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**FINAL OREGON RAPID WETLAND ASSESSMENT PROTOCOL
(ORWAP) REPORT FOR THE PORT OF THE DALLES
REGIONAL WETLAND PLANNING PROJECT
CITY OF THE DALLES, WASCO COUNTY, OREGON**

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Final ORWAP Report Summary for the Port of The Dalles Regional Wetland Planning Project
City of The Dalles, Wasco County, Oregon

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City of The Dalles, Wasco County, Oregon

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Executive Summary

On behalf of the Port of The Dalles, the following report summarizes Oregon Rapid Wetland Assessment Protocol (ORWAP) functional assessment results conducted on representative wetland areas located throughout six participating properties in the north portion of The Dalles, Wasco County, Oregon. In coordination with the North Central Regional Solutions Advisory Committee, Port of The Dalles and City of The Dalles, this report is intended to aid in the preliminary assessment of potential development impacts and mitigation needs to address industrial preparedness goals. This report is specifically drafted for review by U.S. Army USACE of Engineers (USACE) and Oregon Department of State Lands (DSL) for potential development of an Industrial Regional General Permit.

ORWAP is a standardized protocol to rapidly assess wetland functions and values for all wetland types throughout Oregon. ORWAP was designed for the purpose of assessing wetlands for land use planning, watershed assessment, impact and compensatory mitigation assessment (for State and Federal permitting processes) and for evaluating the success of enhancement and restoration projects.

Due to the rather large number of individual wetlands documented by Terra Science, Inc.'s *Wetland Delineation Report Prepared for Potential Issuance of an Industrial Regional General Permit*, conducting individual assessment reports for all identified polygons is considered impractical. As such, wetlands representative of the larger landscape have typically been selected for assessment. In addition to providing feature-specific results, select assessments provide results that could be utilized to assess potential function and values associated with similar wetland types across all six sites.

Twelve distinct ORWAP assessments have been executed to quantify existing functions and values for wetlands within the participating project footprints. ORWAP Grouped Function scores for representative features have been placed into five main groups based generally on hydrogeomorphic classification and best-professional judgment by the consultant team. These five include Slope, Riverine, Emergent Depression, Excavated Features and Scabland features. Based on the variable quality and disturbances associated with delineated Scabland features, this category has been further divided into seven sub-groups. This grouping allows for better comparison of functions across wetlands that are more similar in nature.

As identified in DSL's *Guidance for Using the Oregon Rapid Wetland Assessment Protocol (ORWAP) in State and Federal Permit Programs*, function and value results for the Grouped Functions, Ecological Condition, Stressors, and Sensitivity are specifically utilized during regulatory analysis of proposed impacts and / or mitigation. As such, the results generated for the Grouped Functions and these other attributes are the focus for this assessment.

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Final ORWAP Report Summary for the Port of The Dalles Regional Wetland Planning Project City of The Dalles, Wasco County, Oregon

I. Introduction

On behalf of the Port of the Dalles (POTD), Terra Science, Inc. (TSI) has prepared the following report to assist in assessment of potential wetland functions and values for select representative wetland / waters features within a study area composed of six participating sites in the northern portion of the City of The Dalles, Wasco County, Oregon (see Figures 1 through 3). In conjunction with TSI's *Wetland Delineation Report Prepared for Potential Issuance of an Industrial Regional General Permit*, information contained within this report is intended to serve as a planning tool for the development of a programmatic Industrial Regional General Permit (IRGP) as part of a collaborative effort with the U.S. Army Corps of Engineers (USACE) and the Oregon Department of State Lands (DSL).

More specifically, this report serves to support development and mitigation planning efforts for six sites for which parcel landowners have agreed to participate in the proposed IRGP process. In Section II. Site Descriptions, brief descriptions of each site are provided along with analysis of historic and present land use and any site alterations that have occurred. The selection of these six sites was a collaborative approach between the Port of The Dalles, the City of The Dalles, project Technical Advisory Committee (TAC) and regional land owners. Collectively, these entities believe that a programmatic and collaborative approach would allow local development interests and regulatory agencies to make strategic decisions about protecting the most important aquatic resources on these large industrial lots while maintaining a viable inventory of buildable industrial land. Additionally, through this effort and with support from the findings of this report, suitable areas within these six sites could potentially be identified for mitigation that are both ecologically appropriate and sustainable.

Further, this report satisfies USACE and DSL Joint Permit Application (JPA) requirements to document existing and / or baseline functions and values associated with wetland either proposed for impact or potentially chosen for use in compensatory mitigation. While reviewing projects (including IRGP projects) that propose impacts to jurisdictional wetlands or waters, USACE and DSL must review the existing wetland capabilities (functions and values) and weigh them versus what functions and values would be lost due to impact from the proposed development. This is used to assist in determining if proposed compensatory mitigation measures are sufficient to offset development impacts. Such analysis is required to ensure the Federal goal and State policy of "no net loss" of wetland acreages and functions is adequately addressed.

II. Study Area Overview and General Site Descriptions

The study area for this report is comprised of six separate and individually owned sites located in the north part of The Dalles. Save for Site 1, these sites constitute a large portion of currently undeveloped land between Interstate I-84 the Columbia River. Site 1 is located west of Interstate I-84 and north of River Road and is bound on the west by Highway 30.

Approximately half of the subject lands have previously leveled for the former aluminum mill site (Site 5) and / or for historic log storage / mill operations (Site 3). Remaining areas have experienced less intense disturbance and exhibit fairly intact landscapes comprised (mostly) of historic Missoula Flood scablands where bedrock was exposed and scoured during these epic events. Chenoweth Creek dissects the study area from west to east and eventually enters the Columbia River along the southeast edge of Site 3. Site 1 is somewhat an outlier in overall landform as it contains a large, flat alluvial terrace with deep soils throughout its central part.

Details for project sites is provided below while rationale and descriptions of selected Assessment Areas is discussed in report Section III.

Site 1. Northwest Aluminum Company

The site is bound by Interstate I-84 to the east, Old Columbia River Highway to the west and River Road to the south. The 51.13± acre site consists of Tax lot 900 on Wasco County Assessor's map Township 02 North, Range 13 East, Section 20 and Tax lot 100 on Township 02 North, Range 13 East, Section 29A. Areas south of Chenoweth Creek are zoned Recreational Commercial (CR) and lie within The Dalles Urban Growth Boundary (UGB). Areas north of Chenoweth Creek lie beyond the current UGB but are proposed for UGB inclusion under The Dalles 2013 Expansion Proposal.

The site transitions from steep basalt cliffs and rock outcrops in the north and northwest portion of the site to a relatively flat alluvial terrace on the north side of Chenoweth Creek. Several basalt rock outcrops are scattered in the east part of this terrace. Chenoweth Creek and its floodplain dissect the site as it flows easterly towards the Columbia River. Approximately one-quarter of the site lies south of the creek and consists of a fill terrace along River Road and the freeway off-ramp that transitions to native terrace which gently slopes north to Chenoweth Creek. Onsite elevations range from approximately 165 feet above mean seal level (msl) in the northern corner to approximately 120 feet along Chenoweth Creek.

Much of Site 1 has been historically disturbed by past agricultural practices although most of the site maintains native topography. Former agricultural practices included crop production and flood irrigation of the flat alluvial terrace in the north as evidenced by the remnant delivery ditches. Additionally, fill material associated with a former rural residential / farming structures was placed along the northern flank of the Chenoweth Creek floodplain greater than fifty years ago. Construction of the Union Pacific Rail Line and subsequent Interstate I-84 road bases have partially severed the historical upgradient hydrology to a scabland depression in the northeast portion of the site. Lastly, several areas of fill material occupy part of the site south of Chenoweth Creek. Construction of the River Road overpass has concentrated flows entering the site from the south into a culvert that discharges immediately upgradient (south) of the Site 1 boundary; this results in a point-source discharge to the Slope Complex Wetland analyzed as Assessment Area AA1.1.

As identified in TSI's 2014 delineation report, five distinct waters and wetland features are mapped within the boundaries of Site 1¹ utilizing routine intermediate-level (level 2) delineation methodology outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (Arid West Manual)*. Of the five delineated features, three are determined to have unique characteristics and / or functional attributes reflective of other wetlands associated with the larger Port of The Dalles Regional General Permit analysis. As such, the Slope Complex Wetland (AA1.1) south of Chenoweth Creek, Chenoweth Creek Waters / Wetlands (AA1.2) and the Emergent Depression (AA1.3) are assessed using the Oregon Rapid Wetland Assessment Protocol (ORWAP) as representative polygons of specific wetland types in the regional project footprint. See report Section III. Assessment Methodology and Appendices A through C for greater descriptions of Site 1 assessment areas.

Site 2. Northwest Aluminum Company

This study area is bound by the Union Pacific railroad right-of-way and then Interstate I-84 to the west, Oregon Department of Fish and Wildlife (ODFW) Taylor Lake wildlife refuge to the north, vacant lands owned by Port of The Dalles (Site 3) to the east and River Road to the south. The 42.73± acre site consists of Tax lot 600 on Wasco County Assessor's map Township 02 North, Range 13 East, Section 21 and Tax lot 701 on Township 02 North, Range 13 East, Section 28. The entire site is zoned Industrial (I) and is located within The Dalles UGB.

The site is quite variable in landform and, from the south, includes a northeast sloping terrace interspersed with rocky outcrops that leads down (north) to the flatter terrace adjacent to Chenoweth Creek. North of the creek, the land rises into uneven rock outcrops and ridges interspersed with shallow depressional areas that are typical of the scablands in this area. These scablands continue on to the north before gently sloping northeasterly down toward Taylor Lake and the fringe of wetlands surrounding it. Onsite elevations range from 137 feet

¹ DSL WD#2014-0399 and USACE NWP 2014-371-1.

above mean seal level (msl) at several high outcrops to 88 feet along the creek. The elevation at along the Taylor Lake fringe wetlands is approximately 90 feet.

The land is currently vacant of buildings or other structures and has been unmanaged for greater than ten years. Historic aerial photography analysis documents site disturbances for agricultural purpose (grass management and grazing) in the area south of Chenoweth Creek. Areas north of the creek appear to have been grazed but were likely to rocky for agriculturally related management activities to occur. Despite said disturbances, most of the site continues to express native topography. Several small areas scattered throughout the site have been excavated and / or filled within the scablands in the north-central part of the site. The area that comprises Taylor Lake and its wetland fringe has been clearly influenced by dam construction on the Columbia River as well as damming and pumping of water into the lake by Oregon Department of Fish and Wildlife.

Construction of the Union Pacific rail line (pre-1935) and I-80 North (now I-84) partially severed and / or impounded historical upgradient hydrology from the west to the scabland depressions in the north-central part of the site along with the emergent swale / depressions south of Chenoweth Creek. More recent construction of River Road and its interchange with I-84 has further severed and constricted upgradient hydrology that feeds the emergent swales / depressions in the south part of the site. Hydrology to these features is now constricted to culvert discharge from under the base material of the River Road overpass. Furthermore, it appears that some areas in the south portion have been disturbed, likely associated with improvements to River Road.

As identified in TSI's 2014 delineation report, TSI identified six distinct types of waters and wetland features within the boundaries of Site 2² utilizing Arid West Manual methodologies. Of the six delineated types of features, two are determined to have unique characteristics and / or functional attributes reflective of other wetlands associated with the larger Port of The Dalles Regional General Permit analysis. As such, the Scabland Depression Complex (AA2.1) and an Impounded Scabland Depression, Type I (AA2.2) are assessed using ORWAP as representative polygons. See report Section III. Assessment Methodology and Appendices D and E for greater descriptions of Site 2 assessment areas.

² DSL WD#2014-0400 and USACE NWP 2014-371-2.

Site 3. Port of The Dalles

The study area is bound by Chenoweth Creek to the south, Taylor Lake dirt access road then vacant lands (Site 2) to the west, Taylor Lake and the Crates Point Wildlife Area to the north and the Columbia River to the east. The 83.44± acre study area consists of Tax lots 700 and 800 on Wasco County Assessor's map Township 02N, Range 13E, Section 21, Willamette Meridian. The entire site is zoned Industrial (I) and is located within The Dalles UGB.

Approximately three-fifths of Site 3 has experienced significant disturbances. Specifically, the eastern half of Site 3 consists of a heavily disturbed fill terrace associated with a former lumber mill which is currently under construction for the Phase I of the Chenoweth Business Park. As Site 3 wetlands lie beyond the construction envelope (and contributing area), current construction activities have not impacted jurisdictional resources, affected supporting upgradient hydrological sources or otherwise encroached upon Site 3 wetland features. The southernmost portion of the site is dissected by the paved River Trail Way access road. South of that, fill terraces slope toward a low terrace along Chenoweth Creek. Chenoweth Creek is typically ten to fifteen feet lower than the low terrace landform. The western portion of the site contains relatively undisturbed and native topography containing rocky outcrops and remnant scour channels. The northwest portion of the site contains heavily disturbed areas associated with an active aggregate staging and quarry area. The northernmost portion is relatively undisturbed and contains rocky outcrops and bluffs which drop ten to twenty feet to Taylor Lake. According to the georeferenced topographic, onsite elevations range from approximately 86 feet above mean sea level (msl) along the banks of Chenoweth Creek to approximately 126 feet above msl atop several rock outcrops in the central portion of the parcel.

As identified in TSI's 2012 delineation, TSI identified seven distinct types of waters and wetland features within the boundaries of Site 3³ utilizing Arid West Manual methodologies. Of these features, two types of features are determined to have unique characteristics and / or functional attributes reflective of other wetlands associated with the larger Port of The Dalles Regional General Permit analysis. As such, the Remnant Scabland Depression, Type I (AA3.1) and a Ditch / Swale Complex (AA3.2) are assessed as representative polygons. See report Section III. Assessment Methodology and Appendices F and G for greater descriptions of Site 3 assessment areas.

³ DSL WD#2012-0159 and USACE AJD NWP 2012-134.

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Site 4. WM3, Inc.

This study area is bound by the Union Pacific railroad right-of-way and then Interstate I-84 to the west, River Road to the north and northeast, and the former Northwest Aluminum mill site to the southeast and south. The 67.0± acre site consists of Tax lot 702 on Wasco County Assessor's map Township 02 North, Range 13 East, Section 28. The entire site is zoned Commercial Light Industrial (CLI) and is located within The Dalles UGB.

NOTE: Wal-mart Stores, Inc. is pending construction of a retail store and associated infrastructure on approximately 56% of Tax lot 702; said development has received authorization via issuance of DSL Permit 43798-RF and USACE NWP 2008-445. As such, and in coordination with the project TAC, this assessment considers only those areas which lie beyond the authorized development footprint and existing Oregon Department of Transportation Mitigation Easement (see Figures 4.1D and 4.2D). Further, ORWAP scores provided for this assessment do not account for authorized development (pending construction) within the larger wetland complex and Contributing Areas of selected assessment areas.

Areas assessed for this report contain a fairly continuous landform consisting of mostly uneven low rock outcrops interspersed with shallow depressional areas or swales that are typical of the scablands in this area. Areas in the northern parcels generally slope north and west while those areas in the southern parcels generally slope slightly west. Several constructed berms and rough access roads cross the parcels and an excavated ditch runs along the southeast edge. Onsite elevations range from 150 feet above mean seal level (msl) in the south part of the site to 125 feet msl along River Road.

Parcels investigated for this report are undeveloped and support a complex of low-growing grasses, scattered shrubs, rock-outcrops and scabland depressions exhibiting high to low disturbance. The land is currently vacant of buildings or other structures and has been generally unmanaged for greater than ten years. Historic aerial photography analysis documents various site disturbances for agricultural purpose (grass management and grazing) throughout much of the site at some point. Those areas that were likely too rocky for any grass management activities were grazed while flatter areas (in the south) were used for hay production. Despite said agricultural actions, much of the site continues to express fairly native topography. Several areas (including wetlands) have been excavated and / or filled which includes the fill berm in the northwest part of the site, the rough access roads in the northeast and central parts of the site, and ditch along the southeast edge. The general effect has been either creation of wetter areas through excavation or by impoundment or loss of reduced hydroperiod within wetland and former wetland areas through severance of upgradient hydrology or filling.

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As verified in TSI's 2014 delineation report update, TSI identified two general types of wetland features within the boundaries of Site 4⁴ using Arid West Manual methodology. Of these features, two distinct features are determined to have characteristics and functional attributes reflective of other wetlands associated with the larger Port of The Dalles Regional General Permit analysis. As such, Scabland Swale / Depression Complexes, Types I and II (AA4.1 and AA4.2, respectively) are assessed as representative polygons. See report Section III. Assessment Methodology and Appendices H and I for greater descriptions of Site 4 assessment areas.

Site 5. Northwest Aluminum Company

This study area is bound by Union Pacific railroad right-of-way then Interstate I-84 to the west, currently vacant lands (Site 4) to the north, River Road and light industrial lands to the east and vacant land containing a former golf course and landfill to the south. The 91.52± acre Site 5 consists of Tax lot 700 on Wasco County Assessor's map Township 02 North, Range 13 East, Section 28. The entire site is zoned Industrial (I) and is located within The Dalles UGB.

The southern 82.8± acres formerly housed an aluminum production facility beginning circa 1958. Mill decommissioning and demolition occurred between 2007 and 2009 resulting in a flat fill terrace containing concrete and crushed concrete fill pads. Union Pacific rail spurs enter the southern end of the former mill site. Lands north of the former plant have experienced varying levels of disturbance ranging from mass excavation (ditch and pond formation) to fill material placement (boulder fields and access road). The northern portion contains historically disturbed scabland depression and rock outcrop complexes. Onsite elevations range from 145 feet above mean seal level (msl) in atop a rock pile in the northern portion to 123 feet msl within a remnant scabland depression.

Historic aerial photography analysis documents site disturbances for agricultural purposes since (at least) 1935. A majority of agricultural activity occurred in the northwestern portion of the site in areas lacking exposed rock outcrop features. Major industrial mill construction occurred throughout the southern 90% of the site circa 1958. Aluminum production continued through circa 1987. Mill decommissioning and demolition occurred between 2007 and 2009.

During mill operations, earthwork occurred in the northern portion of the site during waste management activities. During said actions, boulders and large rocks displaced by construction were placed along the edge of Site 5. Ditches and other depressions were also excavated. Lastly, encroachment into the northern portion of Site 5 included construction of a gravel access road circa 1980 for well monitoring. Several remnant scabland depressions along the northern site boundary are slightly impounded by the gravel access road which may slightly expand their historical boundaries.

⁴ DSL WD#2009-0216R and USACE AJD NWP 2012-2008-445.

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As identified in TSI's 2014 delineation report, TSI identified two general types of wetland features within the boundaries of Site 5⁵ utilizing Arid West Manual methodologies. Of the delineated features, two are determined to have characteristics and functional attributes reflective of other wetlands associated with the larger Port of The Dalles Regional General Permit analysis. As such, the Remnant Scabland Depression, Type II (AA5.1) and an Excavated Feature (AA5.2) are assessed as representative polygons. See report Section III. Assessment Methodology and Appendices J and K for greater descriptions of Site 5 assessment areas.

Site 6. Northern Oregon Correctional Facility

The site is bound by Union Pacific railroad right-of-way to the west, Webber Street and vacant lands to the south, River Road to the east and Fort Dalles Rodeo grounds to the north. The 17.5± acre Site 6 consists of Tax lot 500 on Wasco County Assessor's map Township 02N, Range 13E, Section 33, Willamette Meridian. Much of the site is developed (housing NORCOR facilities, industrial warehouses and recently constructed fill terraces) while remaining areas contain (remnant) and impounded scabland depressions and adjacent rock outcrops. The entire site is zoned Industrial (I) and is located within The Dalles UGB.

Approximately 85% of Site 6 has been developed; the south part of the property is occupied by the NORCOR buildings and associated parking lots while adjacent lands have recently been filled for future development purposes in accordance with DSL Permit 45855-RF⁶. Two impounded scabland depressions lie within the undeveloped eastern portion of the site. Topography on the undeveloped portion is irregular except for the gravel access road. Onsite elevations range from 130 feet above mean seal level (msl) in the northwest portion to 115 feet msl along River Road.

As verified in TSI's 2014 delineation report, two wetland features are located within the boundaries of Site 6⁷. As these areas are quite similar, one Impounded Scabland Depression (AA6.1) was assessed as a representative polygon for Site 6 wetlands. See Report Section III Assessment Methodology and Appendix L for greater descriptions of the Site 6 assessment area.

⁵ Despite the obvious wetland condition of Site 6, DSL is unable to process TSI's 2014 delineation update report format. NORCOR has indicated they do not want to provide a full delineation (per the DSL review fee). Boundaries assessed for this report are accurate to 1.0 feet.

⁶ USACE AJD NWP 2010-105 determined wetlands associated with this impact were non-jurisdictional.

⁷ DSL WD#2009-0353 and USACE AJD NWP 2010-105.

III. Assessment Methodology

Background Overview

In order to assess wetland functions and values, specific data-gathering protocols have been developed that evaluate a multitude of wetland attributes and how they are affected by, interact with, or dependent on the surrounding landscape. The State of Oregon recognizes and / or utilizes several such protocols, but no methodology specific to Missoula Flood scabland-associated wetlands has been approved for use. In Washington, the Washington State Department of Ecology has developed *Methods for Assessing Wetland Functions. Volume II: Depressional Wetlands in the Columbia Basin of Eastern Washington* (WSDOE 2000) to assess depressional wetlands within the Columbia Basin. While this method may be the most ecologically suitable for assessing identified scabland-associated wetlands, recent discussions with DSL indicate that this methodology is not recognized for JPA processing and / or mitigation analysis⁸.

In accordance with DSL Oregon Revised Statute (ORS) 141-085-0685, projects which propose:

"wetland impacts of greater than 0.20 acres must include a functions and values assessment using the reference-based method in the appropriate Hydrogeomorphic Method (HGM) guidebook for Oregon wetlands, if available. If not available, the Oregon Rapid Wetland Assessment Protocol (ORWAP) is the required method."

For the vicinity of The Dalles, a DSL-approved HGM methodology does not exist. As such, the default ORWAP methodology was utilized. ORWAP is also recommended (but not required) by the USACE Portland District for JPA functional wetland analysis.

ORWAP Overview

Led by DSL in its development, with funding from U.S. Environmental Protection Agency and oversight by a committee of State and Federal agencies and private consultants, ORWAP is a standardized protocol to rapidly assess wetland functions and values for all wetland types throughout Oregon. ORWAP was designed for the purpose of assessing wetlands for land use planning, watershed assessment, impact and compensatory mitigation assessment (for State and Federal permitting processes) and for evaluating the success of enhancement and restoration projects.

⁸ Personal communications with Kirk Jarvie, et. al (DSL).

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Created as a three-part data form, 140 individual indicators are utilized in the protocol. The indicator values are derived from field-collected site and vicinity attributes as well as internet-derived information and aerial imagery. This data is entered into pre-formatted Excel spreadsheets which calculate specific function and value scores for a variety of wetland attributes and services. Specifically, ORWAP generates function and value scores for Water Storage and Delay, Sediment Retention and Stabilization, Phosphorus Retention, Nitrate Removal and Retention, Thermoregulation, Carbon Sequestration, Organic Matter Export, Pollinator Habitat, Aquatic Invertebrate Habitat, Anadromous Fish Habitat, Non-anadromous Fish Habitat, Amphibian & Reptile Habitat, Waterbird Feeding Habitat, Waterbird Nesting Habitat, Songbird, Raptor and Mammal Habitat, Pollinator Habitat, and Native Plant Diversity. For all but two of these functions, scores are calculated for both the function and value (collectively, ecosystem service).

Individual functions are then combined into thematic "Grouped Functions" and scored similarly. These include Hydrologic, Water Quality Support, Fish Support, Aquatic Support, Terrestrial Support, and Carbon Sequestration. The ORWAP calculator also provides scores for wetland Public Use & Recognition, Provisioning Services, Ecological Condition (integrity), Stressors (risk), and Sensitivity (resistance/resilience). Lastly, the ORWAP calculator estimates the likely Hydrogeomorphic Classification for the assessed wetland.

As identified in DSL's *Guidance for Using the Oregon Rapid Wetland Assessment Protocol (ORWAP) in State and Federal Permit Programs*, the function and value results for the Grouped Functions, Ecological Condition, Stressors, and Sensitivity are utilized during regulatory (JPA or permit) analysis of proposed impacts and/or mitigation. As such, the results generated for the Grouped Functions and these other attributes will be the focus for this assessment and are discussed in greater detail in Sections IV and V of this report. For more information regarding details of the ORWAP protocol, please refer to the *Manual for the Oregon Rapid Wetland Assessment Protocol (ORWAP)*, Version 2.0.2.

Assessment Area (AA) Selection

Due to the rather large number of delineated features (100 distinct polygons) within the six participating sites, conducting individual functional assessment reports for each feature is impractical. As such, for each site, representative wetland features were selected for individual assessment (herein, Assessment Area or AA) that would be useful in generating not only site-specific results but also in generating representative results for similar features (HGM-classification and / or landform) across all six sites. Additionally, other general site and assessment feature characteristics were taken into consideration when choosing specific features to be assessed including the immediate proximity to roads or railroads and the level of overall site and feature disturbance. For example, Chenoweth Creek and its associated wetlands cross three of the six sites. Rather than assess this feature three times (once for each site), it was assessed once for the reach that crosses Site 1. Specifics regarding the selection process for each AA are discussed on the following pages and within Appendices A through L.

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Despite best efforts to categorize delineated resources into representative AA's the ORWAP methodology inherently produces varying scores for similarly classified wetlands based on CA and adjacent land uses. To minimize score variations, TSI field teams categorized delineated resources into twelve categories based on similar vegetative communities, hydrological attributes and vicinity manipulations. For example, AA1.1 is considered to be representative of Slope Complex Wetlands located within Sites 1 and 2. Represented wetlands have similar slope landscape settings, support similar vegetation communities, contain similar soil substrates, experience similar hydrological manipulations and CA disturbances (including proximity to high traffic roads). While Site 2 Slope Complex Wetlands lie within a differently configured and sized CA, final ORWAP scores would not be anticipated to largely vary from AA1.1 results based on the similar existing condition of the wetland and immediate surroundings.

When existing conditions and / or CA attributes are anticipated to drastically alter representative feature scores, TSI teams dissected the ORWAP analysis into subclasses / Types. For example, Impounded Scabland Depressions are identified within Sites 1 and 6. Due to the drastically different types of impoundment (Union Pacific railroad base versus more native basalt topography) and disturbances in the CA (relatively undisturbed versus heavily developed), the field team classified Site 2 wetlands as Impounded Scabland Depression, Type I while Site 6 wetlands are classified as Impounded Scabland Depression, Type II. As anticipated, the variations in feature condition and CA manipulations result in drastically different scores for similarly delineated Impounded Scabland Depression features (see Table 6).

As score variations among represented wetlands is inherently present, TSI's classification system minimizes significant fluctuation. As scores provided in this report reflect the regional condition at the time of delineation, any future development would inevitably modify feature scoring. As such, future Applicant(s) should be provided the opportunity to re-assess representative scores based on project needs.

During the ORWAP feature selection process, TSI teams reviewed field notes and delineation results, assessed City of The Dalles Comprehensive Plans, potential development footprints (using TAC development criteria) and potential mitigation scenarios. During this selection, it was determined that wetlands / waters associated with the Columbia River (Site 3) and Taylor Lake (Sites 2 and 3) would not be assessed. Current POTD development footprints coupled with City mandated thirty foot setback requirements from the Columbia River (to facilitate the Riverfront Trail (per Section 5.090.040)) indicate that encroachment to the river would not occur.

While not specifically identified in the Comprehensive Plan, internal POTD and TSI discussions determined that topographical development constraints associated with wetland fringes of Taylor Lake make these areas unfeasible for development. Further, these wetlands are situated in the extreme northern portions of these sites and should be avoidable by potential future development. As such, fringe wetlands were omitted from this ORWAP assessment. Should future development proposals include impacts to these areas, Applicant(s) would be required to conduct an independent ORWAP assessment to determine potential functional attributes.

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As previously indicated, three separate AA's within Site 1 were selected for ORWAP analysis. The Slope Complex Wetland (AA1.1) is representative of 1.16± acre of Slope type wetlands on Sites 1 and 2 which lie between River Road and Chenoweth Creek (See Appendix A, Figure 1.1E). Chenoweth Creek Waters / Wetlands (AA1.2) is representative of the 4.43± acres of creek / side channels as it flows easterly through Sites 1, 2 and 3 (see Appendix B, Figure 1.2E). As a distinct feature within the regional project, the 1.65 acre Emergent Depression (AA1.3) warranted analysis based on the unique wetland characteristics and potential mitigation opportunities (see Appendix C, Figure 1.3E).

Two AA's within Site 2 were selected for ORWAP analysis. The Scabland Depression Complex (AA2.1) is representative of 0.67± acre of relatively undisturbed, intact and higher quality Scabland Depressions scattered throughout Site 2 (see Appendix D, Figure 2.1E). The 0.5-acre Impounded Scabland Depression, Type I (AA2.2) is another unique wetland feature within the regional project which warranted independent analysis for the potential use for compensatory mitigation (see Appendix E, Figure 2.2E).

Two AA's within Site 3 were assessed for this project. The Remnant Scabland Depression, Type I (AA3.1) is reflective of 2.97± acres of remnant scabland depressions within Sites 3 and 4 which have experience historic grading / impoundment disturbances which result in slightly wetter hydrological regimes (see Appendix F, Figure 3.1E). The Ditch / Swale Complex (AA3.2) is representative of 1.35± acre of areas which have experienced significant disturbances associated with ditching, excavation and other manipulations; represented areas are scattered throughout Sites 2, 3, 4 and 5 (see Appendix G, Figure 3.2E)

Two Scabland Swale / Depression Complexes within Site 4 were assessed for this project. AA4.1 is representative of 1.58± acre of only slightly disturbed and relatively in-tact Scabland Swale / Depression Complex, Type I wetlands scattered throughout Site 2, 4 and 5 (see Appendix H, Figure 4.1E). AA4.2 is representative of 1.58± acre of moderately disturbed and relatively in-tact Scabland Swale / Depression Complex, Type II wetlands within Sites 1 and 4 (see Appendix I, Figure 4.2E). AA4.1 is differentiated from AA4.2 by the larger percentage that qualifies as depression as opposed to swale area; this variation is reflective of the flatter landscape positioning. AA4.2, in contrast, is located on a slight slope and consists of higher percentages of swale wetland (as opposed to pools).

Two AA's within Site 5 were assessed for this project. The Remnant Scabland Depression, Type II (AA5.1) is representative of 0.33± acre of remaining depressional areas experiencing varying levels of ground and hydrological disturbances scattered throughout the northeastern portion of Site 5 (see Appendix J, Figure 5.1E) while an Excavated Feature (AA5.2) is representative of 0.51± acre of heavily disturbed, excavated and created features scattered throughout Sites 1, 2, 3, 4 and 5 (see Appendix K, Figure 5.2E).

Lastly, one representative Impounded Scabland Depression (AA6.1) was selected to represent 0.8± acre wetland areas within Site 6 (see Appendix L, Figure 6.1E).

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Table 1. Categorization of ORWAP Assessed Wetlands.

AA	Wetland Type	Description	Site: Acreage
1.1	Slope Complex Wetlands	Represents wetlands having similar slope landscape setting, primarily native vegetation communities (including scrub-shrub inclusions) which experience severed and concentrated hydrological manipulations due to River Road. Represented wetlands lie in similar proximity to high traffic roads with similar disturbances in the immediate vicinity.	Site 1: 0.19-acre Site 2: 0.97-acre Total: 1.16 acre
1.2	Chenoweth Creek Waters / Wetlands	Represents Chenoweth Creek features which lie in the topographically low end of the watershed. Features support similar vegetation communities, wildlife populations, soil substrates and experience similar hydrological influences. Represented features lie in similar proximity to high traffic roads and encroachments.	Site 1: 1.53 acre Site 2: 0.66-acre Site 3: 2.24 acres Total: 4.43 acres
1.3	Emergent Depression	Represents a unique wetland feature within the regional project footprint. Isolated feature contains very deep, dark silt loam soils which support an invasive plant community.	Site 1: 1.65 acre Total: 1.65 acre
2.1	Scabland Depression Complex	Represents high quality Scabland Depressions which support primarily native vegetation communities and are supported primarily by precipitation and immediate runoff from surrounding basalt uplands. Represented wetlands lie in similar proximity to the Union Pacific rail line, Taylor Road access road and experience similar disturbances in the immediate vicinity.	Site 2: 0.67-acre Total: 0.67-acre
2.2	Impounded Scabland Depression, Type I	Represents a unique wetland feature within Site 2. Hydrology is significantly impounded by the Union Pacific rail line, increasing the size and depth of inundation typically observed for similar scabland depressions in the vicinity. Type I Impoundment has a relatively undisturbed CA.	Site 2: 0.5-acre Total: 0.5-acre
3.1	Remnant Scabland Depression, Type I	Represents depressional features which primarily support native vegetation (including small scrub-shrub inclusions) and have experienced similar excavation, fill material placement and impoundment alterations significantly altering the natural hydrological characteristics of this type of wetland. Represented wetlands also lie within similarly disturbed Contributing Areas with similar proximity to access roads.	Site 3: 2.26-acre Site 4: 0.71-acre Total: 2.97 acres
3.2	Ditch / Swale Complex	Represents wetlands which support varying plant communities ranging from native dominated to (near monocultures) of non-native species. Soils range from truncated and excavated areas to areas leveled and / or partially filled. Despite historic disturbances, this category of wetland appears to have an in-tact basalt bedrock layer which perches precipitation and immediate runoff. Represented wetlands also lie within similarly disturbed Contributing Areas with similar proximity to access roads.	Site 2: 0.4-acre Site 3: 0.61-acre Site 4: 0.11-acre Site 5: 0.23-acre Total: 1.35 acre

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Table 1, Continued.

AA	Wetland Type	Description	Site: Acreage
4.1	Scabland Swale / Depression Complex, Type I	Represents relatively in-tact scabland depression wetlands which primarily support native vegetation communities and are supported by precipitation and immediate runoff from surrounding basalt uplands. Represented wetlands lie in similar proximity to the high traffic roads and experience similar disturbances in the immediate vicinity. This type of feature is differentiated from Type II Complex (represented by AA4.2) by the <i>higher percentage of depressional areas</i> within topographically flatter landforms.	Site 2: 0.08-acre Site 4: 1.13 acre Site 5: 0.22-acre Total: 1.53 acre
4.2	Scabland Swale / Depression Complex, Type II	Represents disturbed but relatively in-tact scabland depression wetlands which primarily support native vegetation communities and are supported primarily by precipitation and immediate runoff. Represented wetlands lie in similar proximity to the high traffic roads and experience similar hydrological disturbances in the immediate vicinity. This feature is differentiated from Type I Complex by the <i>higher percentage of swale areas</i> within slightly sloping landforms.	Site 1: 0.1-acre Site 4: 1.48 acre Total: 1.58 acre
5.1	Remnant Scabland Depression, Type II	Represents disturbed scabland depression wetlands located in the northeastern corner of Site 5. Represented features are depressional, primarily support native vegetation and have experienced similar excavation, fill material placement, partial hydrological severance and road impoundments disturbances. Represented wetlands also lie within similarly disturbed Contributing Areas with similar proximity to access roads.	Site 5: 0.33-acre Total: 0.33-acre
5.2	Excavated Feature	While regional Excavated Features scattered throughout Sites 1, 2, 3, 4 and 5 are rather variable, AA5.2 is selected as representative as it exhibits typical disturbances and characteristics. Represented features are typically depressional, support mixed vegetation communities, exhibit truncated soil profiles, and have experienced similar historical excavation disturbances. Disturbances result in created and heavily manipulated hydrological characteristics. Due to the highly manipulated and created condition of these Excavated Features, however, these wetland areas should not rank as high priority for avoidance / preservation for the larger IRGP process.	Site 1: 0.02-acre ⁹ Site 2: 0.05-acre Site 3: 0.08-acre Site 4: 0.18-acre Site 5: 0.18-acre Total: 0.51-acre
6.1	Impounded / Remnant Scabland Depression	Represents wetlands within Site 6 which are impounded within a more native basalt topography and constructed road basin (as opposed to significant impoundment experienced by AA2.2). Further, the Type II Impoundment has an extensively developed and highly undisturbed CA while the Type I (AA62.2) CA is relatively undisturbed.	Site 6: 0.8-acre Total: 0.8-acre

⁹ Feature does not qualify as State jurisdictional wetland (DSL WD#2014-0399).

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Study Area Specific Methodologies

Prior to conducting the field work portions of the ORWAP protocol (FieldF and FieldS form), TSI staff began gathering pertinent background and data needed for completion of the 'Office' form (Form OF). TSI staff gathered and analyzed historic and contemporary aerial photographs, Natural Resource Conservation Service published soils maps, Wasco County LiDAR based topographic linework and Wasco County assessor maps. TSI reviewed U.S. Fish and Wildlife Service National Wetland Inventory (NWI) maps and pertinent information from the six web sites detailed in the ORWAP protocol. Previous TSI experience with botanical inventoring, Endangered Species surveys, and mitigation site evaluations provided unique insight and an intrinsic knowledge of these areas that only comes with repeated site visits throughout the year over several years.

Actual field data collection occurred over multiple site visits during the spring of 2014 in conjunction with the wetland delineation process. More specifically, TSI staff conducted ORWAP-related field work on March 23-24, April 15-16, May 9, and May 29, 2014. Specific data collection included gathering field information sufficiently to complete the FieldF and FieldS forms of the ORWAP protocol. More specifically, all assessment areas were visited on one or more occasions to evaluate the plethora of indicators such as vegetation (native vs. non-native, percent cover of trees, shrubs, forbs, grasses, etc.), hydrology (sources, connectivity, depths, extent, etc.), level of disturbance to and within proximity of, complexity and microtopography, slopes, buffers, and stressors (actual and potential). Please refer to FieldF and FieldS forms of the ORWAP protocol and the ORWAP Manual for more specifics on the types of information collected.

IV. Overview and Comparison of Assessment Results

Grouped Function scores for the twelve AA's are presented in Tables 2 through 6 and within Appendices A through L. Appendices provide feature scores adjacent scores derived for the 221 state-wide reference wetlands, four Wasco County Flats wetlands and project specific mean and median scores. As outlined in the following tables and to aid in comparison purposes, scores are placed into five sub-groups based on HGM-classification and best-professional judgment by the wetland consultant team. These five sub-groups include Slope, Riverine, Excavated Feature, Emergent Depression and Scabland Features. This grouping allows for better comparison of functions across wetlands that are more similar in nature.

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Admittedly, for three of these sub-groups, only one (or two) representative assessment area(s) is represented. This is primarily due to the fact that very few wetlands of similar character exist within the study area. As mentioned, the Riverine (Chenoweth Creek) Sub-Group could have been assessed three times, but one representative AA was considered sufficient for the purposes of this process. For the Slope Sub-Group, only two landscape positions within Sites 1 and 2 share sufficiently similar characteristics to be placed in this sub-group. TSI is confident that the representative AA sufficiently documents Slope wetlands as these wetlands types experience similar hydrological disturbances, lie in similar topographical positions and support similar vegetation communities.

Despite their ORWAP derived Flats HGM designations, manipulations associated with the Excavated Features Group results in sufficiently different conditions than other wetland areas to warrant consideration as a unique sub-group. As only one Emergent Depression (Flats) type wetland is located within the project area, AA1.3 provides sufficient documentation. Lastly, the remainder of project wetlands lie within the Scabland Sub-Group. As evident by feature descriptions and scores, existing Scablands reflect a diverse range of disturbances and encroachments.

Table 7 outlines ORWAP results from four AAs located in Wasco County which possess similar HGM-classification (Flats). These AAs are a subset of the original 221 sites assessed during development of the ORWAP protocol. The data results for all 221 sites were published as part of the ORWAP *Manual and Guidance* documents. All four sites were considered as having a Flats HGM-classification. While two other sites in Wasco County were evaluated during the development of ORWAP, their lacustrine HGM-classification was considered sufficiently different than assessed project wetlands, therefore were omitted for project comparisons.

Of the four Wasco County Flats sites included, two are in the same HUC-12 watershed, three are in the same HUC-10 watershed and all are in the same HUC-8 watershed. Presentation of these results is useful in that their respective grouped functions and values can be compared to those sites that were assessed within the project area. Generally speaking, for those wetlands that are closer in geographic proximity (by watershed) and which share a similar HGM-classification, better comparisons can be made between their functions and values in terms of evaluating functional loss and/or gains through development and/or mitigation.

Lastly, median and mean scores of the project wetlands are provided in Table 8 to aid in comparison and (potential) ranking purposes.

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Table 2. Slope Sub-Group ORWAP Results

		Slope Complex Wetland (AAL1)	
GROUPED SERVICE FUNCTIONS	Function Score	Value Score	
Hydrologic Function (WS)	2.65	4.33	
Water Quality Group (WQ)	4.77	7.36	
Carbon Sequestration (CS)	2.53		
Fish Support Group (FISH)	1.21	6.67	
Aquatic Support Group (AQ)	7.00	8.00	
Terrestrial Support Group (TERR)	5.44	8.00	
Public Use & Recognition (PU)		3.06	
Provisioning Services (PS)		0.00	
OTHER ATTRIBUTES			
Wetland Ecological Condition		5.92	
Wetland Stressors		5.30	
Wetland Sensitivity		4.58	
HGM CLASSIFICATION	Slope		
Represented polygons located within Sites 1 and 2.			

Table 3. Riverine Sub-Group ORWAP Results

		Chenoweth Creek (AA1,2)	
GROUPED SERVICE FUNCTIONS	Function Score	Value Score	
Hydrologic Function (WS)	2.44	2.50	
Water Quality Group (WQ)	5.28	10.00	
Carbon Sequestration (CS)	3.06		
Fish Support Group (FISH)	6.86	10.00	
Aquatic Support Group (AQ)	6.00	8.00	
Terrestrial Support Group (TERR)	6.51	8.00	
Public Use & Recognition (PU)		4.72	
Provisioning Services (PS)		0.00	
OTHER ATTRIBUTES			
Wetland Ecological Condition		4.92	
Wetland Stressors		5.40	
Wetland Sensitivity		4.17	
HGM CLASSIFICATION	Riverine		
Represented polygons located within Sites 1, 2 and 3.			

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Table 4. Excavated Feature Sub-Group ORWAP Results.

GROUPED SERVICE FUNCTIONS	Excavated Feature (AA5.2)		Ditch / Swale Complex (AA3.2)	
	Function Score	Value Score	Function Score	Value Score
Hydrologic Function (WS)	3.01	3.92	5.00	3.83
Water Quality Group (WQ)	6.12	6.77	10.00	7.19
Carbon Sequestration (CS)	2.88		2.26	
Fish Support Group (FISH)	1.45	10.00	1.50	10.00
Aquatic Support Group (AQ)	7.05	8.67	6.71	8.67
Terrestrial Support Group (TERR)	5.86	8.00	6.33	8.00
Public Use & Recognition (PU)		1.39		0.56
Provisioning Services (PS)		0.00		0.00
OTHER ATTRIBUTES				
Wetland Ecological Condition		6.99		7.46
Wetland Stressors		4.14		7.23
Wetland Sensitivity		5.00		10.00
HGM CLASSIFICATION	Flat		Flat	
	Represented polygons located on Sites 1, 2, 3, 4 and 5.		Represented polygons located within Sites 2, 3, 4 and 5.	

Table 5. Emergent Depression Sub-Group ORWAP Results.

GROUPED SERVICE FUNCTIONS	Emergent Depression (AA1.3)	
	Function Score	Value Score
Hydrologic Function (WS)	5.0	3.58
Water Quality Group (WQ)	10.0	6.56
Carbon Sequestration (CS)	1.84	
Fish Support Group (FISH)	0.98	10.0
Aquatic Support Group (AQ)	6.88	8.0
Terrestrial Support Group (TERR)	6.3	8.00
Public Use & Recognition (PU)		4.72
Provisioning Services (PS)		0.0
OTHER ATTRIBUTES		
Wetland Ecological Condition		4.82
Wetland Stressors		4.63
Wetland Sensitivity		10.0
HGM CLASSIFICATION	Flat	
	Represented polygon located within Site 1.	

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Table 6. Scabland Sub-Group ORWAP Results.

GROUPED SERVICE FUNCTIONS	Depression Complex (AA2.1)		Impounded Scabland Depression, Type I (AA2.2)		Remnant Scabland Depression, Type I (AA3.1)		Swale / Depression Complex (AA4.1)		Swale / Depression Complex (AA4.2)		Remnant Scabland Depression, Type II (AA5.1)		Impounded Scabland Depression, Type II (AA6.1)	
	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score
Hydrologic Function (WS)	5.00	3.83	5.00	3.67	7.00	3.83	5.00	3.42	5.00	2.83	4.71	3.92	4.99	3.58
Water Quality Group (WQ)	10.00	6.87	10.00	5.67	10.00	7.19	10.00	6.14	10.00	6.24	6.22	6.61	6.50	6.85
Carbon Sequestration (CS)	2.25		2.21		2.33		2.25		2.25		2.94		2.76	
Fish Support Group (FISH)	1.06	10.00	0.85	10.00	1.50	10.00	1.06	10.00	1.06	10.00	1.41	10.00	1.50	10.00
Aquatic Support Group (AQ)	7.66	8.67	7.20	7.20	6.58	8.67	7.42	8.67	7.42	8.67	7.33	8.67	6.71	8.00
Terrestrial Support Group (TERR)	7.16	8.00	6.69	7.09	6.36	8.00	7.94	8.00	6.83	8.00	7.57	8.00	5.73	8.00
Public Use & Recognition (PU)		3.06		3.06		2.22		3.06		3.06		3.06		3.06
Provisioning Services (PS)		0.00		0.00		2.00		0.00		0.00		0.00		0.00
OTHER ATTRIBUTES														
Wetland Ecological Condition		7.62		7.23		6.84		7.62		7.17		7.62		5.68
Wetland Stressors		2.21		2.69		6.75		2.33		2.33		2.69		3.81
Wetland Sensitivity		10.00		10.00		10.00		10.00		10.00		5.00		6.10
HGM CLASSIFICATION														
	Flats		Flats		Flats		Flats		Flats		Flats		Flats	
	Represented polygons located within Site 2.		Represented polygons located within Site 2.		Represented polygons located within Sites 3 and 4.		Represented polygons located within Sites 2, 4 and 5.		Represented polygons located within Sites 1 and 4.		Represented polygons located within Site 5.		Represented polygons located within Site 6.	

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Table 7. Wasco County Flats Sub-Group ORWAP Results.

GROUPED SERVICE FUNCTIONS	Wasco County 1		Wasco County 2		Wasco County 3		Wasco County 4		Wasco County MEDIAN		Wasco County MEAN	
	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score	Function Score	Value Score
Hydrologic Function (WS)	5.00	3.17	4.4	3.0	6.0	3.17	5.0	3.24	5.0	3.17	5.1	3.15
Water Quality Group (WQ)	10.00	5.97	5.18	5.47	10.00	6.35	10.00	6.1	10.0	6.04	8.8	5.97
Carbon Sequestration (CS)	2.19		2.16		2.34		2.03		2.18		2.18	
Fish Support Group (FISH)	0.72	10.00	0.18	10.00	10.0	10.00	10.0	7.19	5.36	10.0	5.23	9.3
Aquatic Support Group (AQ)	6.93	10.0	5.42	6.67	4.32	8.67	5.69	7.0	5.56	7.84	5.59	8.08
Terrestrial Support Group (TERR)	5.52	8.00	2.99	6.67	4.06	8.0	6.45	10.0	4.79	8.0	4.76	8.17
Public Use & Recognition (PU)		0.83		1.67		0.0		3.33		1.25		1.46
Provisioning Services (PS)		2.0		0.0		0.0		2.0		1.0		1.0
OTHER ATTRIBUTES												
Wetland Ecological Condition		7.3		4.05		5.96		5.83		5.9		5.79
Wetland Stressors		0.81		6.59		5.08		1.65		3.37		3.53
Wetland Sensitivity		5.0		7.0		7.63		4.5		6.0		6.03
HGM CLASSIFICATION	Flats		Flats		Flats		Flats		Flats		Flats	

Table 8. Project ORWAP Results.

GROUPED SERVICE FUNCTIONS	Project Wetlands Median		Project Wetlands Mean	
	Function Score	Value Score	Function Score	Value Score
Hydrologic Function (WS)	5.0	3.75	4.57	3.7
Water Quality Group (WQ)	10.0	6.81	8.24	7.22
Carbon Sequestration (CS)	2.3		2.46	
Fish Support Group (FISH)	1.31	10.0	1.7	8.98
Aquatic Support Group (AQ)	7.03	8.34	7.0	8.24
Terrestrial Support Group (TERR)	6.44	8.0	6.56	7.85
Public Use & Recognition (PU)		3.06		2.91
Provisioning Services (PS)		0.0		0.18
OTHER ATTRIBUTES				
Wetland Ecological Condition		7.08		6.66
Wetland Stressors		3.98		4.13
Wetland Sensitivity		10.0		7.9

V. Conclusions

In terms of prioritizing wetland impacts for development and potential mitigation use, the results of the various ORWAP assessments are by no means meant to be used in isolation from other deciding factors and priorities that have been developed by the POTD, the City of The Dalles, and TAC. The results herein can and should be used to identify how individual wetland functions compare between different AAs throughout the study area and geographic proximity. The model scores their relative effectiveness and not a total of ecosystem service. The corresponding wetland values generally indicate how important that function is to humans and is relative to its surrounding landscape and proximity to other features providing similar wetland functions.

As such, some direct comparisons can be made between both AAs in the same sub-group and AAs in different sub-groups. AA3.1 would appear to be the highest overall functioning wetland in terms of sum of functions. However, two of the AAs within the Scabland group score similarly high across functions (AA2.1 and AA4.1). Of the Scabland Depression group, AA6.1 appears to be the lowest functioning within the groups but not the lowest amongst all AAs. That designation falls on AA1.1 which corroborates with the best professional judgment of the consultant team. AA1.1 seems fairly low in ecological condition namely due to its hydrological alterations, influence from untreated storm water and proximity to development and roads.

In terms of values, AA1.2 (Chenoweth Creek Waters / Wetlands) is the highest in sum value score but not necessarily the highest in all values. In contrast, one of the lesser sum functioning wetlands (AA5.1) has one of the higher sum values across the board. This again affirms the point of evaluating individual functions across wetlands rather than the entirety of functions which must be then also be balanced against priorities outside of the assessment protocol.

VI. Limitations of Methodology and Results

Assessment results and conclusions outlined in this report are based on conditions observed during TSI's 2014 field investigations and the ORWAP Version 2.0 methodology. The current ORWAP methodology provides numeric estimates of wetland function based on 221 sites throughout Oregon and only six sites within Wasco County. Results should not be construed as direct measurements of total ecosystem services but rather relative effectiveness in performing the function. Results are meant to augment and/or support the interpretations of a subject professional and not replace them. As such, the complete understanding of wetland science is still a work in progress and the protocol admittedly does not measure all functions, values, and services that a wetland might support. The *ORWAP Manual* covers in much more detail the limitations of the protocol and its results and should be consulted as such.

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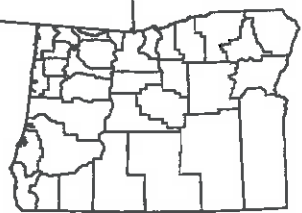
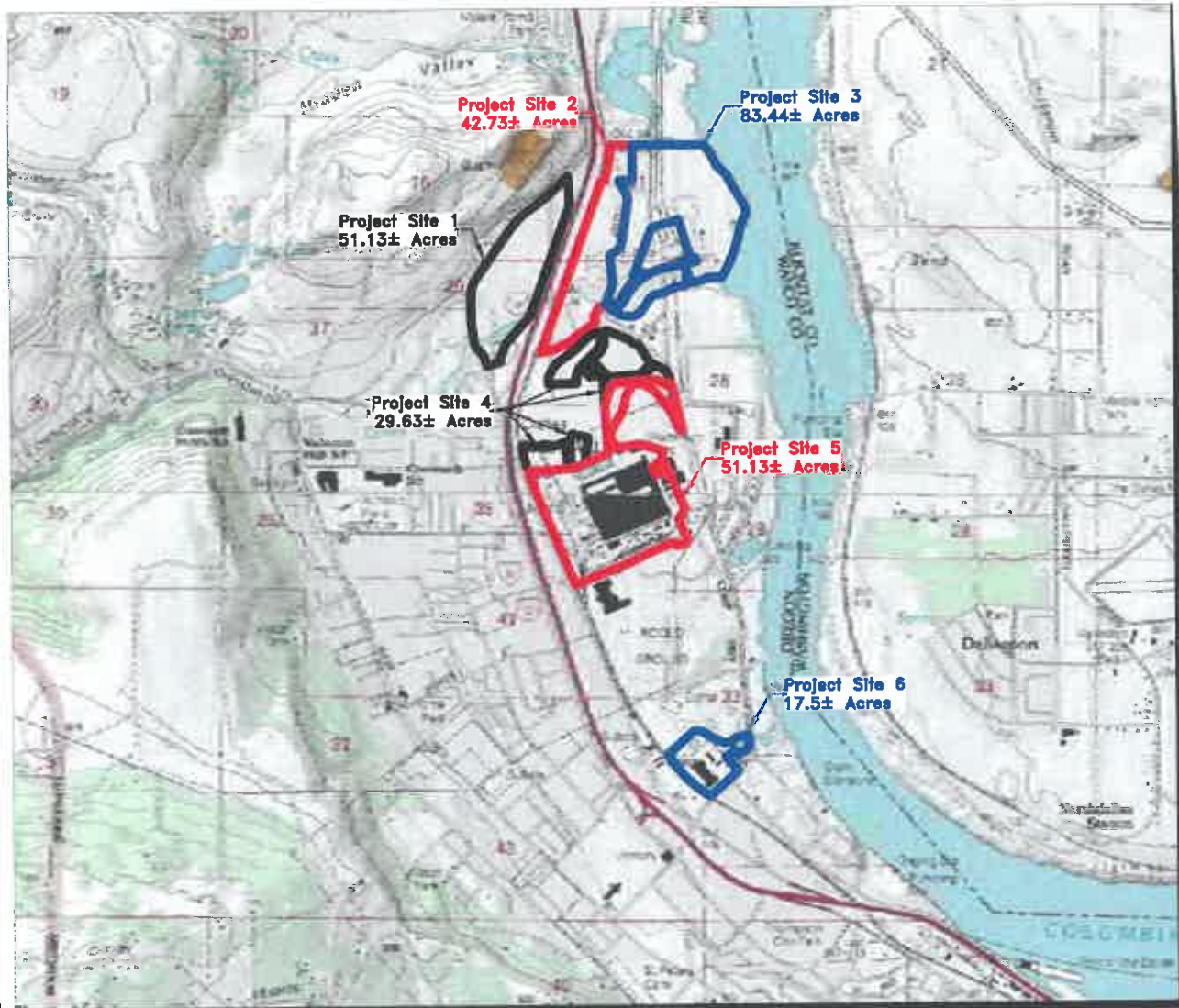
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Final ORWAP Report Summary for the Port of The Dalles Regional Wetland Planning Project

City of The Dalles, Wasco County, Oregon

As for study area specific limitations, this report documents the investigation, best professional judgment and conclusions of the consultant team as they pertain to site conditions at the time of said investigation. Any changes to the sites and surrounding landscapes after the timing of the investigation are not reflected in this report. Knowingly, the east portion of Site 3 is under construction for a business park and regulatory permits have been issued for the construction of commercial space and associated compensatory wetland mitigation on Site 4. However, the effects these developments have or will have in the future is not known and thus not reflected in this report.

ORWAP results presented in this report are representative of specific types of wetlands which reflect the regional condition at the time of delineation; any future development would inevitably modify feature scoring. Further, while professional judgement and analysis of the delineation results were the primary basis for categorization of delineated features into classes, score variations among represented wetlands is inherently present. As such, future Applicant(s) should be provided the opportunity to re-assess representative scores based on project needs.



Source: Adapted from U.S.G.S. Topographic Quads.

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**FINAL OREGON RAPID WETLAND ASSESSMENT
PROTOCOL (ORWAP) REPORT SUMMARY FOR
THE PORT OF THE DALLES
REGIONAL WETLAND PLANNING PROJECT
The Dalles, Wasco County, Oregon**

VICINITY MAP



1 inch = 2500 ft.

March 2015

FIGURE 1



Source: Adapted from U.S.D.A. Farm Service Agency aerial photography, available at Google Earth.

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**AUGUST 2013
AERIAL
PHOTOGRAPH**

FIGURE 2

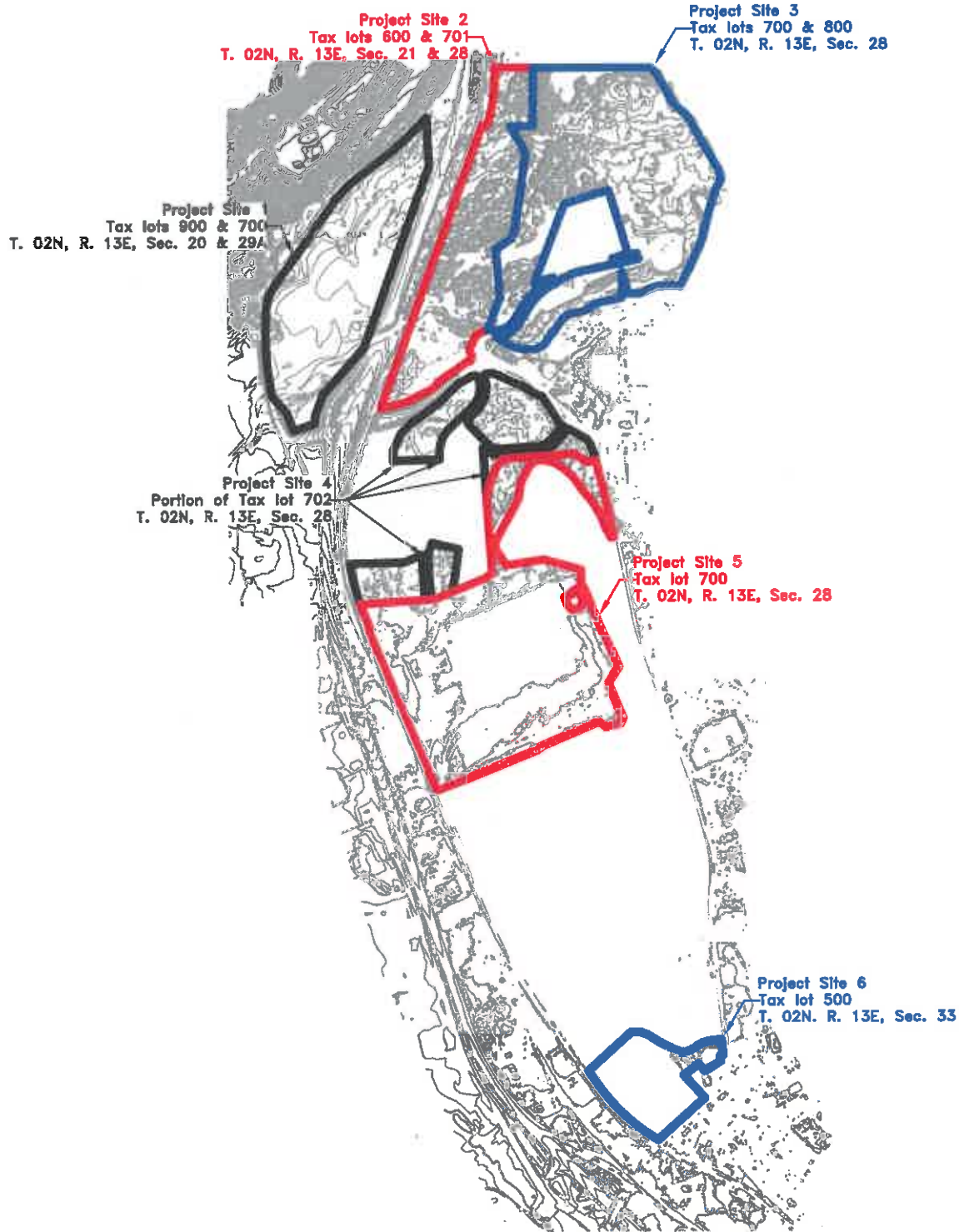
GRAPHIC SCALE



1 Inch = 1500 ft.

March 2015

LEGEND
 1- to 5- Foot Contour



NOTE: All representative Assessment Area wetlands assessed for this report lie within the City of The Dalles Urban Growth Boundary and The Dalles Enterprise Zone.

Source: Adapted from Wasco County GIS files.

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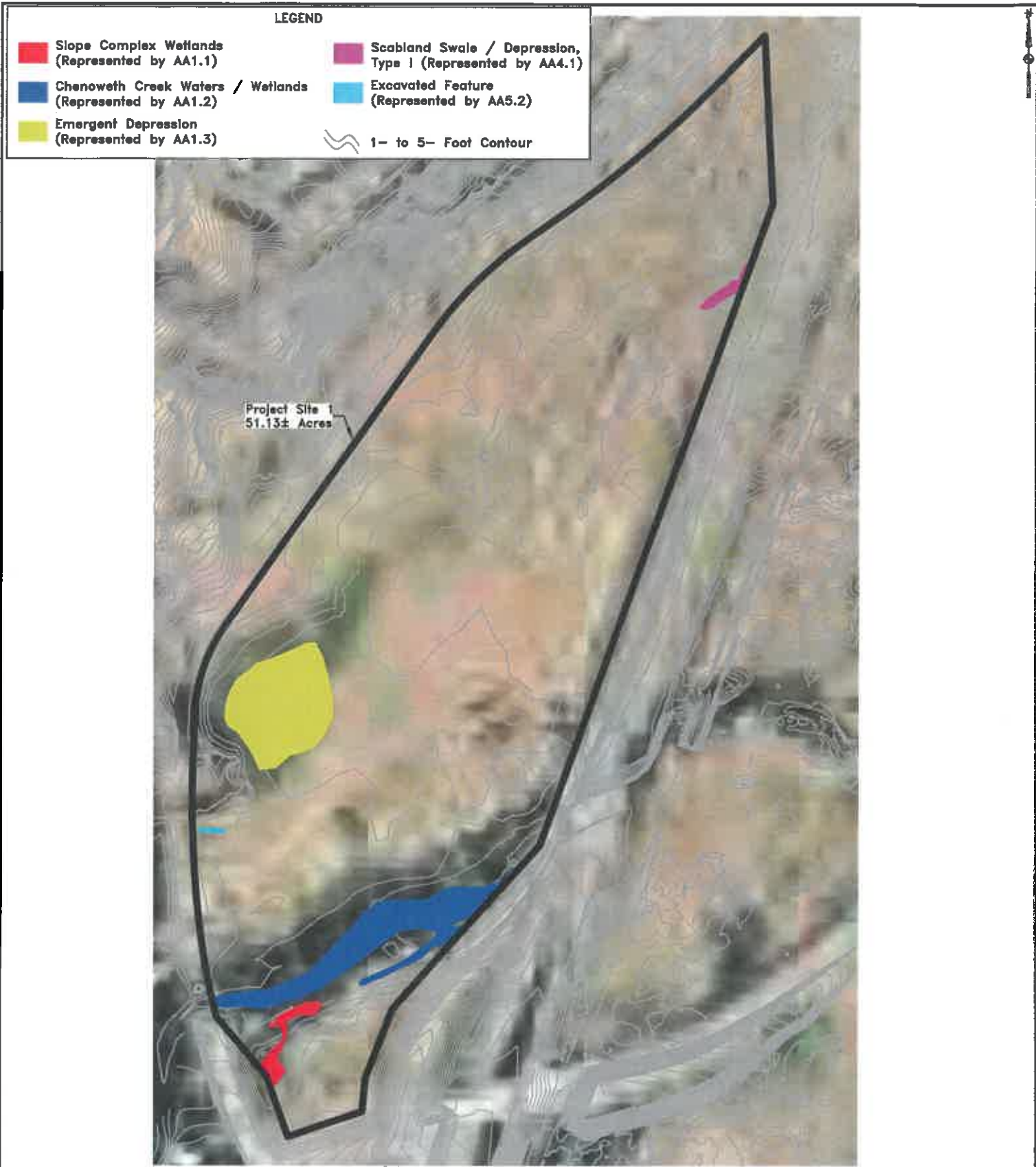
SITE INDEX

FIGURE 3



1 inch = 1500 ft.

March 2015



Source: Adapted from Wasco County GIS files, TSI GIS files and Google Earth Imagery.

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OVERVIEW OF
SITE 1 ORWAP
FEATURES

FIGURE 4A

GRAPHIC SCALE

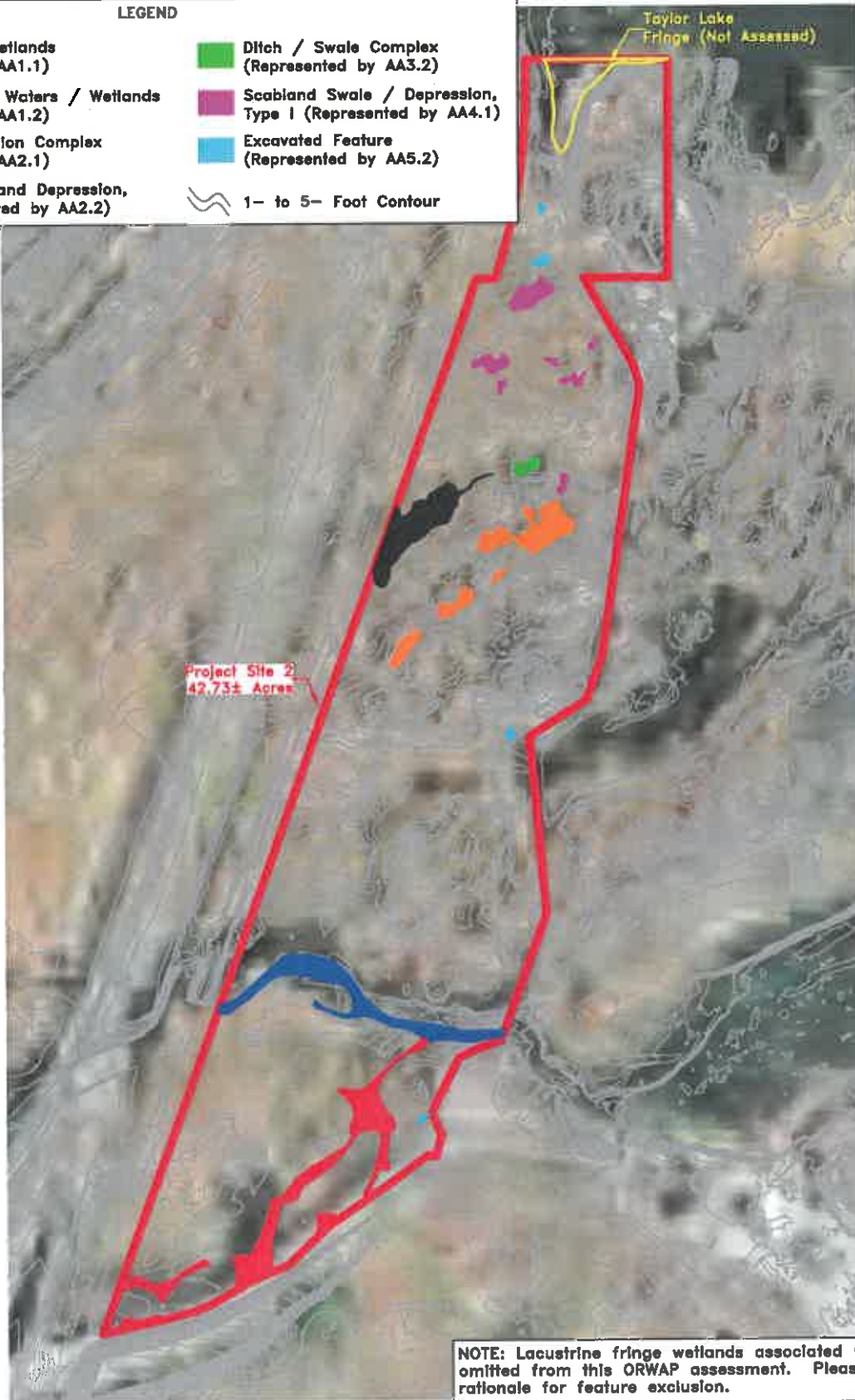


1 Inch = 350 ft.

March 2015

LEGEND

- Slope Complex Wetlands (Represented by AA1.1)
- Chenoweth Creek Waters / Wetlands (Represented by AA1.2)
- Scabland Depression Complex (Represented by AA2.1)
- Impounded Scabland Depression, Type I (Represented by AA2.2)
- Ditch / Swale Complex (Represented by AA3.2)
- Scabland Swale / Depression, Type I (Represented by AA4.1)
- Excavated Feature (Represented by AA5.2)
- 1- to 5- Foot Contour



NOTE: Lacustrine fringe wetlands associated with Taylor Lake are omitted from this ORWAP assessment. Please see report text for rationale for feature exclusion.

Source: Adapted from Wasco County GIS files, TSI GIS files and Google Earth Imagery.

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OVERVIEW OF
SITE 2 ORWAP
FEATURES

FIGURE 4B

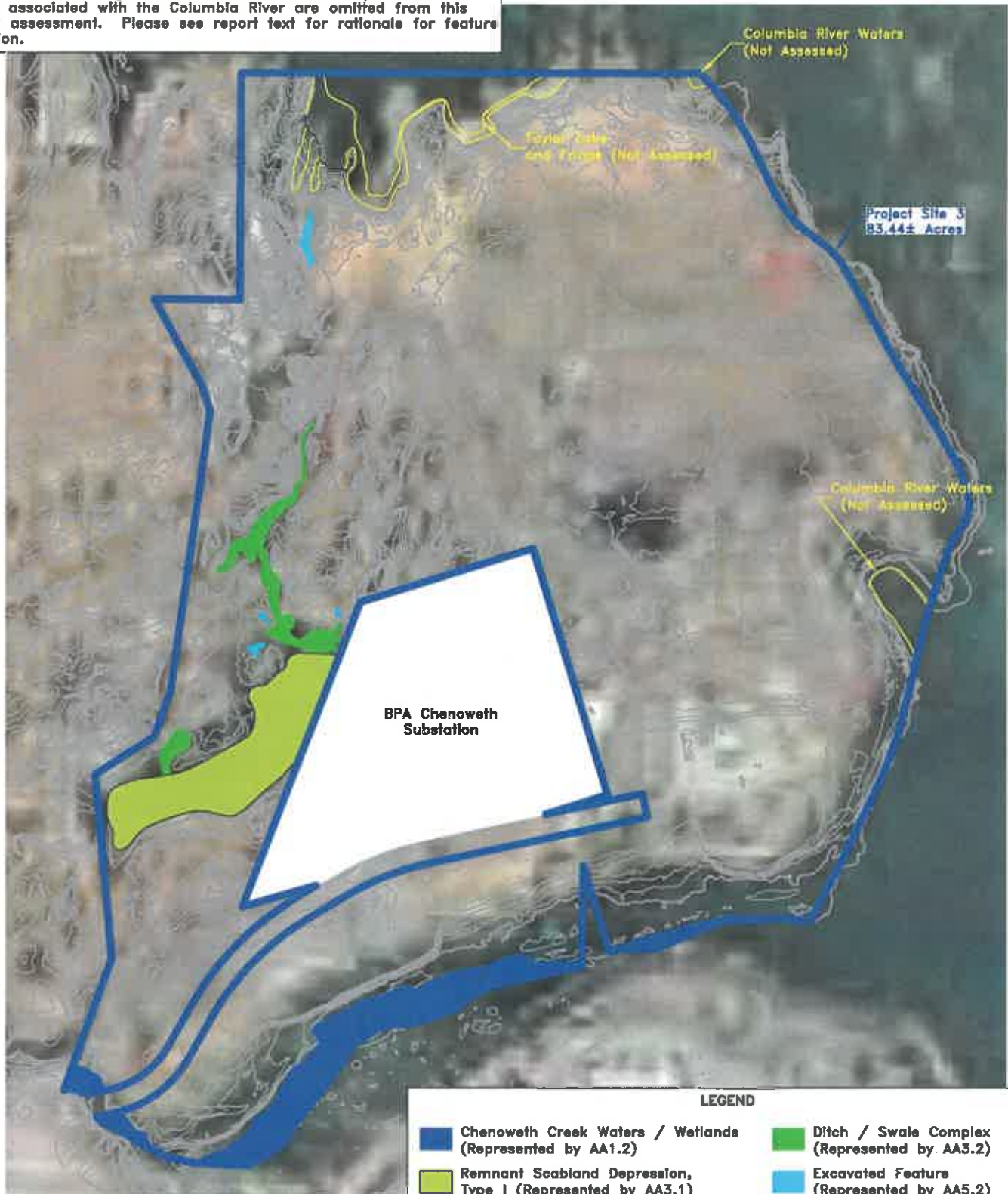
GRAPHIC SCALE



1 Inch = 400 ft.

March 2015

NOTE: Lacustrine fringe wetlands associated with Taylor Lake and waters associated with the Columbia River are omitted from this ORWAP assessment. Please see report text for rationale for feature exclusion.



Source: Adapted from Wasco County GIS files, TSI GIS files and Google Earth Imagery.

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OVERVIEW OF
SITE 3 ORWAP
FEATURES

FIGURE 4C

GRAPHIC SCALE

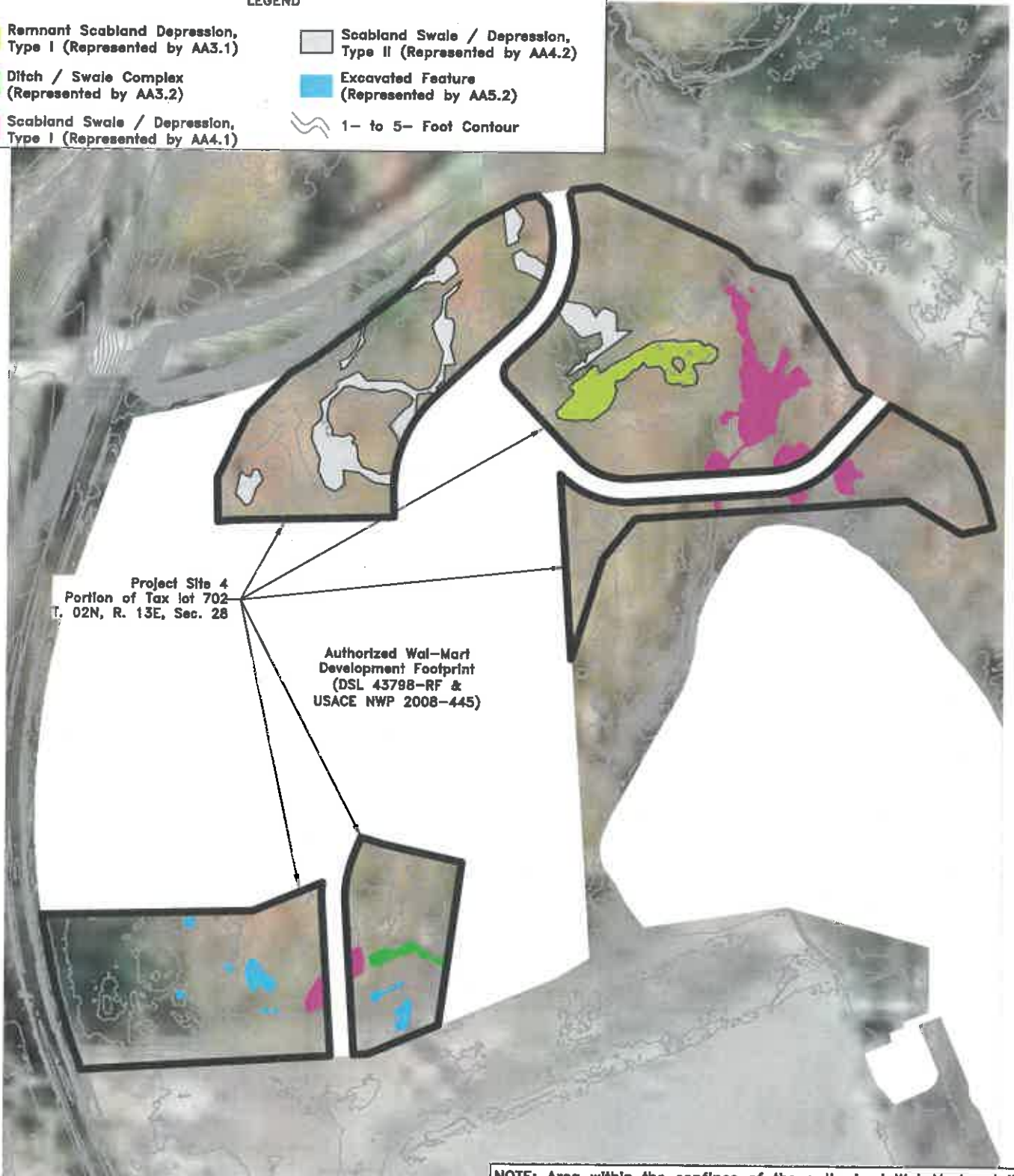


1 inch = 400 ft.

March 2015

LEGEND

- Remnant Scabland Depression, Type I (Represented by AA3.1)
- Ditch / Swale Complex (Represented by AA3.2)
- Scabland Swale / Depression, Type I (Represented by AA4.1)
- Scabland Swale / Depression, Type II (Represented by AA4.2)
- Excavated Feature (Represented by AA5.2)
- 1- to 5- Foot Contour



Source: Adapted from Wasco County GIS files, TSI GIS files and Google Earth Imagery.

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OVERVIEW OF
SITE 4 ORWAP
FEATURES

FIGURE 4D

GRAPHIC SCALE








1 inch = 400 ft.

March 2015

Authorized Wal-Mart
Development Footprint
(DSL 43798-RF &
USACE NWP 2008-445)

Project Site 5
51.13± Acres

LEGEND

 Ditch / Swale Complex (Represented by AA3.2)	 Remnant Scabland Depression, Type II (Represented by AA5.1)
 Scabland Swale / Depression, Type I (Represented by AA4.1)	 Excavated Feature (Represented by AA5.2)
 1- to 5- Foot Contour	

Source: Adapted from Wasco County GIS files, TSI GIS files and Google Earth Imagery.

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OVERVIEW OF
SITE 5 ORWAP
FEATURES

FIGURE 4E

GRAPHIC SCALE




1 Inch = 400 ft.

March 2015

LEGEND

 Impounded Scabland Depression, Type II
(Represented by AA6.1)

 1- to 5- Foot Contour



Source: Adapted from Wasco County GIS files, TSI GIS files and Google Earth Imagery.

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OVERVIEW OF
SITE 6 ORWAP
FEATURES



1 inch = 400 ft.

March 2015

FIGURE 4F

