Technical Memorandum

Final

Date: June 15, 2012

Prepared for: Lake Oswego-Tigard Water Partnership

Subject: City of West Linn Water Resource Area (WRA) and Habitat Conservation Area (HCA) Technical Memorandum

To: Eric Day (City of Lake Oswego)

From: Ethan Rosenthal, Project Manager-Ecologist
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Introduction and Project Overview

This water resources memo has been prepared in support of a City of West Linn (City) land use approval application for the Lake Oswego-Tigard Water Partnership Project (Project). The cities of Lake Oswego and Tigard propose to expand and improve the existing water collection, transmission, and treatment system of Lake Oswego to meet increasing future water demand of both cities. The overall Project lies primarily within Clackamas County, Oregon with a small portion lying within Washington County, Oregon. The project extends approximately 10 miles from the Clackamas River Intake in Gladstone, Oregon through West Linn and Lake Oswego to the Bonita Pump Station located in Tigard, Oregon.

This technical memorandum concerns that portion of the Project that lies within the City of West Linn, Oregon, specifically the location of the raw water pipeline (RWP) and finished water pipeline (FWP), including where the RWP occurs in Mary S. Young State Park (MSY Park). The study areas shown on Figures 1 and 2 define the study area for this memorandum. The purpose of this memo is to assist in the evaluation of potential impacts and alternatives in order to avoid and minimize impacts to Goal 5 Resources as described in the following City code chapters:

- Chapter 28: Willamette and Tualatin River Protection
- Chapter 32: Water Resource Area Protection

Site Description

The project study area outside of MSY Park follows the right of way of existing paved roadways, including Mapleton Drive and Highway 43 (Figure 1). Mapleton Drive is bordered primarily by suburban single family dwellings and associated front yard landscaping (i.e. lawn, ornamental trees, and some remnant native trees). Conditions along Highway 43 consist primarily of commercial development, with some residential dwellings, Marylhurst College campus, and several stream corridors with associated riparian plant communities.

The study area shown in Figure 2 includes portions of MSY Park and two adjacent tax lots owned by Oregon Parks and Recreation Department (OPRD parcels), located on the west bank of the Willamette River. The MSY Park and OPRD parcels lie in dense mixed forest on a high bench and steep east-facing slopes that lead down to the Willamette River. A wetland bench occurs at the base of slope and the Willamette River. The study area remains a relatively undisturbed natural area compared to development upslope; however, various disturbances in the form of recreation (fishing, dog walking, running) and maintenance (mowing and access of existing utilities) do occur.

Methods

City natural resource mapping was reviewed, specifically significant riparian corridor (SRC), local wetland inventory, and habitat conservation area (HCA) planning maps. Wetlands and waterways were previously delineated as part of the wetland delineation report for the project in support of obtaining permits from the U.S. Army Corps of Engineers (USACE) and Oregon Department of State Lands (DSL).

Crossings of City mapped protected water resource areas (WRAs), including setbacks, along the project corridor outside of MSY Park were not altered by field verification. The City's mapping generally aligned with David Evans and Associates, Inc.'s (DEA) wetland delineation work. WRA boundaries in MSY Park were adjusted based on more detailed field delineation mapping. In the park, the wetland delineation results provided wetland and stream boundaries from which the appropriate buffers were determined.

The wetland delineation work was conducted using the Level 2 Routine Delineation Method described in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory 1987) and further supported by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*. This method requires the simultaneous presence of hydrophytic vegetation, hydric soils, and positive wetland hydrology in wetland delineations.

DEA conducted on-site reconnaissance on December 20 and 21, 2011. WRA Setback widths were based on the methodology outlined in Chapter 32 of the City of West Linn Code, Water Resource Area Protection. This methodology uses the gradient of adjacent slopes to determine setback widths. According to the code, widths can range from a minimum of 15 feet to a maximum of 200 feet. Wetland boundaries originated from previous delineation field work conducted by DEA in 2010 and 2011.

Habitat Conservation Area Existing Conditions

Review of City HCA mapping revealed that HCA areas in or adjacent to the project are essentially identical to the WRAs that are in or adjacent to the project area. The exception to this is that all of MSY Park within the project study area is mapped as HCA, with a smaller area being mapped as WRA. Additionally a small portion of the adjacent OPRD parcels is mapped as HCA but not WRA. The portion of the OPRD parcels within the project study area that is mapped as HCA but not WRA occurs near the Mapleton Drive entrance point. This can be seen on Figure 2 where no WRA has been mapped near Mapleton Drive.

Because of the direct overlap between HCAs and WRAs in the project study area, these areas are described just once under the section that follows, Water Resource Areas Existing Conditions. The small portion of HCA that does not overlap with WRAs occurs in MSY Park and the adjacent OPRD parcels. These areas consist of mature second growth Douglas fir forest that is heavily infested with invasive English ivy and contains few native shrubs or ground cover. Impacts and revegetation of HCA areas are included with the discussion of impacts and revegetation of WRAs later in this report.

Water Resource Areas Existing Conditions

Areas Outside of MSY Park and OPRD Parcels

This report section provides a description of sensitive area resources that occur along or adjacent to the RWP and FWP alignment through the City of West Linn as shown in Figure 1. A discussion of the results specific to MSY Park occurs thereafter. For areas outside of the MSY Park, the RWP and FWP will be placed entirely within existing roadway and will therefore have no impacts to WRAs. The following descriptions of WRAs pertain to conditions located beyond the existing road prisms.

Arbor Creek

The City identifies Arbor Creek as a SRC where it crosses the project corridor along Highway 43. The stream crossing was identified as Water Resource 10 (WR-10) in the project wetland delineation report. WR-10 is a perennial tributary and passes under Highway 43 via a concrete culvert three feet in diameter. On the west side of the highway, the stream is four feet wide and one foot deep at the ordinary high water mark (OHW). East of the highway, OHW is five feet wide and one foot deep.

In accordance with West Linn code, the riparian corridor mapping shown in Figure 1 extends 100 feet from either side of the OHW, as well as across the highway. (i.e. includes fill side slopes and paved portions of the roadway).

Robinwood Creek

The City identifies Robinwood Creek as a SRC where it crosses the project corridor along Highway 43. Robinwood creek was identified as WR-9 in the project wetland delineation report. This intermittent tributary is three feet wide and one foot deep at the OHW. The channel substrate is silt and gravel. At the time of the site visit on May 28, 2010 an average flow depth of four inches was observed.

Unnamed Tributary to Robinwood Creek

The City does not identify this unnamed tributary to Fern Creek as a SRC. This stream crossing was identified as WR-8 in the project wetland delineation report. WR-8 is an intermittent tributary that is three feet wide and six inches deep at the OHW, and lies in a steep, v-shaped ravine. It originates a short distance upslope (west) of the highway and is piped for most of its length west of the highway. The stream passes under Highway 43 via two 18-inch culverts. The lower culvert conveys the stream and is half buried. The channel substrate is silt and embedded gravel. At the time of the site visit on May 28, 2010 a flow of four inches was observed.

Fern Creek

The City identifies Fern Creek as a SRC upstream and downstream of where it crosses the project corridor along Highway 43, but not in the actual project crossing location. This stream was not delineated in the project wetland delineation because it is fully piped within and beyond the right of way of Highway 43, which represents the study area limits.

Robin Creek

The City identifies Robin Creek as a SRC downstream of where it crosses the project corridor along Highway 43, including where buffer extends across the highway. SRC is also mapped approximately 1,000 feet to the west (upstream) of the crossing. This stream crossing was identified as WR-7 in the project wetland delineation report. It is an intermittent tributary that is three feet wide and six inches deep at the OHW on the east side of Highway 43. The stream passes under the highway via a two foot diameter culvert. The channel substrate is cobble and gravel. At the time of the site visit on May 28, 2010 an average flow depth of two inches was observed.

Gans Creek

This stream crossing was not identified in the project wetland delineation report because the crossing enters and exits well outside the study area on private lands. However, the SRC overlaps onto the project corridor as shown on Figure 1. The figure also shows that the channel is piped for quite a distance upstream of Hwy 43. It then appears to flow through a fairly intact riparian corridor

(based on aerial photos) before being piped again under Kenthorpe Way the entire remainder of the distance before it joins Trillium Creek.

Trillium Creek

The City identifies Trillium Creek as a SRC where it crosses the project corridor along Mapleton Drive and Kenthorpe Way. This stream crossing was identified as WR-5 in the project wetland delineation report. WR-5 is a perennial tributary that crosses the project alignment at Mapleton Drive via an arched culvert and further downstream at Kenthorpe Way via a metal culvert. The channel is approximately three feet wide and two feet deep at the OHW. The substrate of WR-4 consists of silt, gravel, and cobble. However, immediately downstream of the Kenthorpe Way outlet the creek is contained in a landscaped rock lined channel. At the time of the site visit on October 26, 2010 an average flow depth of three inches was observed.

Heron Creek

The City identifies Heron Creek as a SRC where it crosses the project corridor along Mapleton Drive. This stream crossing was identified as WR-4 in the project wetland delineation report. This perennial tributary crosses the project alignment at the eastern end of Mapleton Drive. On the upstream (south) side of the crossing the creek is situated in a narrow and moderately deep ravine with steep side slopes. The creek outfalls on the north side of the crossing well beyond the study area into a very steep and deep ravine. The channel is approximately three feet wide and two feet deep at the OHW. The substrate of WR-4 consists of silt, gravel, and cobble. At the time of the site visit on August 5, 2010 an average flow depth of two inches was observed.

MSY Park and OPRD Parcels

The on-site investigation of WRAs within the project study area portion of MSY Park (Tax ID# 21E2400600) and two adjacent parcels owned by OPRD (Tax ID#'s 21E24AC00100 and 21E24AC00200) resulted in the identification of six WRAs, which are shown in Figure 2 and summarized in Table 1. These are described below.

Table 1. Water Resource Areas in MSY Park

WRA Name	Feature Type
Water Resource Area A	Wetland
Water Resource Area B	Wetland
Water Resource Area C	Wetland and Creek Setback Area (i.e. buffer)
Water Resource Area D	Wetland and Willamette River Setback Area (i.e. buffer)
Turkey Creek	Stream
Mary S. Young Creek	Stream

Water Resource Area A: Riparian Wetland (Wetland A)

This WRA consists of a wetland (Wetland A) found in a low area between the natural berm along the river and the slopes leading up from the floodplain. It is made up of three Cowardin classes (i.e. plant community types), including emergent, scrub-shrub, and forested wetland, as shown in Figure 2. Within the wetland, vegetation consists primarily of black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), Pacific willow (*Salix lasiandra*), red-osier dogwood (*Cornus sericea*), and reed

canarygrass (*Phalaris arundinacea*), with black cottonwood dominant in the tree stratum within forested wetland areas. Scrub-shrub wetland areas lack black cottonwood entirely, and consist of willow that is three inch at diameter-breast-height (DBH) or greater. Emergent wetland is dominated entirely by reed canarygrass, and may be subject to occasional mowing.

All areas identified as forested wetland in WRA-A are in "unhealthy" condition due to the high percentage cover of invasive species. Table 2 provides a representative sample of plant community conditions within the forested portion of the wetland, as collected at Plot A-1. Due to the high percentage of invasive species in the understory, this community was considered to be in "unhealthy" condition. Plot A-2, taken in the shrub portion, was also in an "unhealthy" condition, with 80% cover by reed canarygrass. It lacked black cottonwood but contained Pacific willow less than three inches in diameter at breast height (which qualifies as a shrub). Plot A-3 was taken in emergent wetland. All emergent wetland was considered "unhealthy" since it was dominated entirely by reed canarygrass.

Because WRA-A is occupies more than 0.5 acres, it received a setback of 50 feet. In one location within the study area steeper slopes (i.e. 25 percent or greater) requiring wider corridors were present, and the setback was placed 50 feet from the break in top of slope, as shown in the attached figure.

Table 2 Water Resource Area A, as Sampled at Plot A-1

Scientific Name	Common Name	Cover	Stratum	Status
Populus balsamifera	Black cottonwood	45	T	Native
Salix lasiandra	Pacific willow	10	T	Native
Salix lasiandra	Pacific willow	25	S	Native
Phalaris arundinacea	reed canarygrass	55	H	Invasive
Total		**130**		

Canopy Cover = 55% *Non-native, Noxious or Invasive = 42%*

Condition = Unhealthy *Native = 58%*

Water Resource Area B: Slope Wetland (Wetland B)

WRA-B consists of a slope wetland on the western edge of the study area, and is dominated by stinging nettle. Otherwise, it consists of mostly bare ground due to adjacent heavy cover by English ivy, which covers much of the wetland but is not rooted in the wetland due to the perennially saturated soils (Plot B-1). All areas identified as WRA-B are in "unhealthy" condition due to a lack of canopy cover in the wetland.

Water Resource Area C: Riparian Forest

This WRA is found in upland areas upslope and to the west of Wetland A, surrounds Wetland B, and is adjacent to portions of Turkey and Mary S. Young Creeks. Vegetation was dominated primarily by black cottonwood in the tree canopy, Himalayan blackberry *(Rubus armeniacus)* in the shrub layer, and English ivy in the woody vine strata. Areas of higher ground transition into a Douglas fir dominated community, where English ivy is often extensive in the understory. All areas identified as WRA-C are in "unhealthy" condition due to the high percentage cover of invasive species, in spite of 95% native tree canopy cover. Table 3 provides a representative sample, as

sampled at Plot C-1. All of WRA-C was similarly "unhealthy" due to cover by invasives. Plot C-2, taken in the same community further to the south, had slightly different species assemblages, but was very similar overall, and was also in an "unhealthy" condition, with 38% non-native and invasive species present, primarily due to cover by English ivy.

Table 3. Water Resource Area C, as Sampled at Plot C-1

Scientific Name	Common Name	Cover	Stratum	Status
Populus balsamifera	Black cottonwood	95	T	Native
Corylus cornuta	Beaked hazelnut	5	S	Native
Symphoricarpos albus	common snowberry	5	S	Native
Rubus armeniacus	Himalayan blackberry	30	S	Invasive
Hedera helix	English ivy	60	WV	Invasive
Phalaris arundinacea	reed canarygrass	5	H	Invasive
Polystichum munitum	swordfern	5	H	Native
Urtica dioica	Stinging nettle	5	H	Native
Total		**210**		

Canopy Cover = 95% *Non-native, Noxious or Invasive = 43%*

Condition = Unhealthy *Native = 57%*

Water Resource Area D: Riparian Scrub Forest

This WRA lies on a natural berm upslope of the top of bank of the Willamette River, and is dominated by large willow trees with an understory of Himalayan blackberry and reed canarygrass. Table 4 provides a representative sample of this plant community, as sampled at Plot D-1. All areas identified as WRA-D are in "unhealthy" condition due to the high percentage cover of invasive species and lack of tree canopy cover.

Table 4 Water Resource Area D, as Sampled at Plot D-1

Scientific Name	Common Name	Cover	Stratum	Status
Salix lasiandra	Pacific willow	45	T	Native
Rubus armeniacus	Himalayan blackberry	90	S	Invasive
Phalaris arundinacea	reed canarygrass	20	H	Invasive
Total		**155**		

Canopy Cover = 0% *Non-native, Noxious or Invasive = 71%*

Condition = Degraded *Native = 29%*

Willamette River

The City identifies the Willamette River as a SRC where it crosses the project study area in MSY Park. A buffer of 100 feet west of the OHW of the river is mapped in Figure 2.

Turkey Creek

The City identifies Turkey Creek as a SRC where it crosses the project study area in MSY Park. This stream crossing was identified as WR-2 in the project wetland delineation report. It is a perennial tributary that flows through a wetland bench along the Willamette River and then into the Willamette River. The channel is six inches deep and two feet wide at the OHW, and widens out to six feet at a flat pedestrian footbridge near the boundary of the wetland. The channel substrate is primarily sandy. At the time of the site visit on August 3, 2010 an average flow depth of one inch of water was observed.

A buffer of 100 feet to either side of the OHW of the creek is mapped in Figure 2. In addition, an unmapped, intermittent drainage (WR-3) leads from a small draw and joins WR-2 near the boundary of Wetland A. The channel of WR-3 is 18 inches wide and 12 inches deep and appears to have been excavated and/or diverted in places, particularly in the vicinity of the park walking paths in the area. A 50-foot buffer was applied to this drainage per West Linn code.

Mary S. Young Creek

The City identifies Mary S. Young Creek as a SRC where it crosses the project study area in MSY Park. This perennial creek was identified as WR-1 in the project wetland delineation report. It empties into the Willamette River within the study area. The channel was deeply incised at approximately four feet wide and six feet deep at OHW, and riparian vegetation was somewhat limited in the study area. In accordance with West Linn code, the riparian corridor mapping extends 100 feet from either side of the OHW, where it combines with buffer along the western edge of the adjacent wetland.

Proposed Impacts

This report section provides a summary of resource impacts and the proposed efforts to restore the temporarily impacted areas. All impacts will be temporary and will only occur in HCA located in the OPRD parcels adjacent to MSY Park. No impacts, temporary or permanent, will occur in WRAs.

According to West Linn CDC 28.110(L), which allows for the construction of utilities in HCAs, mitigation and revegetation is required, with the applicant to submit a mitigation plan pursuant to CDC 32.070 and a revegetation plan pursuant to CDC 32.080. According to West Linn CDC, 32.070 Mitigation Plan, "a mitigation plan shall be required if any portion of the water resource area is proposed to be permanently disturbed by development." Because no permanent impacts will occur, a mitigation plan following CDC 32.070 has not been prepared. However, a revegetation plan has been prepared in compliance with CDC 32.080 Revegetation Plan Requirements.

Areas Outside of MSY Park and OPRD Parcels

No impacts will occur to WRAs located outside of MSY Park. All work will occur within existing roadways. Pipeline crossings of existing stream culverts will occur either above or below the existing culverts so that no modifications to the culverts are needed.

MSY Park and OPRD Parcels

No impacts will occur within MSY Park. Impacts to vegetation on the OPRD parcels north of MSY Park will occur from surface activities associated with the HDD staging and transition to open cut

trench installation of the RWP. No permanent impacts are anticipated. Construction activities will result in 7,715 square feet of temporary disturbance to the upland forest HCA described above. Of this amount, 3,770 square feet (sq. ft.) will be over the proposed pipeline, which will have an associated permanent easement. The remaining 3,945 sq. ft. of temporary impact will be in staging areas beyond the permanent easement area, where a temporary construction easement will be obtained. No impacts will occur in areas mapped as WRA. Figure 3 shows the various areas of proposed impact.

Construction activities will result in the removal of 19 trees. The trees to be removed were assessed by the Project's certified arborist as being in fair to very poor condition. Based on consultation between the City Arborist and Project Arborist, none of the trees proposed for removal were determined to be "significant trees." Tree species proposed for removal include bitter cherry (*Prunus emarginata*), black cottonwood, red alder (*Alnus rubra*), and bigleaf maple (*Acer macrophyllum*).

Proposed Site Restoration

Mitigation requirements for impacts to HCA are described in Chapter 28 Willamette and Tualatin River Protection of the City's community development code (CDC) section 28.160 Mitigation Plan. However, this code section merely states that mitigation should follow the guidelines specified in Chapter 32 Water Resource Protection. Specifically, CDC sections 32.070 and 32.080 must be followed.

According to West Linn CDC, 32.070 Mitigation Plan, "a mitigation plan shall be required if any portion of the water resource area is proposed to be permanently disturbed by development." Because no permanent impacts will occur, a mitigation plan following CDC 32.070 will not be prepared. However, a revegetation plan will be prepared in compliance with CDC 32.080 Revegetation Plan Requirements.

Proposed Planting Location

Proposed plantings will occur within the designated permanent and temporary easement areas within the OPRD parcels (Figure 4). Total area proposed for vegetation replanting is 7,715 sq. ft. (3,770 sq. ft. of permanent easement and 3,945 sq. ft. of temporary easement).

Proposed Plant Species

Figure 5 provides the proposed plant schedule list for areas to be replanted, including permanent and temporary easements. Trees and deep rooted shrubs cannot be planted over the pipeline (i.e. permanent easement). However, shallow rooted shrubs and herbaceous species will be planted over the pipeline. The temporary easement area will receive tree, shrub, and herbaceous species plantings. Understory tree plantings will focus on the more shade tolerant species noted in Figure 5, such as western redcedar (*Thuja plicata*) and bigleaf maple.

Revegetation and Additional Vegetation Improvements Goal

In accordance with CDC 32.080(F) the revegetation goal is to achieve 80 percent survival of planted trees and shrubs. The 80 percent survival number will be based on the initial proposed plant count, which will be determined upon approval of the general planting scheme laid out in this memorandum. Native recruitment of planted species may be counted towards the survival counts (i.e. species that have spread through rhizomes or self seeding).

CDC 32.080(F) does not specify invasive species control revegetation goals. A voluntary goal of no more than 20 percent cover by invasive species will be set for the revegetation and vegetation improvement areas. Success of the revegetation planting will be based on the required 80-percent survival of planted trees and shrubs. The invasive species goal is voluntary and will be used to help address maintenance issues.

Monitoring and Maintenance

The following maintenance and monitoring plan will be conducted within the revegetation and vegetation improvement areas.

A maintenance and monitoring period of three years post-construction is proposed. Monitoring will occur on an annual basis, during late summer or early fall. An additional monitoring visit will occur immediately post-construction to assess quality of plant installation (i.e. effective installation, appropriate species planted). An annual monitoring report will be prepared and provided to the City Planning Director. The report will document site conditions with a narrative and photos that describe the mitigation sites' progress towards meeting mitigation goals (i.e. 80-percent survival of planted species based on initial proposed plant count). Vegetation monitoring will entail a total tree and shrub count. Visual inspection of herbaceous planting success along with percent cover of invasive species will also be documented.

Maintenance efforts will consist of controlling the spread of invasive species into the mitigation site. Primary invasive species of concern, based on current conditions, include English ivy and Himalayan blackberry. Maintenance efforts will likely be conducted one to two times per year during the first three years post-construction. Maintenance may also include conducting additional plantings if there are unacceptable levels of plant mortality. The level of maintenance and need for additional plantings will be determined based on monitoring efforts and will be described in the annual monitoring report.

Revegetation Plan Code Requirements (CDC 32.080 Revegetation Requirements)

Code sections are provided in italics with a response in non-italics font.

Metro's Native Plant List is incorporated by reference as a part of this chapter, and all plants used in revegetation plans shall be plants found on the Metro Native Plant List. Performance standards for planting upland, riparian and wetland plants include the following:

A. Native trees and shrubs will require temporary irrigation from June 15th to October 15th for the three years following planting.

Response: Temporary irrigation is proposed for the June 15th to October 15th time period for all plantings.

B. Invasive non-native or noxious vegetation shall be removed within the area to be revegetated prior to planting.

Response: Invasive non-native or noxious vegetation will be removed from proposed revegetation areas prior to planting.

C. Replacement trees must be at least one-half inch in caliper, measured at six inches above the ground level for field grown trees or above the soil line for container grown trees (the one-half inch minimum size may be an average caliper measure, recognizing that trees are not uniformly round) unless they are oak or madrone, which may be one-gallon size.

Shrubs must be in at least a one-gallon container or the equivalent in ball and burlap and must be at least 12 inches in height.

Response: Plantings will be sized to meet the above requirements.

D. Trees shall be planted between eight and 12 feet on center and shrubs shall be planted between four and five feet on center, or clustered in single species groups of no more than four plants, with each cluster planted between eight and 10 feet on center. When planting near existing trees, the dripline of the existing tree shall be the starting point for plant spacing requirements.

Response: Planting densities will be spaced according to the above criteria. An exception to this is that tree and shrub plantings intended to occur under mature existing canopy may be placed within the dripline of existing trees as occurs under natural forest conditions.

E. Shrubs must consist of at least two different species. If 10 trees or more are planted, then no more than 50 percent of the trees may be of the same species.

Response: The planting plan consists of a diverse mix of native tree and shrub species that meets and exceeds the above requirements (see Figure 5).

F. The responsible party shall provide an appropriate level of assurance documenting that 80 percent survival of the plants has been achieved after three years, and shall provide annual reports to the Planning Director on the status of the revegetation plan during the three-year period. (Ord. 1545, 2007)

Response: The project sponsors will fund three years of annual monitoring post plant installation. An annual monitoring technical memo, including recommendations and actions taken to rectify problem issues in order to achieve 80-percent survival of proposed planting quantities, will be provided to the Planning Director for each year of monitoring.

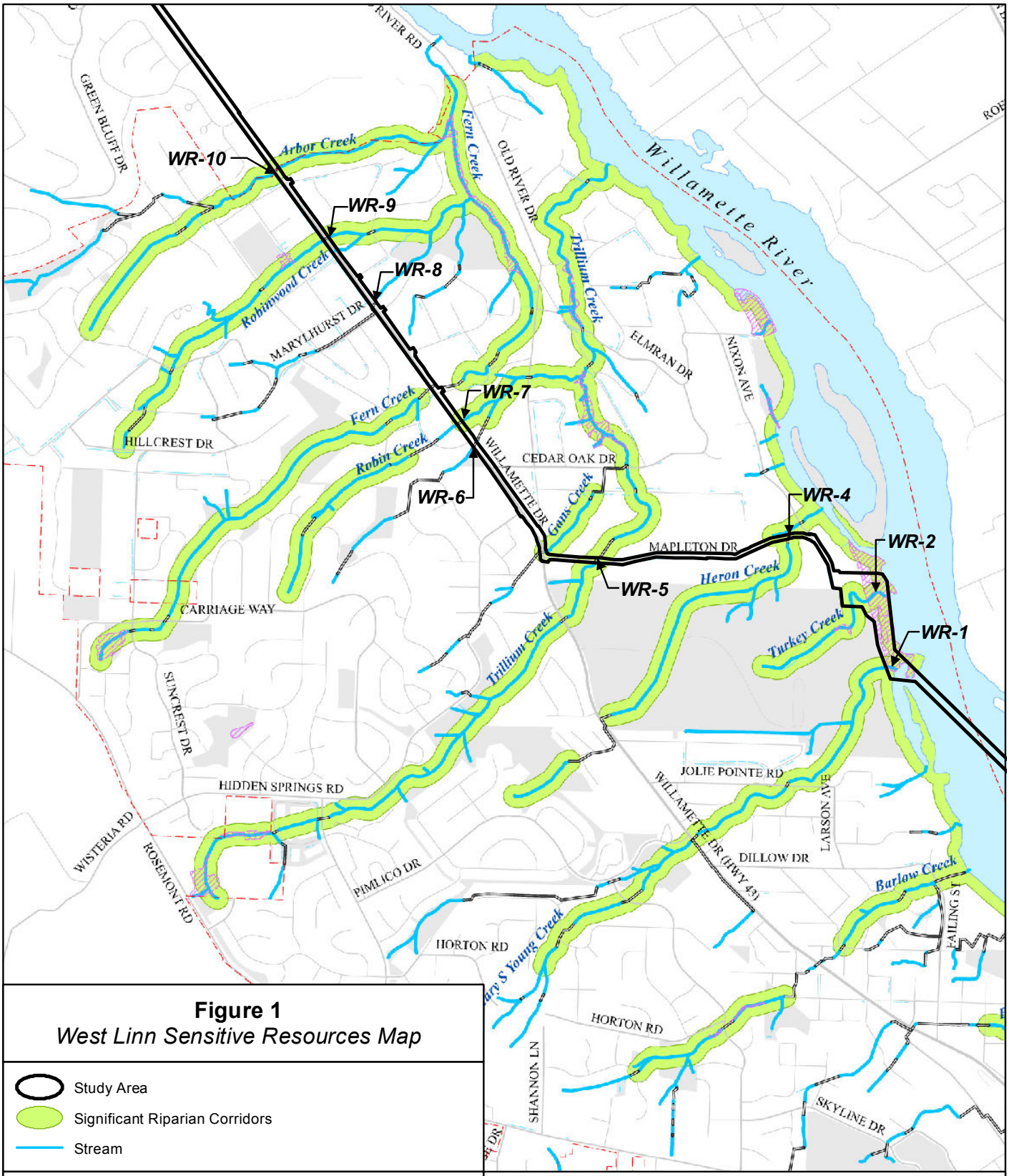

Figure 1
West Linn Sensitive Resources Map

Study Area

Significant Riparian Corridors

Stream

WR NUMBERS: Water Resources identified in the delineation mapped streams without WR numbers are not included in the delineation because they are outside the study area

DATA SOURCES: West Linn Goal 5 Inventory, Significant Riparian Corridors, January 2007

N

0 1,500 3,000

Feet

STANDARD WEST LINN GIS MAP DISCLAIMER:
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

WETLANDS/GOAL 5 DISCLAIMER (DSL STANDARD):
Information shown on this map is for planning purposes only and wetland information is subject to change. There may be unmapped wetlands subject to regulation and all wetland boundary mapping is approximate. In all cases, actual field conditions determine wetland boundaries. You are advised to contact the Oregon Division of State Lands and the U.S. Army Corps of Engineers with any regulatory questions.

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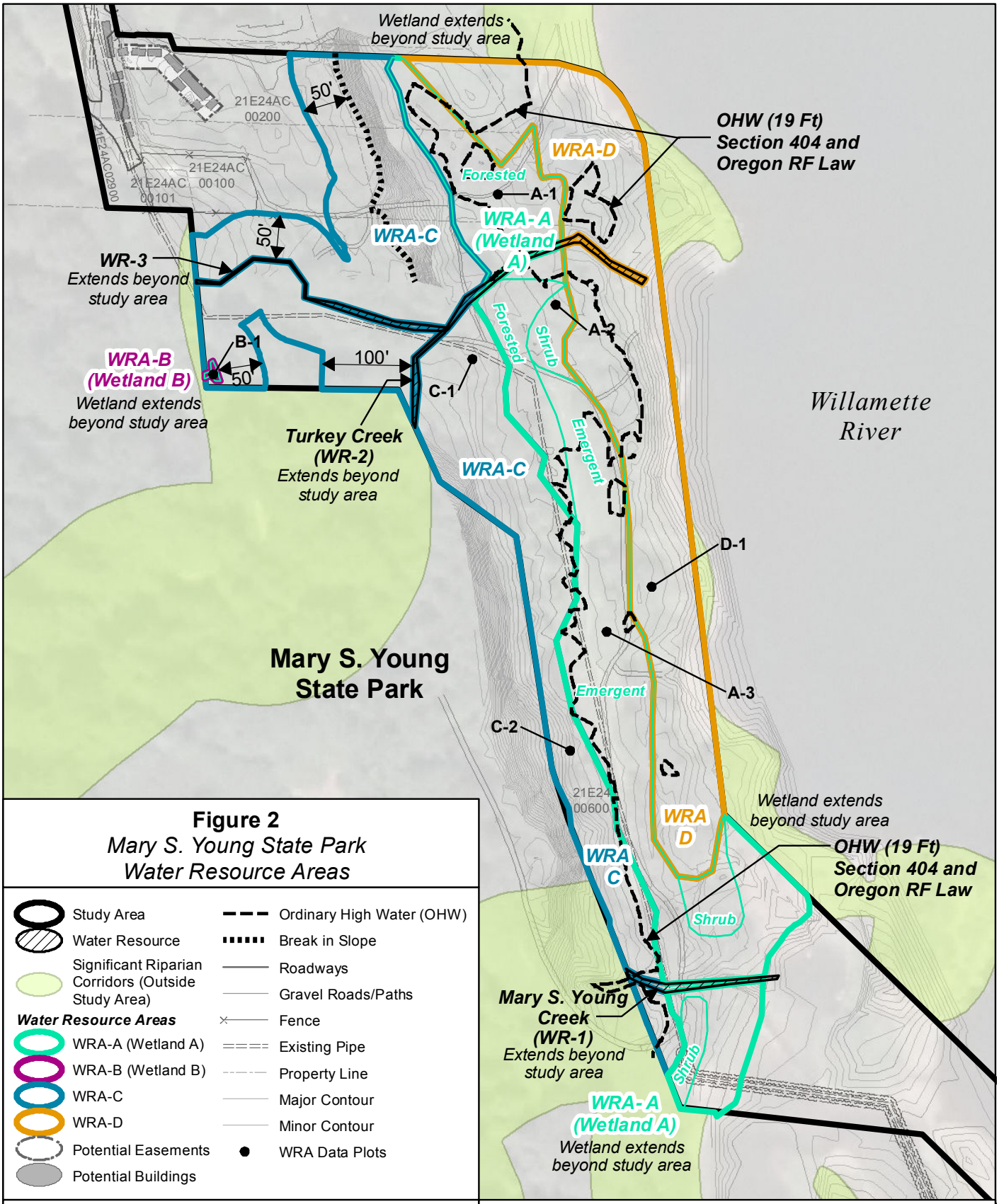

Figure 2
Mary S. Young State Park
Water Resource Areas

- Study Area
- Water Resource
- Significant Riparian Corridors (Outside Study Area)

Water Resource Areas

- WRA-A (Wetland A)
- WRA-B (Wetland B)
- WRA-C
- WRA-D
- Potential Easements
- Potential Buildings

- Ordinary High Water (OHW)
- Break in Slope
- Roadways
- Gravel Roads/Paths
- Fence
- Existing Pipe
- Property Line
- Major Contour
- Minor Contour
- WRA Data Plots

MAP ACCURACY: All wetlands and ordinary high water lines were flagged in the field by DEA Biologists and surveyed by Westlake Consultants, Inc. except where noted. Accuracy is estimated at 1 foot. Vertical datum is NGVD-29.

DATA SOURCES: Metro RLIS GIS Data, 2011; City of West Linn GIS, 2011; Oregon Imagery Explorer, 2005

N

0 150 300

Feet

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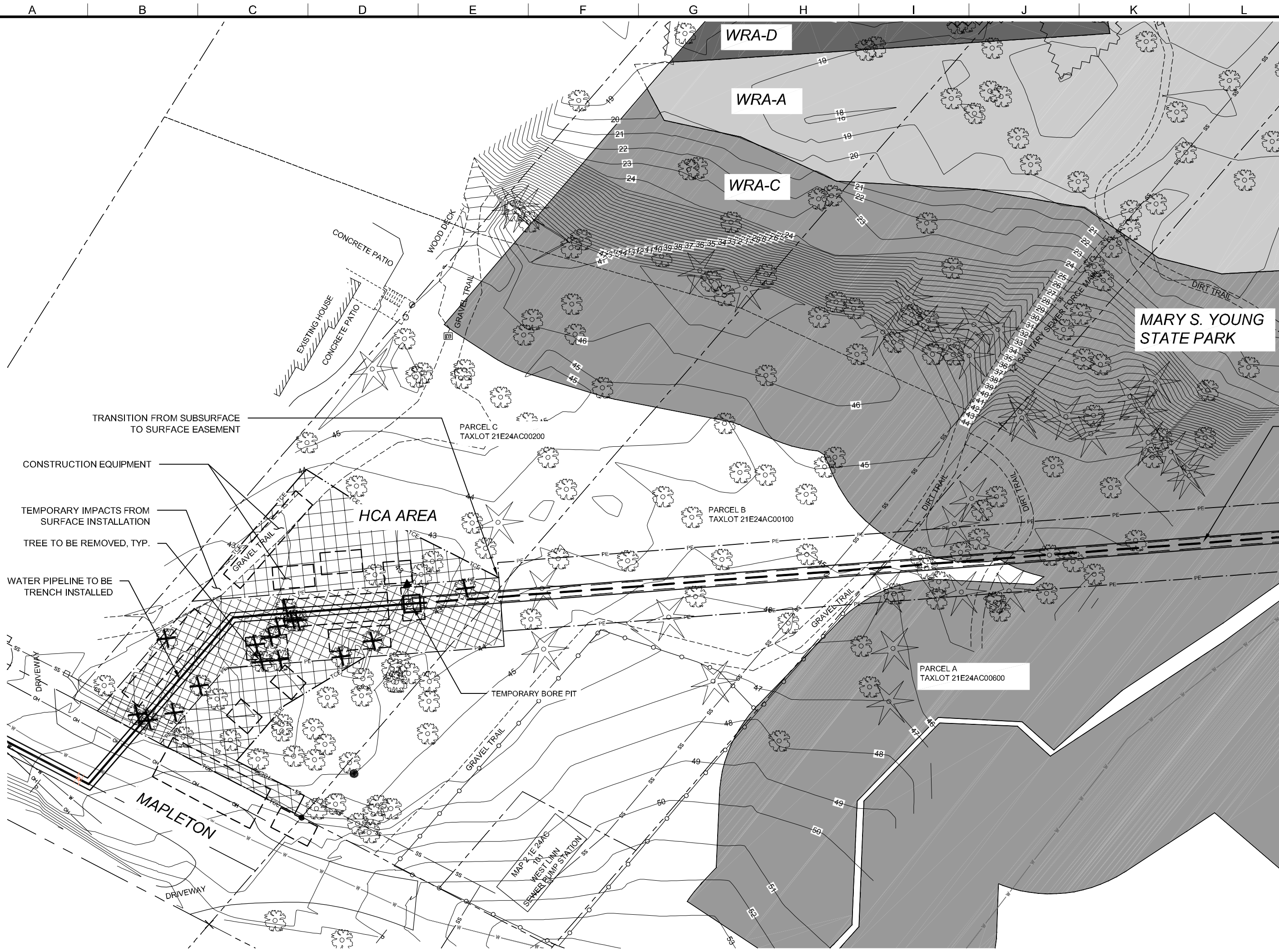

SUMMARY OF IMPACTS

TEMPORARY IMPACTS WITHIN PERMANENT ESMT - 3,770 SQ FT

HCA TEMPORARY IMPACTS - 3,770 SQ FT

EXISTING TREES TO BE REMOVED - 19

TEMPORARY IMPACTS WITHIN TEMPORARY EASEMENT - 3,945 SQ FT.

LEGEND

- TEMPORARY IMPACTS WITHIN PERMANENT EASEMENT
- TEMPORARY IMPACTS WITHIN TEMPORARY EASEMENT
- WRA-A
- WRA-C
- WRA-D
- X EXISTING TREE TO BE REMOVED

SHEET NOTES

1. NO IMPACTS TO WRA AREAS.

1 MARY S. YOUNG SITE IMPACTS
SCALE: 1"=20'

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PORTLAND, OREGON

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LAKE OSWEGO LANDUSE APPLICATION, FINISHED WATER PIPELINE

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2100 Southwest River Parkway
Portland Oregon 97201
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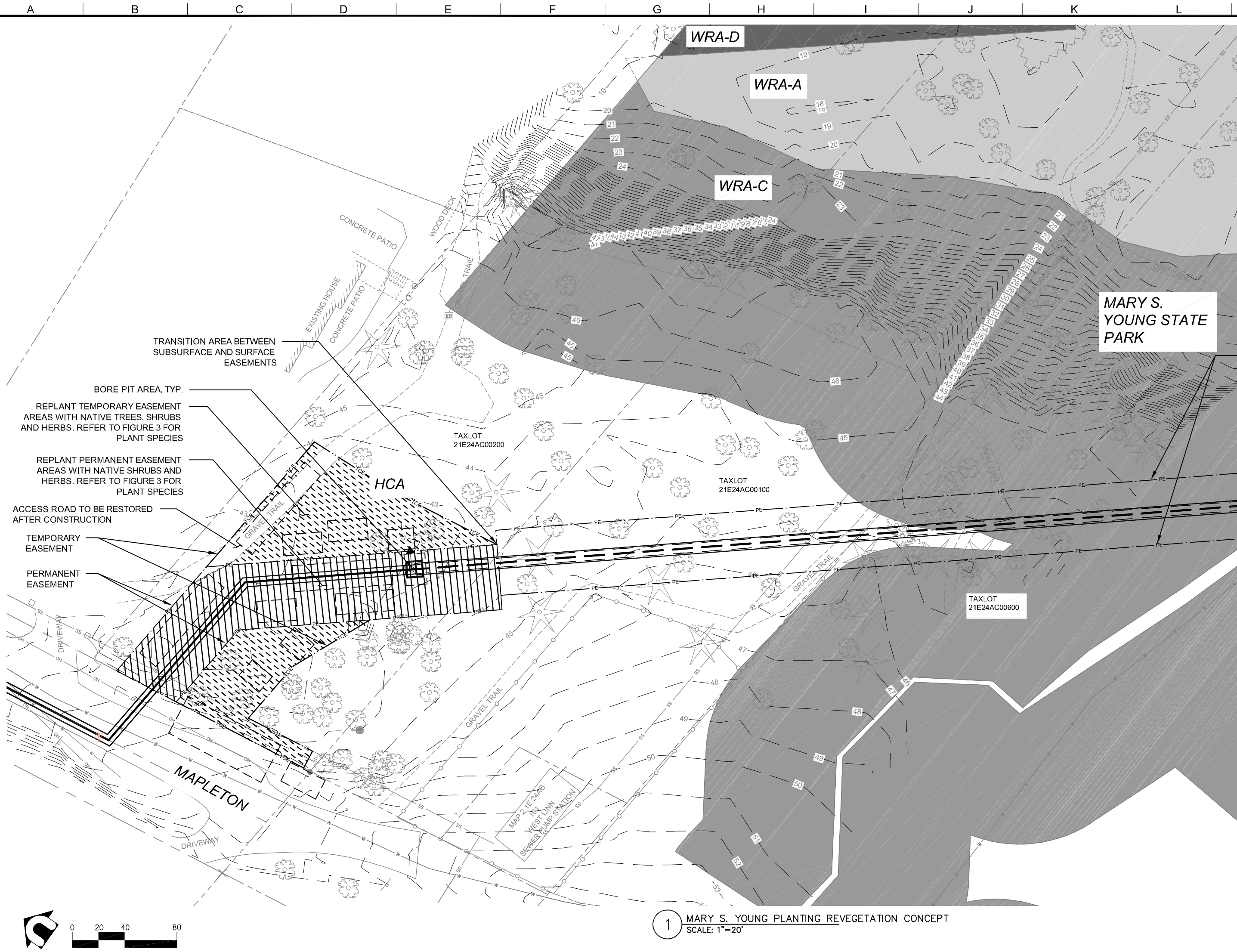
IMPACTS
WATER QUALITY AREAS AND HABITAT CONSERVATION AREAS, MARY S. YOUNG STATE PARK

FILENAME IWSO-0001_MARYSYOUNG
BC PROJECT NUMBER 139525
SCALE AS SHOWN
DRAWING/FIGURE NUMBER
FIGURE 3

PLOT DATE: May 11, 2012 - 11:14AM USER: bdu
FILE: P:\MWS\000000001\0400CAD\LA\Mary S Young site\IWSO-0001_MarySYoung.dwg



1 MARY S. YOUNG PLANTING REVEGETATION CONCEPT
SCALE: 1"=20'

LEGEND

- PERMANENT EASEMENT REPLANTING AREA - 3,770 SQ FT. NO TREES WITHIN THIS AREA. SEE FIGURE 3.
- TEMPORARY EASEMENT REPLANTING AREA - 3,511 SQ FT. REPLANT WITH TREES, SHRUBS AND HERBS. SEE FIGURE 3.
- WRA A
- WRA C
- WRA D

SHEET NOTES

1. NOXIOUS AND INVASIVE SPECIES SHALL BE REMOVED WITHIN IDENTIFIED REVEGETATION AREAS PRIOR TO REPLANTING.
2. ONLY NATIVE SPECIES WILL BE PROPOSED FOR REPLANTING. SEE PLANT SCHEDULE.
3. ONLY SHRUBS AND HERBS SHALL BE REPLANTED WITHIN THE PERMANENT EASEMENT. TREES, SHRUBS AND HERBS WILL BE REPLANTED WITHIN THE TEMPORARY EASEMENT.

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LAKE OSWEGO LANDUSE APPLICATION,
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REVEGETATION PLAN
WATER QUALITY AREAS AND HABITAT CONSERVATION AREAS,
MARY S. YOUNG STATE PARK

FILENAME: IWSO-0001_MARYSYOUNG_LA
BC PROJECT NUMBER: 139525
SCALE: AS SHOWN
DRAWING/FIGURE NUMBER: FIGURE 4

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REPLANTING SCHEDULE

TYPE	BOTANICAL NAME/Common Name	QUANTITY	SIZE	CONDITION	REMARKS
TREES:					
	Acer macrophyllum / Bigleaf maple	5	½" CAL.	Container or B&B	All trees are to be well branched
	Alnus rubra / red alder	3	½" CAL.		Mix and space trees within Temporary Easement 12' O.C. min.
	Prunus emarginata / Bitter cherry	5	½" CAL.		
	Thuja plicata / Western redcedar	6	½" CAL.		
SHRUBS:					
	Corylus cornuta / Beaked hazelnut	12	12" in height (all shrubs)	1 Gal. Container min. (all shrubs)	10' O.C.
	Mahonia nervosa / Dull Oregon grape	32			Clusters of 4, spaced 8' O.C.
	Oemleria cerasiformis / Indian plum	12			10' O.C.
	Polystichum munitum / Sword fern	32			Clusters of 4, spaced 8' O.C.
	Symphoricarpos alba / Snowberry	24			Clusters of 4, spaced 8' O.C.
	Samubcus racemosa / Red elderberry	6			10' OC.
	Rosa nutkana / Wood's rose	16			Clusters of 4, spaced 8' O.C.
HERBS & FORBS					
	Native erosion control seed mix	7,618 sq ft			Seed all areas disturbed by construction activities.
	Viola sempervirens / Evergreen violet	240	4" pot		Plant forbs in single-species clusters of 25-35, spaced 12' O.C.
	Fragaria vesca / Woods strawberry	240	4" pot		

Planting notes:
1. Trees are not to be planted within the permanent easement boundary.
2. Avoid damage to roots of existing trees when planting. Avoid placing new trees within dripline of existing trees.
3. Space all plantings per schedule to achieve uniform coverage.

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LAKE OSWEGO LANDUSE APPLICATION,
FINISHED WATER PIPELINE

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WATER QUALITY AREAS AND HABITAT CONSERVATION AREAS,
MARY S. YOUNG STATE PARK

FILENAME
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BC PROJECT NUMBER
139525
SCALE
AS SHOWN
DRAWING/FIGURE NUMBER
FIGURE 5

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