential pocket gopher habitat is limited on the Kimmie Road site. Pocket gophers require well drained soils for their burrow systems and nests (Stinsen, 2005). High ground water on the north half of the site and hydric soil mapped on the south portion of the site indicate that most of the site is not likely to have well drained soils suitable for pocket gophers. Wetland areas observed during our field survey also confirmed the presence of high ground water and hydric soils on this site. Secondly, most of the site is forested. Pocket gophers depend upon abundant forbs and grasses found in prairie habitats, and are not usually found in closed canopy forest habitats like those present on this site.

Attachments: Figure 1  
Photos 1 through 3

CREATED BY: MJL DATE: 03/25/08  
G:\NATURAL SCIENCES\2008\208092\_KimmieRd\PocketGopher\GIS\Fig01\_VicinityMap.mxd (MH 04/16/2008)



SOURCE: Skillings and Connolly, 2008; ESA Adolfson, 2008; USDA, 2006; WSDOT, 2007

Kimmie Rd. Pocket Gopher Survey. 208092

**Figure 1**  
Vicinity Map  
Thurston County, WA

Kimmmie Road Industrial Park



Photo 1. Red alder forest on the south portion of the site (March 20, 2008).



Photo 2. Conifer forest on the north-central portion of the site (March 20, 2008).

Kimmmie Road Industrial Park



Photo 3. Shrub thicket and grassy patch in the central portion of the site (March 20, 2008).

**APPENDIX N**  
**CULTURAL RESOURCES ASSESSMENT, CRC CONSULTANTS, 2015**

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**TECHNICAL MEMO 1507C-4**

DATE: October 13, 2015

TO: Lisa Klein  
AHBL, Inc.

FROM: Glenn Hartmann, Principal Investigator

RE: Cultural Resources Assessment for the Tumwater Readiness Center, Thurston  
County, WA

The attached short report form constitutes our final report for the above referenced project. Assessment did not identify cultural resources that could be affected by this project. Please contact this office should you have any questions about our findings and/or recommendations.

# CULTURAL RESOURCES REPORT COVER SHEET

Author: James Schumacher

Title of Report: Cultural Resources Assessment for the Tumwater Readiness Center, Thurston County, WA

Date of Report: October 13, 2015

County: Thurston Sections: 16, 39, 40 Township: 17 N Range: 2 W

Quad: Maytown, WA Acres: 53

PDF of report submitted (REQUIRED)  Yes

Historic Property Inventory Forms to be Approved Online?  Yes  No

Archaeological Site(s)/Isolate(s) Found or Amended?  Yes  No

TCP(s) found?  Yes  No

Replace a draft?  Yes  No

Satisfy a DAHP Archaeological Excavation Permit requirement?  Yes #  No

Were Human Remains Found?  Yes DAHP Case #  No

DAHP Archaeological Site #:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.

## Management Summary

This report describes a cultural resources assessment for the proposed Tumwater Readiness Center, located in Thurston County, Washington. AHBL, on behalf of Washington Military Department's Washington Army National Guard, requested this assessment prior to development of the facility. This assessment was developed to identify any previously recorded archaeological or historic sites at the project location and evaluate the potential for the project to affect cultural resources. No previously recorded archaeological sites are located in the project boundary. Assessment did not identify significant potential for cultural resources that could be affected by this project. No further cultural resources assessment is recommended. An archaeological inadvertent discovery protocol is attached (Attachment A).

### 1. Administrative Data

Report Title: Cultural Resources Assessment for the Tumwater Readiness Center, Thurston County, Washington.

Author: James Schumacher

Report Date: October 13, 2015

Location: The project is located in Township 17 North, Range 2 West, Sections 16, 39, and 40, Willamette Meridian (Figure 1).

USGS 7.5' Topographic Map (s): Maytown, WA

Total Area Involved: 53

Objective (Research Design): This assessment was developed as a component of preconstruction environmental review with the goal of ensuring that no cultural resources are disturbed during construction of the proposed project by determining the potential for any as-yet unrecorded archaeological or historic sites within the project area. This project requires permits and regulatory compliance that includes SEPA Environmental Review; NEPA Environmental Assessment; and a National Pollutant Discharge Elimination System permit from the Washington State Department of Ecology. CRC's work was intended, in part, to assist in addressing federal agency responsibilities regarding the identification of potential impacts to archaeological and historic sites in compliance with Section 106 of the National Historic Preservation Act (NHPA), as well as state laws and regulations protecting cultural resources (e.g., RCW 27.44, RCW 27.53). Under Section 106, agencies involved in a federal undertaking must take into account the undertaking's potential effects to historic properties (36 CFR 800.16(l)(1)). The Washington State Archaeological Sites and Resources Act (RCW 27.53) prohibits knowingly disturbing archaeological sites without a permit from the Washington Department of Archaeology and Historic Preservation (DAHP), and the Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing Native American or historic graves.

Assessment methods consisted of review of available project information, local environmental, cultural, and historical information, and records on file at DAHP, as well as field investigations. CRC also contacted cultural resources specialists with the Chehalis Tribe, the Muckleshoot Tribe, the Nisqually Tribe, the Puyallup Tribe, the Skokomish Tribe, the Squaxin Island Tribe, and the Steilacoom Tribe to inquire about project-related cultural information or concerns (Attachment B). This assessment utilized a research design that considered previous studies, the magnitude and nature of the project, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the project area, as well as other applicable laws, standards, and guidelines (per 36CFR800.4 (b)(1)).

Recorded Cultural Resources Present: Yes [ ] No [x]

No cultural resource sites have been previously recorded in the project boundary.

Project Background: AHBL, on behalf of Washington Military Department's Washington Army National Guard, requested this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW (Figure 2). The new facility will be an approximately 90,940 square foot (sf) readiness center; 29,701 sf vehicle storage building; 8,900 sf storage building; 300 sf controlled waste facility; a 200 sf flammable materials structure; and, an 18,000 sf parking area. The entire property is approximately 53 acres (ac) on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie Street SW on the east, several residential properties on the east, undeveloped land to the south, and Frontage Road to the north. The Thurston County Assessor does not list any buildings recorded on the subject parcels. For purposes of this assessment, the area of potential effects (APE) for this project is understood to be the area described above and depicted on attached maps.

## 2. Background Research

Background research was conducted in August 2015.

### Archival Sources Checked:

DAHP WISAARD	[x] No cultural resources are inventoried within the project boundary.
Web Soil Survey	[x] Soils mapped in the project area consist of Cagey loamy sand, Everett very gravelly sandy loam, and Norma silt loam (USDA NRCS 2015).
Library	[x] Various historical, archaeological, and ethnographic references.
General Land Office Map	[x] 1854, 1863/1883

Context Overview: Environmental and cultural context information for this project is derived from relevant published reports, articles, and books; historical maps and documents; geological and soils surveys; ethnographic accounts; and local archaeological survey reports.

Environmental Context: An understanding of environmental and geological processes is important to assess archaeological expectations and model the potential for unidentified cultural

resources in any location. Local topography in the project area was formed by Late Pleistocene glaciers that advanced through the area approximately 15,000 years ago, during the Vashon Stade of the Fraser Glaciation, scouring troughs or channels in the older glacial till that was deposited and compacted during previous glacial advances. Since the last glacial retreat (ca. 12,000-13,000 years ago), little, if any, sedimentary deposition has occurred in the vicinity of the project area. The surface geologic unit mapped in the project location is Qgd, Pleistocene glacial drift, which is composed of unsorted till and outwash clay, silt, sand, gravel, and cobbles deposited by glacial ice (WA DNR 2015).

Soils mapped in the project area are Cagey loamy sand, Everett very gravelly sandy loam, and Norma silt loam (USDA NRCS 2015). Cagey loamy sand formed on terraces from sandy glacial drift. The typical profile consists of 0-28 inches of loamy sand over fine sand to a depth of 60 inches. Everett very gravelly sandy loam formed on terraces from glacial outwash. The typical profile consists of 0-3 inches of very gravelly sandy loam over 3-60 inches of extremely gravelly loam and sand. Norma silt loam formed in depressions and drainages from alluvium. The typical profile consists of 0-8 inches of silt loam over 8-60 inches of sandy loam. Locally mapped soils and surface geologic deposits indicate that local topography has remained largely unchanged since humans have been present on the landscape. Evidence of postglacial cultural activity would typically be expected to be present near the modern ground surface.

Archaeological Context: Cultural resource syntheses (e.g., Nelson 1990) provide background information on western Washington archaeology relevant to the project area. Archaeologists have identified broad similarities in site and lithic assemblages dated to between 9000-5000 years before present (BP). This period is characterized by occupation sites located on uplands or atop upper river terraces, lithic workshops, and temporary hunting camps that contain a wide variety of flaked stone tools and laurel-leaf-shaped bifaces suggestive of large game hunting, butchering and processing (e.g., Gallison 1994; Morgan et al. 1999). Patterns of seasonal residence and logistical mobility characterizing the ethnographic pattern find their foundation from about 3000 BP. Sites dating from this period represent seasonal specialized spring and summer fishing and root gathering campsites and winter village locations.

Ethnographic Context: The project area is within the traditional territory of the Nisqually people (Ruby and Brown 1992; Smith 1940) and may have been utilized by ancestral members of the Squaxin Island Tribe and the Confederated Tribes of the Chehalis. Native Americans by the early historic period practiced a seasonal subsistence economy that consisted of spring, summer and fall migrations to areas for hunting, fishing, gathering of berries and roots, and procurement of shellfish followed by a more sedentary lifestyle as they returned to longhouse villages as winter approached. Although salmon and other fish were a primary food source, the complexity of the Puget Lowland environment provided a rich subsistence base. Villages were typically adjacent to or near river or marine transportation routes (Smith 1940). In 1854, following negotiations between Puyallup, Nisqually, and Squaxin Island people and the United States government, the Treaty of Medicine Creek led to the abandonment of most southern Puget Sound villages and compelled Nisqually people to relocate to one of three reservations, including that established near the mouth of Shenahnam Creek (Ruby and Brown 1992). This treaty dissolved Indian title to their traditional lands, and by 1855-56 the federal government used military force to contain Nisqually and other Indian people dissatisfied with the poor quality of

reservation lands. No information about specific village sites or use-areas related to the current project APE was identified in research literature.

Historic Context: European and American fur traders and settlers had contact with Indian people in the early 19<sup>th</sup> century. In 1845, Michael Simmons and George Bush led the first group of Euro-American settlers to the area and located themselves at the southern shore of Budd Inlet in a community they called “New Market” (now Tumwater). New Market’s economy was initially based on lumber, with a mill located on the west bank of the lower falls of the Deschutes River. The Hudson’s Bay Company facilitated early development of the community by purchasing lumber and shingles from the mill. Some of these initial settlers also established small farms with cattle in the surrounding areas. By the late 1870s, people located along the Deschutes River valley as evidenced by homestead and cash sale land claims, and in 1889 the City of Olympia was made capitol of Washington State (Kirk and Alexander 1990; Stevenson 1996). With the notable exception of the interstate highway corridor just west of the project APE, constructed in the late 1950s, the vicinity of the current project remains a landscape of undeveloped and mixed rural/residential character.

A land patent in the project APE dates to 1867. A patent for 317 acres that included the northern half of the project area was issued to Henry and Margaret Kaudle (1850 Oregon-Donation Land Grant Act, Accession No. WAOAA 090958, 3/11/1867). Research did not identify land-use or development that might have occurred on the Kaudle property. The remainder of the land within the project area was deeded to the State of Washington in 1889 (BLM 2015).

Historical Maps: The 1854 General Land Office (GLO) cadastral survey plat for the area does not show any natural or cultural or features such as wetlands, structures, trails, or clearings within the project boundary (Figure 3). Land in the general vicinity of the project area is described with the notation “timber fir cedar[,] the soil 2<sup>nd</sup> rate” (USSG 1854). The 1854 map does illustrate three homesteads around the project APE, each about one mile from the project boundary, as well as features such as streams, ponds, lakes, and roads, all well outside the project APE. An 1883 photo-lithograph of the 1863 GLO map shows only several large deeded parcel boundaries, including that deeded to Henry and Margaret Kaudle in 1867 (USSG 1883). No other cultural features are depicted.

Aerial imagery from 1990 (Figure 4) and 2003 (Figure 5) showed that most of the southern half of the APE had been logged prior to 1990; and, building construction had substantially cleared the northern portion of the APE (Google, Inc. 2015). These photos corroborate information subsequently learned from property owners adjacent to the project area, which indicated much of the area had been logged and cleared with heavy machinery by the 1970s. As part of logging operations or soon afterwards, a “jeep track” was cleared around the perimeter of at least the southern half of the APE and along its western boundary to the north (Figure 6). Other automobile roads were cleared and used to transport and dump debris in the clearing. Local youths also used earth-moving machinery to create “50cc dirt-bike trails, ramps, and jumps” in the southern half of the APE (author’s personal communication with local residents, August 22-23).

Recorded Cultural Resources: Background research did not identify any recorded archaeological sites or historic structures in the APE. Literature review did not identify traditional cultural properties (TCPs) in or near the project. No pre-contact archaeological sites have been recorded with DAHP within a mile of the project location. The nearest recorded historic site is 45TN91, the location of George Bush's homestead, approximately 2 miles east of the project area. The nearest recorded precontact site is a small lithic scatter (45TN63) also located about two miles east, near the Deschutes River. No historic structures or features are recorded within or adjacent to the project APE. Cultural resource investigations have been conducted within about one mile. These include surveys for a proposed pipeline 0.5-mile south of the current APE (Weed et al. 2002); for airport improvements about a mile east of the APE (Parvey 2002); and, road and infrastructure improvements within one mile north and south of the APE (Robinson 1998; Schumacher 2009a, 2009b, 2009c). These did not identify cultural resources in the vicinity of the current project area.

Archaeological Expectations: The DAHP statewide predictive model uses environmental data about the locations of known archaeological sites to identify where previously unknown archaeological sites are more likely to be found. The model correlates locations of known archaeological to environmental data "to determine the probability that, under a particular set of environmental conditions, another location would be expected to contain an archaeological site (Kauhi and Markert 2009:2-3). Environmental data categories included in the computer-based model are elevation, slope, aspect, distance to water, and landforms. The DAHP model classifies most of the project APE as moderate potential, with several small dispersed locations and the southwest part of the APE classified as high potential. These classifications are likely based on level terrain and distance to water variables. The predictive model does not take into account soils data, which in this case would reduce the likelihood of archaeological resources (see discussion below).

CRC's assessment included the entire property. Multiple lines of evidence suggest low potential for the presence of undisturbed or potentially significant buried archaeological deposits.

Evidence of postglacial cultural activity would typically be expected to be present near (i.e., within several inches) the modern ground surface. Soils in the southern portion are mapped as Everett very gravelly sandy loam, and Norma silt loam. Everett very gravelly sandy loam was formed from glacial outwash, with an average of 3 inches of developed very gravelly sandy loam over extremely gravelly outwash parent material. Norma silt loam is a poorly drained soil susceptible to ponding (i.e., frequent standing water).

Archaeological and ethnographic information suggest that this pre-contact inland forest locale could have been used for temporary and transitory activities such as hunting or foraging, rather than for seasonal camps or permanent villages. The absence of mapped permanent natural freshwater sources within at least one half-mile of the south half of the project area would corroborate this expectation.

Air photos and maps indicate modern disturbance in the southern area. The 1959 Maytown, WA USGS quad was photo-revised in 1968 and 1973 (Figure 6). It clearly depicts the dirt roads that ringed the southern part of the project area, including the western "extension" of Taylor Road

that forms the southern boundary of the project APE. These roads are not depicted on more recent USGS photo-revised quads.

The 1991 and 1992 air photos show these roads as lighter lines in the lower left of Figures 7 and 8, which indicated significant land clearing where these roads are visible. Current air photos do not show most of the roads, indicating rapid regrowth of logged areas over the last two decades. Field survey confirmed this: the majority of tree trunks were generally small diameters and the forest understory was dense and brushy and typical of regrowth in disturbed western Washington environments.

What is not shown as cleared by 1992 is a small area in the south-central part of the project area. Soils here are mapped largely as Norma silt loam, poorly drained and susceptible to standing water (Figure 9), and therefore an area having a lower probability for the occurrence of buried archaeology.

The author reviewed logs and summary analyses of 10 geotechnical soil samples drilled within the project area (Figure 10) for the proposed development (South Sound Geotechnical Consulting 2015). No indication of anthropogenic sediments or archaeological materials was identified in any samples.

Based upon the results of background research, the project location was considered to have a low to moderate potential to contain intact archaeological deposits. Archaeological and ethnographic information suggest that this pre-contact inland forest locale could have been used for temporary and transitory activities such as hunting or foraging, or for individual religious activities unlikely to leave a distinctive archaeological signature. Given the glacial outwash origins of local soils, any archaeology that might be present would be expected to be buried very near the modern ground surface. The documented history of modern logging and other ground disturbing activities, particularly in the southern half of the APE, suggests a low potential for the presence of undisturbed cultural deposits.

### **3. Fieldwork**

Field investigations were conducted by the author; notes and photographs are on file at CRC.

Total Area Examined: Accessible portions of the project area were investigated by pedestrian survey and excavation of shovel probes in post-glacial sediments.

Areas not examined: Prior to the beginning of fieldwork, pedestrian transects were intended to be spaced at 15-meter intervals. This proved impractical in practice. Parts of the forested project area were discovered to have uneven, hummocky terrain overgrown with dense understory brush that made physical transit along planned transects extremely difficult and a potential safety risk (Figure 11). Due to the thick vegetation, ground surface and mineral soil visibility was very poor across most of the APE. Access to all areas of the project was attempted, but in places pedestrian survey was limited to following the irregular overgrown remnants of dirt bike trails (Figure 12). This departure from the planned survey transect interval was considered to be mitigated by the fact that most of the southern half of the APE had been cleared by heavy

machinery logging, and had been subjected to substantial ground disturbance that would likely have destroyed any near-surface archaeology that could have been present.

Date(s) of Survey: August 22-24, 2015

Weather and Surface Visibility: Weather conditions were warm and dry. Surface visibility of mineral soils was poor throughout most of the project area.

#### 4. Results

The author conducted fieldwork in the project area August 22-24. Survey transects and shovel probes were distributed in response to local field conditions and available information about the project area. The intent was to provide an assessment of cultural resources potential informed by all lines of evidence. Pedestrian survey transects generally followed a “lazy-S” pattern and were governed by accessibility through forest and dense understory vegetation (Figures 13 – 15). Fifteen-meter interval transects were used when possible. Large-scale air photos and a GPS receiver enabled documentation of survey routes and shovel probe locations. No evidence of pre-modern aboveground cultural resources was observed. Modern use of the project area was indicated by cement slab foundations and demolished building debris in the northernmost part of the APE; the “jeep track” and dirt bike trails; a discarded appliance and other modern trash; a partially collapsed deer stand or tree house near shovel probe 15; and, several Tumwater well heads. The backfilled geotechnical survey pits were relocated and these sediments examined for evidence of buried archaeology. None was identified.

Twenty-five shovel probes were excavated within the APE (Figures 16 and 17; Table 1). Sediments were screened in 0.25-inch mesh and the holes backfilled. Soils consisted of loamy sands consistent with mapped geology and soils. No cultural material or indication of buried archaeological surfaces was observed.

Table 1. Shovel probe (SP) summary.

<b>SP No.</b>	<b>Description, depths in centimeters (with UTM coordinates: Zone-Easting-Northing; WGS84 datum)</b>
1	10T-505210-5201798 Sod. 0-25: very gravelly brown loamy sand. No cultural material.
2	10T-505168-5201619 Sod. 0-28: gravelly loamy sand. 28-40: loamy sand. No cultural material.
3	10T-505111-5201378 0-38: gravelly loamy sand. No cultural material.
4	10T-505147-5201332 0-5: gravelly brown loamy sand. 5-24: yellowish-brown loamy sand. Excavation stopped by roots. No cultural material.
5	10T-505145-5201262 0-5: duff. 5-42: yellowish-brown loamy sand. No cultural material.
6	10T-505157-5201174 0-5: duff. 5-29: yellowish-brown loamy sand. Stopped by roots. No cultural material.
7	10T-505117-5201144 (at discarded washing machine) 0-38: brown loamy sand. No cultural material.
8	10T-505140-5201145

<b>SP No.</b>	<b>Description, depths in centimeters (with UTM coordinates: Zone-Easting-Northing; WGS84 datum)</b>
	Sod. 0-24: brown loamy sand. Stopped by roots. No cultural material.
9	10T-505089-5201116 Sod. 0-29: brown loamy sand. 29-50: light brown loamy sand. No cultural material.
10	10T-505100-5201076 Sod. 0-40: brown loamy sand. No cultural material.
11	10T-505082-5201043 Sod. 0-18: loamy sand. Stopped by roots. No cultural material.
12	10T-505068-5200994 Sod. 0-27: loamy sand. Stopped by roots. No cultural material.
13	10T-505098-5200991 Sod. 0-18: brown loamy sand. Stopped by roots. No cultural material.
14	10T-505106-5200966 Sod. 0-22: brown loamy sand. Stopped by roots. No cultural material.
15	10T-505114-5200944 0-27: brown loamy sand. 27-50: grayish-brown loamy sand. No cultural material.
16	10T-505084-5200951 0-18: brown loamy sand. 18-30: light brown loamy sand. No cultural material.
17	10T-505122-5200970 0-40: brown loamy sand. No cultural material.
18	10T-505107-5201041 0-10: brown loamy sand. Stopped by roots. No cultural material.
19	10T-505130-5201054 Sod. 0-40: brown loamy sand. No cultural material.
20	10T-505150-5201019 Sod. 0-18: brown loamy sand. Stopped by roots. No cultural material.
21	10T-505187-5201034 Sod. 0-32: brown loamy sand. 32-41: light brown loamy sand. No cultural material.
22	10T-505202-5201067 0-36: brown loamy sand. 36-44: light brown loamy sand. No cultural material.
23	10T-505183-5201119 0-20: brown sandy loam. Stopped by roots. No cultural material.
24	10T-505095-5201162 0-15: brown sandy loam. Stopped by roots. No cultural material.
25	10T-505135-5201438 0-35: brown loamy sand and gravels. No cultural material.

Cultural Resources Identified: None.

Conclusions, Findings and Recommendations: Background research and field survey did not identify evidence of pre-contact or historic sites within the project APE. Archaeological and ethnographic data suggest this area could have been used for pre-contact transitory activities not likely to result in clearly definable archaeology. Documented modern logging and other ground disturbing activities, particularly in the southern half of the APE, suggests low potential for the presence of undisturbed cultural deposits.

An archaeological inadvertent discovery protocol is attached (Attachment A). In the event that ground disturbing or other activities do result in the inadvertent discovery of archaeological deposits, work should be halted in the immediate area and contact made with the State Department of Archaeology and Historic Preservation (DAHP) in Olympia. Work should be halted until such time as further investigation and appropriate consultation is concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel.

No historic properties affected   
Historic properties affected   
    No adverse effect to historic properties   
    Adverse effect to historic properties

Attachments:

Figures   
Photographs   
Other  Proposed inadvertent discovery plan; project related correspondence.

**5. Limitations of this Assessment**

No cultural resources study can wholly eliminate uncertainty regarding the potential for prehistoric sites, historic properties or traditional cultural properties to be associated with a project. The information presented in this report is based on professional opinions derived from our analysis and interpretation of available documents, records, literature, and information identified in this report, and on our field investigation and observations as described herein. Conclusions and recommendations presented apply to project conditions existing at the time of our study and those reasonably foreseeable. The data, conclusions, and interpretations in this report should not be construed as a warranty of subsurface conditions described in this report. They cannot necessarily apply to site changes of which CRC is not aware and has not had the opportunity to evaluate.

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7. Figures

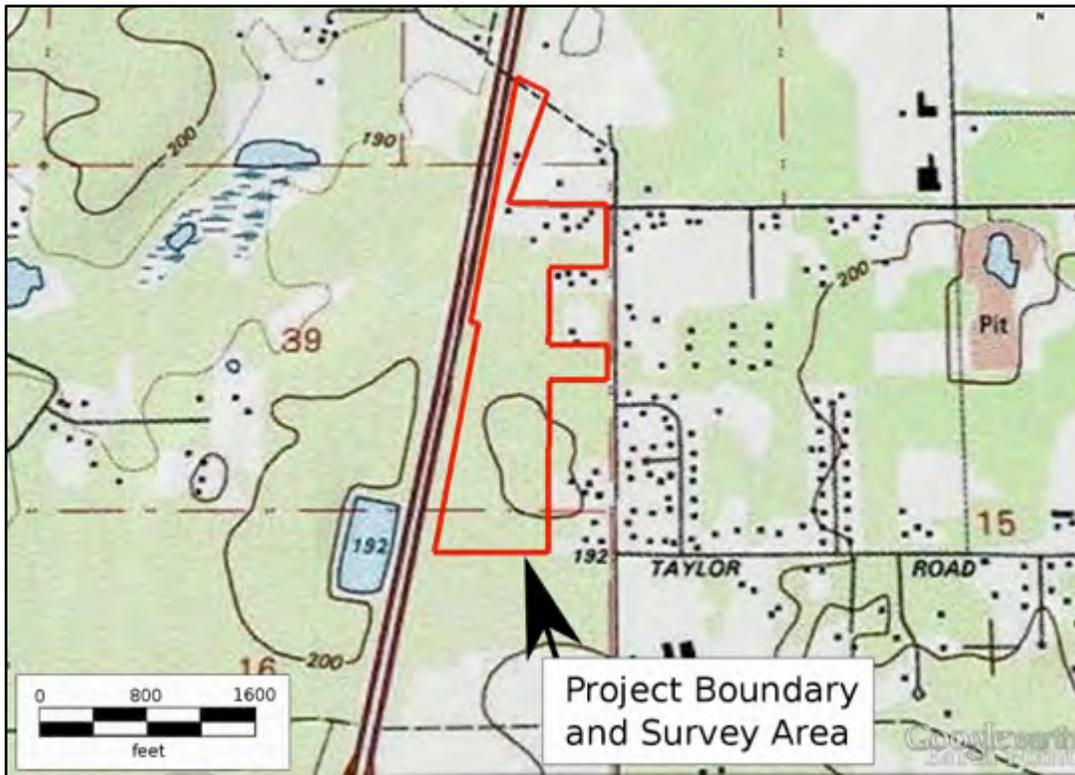


Figure 1. USGS Maytown, WA 7.5-minute quad marked with project boundary.



Figure 2. Air photo annotated with project location.



Figure 3. Portion of 1854 GLO map with project APE overlaid on USGS quad.



Figure 4. 1990 photo annotated with the project area (source: Google, Inc. 2015).

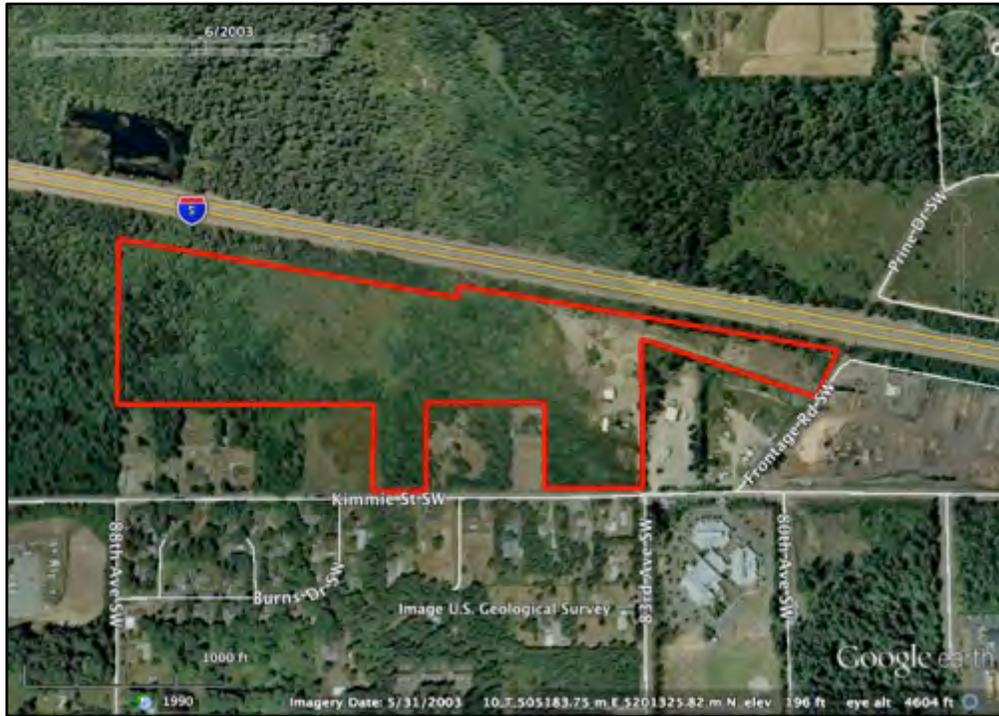


Figure 5. 2003 air photo of the project area (source: Google, Inc. 2015).

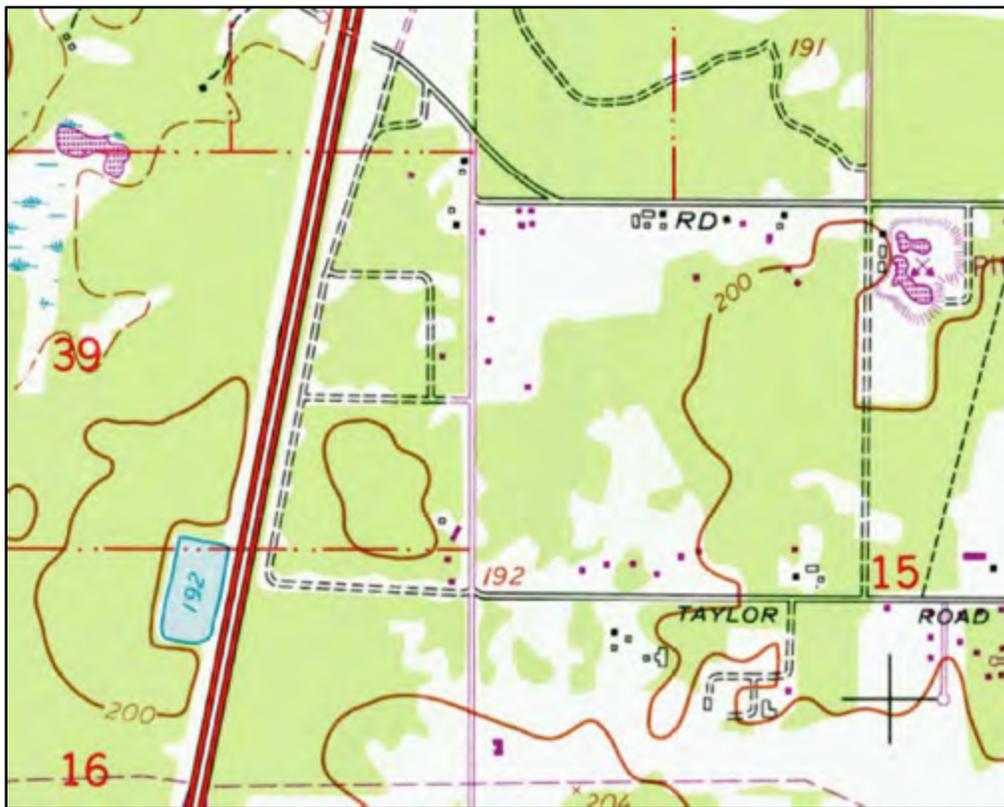


Figure 6. Portion of 1959 USGS Maytown quad (photo-revised 1968 and 1973).



Figure 7. 1991 air photo annotated with project boundary and survey transects.



Figure 8. 1992 air photo of south half of project area (source: USGS 1992).

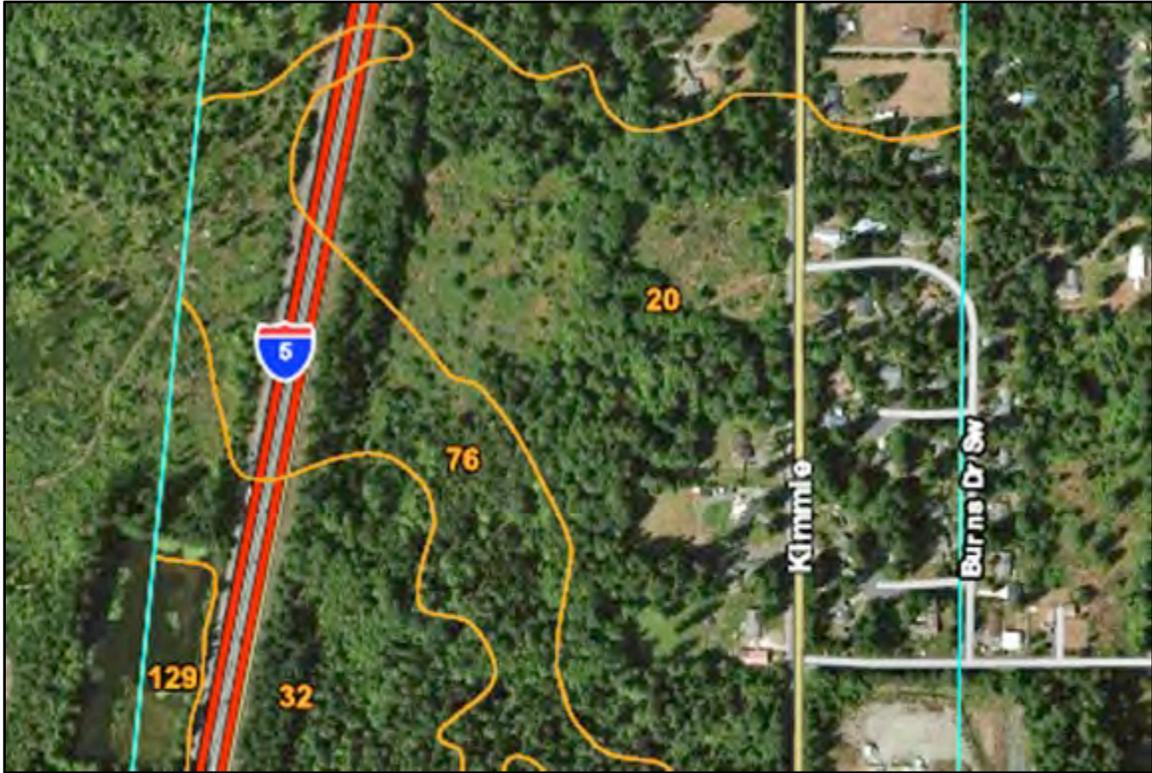


Figure 9. Portion of air photo annotated with soil map (source: USDA).  
Key: Norma silt loam (76); Cagey loamy sand (20); Everett very gravelly sandy loam (32).

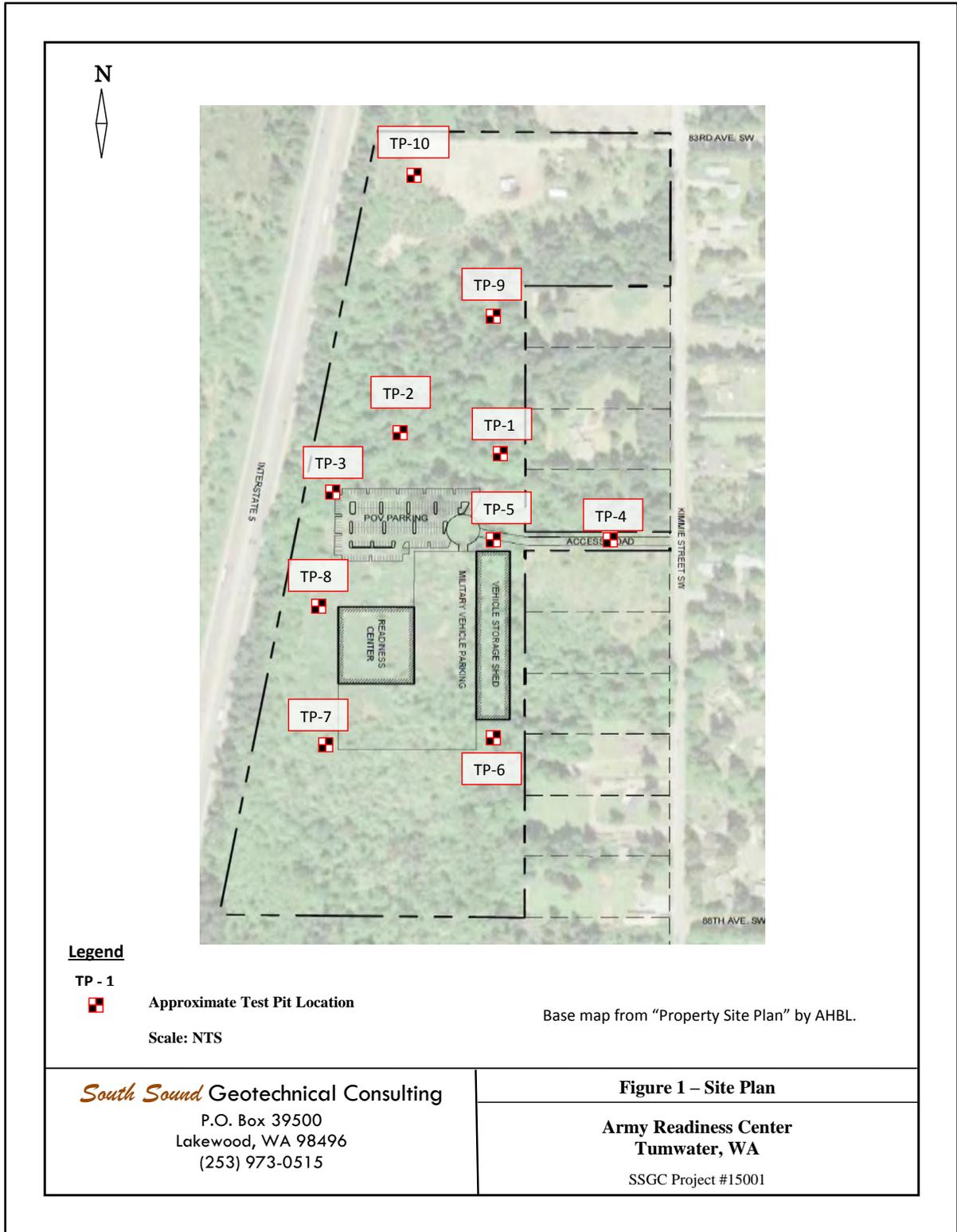


Figure 10. Map of geotechnical assay locations (South Sound Geotechnical Consulting 2015).



Figure 11. Representative view of post-1990 second-growth understory in southern part of the project area.



Figure 12. 1990 air photo (Google, Inc. 2015) annotated with schematic pedestrian survey transects.



Figure 13. Representative view of the northern forested part of the APE.



Figure 14. Discarded appliance adjacent to remnant roadway (near SP 7).



Figure 15. View across the south half of the project area; view to the south.

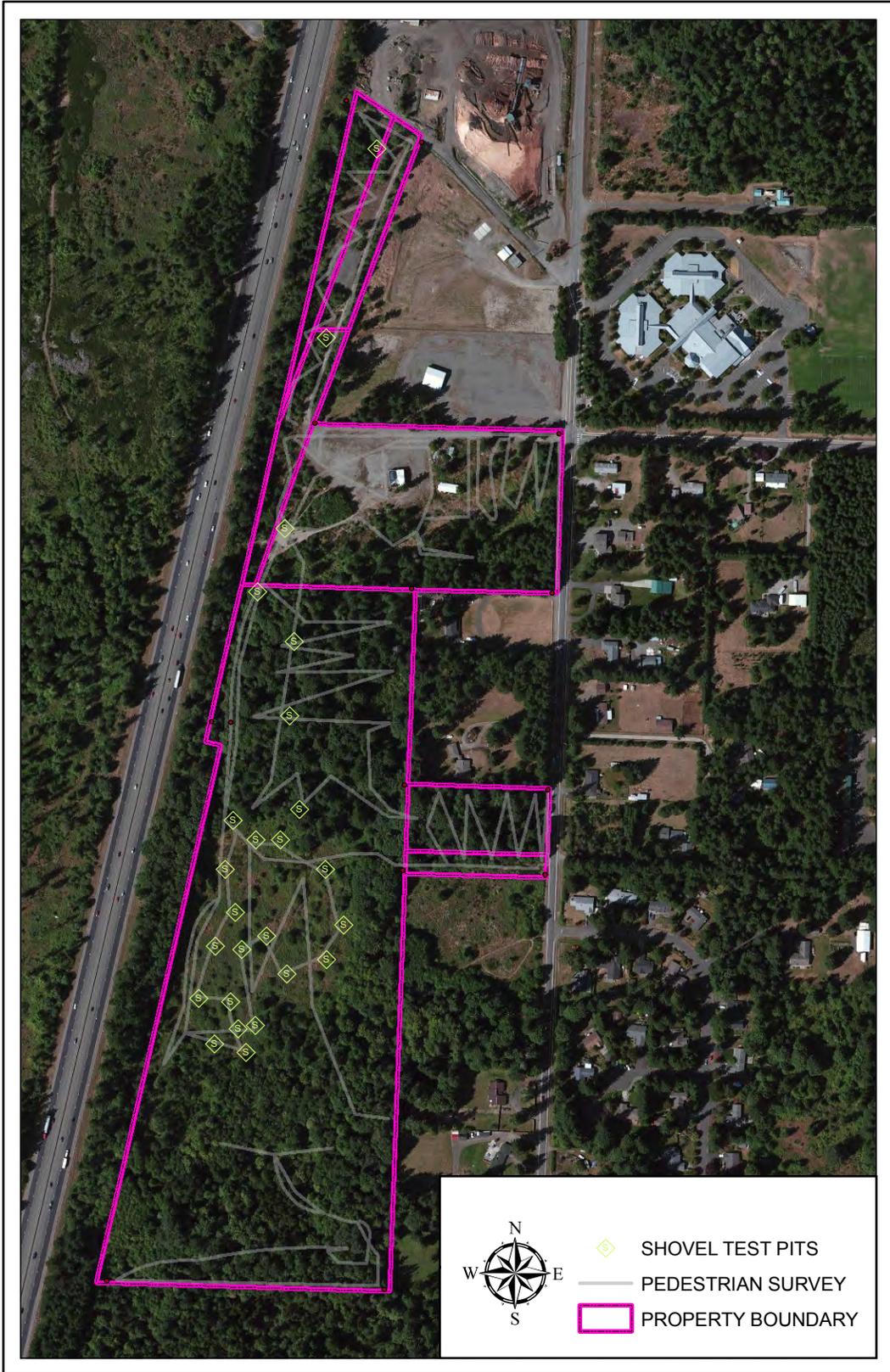


Figure 16. Shovel probe locations in the APE.

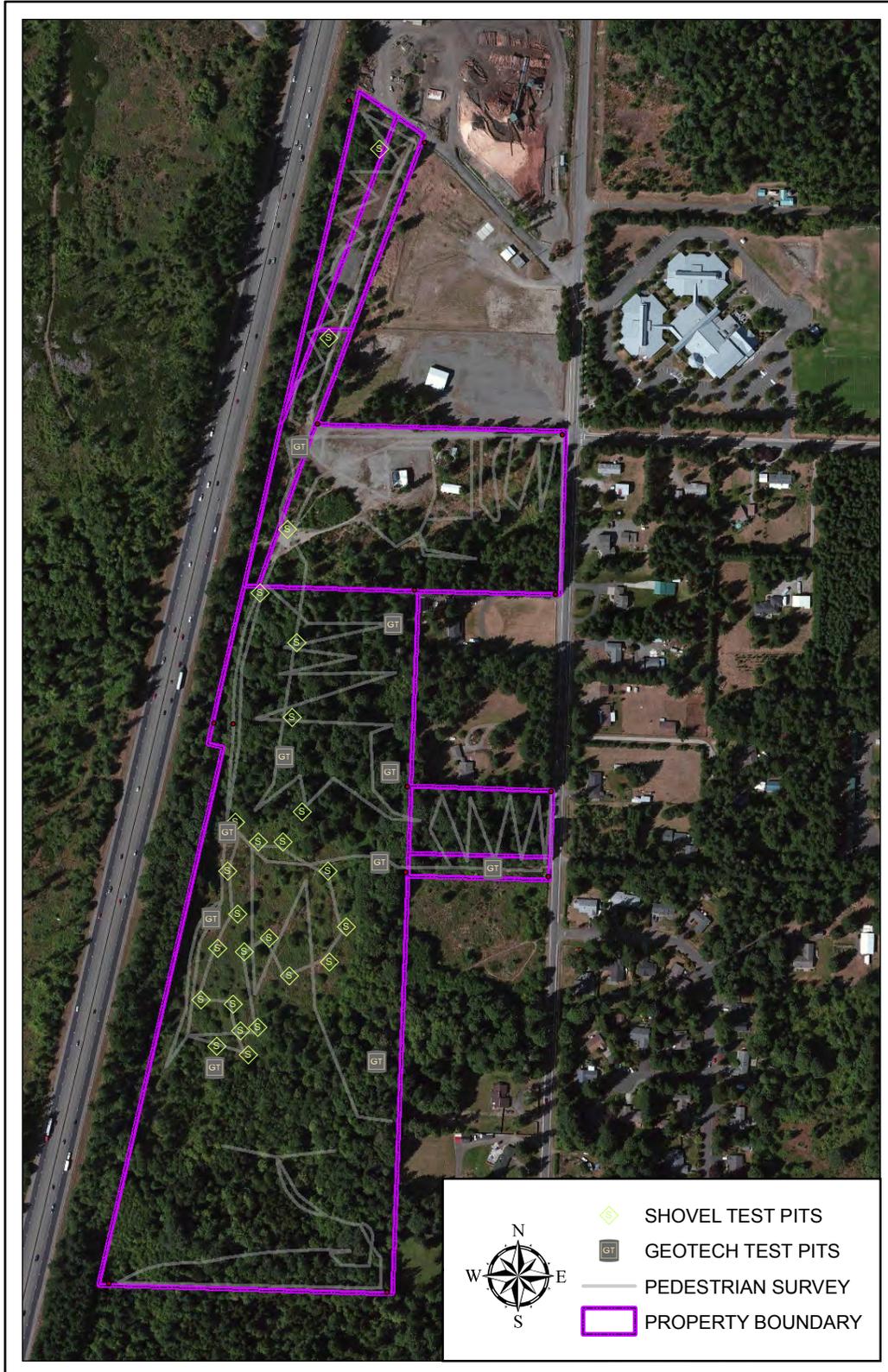


Figure 17. Composite map with project plan, geotechnical assay locations, survey transects and shovel probe locations.

## **Attachment A. Protocols for Discovery of Archaeological Resources and Human Remains**

### **Protocols for Discovery of Archaeological Resources**

In the event that archaeological resources are encountered during project implementation, the following actions will be taken:

In work areas, all ground disturbing activity at the location will stop, and the work supervisor will be notified immediately. The work site will be secured from any additional impacts and the supervisor will be informed.

The project proponent will immediately contact the agencies with jurisdiction over the lands where the discovery is located, if appropriate. The appropriate agency archaeologist or the proponent's contracting archaeologist will determine the size of the work stoppage zone or discovery location in order to sufficiently protect the resource until further decisions can be made regarding the work site.

The project proponent will consult with WADAHP regarding the evaluation of the discovery and the appropriate protection measures, if applicable. Once the consultation has been completed, and if the site is determined to be NRHP-eligible, the project proponent will request written concurrence from the agency or tribe(s) that the protection and mitigation measures have been fulfilled. Upon notification of concurrence from the appropriate parties, the project proponent will proceed with the project.

Within six months after completion of the above steps, the project proponent will prepare a final written report of the discovery. The report will include a description of the contents of the discovery, a summary of consultation, and a description of the treatment or mitigation measures.

### **Protocols for Discovery of Human Remains**

If human remains are found within the project area, the project proponent, its contractors or permit-holders, the following actions will be taken, consistent with Washington State RCWs 68.50.645, 27.44.055, and 68.60.055:

If ground-disturbing activities encounter human skeletal remains during the course of construction then all activity will cease that may cause further disturbance to those remains. The area of the find will be secured and protected from further disturbance. The project proponent will prepare a plan for securing and protecting exposed human remains and retain consultants to perform these services. The finding of human skeletal remains will be reported to the county medical examiner/coroner and local law enforcement in the most expeditious manner possible. The remains will not be touched, moved, or further disturbed. The county medical examiner/coroner will assume jurisdiction over the human skeletal remains and make a determination of whether those remains are forensic or non-forensic. If the county medical examiner/coroner determines the remains are non-forensic, then they will report that finding to WADAHP, which will then take jurisdiction over the remains. WADAHP will notify any appropriate cemeteries and all affected tribes of the find. The State Physical Anthropologist will make a determination of whether the remains are Indian or Non-Indian and report that finding to

any appropriate cemeteries and the affected tribes. WADAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

### **Lead Representative and Primary Contact**

#### **Chehalis Confederated Tribes**

P.O. Box 536, Oakville, WA 98568  
Don Secena, Chair, 360-273-5911  
Richard Bellon, Cultural Resources, 360-273-5911, ext. 1304

#### **Muckleshoot Tribe**

39015 172<sup>nd</sup> Ave. SE, Auburn, WA 98092  
Virginia Cross, Chair, 253-939-3311, ext. 3194  
Laura Murphy, Cultural Resources, 253-876-3272

#### **Nisqually Tribe**

4820 She-Nah-Num Dr. SE, Olympia, WA 98513  
Farron McCloud, Chair, 360-456-5221  
Jacqueline (Jackie) Wall, THPO, 360-456-5221, ext. 2180

#### **Puyallup Tribe**

3009 Portland Ave., Tacoma, WA 98404  
Bill Sterud, Chair, 253-573-7800  
Brandon Reynon, Cultural Resources, 253-573-7986

#### **Skokomish Tribe**

North 80 Tribal Center Rd., Skokomish Nation, WA 98584  
Charles "Guy" Miller, Chair, 360-490-6679  
Kris Miller, THPO, Cultural Resources, 360-426-2280

#### **Squaxin Island Tribe**

SE 10 Squaxin Lane, Shelton, WA 98584  
David Lopeman, Chair, 360-432-3800  
Rhonda Foster, Cultural Resources, 360-432-3850

#### **Steilacoom Tribe**

P.O. Box 88419, Steilacoom, WA 98388  
Joan K. Ortez, Chair 253-584-6308

#### **Thurston County Coroner**

360-586-2091

#### **Thurston County Sheriff**

360-786-5500

**Washington Department of Archaeology and Historic Preservation**

PO Box 48343

Olympia, WA 98504-8343

Lead Representative: Allyson Brooks, State Historic Preservation Officer, 360-586-3066

Primary Contact: Rob Whitlam, State Archaeologist, 360-586-3080

Primary Contact for Human Remains: Guy Tasa, State Physical Anthropologist, 360-586-3534

**Attachment B. Project related correspondence with tribal cultural resources offices.**



July 14, 2015

Chehalis Confederated Tribes  
Richard Bellon, Cultural Resources  
420 Howanut Rd  
Oakville, WA 98568

Re: Cultural Resources Assessment for the Tumwater Readiness Center Project, Tumwater,  
Thurston County, WA

Dear Richard:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located within Section 16 and a small portion of Section 9, Township 17 North, and Range 2 West Willamette Meridian at 8102, 8311 and 8427 Kimmie St SW, in Tumwater. AHBL, on behalf of Washington Military Department's Washington Army National Guard, is requesting this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW. The new facility will be approximately 90,940 sq ft readiness center, 29,701 sq ft unheated vehicle storage building, ~8,900 sq ft unheated storage building, 300 sq ft controlled waste facility, a 200 sq ft flammable materials structure, and about 18,000 sq ft parking area. The entire property is approximately 53 acres on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie St SW on the east, and a number of residential properties on the east, undeveloped land to the south, and Frontage Rd to the north.

We are in the process of reviewing available information. Background research will include a site files search at the Washington State Department of Archaeology and Historic Preservation, review of previously recorded cultural resource reports, and review of pertinent published literature and ethnographies. Results of our investigations will be presented in a technical memo.

We are aware that not all information is contained within published sources. Should the Tribe have additional information to support our assessment, we would very much like to include it in our study. Please contact me should you wish to provide any comments. I appreciate your assistance in this matter and look forward to hearing from you.

Sincerely,

Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com



July 14, 2015

Muckleshoot Indian Tribe  
Laura Murphy, Archaeologist/Cultural Resources  
39015 172nd Ave SE  
Auburn, WA 98092

Re: Cultural Resources Assessment for the Tumwater Readiness Center Project, Tumwater,  
Thurston County, WA

Dear Laura:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located within Section 16 and a small portion of Section 9, Township 17 North, and Range 2 West Willamette Meridian at 8102, 8311 and 8427 Kimmie St SW, in Tumwater. AHBL, on behalf of Washington Military Department's Washington Army National Guard, is requesting this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW. The new facility will be approximately 90,940 sq ft readiness center, 29,701 sq ft unheated vehicle storage building, ~8,900 sq ft unheated storage building, 300 sq ft controlled waste facility, a 200 sq ft flammable materials structure, and about 18,000 sq ft parking area. The entire property is approximately 53 acres on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie St SW on the east, and a number of residential properties on the east, undeveloped land to the south, and Frontage Rd to the north.

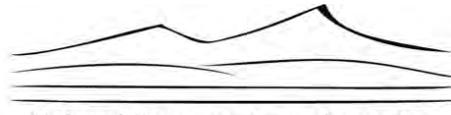
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Sincerely,

Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com



Cultural Resource Consultants, Inc.

July 14, 2015

Nisqually Tribe  
Jackie Wall, THPO  
4820 She-Nah-Num Dr SE,  
Olympia, WA 98513

Re: Cultural Resources Assessment for the Tumwater Readiness Center Project, Tumwater,  
Thurston County, WA

Dear Jackie:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located within Section 16 and a small portion of Section 9, Township 17 North, and Range 2 West Willamette Meridian at 8102, 8311 and 8427 Kimmie St SW, in Tumwater. AHBL, on behalf of Washington Military Department's Washington Army National Guard, is requesting this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW. The new facility will be approximately 90,940 sq ft readiness center, 29,701 sq ft unheated vehicle storage building, ~8,900 sq ft unheated storage building, 300 sq ft controlled waste facility, a 200 sq ft flammable materials structure, and about 18,000 sq ft parking area. The entire property is approximately 53 acres on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie St SW on the east, and a number of residential properties on the east, undeveloped land to the south, and Frontage Rd to the north.

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Sincerely,

Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com



July 14, 2015

Puyallup Tribe of Indians  
Brandon Reynon  
3009 East Portland Ave  
Tacoma, WA 98404

Re: Cultural Resources Assessment for the Tumwater Readiness Center Project, Tumwater,  
Thurston County, WA

Dear Brandon:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located within Section 16 and a small portion of Section 9, Township 17 North, and Range 2 West Willamette Meridian at 8102, 8311 and 8427 Kimmie St SW, in Tumwater. AHBL, on behalf of Washington Military Department's Washington Army National Guard, is requesting this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW. The new facility will be approximately 90,940 sq ft readiness center, 29,701 sq ft unheated vehicle storage building, ~8,900 sq ft unheated storage building, 300 sq ft controlled waste facility, a 200 sq ft flammable materials structure, and about 18,000 sq ft parking area. The entire property is approximately 53 acres on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie St SW on the east, and a number of residential properties on the east, undeveloped land to the south, and Frontage Rd to the north.

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Sincerely,

Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com



July 14, 2015

Skokomish Tribe  
Kris Miller, Cultural Resources  
North 80 Tribal Center Rd  
Skokomish, WA 98584

Re: Cultural Resources Assessment for the Tumwater Readiness Center Project, Tumwater,  
Thurston County, WA

Dear Kris:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located within Section 16 and a small portion of Section 9, Township 17 North, and Range 2 West Willamette Meridian at 8102, 8311 and 8427 Kimmie St SW, in Tumwater. AHBL, on behalf of Washington Military Department's Washington Army National Guard, is requesting this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW. The new facility will be approximately 90,940 sq ft readiness center, 29,701 sq ft unheated vehicle storage building, ~8,900 sq ft unheated storage building, 300 sq ft controlled waste facility, a 200 sq ft flammable materials structure, and about 18,000 sq ft parking area. The entire property is approximately 53 acres on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie St SW on the east, and a number of residential properties on the east, undeveloped land to the south, and Frontage Rd to the north.

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Sincerely,

Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com



July 14, 2015

Squaxin Island Tribe  
Rhonda Foster and Stephanie Neil  
SE 70 Squaxin Lane  
Shelton, WA 98584

Re: Cultural Resources Assessment for the Tumwater Readiness Center Project, Tumwater,  
Thurston County, WA

Dear Rhonda and Stephanie:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located within Section 16 and a small portion of Section 9, Township 17 North, and Range 2 West Willamette Meridian at 8102, 8311 and 8427 Kimmie St SW, in Tumwater. AHBL, on behalf of Washington Military Department's Washington Army National Guard, is requesting this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW. The new facility will be approximately 90,940 sq ft readiness center, 29,701 sq ft unheated vehicle storage building, ~8,900 sq ft unheated storage building, 300 sq ft controlled waste facility, a 200 sq ft flammable materials structure, and about 18,000 sq ft parking area. The entire property is approximately 53 acres on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie St SW on the east, and a number of residential properties on the east, undeveloped land to the south, and Frontage Rd to the north.

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We are aware that not all information is contained within published sources. Should the Tribe have additional information to support our assessment, we would very much like to include it in our study. Please contact me should you wish to provide any comments. I appreciate your assistance in this matter and look forward to hearing from you.

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn D. Hartmann". The signature is written in a cursive style with a large initial "G".

Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com



July 14, 2015

Steilacoom Tribe  
Danny K. Marshall, Chair  
PO Box 88419  
Steilacoom, WA 98388

Re: Cultural Resources Assessment for the Tumwater Readiness Center Project, Tumwater,  
Thurston County, WA

Dear Danny:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located within Section 16 and a small portion of Section 9, Township 17 North, and Range 2 West Willamette Meridian at 8102, 8311 and 8427 Kimmie St SW, in Tumwater. AHBL, on behalf of Washington Military Department's Washington Army National Guard, is requesting this assessment prior to development of the Tumwater Readiness Center (TRC). The TRC facility will be built along Kimmie St SW. The new facility will be approximately 90,940 sq ft readiness center, 29,701 sq ft unheated vehicle storage building, ~8,900 sq ft unheated storage building, 300 sq ft controlled waste facility, a 200 sq ft flammable materials structure, and about 18,000 sq ft parking area. The entire property is approximately 53 acres on tax parcels 51850000400 (2.08 ac), 51850001200 (35.97 ac), 09230006000 (2.00 ac), 09230019000 (1.49 ac), 09520004000 (1.57 ac), and 09520003000 (9.71 ac). The project area is bordered by I-5 on the west, Kimmie St SW on the east, and a number of residential properties on the east, undeveloped land to the south, and Frontage Rd to the north.

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Sincerely,

Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com

**APPENDIX O**  
**TRAFFIC IMPACT ANALYSIS, TRANSPO GROUP, 2015**

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## MEMORANDUM

<b>Date:</b>	October 20, 2015	<b>TG:</b>	15044.00
<b>To:</b>	Tom Skjervold – Washington State Military Department		
<b>From:</b>	Jon Pascal, PE, PTOE Jesse Birchman, PE, PTOE		
<b>Subject:</b>	Tumwater Readiness Center (TRC) Transportation Impact Analysis		

This memorandum summarizes our review of transportation conditions and potential impacts for the proposed National Guard Readiness Center located in the City of Tumwater. The project would involve the construction of a readiness center for the Washington Military Department and National Guard that would consist of two building structures<sup>1</sup> with access proposed onto Kimmie Street SW south of the 83rd Avenue SW intersection. The project is anticipated to be constructed and occupied by 2019. Figure 1 shows a preliminary site plan.

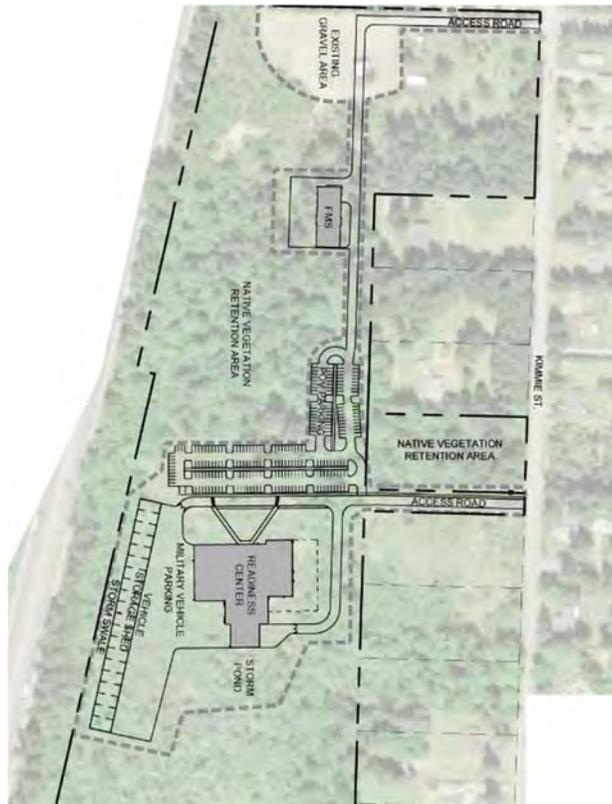


Figure 1: Preliminary TRC Site Plan

The following sections summarize background transportation conditions within the project vicinity, the estimated project trip generation, an evaluation of the site access driveway, and a summary of forecast transportation impacts and mitigation measures and/or mitigation fee costs.

<sup>1</sup> One approximately 80,000 square foot building and one 30,000 square foot vehicle storage building.

## Background Conditions

The proposed Tumwater Readiness Center (TRC) would be located east of Interstate 5 (I-5) in the City of Tumwater, Washington between two I-5 interchanges (see Figure 2): Tumwater Boulevard to the north and 93rd Avenue SW to the south. The proposed development would consolidate existing Olympia and Puyallup Armory operations to the proposed TRC. Access to the site would be provided by Kimmie Street SW and frontage improvements would be constructed consistent with City requirements. It is anticipated that employees and reservists traveling to the site from the north would use the Tumwater Boulevard interchange from I-5 and employees and reservists traveling from the south would use the 93rd Avenue SW (SR 121) interchange, unless otherwise directed.

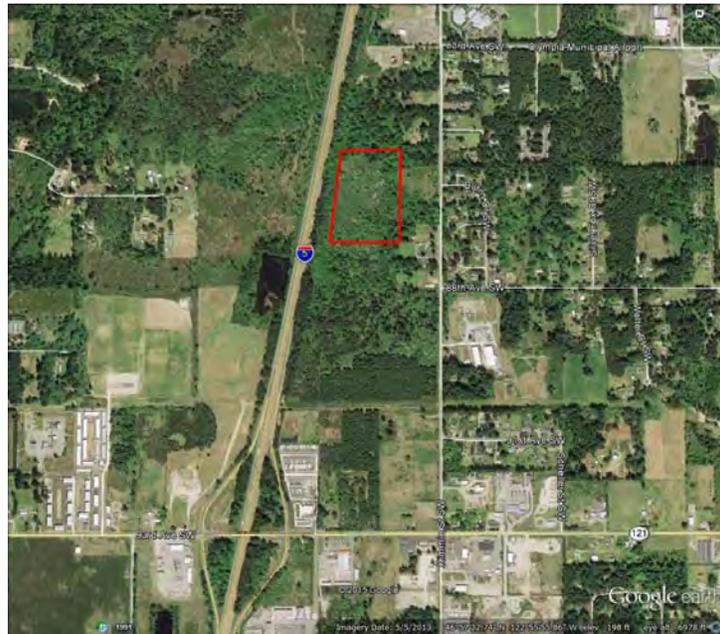


Figure 2: Project Vicinity

Available City of Tumwater and Washington Department of Transportation (WSDOT) planning documents were reviewed to identify any existing or forecast transportation related deficiencies and/or improvements within the vicinity of the proposed project. This included a review of the following documents:

- Mitigation Determination of Non-Significance (MDNS) of the previously submitted development application at the project site (2008);
- Tumwater Transportation Impact Fee Program (March 2010);
- 2014-2019 Tumwater Capital Facilities Plan (CFP) (2013);
- WSDOT Statewide Transportation Improvement Program (STIP);
- Thurston County Impact Fee Ordinance (2013).

In addition, City and WSDOT staff were contacted to provide additional information regarding the current status of previously identified mitigation measures that could apply to the current proposed project.

Of the intersections in the project vicinity, only two are currently signalized: the southbound on/off ramp at Tumwater Boulevard and the southbound on/off ramp at 93rd Avenue SW. All of the other intersections that project traffic is anticipated to use are either stop or yield controlled. Tumwater Boulevard, located north of the project site, is currently a four lane road with two lanes in the

eastbound and westbound directions. There is a designated right turn lane onto the northbound I-5 on ramp, and the westbound direction narrows to one lane following the intersection. 93rd Avenue SW (State Route 121) operates as a three lane roadway with one lane in the eastbound and westbound directions and a two way left turn lane (TWLTL). At the Kimmie Street SW Intersection with 93rd Avenue SW, the roadway narrows to a two lane roadway. Kimmie Street SW, which provides access to the project site, operates as a rural all-purpose roadway with two travel lanes.

## Project Trips

To provide a conservative estimate of potential project impacts, project trip generation estimates were developed based on the maximum number of full time employees anticipated on-site and maximum number of reservists anticipated for monthly training weekends. Most trips to/from the site are anticipated to be via passenger vehicle, although some truck traffic and/or military vehicle transport could occur during weekday or training weekend operations.

In total, up to 25 full time employees could be located on-site and up to 300 reservists could report for training one weekend per month; no weekend events are anticipated for the remaining weekends of the year. Reservists arriving for training will arrive on Friday evenings for nine of the monthly trainings, on Saturday mornings for two months, and have one month each year without weekend training. Training typically extends into Sunday evenings. Arrivals and departures for training weekends typically occur over several hours. Table 1 summarizes the estimated maximum weekday PM peak hour (all assumed to travel outbound) and weekend training vehicle trip generation. Although weekday employees would like depart the site over a wider time period than one-hour (i.e. 3-6 p.m.), all employees were assumed to depart the site within a one-hour period to provide a conservative analysis.

**Table 1. Weekday and Weekend Peak Period Trip Generation Estimates**

*Tumwater Readiness Center*

Peak Period	Project Trips	Trips to Tumwater Blvd Interchange (80%) <sup>1</sup>	Trips to 93rd Ave SW Interchange (20%)
Weekday PM	25	20	5
Weekday Daily <sup>2</sup>	180	144	36
Training Weekend Arrivals	300	240	60
Training Weekend Departures	300	240	60

1. Distribution is based on zip code information for current Olympia and Puyallup army employees. Based on relative population densities and freeway facilities, a similar travel distribution is assumed for reservists.

2. Weekday daily traffic volumes estimated based on PM [0.46 per employee] and daily trip rates [3.32 per employee] for Office (LU #710) published in the Institute of Transportation Engineers *Trip Generation* (9th Edition, 2014).

Based on zip codes provided by the National Guard of existing Olympia Armory and Puyallup Armory employees, the trip distribution for the site is anticipated to include 80 percent of the daily trips to from northern areas (i.e. Tacoma, Olympia, Aberdeen) and 20 percent of daily trips from south of the project site (i.e. Centralia and Rochester). Taking into account population densities and freeway facilities, a similar trip distribution is assumed for reservists arriving on weekends. Table 1 also summarizes the project trips anticipated to travel through these interchanges. Since it differs from the distribution of project trips assigned for the development previously proposed at this project site, it should be noted that no specific trips are likely to travel to Thurston County facilities.

## Traffic Operations

Site access traffic operations were forecast for 2019 conditions when the proposed project would be constructed and occupied. Future traffic volumes at buildout and occupancy were forecast by observing existing traffic volumes along Kimmie Street SW, increasing the traffic volumes based on historical growth rates within the project vicinity, and adding project generated vehicle trips.

Existing traffic volumes were collected along the project frontage on Kimmie Street SW on a weekday PM commute peak period when public schools were in session, which corresponds to the typical overall peak traffic volume period. Detailed turning movement worksheets are provided in Attachment A. Approximately 95 vehicles traveled northbound and 115 vehicles traveled southbound along the project frontage during the PM peak hour. These volumes were then grown by 2-percent each year to 2019 conditions, resulting in 105 northbound and 125 southbound vehicles. Project traffic was assigned to the driveway consistent with Table 1. Figure 3 illustrates the forecast 2019 with-project weekday PM peak hour volumes.

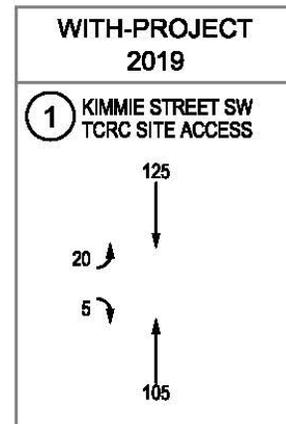


Figure 3 – 2019 Weekday PM Peak Hour With-Project Traffic Volumes

Weekday PM peak hour traffic operations at the site access driveway were evaluated based on procedures identified in the *Highway Capacity Manual* (2010) and evaluated using the Synchro9 software program. At stop-controlled intersections such as driveways, traffic operations are typically evaluated using the average delay per vehicle and is typically reported for the worst operating movement at the intersection. Traffic operations for an intersection can be described alphabetically with a range of levels of service (LOS A through F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Attachment B contains a detailed explanation of LOS criteria and definitions.

A detailed delay/LOS calculation worksheet for forecast (2019) conditions at the proposed site access driveway is provided in Attachment C. The proposed driveway is forecast to operate well at LOS B with approximately 11 seconds of delay during weekday PM peak hour conditions. Operations at the site access driveway are also anticipated to operate well during the eleven training weekends that occur each year. Reservist arrivals and departures on training weekends are typically dispersed over a several hour period and would occur at times other than peak traffic conditions within the study area. Impacts to the nearby George Washington Bush Middle School, located at the Kimmie Street SW/83rd Avenue SW intersection are anticipated to be minimal based on the low number of trips generated on a typical weekday and limited number of weekend trainings during the school year.

## Potential Impacts and Mitigation

As identified in the preceding sections, the project is anticipated to generate approximately 25 vehicle trips during weekday PM peak hour conditions. Although regular training events with 300 reservists would occur one weekend a month for eleven months of the year, traffic is anticipated to operate well during arrival and departure time periods. Based on the project trip generation and operations analysis conducted for the project site access, the proposed project is not anticipated to cause significant impacts to transportation facilities in the project vicinity. Similarly, no adverse traffic safety impacts are anticipated.

The City of Tumwater Municipal Code<sup>2</sup> and WSDOT staff were consulted to understand the various thresholds in place for determining if a project necessitates a full traffic impact study and/or mitigation. Currently, Tumwater’s threshold for a Traffic Impact Analysis (TIA) is either trip generation of more than 50 PM peak hour trips or a generation of more than 25 percent of PM peak hour traffic through an intersection. The proposed project is well under these identified thresholds.

Based on conversations with WSDOT staff, WSDOT traffic mitigation for highway/intersection projects identified in this review is requested when a project sends at least 10 PM peak hour trips or more through an improvement project limits. As summarized in Table 1 (page 3), the project is well under this threshold at the 93rd Avenue SW interchange.

Because project traffic is not expected to use Thurston County facilities and is not located in a Thurston County impact fee area,<sup>3</sup> no Thurston county mitigation fees are anticipated.

Potential mitigation of project related impacts include payment of City of Tumwater Transportation Impact Fees (TIF) and off-site improvements at locations where project generated traffic results in the intersection falling below the City’s intersection operations standards. In addition, State Environmental Policy Act (SEPA) mitigation fees apply on a per trip basis when a proposed project is anticipated to add trips to an area with planned City or WSDOT projects not funded through the TIF. Transpo reviewed information from the 2008 Mitigation Determination of Non-Significance (MDNS) issued for the development previously proposed at the TRC site. The MDNS identified numerous improvements for the applicant to undertake or to partially fund in order to mitigate for the increase in project traffic. Table 2 shows the previously conditioned improvements that fall within the site vicinity of the proposed readiness center.<sup>4</sup>

**Table 2. Planned WSDOT and Tumwater Improvements**

<b>Improvement</b>	<b>2008 MDNS Required</b>	<b>Anticipated Mitigation for Tumwater Readiness Center</b>
Tumwater Blvd Interchange <i>Roundabouts at both ramp intersections, widening of existing bridge</i>	Yes	Yes
Tumwater Blvd SB I-5 Ramp Improvement <i>WB turn-lane on Tumwater Blvd, SB off-ramp right-turn lane</i>	Yes	Yes
SB I-5 Ramp Improvements at 93rd Ave SW <i>Install signal, SB right-turn Lane, WB left-turn lane on 93rd Ave SW</i>	Yes	No (Completed)
NB I-5 Ramp Improvements at 93rd Ave SW <i>Install signal, widen on &amp; off ramps to two lanes, free-flowing WB to NB on-ramp</i>	Yes	Unlikely
93rd Ave SW Corridor <i>Widen 93rd to 4 Lanes (2 WB, 1EB, 1 TWLTL), Add paved shoulder, 2nd EB receiving lane at NB amp</i>	Yes	Unlikely
93rd Ave SW & Kimmie St SW Intersection <i>Install signal &amp; left-turn lanes on all approaches</i>	Yes	Unlikely

Based on the review of previous documents, communication with City and WSDOT staff, and the analysis previously summarized earlier in this document, no specific offsite impacts are identified nor are improvements anticipated to be required of the proposed TRC including the need to pay for improvements along 93rd Avenue SW. However, likely mitigation does include the payment of City impact fees and SEPA mitigation fees for applicable City or WSDOT projects. For the TRC,

<sup>2</sup> Tumwater Municipal Code, section 15.48.060

<sup>3</sup> Thurston County Transportation Impact Fee Map

<sup>4</sup> Other improvements were identified in the MDNS but did not fall within the proposed site vicinity

impact fees would likely be required for improvements along the Tumwater Boulevard Interchange. The following sections discuss the likely fees in greater detail.

### *WSDOT Fees*

Many of the mitigation measures noted by the 2008 MDNS would not apply to the proposed project due to the sizeable difference in project magnitude. The WSDOT has required other previously approved developments to improve existing transportation infrastructure at the southbound and northbound I-5 ramps at 93rd Avenue SW. While design and construction at the southbound ramp intersection has been completed, the improvements at the northbound ramp intersection include installing a signal and widening the on and off ramps to provide two lanes and is not yet complete.

As previously noted, WSDOT only requires projects that send 10 or more weekday PM peak hour trips to 93rd Avenue SW to contribute towards the planned interchange improvements. Because the Readiness Center only contributes 5 weekday PM peak hour trips to the intersection (20 percent of 25 PM peak hour trips), impacts are not considered significant and no specific mitigation or proportionate contribution would be required. However, wayfinding signage could be installed along I-5 and other site vicinity roadways that directs traffic to/from the TRC site via the Tumwater Boulevard interchange (Exit 101) to further reduce the potential of TRC traffic to use the 93rd Avenue SW interchange.

### *City of Tumwater Fees*

A TIA is not required by the City of Tumwater because the project generates fewer than 50 weekday PM peak hour trips. As a result of the project's estimated trip generation, no offsite mitigation is required; however, a payment of City Transportation Impact Fees and SEPA mitigation fees are likely to be required.

The City of Tumwater's Impact Fee Program (2010) prescribes that an impact fee of \$2,379<sup>5</sup> per weekday PM peak hour trip would be charged to the National Guard. A trip length adjustment factor of 1.7<sup>6</sup> will likely apply (consistent with an office land use) and results in a likely fee of \$4,656.30 per weekday PM peak hour trip generated by the proposed TRC. Based on the maximum 25 project trips expected to be generated as a result of the proposed project, this results in a total cost of \$93,126 for the City of Tumwater's impact fee program. The City of Tumwater would also assess a SEPA mitigation fee of \$3,106 per PM peak hour trip for each of the two projects relating to the re-construction of the Tumwater Boulevard interchange at Interstate 5 to accommodate the increase in traffic due to the proposed project. The two projects are listed under the City of Tumwater CFP as ST-08 and ST-15. Currently, the City continues to collect SEPA mitigation fees as developer mitigation and it is anticipated that the City of Tumwater would require mitigation fees for this project based on project trips anticipated to travel through the Tumwater Boulevard Interchange. Based on the 80 percent of the 25 reservists using the interchange during the weekday PM peak hour, 20 new project trips would be generated, resulting in a mitigation fee of \$62,120 for each project—\$124,240 total. The estimated mitigation fees are summarized in Table 3 and total \$217,366.

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<sup>5</sup> City of Tumwater Impact Fee Program 5.2 (2010)

<sup>6</sup> City of Tumwater Impact Fee Program Appendix B (2010)

**Table 3. Estimated City of Tumwater Mitigation Fees**  
*Tumwater Readiness Center*

<b>Fee Category</b>	<b>Fee Rate (per PM peak hour trip)<sup>1</sup></b>	<b>Estimated Fee</b>
City Impact Fee <sup>1</sup>	\$4,656.30 <sup>2</sup>	\$93,126
Tumwater Blvd SB I-5 Ramp Improvements <sup>3</sup>	\$3,106.00	\$62,120
Tumwater Blvd Interchange <sup>3</sup>	\$3,106.00	\$62,120
<b>Estimated Mitigation Fees</b>		<b>\$217,366</b>

1. Based on City of Tumwater Impact Fee Program (2010, \$2,739 per trip)
2. Includes trip length adjustment factor of (City of Tumwater Impact Fee Program Appendix B, 2010)
3. Based on City of Tumwater Capital Facilities Plan (2014-2019)

## Summary

The proposed Tumwater Readiness Center, located just east of I-5 between Tumwater Boulevard and 93rd Avenue SW, is anticipated to generate 25 new weekday PM peak hour trips and 300 weekend inbound and outbound trips on each monthly training weekend. The site access driveway is anticipated to operate well during weekday PM peak hour conditions. Arrivals for the weekend training session are not expected to have a significant impact on the existing transportation network due to decreased background traffic volumes on late Friday evenings or Saturday mornings. Similarly, background traffic volumes are also lower on Sundays when reservists depart from the weekend training.

Based on a review of available documentation and current City and WSDOT requirements, the project is anticipated to be assessed mitigation fees up to \$217,366. No mitigation or proportionate improvement cost is anticipated towards improvements at the 93rd Avenue SW interchange. Additionally, wayfinding signage could be installed along I-5 and other site vicinity roadways that directs traffic to/from the TRC site via the Tumwater Boulevard interchange (Exit 101) to further reduce the potential of TRC traffic to use the 93rd Avenue SW interchange. No off-site mitigation or impact fees are anticipated to be required by Thurston County.

## Attachment A. Traffic Count Worksheets



Prepared for: **Transpo Group**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

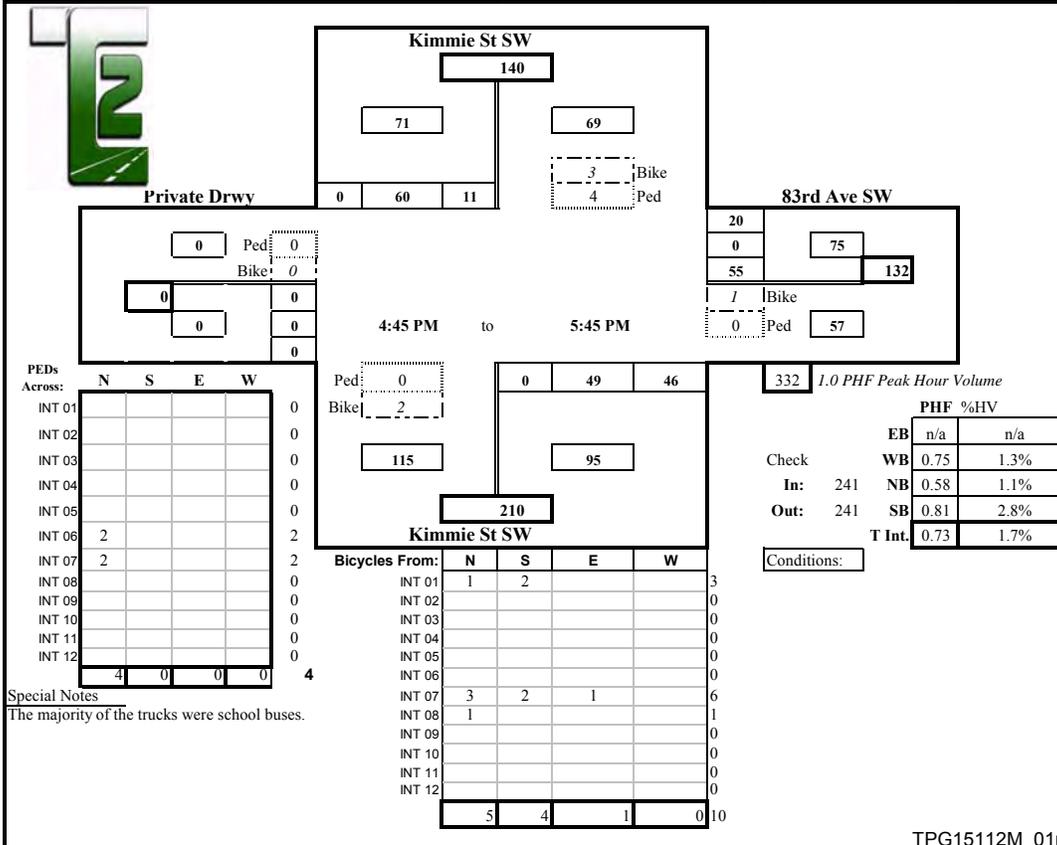
WBE/DBE

**Intersection:** Kimmie St SW & 83rd Ave SW  
**Location:** Tumwater, Washington

**Date of Count:** Tues 9/29/2015  
**Checked By:** Jess

Time Interval Ending at	From North on (SB) Kimmie St SW				From South on (NB) Kimmie St SW				From East on (WB) 83rd Ave SW				From West on (EB) Private Drwy				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	3	12	0	2	0	8	8	2	4	0	4	0	0	0	0	39
4:30 P	0	2	10	0	5	0	11	2	0	4	0	1	0	0	0	0	30
4:45 P	0	2	8	0	7	0	10	7	0	5	0	1	0	0	0	0	33
5:00 P	1	3	19	0	1	0	9	6	0	15	0	5	0	0	0	0	57
5:15 P	1	4	13	0	0	0	21	20	1	16	0	9	0	0	0	0	83
5:30 P	0	1	15	0	0	0	11	17	0	17	0	6	0	0	0	0	67
5:45 P	0	3	13	0	0	0	8	3	0	7	0	0	0	0	0	0	34
6:00 P	1	2	13	0	0	0	3	4	0	1	0	2	0	0	0	0	25
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	3	20	103	0	15	0	81	67	3	69	0	28	0	0	0	0	368
Peak Hour: 4:45 PM to 5:45 PM																	
Total	2	11	60	0	1	0	49	46	1	55	0	20	0	0	0	0	241
Approach	71				95				75				0				241
%HV	2.8%				1.1%				1.3%				n/a				1.7%
PHF	0.81				0.58				0.75				n/a				0.73



# Attachment B. LOS Description

## Highway Capacity Manual 2010

**Signalized intersection** level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period (e.g., weekday PM peak hour). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues. Table 1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual 2010* (Transportation Research Board, 2010).

**Table 1. Level of Service Criteria for Signalized Intersections**

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	>10 – 20	Stable Flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F <sup>1</sup>	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

1. If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0 LOS F is assigned to the individual lane group. LOS for overall approach or intersection is determined solely by the control delay.

**Unsignalized intersection** LOS criteria can be further reduced into two intersection types: all-way stop and two-way stop control. All-way stop control intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major-street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low delay could mask deficiencies of minor movements. Table 2 shows LOS criteria for unsignalized intersections.

**Table 2. Level of Service Criteria for Unsignalized Intersections**

Level of Service	Average Control Delay (seconds/vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F <sup>1</sup>	>50

Source: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

1. If the volume-to-capacity (v/c) ratio exceeds 1.0, LOS F is assigned an individual lane group for all unsignalized intersections, or minor street approach at two-way stop-controlled intersections. Overall intersection LOS is determined solely by control delay.

# Attachment C. LOS Worksheets

**Intersection**

Int Delay, s/veh 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	20	5	0	105	125	0
Future Vol, veh/h	20	5	0	105	125	0
Conflicting Peds, #/hr	4	0	0	0	0	4
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	0	0	1	1	3	3
Mvmt Flow	27	7	0	144	171	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	319	175	0
Stage 1	175	-	-
Stage 2	144	-	-
Critical Hdwy	6.4	6.2	4.11
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.209
Pot Cap-1 Maneuver	678	874	1407
Stage 1	860	-	-
Stage 2	888	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	673	871	1407
Mov Cap-2 Maneuver	673	-	-
Stage 1	857	-	-
Stage 2	885	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	705	-	-
HCM Lane V/C Ratio	-	-	0.049	-	-
HCM Control Delay (s)	0	-	10.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-