

WILLAMETTE WATER SUPPLY PROGRAM PRELIMINARY DESIGN

Environmental, Land Use and Cultural Resources Review

Prepared for



Prepared by:



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Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
AHPA	Archeological and Historical Preservation Act
ARPA	Archaeological Resource Protection Act
BA	Biological Assessment
BiOp	Biological Opinion
BPA	Bonneville Power Administration
CCS	cryptocrystalline silicate
CEQ	Council on Environmental Quality
CWA	Clean Water Act
CWS	Clean Water Services
DBH	diameter at breast height
DEA	David Evans and Associates, Inc.
DSL	Department of State Lands
EFU	Exclusive Farm Use
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCR	fire-cracked rock
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GIS	Geographic Information Systems
GLO	General Land Office
HRA	Historical Research Associates, Inc.
JPA	Joint Permit Application
LUBA	Land Use Board of Appeals
LWI	Local Wetland Inventory
MBTA	Migratory Bird Treaty Act
MSTIP	Major Streets Transportation Improvement Plan
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRLF	Northern red-legged frog
NWHI	Northwest Habitat Institute
NWI	National Wetland Inventory
OAR	Oregon Administrative Rule

Acronyms and Abbreviations

OCS	Oregon Conservation Strategy
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OMNCH	Oregon Museum of Natural and Cultural History
ORBIC	Oregon Biodiversity Information Center
ORNHC	Oregon Natural Heritage Information Center
ORS	Oregon Revised Statute
OWMS	Oregon Wildlife Movement Strategy
OWRD	Oregon Water Resources Department
PA	Programmatic Agreement
PDI	Planned Development Industrial
RCS	Regional Conservation Strategy
RFO	Regulatory Floodplain Overlay
RLIS	Regional Land Information System
ROW	right-of-way
RTP	Regional Transportation Plan
RUGGO	Regional Urban Growth Goals and Objectives
SHPO	State Historic Preservation Office
SNRO	Significant Natural Resource Overlay
SOC	Species of Concern
SROZ	Significant Resource Overlay Zone
TDT	Transportation Development Tax
TRNWR	Tualatin River National Wildlife Refuge
TSP	Transportation System Plan
TVWD	Tualatin Valley Water District
TWC	The Wetlands Conservancy
UGB	Urban Growth Boundary
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WES	Westside Express Service
WRWTP	Willamette River Water Treatment Plant
WWSP (or Program)	Willamette Water Supply Program

Executive Summary

The Tualatin Valley Water District (TVWD) and the City of Hillsboro (Hillsboro), collectively referred to as the Partners, have identified the Willamette Water Supply Program (WWSP or Program) as the best option for future delivery of drinking water to their service areas in Washington County. The mid-Willamette River at Wilsonville will be the water supply source for the Program. A Preliminary Design Study is currently being conducted to evaluate and develop preliminary design of the Program elements. This document provides the information developed as part of the Preliminary Design Study to facilitate the environmental, land use and cultural resource authorizations required to develop the Program.

Introduction and Background

Program Description: There is enough water for today, but steps need to be taken now to provide an adequate supply of water to meet future demands. Water needs in Washington County are projected to double by 2050. Water conservation measures alone will not be enough to meet these future demands, and a new supply will be needed as early as 2026. After an extensive evaluation of supply options, the mid-Willamette River at Wilsonville was selected as the Partners' preferred future water supply source because of the significant benefits it offers. The Program will include potential modifications at the existing intake and water treatment plant facility, approximately 30 miles of water supply pipeline and terminal storage reservoir(s).

Permit-related Communication: The permit-related communication will be consistent with the Program's established values, and will focus on early and constant communication, transparency and the pursuit of ancillary community benefits. The Partners began meeting with resource agencies, land use planning departments and stakeholders in 2014, early in the Preliminary Design Phase of the Program. Detailed summaries of these meetings and their outcomes are included as Table C-1 in Appendix C.

Environmental Review

As part of the Preliminary Design Phase, the Partners evaluated a variety of environmental permitting alternatives as well as the natural resources within the project vicinity. The environmental review section of this document describes: (1) the process for developing the preferred environmental permitting strategy, (2) the preferred strategy, and (3) the environmental conditions along the preferred pipeline alignment.

Summary of Environmental Permitting and Other Regulatory Requirements. Summaries of the local, state and federal environmental permit and authorization requirements for the Program are provided as Table 1 and Table 2 in Section 2 and Table C-2 in Appendix C.

Federal Nexus and Lead Federal Agency. A project that has a federal nexus is one that involves federal funding, a federal permit or other federal approval, or the use of federal lands or a federal program. The most certain federal nexus for the Program are related to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The Partners will coordinate with the U.S. Army Corps of

Engineers (USACE) to confirm its status as lead federal agency for the Program, because it has regulatory authority for both Acts, expertise concerning potential wetland and waterways impacts, and a well-defined regulatory process.

Environmental Permitting Considerations. The following elements of the Program are uniquely important for evaluating alternative permitting approaches:

- Whole Program – constructed in sections
- Multiple Components – pipeline, water treatment plant, reservoir(s)
- Varying pipeline and roadway schedules
- Permit duration and renewals
- Maximizing assurances and reducing surprises.

Clean Water Act Section 404 Permitting Options and Preferred Approach. The primary and most significant permit requirement for the Program is a joint Clean Water Act (CWA) Section 404 and Oregon Department of State Lands (DSL) permit. The Partners evaluated the following four primary environmental permitting options for the CWA Section 404/DSL permit: (1) develop a programmatic permit for the Program, (2) permit each element of the Program through separate CWA Section 404 Individual Permits, (3) permit each element of the Program through individual Nationwide Permits and (4) develop an Individual Permit under the CWA for the whole Program. Option 4, the Individual Permit for the whole Program, was selected as the preferred approach for the following reasons:

- Potential impacts will be well understood early in the Program.
- Agencies can provide 10-year authorizations that will cover the Program during the construction period.
- Most regulatory programs require agencies to evaluate the whole Program.¹
- This approach allows the Partners to efficiently coordinate with applicable regulatory agencies in defining the whole Program and required authorizations.
- The preferred alignment is “secured” to the extent practical and minimizes the opportunity for regulatory surprises.
- This approach allows for design flexibility.
- This approach allows the Partners to take advantage of early roadway partnering opportunities as they arise.
- To the extent feasible, the Partners will seek to obtain all other required permits and authorizations for the whole Program under each applicable regulatory program.

¹ *As the lead federal agency, the USACE’s regulatory authority applies to the sum of the jurisdictional features and related project components impacted by the Program. NMFS, through their ESA consultation with USACE on the Section 404 permit, would have regulatory authority over stormwater impacts and, potentially, impacts to upland areas associated with the Program.

The Individual Permit and associated authorizations obtained for the Program will be based on the current project footprint, which includes the preferred pipeline alignment, reservoir locations, and water treatment plant/intake modifications. However, subsequent modifications and/or extensions may be made to the permit to accommodate changes in the Program.

Implementing the Preferred Environmental Permitting Approach. There are several phases to successfully implementing the preferred environmental permitting approach. The initial phase, or permit acquisition phase, will facilitate securing the initial permits and authorizations for the whole Program. Subsequent phases of the permitting approach will be associated with construction and post-construction to demonstrate compliance with the permits and authorizations. A preliminary schedule for the permit acquisition phase, provided in Section 2.8, describes the process for acquiring the permits and authorizations by the end of 2016, details the information required for the permit acquisition phase and summarizes the permit coordination strategy.

Environmental Analysis of the Preferred Alignment. Natural resources were evaluated along the preferred pipeline alignment to facilitate impact avoidance and minimization, clarify potential mitigation requirements, and detail environmental considerations that shaped the specifics of the permitting strategy and stakeholder involvement. The study area is characterized by urban and agricultural land and, based on the analysis of habitat within 100 feet of the preferred alignment centerline, the majority of potential impacts are to these areas. This section describes each of the habitats in the Program vicinity in terms of its value to wildlife, general habitat conditions within each section of the alignment, species and habitats of concern that may occur within the Program vicinity, and measures to avoid and minimize environmental impacts.

Land Use Review

The Partners evaluated the land use authorizations required for successful implementation of the Program. The land use review section of this document describes: (1) the key steps for the land use authorizations, (2) the regulatory context for the land use authorizations, (3) local land use permitting requirements, and (4) a land use analysis of the preferred pipeline alignment—including adjacent land uses, planned roadway improvements and community considerations for each section.

Although it is anticipated that most of the alignment will be within the right-of-way, this document identifies land use permitting requirements for utilities both inside and outside of right-of-way in each jurisdiction and as associated with transportation improvement projects. Land use permitting processes will generally depend upon whether the planned construction: (1) is entirely within right-of-way; (2) includes public street right-of-way acquisition as part of a transportation project; (3) is outside of right-of-way on private or public land in the utility easement; or (4) includes other factors such as zoning overlays (e.g., floodplain and natural resources).

Relevant case studies revealed the following fundamental requirements for a successful land use authorization process:

- Clearly defined jurisdictional authority and agreements
- Consistency between the Program and adopted public plans
- Compliance with analysis requirements of state and regional regulations
- Clear and open communication with the community
- Adherence to public process requirements
- Detailed Intergovernmental Agreements
- Clear identification of benefits and impacts
- A community-specific construction management plan

Cultural Resources Review

The Partners evaluated the cultural resources requirements for successful implementation of the WWSP. This cultural resources review section of this document describes: (1) the cultural resources regulatory environment, (2) the development and implementation of a proposed Programmatic Agreement addressing cultural resources, (3) an analysis of cultural resources along the preferred alignment, and (4) a summary of anticipated permitting requirements.

Archaeological and historical resources are known to exist within 100 feet of the preferred alignment, and it is possible that Native American graves or sacred objects will be encountered during construction of Program elements. These cultural resources are managed by state and federal regulations. The Partners will be required to consider the effects of the Program on historic properties (cultural resources that are determined eligible or potentially eligible for listing in the National Register of Historic Places), and the permitting process will include government-to-government consultation with the Oregon State Historic Preservation Office (SHPO) and appropriate federally recognized tribes.

Research revealed that 55 cultural resource studies have been conducted within 1 mile of the study area. Of these, 25 were carried out within or immediately adjacent to the preferred alignment, resulting in roughly 25% of the WWSP study area being surveyed for cultural resources; however, some of the older studies may not meet current survey standards.

The literature review resulted in the identification of eight areas along the preferred alignment that are known to be sensitive for archaeological resources. Permits will be required when conducting archaeological investigations within the Program vicinity.

1. Introduction and Background

The Tualatin Valley Water District (TVWD) and the City of Hillsboro (Hillsboro), collectively referred to as the Partners, have identified the Willamette Water Supply Program (WWSP or the Program) as the best option for future delivery of drinking water to their service areas in Washington County. TVWD currently serves a population of over 200,000 people, which includes residences and commercial and industrial water users in unincorporated Washington County and portions of the cities of Beaverton, Hillsboro and Tigard. Hillsboro serves a population of over 83,000 people in the City of Hillsboro and a small portion of rural Washington County, and provides water to a population of over 14,000 people in the Cities of Gaston and Cornelius through wholesale agreements. A Preliminary Design Study is currently being conducted and includes the following tasks:

- Developing criteria, evaluating options, and selecting a preferred alignment for the water pipeline and a preferred location for the finished water tank
- Establishing pipeline design standards
- Evaluating options to reduce impacts to the environment and the community created by the Program
- Designing the system for optimum performance (pipe size, reservoir elevations, supply points)
- Establishing criteria for design of new reservoirs
- Establishing an overall schedule and cost estimates for required improvements
- Developing a natural resource, land use and cultural resources permitting approach

This document provides the information developed as part of the final bullet above, to facilitate the environmental, land use and cultural resource authorizations required to develop and implement the Program. This document is intended to support the permitting phase of the WWSP and addresses the following topics:

- Program Description
 - Permit-related Communication
- Environmental Review
 - Environmental Permitting Considerations
 - Environmental Analysis of the Preferred Alignment
- Land Use Review
 - Land Use Permitting Considerations
 - Land Use Analysis of the Preferred Alignment
- Cultural Resources Review
 - Cultural Resources Permitting Considerations
 - Cultural Resources Analysis of the Preferred Alignment

The environmental, land use and cultural resources sections begin with a description of the permits and authorizations² that are anticipated to be required for the development of the Program, followed by an analysis of the currently preferred water supply pipeline alignment. The proposed permitting approaches and the resource analyses of the currently preferred alignment allow for the possibility that, through the life of the Program, the alignment may be adjusted to take advantage of partnering opportunities and to minimize community and environmental impacts. The preferred terminal storage site has not yet been selected and is not included in this document.

1.1. Program Description

The Partners are developing a water supply source at the mid-Willamette River in Wilsonville. Other water providers in the region are also looking at their options for future participation. There is enough water for today, but steps need to be taken now to ensure an adequate supply for meeting future demands and providing greater reliability. Water needs in Washington County are projected to double by 2050, and new supplies will be needed as early as 2026. Developing an additional water supply through a partnership supports the region's plans for responsible growth within urban growth boundaries (UGBs).

Although effective water conservation programs and newer low-water-use appliances mean that Washington County homes and businesses are using 15% to 20% less water than a decade ago, conservation alone is not enough to meet this future demand.

Anticipating the long-term need for a new water source, TVWD and Hillsboro began years ago to prepare for this need. Independently, each provider evaluated a number of water supply source alternatives and each ultimately selected the mid-Willamette at Wilsonville as its preferred future water supply option. The Partners are currently in the Preliminary Design Phase to determine a preferred pipeline route and reservoir location. Further design and environmental permitting for the Program will occur from 2015 through 2016, construction will occur from 2015 through 2026 with water to be delivered by July 1, 2026. Concurrently, the Partners are evaluating early opportunities to place sections of the pipeline by partnering with roadway projects. The project vicinity and preferred alignment is shown on Figure 1 in Appendix A.

² An example of a "permit" is the Clean Water Act Section 404 permit issued by the U.S. Army Corps of Engineers. An example of an "authorization" is the Biological Opinion issued by the National Marine Fisheries Service. For purposes of this document, both terms are used to indicate general agency approval.

The new Willamette River water system will be one of Oregon's most important projects: It will be designed to supply water to more than 300,000 residents and some of the state's largest employers for the next 100 years. The mid-Willamette River at Wilsonville offers significant benefits, such as excellent finished water quality, redundancy, ownership and control of the supply, year-round reliability and better value. There are four primary components of the WWSP:

1. **Potential Intake Modifications.** Necessary improvements to the existing intake at the Willamette River Water Treatment Plant (WRWTP) at Wilsonville are being evaluated as part of the WRWTP Master Plan process that is occurring in parallel with the current WWSP Preliminary Design Phase. A memo summarizing the potential intake modifications is included as Appendix B.
2. **Expansion of the Water Treatment Capacity at the WRWTP.** A WRWTP Master Plan is currently being prepared and will identify the strategy and timing for future modifications and/or expansion of the treatment plant. The Master Plan will identify WTP and/or intake modifications that will be considered part of the Program.
3. **Water Supply Pipeline.** Approximately 30 miles of 36- to 66-inch water supply pipeline that will be built to modern seismic standards. A preferred pipeline route has been selected to deliver drinking water from the WRWTP north to Highway 26, and to the extent practical, east to TVWD service areas (see Figure 1). This pipeline will be constructed in sections. The timing of construction and length of some sections will be based on opportunities to partner with planned roadway projects.
4. **Terminal Storage Reservoir(s).** Approximately 30 million gallons of finished water storage is needed. Analyses are being conducted to identify a site or sites for the location of the terminal storage reservoir(s).

1.2. Permit-related Communication

1.2.1. Principles of Permitting Communication

The following values guide all of the Program's communications and interactions:

- Preserving and helping to improve the quality of life in our communities by protecting public health and public safety, and supporting the regional economy through reliable delivery of water
- Engaging city councils, host communities, and natural resource and transportation agencies in the evaluation of facility sites and pipeline routes
- Fostering partnership through collaboration, teamwork and opportunities for involvement
- Seeking opportunities for mutual benefits and efficiencies for property owners, site neighbors, and communities and their utility customers
- Carefully considering and mitigating the Program's effects on natural areas
- Striving to minimize construction impacts on neighbors and travelers

In alignment with these values, the Partners are committed to the following permitting-related communication principles throughout the life of the WWSP:

Early and frequent communication: The Partners began meeting with resource agencies and stakeholders in 2014, early in the Preliminary Design Phase of the Program to introduce them to the Program, to listen to their concerns and suggestions, and to solicit their input towards the development of an effective permitting strategy. As the Program moves forward, the Partners will continue to work closely with the agencies and stakeholders to keep them engaged, to maintain open lines of communication, to share progress and to hear their concerns.

Transparency: A key component of the Partners' outreach strategy is transparency. From a permitting perspective, this transparency means the Partners are committed to effectively communicating near- and long-term Program goals, water demands, infrastructure requirements, and potential impacts; engaging city councils, host communities, and natural resource and transportation agencies in the evaluation of facility sites and pipeline routes; fostering partnership through collaboration, teamwork and opportunities for involvement; and carefully considering and minimizing, where possible, the Program's effects on natural areas.

Pursuit of ancillary community benefits: The Partners are committed to seeking opportunities for mutual benefits and efficiencies for their utility customers, neighbors and other stakeholders. One example of such opportunities is partnering with planned transportation projects to minimize impacts to the community and the environment. These partnering opportunities allow the pipeline to be constructed without additional disruptions and impacts by reducing the total number of construction projects.

1.2.2. Resource Agency, Land Use and Stakeholder Communication

The Partners began meeting with local, state and federal resource agencies, municipal and county land use departments, and interested stakeholders very early in the Program development to introduce them to the Program, to listen to their concerns and suggestions, and to solicit their input towards the development of an effective permitting strategy. Table C-1 in Appendix C provides a detailed summary of the meetings with environmental resource agencies and stakeholders. Land use meetings are described in Section 3, Land Use Review.

In addition to the communication summarized in Appendix C, Table C-1, the Partners actively solicited public involvement and hosted a series of open houses throughout the vicinity of the Program. There was also an online Virtual Open House where the community could learn about the Program and send in questions and comments. For additional information, refer to the Program website:

www.ourreliablewater.org.

2. Environmental Review

As part of the Preliminary Design Phase of the Willamette Water Supply Program (WWSP or Program), The Tualatin Valley Water District (TVWD) and the City of Hillsboro (Hillsboro) (the Partners) evaluated a variety of environmental permitting alternatives as well as the natural resources within the Program vicinity. This section describes: (1) the process for developing the preferred environmental permitting strategy, (2) the preferred strategy, and (3) the environmental conditions along the preferred pipeline alignment.

2.1. Summary of Environmental Permit Requirements

Table 1 provides a summary of the permits and authorizations that are anticipated to be required in advance of approval for each element of the Program, the agencies with jurisdiction, and the governing rules and/or regulations. Table C-2 in Appendix C provides more detailed information on potential permit and authorization requirements, the regulated activities, anticipated timelines, and potential mitigation. For construction-related and post-construction-related permitting requirements, refer to Section 2.7.1 below.

Table 1: Summary of Potential Environmental Permit and Authorization Requirements

Permit/Authorization Description	Agency	Regulatory Authority
FEDERAL		
Department of the Army Section 404/10 Permit (Joint Permit Application with Oregon Department of State Lands)	U.S. Army Corps of Engineers	Clean Water Act, Section 404 Rivers and Harbors Act, Section 10
Endangered Species Act Consultation	National Marine Fisheries Service U.S. Fish and Wildlife Service	Endangered Species Act, Section 7 or Section 10
Bald and Golden Eagle Protection Act Consultation as Part of Section 404 Permit Process	U.S. Fish and Wildlife Service	Bald and Golden Eagle Protection Act
Migratory Bird Treaty Act Consultation as Part of Section 404 Permit Process	U.S. Fish and Wildlife Service	Migratory Bird Treaty Act
Fish and Wildlife Coordination Act Consultation as Part of Section 404 Permit Process	U.S. Fish and Wildlife Service	Fish and Wildlife Coordination Act
Right-of-Way Permit	U.S. Fish and Wildlife Service	National Wildlife Refuge System Administration Act (50 CFR 29.21, 29.22)
Right-of-Way Permit	Bonneville Power Administration	Required for construction and placement of pipeline within Bonneville Power Administration right-of-way
Right-of-Way Permit	Railroad	Required for construction and placement of pipeline within railroad right-of-way

Permit/Authorization Description	Agency	Regulatory Authority
STATE		
Removal/Fill Permit (Joint Permit Application with U.S. Army Corps of Engineers)	Oregon Department of State Lands	Oregon Removal Fill Law (ORS 196.795-990)
Section 401 Water Quality Certification	Oregon Department of Environmental Quality	Clean Water Act, Section 401 Federally delegated to the State
National Pollutant Discharge Elimination System (NPDES) 1200-C Construction Stormwater Permit	Oregon Department of Environmental Quality	Clean Water Act, Section 402 Federally delegated to the State
State Endangered Species Act Consultation as Part of Removal/Fill Permit Process	Oregon Department of Fish and Wildlife Oregon Department of Agriculture	Oregon Endangered Species Act
Oregon Department of Fish and Wildlife Habitat Mitigation Policy Review as Part of Removal/Fill Permit Process	Oregon Department of Fish and Wildlife	Oregon Department of Fish and Wildlife provides recommendations through Oregon Department of State Lands Removal/Fill Permit process
Oregon Department of Fish and Wildlife Fish Passage Plan Approval	Oregon Department of Fish and Wildlife	ORS 509.580-509.910 OAR 635, Division 412
LOCAL		
Environmental Review	Clean Water Services	
Local Land Use Authorizations – See Section 3, Land Use Review		

2.2. Environmental Permitting Considerations

The Partners evaluated a variety of permitting alternatives as part of the WWSP Preliminary Design Phase. One of the goals of the early agency coordination was to develop a permitting approach that would best meet the long-term needs of the WWSP and the regulatory requirements. The following section describes the Program and permitting elements that were uniquely important in terms of evaluating alternative permitting approaches.

2.2.1. Whole Program – Constructed in Sections

The Partners will construct the pipeline in individual sections, rather than from one end to another in a progressive, linear manner. This approach allows the Partners to minimize impacts and costs by constructing sections of the WWSP through partnerships with roadway projects, whenever possible, that are planned to be constructed between now and 2026. One example of this is the SW 124th Avenue extension project, which is a partnership between the WWSP and Washington County (County). The County intended to construct the SW 124th Avenue extension, and this project served as an early opportunity to significantly minimize impacts and costs for both the WWSP and the County.

Rather than permit each section of the pipeline individually, many of the regulatory agencies are required to address the WWSP as a whole. Although there are several examples of how the different agencies define a “single and complete project,” the definition under Section 7 of the federal Endangered Species Act (ESA) is particularly relevant. The regulatory agencies that are responsible for managing ESA-listed species are the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). Under the ESA, these agencies are required to evaluate all “interrelated and interdependent activities” associated with the proposed action. There are similar requirements under the National Environmental Policy Act (NEPA). For an action to be evaluated alone, it must be demonstrated that it is not dependent on the larger project or the larger project facilities.

2.2.2. Varying Pipeline and Roadway Schedules

The Partners will develop preliminary design of the pipeline as part of the WWSP Preliminary Design phase. It is anticipated that this level of design will be sufficient for permitting the WWSP in the near term; however, some sections may not be designed for many years if they are associated with a roadway partnership project. The permitting approach must allow for WWSP permits to be secured now and then allow for a consistency review to occur when different sections of the Program move forward.

2.2.3. Permit Duration and Renewals

The WWSP will be constructed over a ten-year period, from now through 2026. Therefore, the permitting approach must consider permit duration and ability for renewal. It is important for the WWSP permitting to be initiated as soon as possible in order to take advantage of other similar roadway partnering opportunities that may arise in the near term. In addition, it’s important for the WWSP permitting either to cover the entire ten-year construction duration or to have a clearly defined renewal process.

2.2.4. Maximizing Assurances and Reducing Surprises

Because of the long-term and long-distance nature of the Program, it is important for the Partners to secure the alignment corridor and minimize regulatory surprises to the extent practical in the earliest phase of the Program. Although no permitting approach can guarantee the securing of permits, the permitting options were evaluated according to their ability to provide the Partners with greater assurances earlier in the Program.

2.3. Federal Nexus

The term “federal nexus” is used when a project involves federal funding, a federal permit or other federal approval, or the use of federal lands or a federal program. The federal nexus is important for evaluating permitting approaches. The existence of a federal nexus often triggers the need for additional federal approvals, such as compliance with NEPA, Section 106 of the National Historic Preservation Act (addressing cultural resources) and the federal ESA. The following are the certain federal nexus and potential federal nexus for the WWSP:

Certain Federal Nexus

- U.S. Army Corp of Engineers (USACE), Clean Water Act (CWA), Section 404 permit for impacts to jurisdictional wetlands and/or waterways.
- USACE, Rivers and Harbors Act, Section 10 permit for work above, within or below a navigable waterway (for Tualatin River crossing; possibly for modifications to the intake on the Willamette River).
- Bonneville Power Administration (BPA), right-of-way (ROW) permit for electrical utility crossings.

Potential Federal Nexus

- USFWS, easement/authorization for work on the Tualatin River National Wildlife Refuge (TRNWR) as part of Tualatin River crossing.
- Federal Highway Administration (FHWA), construction associated with FHWA-funded road partnering projects. Federal funding from the FHWA could “federalize” the Program, leading to an expanded NEPA review and an expansion of the lead federal agency’s regulatory authority into upland areas. Partnering opportunities, such as roadway projects, may receive FHWA or other federal funding. For these partnering projects, the Program component is not eligible to receive federal transportation funding; therefore, additional federal agency-specific design and/or permitting requirements are not anticipated. The permitting strategy will be updated if additional, funding-related federal requirements are applied to the Program.

2.4. Lead Federal Agency

Criteria for selecting a lead federal agency are outlined by regulation (40 CFR 1501.5 – Lead Federal Agencies) as follows:

- Magnitude of agency’s involvement
- Project approval/disapproval authority
- Expertise concerning the action’s environmental effects
- Duration of agency’s involvement
- Sequence of agency’s involvement

Of the two federal agencies with a certain nexus, USACE and BPA, it was determined that USACE would be the preferred lead federal agency because of: (1) USACE’s expertise concerning the potential impacts to wetlands and waterways associated with the WWSP and (2) USACE’s well-defined regulatory and ESA Section 7 consultation process. Once the WWSP alignment and footprint are defined, the Partners will request to formalize USACE’s role as lead federal agency. There are no cooperating agencies identified at this time; however, BPA may elect to engage as a cooperating agency for permitting purposes.

2.5. Environmental Permitting Options

The Program will require a number of permits and authorizations. The primary and most significant permits for the Program are a joint CWA Section 404/Oregon Department of State Lands (DSL) permit and the associated ESA Section 7 consultation and Incidental Take Statement. There are a variety of means and mechanisms for securing this permit coverage. The following are the options that were evaluated and discussed with the regulatory agencies:

Option 1: Develop a *programmatic permit* for the WWSP with each section tiering from, and demonstrating compliance with, the conditions included in the permit. This permitting option was rejected because of the following concerns:

- Programmatic permits can require substantially more time and resources to develop than individual permits.
- Programmatic permits are blanket permits for recurring actions that are either too numerous to permit individually (e.g., the Oregon Department of Transportation (ODOT) statewide Bridge Delivery Program that addressed over 300 individual “projects”) or that happen in locations that are not known specifically at the time of permitting. In the case of the WWSP, the actions may be recurring (such as wetland impacts or waterway crossings), but there are few “projects” and their locations are generally known. As such, the time and resources required to develop a programmatic permit may not be warranted.

Option 2: Permit each element of the Program (such as intake modifications and water treatment expansions at the WRWTP, supply pipeline sections, and reservoirs) through separate *CWA Section 404 Individual Permits*. This option was rejected because of the ESA requirement to evaluate the whole Program (see Whole Program – Constructed in Segments, Section 2.2.1).

Option 3: Permit each element of the Program through separate *CWA Section 404 Nationwide Permits (NWP) 12*. NWP 12, which addresses utility line activities, was considered because 1) it may provide greater flexibility to change the alignment, if required, during the Program and 2) NWP 12 currently includes water quality certification through CWA Section 401; however, DEQ would still review stormwater requirements for the Program. Under this option, the Partners would submit an application addressing impacts to jurisdictional features for the whole Program, thereby allowing NMFS to evaluate the whole Program, and USACE would authorize each impact individually under NWP 12. This option was rejected primarily because NWPs expire every five years with the potential for criteria and requirements to change. The Program would require at least two renewals and re-verification of jurisdictional features, which would increase the overall level of permitting effort and substantively decrease permitting predictability.

Option 4 (preferred): Obtain *CWA Section 404/DSL authorization and related ESA Section 7 Incidental Take Statement using a ten-year Individual Permit for the whole Program*. This permitting option had the following considerations:

- Once the alignment has been selected and intake modifications have been defined, the Program footprint and impacts will be well understood.
- USACE and NMFS can provide a ten-year permit and Biological Opinion under CWA Section 404 and ESA Section 7 that would include conditions (or “openers”) that would allow the Program to respond to changing environmental conditions, design changes or new information. The permit can be extended and/or renewed after the initial ten-year period through coordination with USACE.
- Regulatory agencies are required to evaluate the whole Program, unless it is determined that the action is not interdependent or interrelated.

2.6. Preferred Environmental Permitting Approach

Option 4 is the preferred environmental permitting approach for the WWSP, based on current regulations, the environmental permitting considerations, meetings with regulatory agencies and stakeholders, and experience in permitting similar projects.

The following are the key elements of Option 4, the whole Program/Individual Permit approach:

- It allows the regulatory agencies to evaluate the whole Program.
- It allows the Partners to efficiently coordinate with applicable regulatory agencies in defining the whole Program and required permits and approvals.
- It provides the greatest level of assurance to the Partners, because it “secures” their preferred alignment to the extent practical and minimizes the opportunity for regulatory surprises and/or changes over the long term.
- It allows for design flexibility over the ten-year construction period in the following ways:
 - The permits will be based on the current project footprint (preferred alignment, reservoir locations and WRWTP/intake modifications); however, the Partners can submit modifications that the agencies will review and process. These modifications can be addressed relatively quickly throughout the life of the Program.
 - The permits will include conditions to minimize impacts to the environment. If these conditions are not met, either due to design changes, changing environmental conditions or new information, the USACE and NMFS will re-evaluate impacts.

- The agencies will evaluate the modifications for “significance” based on changes to the impacts on the resource (as opposed to significance of the design modification). For any proposed change in impact to a jurisdictional feature the Partners will coordinate with the USACE and may be required to submit a memo to USACE describing the location and/or removal/fill quantity changes. In response, USACE will determine the significance of that change.
 - If there are **no significant changes** to the impacts (such as an alignment change that does not increase wetland/waterway impacts or result in greater impacts to habitat), then the agencies will not require that the permits be updated.
 - If the design modification results in a **significant change** in impacts (such as moving the crossing location on the Tualatin River to an area with higher quality habitat), then the permits will need to be updated.
 - **Very significant changes** in impacts (such as a new alignment that has significantly more impacts to wetlands/waterways) may require significant modifications to the permits and, potentially, a new permit.
- Public comment periods are associated with the USACE’s Section 404 permitting process. If a proposed modification is considered insignificant, then a new public comment period is not required. If the modification is considered significant, then the permit updates will need to go out for public review.
- The Partners can take a conservative approach to estimating impacts and minimizing or mitigating these impacts during the initial permitting phase. This approach will allow more flexibility for alignment modifications. The proposed approach to potential mitigation measures is addressed further in Section 2.9.7.
- The early permitting allows the WWSP proponents to take advantage of roadway partnering opportunities as they arise.

2.7. Construction and Post-Construction Permitting Considerations

2.7.1. Potential Construction Permits

Table 2 below provides a list of the construction permits that will potentially be required for the Program.

Table 2: Construction Permits Potentially Required for the WWSP

Permit Description	Agency	Division
INTAKE		
Will be updated following WRWTP Master Plan		
PIPELINE		
NPDES 1200-C Stormwater Discharge	Oregon Dept. of Environmental Quality	

Permit Description	Agency	Division
Right-of-Way	Bonneville Power Administration (see below)	
General Right-of-Way	Washington County Dept. of Land Use & Transportation	Operations and Maintenance
Land Use - Type II Special Use Development	Washington County Dept. of Land Use & Transportation	
Approach Final Sidewalk	Washington County Dept. of Land Use & Transportation	Operations and Maintenance
Grading	Washington County Dept. of Land Use & Transportation	Building Services Section
Transportation Development Tax (TDT)	Washington County Dept. of Land Use & Transportation	Building Services Section
RESERVOIR		
NPDES 1200-C Stormwater Discharge	Oregon Dept. of Environmental Quality	
Land Use - Type II Special Use Development	Washington County Dept. of Land Use & Transportation	
Commercial Electrical	Washington County Dept. of Land Use & Transportation	
Approach Final Sidewalk	Washington County Dept. of Land Use & Transportation	Operations and Maintenance
Renewable Energy	Washington County Dept. of Land Use & Transportation	Building Services Section
Noise Variance - Type I	Washington County Dept. of Land Use & Transportation	Building Services Section
Fence (Building)	Washington County Dept. of Land Use & Transportation	Building Services Section
Grading	Washington County Dept. of Land Use & Transportation	Building Services Section
Commercial Plumbing	Washington County Dept. of Land Use & Transportation	Building Services Section
Commercial Mechanical	Washington County Dept. of Land Use & Transportation	Building Services Section
Sprinkler	Washington County Dept. of Land Use & Transportation	Building Services Section
Transportation Development Tax (TDT)	Washington County Dept. of Land Use & Transportation	Building Services Section
Building	Washington County	Building Services Section

In locations where the alignment is adjacent to or crosses BPA facilities, BPA coordination, and potentially authorization, will be required. If the BPA facility is on land that is not owned by BPA, the permit process is specific to meeting BPA's technical and policy requirements. If the BPA facility is located on fee-owned property (owned by BPA), then the approval process would require a BPA-

approved environmental and cultural review, and takes approximately one year for authorization. It is likely that the WWSP's federal permitting documents would satisfy BPA's permitting requirements on fee-owned property, but this would need to be confirmed with BPA at each fee-owned location. Once BPA assigns a Customer Service Representative to the WWSP, the permitting team will coordinate with them on specific environmental and cultural review requirements.

2.7.2. Construction Monitoring

It is recommended that an on-site pre-construction meeting be held for each separate construction contract among the project biologist or resource representative, project manager, inspector and contractor before moving equipment on-site or beginning any work, to ensure that all parties understand the locations of sensitive biological or cultural sites and the measures that are required to be taken to protect them.

Environmental construction permits will have specific monitoring requirements, but typically require monitoring that occurs during the following activities or time frames:

- “No Work” areas – monitor area before beginning any work to ensure that protective measures are in place.
- In-stream work – monitor in-water work isolation measures before beginning in-water work; conduct fish salvage as needed.
- Regulated work areas – turbidity monitoring should occur each day when working in these areas; the monitoring frequency should follow NPDES requirements.
- Erosion control measures – inspect before beginning work; monitor all erosion controls daily during the rainy season and weekly during the dry season, or more often as necessary, to ensure that the erosion controls are working adequately to meet the treatment requirements.

2.7.3. Mitigation Monitoring

The DSL requires three years of monitoring for temporary impacts to wetlands and riparian habitat. The DSL and USACE require five years of monitoring for mitigation of permanent impacts to wetlands. In general, however, the length of required monitoring will depend on the type of restoration. For example, re-planting could require three years of monitoring for plant establishing. Restoration that includes site grading could require five years of monitoring and the restoration of forested wetland could require up to 10 years of monitoring. A post-construction report demonstrating as-built conditions and discussing any variation from the approved plan is required within 90 days of site grading. An Annual Monitoring Report is required by DSL and USACE to determine whether the site is meeting performance standards for a minimum period of three growing seasons for temporary impacts and five growing seasons for permanent impact mitigation sites.

2.8. Implementing the Preferred Environmental Permitting Approach

There are several phases to successfully implementing the preferred environmental permitting approach. The initial phase, or permit acquisition phase, will facilitate securing the initial permits for the whole Program, including the potential modifications to the WRWTP and intake, the supply pipeline and the finished water reservoir. The permit acquisition phase can be accomplished using preliminary alignment design information. Subsequent phases of the permitting approach are associated with construction and post-construction activities to demonstrate compliance with the permits and to acquire land use authorizations.

2.8.1. Process and Schedule

A preliminary schedule for the permit acquisition phase is illustrated below.



Key milestones and decision points on this schedule are as follows:

1. **Design and Constructability Details:** The Partners will coordinate with the resource agencies to determine the specific information needs for permitting. Information requirements are described further in Section 2.8.2, below.
2. **Define the Proposed Action and Program Action Area:** The lead federal agency will determine the Proposed Action and Program Action Area in conjunction with the Partners before submitting the applications. The Partners will prepare a description of the Proposed Action for the regulatory agencies that addresses *who, what, where, when* and *why*. The Proposed Action will also include the anticipated mitigation and conservation measures.

The “Action Area” is defined by the ESA as “all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action.” For the WWSP, the regulatory agencies will most likely consider the Action Area to include areas downstream and/or adjacent to the Program footprint.

3. **Describe Baseline Conditions and Potential Impacts:** The permit applications and the Biological Assessment, in particular, must describe the baseline conditions (i.e., pre-Program conditions) and the potential impacts to those conditions as a result of the Program. Baseline conditions and impacts must be addressed for all areas within the Action Area. Included within this process is DSL’s and USACE’s concurrence with the delineation of jurisdictional wetlands and waterways as well as any other evaluations the state or federal resource agencies (e.g., NMFS, Oregon Department of Fish

and Wildlife [ODFW] or Oregon Department of Environmental Quality [ODEQ]) may consider relevant for evaluating impacts, such as aquatic habitat modeling or flow modeling. The Partners can consider these evaluations with the resource agencies.

4. **Define Conservation and Mitigation Measures:** Per state and federal regulations, mitigation or other measures are required to address impacts to jurisdictional wetlands and waterways as well as impacts to state and federal ESA-listed species (see Table C-3 in Appendix C). Conservation measures are intended to minimize and/or avoid impacts and are considered part of the Program. Conservation and mitigation measures are determined along with the regulatory agencies. The Partners will attempt to identify those conservation measures needed to satisfy the applicable regulatory requirements. These measures will be included as part of the proposed action for purposes of the federal ESA, CWA Section 404, CWA Section 401 and NEPA analyses. As suggested previously, taking a conservative approach to providing conservation and mitigation measures early in the Program will provide for greater flexibility through the life of the Program.
5. **Finalize the Applications:** Once all of the above information has been prepared, the Partners will submit their Joint 404/Removal-Fill Permit Application to USACE (for federal review) and to DSL (for state review). This application will include an Alternatives Analysis.

At the same time, the Partners will submit the Biological Assessment (BA) to USACE for USACE's use in ESA Section 7 consultation with NMFS. Once USACE has made a Preliminary Effects determination (generally within 30 days), it will submit the BA to NMFS to initiate ESA consultation.

Formal ESA consultation with USFWS may not be required because there are no listed terrestrial/non-anadromous species that will be impacted by the WWSP (as described in Section 2.9). If formal consultation is not required, the Partners may elect to conduct informal consultation to ensure protection from any objecting parties.

The ESA consultation is between the federal agencies; however, USACE and NMFS (and possibly USFWS) will include the Partners in consultation discussions. USACE will also coordinate with ODEQ, through the Section 404 process, to address CWA Section 401 water quality certification.

6. **Develop Programmatic Service Provider Letter with Clean Water Services (CWS) and a Programmatic Agreement with the Oregon State Historic Preservation Office (SHPO):** The development of these Programmatic Agreements can occur concurrently with the development and review of the other permits. The Programmatic Agreement for coordination with the Oregon SHPO is described further in Section 4, Cultural Resources Review.
7. **Agency Review:** Anticipated agency review periods are detailed in Table C-2, Appendix C. In general, the ESA consultation requires the most time and may take up to one year or more. The agency review period can be reduced by conducting early coordination with the agencies to incorporate their ideas and concerns into the analysis and permit documentation. The agency review period includes a 30-day public comment period, tribal coordination and NEPA

documentation, which are all led by USACE. This period also includes CWA 401 water quality certification.

8. **NMFS Issues Biological Opinion (BiOp); ODEQ Issues 401 Water Quality Certification; USACE Issues Final CWA 404 Permit; and DSL Issues Final Removal-Fill Permit:** These authorizations will include conditions that govern the construction of the Program as well as further agency coordination. Variances from these conditions could require additional permit review.

Subsequent “permitting” phases will be associated with the actual construction of the Program elements and post-construction to demonstrate compliance with the permit conditions and to acquire land use authorizations.

2.8.2. Information Required for Permit Acquisition Phase

The following is a summary of the Program, and the design-related and impact-related information that will be required for all elements of the Program (intake, WRWTP, pipeline and reservoir):

- Drawings: 8 ½ x11-inch paper, black and white; scale may be as needed to best illustrate impacts to resource
- Program footprint:
 - Entire footprint (intake, pipeline and reservoir) with tax lots and work area boundaries
 - Overall site plan (entire alignment) with cross-section locations
 - Plan view and cross sections of jurisdictional elements (i.e., wetland and waterway crossings), including potential staging areas, culvert crossings and all ground-disturbing activities
 - Typical:
 - Cross section of pipeline placement in roadway (no impacts to jurisdictional features)
 - Site restoration of temporary impacts to jurisdictional features (post-pipeline placement)
- All construction or operational impacts to the following resources:
 - Jurisdictional wetlands/waterways:
 - Removal/fill quantities (area and volume) within jurisdictional wetlands/waterways
 - Differentiate between temporary and permanent impacts
 - Potential state or federal ESA species and/or their habitat:
 - Description of the potential noise, light, air quality and traffic-related impacts
 - Species-specific surveys may be required, depending on potential impacts (described further in Section 2.9.4.2)
 - Historic and/or cultural resources
- Phase 1 assessment of hazardous materials within the Program footprint

- An Alternatives Analysis that describes how impacts to jurisdictional wetlands/waterways have been minimized to the extent practical in meeting the purpose and need of the WWSP.
- Quantification of impacts to vegetated corridors (per CWS's Environmental Review)
- Quantities of new and/or improved impervious surface associated with the WWSP and a Stormwater Management Plan (Note: A separate approach for addressing stormwater requirements is currently being developed and can be incorporated into the permitting strategy later if necessary.)
- Description of construction-related Best Management Practices (BMPs) that will minimize impacts (see Section 2.9.6)
- A summary of all existing water rights associated with the WRWTP intake, including the fish persistence conditions. A memo describing the existing water rights at the WRWTP and the associated fish persistence conditions applied by Oregon Department of Fish and Wildlife (ODFW) and Oregon Water Resources Department (OWRD) is included as Appendix D. There are some water rights associated with the intake that are not being utilized through the WWSP, but impacts from all of the water rights will be considered during ESA consultation and NEPA analysis.
- Description of all in-water work, if applicable, including compliance or variances required in association with the ODFW preferred in-water work windows (see Section 2.9.8)
- Demonstration of compliance with ODFW/NMFS fish passage criteria for all work proposed in or near a fish-bearing stream
- General description of how the Program elements, the pipeline in particular, will be constructed in association with partnering projects, how subsequent permitting will occur and who will be responsible for impacts and mitigation
- Description of how the Program may contribute to greenhouse gas emissions and the implications of climate change on the potential environmental effects. The Council on Environmental Quality (CEQ) recently released revised draft guidance (CEQ 2014) that describes how federal agencies should consider these factors in their NEPA reviews, and it is likely that USACE, the lead federal agency for the Program, will request this analysis from the Partners.
- Conservation and/or mitigation measures, as negotiated with the agencies

The following are additional information requirements that **may** be required specifically for intake modifications (actual requirements will be negotiated with the agencies):

- Intake demands analysis – how much and when Program-related water will be withdrawn from the Willamette River and how these withdrawals meet the fish persistence conditions that ODFW has applied to the relevant water rights.
- Aquatic habitat impacts analysis – a description of how the Program-related withdrawals impact baseline flows and water quality within the Willamette River, and potential impacts that minimize the ability to meet ESA-related fish population recovery criteria.
- Description of new intake fish screen design, if new intake demands require a modification to the screens.

2.8.3. Environmental Permit Coordination

Consistent with the principles of permitting communication, described in Section 1.2.1, the Partners will continue early, constant and transparent communication with the resource agencies and key stakeholders throughout the permitting process. The Partners understand that this kind of coordination provides many Program benefits, including:

- Minimizing potential regulatory “surprises” throughout the life of the Program
- Reducing overall permitting timelines
- Finding regional and conservation-related partnering opportunities
- Facilitating a common understanding of the regulatory requirements

The Partners will meet with individual agencies and stakeholders to address their specific permitting concerns, and will organize interagency meetings for important Program milestones to be determined with the agencies and stakeholders during the permitting phase of the Program.

2.9. Environmental Analysis of the Preferred Alignment

This section will detail specific environmental considerations along the preferred alignment (as illustrated in Figure 1 in Appendix A) to facilitate impact avoidance and minimization, clarify potential mitigation requirements, and detail environmental considerations that will shape the specifics of the permitting strategy and stakeholder involvement.

2.9.1. General Description of Natural Resources along the Preferred Alignment

This section will provide an overview of habitats present along the preferred pipeline alignment in order to facilitate impact avoidance and minimization, and will discuss environmental considerations that will shape the permitting strategy and stakeholder involvement.

2.9.1.1. Methods

The “project area” is defined as the area of potential ground disturbance, which for the purposes of this assessment includes a 200-foot corridor centered on the preferred pipeline alignment. The “study area” for environmental resources consists of a 3,000-foot corridor centered on the proposed alignment (1,500 feet to either side of the alignment). The “project vicinity” for environmental resources is defined as a 2-mile radius from the project area. A combination of the following mapping resources were used to document existing conditions within the study area (shown in Appendix A, Figure 2).

- The Northwest Habitat Institute (NWHI) Current Vegetation Land Cover Map (NWHI 2000).
- The Northwest Habitat Institute (NWHI) Willamette Valley Oak Map (NWHI 2007).
- The Metro Data Resource Center Regional Land Information System (RLIS) Discovery Website (Metro 2015).
- Wetland Priority Sites for the Willamette Valley Basin (Oregon Natural Heritage Information Center [ORNHIC] and The Wetlands Conservancy [TWC] 2009).

No single source provided complete and accurate coverage of the study area. In order to produce a single habitat layer, the sources were used as follows: The NHWI “Current” layer was used for “Agriculture, Pasture, and Mixed Environs” and “Urban and Mixed Environs” (NHWI 2000). The Metro “Vegetation” layer (Metro 2015) for “Forest” and “Shrub” was used in place of NHWI’s “Westside Lowland Conifer Hardwood Forest” layer because, based on air photos, Metro’s layer was more accurate than NHWI for these habitat types. Metro’s “Shrub” category is further described as “Woody or Shrub,” which “includes orchards and tree farms.” The NHWI Willamette Valley Oak Map layer was used to map oak habitat within the project vicinity. Lastly, “Wetlands” were mapped using the Wetland Priority Sites for the Willamette Valley Basin (ORNHC and TWC 2009), since this layer provided the most accurate mapping of wetlands within the project vicinity.

David Evans and Associates, Inc. (DEA) conducted a reconnaissance of the preferred alignment to review site conditions and to “ground-truth” portions of the habitat mapping. Observations made during the reconnaissance were used to inform this section. The preferred pipeline alignment was divided into separate sections, Section 1 through 4, consistent with the Partners analysis of the pipeline route (HDR 2014).

2.9.1.2. General Wildlife Habitat Types

As shown in Appendix A, Figure 2, the majority of the study area consists of urban and agricultural areas, which contain remnant forest and other patches of habitat. Habitat is mapped within 1,500 feet of the project centerline in order to provide context, although impacts would not likely extend this far from the alignment. In addition, Table 3 on the following page provides a summary of habitat types mapped within the project area to give an idea of the habitat types that have the greatest potential to be impacted by the pipeline. As shown in Table 3, based on habitat within the project area, the vast majority of potential impacts are to agricultural and urban land for all of the pipeline sections. A brief description of the habitat and general wildlife usage is provided for each of these habitat types below.

Urban Habitats and Mixed Environs (NHWI 2000): Urban habitats within the study area include primarily medium-density and low-density zones, as described in Johnson and O’Neil (2001), and are summarized as follows:

The *high-density zone* is the downtown area of the inner city, whereas the *medium-density zone* is composed of light industry mixed with high-density residential areas. Compared to the high-density zone, the medium-density zone has more potential wildlife habitat. Vegetation in this mid-zone is typically composed of non-native plant species. Native plants, when present, represent only a limited range of the natural diversity for the area. Isolated wetlands, stream corridors, open spaces and greenbelts are more frequently retained in the medium-density zone than in the high-density zone. However, remnant wetland and upland areas are often widely separated by urban development.

The *low-density zone* is the outer zone of the urban-rural continuum. This zone contains only 10% to 29% impervious ground cover and normally contains only single-family homes. It has more natural ground cover than artificial surfaces. Vegetation is denser and more abundant than in the high-density and medium-density zones. Road density is lowest of all three zones, and consists of many secondary and tertiary roads. Roads, fences, livestock paddocks and pets are more abundant than in neighboring rural areas. Vegetable and flower gardens are widespread; fencing is prevalent. Many wetlands remain and are less impacted. Water tables are less impacted and vernal wetlands are more frequent; stream corridors are less impacted and more continuous. Although the low-density zone may have large areas of native vegetation and is generally the least impacted of all three zones, it still has been significantly altered by human activities and associated disturbances.

Overall, as urbanization increases, species diversity declines and species densities increase, primarily because of high numbers of exotic species. Urban landscapes support a variety of wildlife species that are adapted to, or have adjusted to, urban areas.

Table 3: General Wildlife Habitat Types within 100 feet of Alignment Centerline (in acres), by Section

Habitat Type	Section			
	1	2	3	4
Urban and Mixed Environs ¹	117.7	45.5	56.0	127.4
Agriculture, Pasture, and Mixed Environs ¹	17.1	248.0	122.1	16.9
Shrub ²	0	4.2	0.2	0
Forest ²	7.2	22.6	4.2	2.8
Wetland ³	8.9	0.9	3.8	2.1
Willamette Oak Woodland ^{1*}	0	0.8	1.4	0
Total Acres	150.9	322.0	187.7	149.2

**Scattered oaks and oak woodlands are known to be present in Section 1. Despite not being identified by NWHI, oaks have been observed in the area and this habitat type was identified in a desktop GIS review as part of the Metro Forest dataset.*

Sources: ¹NWHI 2000, ²Metro 2015, ³ORNHIC and TWC 2009.

Agricultural Habitats, Pasture, and Mixed Environs (NWHI 2000): Most wildlife species using agricultural habitat either are seasonal migrants or use these areas in conjunction with other habitat types. Most amphibians, reptiles, birds and mammals are only partially associated with, or present in, agricultural habitats (Johnson and O’Neil 2001). Although remnant native grasslands are not likely to occur in the study area due to the high level of development, pasture areas are included in the “Mixed Environs” type and may support some grassland-adapted species.

Shrub Habitats (Metro 2015): This category includes younger scrub forest as well as orchards and tree farms. Wildlife use is similar to that described for agricultural habitats, although shrubs and trees may provide greater opportunities for bird nesting habitats for some species.

Forested Habitats (Metro 2015): Although mapping of forested habitats was not broken into specific forest types in the most accurate available Geographic Information Systems (GIS) data, general forested habitat types in the study area include primarily mixed conifer-deciduous forest and dry Douglas-fir forests and woodlands. This habitat type has been considerably degraded by exotic species, logging and fire suppression (Johnson and O’Neil 2001).

Wetland and Riparian Habitats (ORNHIC and TWC 2009): Riparian habitats are not mapped specifically in the available GIS data, but generally consist of forested areas adjacent to water resources that usually contain species adapted to moist forest conditions. Riparian areas provide many habitat features necessary for many fish and wildlife species to survive, and often serve as natural migration corridors. Wetland habitats typically contain more plant, mammal, bird and amphibian species than the surrounding upland areas (Johnson and O’Neil 2001). Wetlands are discussed in greater detail in Section 2.9.3.

Willamette Oak (NHWI 2000): Oregon white oak habitats are considered a habitat of concern and are discussed in greater detail in Section 2.9.4.3, Habitats of Concern.

2.9.2. General Habitat Descriptions by Section

Appendix A, Figure 2 shows the alignments as primarily urban and agricultural due to the scale of mapping; therefore, this Section 2.9.2 provides an overview of habitat present within each of the four sections of the preferred alignment, based on habitat mapping and the site reconnaissance.

2.9.2.1. Section 1 – WRWTP to SW 124th Avenue

Section 1 (approximately 4 miles in length) begins at the WRWTP on the Willamette River, and goes north between orchards, open fields, roads and commercial structures before briefly passing along the eastern edge of the Coffee Lake Creek floodplain. The alignment through Section 1 avoids the floodplain by following roads through the commercial area of northern Wilsonville before ending in mixed pasture and rural residential areas. The alternate route for Section 1, shown in Appendix A, Figure 2 (dashed red line) lies in this commercial area. As shown in Table 3, above, this section is mapped as having primarily urban habitats, with a small amount of forest and wetland habitat, which is concentrated in the Coffee Lake Creek area. Based on site reconnaissance, however, much of the alignment of Section 1 is more rural than what is mapped.

Inset 2 of Appendix A, Figure 2 shows a close-up of the habitat mapping near Coffee Lake Creek in order to illustrate the limitations of the available habitat mapping. In particular, an area of oaks is not mapped by available sources, but is present in the area shown in the inset. This area may be attractive for staging because it is large and open; however, oaks should generally be avoided when identifying potential areas for staging because they are a species of concern.

2.9.2.2. Section 2 – SW 124th Avenue to Cooper Mountain

Section 2 is the longest (approximately 11 miles in length) and likely the most challenging section from a natural resources perspective, since it contains significant acreage of forest, including oak forest. It begins north of the 124th Avenue Extension section, which is already in the process of being permitted and is therefore not included in this analysis. Section 2 is more rural than Section 1, and passes among farms, orchards, forest and riparian areas of small creeks before crossing the Tualatin River. North of the Tualatin River, Section 2 passes through more farms before two route alternatives split around a large mining operation west of Cooper Mountain. The section ends at SW Farmington Road.

2.9.2.3. Section 3 – Cooper Mountain to Hillsboro

Section 3 (approximately 7 miles in length) also contains significant acreage of forest habitat, though it is mapped as primarily agricultural. The alignment through Section 3 passes along the less-developed edge of Aloha before crossing Butternut Creek. It proceeds north across Tualatin Valley Highway and through the east side of Hillsboro before terminating at Highway 26. As shown in Table 3, above, impacts to Oregon White Oak Forest (NWHI 2000), which is an Oregon Conservation Strategy (OCS) habitat, are potentially greatest in Section 3 of all the sections, based on available habitat mapping.

2.9.2.4. Section 4 – Cooper Mountain to Beaverton

Section 4 (approximately 6 miles in length) leads east from near Butternut Creek, going through Aloha into Beaverton along busy roads before passing near Tualatin Hills Nature Park, crossing Beaverton Creek, and terminating near Cedar Hills Park. Section 4 occurs primarily in urban environs and along existing roads, with only a small portion of forest, wetlands and agricultural land within 100 feet of the alignment centerline. The majority of this section is constrained and lies within developed curb and gutter sections.

2.9.3. Jurisdictional Wetlands and Waterways

Table 4, below, provides a summary of wetlands and related resources within each project section. Appendix A, Figure 3 displays wetland mapping for the project, which is based on Metro's RLIS database wetlands layer. This includes a combination of National Wetland Inventory (NWI) and more detailed Local Wetland Inventory (LWI) mapping. As shown in Table 4 below and Appendix A, Figure 3, Section 1 contains the greatest acreage of mapped wetlands within the project area, while Section 2 has the least. Hydric soils and floodplain mapping acreage is also provided to supplement the Metro wetlands layer. These areas should be viewed as having the potential to have wetlands, but wetlands that were not mapped by NWI and LWI. For example, NWI mapping typically does not map wetlands in agricultural lands; thus, supplemental hydric soils and floodplain information can be used to highlight the potential for wetlands to occur in these areas. Section 2 has a considerable amount of mapped hydric soils, which indicates a high potential for wetlands in this section of the study area. Table 4 shows that the preferred alignment will cross a total of 26 streams, with the greatest number of crossings occurring in Sections 1 and 2.

Table 4: Wetlands and Related Resources within 100 feet of Alignment Centerline (in acres, except for # of stream crossings)

Habitat Type	Section				Total
	1	2	3	4	
Wetlands ¹	9	1	5	2	17
Hydric Soils ²	18	31	24	26	99
Floodplain ¹	15	11	5	5	36
Wetland Priority Sites ³	10	14	0	7	31
Stream Crossings ⁴	8	9	6	3	26

Sources:

¹ Metro 2015.

³ ORNHIC and TWC 2009.

² NRCS 2014.

⁴ USGS 2015.

Table 5, below, notes the acreage of Wetland Priority Sites for the study area. Wetland Priority Sites for the Willamette Valley were defined by the Oregon Natural Heritage Information Center and The Wetlands Conservancy (2009), and consist of areas with concentrations of important wetland habitats and opportunities for successful restoration. Sections 1, 2 and 4 all cross through Wetland Priority Sites. Table 5 provides a list of notable wetland and waterway features within each section. The phrase “notable wetland features” in this report refers to Wetland Priority Sites and other areas of large wetlands and floodplain crossings. It should be noted that all jurisdictional wetlands and waterways, not just those noted as “notable wetland features” in this report, will need to follow permitting requirements as follows: first seeking to avoid impacts, and then minimizing and mitigating impacts if they cannot be avoided.

Table 5: Notable Wetland Resources within 100 feet of Alignment Centerline

Section			
	Approx. Station	Wetland Priority Site	Description
Section 1	1-1 to 1-2W	Yes	Coffee Lake Creek wetlands/drainage system.
Section 2	2-1	Yes	Rock Creek floodplain crossing at SW Tualatin Sherwood Road. Tualatin River National Wildlife Refuge (TRNWR) is located to north and south of crossing.
Section 2	2-2.5	No	Chicken Creek and riparian area crossing. This drainage flows into a Wetland Priority Site roughly one-half mile downstream and provides hydrology to the TRNWR.
Section 2	2-3.5 to 2-4	Yes	Tualatin River crossing. Alignment along SW Roy Rogers Road runs along several units of the TRNWR, which contains large acreage of managed marshland.
Section 3	3-1.5 to 3-2	No	Overland crossing of Butternut Creek floodplain. Based on aerial photo interpretation, this area may contain substantially greater acreage of wetlands than mapped by Metro. Contains a large block of mixed upland and wetland habitats. This area is part of the South Hillsboro Master Plan.

Section			
	Approx. Station	Wetland Priority Site	Description
Section 3	3-5	No	Beaverton Creek floodplain crossing near confluence with Bronson Creek. Extensive floodplain wetlands.
Section 3	3-6	No	Rock Creek floodplain crossing near Orchard Park contains forested wetlands and relatively intact riparian habitat.
Section 4	4-4	Yes	Beaverton Creek floodplain wetlands crossing and adjacent Tualatin Hills Nature Park.

2.9.4. Species and Habitats of Concern

This section describes species and habitats of concern that are known, or suspected, to occur along the preferred alignment in order to facilitate impact avoidance and minimization, and to emphasize environmental considerations that will shape the permitting strategy and stakeholder involvement.

2.9.4.1. Methods

Specific resources were mapped within the study area, a 3,000-foot corridor centered on the proposed alignment (1,500 feet to either side of the alignment and alternatives). These resources used to document existing conditions were:

- The USFWS Species List and ODFW Species List for Washington and Clackamas Counties were used to identify the listed, proposed and candidate species that may occur within the project vicinity (USFWS 2015a, USFWS 2015b).
- The Oregon Biodiversity Information Center (ORBIC) (ORBIC 2013) database search, conducted on December 5, 2013, was used to map known locations of rare, threatened, and endangered plant and animal species within the project vicinity. Since data and records can change, a new search will be conducted as the Program progresses.
- The NWHI Willamette Valley Oak Map (NWHI 2007) was used to map oak habitat and point out areas of concern from a project perspective.
- StreamNet data maps were used to identify salmon and steelhead occurrence and habitat use within the project vicinity (StreamNet 2012).
- USFWS Critical Habitat maps were used to identify designated and proposed Critical Habitat within the project vicinity (USFWS 2014, ORBIC 2013).
- The Oregon Conservation Strategy (OCS) was used to identify special status, non-listed species and habitat (ODFW 2006). Strategy habitats in the Willamette Valley include oak woodland and savannah, riparian areas, grasslands (including Willamette Prairie) and wetlands.
- The Intertwine Alliance (2012) Regional Conservation Strategy for the Greater Portland-Vancouver Region was used to identify high value habitats.

On March 17, 2015, DEA conducted a reconnaissance of the preferred alignment to review site conditions and to “ground-truth” portions of the habitat mapping. Observations made during the reconnaissance were used to inform the following sections.

2.9.4.2. Species of Concern

Table C-3 in Appendix C, Species of Concern, was compiled using the USFWS species lists for Washington and Clackamas Counties (USFWS 2015a, USFWS 2015b), StreamNet fisheries online data (StreamNet 2012) and the ORBIC database search (ORBIC 2013). Based on these resources, the species listed in Appendix C, Table C-3 have the potential to occur in or near the study area.

The mapped results of the ORBIC database search are confidential and, therefore, not included in this document. Although the only species of concern that are known to occur within the project vicinity are fish, it is possible that other species could occur as well, especially within oak forest and larger, more intact wetlands.

Surveys may be required for federally listed species if suitable habitat may be impacted by the Program. Given the ORBIC results and apparent lack of native habitats within the project area, surveys may only be needed for Nelson's checker-mallow (Federal Threatened), which can persist in rural ditches, and streaked horned lark (Federal Threatened), which can occur in a variety of agricultural habitats. Both species are described further in the following section. If the project were to cross state lands, which is not currently anticipated, surveys for state-listed species such as Northern red-legged frog may be required.

There are no known survey requirements for non-listed species; however, where potentially suitable amphibian habitat may be impacted by the Program, it may be reasonable to conduct amphibian surveys and conduct native amphibian salvage prior to wetland impacts. While it may not be required, this effort might be appreciated by the resource agencies and other stakeholders.

Terrestrial Species of Concern

Permitting considerations for terrestrial species of concern are discussed briefly below in order to inform the overall permitting strategy.

Animals

Northern red-legged frog (NRLF): Although the closest NRLF occurrence is mapped along the Tualatin River well west of the middle of Section 2, the species has a relatively high likelihood of occurrence in the vicinity of permanent waters of stream pools, marshes, ponds and other quiet bodies of water, since they can go undetected relatively easily. However, they are likely limited to relatively intact wetland systems that do not contain large populations of bullfrogs (which could limit its presence within the project vicinity). These areas of potential presence will be noted, to the extent possible, during wetland delineations conducted for the project.

Where present, the species could be impacted by construction in wet meadows and riparian areas as well as wetlands with standing water. Surveys may be needed to determine presence, and salvage of these and other amphibians and reptiles may be appropriate in some places. This salvage, if deemed appropriate, should be coordinated with ODFW, which has provided guidance on wildlife salvage in a document that has not yet been published, but which is available upon request.

Painted turtle: This species is known to occur within two miles of Section 1. It hibernates in water, but nests on land near water, which could result in direct and indirect impacts from construction, if the species is present. Surveys may be needed depending upon the habitats that are actually impacted by the Program; however, it is difficult to confirm presence or absence of this species, even with surveys.

Western pond turtle: This species also nests on land near water, and is documented in several locations east of the project vicinity in Beaverton and Tigard, as well as within one-half mile of Section 1 within the Coffee Lake Wetlands. It can exist in urban areas, and could be present along much of the Tualatin River and its tributaries since it can go undetected relatively easily. Surveys may be needed depending upon the habitats that are actually impacted by the Program, and wildlife passage may be important for this species given its proximity to the Program.

Bald eagle: A known nest occurs within one-quarter mile of Section 2, although undocumented nests could occur in large trees, especially along rivers. If an occupied nest is present within sight or sound of the Program, seasonal restrictions on construction may be required. This is discussed in greater detail in Section 2.9.8, which describes natural resource-related schedule considerations.

Streaked horned lark: Agricultural fields or other areas that are maintained for short vegetation and bare ground may provide suitable habitat for the streaked horned lark. The species is not known to occur near the Program, but can move around areas of suitable habitat, even in the breeding season, and their use of agricultural and other disturbed areas makes habitat assessment difficult. Their presence is somewhat unlikely given estimates of low population in the area: Pearson and Altman (2005) estimated only 398 birds present in the Willamette Valley. Although the authors note that these numbers should be used cautiously as population estimates, they give an indication of the current size of populations known within the Willamette Valley. Importantly, methods to assess habitat for the species are currently being developed. In 2014, DEA contacted the USFWS (Cat Brown), and the agency has offered to work closely with the Program to facilitate habitat assessment for the streaked horned lark.

The following is excerpted from Pearson and Altman (2005) to provide more specific habitat characteristics for the Willamette Valley for this species:

Breeding Habitat – Willamette Valley

- Large expanses of herbaceous dominated habitat (cultivated grass fields, moderate to heavily grazed pasture, fallow fields, and roadside shoulders), Christmas tree farms and wetland mudflats
- Dominated by short grasses (0 to 6 inches)
- Relatively high percentage of bare ground (17%) for territories
- A higher percentage cover of bare ground (31%) for nest sites

Breeding Season Foraging Habitat – Willamette Valley

- Recently plowed or burned fields
- Row crops and vegetable fields with dirt rows between vegetation

Winter Habitat – Willamette Valley

- High percentage of bare ground (sites with flocks of greater than 20 birds averaged greater than 85% bare ground) and large expanses of treeless area. Most birds use agricultural fields, particularly rye grass fields with sparse ground cover.
- Winter habitats used in the Willamette Valley are very unusual with respect to characteristics of dominant land cover. Larks are using fields that have apparently been fallow for a few months. The fields have sparse, patchy, weedy cover with very little rye grass. Occasionally they are found in annual rye grass fields with sparse cover, but more typically they avoid those fields. Perennial rye grass is almost universally avoided during winter.

Fender's blue butterfly: Although most native habitat has been removed within the project area, Fender's blue butterfly is known to occur at Hagg Lake, which lies more than 10 miles west of the Program. Since it requires Kincaid's lupine for reproduction, surveys for plants would also indicate whether the species could be present.

Oregon giant earthworm: The species was last observed prior to 1985 near Aurora and is not likely to be present in the project area. Since it has no federal or state status, no surveys are likely to be required.

Townsend's big-eared bat: The species is known to occur in one location east of the Program in Tigard, near Section 2; this location is likely under a bridge, based on ORBIC records. When construction is anticipated near bridges surveys for this species may be required.

Plants

Nelson's checker-mallow: The species can persist in ditches and small remnants of native prairie, which could be present within the project vicinity, although most native prairie habitat has likely been removed or is highly degraded. No native prairie remnants were noted within view of the roadway alignments during the site reconnaissance conducted by DEA on March 17, 2015; however, surveys for Nelson's checker-mallow and other plant species may need to be conducted in less-disturbed grassy areas, depending upon the habitats that are actually impacted by the Program.

Kincaid's lupine: Since the presence of native grassland habitat is unlikely within 100 feet of the preferred alignment, Kincaid's lupine is not likely to occur. However, surveys may need to be conducted in less disturbed areas. This species is known to occur at Hagg Lake, which is more than 10 miles from western edge of the Program.

Thin-leaved peavine: Although most native habitat has been removed within the project area, thin-leaved peavine is present in several places very close to Section 2 near Cooper Mountain, and may also be present in other areas, especially in the vicinity of oak habitat. It has no federal or state status, but could be surveyed in conjunction with other plant surveys, if they are required.

Water howellia: Vernal freshwater wetlands that are not dominated by weeds are rare or absent from the project area. Such wetlands should be documented during the wetland delineation and, if present, specific survey for the water howellia may be needed.

White rock larkspur: Although most native habitat has been removed within the project vicinity, the species is present in several places within the project vicinity north and west of Section 1, and east of Section 2 in the Cooper Mountain Nature Park. It occurs primarily on rocky ground, and it has no federal or state status.

Willamette daisy: Although unlikely to occur, if undisturbed bottomland or remnant upland prairie is present, the Willamette daisy may be present within the project vicinity. Surveys should be conducted if this habitat is impacted by the Program.

Fungi

Amanita (novinupta) mushroom: The species was last observed in one location in 1992 (in a landscaped area under an oak tree) near the eastern end of Section 4. It has no federal or state status.

Aquatic Species of Concern

Permitting considerations for aquatic Species of Concern (SOC) are discussed briefly below in order to inform the overall permitting strategy. Appendix A, Figure 4-1 shows mapped fish distribution and selected culverts and dams present within waterways. The species of concern that occur in the project vicinity include coho salmon and steelhead in the Tualatin River and Chinook salmon, steelhead and Pacific lamprey in the Willamette River. Critical Habitat for Chinook salmon and steelhead is mapped in

Figure 4-1 within the Willamette River at the location of the WRWTP. Willamette River coho salmon are not known to be a species native to the Willamette River basin but are an artifact of hatchery releases.

As shown in Appendix A, Figure 4-1, Section 2 contains the greatest number of crossings with aquatic SOC, including crossings of the Tualatin River and a few of its tributaries. Willamette River coho and Pacific lamprey are present, but are not listed federally or by the State of Oregon, and are therefore not addressed further at this time (though they will be considered in project design and permitting along with the listed aquatic species).

During site reconnaissance on March 17, 2015, DEA noted several creeks that may be candidates for trenching rather than using trenchless technology, due to their small size and potential for low flows during the dry season. However, more information about existing ROW, the need for replacement of existing culverts, and other site characteristics and constraints will be required before this concept can be pursued further. When more information is available, DEA will attempt to identify potential trenched crossings during the wetland delineation to be conducted for the Program.

Chinook salmon (Upper Willamette River Evolutionarily Significant Unit [ESU], spring run): Chinook salmon occur year-round within the Willamette River, using the lower river as a migratory corridor and juvenile rearing habitat. Section 2.9.6, Impact Avoidance and Minimization, provides BMPs for avoiding impacts to fish habitat, and pipeline construction in the larger streams where the species occurs will likely be accomplished by using trenchless technology, thereby avoiding direct impacts. Additional permitting considerations for listed fish will be provided in the BA that will be prepared for the Program, which will include potential modifications to the WRWTP intake.

Steelhead (Upper Willamette River ESU, winter run): Steelhead occur within the Willamette River, the Tualatin River and several tributaries in the project vicinity. Steelhead use the lower Willamette River and the Tualatin River as a migratory corridor and juvenile rearing habitat, and will spawn in tributary habitats. The mainstem Tualatin River does not currently support spawning habitat for steelhead (ODEQ 2001).

California floater (mussel): The species exists within the Tualatin River and several tributaries in the project vicinity. However, impacts would likely be indirect in nature, and could potentially be avoided through the use of BMPs during construction.

Olympia pebblesnail: The species exists within the Willamette River. However, impacts would likely be indirect in nature, and could potentially be avoided through the use of BMPs during construction.

Western ridged mussel: The species exists within the Tualatin River and tributaries in the project vicinity. However, impacts would likely be indirect in nature, and could potentially be avoided through the use of BMPs during construction.

2.9.4.3. Habitats of Concern

Critical Habitat for Chinook salmon and steelhead is mapped in Appendix A, Figure 4-1 within the Willamette River at the location of the WRWTP. No other Critical Habitat is mapped within the project vicinity, but the habitats of concern discussed below are present.

The Oregon Conservation Strategy Habitats

The OCS charts a course for the long-term conservation of Oregon's fish and wildlife. It identifies how all Oregonians can become involved through a non-regulatory, statewide approach to conservation. ODFW staff led development of the OCS and worked with a diverse coalition of Oregonians including scientists, conservation groups, landowners, extension services, anglers, hunters, and representatives from agriculture, forestry and rangelands.

The OCS emphasizes the proactive conservation of declining species and habitats to reduce the possibility of future federal or state listings and regulations. It is a strategy for all of Oregon, offering potential roles and opportunities for residents, agencies and organizations. It establishes the basis for a common understanding of the challenges facing Oregon's fish and wildlife and provides a shared set of priorities for addressing the state's conservation needs.

Table 6 provides a list of OCS habitats present in or near the project vicinity and a selection of species that occupy those habitats, which may be of concern to stakeholders as the Program progresses. This table includes many of the species discussed in the previous section, as well as a few more common species that can benefit from conservation planning during the development of the Program, such as acorn woodpecker, purple martin and western bluebird. Native prairie is not known to occur in the project vicinity and is therefore omitted from Table 6.

Table 6: Selected Oregon Conservation Strategy (OCS) Species and Associated Habitats in or near the Project Vicinity

OCS Habitat	OCS Species
Oak Woodland/Savannah	Acorn woodpecker (<i>Melanerpes formicivorus</i>)
	Chipping sparrow (<i>Spizella passerina</i>)
	Common nighthawk (<i>Chordeiles minor</i>)
	Hoary bat (<i>Lasiurus cinereus</i>)
	Nelson's sidalcea (<i>Sidalcea nelsoniana</i>)
	Pallid bat (<i>Antrozous pallidus</i>)
	Slender-billed (white-breasted) nuthatch (<i>Sitta carolinensis aculeata</i>)
	Western gray squirrel (<i>Sciurus griseus</i>)
	White rock larkspur (<i>Delphinium leucophaeum</i>)
Riparian	American grass bug (<i>Acetropis americana</i>)
	Little willow flycatcher (<i>Empidonax traillii brewsteri</i>)
	Western blue bird (<i>Sialia mexicana</i>)
	Western purple martin (<i>Progne subis</i>)
	Yellow-breasted chat (<i>Icteria virens</i>)

OCS Habitat	OCS Species
Wetlands	Dusky Canada goose (<i>Branta canadensis occidentalis</i>)
	Water Howellia (<i>Howellia aquatilis</i>)
	Northern red-legged frog (<i>Rana pretiosa</i>)
	Short-eared owl (<i>Asio flammeus</i>)
	Western painted turtle (<i>Chrysemys picta belli</i>)
	Willamette floater (freshwater mussel) (<i>Anodonta wahlametensis</i>)

Oregon White Oak woodland is an OCS habitat that is present in several locations (and in various stages of disturbance) along the preferred alignment. It should be noted that the oak class, as mapped, includes a variety of subclasses that cannot be mapped at the scale of this assessment. They include a range of percent cover by oak and other species. Inset 1 on Figure 2 shows a close-up of the habitat mapping near Chicken Creek in order to show an area where oak habitat was mapped close to the preferred alignment. Given site constraints on the east side of the preferred alignment, it may be necessary to impact habitat west of the road, where oak habitat is mapped (in purple) close to the roadway. Fortunately, based on the site reconnaissance, within the area that may be impacted, no oaks were present, so this resource can likely be avoided.

As shown in Appendix A, Figure 2, oak woodland is also mapped near the intersection of Sections 3 and 4 along Butternut Creek. Unless using trenchless technology under the creek and oak habitat is planned, impacts to oak habitat may occur here; however, it may be possible to route the pipeline through oak forest mapped habitat without direct impacts to oak and to improve habitat conditions through removal of Douglas-fir or other species that out-compete oak. It is important to note that the Butternut Creek area is currently being developed as part of a master plan for a residential project. The preferred alignment follows a future extension of SW Cornelius Pass Road, and that project will provide a detailed analysis of the issues described above.

During the DEA site reconnaissance, it was also noted that several areas of scattered oaks or oak forest were present along Section 3, but were not mapped by available sources. It is likely that these patches of oak would be addressed in the tree ordinances, by jurisdiction, and it may be worthwhile to identify the location of these trees during the early stages of refinement of the alignment in order to avoid impacts that may otherwise be overlooked until later in the process. Other than oak woodland, OCS habitats of concern include wetlands and streams, which are addressed in Section 2.9.3 – Wetlands and Waterways.

Regional Conservation Strategy Habitats

In 2010 the Intertwine Alliance launched the Regional Conservation Strategy (RCS) as a way to achieve the creation of “a bi-state regional biodiversity recovery and management plan that would, among other goals, identify significant natural areas for acquisition and protection, develop innovative strategies to conserve the region’s natural resources, and ensure that large and small refugia are interconnected in every neighborhood and watershed in the region.”

The vision calls for specific outcomes that would result in the protection of a diversity of habitat types, plants, and animals across the urban and rural landscape; acquisition, restoration and management of habitat connectivity for fish and wildlife; and long-term protection of the ecological integrity of streams, wetlands, rivers and floodplains.

The RCS High Value Habitat mapping is shown in Appendix A, Figure 4-2 in order to help inform the WWSP about the high value habitats in the project vicinity and focus conservation efforts where they are most useful. The highest-value habitats are shown in purple in Figure 4-2. These habitats are scattered throughout the preferred alignment, but occur in larger blocks in Section 1 and in Sections 2 and 3 near Cooper Mountain. High value riparian habitats are shown in blue, and generally overlap the other mapped high value habitats.

Inset 1 on Figure 4-2 in Appendix A shows high value forested habitat that occurs northwest of Cooper Mountain, south of the intersection with SW Farmington Road at the north end of Section 2. Based on a site reconnaissance, this habitat consists of mid-mature native Douglas-fir forest with a primarily native understory, and is correctly mapped as high value habitat on Figure 4-2. It may be difficult to avoid this habitat given the site constraints of a narrow roadway, unless the road could be closed during portions of construction.

Inset 2 on Figure 4-2 in Appendix A shows high value forested habitat that occurs adjacent to the portion of Section 1 that follows the narrow Garden Acres Road. It too consists of mid-mature native Douglas-fir forest with a primarily native understory. Site constraints may make it difficult to avoid this habitat unless the preferred alignment stays within the roadway, which may impact resident access, or is shifted to the east side of the road, which may conflict with overhead power lines. These challenges will be investigated in greater detail as the Program progresses.

2.9.5. Other Important Natural Resources

Previous sections described resources typically regulated and protected at the federal and state level. Local land use ordinances afford additional protections to these resources. Although some local ordinances simply point to federal and state regulations, others often explicitly call out the need for the protection of natural resources, such as providing riparian buffers around streams and wetlands. Different jurisdictions may refer to these buffers by different names (for example, CWS refers to these buffers as vegetated corridors) and have different criteria to define these corridors. Generally speaking, the buffer width is defined by the type of resource being protected (wetland, perennial stream, intermittent stream, etc.) and whether or not steep slopes (i.e., slopes greater than 25%) occur adjacent to the resources. Typical riparian buffer widths range from 25 to 200 feet.

In addition to riparian resources, some jurisdictions also have protections for important upland habitats, with each municipality providing different naming conventions for such resources. Figure 5 in Appendix A shows Metro mapping of upland and riparian wildlife habitats. Upland habitat is classified as Class A to Class C, higher value to lower value, respectively. Riparian habitat is classified as Class I to Class III, higher to lower value, respectively. This mapping overlaps with much of the habitats previously covered in other sections of this report and also overlaps with much of the area likely to be included in local habitat protection ordinances. Additional detail about natural resource land use requirements is also provided in Section 4, Land Use Authorizations.

In addition to regulated resources, the proposed alignment passes by a number of parks and open spaces mapped by Metro. These are shown and listed in Appendix A, Figure 5. A number of these parks might provide important habitats for the various species of concern discussed in this section, in addition to providing habitat for more common urban wildlife species found in the area. Some of the larger protected areas in the project vicinity include the TRNWR, the Cooper Mountain Nature Park and the Tualatin Hills Nature Park.

2.9.6. Impact Avoidance and Minimization

Impact avoidance and minimization measures need to be taken into consideration during both the design and construction phases of the WWSP. These measures would first pursue avoidance of impacts, followed by minimization of impacts. If impacts are unavoidable, the agencies would then consider mitigation for impacts.

2.9.6.1. Design Phase

Impacts to biological and cultural resources should be avoided or minimized during design by reducing:

- Project footprints, especially near known occurrences of listed species and Critical Habitat, sensitive habitats, wetlands and cultural sites.
- Direct impacts to streams and aquatic habitats.
- Impacts to the existing hydrologic regime of the area. This can be especially important when new roads bisect existing wetlands, as could be the case on road partnering projects.

2.9.6.2. Construction Phase

Construction may cause temporary disturbance, displacement or injury to fish and wildlife as a result of habitat removal or degradation, grading, vegetation impacts, hydrologic changes, water quality changes, elevated noise during construction, or visual disturbance. ODOT developed Standard Specifications for Construction (2015) to meet federal, state and local regulations, and these can provide a useful template for the WWSP. These specifications outline BMPs that can be implemented to avoid and minimize impacts to natural and cultural resources. The following ODOT Environmental Protection Standard Specifications (Section 00290) may apply to the construction of the WWSP:

Protection of Fish, Wildlife and Plant Habitat

- Perform work within regulated work areas only within the regulated in-water work windows (which are listed in Section 2.9.8). Do not allow equipment to enter any waters of the State or U.S., or the regulated work area except as allowed in permits issued for the project.
- The following operations are prohibited, unless allowed by permit:
 - Disturbing spawning beds.
 - Obstructing stream channels.
 - Impeding adult and juvenile fish passage, including intermittent streams.
- The work area must be isolated from the water during construction. All structures and materials used to isolate the work area must be removed immediately following construction and water flow returned to pre-construction conditions. All fish must be salvaged from the isolated area in accordance with ODFW requirements.
- Comply with the Migratory Bird Treaty Act (MBTA), which protects most species of birds in Oregon and prohibits the removal of nests containing eggs and dependent young. If migratory bird nests are encountered that contain eggs or dependent young, stop all actions that may disrupt the nest. Pigeons, house sparrows and starlings are not covered under the MBTA.
- Plant habitats to be protected will be shown on the plans as “No Work” areas. The areas will be fenced or flagged before staging any equipment or starting work near the site or sites. Avoid destruction of plant habitats by ensuring that construction personnel, equipment and associated pollutants, including sediment, chemical contaminants, discharge water, and non-native grass and seed do not enter the habitat.

Protection of Wetlands and Waters of the State or U.S.

- Protected wetlands and other jurisdictional waters of the State or U.S. will be identified as “No Work” areas on the plans. The protected areas will be fenced or flagged before staging any equipment or starting work near the site or sites.

Pollution Control Measures

- Comply with erosion prevention and sediment control requirements and all applicable ODEQ National Pollutant Discharge Elimination System (NPDES) 1200 Permit requirements.
- During construction, monitor in-stream turbidity and inspect all erosion controls daily during the rainy season and weekly during the dry season, or more often as necessary, to ensure that the erosion controls are working adequately to meet treatment requirements. Do not cause turbidity in waters of the State or U.S. greater than 10% above background reading (up to 100 feet upstream of the Program), as measured 100 feet downstream of the Program.
- Implement containment measures adequate to prevent pollutants or construction and demolition materials, such as waste spoils, fuel or petroleum products, concrete cured less than 24 hours, concrete cure water, silt, welding slag and grindings, concrete saw cutting by-products and sandblasting abrasives, from entering waters of the State or U.S.

- Store construction equipment, materials and debris in a manner that prevents contamination of water and soil, and prevent fugitive dust. Locate areas for storing fuels and other potentially hazardous materials, and for parking, refueling and servicing mobile equipment at least 150 feet away from any waters of the State or U.S. or any storm inlet, unless spill containment systems designed to completely contain potential spills are provided.
- Establish truck staging areas for diesel-powered vehicles where truck emissions have a minimum impact on sensitive populations such as residences, schools, hospitals and nursing homes.

Drilling, Boring or Jacking

- Design, build and maintain facilities to collect and treat all construction and drilling discharge water using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present. An alternative to treatment is collection and proper disposal off-site.
- Isolate drilling operations from wetted stream to prevent drilling fluids from contacting waters of the State or U.S.
- If drilling fluid or waste is released to surface water, wetland or other sensitive environment, cease all drilling pending written approval from appropriate regulatory agencies, through the project manager, to resume drilling.
- Recover, recycle, or dispose of all drilling fluids and waste to prevent entry into flowing water.

Protection of Cultural Resources

- Cultural resources may include but are not limited to dwellings, bridges, trails, fossils and artifacts.
- Known cultural resources will be protected and shown on the plans as “No Work” areas. The protected areas will be fenced or flagged before staging any equipment or starting work near the site or sites.
- If a previously undiscovered sensitive cultural site is found, immediately cease all activities at that site. Protect the cultural resource from disturbance or damage.
- Protection of cultural resources is addressed further in Section 4, Cultural Resources Review.

2.9.7. Potential Mitigation Requirements and Opportunities

Mitigation will typically be required for permanent impacts to regulated resources, and some local jurisdictions may also require mitigation for temporary impacts. Whether or not mitigation is required, all temporarily disturbed areas will be restored to pre-project conditions to the extent reasonably feasible. Often, removal of invasive species is a requirement for the restoration of disturbed areas. Also, in areas where pipeline construction will require the removal of native forest or shrub vegetation, and when similar vegetation cannot be replanted over the buried pipeline (i.e., due to concerns about tree roots or maintenance access), some jurisdictions may view this as a permanent impact that requires mitigation.

Mitigation requirements are detailed in the various environmental rules and regulations that cover the resources within the project vicinity. Generally speaking, these can be grouped into the following categories: (1) wetlands, (2) streams, (3) wetland and stream buffers, and (4) species-specific mitigation for impacts to listed and sensitive species. An overview of mitigation requirements and opportunities for each resource category is provided below. In addition to the agencies specifically mentioned below as having regulatory authority, ODFW will have the opportunity to comment on permit applications. Thus, it is generally beneficial to seek comment from ODFW when mitigation concepts are first being developed. Coordination with other regional conservation entities, such as Metro, Tualatin Riverkeepers and others, may also be beneficial in identifying mitigation opportunities.

2.9.7.1. Wetlands

Wetland impacts and associated mitigation are regulated by the USACE and the Oregon DSL. Wetland mitigation opportunities can occur in the form of on-site mitigation, off-site mitigation and purchase of wetland mitigation bank credits. If on-site or off-site mitigation is conducted, then mitigation-to-impact ratios typically follow DSL rules, which apply a one-to-one ratio for wetland restoration (i.e., former wetlands restored to functioning wetland), a 1.5-to-one ratio for wetland creation (i.e., upland areas converted to wetland) and a three-to-one ratio for wetland enhancement (i.e., improving hydrology and habitat components of existing wetlands). In recent years, wetland enhancement has generally been viewed as less desirable than wetland restoration or wetland creation by the agencies. An exception to this current view would be with respect to the conversion of agricultural wetlands (plowed fields) back to natural wetlands. Preservation of very high quality wetlands is also sometimes used, but it often requires a very high ratio, such as ten to one, and is often viewed as an option of last resort by the agencies.

Two wetland mitigation banks are currently available that could cover potential wetland impacts. The Tualatin Environmental Bank covers potential impacts that may occur within the Tualatin River basin (Sections 2, 3 and 4), while the Mud Slough Bank covers potential impacts that may occur within the Coffee Lake Creek subbasin that drains directly to the Willamette River (Section 1). Use of a wetland mitigation bank is often the easiest and most convenient wetland mitigation method for a project proponent. With a bank, the project does not need to acquire additional property or design a mitigation site, which includes a variety of due diligence efforts such as geotechnical, cultural resource, wetland delineation and functional assessment, and other studies. Banking also means that the project does not need to construct the site or monitor it for a minimum of five years, with no guarantee of success at the end of the five years.

Credits for mitigation banks are currently being sold for approximately \$87,000 and \$170,000 per acre at the Mud Slough and Tualatin Environmental Banks, respectively (based on early 2015 pricing information). These costs typically increase from year to year, based in part on demand and surrounding real estate values. This cost provides the convenience and security of mitigation banks described above. However, if a project has access to large areas of habitat that is suitable for mitigation, and wants to retain such habitat for educational or political purposes, it should weigh the costs and benefits of mitigation banking versus on-site wetland mitigation completed by the project.

2.9.7.2. Streams

Similar to wetlands, streams are regulated by USACE and DSL. However, the NMFS may also have requirements for mitigation if streams with listed fish species are affected. Guidance regarding stream mitigation requirements is less well defined than guidance regarding wetland mitigation requirements. Typically, however, stream mitigation will be required for permanent impacts to stream reaches and would likely require a minimum of a one-to-one ratio of linear feet of stream mitigation to stream impact. Mitigation may take the form of adding sinuosity to channelized stream reaches, improving in-stream habitat structure and potentially improving riparian conditions directly adjacent to stream banks. Temporary impacts likely would not require mitigation, but they would still require that the temporarily disturbed channel and riparian areas be restored to pre-project conditions or better. It is anticipated that the majority of the Program's potential stream impacts would occur from open trench cutting, and would be considered temporary. If such revegetation is required, it may make sense politically to provide additional mitigation in places. This approach would also help to ensure the success of the restoration, which may require some degree of monitoring to confirm it is successful. DSL requires three years of monitoring for temporary impacts to riparian habitat, but USACE and NMFS do not have specific requirements beyond the typical one-year plant establishment period.

2.9.7.3. Wetland and Stream Buffers

Local municipalities and utilities, including CWS, have a variety of requirements for mitigating impacts to wetland and stream buffers. All municipalities will likely require restoration of these buffers as a result of temporary impacts. Some may view removal of forested or dense native shrub vegetation as a permanent impact if similar vegetation cannot be planted over the top of the buried pipeline. When mitigation is needed, it usually consists of widening an existing buffer beyond the required width and planting with a native forested plant community. Some municipalities may allow improvements to existing buffers, such as the removal of invasive plant species and replanting with native species, to be used as a means of mitigation. Interpretation of local ordinances often varies widely, and therefore it is often beneficial to confirm mitigation approaches with the local authority before proceeding too far into the design process. The minimum mitigation ratio is typically one square foot of mitigation for one square foot of impact; however, some municipalities require a greater mitigation ratio the farther the mitigation is from the impact site.

2.9.7.4. Listed and Sensitive Species

Required mitigation for impacts to listed and sensitive species will be dependent on the species being impacted, but may often be covered by other mitigation actions. For example, impacts to listed fish resulting from habitat degradation would likely be covered by mitigation and site restoration requirements associated with impacts to streams and associated buffers as described above. Mitigation requirements are generally not well defined and therefore require close and early coordination with the associated resource agencies.

2.9.8. Natural Resource-related Schedule Considerations

2.9.8.1. In-water Work Windows

The 2008 ODFW preferred in-water work guidelines for the proposed pipeline alignment are shown in the list below. The preferred work period applies to the streams identified by name, their upstream tributaries, and associated reservoirs and lakes. These water resources are shown in Appendix A, Figure 3 and discussed in Section 2.9.3. The time periods were established by ODFW's district fish biologists to avoid vulnerable life stages of anadromous and other game fish; and threatened, endangered, or sensitive species. The vulnerable life stages of these fish include migration, spawning and rearing. The 2008 ODFW preferred in-water work guidelines are:

- Willamette River (Willamette Falls to Newberg): June 1–October 31 and December 1–January 31
- Other Willamette River tributaries: July 15–September 30
- Tualatin River (below Scoggins Creek): June 1–September 30
- All Tualatin River tributaries: July 15–September 30

2.9.8.2. Migratory Bird Treaty Act Compliance

The MBTA protects most bird species in Oregon and makes it illegal to injure or kill migratory birds, including disturbance of active nests (those containing eggs or chicks). To be in compliance with the MBTA, it is recommended that all vegetation, including shrubs, be removed and cleared from a project site outside of the nesting season. The *Terrestrial Ecology Enhancement Strategy Guidance: Avoiding Impacts on Nesting Birds during Construction and Revegetation Projects* prepared by the City of Portland Environmental Services (2010) can provide a useful template for the WWSP.

Nesting Season: The nesting season can be divided into two major time frames:

- **Early Nesting Season:** February 1–April 15
Raptors (owls, eagles, falcons and hawks), herons, geese and hummingbirds are early nesters. Great-horned owls are exceptionally early nesters and may lay eggs in January. Many early nesters have longer breeding cycles and most will not complete breeding until June or July.
- **Primary Nesting Season:** April 15–July 31
This includes songbirds and the majority of species. Willow flycatchers are late nesters, whose nesting season often extends to the end of August.

2.9.8.3. Bald and Golden Eagle Protection Act Compliance

Bald eagles are protected under the Bald and Golden Eagle Protection Act. An active bald eagle nest was identified in ORBIC in the vicinity of the pipeline alignment near the Tualatin River. The nesting season for bald eagles can vary depending on weather but generally occurs between December and August. The entire breeding cycle, from initial activity at a nest through the period of fledgling dependency, is about six months. The TRNWR may have more specific nest timing for this site. During the roadway design phase of the Program, a biologist should confirm whether any other active nests occur within the buffers described below by scanning the tree line.

To avoid disturbing nesting bald eagles, USFWS recommends maintaining natural forested or established vegetative buffers around nest trees, and avoiding certain activities during the nesting season. The following buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. To avoid the non-purposeful take of bald eagles or their young, USFWS recommends the following:

For construction activities within line-of-sight of the nest:

1. Maintain a buffer of at least 660 feet (200 meters) between your project activities and the nest (including active and alternate nests). If a “similar activity” (defined in the Bald and Golden Eagle Protection Act) is closer than 660 feet, then you may maintain a distance buffer as close to the nest as the existing tolerated activity.
2. If you perform your activity closer than 660 feet due to a similar activity existing closer than 660 feet, then restrict all clearing, external construction and landscaping activities within 660 feet of the nest to outside of the nesting season.

For construction activities with visual buffer:

1. Maintain a buffer of at least 330 feet (100 meters) between your project activities and the nest (including active and alternate nests). If a “similar activity” is closer than 330 feet, then you may maintain a distance buffer as close to the nest as the existing tolerated activity.
2. Restrict all clearing, external construction and landscaping activities within 660 feet of the nest to outside of the nesting season.

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3. Land Use Review

As part of the Preliminary Design Phase of the Willamette Water Supply Program (WWSP or Program), The Tualatin Valley Water District (TVWD) and the City of Hillsboro (Hillsboro) (the Partners) evaluated the land use authorizations likely to be required for successful implementation of the WWSP. This section describes: (1) the key steps for the land use authorizations, (2) the regulatory context for the land use authorizations, (3) local land use permitting requirements, and (4) a land use analysis of the preferred pipeline alignment.

3.1. Key Steps for Land Use Authorizations

This section outlines the key steps for a successful land use authorization process. The results of these steps will provide the background and the required information to complete the necessary land use permit applications. Policy compliance will be documented as part of the following steps, and materials will be prepared for public presentation and required hearings.

1. **Public Involvement:** Ongoing public involvement and outreach, including local agency meetings, through all phases of the Program, as outlined in the WWSP communication values (see Section 1.2).
2. **Program Planning Process Documentation:** Development of project goals, purpose and need, feasibility analysis, evaluation criteria, alternatives analysis and design decisions, and public involvement documentation show how the Program followed a coordinated public planning process.
3. **Adoption of Program into Jurisdictional Plans:** Planning documents are used as a framework to coordinate the interrelated functional and natural systems and activities relating to the use of lands, including but not limited to sewer and water systems, transportation systems, educational facilities and recreational facilities. Therefore, having the WWSP included in adopted public facilities plans, master plans, or similar plans (e.g., the Washington County Transportation System Plan [TSP], City of Wilsonville Water Master Plan and City of Sherwood Water Master Plan) will help to coordinate and maximize the use of land, including right-of-way (ROW), for the benefit of the community.
4. **Environmental and Construction Best Management Practices (BMPs):** To limit potential impacts to the community and resources, the design will stay within the ROW to the maximum extent practicable. Resource and zoning mapping and continual coordination with local jurisdictions and agencies will provide guidance about where potential areas of community impact could occur. BMPs for erosion control, implementing project phasing, and incorporating other measures into design and construction can further limit impacts. For a description of construction-related BMPs that will minimize impacts, see Section 2.9.6.
5. **Consistent Templates for Permitting:** Local jurisdictions may receive more than one application for the WWSP. Program templates for permitting can provide consistency and clarity, and can make the review process easier and potentially quicker, and will also help ensure consistent decision-making between jurisdictions.

3.2. Land Use Authorizations – Context and Applicable Policies and Regulations

3.2.1. Regulatory Context

This section provides a regional and state regulatory framework for the WWSP and for land use permitting for implementation of the WWSP. The applicable state and regional plans and regulations are as follows:

Statewide Planning Goal 1, Citizen Involvement: The purpose of Goal 1 is to develop a citizen involvement program that ensures the opportunity for citizens to be involved in all phases of the planning process. Local jurisdictions implement Goal 1 through a variety of measures that require citizen input at every level of the planning process, from the adoption of a comprehensive plan to a local review process of a specific development permit. Section 1.2 describes additional opportunities for public input into the WWSP, furthering the intent of Goal 1.

Statewide Planning Goal 2, Land Use Planning: The purpose of Goal 2 is to establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to ensure an adequate factual base for such decisions and actions. Any land use permitting decision at the local level will have to be based on the local jurisdiction's regulations in place at the time of the permitting, and will have to be supported by an adequate record.

Statewide Planning Goal 3, Agricultural Lands: The purpose of Goal 3 is to preserve and maintain agricultural lands. Oregon Revised Statutes (ORS) 215.213, 215.283 and 215.275 contain specific requirements for developing non-farm uses such as the WWSP on agricultural lands. The Land Conservation and Development Commission has also promulgated rules implementing those statutes.

Local jurisdictions implement Goal 3 statutes and rules through adopting Exclusive Farm Use (EFU) zoning and standards into their zoning and development code as applicable for areas outside Urban Growth Boundaries (UGBs). Local land use development permits are then required to document consistency with those statutes, rules and local regulations.

ORS 215.275 - Utilities Necessary for Public Service: Meeting the requirements of this statute means that a project must demonstrate that it is necessary to locate the utility facility on resource land. Cost may be considered as a factor, but it cannot be the only factor for consideration and is not one of the six key factors described in (2) below:

(1) A utility facility established under ORS 215.213 (1)(c)(A) or 215.283 (1)(c)(A) is necessary for public service if the facility must be sited in an exclusive farm use zone in order to provide the service.

(2) To demonstrate that a utility facility is necessary, an applicant for approval under ORS 215.213 (1)(c)(A) or 215.283 (1)(c)(A) must show that reasonable alternatives have been considered and that the facility must be sited in an exclusive farm use zone due to one or more of the following factors: (a) Technical and engineering feasibility; (b) The proposed facility is locationally dependent. A utility facility is locationally dependent if it must cross land in one or more areas zoned for exclusive farm use in order to achieve a reasonably direct route or to meet unique geographical needs that cannot be satisfied on other lands; (c) Lack of available urban and nonresource lands; (d) Availability of existing rights of way; (e) Public health and safety; and (f) Other requirements of state or federal agencies.

(3) Costs associated with any of the factors listed in subsection (2) of this section may be considered, but cost alone may not be the only consideration in determining that a utility facility is necessary for public service. Land costs shall not be included when considering alternative locations for substantially similar utility facilities. The Land Conservation and Development Commission shall determine by rule how land costs may be considered when evaluating the siting of utility facilities that are not substantially similar.

Oregon Administrative Rule (OAR) 660-033-0130(16) incorporates the same requirements as those set forth in ORS 215.275. That administrative rule, however, imposes an additional requirement and requires a local jurisdiction to impose clear and objective conditions to mitigate and to minimize the impacts of a proposed facility, if any, in order to prevent a significant change in accepted farm practices or a significant increase in the cost of farm practices on surrounding farmlands.

Goal 5, Natural Resources, Scenic and Historic Areas, and Open Spaces: (See the discussion of Metro Functional Plan, below.)

Goal 7, Areas Subject to Natural Hazards and Federal Emergency Management Agency (FEMA) regulations: The National Flood Insurance Program (NFIP) provides minimum standards for floodplain management that ensures that individuals and businesses in participating local jurisdictions are able to purchase federally backed flood insurance and implement Goal 7. Floodway and floodplain mapped areas are implemented as overlay zones in local jurisdictions. Development in floodplains requires floodplain development permits. Depending on the development type, required documentation may include: elevation certificate, flood-proofing certificate, demonstration of balanced cut and fill, and certification of no net rise.

Goal 11, Public Facilities and Services OAR 660-015-0000(11): The purpose of Goal 11 is to “plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.” Goal 11 has specific requirements related to the development of a Public Facilities Plan to ensure the timely, orderly and efficient provision of public facilities and services in urbanizing areas.

Goal 14, Urbanization OAR 660-015-0000(14): The purpose of Goal 14 is “[t]o provide for an orderly and efficient transition from rural to urban land use.” This purpose is accomplished through UGBs that are established to identify and separate land that can be urbanized from rural land to control sprawl, preserve valuable resource lands, and promote the coordinated and logical provision of public facilities and services in the UGB. The WWSP is located both in and just outside of the western Portland Metropolitan UGB, but will only serve those areas inside the UGB. As the regional governmental entity, Metro has the responsibility for establishing and managing the UGB in order to accommodate urban growth in the region for the next 20 years. Metro expanded the UGB in 2011 to include portions of the study area, including South Hillsboro and South Cooper Mountain. Future expansions of the UGB are possible prior to the time the WWSP or sections of the WWSP seek land use approval. Following a UGB expansion, a particular parcel may end up with different zoning or be annexed into a different jurisdiction, and these potential changes should be monitored.

Metro Urban Growth Functional Plan: The Metro Functional Plan is a regional functional plan that contains requirements, which are binding on cities and counties of the region, as well as recommendations, which are not binding, to implement the regional goals and objectives adopted by the Metro Council as the Regional Urban Growth Goals and Objectives (RUGGO), including the Metro 2040 Growth Concept and the Regional Framework Plan. Title 11, Planning for New Urban Areas, of the Metro Functional Plan calls for long-range planning, including facilities planning, to ensure that areas brought into the UGB are urbanized efficiently and become or contribute to mixed-use, walkable, transit-friendly communities, and it guides planning of areas brought into the UGB for conversion from rural to urban use. Title 14, Urban Growth Boundary, provides the process and criteria for amendments to the UGB to provide a clear transition from rural to urban development, an adequate supply of urban land to accommodate long-term population and employment, and a compact urban form.

Statewide Planning Goal 5 requirements for resource protection and Metro Functional Plan Titles 3 and 13: These state and regional policies provide requirements for water quality and habitat protection. Local jurisdictions implement Goal 5 and Titles 3 and 13 in their comprehensive plans and zoning ordinances, typically through overlay zones that apply to parcels or portions of parcels with identified resources. In addition, these policies require compliance and documentation of other applicable federal, state and regional laws that protect sensitive, threatened and endangered species, and water resources.

3.2.2. Land Use Permits and Filing

As required by state statute, and based on the preceding regulatory context, each local jurisdiction adopts a comprehensive plan. A city or county then implements its comprehensive plan through its own zoning and development code and standards. The general zoning classifications along the preferred alignment are illustrated in Appendix A, Figure 6. For the most part, general zones (underlying zones: residential, commercial, industrial, etc. and overlay zones, such as floodplains and sensitive areas) are

similar; however, the particular allowed use in each zone could be different in each jurisdiction (except for the direct implementation of state or federal policy, such as for farmland and floodplains, which must establish minimum standards). Jurisdictions have different procedure types, decision-making authority and appeal authority. Some jurisdictions categorize their procedures by Type I, II, III and IV, depending on the degree of discretion (non-discretionary ministerial actions to substantially discretionary legislative actions) that the jurisdiction has and whether the permit involves the adoption, implementation or amendment of policy or law by ordinance. Most local jurisdictions commonly use the following land use permit filing steps:

1. **Pre-application Conference:** This conference is typically conducted at or around 30% design. Typically staff from the local jurisdictions' planning and engineering departments attend the pre-application meeting with the applicant. The purpose of the pre-application meeting is to acquaint local jurisdictions and service providers with a project, and to acquaint the applicant with the requirements of the code and other relevant criteria and procedures. At the meeting, the local planner outlines the necessary permits, applicable standards, supplemental materials, and application forms and fees required for a complete application submittal, and provides the applicant with pre-application meeting notes. A pre-application meeting is not an exhaustive review of applicable regulations, and the meeting does not bind and does not preclude the local jurisdiction from applying regulations in a manner differently than may have been indicated in the pre-application meeting.
2. **Application Submittal:** The application typically includes a form signed by the applicant and all property owners, required fees, a narrative addressing the required standards, a site plan and plan set, and supporting documentation and analysis, such as a Clean Water Services (CWS) Service Provider Letter, and hydraulic and natural resources assessments.
3. **Completeness Review:** The local government has 30 days to review the application for completeness. The local staff planner sends a letter regarding the completeness determination to the applicant. If the application is deemed incomplete, the applicant will be given an opportunity to provide additional information and materials before proceeding.
4. **After the Completeness Determination:** A city or a county acting within the UGB has 120 days to review a completed application and make a final decision. Outside the UGB, a county has 150 days to review and make a final decision. The decision may include conditions of approval to ensure that the proposal conforms to applicable development standards.
5. **Public Posting and Comment Period (if applicable):** If the permit requires public posting, there is a minimum 14-day posting period. Jurisdictions vary in their posting and notification requirements. Certain land use actions, such as map amendments, typically require posting on the property and notification of property owners within a specified vicinity (i.e. adjacent or within 300 feet).
6. **Hearing (if applicable):** Public hearings are required for legislative land use decisions (i.e. decisions made by the City Council or Board of County Commissioners such as annexations), and are typically

required for discretionary decisions such as conditional use permits. Hearings are not held for ministerial decisions. When a hearing is required or allowed, a copy of the application, all documents and evidence relied upon by the applicant, and the staff report are available for inspection at least seven days before the hearing. The initial hearing may remain open and a second hearing may be scheduled if the hearings authority (hearings officer, planning commission, city council/county commission) receives a request for that purpose or deems such a hearing is necessary.

7. **Appeals (if applicable):** Decisions of the Planning Director are typically appealable to the Planning Commission; decisions of the Planning Commission are typically appealable to the City Council or County Commission; and all final land use decisions from the local jurisdiction are appealable to the Land Use Board of Appeals (LUBA).

Coordination with Natural Resources Permits and Documentation

Land use permit applications require that consistency with natural resources regulations and requirements be documented. Meeting this requirement often includes providing a Joint Permit Application (JPA), CWS Provider Letters, and Endangered Species Act (ESA) documentation along with the local land use permit application, or accepting a condition of approval requiring that documentation be provided before the land use permit will be issued. Local jurisdictions typically require additional standards and possibly mitigation to be addressed for these resources. Therefore, coordination between the staff who prepare the environmental documentation and permits and the staff who prepare the land use documentation and permits is critical to successfully and efficiently meeting all jurisdictional requirements and developing comprehensive mitigation plans.

3.2.3. Project Type

The Program includes three primary components: (1) potential modifications at the existing intake and water treatment plant facility, (2) an approximately 30-mile water supply pipeline, and (3) terminal storage reservoir(s). Modifications to the water treatment plant and a new terminal storage reservoir are inherently different than the pipeline component, because they are above ground and visible. Permitting requirements for those components may be more discretionary and require “compatibility” measures such as screening and buffering. The remainder of this section focuses primarily on permitting the pipeline component. Although it is anticipated that most of the WWSP alignment will allow the pipeline to be within the ROW, this strategy document identifies land use permitting requirements for utilities both inside and outside of ROW in each jurisdiction and as associated with transportation improvement projects. Land use permitting processes will generally depend upon whether the planned construction:

1. Is entirely within ROW;
2. Includes public street ROW acquisition as part of transportation project;
3. Is outside of ROW on private or public land in the utility easement; or
4. Includes other factors such as overlays (e.g., floodplain and natural resources).

3.3. Local Land Use Permitting Requirements

This section summarizes, by jurisdiction, the potential land use permits for implementation of the WWSP, based on an initial review of each local jurisdiction's existing zoning or development code, and meetings and email and phone correspondence with the planning staff of the local jurisdictions. The information presented in this section is an introductory, high-level review of potential land use permits that precedes design; it is not based on any degree of design—conceptual or preliminary. Rather, this review of potential land use permitting requirements is based on general assumptions of project types or thresholds, as described in the previous section, for implementing the WWSP.

By the time any particular section of the WWSP is ready to apply for a specific land use permit, federal regulations, state statutes, state administrative rules, or local land use regulations may have changed. The WWSP is also likely to pass through areas that are in a state of transition to more urban uses, which may result in areas being annexed into a city. The jurisdiction with oversight today, therefore, may not be the jurisdiction that has oversight in the future. This review is not intended to provide exact land use permitting requirements, but rather a preliminary assessment of consideration and degree of effort that may be required in obtaining land use permits. An official pre-application meeting with each local jurisdiction, in coordination with design and construction schedules (which usually includes a review of the project at approximately 30% design), will identify the necessary permits. The following considerations, some of which may apply to all local jurisdictions in the study area, inform the discussion of potential permitting requirements in this section:

- In general, only land use permits are identified. Building or construction permits, including ROW, grading and erosion, and public works permits, are outlined in Section 2.7. There is some difference between what is permitted through planning departments and what is permitted through building or public works departments for each jurisdiction.
- In the study area, roads (typically arterials) may be under the jurisdiction of Washington County within the ROW, and within another jurisdiction when adjacent to and outside of the ROW.
- Right-of-way may not have an underlying zone attributed to it, but it is still regulated and can have overlay zones such as floodplain areas and significant natural resource areas (SNRAs). The application of a local zoning or development code to ROW without an underlying zoning designation will have to be determined on a case-by-case basis.
- Land use permitting requires documentation of required federal, state, and regional policies and permitting requirements.
- The definition and interpretation of utility and public utility structures, underground utilities and minor above-ground appurtenances associated with underground utilities vary by jurisdiction.
- The definition and interpretation of development varies by jurisdiction, but development is typically defined to include a broad array of human-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials.

- The Program’s proposed pipeline alignment is on the western edge of the Portland Metro UGB and therefore crosses multiple jurisdictions and unincorporated areas of Washington County and may “straddle” two jurisdictions at once. It crosses outside of the UGB in Section 2.
- More than one land use permit from each jurisdiction could be required or permits from two jurisdictions may be required for one section of the Program. If a jurisdiction requires two land use authorizations, they are submitted at the same time for concurrent review (unless otherwise specified by preference of the jurisdiction).

3.3.1. Washington County

Table 7 presents the potential Washington County land use review process for the proposed water pipeline.

Table 7: Washington County Potential Water Pipeline Land Use Review Process

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/Expiration
Water pipeline construction within ROW (no transportation improvements), no sensitive lands or floodplain – except EFU ¹ , AF-20 ² and EFC ³ zones	N/A	Excluded from Development Permit requirements if in adopted Public Facility Plan (WDC ⁴ 201-2.8 and 702-4)	N/A	N/A
Water pipeline construction within ROW (no transportation improvements), no sensitive lands or floodplain in EFU, AF-20 and EFC zones	Planning Director	Type II Land Use Action; Must satisfy ORS 215.275 and OAR 660-033-0130 if in farm zone (Section 430-105 includes study requirement for how utility fits into Master Plan)	Hearings Officer	Development Permits expire automatically in two years, with possibility of extensions
Water pipeline construction in conjunction with a planned roadway improvement project that requires ROW acquisition, no sensitive lands	Depends on type: Planning Director (Category A and B), Hearings Officer or Planning Commission (Category C)	Article VII Public Transportation Facilities (usually requires Alternatives Analysis, depending on category); may require farm and forest impacts assessment, depending on location	Depends on type: Hearings Officer, Planning Commission, or Board of Commissioners	Development Permit shall expire automatically in four years

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/Expiration
Water pipeline construction with some (or all) portions outside of ROW in utility easement, no sensitive lands	Depends on type: Planning Director, Hearings Officer or Planning Commission	Type II Special Use (AF-20 and EFU but need to meet ORS 215.275 and OAR 660-033-0130); Type III Special Use for all other zones and in UGB (Section 430-105 includes study requirement for how utility fits into Master Plan and impact)	Depends on type: Hearings Officer, Planning Commission, or Board of Commissioners	Development Permit shall expire automatically in four years
Any project within Significant Resource Overlay Zone (SROZ)	Depends on type: Planning Director, Hearings Officer or Planning Commission	Type I, II, III Development Review (requires supplemental analysis of resources, impacts and mitigation)	Depends on type: Hearings Officer, Planning Commission, or Board of Commissioners	Development Permit shall expire automatically in four years
Floodplain and Drainage Hazard Area development	Depends on type: Planning Director, Hearings Officer or Planning Commission	Type I, II, III Development Review (requires hydraulic balance analysis, balanced cut and fill, and no net rise)	Depends on type: Hearings Officer, Planning Commission, or Board of Commissioners	Development Permit shall expire automatically in four years
Temporary uses, depends on zone – typically incorporated as part of other permits	N/A	Type I, II, III Development Review	N/A	N/A

Source: Washington County Community Development Code (WDC)

¹EFU = Exclusive Farm Use District

³EFC = Exclusive Forest and Conservation District

²AF-20 = Agriculture and Forest District

⁴Washington County Community Development Code (WDC)

Table 8 presents the potential Washington County land use review process for some potential reservoir sites that the Program has identified.

Table 8: Washington County Potential Reservoir Sites Land Use Review Process

Zoning	Procedure Type	Need to Meet ORS 215.275
INST	Type III	No
AF-20	Type II	Yes
AF-20	Type II	Yes
FD-20	Type III	No
EFU	Type II	Yes

Key Land Use Permitting Considerations

On Resource Lands Outside of the UGB (Zones AF-20, EFU and EFC):

- The reservoir and pipeline would be considered as a single project and would be a Type II application. This single project would also need to meet the requirements under ORS 215.275 and OAR 660-033-0130 (Utility Facilities Necessary for Public Service) by meeting one or more of the following factors:

(a) Technical and engineering feasibility;

(b) The proposed facility is locationally dependent. A utility facility is locationally dependent if it must cross land in one or more areas zoned for exclusive farm use in order to achieve a reasonably direct route or to meet unique geographical needs that cannot be satisfied on other lands;

(c) Lack of available urban and non-resource lands;

(d) Availability of existing rights-of-way;

(e) Public health and safety; and

(f) Other requirements of state or federal agencies.

Costs associated with any of the factors listed in subsection (2) of this section may be considered, but cost alone may not be the only consideration in determining that a utility facility is necessary for public service. Land costs shall not be included when considering alternative locations for substantially similar utility facilities.

- There are no height restrictions in these zones that apply to the WWSP.

On Non-Resource Lands Outside of the UGB (Zones AF-5 and RR-5):

- Because these are non-resource lands, there is no requirement to meet the standards in ORS 215.275 for these zones. Depending on the zone, this is either a Type II or a Type III process.

Resource Impacts:

- Trenching through resource lands, such as wetlands and floodplains, will require a mitigation plan and documentation of impacts per Section 421 proving that there is no adverse effect on the floodplain. There may be applicable exemptions from the standards for boring in resource lands per Section 421-16.11.
- Compliance with Section 422 requires an assessment of Goal 5 and a habitat assessment, including delineation of the resources, a methodology for assessment, impact analysis, and mitigation for impacts. Mitigation is not prescriptive and relies on an adequate factual record to demonstrate reduction of impacts.
- The 124th Avenue Extension project, which includes a section of the WWSP, requires both Category B (for inside of the UGB) and C (for outside of the UGB) Article VII Public Transportation Facilities permits including addressing requirements for SNRA and Floodplain.

3.3.2. City of Wilsonville

Table 9, includes a review of the Wilsonville Planning and Land Development Ordinance as of January 2015, which includes all amending ordinances through December 31, 2014, as it pertains to implementation of the potential pipeline routes for the WWSP and other associated WWSP public utility features and structures.

Table 9: City of Wilsonville Potential Water Pipeline Land Use Review Process

Permit Threshold	Decision-Making Body	Review Process	Appeals	Validity/ Expiration
Any project within Significant Resource Overlay Zone (SROZ)	Planning Director	Map verification	N/A	N/A
	Development Review Board	Site Development Permit Class III with public hearing: Significant Resources Impact Report	City Council	Two years, renewable per Development Review Board
	N/A	Mitigation Plan	N/A	N/A
		If project is in an adopted plan, it is exempt from review per Section 4.139.04 Uses and Activities Exempt from These Regulations (.20).		
Water pipeline construction within ROW (could include transportation improvements), no sensitive lands	N/A	Likely excluded per Section 4.005 as a public facility, but may have to comply with Public Works Standards	N/A	N/A
Water pipeline construction in conjunction with a planned roadway improvement project that requires ROW acquisition, no sensitive lands	N/A	Excluded per Section 4.005 as a public facility, but may have to comply with Public Works Standards	N/A	N/A
Water pipeline construction with some (or all) portions outside of ROW in utility easement, no sensitive lands	N/A	Excluded per Section 4.005 as a public facility, but may have to comply with Public Works Standards	N/A	N/A
Above-ground vents and covers	Planning Director	Class I administrative review, ministerial action without public hearing Potential landscape screening requirements	N/A	Two years, renewable per Development Review Board

Permit Threshold	Decision-Making Body	Review Process	Appeals	Validity/Expiration
Public utility structures (all zones – includes water treatment plant)	Development Review Board with Public Hearing	Conditional Use	City Council	Two years, renewable per Development Review Board
Development in Willamette Greenway Setback (applies to water treatment plant)	Development Review Board with Public Hearing	Conditional Use	City Council	Two years, renewable per Development Review Board
Tree Permit (remove regulated trees at 6 feet diameter at breast height [DBH] or greater in size)	Planning Director	Class I or Class II (depending on tree removal) per Section 4.610	Development Review Board	Two years, renewable per Development Review Board
Floodplain Development Permit	Community Development Director	Class II Temporary permit per Section 4.163 (underground utilities exempt per Section 4.172(03)(B))	Development Review Board	Two years, renewable per Development Review Board
Temporary uses more than two weeks	Planning Director	Class II Temporary permit per Section 4.163	Development Review Board	Two years, renewable per Development Review Board
Temporary uses less than two weeks	Planning Director	Class I Administrative review, no hearing per Section 4.035	N/A	Two years, renewable per Development Review Board

Key Land Use Permitting Considerations

Although the Willamette River Water Treatment Plant Master Plan will be updated in association with the WWSP, the Wilsonville Water System Master Plan, which would show the pipeline, may not be updated. Therefore, the water pipeline would not be part of an adopted plan and would be subject to Significant Natural Resource Overlay (SNRO) zone review, including a supplemental impact report and mitigation. In addition, Wilsonville has been recognized by the National Arbor Day Foundation as a Tree City USA. Impacts to trees both inside and outside of ROW will likely require mitigation and avoiding impacts to significant trees such as Heritage Trees might be necessary through design. Screening of minor above-ground appurtenances, such as by landscaping, may also be required as part of the City of Wilsonville land use review.

3.3.3. City of Tigard

Table 10 presents the potential City of Tigard land use review process for the proposed water pipeline. Please note that the table may include more than one process.

Table 10: City of Tigard Potential Water Pipeline Land Use Review Process

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/Expiration
Water pipeline construction within ROW (could include transportation improvements), no sensitive lands	N/A	May be permitted outright (no underlying zone applies to roadways)	N/A	N/A
Water pipeline construction in conjunction with a planned roadway improvement project that requires ROW acquisition, no sensitive lands	N/A	May be permitted outright (no underlying zone applies to roadways)	N/A	N/A
Water pipeline construction with some (or all) portions outside of ROW in utility easement	Hearings Officer	Commercial and Industrial Zones: Mostly permitted outright Residential and Parks and Recreation Zones: Type III Conditional Use	City Council	18 months, with one, one-year renewal possible for conditional use permits
Any project within sensitive lands ¹	Director: Type I and Type II; Hearings Officer: Type III	Depends on ground disturbance. Type I to Type III (Floodplain): Site Development Review (anticipated to be Type II)	Hearings Officer or City Council, depending on review type	18 months, with one, one-year renewal possible
Temporary uses; e.g., staging area and access roads for water pipeline construction	Director	Type I	N/A	One year, with one-year renewals possible

Source: Community Development Code of the City of Tigard, Title 18

¹ Sensitive lands = floodplain, natural drainageways, wetlands, steep slopes greater than 25%, and significant fish and wildlife habitat.

Key Land Use Permitting Considerations

For the City of Tigard, there are no prescriptive mitigation requirements for sensitive lands resource other than compliance with CWS.

3.3.4. City of Tualatin

Table 11 presents the potential City of Tualatin land use review process for the proposed water pipeline.

Table 11: City of Tualatin Potential Water Pipeline Land Use Review Process

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/Expiration
Water pipeline construction within ROW (could include transportation improvements), no sensitive lands	N/A	Permitted – Public Works Permit through engineering	N/A	N/A
Water pipeline construction in conjunction with a planned roadway improvement project that requires ROW acquisition, no sensitive lands	N/A	Permitted (assuming ROW is dedicated before construction) – Public Works Permit through engineering	N/A	N/A
Water pipeline construction with some (or all) portions outside of ROW in utility easement	N/A	Permitted (Section 8.030 Utility Facility)	N/A	N/A
Minor above-ground features outside of ROW	Community Development Director	Architectural Review Plan Approval	Architectural Review Board or City Council	Two years, extensions possible
Any project within sensitive lands ¹	Reviewed in conjunction with other permits	Case-by-case review of design to determine minimization of intrusion into riparian areas	N/A	N/A
Floodplain development	City Engineer	Development Permit to review potential floodplain impacts	City Council	Two years, extensions possible
Development in city park	N/A	Prohibited according to Measure 34-186; boring under with no impacts to surface uses likely allowed	N/A	N/A
Temporary uses; e.g., staging area and access roads for water pipeline construction	N/A	Public Works Permit	N/A	N/A

Source: City of Tualatin Development Code

¹ Sensitive lands = floodplain, natural drainageways, wetlands, steep slopes greater than 25%, and significant fish and wildlife habitat.

Key Land Use Permitting Considerations

The locations of city parks and greenways should be considered to avoid these areas that prohibit development. However, trenchless crossings under such resources, where there is no impact, is anticipated to be allowed.

3.3.5. City of Beaverton

Table 12 presents the potential City of Beaverton land use review process for the proposed water pipeline.

Table 12: City of Beaverton Potential Water Pipeline Land Use Review Process

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/ Expiration
Water transmission pipeline construction within ROW (could include transportation improvements), no sensitive lands	Director	Permitted outright or Public Transportation Facility (Type II) Sidewalk Design Modification, Tree Plan (consistent with SNRA and Floodplain regulations)	Planning Commission	Two years from the effective date of decision (one year for Sidewalk Design Modification, with possible two-year extension)
Water transmission pipeline construction in conjunction with a planned roadway improvement project that requires ROW acquisition, no sensitive lands	Director, in conjunction with Facilities Review Committee	Public Transportation Facility (Type II) Sidewalk Design Modification, Tree Plan (consistent with SNRA and Floodplain regulations)	Planning Commission	Two years from the effective date of decision (one year for Sidewalk Design Modification, with possible two-year extension)
Underground water transmission pipeline construction with some (or all) portions outside of ROW in utility easement, no sensitive lands, and above-ground public utility structures including minor features of underground facilities	N/A	Permitted outright in all districts pursuant to Special Use Regulations; subject to any other applicable development standards.	Depends on process for any other applicable development standards	Depends on process for any other applicable development standards
Within Significant Resource Overlay Zone including floodplain	Director and City Engineer	Site Development Permit, or included with other permits	City Council	One year, with options for extensions
Temporary uses more than two weeks	N/A	Included with other permits	N/A	N/A

Source: Beaverton Development Code

Key Land Use Permitting Considerations

The TVWD Water Master Plan document is included by reference into the City of Beaverton Comprehensive Plan Public Facilities and Services Element, Section 5.2 Public Facilities Plan. Development applications are currently being accepted for public and private build-out of the South Cooper Mountain Concept Plan area (Scott Whyte, personal communication, March 23, 2015).

3.3.6. City of Sherwood

Table 13 presents the potential City of Sherwood land use review process for the proposed water pipeline.

Table 13: City of Sherwood Potential Water Pipeline Land Use Review Process

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/Expiration
Water pipeline construction within ROW (could include transportation improvements within ROW), no applicable environmental resource area	N/A	Exempt if project is in TSP or other plan; otherwise conditional use	N/A	N/A
Water pipeline construction in conjunction with a planned roadway improvement project that requires ROW acquisition, no applicable environmental resource area ¹	N/A	Exempt if project is in TSP or other plan; otherwise conditional use	N/A	N/A
Water pipeline construction with some (or all) portions outside of ROW in utility easement	Hearing Authority for Type III and Planning Commission for Type IV (planning staff prepare a staff report with recommended findings of fact and conditions of approval)	Conditional Use Type III (not permitted in Neighborhood Commercial and Office Commercial Zones [16.22.020]; however, these zones not anticipated to apply to the pipeline alignment).	The appeal authority depends on the review type: For Type III applications, it is the Planning Commission; for Type IV applications, it is City Council.	No expiration
Any project within applicable environmental resource area ¹	N/A	Defer to CWS	N/A	N/A

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/ Expiration
Temporary uses that are not consistent with underlying zone (16.86.030.A.); e.g., staging area and access roads for water pipeline construction	Administrative	Type I	N/A	One year

Source: City of Sherwood, Oregon Zoning and Community Development Code, Part 3 of the City Comprehensive Plan (Title 16 of Municipal Code)

¹ Environmental resource areas include wetlands.

Key Land Use Permitting Considerations

According to communications with the current City of Sherwood Planning Manager (B. Kilby, personal communication, February 26, 2015), incorporating the WWSP into existing plans such as the Water System Master Plan will allow the Program to go through typical public utility system planning and be vetted, which will help “secure the corridor” in relation to other underground and utility networks and will require fewer permits when it comes time to implement.

3.3.7. City of Hillsboro

Table 14 presents the potential City of Hillsboro land use review process for the proposed water pipeline.

Table 14: City of Hillsboro Potential Water Pipeline Land Use Review Process

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/ Expiration
Entirely within existing ROW, no sensitive lands	N/A	Exempt from Development Review per 12.80.040 D. 9.	N/A	N/A
Water pipeline construction within ROW (could include transportation improvements), no sensitive lands	N/A	Exempt from Development Review per 12.80.040 D. 9.	N/A	N/A
Construction and maintenance of water lines, all zones, and public infrastructure	N/A	Exempt from Development Review per 12.80.040 D. 9.	N/A	N/A
Any project within a SNRO zone	N/A	Permitted in all SNRO zone areas per Table 12.27.220-1, subject to development standards; compensatory mitigation may be required	N/A	N/A

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/ Expiration
Regulatory Floodplain Overlay (RFO) Zone	N/A	Underground utility facilities constructed and installed to minimize water damage and flood water infiltration are permitted; construction of public streets, light rail transit tracks and associated bridges and crossings, bikeways, and footpaths that implement the adopted TSP have specific standards (may require compensatory mitigation)	N/A	N/A
Temporary structures in RFO	N/A	Permitted	N/A	N/A
Temporary structures associated with temporary uses	N/A	Exempt from Development Review per 12.80.040 D. 7.		

Source: City of Hillsboro Community Development Code

Key Land Use Permitting Considerations

Although SNRO permits may not be needed, compensatory mitigation for impacts to Goal 5 resources that are not covered by DSL or CWS may be required. Coordination with other utilities and public utility and services providers should occur in order to maximize the use of developable space, particularly for use of public ROW for linear corridors and specifically in the South Hillsboro Concept Plan Area.

3.3.8. City of King City

Table 15 presents the potential City of King City land use review process for the proposed water pipeline.

Table 15: City of King City Potential Water Pipeline Land Review Process

Permit Threshold	Decision-making Body	Review Process	Appeals	Validity/Expiration
Entirely within existing ROW, no sensitive lands	N/A	Underground portions exempt from development permit requirements; all portions likely exempt if part of public facility plan	N/A	N/A
Water pipeline construction within ROW (could include transportation improvements), no sensitive lands	N/A	Underground portions exempt from development permit requirements; all portions likely exempt if part of public facility plan	N/A	N/A
Projects not currently included in an adopted plan	Planning Commission	Type II site plan	City Council per 16.40.040	One year, with a one-time, one-year extension per 16.36.040 and .050
Water pipeline construction with some (or all) portions outside of ROW in utility easement, no sensitive lands	Planning Commission	Exempt if underground per 16.36.020.9. (not known whether this includes minor above-ground appurtenances); Type II conditional use review	City Council per 16.40.040	One year, with a one-time, one-year extension per 16.36.040 and .050
Any project within sensitive lands ¹	Planning Commission	Type II sensitive lands review	City Council per 16.40.040	One year, with a one-time, one-year extension per 16.36.040 and .050
Temporary uses	City Manager	Type I	City Manager	One year, with a one-time, one-year extension per 16.36.040 and .050

Source: King City Municipal Code, Title 16, Community Development and Zoning Code

¹Sensitive lands = floodplain, Drainage Hazard Area, and West King City Planning Area Goal 5 Safe Harbor.

Key Land Use Permitting Considerations

All roads in King City are Washington County jurisdiction except for neighborhood streets. The zoning code is expected to be updated in the spring and summer of 2015 (Keith Liden, personal communication, February 26, 2015). The pipeline alignment is adjacent to the West King City Planning Area, Goal 5 Safe Harbor for riparian areas and wetland protection.

3.4. Land Use Analysis of the Preferred Alignment

This section provides a more detailed view of land use permitting requirements and considerations for the preferred alignment for the WWSP. As noted before, exact permitting types and requirements will be established once an official design set is available, as applicable to each jurisdiction.

3.4.1. Section 1 – WRWTP to SW 124th Avenue

Section 1 is within the City of Wilsonville jurisdiction from the Willamette River Water Treatment Plant (WRWTP) to just north of SW Day Road and SW Grahams Ferry Road, where it connects to the SW 124th extension. The preferred alignment crosses SW Industrial Way to SW Kinsman Road. The alignment then follows SW Kinsman Road, which is a minor arterial, to an unimproved section of SW Kinsman Road that is likely to be improved in the near future. From there it follows SW Boeckman Road to SW 95th Avenue. SW Boeckman Road is a minor arterial that switches to a major arterial from SW 95th Avenue to I-5. The alignment then intersects and follows SW Ridder Road (a collector street) to SW Garden Acres. Once the alignment reaches SW Garden Acres, it is in unincorporated Washington County until the intersection of SW Day Road and SW Grahams Ferry Road to Clay Street, where it is in the City of Wilsonville on the east and unincorporated Washington County on the west. The Coffee Creek Correctional Facility is west of the intersection of SW Grahams Ferry Road and SW Day Road.

3.4.1.1. Summary of Adjacent Land Uses and Potential Land Use Permits

Section 1 is entirely within the UGB. It passes through largely urbanized areas in Wilsonville including industrial, distribution and warehouses uses. However, there are small agricultural and rural uses at the south end of the section, closer to the river, and at the north end, which is in unincorporated Washington County. Land use permitting considerations for each local jurisdiction that Section 1 is in are:

City of Wilsonville: Zoning along the alignment is largely Planned Development Industrial (PDI). All roads along the alignment are designated truck freight routes except for Commerce Circle, which is in the Wilsonville TSP. Potential land use permits for the pipeline are likely to include: Class III for a SNRO Zone (if the project is not in an adopted plan), Class I or II tree permits, floodplain permit, and Class I or II temporary use permits. Mitigation for impacts to trees and SNRO Zone impacts may be required.

Washington County: The small section of Section 1 that is in unincorporated Washington County is in an area zoned Future Development 20 acre district. Land uses are mixed rural residential, agricultural and industrial. According to the Washington County Significant Natural Resource Maps (Map 6), there are no SNRAs in the area; however, there are two small creeks in the area and likely some resources are associated with those water features. The way in which the Program is implemented (with transportation improvements or outside of ROW in easements) and the preferred alignment route will determine the land use permitting requirements; however, the need for addressing SNRA and Floodplain/Drainage Hazard Area standards can be expected.

3.4.1.2. Key Planned Roadway Improvements

According to the City of Wilsonville TSP, the following are some of the key planned road improvements in the Section 1 area:

- **SW Kinsman Road:** The unimproved section of SW Kinsman Road is anticipated to be constructed to become a minor arterial (City of Wilsonville Capital Improvement Project #4004) between SW Barber Street and SW Boeckman Road in spring of 2016, according to the City of Wilsonville website (<http://www.ci.wilsonville.or.us/661/Kinsman-Road-Extension>, accessed March 16, 2015). This project is a High Priority Project in the City of Wilsonville TSP.
- **SW Kinsman Road:** Minor arterial extension from SW Ridder Road to SW Day Road (High Priority Project in the City of Wilsonville TSP).
- **SW Clutter Road:** Improvements to include realignment or grade lowering (High Priority Project in the City of Wilsonville TSP).
- **SW Day Road:** Widening of SW Day Road from SW Boones Ferry Road to SW Grahams Ferry Road to make it a major arterial. This is a Higher Priority Project according to the City of Wilsonville TSP.
- **SW Brown Road Extension:** New minor arterial roadway collector connecting SW Boones Ferry Road with existing portions of SW Brown Road.

3.4.1.3. Environmental and Regulatory Considerations

Besides those already referenced in other sections of this document, some environmental and regulatory considerations for Section 1 as design progresses are:

- Wilsonville is designated a Tree City USA. Impacts to trees should be minimized or avoided, consistent with the city's tree regulations in place at the time of permitting.
- Environmental considerations for such resources as Coffee Creek and Coffee Lake Wetlands.
- Coordination with/integration into adopted plans: The WWSP will be included in the WRWTP Master Plan, but will not be included as a water supply pipeline alignment in the Wilsonville Water System Plan, which shows transmission lines and includes references to distribution to Sherwood.

3.4.1.4. Community Considerations

Besides those already referenced in other sections of this document, some community considerations for Section 1 as design progresses are:

- Multimodal transportation impacts, especially for congested areas close to I-5.
- Freight access: Many of the uses along the alignment are distribution or freight-based industries.
- Westside Express Service (WES) tracks: The preferred alignment may cross WES tracks.
- Other public and private utilities and institutions, such as the substation along SW Ridder Road and the Coffee Creek Correctional Facility.

3.4.2. Section 2 – SW 124th Avenue to Cooper Mountain

Section 2 goes in and out of and, in some sections, follows the western edge of the UGB. It passes through five jurisdictions: Tualatin, Sherwood, unincorporated Washington County, Tigard and Beaverton. It is in the City of Tualatin for a very small section along SW Tualatin-Sherwood Road from the to-be-constructed SW 124th Road extension to SW Cipole Road. From there it continues to follow SW Tualatin Sherwood Road through the City of Sherwood until it transitions to SW Roy Rogers Road and hooks north near Chicken Creek, where it enters into Washington County and is outside of the UGB. The alignment continues to follow SW Roy Rogers Road north, where it enters the River Terrace area of the City of Tigard north of SW Beef Bend Road. The alignment stays in the City of Tigard jurisdiction until it turns west along SW Scholls Ferry Road, which is Beaverton's jurisdiction in the South Cooper Mountain Plan Area to the north and unincorporated Washington County jurisdiction to the south. Section 2 follows the edge of the South Cooper Mountain Plan Area and the UGB along SW Tile Flat Road and then north along SW Grabhorn Road until it reaches SW 209th Avenue and Farmington Road or, alternatively, along SW Grabhorn Road to SW Clark Hill Road and SW Farmington Road to SW 209th Avenue.

3.4.2.1. Summary of Adjacent Land Uses and Potential Land Use Permits

The alignment may straddle two jurisdictions; typically, jurisdictions do not defer their land use or development permitting to other jurisdictions. Therefore, it is possible that permits will be required from two different jurisdictions for the same stretch of the alignment. For example:

- **Tualatin:** For a very short distance, Section 2 passes along where Tualatin jurisdiction is north of SW Tualatin Sherwood Road. Land adjacent to the section in this stretch is zoned general manufacturing, and the existing use likely includes distribution. Because the adjacent area is developed, land use permits for the City of Tualatin are anticipated to include only architectural review if above-ground air vents are placed in this section. Otherwise, necessary permits will likely be handled by the City of Tualatin's engineering and public works departments.
- **Sherwood:** Section 2 passes east to west through northern Sherwood and through a mix of uses, including light industrial with remnant farmland to west of SW Pacific Highway, where it transitions to residential areas. If the WWSP is not in an adopted plan or is outside of ROW, it will likely require a Conditional Use Review, including a hearing, for this part of Section 2.
- **Washington County:** The alignment passes mostly out of or along the edge of the UGB in Washington County jurisdiction. Permitting requirements will be determined depending on how the WWSP is implemented in conjunction with transportation improvements. Outside of the UGB, it will likely require special use permits, and on rural resource lands it will need to demonstrate consistency with ORS 215.275 and that statute's implementing administrative rules. In addition, SNRA and Floodplain/Drainage Hazard Area review will be required, especially in consideration of the Tualatin River National Wildlife Refuge (TRNWR) and Cooper Mountain Nature Park resources.

- **Tigard:** The Section 2 alignment passes through the River Terrace section of Tigard. Surrounding land uses are zoned residential; however, the existing uses in the area are primarily rural. Development applications have been received to begin build-out of the area in accordance with the River Terrace Community Plan. It is anticipated that implementation of the WWSP in this area will require Type II to Type III Development review for development in floodplains and sensitive lands areas. Transportation improvements themselves do not require separate land use permits.
- **Beaverton:** South Cooper Mountain recently became under the jurisdiction of the City of Beaverton. Land uses are primarily residential. Beaverton has already held pre-application meetings for both public and private development on either side of SW 175th Avenue in the South Cooper Mountain Plan Area. Permitting requirements will be determined depending on how the WWSP is implemented in conjunction with transportation improvements. Utilities are permitted outright in all zones. Implementation of the WWSP in conjunction with transportation improvements will likely require a Public Transportation Facility Permit.

3.4.2.2. Key Planned Roadway Improvements

The following are some of the key planned road improvements in the Section 2 area:

- **SW Tualatin-Sherwood Road:** Widening of existing road to five lanes (in Metro Regional Transportation Plan [RTP]/Washington County TSP).
- **SW Roy Rogers Road:** Widening of road (in Major Streets Transportation Improvement Plan [MSTIP] local property taxes for building major transportation improvements countywide).
- **SW Tile Flat Road:** According to the South Cooper Mountain Community Plan (November 2014), SW Tile Road: "...should retain a rural design, particularly on the west side adjacent to land designated as Rural Reserve. All expansions requiring additional right-of-way should be to the east (urban) side. Safe bicycle and pedestrian movements shall be accommodated by a shared-use pathway adjacent to the road on the east side, with trees and other landscaping to provide a visual buffer to adjacent rural lands."

3.4.2.3. Environmental and Regulatory Considerations

Besides those already referenced in other sections of this document, some environmental and regulatory considerations for Section 2 as design progresses are:

- Environmental considerations for such resources as the Tualatin River, TRNWR and Cooper Mountain Nature Park resources.
- Coordination with ongoing implementation of the River Terrace and South Cooper Mountain Community Plans. The plans include maps for water, sewer and stormwater utilities, much of which are within ROW. Therefore, the alignment for Section 2 will need to be coordinated with the other planned utilities to maximize the use of space.

3.4.2.4. Community Impact Considerations

Besides those already referenced in other sections of this document, some community impacts to consider for Section 2 as design progresses are:

- The South Cooper Mountain and River Terrace areas are anticipated to develop quickly—land use applications are currently being received for both areas. Therefore, adjacent communities may experience construction impacts such as noise and disruption of traffic. Coordinating construction efforts and timing could reduce impacts.
- Because the Section 2 alignment is along the western edge of the Portland Metro UGB, implementation of the WWSP should consider potential impacts to adjacent rural uses.

3.4.3. Section 3 – Cooper Mountain to Hillsboro

Section 3 starts on SW Farmington Road and proceeds west along SW Rosedale Road to the planned SW Cornelius Pass Road extension between SW 209th and SW 229th Avenues in the South Hillsboro Community Plan Area. Section 3 continues north of TV Highway along SW Cornelius Pass Road, with Hillsboro jurisdiction to the west and Washington County jurisdiction to the east, to Baseline Road, where it turns north along SW 205th Avenue, NW 206th Avenue and NW Cornelius Pass Road in Hillsboro to its terminus at the intersection of NW Cornelius Pass Road and Highway 26.

3.4.3.1. Summary of Adjacent Land Uses and Potential Land Use Permits

This section of the alignment is entirely within the UGB in both Washington County and City of Hillsboro jurisdiction.

- **Washington County:** This section is all within the urban area of Washington County. It passes by largely residential areas with supporting public facilities such as parks and schools, except along TV Highway, where there are commercial uses and at the northern terminus of Section 3, where there are industrial park uses. Permitting requirements will be determined depending on how the WWSP is implemented in conjunction with transportation improvements.
- **City of Hillsboro:** New development in South Hillsboro will be annexed into the City of Hillsboro as part of a modified Type III procedure, including public notice and a public hearing. A zone change will be processed concurrent to annexation applications, which include an annexation agreement. The annexation agreement is intended to ensure awareness of the annexation process and to outline the requirements for and timing of development of the property in coordination with construction of necessary infrastructure improvements. Permitting requirements will be determined depending on how the WWSP is implemented in conjunction with transportation improvements and land use permits for annexation. There is a potential that compensatory mitigation will be needed as part of impacts to SNRAs.

3.4.3.2. Key Planned Roadway Improvements

Figure 1-5 of the City of Hillsboro TSP update identifies all the roads in Section 3 for street improvements except for NW Amberwood Drive. Funding for the SW Cornelius Pass Road extension south of TV Highway is still being identified.

3.4.3.3. Environmental and Regulatory Considerations

Besides those already referenced in other sections of this document, some environmental and regulatory considerations for Section 3 as design progresses are:

- Environmental considerations for such resources as Butternut Creek.
- Coordination with ongoing implementation of the South Hillsboro Community Plan.

3.4.3.4. Community Impact Considerations

Besides those already referenced in other sections of this document, some community impacts to consider for Section 3 as design progresses are:

- TV Highway Crossing.
- Neighborhood disruption north of TV Highway.

3.4.4. Section 4 – Cooper Mountain to Beaverton

Section 4 follows the same alignment as Section 3 through most of the South Hillsboro Concept Plan Area except that it proceeds east at SW Kinnaman Road into the Aloha-Reedville Area to SW Farmington Road. Section 4 follows SW Farmington Road until SW 160th Avenue, where it turns north across TV Highway into Beaverton and along SW Millikan Way to Schottky Trail and SW Terman Road.

3.4.4.1. Summary of Adjacent Land Uses and Potential Land Use Permits

Section 4 is entirely within the UGB. It is in City of Hillsboro jurisdiction in South Hillsboro, as noted in the description of Section 3, passes into Washington County jurisdiction in the Aloha-Reedville area and then into the City of Beaverton.

- **Washington County:** This section is all within the urban area of Washington County including the Aloha-Reedville Community Plan Area. Permitting requirements will be determined depending on how the WWSP is implemented in conjunction with transportation improvements.
- **City of Hillsboro:** New development in South Hillsboro will be annexed into the City of Hillsboro as part of a modified Type III procedure, including public notice and a public hearing. A zone change will be processed concurrent to annexation applications, which include an annexation agreement. The annexation agreement is intended to ensure awareness of the annexation process and to outline the requirements for and timing of development of the property in coordination with construction of necessary infrastructure improvements. Permitting requirements will be determined depending on how the WWSP is implemented in conjunction with transportation improvements and

land use permits for annexation. There is a potential that compensatory mitigation will be needed as part of impacts to SNRAs.

- **City of Beaverton:** Permitting requirements will be determined depending on how the WWSP is implemented in conjunction with transportation improvements. Utilities are permitted outright in all zones. Implementation of the WWSP in conjunction with transportation improvements will likely require a Public Transportation Facility Permit.

3.4.4.2. Key Planned Roadway Improvements

- **SW Kinnaman Road:** In 2010, the County completed roadway improvements to SW Kinnaman Road from 209th Avenue to SW Farmington Road , which include two vehicle through lanes, pedestrian crossings, bicycle lane, sidewalks, streetlights, stormwater mitigation, and planter strips with street trees (Aloha-Reedville Study and Livable Community Plan).

3.4.4.3. Environmental and Regulatory Considerations

Besides those already referenced in other sections of this document, some environmental and regulatory considerations for Section 4 as design progresses are:

- Environmental considerations for such resources as Butternut Creek, Beaverton Creek and Tualatin Hills Nature Park.
- Coordination with ongoing implementation of the South Hillsboro Community Plan and Aloha-Reedville Community Plan.

3.4.4.4. Community Impact Issues

Besides those already referenced in other sections of this document, some community impact considerations for Section 4 as design progresses are:

- Crossing of MAX Lines and access to MAX parking areas.
- Access to community resources such as Aloha High School and Aloha Community Library.

4. Cultural Resources Review

As part of the Preliminary Design Phase, the Partners evaluated the cultural resources requirements for successful implementation of the WWSP. This section describes: (1) the cultural resources regulatory environment, (2) a description of the development and implementation of a proposed Programmatic Agreement addressing cultural resources, (3) an analysis of cultural resources along the preferred alignment, and (4) a summary of anticipated permitting requirements.

4.1. Cultural Resources Regulatory Environment

The construction of the WWSP will occur under several state and federal regulations or codes that pertain to cultural resources (see Table 16). The determination of which regulations apply depends on the nature of the undertaking and the property owner.

The WWSP will require a permit from the USACE, which will provide a trigger for compliance with Section 106 of the National Historic Preservation Act (NHPA). This regulation calls for the consideration of project effects on historic properties (cultural resources that are determined eligible or potentially eligible for listing in the National Register of Historic Places [NRHP]) and government-to-government consultation with the State Historic Preservation Office (SHPO) and appropriate federally recognized tribes.

It is possible that Native American graves or sacred objects will be encountered during construction of Program elements. Native American graves and sacred objects are protected under the federal Native American Graves Protection and Repatriation Act (NAGPRA) and the Oregon State regulation Indian Graves and Protected Objects (Oregon Revised Statute [ORS] 97.740-97.760).

State law (ORS 358.905-358.955) provides the definition of archaeological and historical resources, and prohibitions against the sale and exchange of cultural items or damage to archaeological sites on public and private lands. Archaeological and historical resources are known to exist within 100 feet of the preferred alignment, and would thus be managed under this regulation.

Table 16: State and Federal Regulations and Codes that May Be Triggered by Actions Associated with the WWSP

Government	Regarding	Law Title	Summary
Federal	Cultural Resource Management	Section 106 of the NHPA of 1966, as amended through 2000 (36 CFR Part 800)	Requires federal agencies to take into account the effects of their activities and programs on historic properties. When a federal agency funds, licenses, or permits an activity that may affect cultural resources, the agency must consult with the SHPO and federally recognized tribes in cooperation with the Advisory Council on Historic Preservation (ACHP) in Washington, D.C. to comply with Section 106 of the NHPA.
Federal	Cultural Resource Management	Archeological and Historical Preservation Act (AHPA) of 1974	Amended the Reservoir Salvage Act of 1960, which provided for the recovery and preservation of historical and archaeological data (including relics and specimens) that might be lost or destroyed in the construction of dams and reservoirs. The AHPA gave the Secretary of the Interior the responsibility for coordinating and administering a nationwide program for recovery, protection and preservation of scientific, prehistoric and historic data.
Federal	Native American Graves and Protected Objects	NAGPRA of 1990	Requires the return of Native American remains and cultural objects by federal agencies and museums to Native American groups; governs excavations and inadvertent discovery of remains and cultural items on federal and tribal lands.
State	Native American Graves and Protected Objects	Indian Graves and Protected Objects (ORS 97.740-97.760)	Protects all Native American cairns and graves and associated cultural items.
State	Cultural Resource Management	Archaeological Objects and Sites (ORS 358.905-358.955)	Provides definitions of archaeological sites, significance and cultural patrimony; prohibits the sale and exchange of cultural items; or damage to archaeological sites on public and private lands.

4.1.1. Cultural Resources Permitting

One federal and two state regulations govern permitting associated with archaeological research or the impacting of known archaeological resources (see Table 17).

Table 17: Regulations Governing Permitting for Impacts to Cultural Resources

Government	Law Title	Summary
Federal	Archaeological Resource Protection Act (ARPA) of 1979	Establishes the permit process for archaeological research and impacts to archaeological sites on federal and Native American lands.
State	Permit and Conditions for Excavation or Removal of Archaeological or Historical Materials (ORS 390.235)	Permitting for subsurface archaeological investigations on non-federal public lands.
State	Administrative Rules for Archaeological Permits for Public and Private Lands (ORS 358.920, Oregon Administrative Rule [OAR] 736-051-0080 through 0090)	Permitting for impacts to archaeological resources.

ARPA permits are issued by the federal landowner. Subsurface archaeological survey or archaeological site testing or data recovery on the federally owned parcels will require an ARPA permit. The WWSP study area for cultural resources (100 feet to either side of the proposed alignment) will cross properties owned by two federal agencies, the BPA and the USFWS. The ARPA permit process varies somewhat between agencies, but generally requires the submission of a cover letter and/or application form and research design developed by an archaeologist who meets the Secretary of the Interior's professional qualifications (36 CFR Part 61). The submitted documents are reviewed by the agency, which then sends them on for review by the SHPO and appropriate tribal governments. The permit is approved or a request is made for further information within a 30-day review period. Permit processing fees vary from agency to agency.

SHPO is the administrative agency designated to carry out the state's policies on the identification, preservation, and management of culturally significant structures, sites and objects within the state (ORS 358.605-358.622). State law requires the obtaining of permits if a subsurface archaeological survey is to be conducted on non-federal public lands. One permit must be obtained for each landowner and can apply to multiple parcels. The WWSP study area will cross properties owned by the state, Washington County, six municipal corporations, and three regional government organizations (see Table 18, below, and Appendix A, Figure 7-1). Subsurface archaeological survey may or may not be needed on all of these parcels. It is possible that as many as 11 archaeological survey permits will be required, based on the current design. Much of the study area is on private land; no permit is necessary for archaeological exploration on private land.

Table 18: Non-federal Public Landowners along the WWSP

Government	Name	Department
State	State of Oregon	Department of Transportation
State	Beaverton School District #48J	School Property
County	Washington County	Housing Authority
County	Washington County	Facilities Management
Municipal	City of Hillsboro	Property
Municipal	City of Beaverton	Property
Municipal	City of Wilsonville	Property
Municipal	City of Sherwood	Property
Municipal	City of Tualatin	Property
Municipal	Tri-County Metropolitan Transportation District of Oregon	Property
Regional	Metro	Property/Conservation Easement
Regional	Metro	Tualatin Hills Park & Recreation District

Government	Name	Department
Other	Tualatin Hills Park & Recreation District	Property, Beaverton and Washington County
Other	Tualatin Valley Water District	Property

The permit process for survey on non-federal public lands requires a qualified archaeologist, as defined in ORS 390.235(6)(B)(b)(A-C), to submit a permit application along with a research design specific to the work and a letter of agreement by the project lead, to the SHPO. SHPO representatives review the application and forward it for review to the appropriate Tribes, the Commission on Indian Services, the Oregon State Museum of Anthropology and the planning department of the owner. The reviewing members have 30 days to respond to the application with conditions or objections. After 30 days, if there are no objections, the permit is issued. There are no fees associated with a SHPO excavation permit.

An additional permit is required, under ORS 358.920 and OAR 736-051-0080 through 0090, to excavate or alter known archaeological sites on private and non-federal public land. This includes the removal from those lands of any material of an archaeological, historical, prehistoric or anthropological nature. The process is similar to that for applying for a subsurface survey permit. However, if the archaeological site is on private land, the application must include a letter from the landowner agreeing to the archaeological work and a plan for the curation of any resulting archaeological material.

All archaeological items collected under the permit must be curated at the Oregon Museum of Natural and Cultural History (OMNCH) in Eugene if they are not retained by the private landowner. Attendant research documents will be curated at OMNCH. All items associated with the work done under a permit on non-federal public lands are also curated at the OMNCH. The OMNCH's 2015 curation fees are \$400 per cubic foot or a minimum of \$125. All archaeological items, from private or public land, must be made available to the appropriate tribes to view to ensure that all funerary objects, sacred objects, or objects of cultural patrimony are returned to tribal ownership per state law (ORS 97.740) and NAGPRA.

Additional permitting, namely for conducting work within ROW owned by the ODOT or by such federal entities such as the BPA, may be required before fieldwork or archaeological excavations.

4.2. Cultural Resources Programmatic Agreement

A cultural resources Programmatic Agreement (PA) is a document that spells out the terms of a formal, legally binding agreement between the SHPO and other state and/or federal agencies. During a meeting between the Partners and Dr. Dennis Griffin, Oregon State Archaeologist, on December 22, 2014, Dr. Griffin suggested that a PA would be the best approach for coordinating the work over multiple years. A PA establishes a process for consultation, review and compliance with one or more federal or state laws concerning historic preservation. A project-specific PA describes the actions that will be taken by the parties in order to meet their compliance responsibilities for the specific project. PAs are used

when the effects of an undertaking are not fully known. In the case of the WWSP, archaeological survey work may be completed in segments over years or as the alignment is changed. In addition, much of the proposed ground-disturbing activities will occur where survey work is not possible, such as below existing pavement. PAs are also tools for implementing approaches that do not follow the normal NHPA Section 106 process, and are used to streamline and enhance historic preservation and project delivery efforts.

4.2.1. Programmatic Agreement Development

Through consultation with the SHPO, the City of Hillsboro and TVWD can begin the process of designing a PA by determining what they want to have happen in the compliance process. This process will include the consideration of issues such as time frames and contingencies, responsibilities of various parties and who will need to be additional signatories to the document.

The partners in the consultation process formulate the basic concepts and structure of the PA. The ACHP should be contacted and informed about the plans. For project-specific PAs, such as the one for the WWSP, the ACHP will apply the criteria in Appendix A of 36 CFR part 800 in making its decision about whether to participate in the consultations or not.

The primary sections of a PA are: the list of required signatories, the background or basis of the PA, the list of stipulations describing the agreements and responsibilities, and a signature section. The PA is appended with supporting documents that detail the steps for implementing the stipulations. Supporting materials essentially function as an operational manual.

Once the negotiations are complete and the formal, legally sufficient PA document has been drafted, the next step is to secure signatures. For Section 106 PAs, the required signatories are the federal agency or agencies, the SHPO and the ACHP, if the ACHP participated in consultations. Other parties who have substantial responsibilities under the terms of the PA should also be invited to sign the agreement. In the case of the WWSP, this would include the Confederated Tribes of the Grand Ronde, the Confederated Tribes of Siletz and the Confederated Tribes of Warm Springs. Parties that have participated in the consultations but do not have responsibilities under the PA may be invited to sign as concurring parties. If a party that was invited to sign or to concur in the agreement declines to sign, the agreement will still go into effect once the required signatories have executed the document (see 36 CFR 800.14(b)(2)(iii)).

4.2.2. Programmatic Agreement Implementation

The supporting documents provide guidance detailing how the PA will be implemented. They can cover, among other topics, expectations for survey methods, procedures for documentation of cultural resources and consultation, the treatment of resources identified during survey or inadvertently during ground-disturbing activities, the treatment of human remains, reporting standards, curation plans, standardized field forms and contact information. These documents can also call for the development of

additional supporting material such as construction monitoring plans or inadvertent discovery protocols appropriate to be distributed to construction contractors.

4.3. Cultural Resources Analysis of the Preferred Alignment

Historical Research Associates, Inc. (HRA) conducted a desktop analysis of the preferred alignment for the WWSP that included extensive background research, the development of a Geographic Information Systems (GIS)-based landform sensitivity model and a field visit. The results of this work are described in the following sections.

4.3.1. General Description of Cultural Resources and the Preferred Alignment

HRA began its study by consulting the Oregon Archaeological Records Remote Access database as well as conducting research at the SHPO archives in Salem to collect information on the types and distribution of known cultural resources and previous cultural resource studies within 1 mile of the preferred alignment. In addition, HRA consulted historic documents such as General Land Office (GLO) Plat Maps from the 1800s, United States Geological Survey (USGS) maps from the 1900s, and various road and county maps to establish regional development trends and potential distribution of historic-era archaeological resources.

Research revealed that 55 cultural resource studies have been conducted within 1 mile of the study area. Of these, 25 were carried out within or immediately adjacent to the preferred alignment, resulting in roughly 25% of the WWSP study area being surveyed for cultural resources (see Table 19). Some of the studies, especially those conducted in the 1980s, may not meet current SHPO survey standards.

Table 19: Cultural Resource Studies Conducted Within or Immediately Adjacent to the WWPS

Section	Year	Title	Author	Associated Resources within 1 mile	Study Type	Proximity to Project Area
1	1993	Wilsonville Road Project Cultural Resources Survey: Shovel Testing, AINW Letter Report No. 51.	Wilson, Douglas C.	Isolate #3	Subsurface Testing	Within
1	2000	Cultural Resources Survey of the Proposed Wilsonville Water Treatment Plant Location, Wilsonville, Oregon	Ellis, David V.		Pedestrian Survey, Subsurface Testing	Within
1	2005	Archaeological Survey of the Boeckman Road-Tooze Road Connector Project, Clackamas County, Oregon	Toepal, Kathryn and Kevin McCornack		Pedestrian Survey	Within

Section	Year	Title	Author	Associated Resources within 1 mile	Study Type	Proximity to Project Area
1	2005	Results of an Archaeological Survey Conducted as Part of the Pearl-Troutdale Fiber Optic Project, Clackamas County, Oregon	Becker, Thomas E., and Bill R. Roulette		Pedestrian Survey, Subsurface Testing	Within
1	2007	A Cultural Resources Survey for the BPA/Tri-Met Pole Relocation, Wilsonville, Oregon	Brannan, Nicole F., and Sunshine R. Clark	Isolate Tri-Met 001	Pedestrian Survey	Within
1	2007	Cultural Resource Survey and Selected Subsurface Testing for the Proposed Tualatin Basin Water Supply Project, Clackamas and Washington Counties, Oregon	Punke, Michele L., Todd Ogle, David V. Ellis, and Elizabeth O'Brien		Pedestrian Survey, Subsurface Testing	Within
1	2010	A Cultural Resource Survey of Three Proposed Wireless Sites	Oliver, Liz and Sunshine Schmidt		Pedestrian Survey	Adjacent, to the north
1	2010	Archaeological Survey of the Barber Street Extension/Kinsman Road Extension Project, Clackamas County, Oregon	Lloyd-Jones, Jeff and John L. Fagan		Pedestrian Survey, Subsurface Testing	Within
1, 2	2006	A Cultural Resources Reconnaissance Survey of the Proposed Tualatin Basin Water Supply Project (Willamette Pipeline), Clackamas and Washington Counties, Oregon	Smits, Nicholas, Elizabeth J. O'Brien, Jason Allen, and David V. Ellis		Reconnaissance Survey	Within
2	1987	A Cultural Resource Survey of the Tualatin-Sherwood/Edy Road Project, Washington County, Oregon	Scott, Sara	35WN00031, 35WN00032	Pedestrian Survey	Within
2	1987	Archaeological Investigations at Two Sites Within the Tualatin-Sherwood/Edy Road Project Corridor, Washington County, Oregon	Scott, Sara	35WN00031, 35WN00032	Subsurface Testing	Adjacent
2	2001	Steinborn Wetland Enhancement/Restoration - Tualatin River NWR	Valentine, Nicholas	35WN00043, 35WN00044	Pedestrian Survey	Adjacent, to the east

Section	Year	Title	Author	Associated Resources within 1 mile	Study Type	Proximity to Project Area
2	2014	Archaeological Testing and Evaluation of Site 35WN89 for the SW 124th Avenue Extension: SW Tualatin-Sherwood Road to SW Grahams Ferry Road Project, Washington County, Oregon	Hambleton, Karla L., and Lucie Tisdale	35WN00089	Subsurface Testing	Adjacent, to the east
3	1984	Report on the archaeological survey of the proposed Cornelius Pass Interchange Section, Sunset Highway, Washington County	Pettigrew, Richard M.		Pedestrian Survey	Within
3	1996	A Cultural Resource Survey of the Tualatin Valley Water District's North Transmission Line, Washington County, Oregon	McClintock, Robin and James C. Bard		Pedestrian Survey	Within
3	2002	Results of an Archaeological Survey of the Keeler Substation, Washington County, Oregon	Finley, Aimee		Pedestrian Survey, Subsurface Testing	Adjacent, to the east
3	2002	Cultural Resource Survey of the Proposed Widening of Baseline Road from 201st to 231st Avenue and Extension of 231st Avenue from Baseline Road to Borwick Road, Hillsboro, Washington County, Oregon	Ozbun, Terry L., Judith S. Chapman, and Jo Reese	35WN00051	Pedestrian Survey, Subsurface Testing	Within
3	1990	A Cultural Resource Survey of the Farmington Road Improvement Project, Washington County, Oregon	Atwell, Rick, Sara Scott, and Mike Gallagher		Pedestrian Survey, Subsurface Testing (augers)	Within
3	2004	Exploratory Probing of ATMS Communications Infrastructure (US 26 and Hwy 217), Washington County, Oregon (ODOT Key #10870)	Helzer, Margaret		Pedestrian Survey, Subsurface Testing	Within

Section	Year	Title	Author	Associated Resources within 1 mile	Study Type	Proximity to Project Area
3	2008	Archaeological Survey along US 26, Sunset Highway, North Plains to 185th, Washington County, Oregon (Key Number 13707)	Hart, Linda P., Kendra Carlisle, and Robert R. Musil		Pedestrian Survey	Within
3	1977?	A Cultural Resources Survey for the Rock and Bronson Creeks Sewer Project, Washington County, Oregon	Follansbee, Julia A. and Felicity Musick	35WN00020, 35WN00021	Pedestrian Survey, Subsurface Testing	Within
3	2009	Cultural Resource Survey of the Proposed Cornelius Pass Road-W Baseline Road to NW Alclek Drive Improvements Projects, Washington County, Oregon	Buchanan, Brian G., Judith A. Chapman, and Elizabeth J. O'Brien		Pedestrian Survey, Subsurface Testing, Aboveground Survey	Adjacent, to the north, located on NW Cornelius Pass Road north of Baseline Road and south of NW Cornell Road
3	2013	Cultural Resource Investigations for Bonneville Power Administration's Keeler-Forest Grove, Forest Grove-Tillamook No. 1 Transmission Line Rebuild/Reconductor Project (OR 2012 029) in Washington and Tillamook Counties, Oregon	Kolar, Kendra Carlisle		Pedestrian Survey, Subsurface Testing	Adjacent, to the east
3	2014	Reedville Farm Cultural Resources Inventory for Reed's Crossing Project, Hillsboro, Washington County, Oregon	Windler, Zach, Karry L. Blake, and Adrienne Donovan-Boyd	35WN00090	Pedestrian Survey, Subsurface Testing	Within
3	2014	Cultural Resource Survey of the Proposed NW Cornelius Pass Road (NW Cornell Road to US 26) Improvement Project, Washington County, Oregon	Adams, Ron L., Elizabeth J. O'Brien, and Judith A. Chapman	35WN00091, Isolates 13/2141-2 and 13/2141-3	Pedestrian Survey, Subsurface Testing	Within

The completion of the previously mentioned studies resulted in the identification of a variety of cultural resources. As of March 24, 2015, there are 26 documented cultural resources within 1 mile of the WWSP study area, six of which are within or immediately adjacent to the study area itself (see Table 20). A seventh area, along Buttermilk Creek in Section 3, has been reported to contain archaeological deposits, but nothing has been formally documented. One resource, the Reedville Farm site (35WN90), has been determined eligible for listing on the NRHP. Two of the resources consist of isolated historic-era artifacts, and are not considered eligible for listing. The section of railroad grade associated with the Orenco Branch line has been determined to be not eligible.

Table 20: Previously Documented Cultural Resources Within or Immediately Adjacent to the WWSP

Section	NRHP Status	Site No.	Site/ Isolate	Site Name	SHPO Type	Distance and Direction	Description
2	Unevaluated (portion of site within previous survey area recommended not eligible)	35WN89	Site		Multi-archaeological Components	Adjacent, to the east	Pre-contact lithics and historic refuse. Represents a seasonal camp and tool manufacturing activity (heat-treated cryptocrystalline silicate [CCS]).
3	Unevaluated	35WN20	Site		Pre-contact Camp	Adjacent, to the north	Lithic scatter with fire-cracked rock (FCR) and bone fragments.
3	Eligible	35WN90	Site	Reedville Farm	Historic Other	Within	Historic-period foundations, artifact concentrations, structural remains and road related to the Reedville Farm
3	Not Eligible	35WN91	Site		Historic Railroad Properties	Adjacent, to the west	Orenco Branch connector railroad grade
3	Not Eligible	13/2141-2	Isolate		Historic Isolate	Adjacent, to the west	Square nail
3	Not Eligible	13/2141-3	Isolate		Historic Isolate	Adjacent, to the west	Aqua-tinted glass fragment

4.3.2. Cultural Resources Sensitivity Model

HRA developed a GIS-based landform sensitivity model in June 2014 to inform the selection of the preferred alignment. Upon the determination of the preferred alignment, the model was updated in 2015 with data from the SHPO and clipped to within 100 feet on either side of the alignment. Due to the sensitivity of this information, this map is not included in this document.

Sensitivity analysis is achieved through the use of environmental variables that, when assessed in conjunction with one another, indicate the likelihood of potential site locations occurring within the study area. The model inputs are variables in the form of GIS thematic layers, geomorphic and other derivative variables. The model outputs are experimental vector data that translates into physical maps of areas that show high, moderately high, moderate and low potential areas for the discovery of cultural resources based on the weighted variable distribution.

These models rely on the archaeologist's understanding of past human behavior to select environmental datasets, such as slope, distance to water, land cover, geology and proximity to previously mapped sites or features. Once pertinent context has been established, it is then determined which variables are most predictive for the occurrence of archaeological sites. The variables within each dataset are then weighted, giving greater weight to those variables the archaeologist perceives as having the most influence on past human settlement patterns, resource acquisition locations, strategies and so forth.

For the cultural resources study area (100 feet to either side of the preferred alignment), category quantities include approximately 10% of high potential area (89 acres), 7% moderately high (66 acres), 65% moderate (571 acres), and 17% low (146 acres). Above-ground architectural resources identified by HRA staff through SHPO research were mapped as a point feature dataset placed on top of the modeling results to assist in future planning phases.

On March 10, 2015, HRA Architectural Historian Natalie Perrin and Archaeologist Cathy Bialas drove the preferred alignment to get a sense of landforms along the route and the level of disturbance and development along the alignment. Ms. Perrin identified portions of the route that are flanked by houses and structures that will likely require documentation as part of a historic inventory before implementation of the Program.

4.3.3. Areas of Concern

The current literature review resulted in the identification of eight areas along the preferred alignment that are known to be sensitive for archaeological resources (see Table 21).

Table 21: Current Areas of Greatest Archaeological Concern

Section	Location	Concern
3	NW Amberwood Dr. between NW 206th Ave. and NW Aloclek Dr.	Pre-contact resources
3	NW Cornelius Pass Rd. between NW Amberwood Dr. and Hwy 26	Historic resources
3	Between SW TV Highway and SW Rosedale Rd.	Pre-contact and Historic resources, little development, few previous surveys
2	Intersection of SW Tile Flat Rd. and SW Scholls Ferry Rd.	Historic community of Kinton
2	SW Roy Rogers Rd. between SW Eisner Rd. and SW Scholls-Sherwood Rd.	Pre-contact and Historic resources, Tualatin River
2	SW Tualatin-Sherwood Rd. between SW Borchers Rd. and SW Baler Way	Historic resources
2	Intersection of SW Tualatin-Sherwood Rd. and SW 124th Ave.	Pre-contact resources
1	Between SW Boeckman Rd. and SW Barber St.	Historic resources, little development

The Tualatin Valley has been occupied by the Kalapuyan People and their predecessors for thousands of years, and evidence of their use of the region is represented by village remains, burial areas, resource procurement and processing stations, stone tool manufacture areas and dispersed stone artifacts. Recent non-native use and settlement has left behind numerous remains of homesteads, burials, earthworks such as drainage canals, transportation grades and associated discarded debris. While the areas mentioned above are known to contain or almost certainly contain cultural resources, other portions of the alignment may also contain cultural resources. The coverage of previous cultural studies is incomplete, and the depth and nature of the disturbances associated with the Program will penetrate to deep deposits that could hold cultural resources not identified by earlier, shallower testing.

Reconnaissance-level survey of historic-era above-ground resources (buildings and structures) will need to be conducted for all properties located adjacent to (within one tax parcel of) the preferred alignment. Properties aged 40 years old and older should be considered, to account for the potential of resources reaching the 50-year age requirement for eligibility to the NRHP over the lifespan of construction of the Program. Survey and inventory should be conducted to current SHPO standards and guidelines.

4.4. Summary of Anticipated Permitting Requirements

A series of permits related to cultural resources are anticipated to be required during the ongoing development of the WWSP. These consist of archaeological permits from federal landowners and the SHPO as well as ROW permits from ODOT and BPA as follows:

- Federal Archaeological Survey Permit (ARPA) – Up to two ARPA permits will be required for work conducted within lands owned by BPA and USFWS.
- State Archaeological Survey Permit – As many as 11 permits may be needed, due to the ownership of project lands by 11 non-federal public agencies.
- State Archaeological Permit to disturb a known resource – Five archaeological sites have been documented within or immediately adjacent to the WWPS alignment.

It is important to note that additional archaeological resources are likely to be identified during the survey work or construction monitoring, and each will require a state permit to test or disturb.

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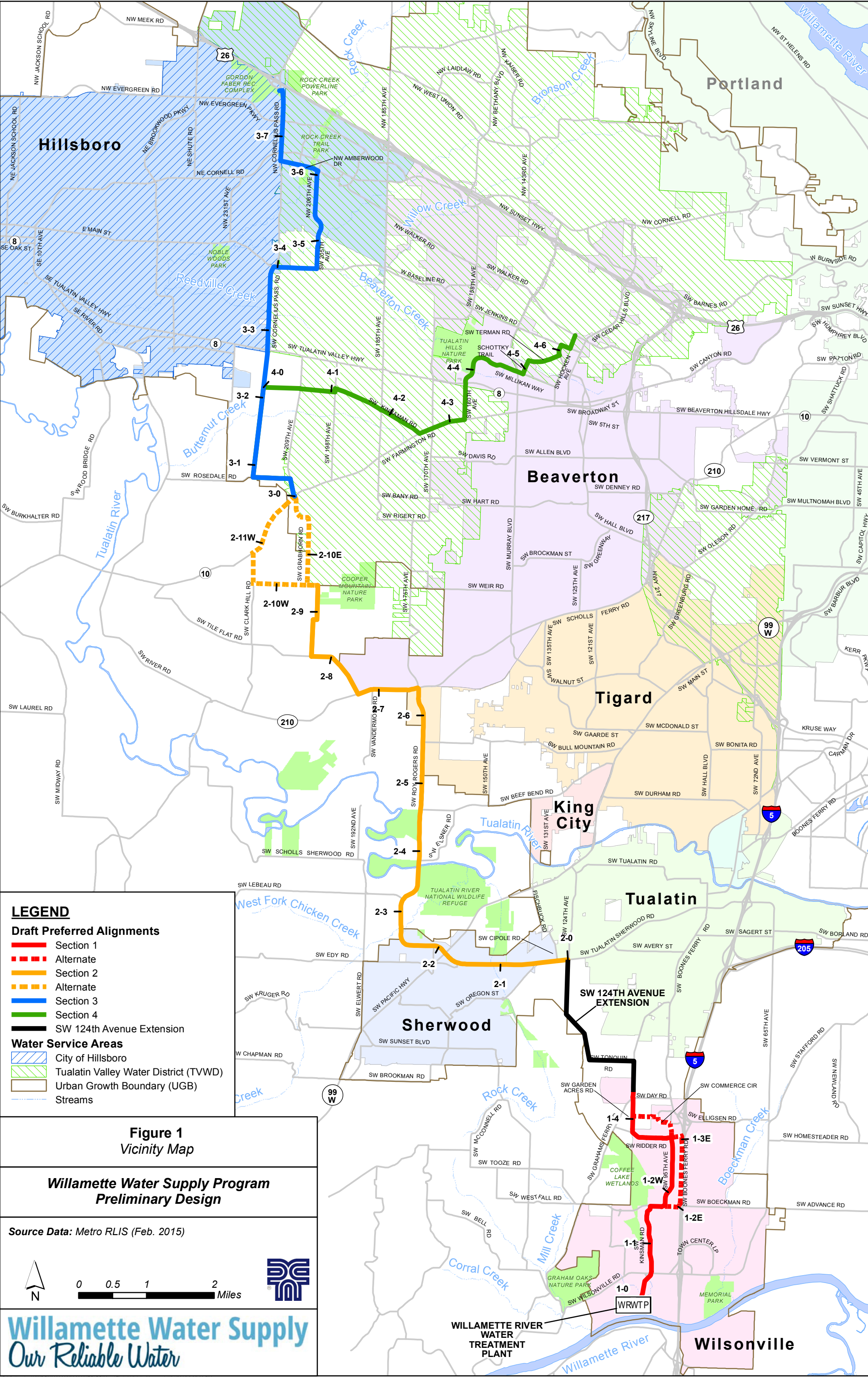
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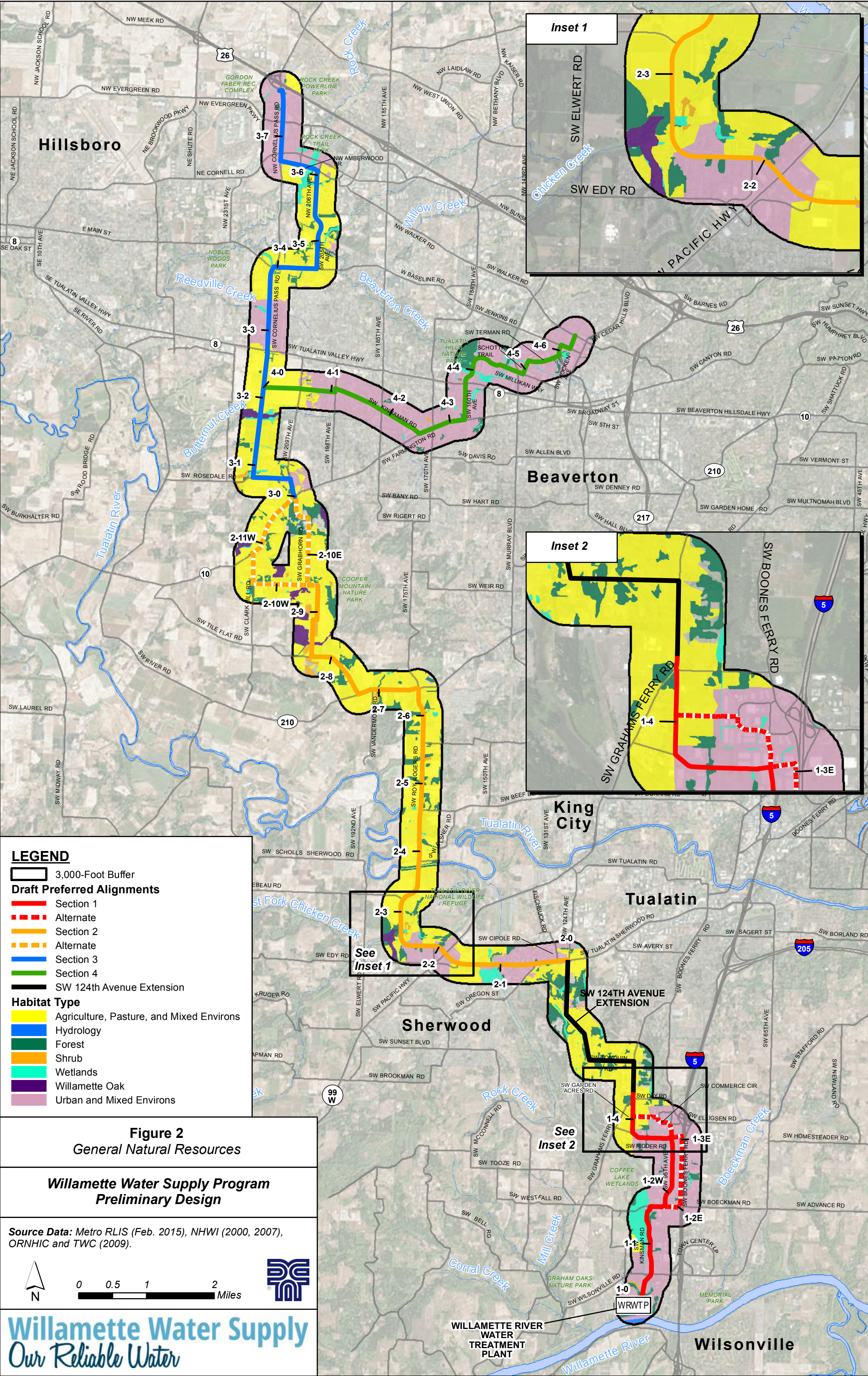
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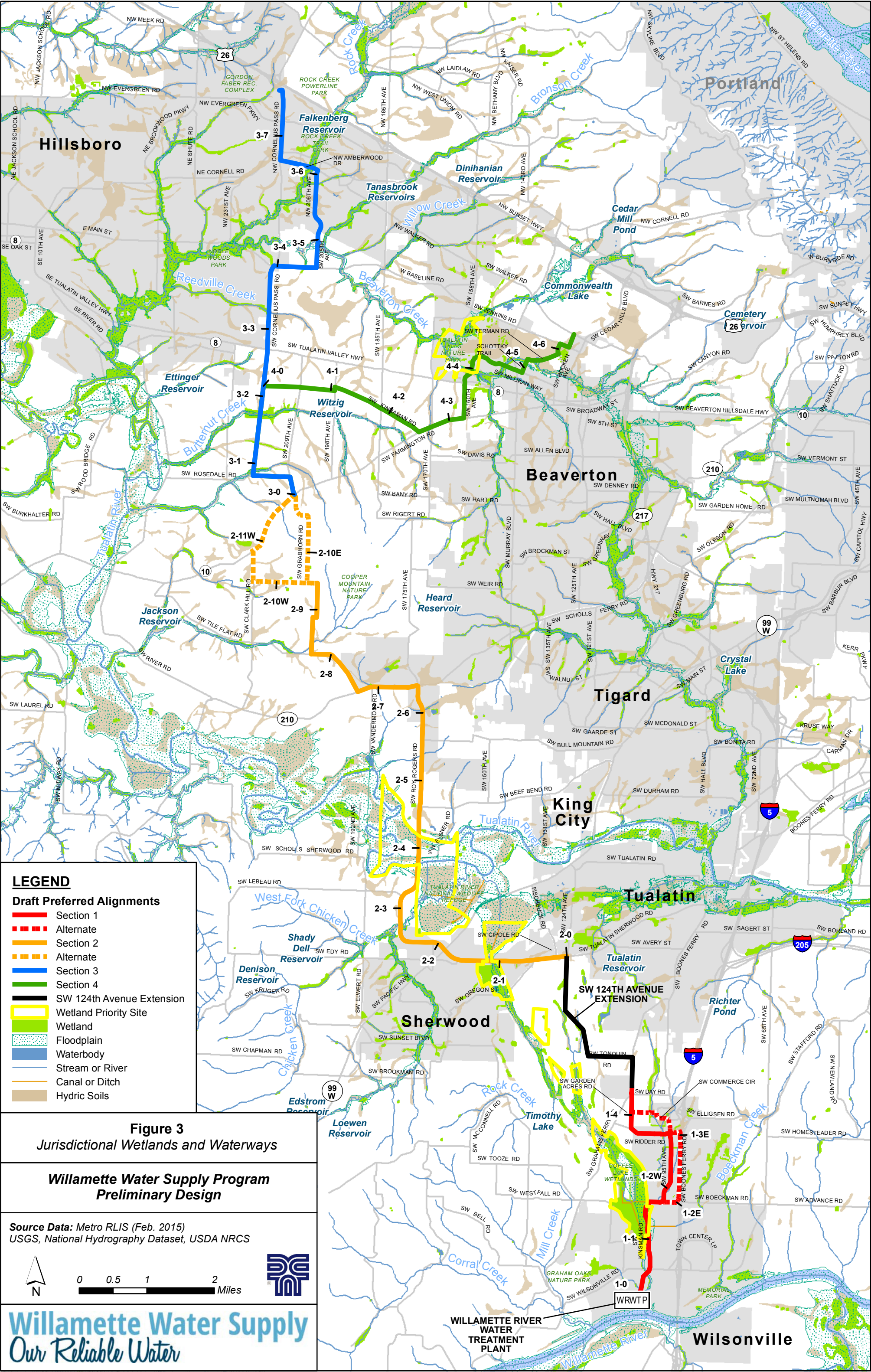
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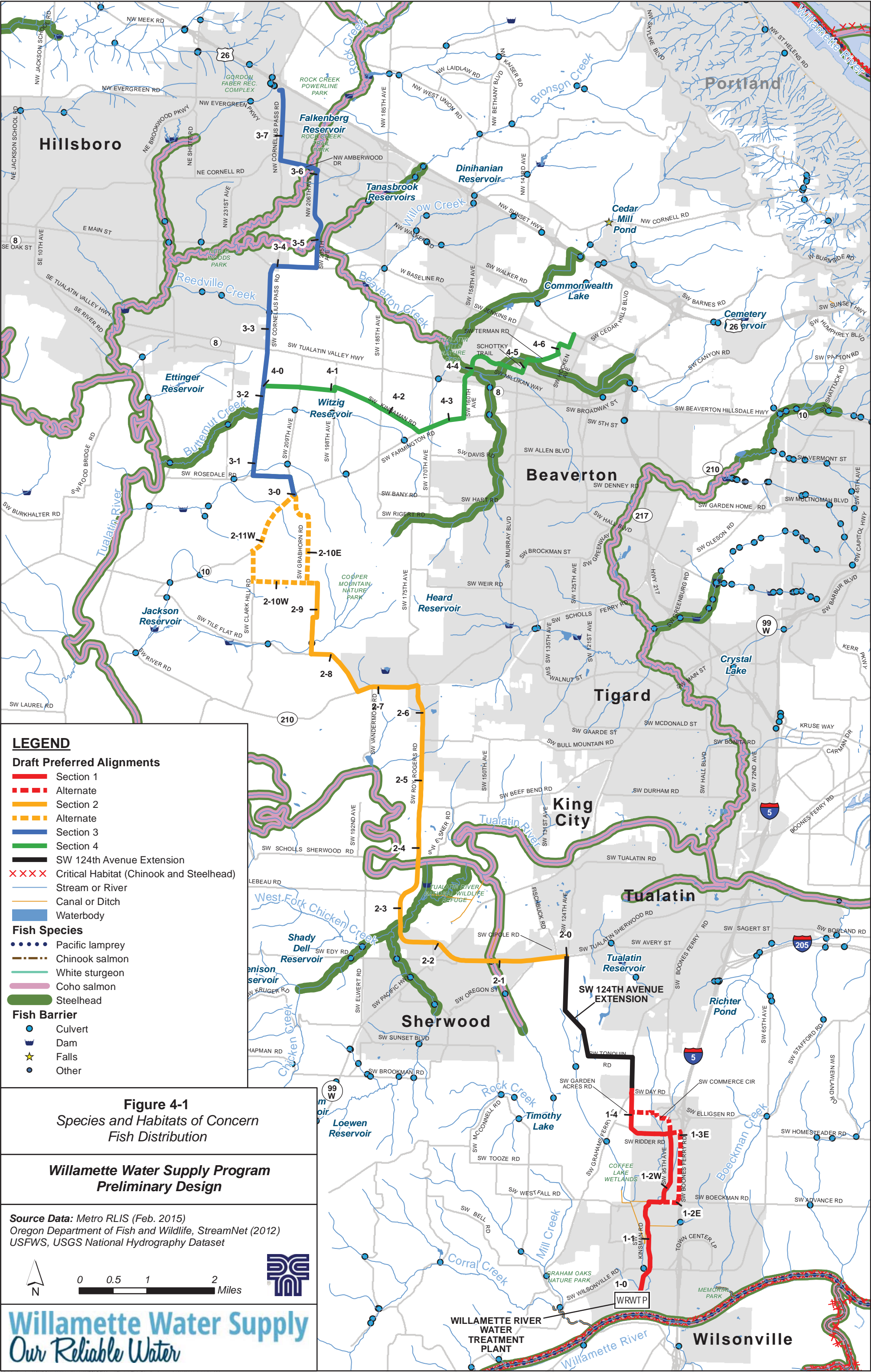
6. Appendices

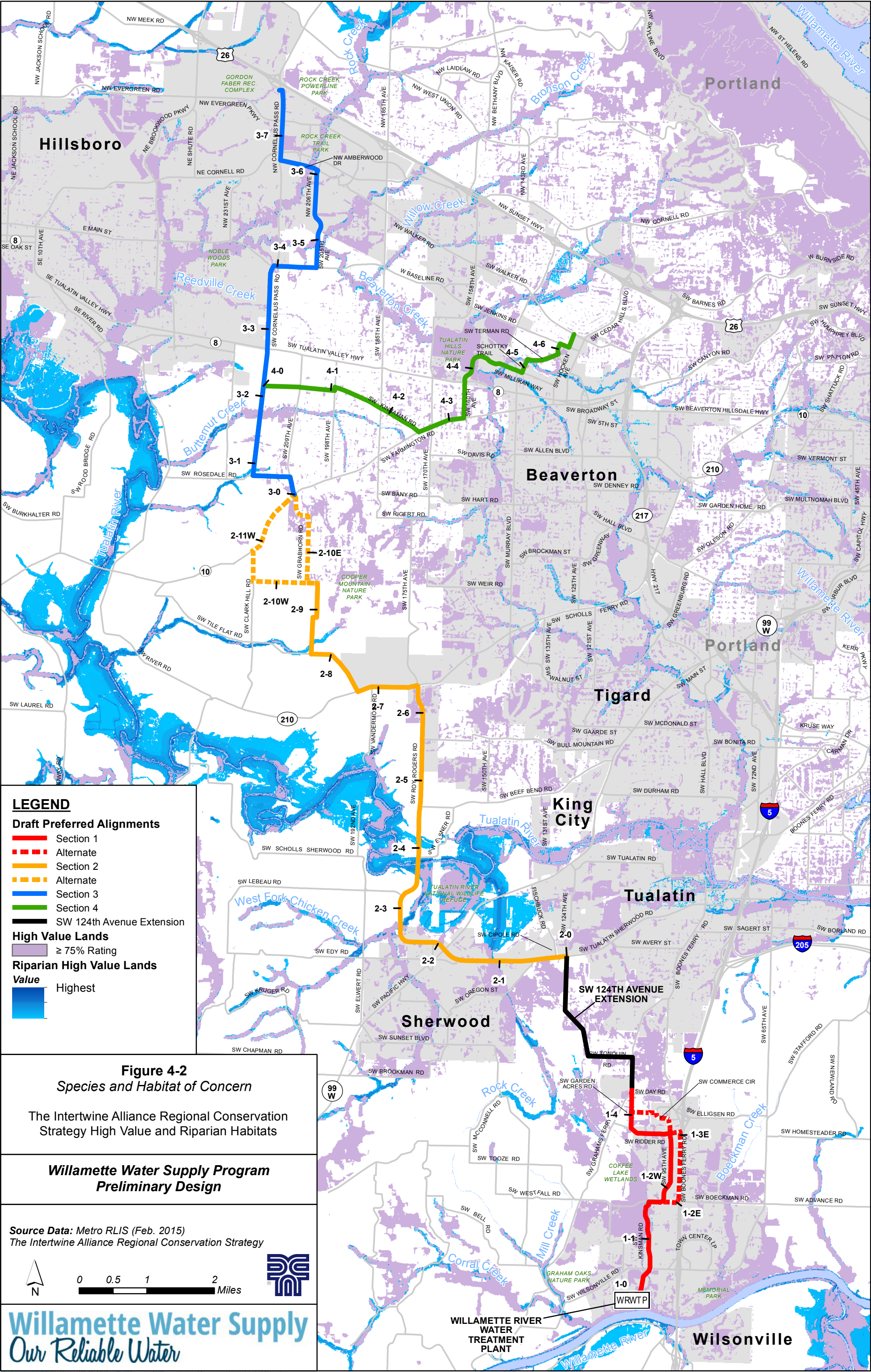
Appendix A: Figures

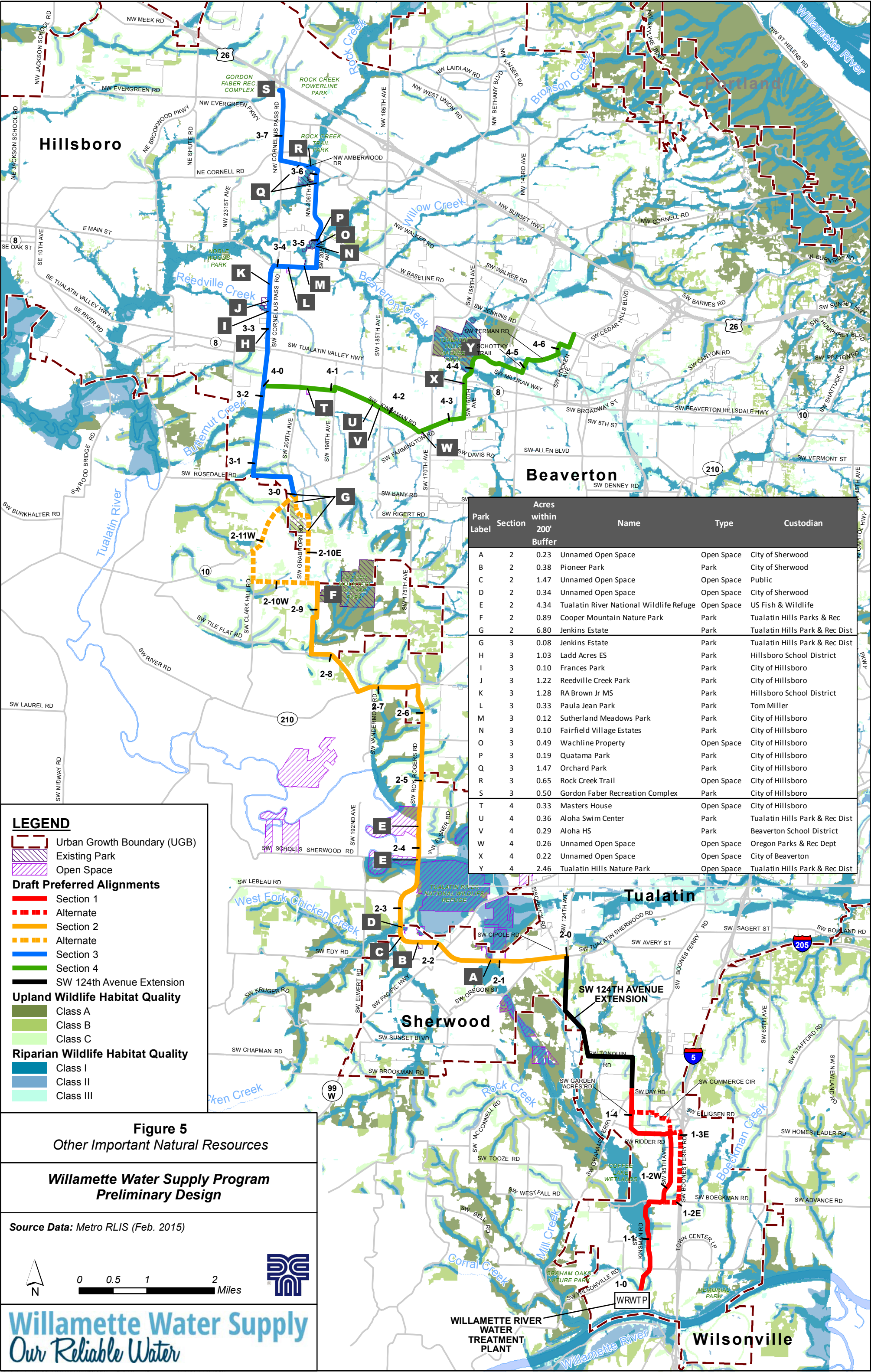


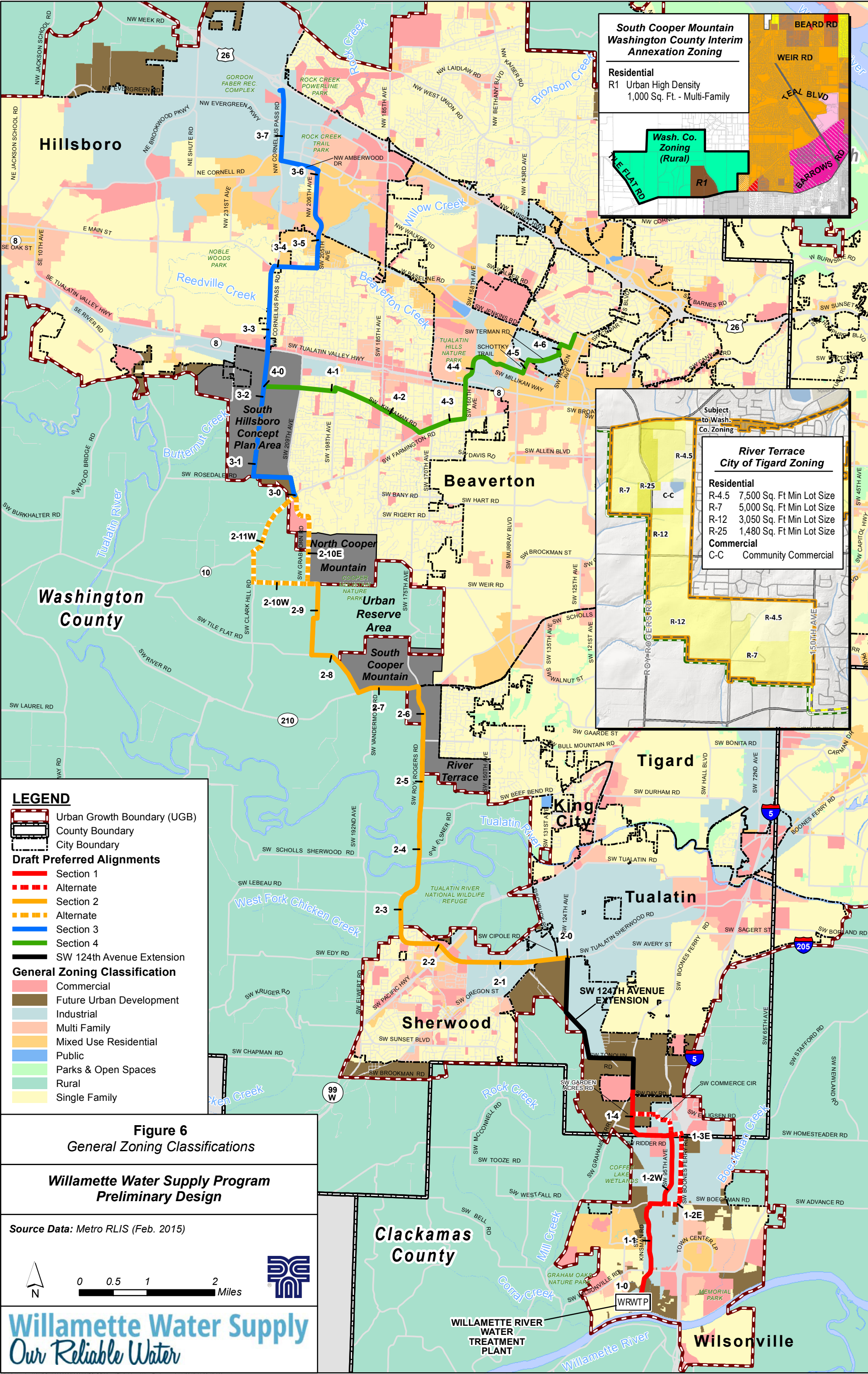












South Cooper Mountain
Washington County Interim
Annexation Zoning

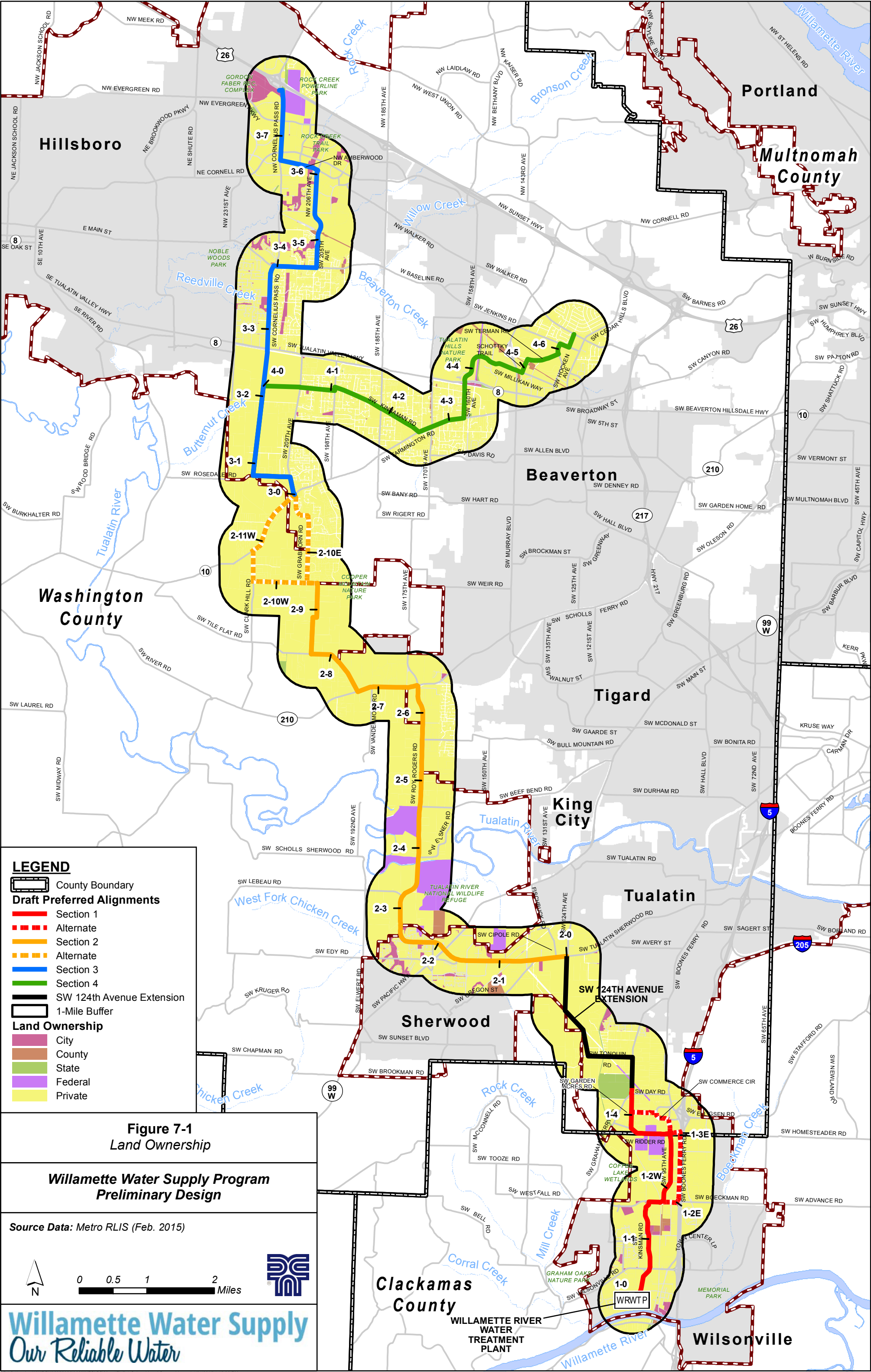
Residential
R1 Urban High Density
1,000 Sq. Ft. - Multi-Family

Wash. Co. Zoning (Rural)
R1

River Terrace
City of Tigard Zoning

Residential
R-4.5 7,500 Sq. Ft Min Lot Size
R-7 5,000 Sq. Ft Min Lot Size
R-12 3,050 Sq. Ft Min Lot Size
R-25 1,480 Sq. Ft Min Lot Size
Commercial
C-C Community Commercial

Subject to Wash. Co. Zoning



Appendix B: Willamette River Water Treatment Plant – Summary of Potential Intake Modifications

Willamette River Water Treatment Plant Summary of Potential Intake Modifications

November 4, 2014

As part of the upcoming Willamette River Water Treatment Plant (WRWTP) Master Plan, the Willamette Water Supply Program (WWSP) Partners will be developing the strategy and timing for the future intake expansion/modification process. To help inform their decisions, the WWSP Partners would like to better understand the permitting requirements of the various intake expansion options. At this time, it is anticipated that the **initial** plant expansion will require minimal modifications to the existing intake facilities. However, future expansions may require additional, more substantive modifications to the intake infrastructure, which will require the WWSP Partners to reinstate permitting discussions at that time. This Summary of Potential Intake Modifications is intended to provide the permitting agencies the background required to help facilitate these initial permitting discussions.

Background

The WRWTP began operating in April 2002. Portions of the plant, including the raw water intake screen, pipeline and pump station wet-well, were constructed to accommodate a maximum capacity of 120+ million gallons per day (mgd) (186 cubic feet per second [cfs]), though the intake screens are currently only permitted for flows up to 70 mgd (108 cfs) (August 10, 2000 NMFS letter of authorization for Informal Consultation; August 30, 2000 USACE NWP 12) (see Figure 1, below). The existing two 66-inch diameter Tee-screens were designed and approved in accordance with the requirements of the Oregon Department of Fish and Wildlife (ODFW) and the National Marine Fisheries Service (NMFS) fish passage standards (2008 NMFS, Anadromous Salmonid Passage Facility Design).

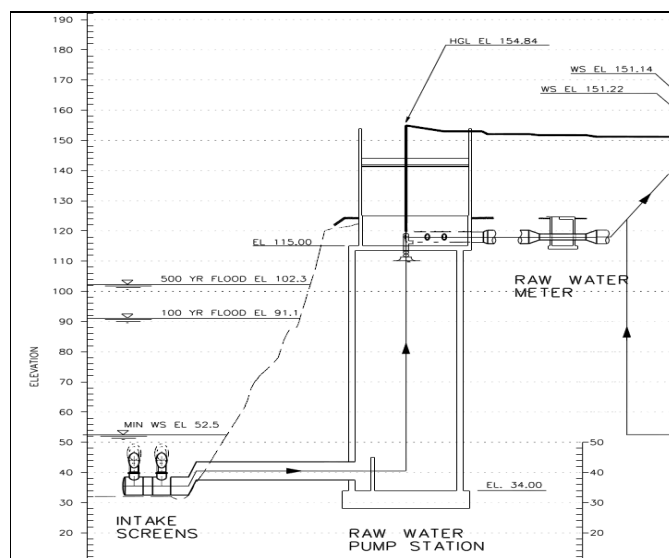


Figure 1. WRWTP Intake Profile

The WWSP is planning to draw and treat water from the Willamette River for delivery to municipalities to the north including the Tualatin Valley Water District and the City of Hillsboro; initial phase of this Program is scheduled to be completed by 2026. Briefly, the initial phase involves the expansion of the WRWTP, installation of 20+ miles of 72" diameter pipelines, construction of 15-30 million gallon storage reservoir(s) (also referred to as terminal storage tanks) and other ancillary facilities. A Preliminary Design Study is currently being developed to identify a preferred route for the pipelines to deliver drinking water from the WRWTP north to Highway 26 and to identify a site(s) for the location of finished water storage reservoirs. In addition, the Preliminary Design Study includes the development of a Program-wide permitting strategy to identify the federal, state, and local permitting requirements to complete the overall Program.

Similar studies are being undertaken for the portion of the Program related to the WRWTP expansion. Tualatin Valley Water District, in conjunction with WRWTP Master Plan participant agencies (Participants), is currently preparing an update to the 2006 Master Plan to consider current plant limitations and expansion requirements in the context of the Willamette Water Supply Program. As part of the 2006 Master Plan, the existing WRWTP site was estimated to be capable of accommodating up to 170 mgd of treatment infrastructure. Though significant construction would be required to expand the current treatment processes, due to early investments in infrastructure during the original construction, expansion of the intake screens and raw water pump station up to approximately 140 to 160 mgd may be accomplished with only minor modifications to the existing infrastructure. The Master Plan Update, when completed in 2016, will provide greater detail on the capacity and phasing of WRWTP modifications required to meet future demands.

Current Authorizations

Construction and current operations of the WRWTP are authorized under the following permits:

- USACE, Clean Water Act, Section 404 (Nationwide Permit 12) and Oregon Department of State Lands (DSL) Removal-Fill (addresses impacts to jurisdictional wetlands and waterways)
- USACE, Rivers and Harbors Act, Section 10 (addresses impacts to navigability)
- NMFS, Endangered Species Act, Section 7, Informal Consultation (addresses impacts to listed anadromous fish)
- Oregon Department of Environmental Quality, National Pollution Discharge Elimination System (NPDES) Permit (addresses construction-related water quality concerns)
- Oregon Water Resources Department (addresses water rights associated with point of diversion)
- City of Wilsonville, Conditional Use Permit (addresses local zoning and land use considerations)

These authorizations are based on the project description provided at the time (2000). Some modifications to the operation or infrastructure of the WRWTP may require additional approval. For example, the NMFS letter of approval indicates "COE [USACE] must reinitiate [ESA] consultation if...the action is modified in a way that causes an effect on listed species that was not previously considered". Recent discussions with USACE indicate that expansion of the existing intake screening facility via a simple replacement of the two existing 66-inch diameter Tee-screens, with larger screens may not require re-authorization; however, it is anticipated that withdrawals greater than 70 mgd (108 cfs) will require initiation of formal ESA consultation (as opposed to the informal consultation that was sufficient in 2000).

Summary of Potential WRWTP Intake Modifications

The WWSP Partners are currently developing a Program-wide permitting approach that will include potential modifications to the WRWTP. Through the WRWTP Master Plan Update process, the Partners will evaluate

projected peak withdrawals, and develop a plant expansion strategy to accommodate these increased flows, which will include maximizing the potential capacity of the existing infrastructure. Current demand projections compiled from the WWSP Partners suggests the maximum demand will occur in 2076, with incremental increases as follows:

- 120 mgd (186 cfs) by 2026
- 160 mgd (186 cfs) by 2047
- 208 mgd (237 cfs) by 2076

As the WWSP is further developed and the WRWTP Master Plan is completed, the Partners will continue to define how best to proceed with WRWTP intake modifications to balance minimal impacts to the aquatic environment with maximum intake capacity and Program efficiency.

Potential WRWTP modifications are described below and summarized in Table 1.

Withdrawals Greater than 70 mgd (108 cfs): While the existing screens may be able to deliver some incremental capacity beyond 70 mgd (108 cfs), that small amount of additional capacity (less than 100 mgd [154.7cfs]) would not meet the required demands of the initial expansion of the WWSP. The terms of the 2000 ESA informal consultation also requires approval from NMFS to exceed 70 mgd (108 cfs).

Screen Replacement: The existing intake meets current regulatory requirements for safe fish passage. However, the existing 2x66-inch diameter Tee-Screens are only permitted for up to 70 mgd (108 cfs) for withdrawals. For confirmation and preliminary planning purposes, MWH developed an approximate flow model to estimate sweeping velocity at the intake site (January 21, 2014, MWH *Willamette Water Supply System Preliminary Design – Preliminary Evaluation of WRWTP Intake Screen Capacity Alternatives*). Based on this initial analysis, it appears that river velocities at the WRWTP intake screens are in the range of 1.1 feet per second (fps) at low river level/flow conditions and greater than 4.5 fps at flood conditions. Both conditions result in river velocities that are more than two times the approach velocity of 0.28 fps at design capacity of 70 mgd (108cfs), thereby exceeding NMFS requirements and recommendations for sweeping velocities¹. The sweeping and approach velocities of the future expansions will be confirmed in the WRWTP Master Plan.

At the time of the preliminary analysis, projected water demands had not been confirmed. Therefore, the following are the screen alternatives that were evaluated as part of the Intake Screen Capacity Alternatives memo (MWH 2014) to maximize the capacity of the existing intake infrastructure:

- 2 - 78-inch diameter Standard Screens
- 2 - 78inch diameter Modified Screens
- 2 - 78-inch diameter Elongated Screens
- 3 - 78-inch diameter Standard Screens
- 2 - 96-inch diameter Standard Screens

These screen alternatives fall into one of two expansion options, as presented in Table 1. Briefly, Option 1 would progressively allow access to greater withdrawal amounts, up to approximately 160 mgd (247.5 cfs). Option 2 would be required to achieve an intake capacity of greater than 160 mgd (247.5 cfs) and would require a level of in-water work that would likely require new USACE, DSL and NMFS authorization. The WRWTP Master Plan

¹ Sweeping velocities will be verified by field testing during low river flow conditions prior to finalizing the WRWTP capacity expansion strategy in the WRWTP Master Plan.

process will identify the potential modifications required to accommodate a range of withdrawals beyond 186 mgd (287.8 cfs).

Table 1. Summary of Potential WRWTP Intake Modifications

Option	Modification	Trigger	Range of Maximum Withdrawal Accommodated	Permitting Notes
Option 1	Replace existing fish screens with 2x78"D standard screens or with 2x78"D modified screens (same footprint)	Withdrawal >140 mgd (216.6 cfs)	140-160 mgd (216.6-247.5 cfs)	Can be accomplished with minimal in-water work by divers supported by a barge with crane. Would require removal of existing screens and bolting of new screens onto existing flanges.
Option 2	Replace 2x78"D modified screens with one of the following alternatives: <ul style="list-style-type: none"> • 2x78"D elongated screens • 3x78"D standard screens • 2x96"D standard screens Additional intake & pump station modifications or expansions	Withdrawal > 186 mgd (287.8 cfs)	186-208 mgd (287.8-321.7 cfs)	Each alternative would require physical modification to the in-river pile system and/or in-water pipe modifications and may also require intake and pump station modifications, expansions and/or augmentations.

Conclusions

The Willamette Water Supply Program will be developing the strategy and timing for future intake expansion/modification as part of the upcoming WRWTP Master Plan Update process. To help inform their decisions, the WWSP Partners would like to understand the permitting requirements of the various options. At this time, it is anticipated that the initial plant expansion will require only minimal modifications to the existing intake facilities (Option 1). However, future expansion (year 2040+) beyond the capacities associated with Option 1 may require additional, more substantive modifications to the intake facility (Option 2) or even the construction of a new intake facility depending on the costs and permitting requirements at that time. For these later expansions, the WRWTP Partners will need to reinitiate permitting with federal and state agencies to meet the requirements of the expansion as part of a separate, future project. In the near-term, the WWSP will likely be permitting Option 1 with a fish screen replacement with no additional major in-water work and, therefore, would like to gather more information from federal and state agencies of the permitting requirements of the proposed intake modification for this option.

Appendix C: Large Format Tables

**Table C-1 – Willamette Water Supply Program – Preliminary Design
Environmental Agency and Stakeholder Communication**

Date(s)	Agenda Items	Notes
U.S. ARMY CORPS OF ENGINEERS Point of Contact = Micheal Ladou		
1/8/2014	<ul style="list-style-type: none">• Program introduction• Best methods for coordinating with USACE	<ul style="list-style-type: none">• Section 10 required for river crossings.• Nationwide permit may be applicable for minor modifications to Willamette intake.• USACE will do in-house NEPA (Environmental Assessment). Environmental Impact Statement required for projects with significant impacts (most likely not this project).
2/21/2014	<ul style="list-style-type: none">• USACE/NMFS coordination• Federal nexus• Lead federal agency	<ul style="list-style-type: none">• Multiple federal nexus; however, USACE is preferred lead federal agency.
9/22/2014	<ul style="list-style-type: none">• Clarify federal nexus• High-level permitting approach• Section 1 – 124th Ave.	<ul style="list-style-type: none">• Discussed permit options with USACE. Program prefers ten-year individual permit (as opposed to a Nationwide Permit (NWP).• “Federalize” entire project or simply impact areas (crossings, wetlands).
10/21/2014	<ul style="list-style-type: none">• See 10/21/2014 meeting w/ NMFS, below	
2/18/2015	<ul style="list-style-type: none">• Interagency Meeting - Kaizen• Also included NMFS, DSL, DEQ, Environmental Protection Agency (EPA), ODFW, USFWS• High-level permitting approach• Routing criteria	<ul style="list-style-type: none">• Consideration of applicant/responsible party for partnering projects.• Ten-year 404 permit is possible.• Changes to crossing locations/alignment may not warrant a public notice or new permit; significance is determined by changes in impacts to resource.• Change to location for Tualatin River crossing would be significant from a Section 10 perspective because it is a navigable waterway.• Include contingency for “fracking” in application.• Future changes to alignment / project:<ul style="list-style-type: none">○ Insignificant = no public notice○ Significant = public notice○ Really significant = new permit
NATIONAL MARINE FISHERIES SERVICES Point of Contact = Richard Domingue for now - Marc Liverman will assign project		
2/21/2014	<ul style="list-style-type: none">• See 2/21/2014 meeting w/ USACE, above	<ul style="list-style-type: none">• NMFS will conduct ESA consultation on the project that is provided by USACE.
10/21/2014	<ul style="list-style-type: none">• High-level permitting approach• Section 1 – 124th Ave.	<ul style="list-style-type: none">• Modifications to “Contributing Impervious Area” triggers formal ESA consultation.• Confirm USACE as lead agency.• Confirm individual permit for entire Program with subsequent permits for roadway projects referencing permit conditions.• Anticipate “openers” in the Biological Opinion and Incidental Take Statement to accommodate length of permit and potential for change.• May initiate Program permitting in 2016.
2/18/2015	<ul style="list-style-type: none">• See Interagency meeting w/ USACE, above	<ul style="list-style-type: none">• Discussed NMFS’s “interrelated and interdependent” requirement in association with 124th Ave. permitting.• Interested in Willamette River water rights.

Date(s)	Agenda Items	Notes
U.S FISH AND WILDLIFE SERVICE Points of Contact TRNWR = Erin Holmes; Ecological Services = Kathy Roberts		
2/25/2014	<ul style="list-style-type: none">Meeting with Tualatin River National Wildlife Refuge (TRNWR)Program introductionBest methods for coordinating with TRNWR	<ul style="list-style-type: none">Discussed Tualatin River crossing challenges.Coordination and easement requirements.
9/15/2014	<ul style="list-style-type: none">Meeting with TRNWRWWSP updatesTualatin River challenges/opportunitiesVisit Roy Rogers crossing	<ul style="list-style-type: none">Partners confirm that land acquisition is anticipated.Mitigation not allowed on TRNWR.Challenges with 150th crossing.Roy Rogers crossing is feasible.Tunneling under TRNWR requires an easement.Partnering opportunities.
9/23/2014	<ul style="list-style-type: none">Meeting with Oregon Region, Ecological ServicesProgram introductionESA-listed species and Species of ConcernHigh-level permitting approachFish and Wildlife Coordination ActMigratory Bird Treaty ActEagle Protection Act	<ul style="list-style-type: none">Not likely to affect USFWS ESA-listed species.Best Management Practices.Opportunities to benefit listed plant species.
3/12/2015	<ul style="list-style-type: none">Meeting with TRNWRProposed Tualatin River pipeline crossing at Roy Rogers Road	<ul style="list-style-type: none">Will schedule subsequent meeting with TRNWR and USFWS Real Estate reps when crossing design / impacts are confirmed.
TRIBES		
Confederated Tribes of the Grand Ronde Points of Contact = Michael Karnosh, David Harrelson and Jordan Mercier		
9/10/2014	<ul style="list-style-type: none">Program IntroductionCultural Resources	<ul style="list-style-type: none">Confederated Tribes of the Grand Ronde indicated they would evaluate the program area for cultural resources and projects with overlapping Areas of Potential Effect.
10/31/2014	<ul style="list-style-type: none">E-mail	<ul style="list-style-type: none">Due to resource constraints, Tribe not able to do detailed analysis of alignment.
Confederated Tribes of Siletz		
2/28/2015	<ul style="list-style-type: none">Sent letter of Introduction	
Confederated Tribes of Warm Springs		
2/28/2015	<ul style="list-style-type: none">Sent letter of Introduction	
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY		
11/17/2014	<ul style="list-style-type: none">Program introductionWater quality considerations	<ul style="list-style-type: none">Program will be required to meet Oregon’s Division 41 “Antidegradation Policy” (related to CWA 401).Stormwater: Any project with a CWA 401 nexus (>1-acre of disturbance) requires the facility/roadway to be “brought up to code.”
2/18/2015	<ul style="list-style-type: none">See Interagency meeting with USACE, above	<ul style="list-style-type: none">See Interagency meeting notes, above.

Date(s)	Agenda Items	Notes
OREGON DEPARTMENT OF FISH AND WILDLIFE		
8/25/2014	<ul style="list-style-type: none">• Program introduction• Species of Concern	<ul style="list-style-type: none">• Consider open-cut trenching when there are opportunities for resource improvement.• Tunneling - ODFW considers frac-outs and in-water work periods.• Vegetation surveys will be required.
9/16/2014	<ul style="list-style-type: none">• Willamette River intake: water rights and fish persistence	<ul style="list-style-type: none">• Withdrawals will be part of the proposed action for ESA consultation.• Need for summary of potential intake modifications.• Coordinate with Tom and cc: Danette.
2/18/2015	<ul style="list-style-type: none">• See Interagency meeting w/ USACE, above	<ul style="list-style-type: none">• Send ODFW final water rights memo.• Include Joy in intake discussions.
OREGON DEPARTMENT OF STATE LANDS Point of Contact = Anita Huffman		
10/30/2014	<ul style="list-style-type: none">• High-level permitting approach• Section 1 – 124th Ave.	<ul style="list-style-type: none">• Concurs with early permitting approach as discussed with USACE.• 124th – Won’t need pipe-related conditions.• Not necessary to have control over property before permitting.• Want early coordination for future sections as well.
CLEAN WATER SERVICES		
9/11/2014	<ul style="list-style-type: none">• Program introduction	<ul style="list-style-type: none">• Potential for programmatic Service Provider Letter (SPL) to cover Program (w/individual SPLs for each roadway project).• Opportunities to partner with CWS – wetland mitigation and property management.
ENVIRONMENTAL STAKEHOLDERS		
Tualatin Riverkeepers		
1/7/2015	<ul style="list-style-type: none">• Program introduction	<ul style="list-style-type: none">• Focused on Tualatin crossing locations / concerns.• Would like to be involved in crossing decisions.• Schedule Watershed Watch Committee meeting after alignment has been selected.• Interested in conservation and re-use.
3/19/2015	<ul style="list-style-type: none">• Program introduction	<ul style="list-style-type: none">• Connection between water supply and growth and potential for including growth in a cumulative impacts discussion.• Interest in a boat launch partnering opportunity on the Tualatin River.
MUNICIPALITIES AND LAND USE REPRESENTATIVES See land use section		

***Appendix D: Water Rights with Points of Diversion at
the Willamette River Water Treatment Plan
(GSI, October 2014)***



TO: Niki Iverson, Willamette Water Supply Program

FROM: Adam Sussman, GSI Water Solutions, Inc.
Kimberly Grigsby, GSI Water Solutions, Inc.

DATE: October 20, 2014

SUBJECT: Water Rights with Points of Diversion at the Willamette River Water Treatment Plant

Introduction

The City of Hillsboro and the Tualatin Valley Water District (TVWD), collectively the Willamette Water Supply Program (WWSP), are in the preliminary phases of developing a water supply from the mid-Willamette River. The City of Beaverton is evaluating options for participation in the WWSP as well. The point of diversion for the WWSP on the Willamette River will be located at the existing Willamette River Water Treatment Plant (WRWTP). This memorandum describes the identified water rights associated with the WRWTP and the conditions that have been placed on these water rights to protect fish resources.

Water Rights at the Willamette River Water Treatment Plant

As shown in the table provided in **Attachment 1**, there are two municipal water rights that currently have points of diversion at the WRWTP: Permit S-49240, and Permit S-46319. In addition, the City of Beaverton has submitted an application (Application S-87964) to the Oregon Water Resources Department (OWRD) requesting a surface water permit with a point of diversion at the WRWTP. Finally, the City of Hillsboro is in the process of applying for a permit amendment to add a point of diversion for Permit S-49240 at the WRWTP.

Permit S-49240 – Willamette River Water Coalition

Permit S-49240 is held by the Willamette River Water Coalition, which includes the Cities of Tigard, Tualatin and Sherwood, and the Tualatin Valley Water District (TVWD). The permit authorizes the use of up to 202 cfs of water from the Willamette River for municipal and industrial use. Permit S-49240 was issued in April 1985. In June 2007 OWRD issued a final order extending the development deadline to October 1, 2047. The order also included a number of conditions on the permit holders' use of water.

Some of the conditions on Permit S-49240 directly affect the amount of water that will be available under the right. First, before a municipal water provider can use water under the permit, it must obtain access to the water through a request for “green light water” in an approved water management and conservation plan (WMCP). A WMCP is a planning document that is reviewed and approved by OWRD and includes a water provider’s existing and projected future water demands, its current conservation efforts and 5-year benchmarks, and its plan for how it will curtail water use during water shortages. To date, only the City of Sherwood has requested “green light water” through an approved WMCP and it now has access to 23.2 cfs. TVWD has a pending updated WMCP that requests access to 80.1 cfs. In addition, through the permit extension process for Permit S-49240, “fish persistence” conditions were incorporated into the permit. Fish persistence conditions are recommended by the Oregon Department of Fish and Wildlife (ODFW) as part of the permit extension process for certain municipal use permits. The conditions are developed to maintain the persistence of fish species that are listed as sensitive, threatened or endangered under state or federal law within the portion of a waterway affected by the municipality’s water use under the permit.

The fish persistence conditions for Permit S-49240 establish flow targets at USGS gage 14191000 at Salem. The flow targets vary throughout the year, as described in **Table 1** below. When flows in the Willamette River at the Salem gage do not meet the applicable flow target, the fish persistence conditions require that the amount of water that can be diverted under the permit must be reduced in proportion to the amount by which target flows are not met.

Table 1. Fish Flow Targets at Salem (Permit S-49240 - WRWC)

Month	Fish Flow Targets Measured at Salem (cfs)
July – October	5,630
November – March	6,200
April – May	15,000
June 1 – 15	12,600
June 16 – 30	8,500

The fish persistence conditions are based on the seven-day rolling average of mean daily flows at the Salem gage. Calculations of the amount of curtailment that must occur consider the amount of water to which the permit holders have access. (As described above, Sherwood currently has access to 23.2 cfs and TVWD has requested access to 80.1 cfs.) The reduction in the amount of water that can be diverted is capped at 20 percent during the months of April, May and June. The cap in the fish persistence conditions was included in recognition that the main influence on flows in the Willamette River is the federal management of the dams in the Willamette Basin Project. There is no cap on the required curtailment percentage in other months.

The following examples illustrate how these fish persistence conditions would be implemented. If, during July, the last seven mean daily flows at the Salem gage had an average of 5,700 cfs, the flow target would be met and no curtailment would be required ($5,700 > 5,630$). If, instead, the average of the last seven mean daily flows was 5,011 cfs, curtailment would be required ($5,011 < 5,630$). The amount of curtailment would be 11 percent ($1 - (5011/5630) = 0.11$ or 11%). Applying the 11 percent reduction to the amount of water that can legally be diverted

(currently 23.3 cfs) yields a reduction of 2.5 cfs ($0.11 \times 23.2 = 2.5$). As a result, only 20.7 cfs could be diverted under the permit under the above-described circumstances ($23.2 - 2.5 = 20.7$).

Permit S-46319 – City of Wilsonville

Permit S-46319 is held by the City of Wilsonville and authorizes the use of up to 30 cfs of water from the Willamette River for municipal use (see **Attachment 1**). In May 2000, OWRD issued an order extending the development deadline for this permit to October 1, 2042. The order predated the legislation requiring fish persistence conditions, so the order did not include conditions that limit the use of water under Permit S-46319.

Application S-87964 – City of Beaverton

In March 2014 the City of Beaverton submitted an application (S-87964) for a permit to use up to 33.7 cfs from the Willamette River at the WRWTP for municipal purposes within the City's service area (see **Attachment 1**, the application is currently pending with OWRD). The amount of water requested is intended to meet the City's projected additional demand of 7 cfs during the next 20 years, and to provide a redundant source of supply for the City's existing supply (26.7 cfs) from the Joint Water Commission and its aquifer storage and recovery program.

Based on OWRD's conditioning of recent "new" water use permits on the Willamette River, it is anticipated that a permit issued in response to this application would have fish target flow conditions similar to those described for the WRWC permit. However, the conditions would prohibit (rather than reduce) diversion of water under the permit if the identified target flows at Salem are not met.

Permit S-35819 – City of Hillsboro (City of Adair Village)

Permit S-35819 is held by the City of Adair Village and authorizes the use of up to 82 cfs from the Willamette River for municipal use. The City of Hillsboro is currently in negotiations with Adair Village to acquire 56 cfs of additional water supply from the Willamette River under Permit S-35819¹ (see **Attachment 1**). (As described above, it is expected that an additional point of diversion at the WRWTP will be added to Permit S-35819 through the permit amendment process.) OWRD recently issued an order extending the development deadline for this permit to October 1, 2050. The order approving the extension included "fish persistence" conditions. **Table 2** describes the flow targets for Permit S-35819 (measured at Salem).

¹ The Intergovernmental Agreement between the City of Adair Village and the City of Hillsboro contemplates Hillsboro obtaining 56 cfs under the Adair Village permit. Adair Village's extension application for Permit S-35819, however, indicates that the agreement could potentially be revised so that Hillsboro's projected future demand of 57.68 cfs could be met by the permit.

Table 2. Fish Flow Targets at Salem (Permit S-35819 – City of Adair Village, and Intergovernmental Agreements with Hillsboro and Polk County)

Month	Fish Flow Targets Measured at Salem (cfs)
July 1 – October 31	5,630
November 1 – March 31	6,000
April 1 – April 15	15,000
April 16 – April 30	17,000
May 1 – May 31	15,000
June 1 – 15	12,600
June 16 – 30	8,500

The fish persistence conditions for Permit S-35819 cap curtailment at 30 percent year-round. Curtailment under Permit S-35819 is based on the permit’s maximum authorized rate. Permit S-35819 requires that the City update its WMCP to obtain access to water under this permit. The City of Hillsboro currently has an approved Water Management and Conservation Plan through its membership with the Joint Water Commission, but will need approval of an updated WMCP before using water under this permit.

Conclusion

The existing water rights associated with the WRWTP (Permits S-46319 and S-49240) authorize the use of up to 232 cfs for municipal purposes. In addition, the City of Hillsboro may acquire 56 cfs of additional water supply from the Willamette River under Permit S-35819 and the City of Beaverton has applied for a permit to obtain up to 33.7 cfs from the Willamette River. A table of all of these permits and the Beaverton application are in Attachment 1. The City of Wilsonville has access to the full rate of 30 cfs under Permit S-46319, but access to water under Permit S-49240 is currently limited to 23.2 cfs (for the City of Sherwood). OWRD will need to approve “green light water” as part of an approved WMCP to increase access to water under Permit S-49240.

The majority of the water rights that are expected to ultimately have a point of diversion at the WRWTP have (or are anticipated to have) conditions intended to protect listed fish. The water rights with such conditions will authorize 91 percent of the combined maximum authorized rate of diversion at the WRWTP. Permits S-49240 and S-35819 have “fish persistence” conditions, which were recommended by the ODFW, and reduce access to water when stream flow at Salem is below the fish flow targets. If OWRD issues a permit in response to the City of Beaverton’s permit application S-87964, it is anticipated to be conditioned to prohibit diversion of water at times when the ODFW recommended flow targets at Salem are not met.

Entity name on water right	Application	Permit	Certificate	Transfer or Permit Amendment	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Date for Completion	Conditions
Willamette River Water Coalition	S-50693	S-49240	N/A	T-10477	June 19, 1973	Municipal & Industrial	202.0	Oct. 1, 2047	<ul style="list-style-type: none">Measuring device requiredFish screen requiredA 60-day waiting period is required between WMCP approval and diversion of water for the first diversion and each increment of “green light water” for each water supplier.Additional section required to be included in WMCPs.WMCP provisions apply to additional future municipal water suppliers using water under permit under certain conditions. WRWC member Sherwood has access to up to 23 cfs based on last WMCP approval. TVWD is currently pursuing access to approximately 80 cfs.Fish persistence conditions. Proportional reduction based on target flows and the portion of permit to which permittee has legal access. Reduction is capped at 20% during April, May and June.
City of Wilsonville	S-51780	S-46319	N/A	T-8444	March 27, 1974	Municipal	30.0	Oct. 1, 2042	<ul style="list-style-type: none">Measuring device requiredFish screen requiredProgress reports due to OWRD by October 1 2013, 2018, 2028, 2033 and 2038.
City of Hillsboro (City of Adair Village)	S-48146	S-35819	N/A	--	July 7, 1971	Municipal	56*	Oct. 1, 1995 (extension to 2050 pending)	<ul style="list-style-type: none">Fish persistence conditions. Proportional reduction based on target flows and permit's maximum authorized rate; capped at 30% year-round. Conditions from permit amendment will likely require measurement device and fish screen.
City of Beaverton	S-87964	N/A	N/A	-	3/11/2014	Municipal	33.7	N/A	<ul style="list-style-type: none"><i>It is anticipated that the approved permit would be conditioned to prohibit diversion of water at times when the ODFW recommended flow targets at the Salem gage are not met.</i>

* Contingent on approval of a permit amendment, and execution of a purchase agreement.

