

# TM 07 - Permitting Constraints Analysis Hillsboro Water Master Plan

PREPARED FOR: Hillsboro Water Master Plan Group  
PREPARED BY: Peggy O'Neill  
COPIES: Joe Broberg/CH2M HILL  
Brad Phelps/CH2M HILL  
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## Executive Summary

The City of Hillsboro is evaluating long term water supply options that will deliver 80 million gallons per day (mgd) of treated water. This memorandum identified and analyzed anticipated environmental and land use permits required by each of the options. The analysis was conducted by identifying resources potential impacted by each water supply option and then determining number and types of permits required for construction

Results of the analysis conclude that all proposed options have permitting challenges. However, all proposed options are permittable although some may take a considerable more time, effort, and funds to successfully permit.

## Background

The City of Hillsboro is evaluating long term water supply options that will deliver 80 mgd of treated water. The purpose of this document is to analyze likely permitting requirements for each of the proposed options. This information will be used to support a more extensive analysis of the options. This document will

- identify potential federal, state, and local environmental and land use permits or regulatory approvals required for each of five proposed options
- identify permitting constraints for each option
- analyze the permitting constraints in terms of the various permitting processes

## Proposed Water Supply Options

Six options are being considered for implementation of the Hillsboro Water Master Plan. This document describes and evaluates those options as shown in Figures 8-1 and 8-2A through 8-2E provided at the end of this technical memorandum.

The options analyzed in this technical memorandum are as follows:

### TBWSP Option

The environmental impacts and permitting needs of the sixth option, the Tualatin Basin Water Supply Project, have been extensively evaluated in previous studies. The conclusions of those evaluations are summarized in this report. This option would reconstruct Scoggins Dam, improving its seismic capability and raising the pool by 40 feet to provide additional storage in Hagg Lake. This option includes a new raw water pump station and intake with significant permitting challenges, over seven miles of 48- to 60-inch-diameter pipe. This pipeline would cross Metro and NRCS controlled properties and would include multiple river, stream, and creek crossings. Other permitting challenges associated with the 40-foot dam raise included associated road reconstruction around the expanded source. This option includes a 48- to 60-inch raw water pipe and the piping from the JWC WTP to the Hillsboro connection. JWC would expand its existing water treatment plant, treated water storage reservoir, and 99,400 feet (18.83 miles) of transmission pipeline with diameters of 48 inches to 96 inches to deliver its share of the expanded supply.

### Willamette – Wilsonville Option

The existing Willamette River Water Treatment Plant (WRWTP) at Wilsonville could potentially be expanded to provide 80 mgd of surface water treatment capacity from the Willamette River for the JWC. According to the *Willamette Water Treatment Plant Master Plan*, MWH, 2006, there is enough room on the upper site to build 100 mgd in additional capacity. The Tualatin Valley Water District has also confirmed there is sufficient capacity in the existing river intake and raw water line to accommodate the additional project demand which limits the needed on-site improvements to just expanding the pumping capacity of the existing raw water pump station and constructing a new parallel water treatment plant. The Willamette-Wilsonville option also includes expansion of an existing raw water pumping station, and construction of an 80 mgd surface water treatment plant with granular activated carbon filters, new clearwell, a booster pumping station, 137,500 feet (26.0 miles) of transmission pipeline with diameters of 48 inches to 66 inches, and a covered concrete reservoir.

### **Portland Supply Option**

Finished water would be purchased from the Portland Water Bureau system at the Powell Butte Reservoir and conveyed through 227,300 feet (43.05 miles) of new 60 inch transmission pipeline parallel to the existing Washington County Supply line and then north to the Hillsboro connection. This option also includes a new covered finished water reservoir. A 36 mgd water treatment plant and booster pumping station would also be constructed to serve Hillsboro to remove chloramines and filter out turbidity.

### **Willamette – Newberg West Sub-Option**

Surface water from the Willamette River would be treated in a new treatment plant near Newberg and pumped through a new transmission system along a western alignment to the Hillsboro/ JWC supply system. Additional finished water storage would also be provided. This option includes construction of a new river intake, raw water pumping station, 80 mgd surface water treatment plant and booster pumping station near Newberg; 210,700 feet (39.9 miles) of transmission pipelines with diameters of 48 to 66 inches; an 80 mgd booster pumping station near the existing JWC Water Treatment Plant; and a covered finished water reservoir.

### **Willamette – Newberg East Sub-Option**

Surface water from the Willamette River would be treated in a new treatment plant near Newberg and pumped through a new transmission system along an eastern alignment to the Hillsboro/ JWC supply system. Additional finished water storage would also be provided. This option includes construction of a new river intake, raw water pumping station, 80 mgd surface water treatment plant, and booster pumping station near Newberg; 158,600 feet (30.0 miles) of transmission pipeline with diameters of 48 to 66 inches; an 80 mgd booster pumping station near Cooper Mountain; and a covered finished water reservoir.

### **Northern Groundwater Supply Option**

Groundwater from new collector wells constructed east of Scappoose would be treated in a new water treatment plant near Scappoose and pumped through a new pipeline over Cornelius Pass to Hillsboro. The project would include construction of eight new 10 mgd collector wells, a new 80 mgd ground water treatment plant and booster pumping station, 135,700 feet (25.7 miles) of transmission pipeline with diameters of 48 to 66 inches, an 80 mgd booster pumping station and a covered finished water reservoir.

### **Other Options**

A second dam raise project that would provide water for Clean Water Services but not JWC has also been identified. The second would raise the water surface by approximately 12.5 feet if the dam is reconstructed at its current location or approximately 7.5 feet if a new dam was constructed downstream.

In addition, Hillsboro is also participating in aquifer storage and recovery and conservation programs. No evaluation of environmental impacts and permitting needs has been performed for these options.

## Potential Permits and Regulatory Approvals

Federal, state, and local environmental and land use permits are anticipated for all options. Implementation of any of the options will include temporary and permanent ground disturbance, installation of conveyance pipe, and construction of associated support facilities.

Major federal, state, and local compliance requirements that may be associated with the options include:

### FEDERAL

- Clean Water Act Section 404 Dredge and Fill Permit
- Section 10 Rivers and Harbors Act
- Clean Water Act Section 401 Water Quality Certification (administered by the Department of Environmental Quality)
- National Environmental Policy Act
- Endangered Species Act, Public Law 93-205
- Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)
- Fish and Wildlife Coordination Act of 1934
- Bald and Golden Eagle Protection Act
- Migratory Bird Treaty Act
- National Historic Preservation Act of 1966, Section 106; Executive Order 11593

### STATE

- Oregon Removal/Fill Law
- Oregon Endangered Species Act
- Oregon Water Code
- Oregon Forest Practices Act

### COUNTY

- Clackamas County Development Code
- Columbia County Zoning Code
- Multnomah County Land Use Ordinance
- Washington County Community Development Code
- Washington County Clean Water Service's Design and Construction Standards
- Yamhill County Zoning Ordinance

### CITY

- Beaverton Community Development Code
- Forest Grove Development Code
- Hillsboro Zoning Ordinance

- Newberg Development Code
- Portland Zoning Code
- Sherwood Municipal Code
- Wilsonville Development Code

#### OTHER

- Railroad Rights-of-Way

These potential requirements were reviewed to determine if and how they would apply to each of the project options. Based on recent consultations with regulatory agencies, a review of the specific components of each option, and comparison with environmental and land use permitting experience with other similar projects, the potential permitting requirements for each option were identified. Table 1 summarizes the anticipated permits for each option. Table 1 also identifies the associated studies required, permit preparation and approximate approval time frames, and pertinent notes about coordination. Note that many of these permit authorizations are interdependent and completed in coordination with each other and some may require considerable more time, effort, and cost to acquire.

	Authorizing Agency	Permit or Compliance Vehicle	Alternative							Short Dam Raise	Required Studies & Documentation	Timeframe	Comments
			TBWSP Dam Raise (Fed Owned)	TBWSP Dam Raise (Non-fed Owned)	Willamette-Wilsonville	Portland	Willamette-Newberg West	Willamette-Newberg East	Northern Groundwater				
FEDERAL	EPA	National Environmental Policy Act	X	X						X			USBR - the EIS is in process for the dam raise evaluation.
	USACE	Clean Water Act (CWA) Section 404/Section 10 Permits	X	X	X	X	X	X	X	X	Wetland/Waters Delineation Wetland Functional Assessment Mitigation Plan Coordination with Utilities located in roadway USACE/DSL Joint Permit Application	8 to 12 months	Removal/ fill below OHW of navigable waters or in wetlands – Corps and DSL Joint permit. An individual permit will likely be required. The JPA will also cover USACE Section 10 permitting.  Timeframe does not include obtaining rights-of-entry to private property.
	USFWS NMFS	Endangered Species Act (ESA) Compliance	X	X	X	X	X	X	X	X	Surveys for special status plants and wildlife	8 to 12 months	
	NMFS	ESA Section 7 Formal Consultation	X	X		X	X	X		X	Biological Assessment Stream Crossing Plans	8 to 12 months	Section 7 consult requires BA/BO that will lead to a jeopardy/no jeopardy decision and possibly Incidental Take permit (ITP). NMFS if fish only, USFWS if terrestrial species too. This process would occur within the USACE permitting process.  Includes pre-consultation meetings and 135 days required by statute for consultation . Extensions may be requested by lead agency or the consulting Service.
		Incidental Take Permit	X	X	X	X	X	X	X	X			
	USFWS	Bald/Golden Eagle Protection Act	X	X	X	X	X	X	X	X	Identification of active eagle nests in project area	Concurrent with other permit preparation.	Need to show compliance with BEGE Protection Act. Potential impacts to nesting birds if land clearing occurs during nesting season. Also potential indirect effects from noise during construction.
		Migratory Bird Treaty Act	X	X	X	X	X	X	X	X	Identification of potential migratory bird resources	Concurrent with other permit preparation.	Need to show compliance with MBTA. Potential impacts to nesting birds if land clearing occurs during nesting season. Also potential indirect effects from noise during construction. . USFWS may request an Avian Protection Plan.

TABLE 1 POTENTIAL REGULATORY APPROVALS AND PERMITS

	Authorizing Agency	Permit or Compliance Vehicle	Alternative								Short Dam Raise	Required Studies & Documentation	Timeframe	Comments
			TBWSP Dam Raise (Fed Owned)	TBWSP Dam Raise (Non-fed Owned)	Williamette-Wilsonville	Portland	Williamette-Newberg West	Williamette-Newberg East	Northern Groundwater					
	USFWS	Fish and Wildlife Coordination Act	X	X	X	X	X	X	X	X	<p>Consultations with fish and wildlife agencies</p> <p>Project impacts on fish and wildlife resources; mitigation recommendations</p>		<p>This coordination occurs through the federal permitting agency (Corps); it provides direct input into the decision process by the state and federal fish and wildlife agencies</p> <p>Done in coordination with NEPA process or Section 404 permit application</p>	
	SHPO	National Historic Preservation Act	X	X	X	X	X	X	X	X	<p>State records review</p> <p>Archaeological &amp; historical resource surveys</p>	3 to 6 months (concurrent with USACE permit)	Cultural permits – Section 106 consultation and concurrence will be required for the USACE Section 404 permit.	
		Archaeological Excavation Permit	X	X	X	X	X	X	X	X			An excavation permit will be required from the State (SHPO) for the survey test pits.	
	NRCS	Conservation Easement	X	X						X				
	DSL	Removal/Fill Permit	X	X	X	X	X	X	X	X	<p>Wetland/Waters Delineation</p> <p>Wetland Functional Assessment</p> <p>Mitigation Plan</p> <p>Coordination with Utilities located in roadway</p> <p>USACE/DSL Joint Permit Application</p>	8 to 12 months	<p>Removal/ fill below OHW of navigable waters or in wetlands – Corps and DSL Joint permit. An individual permit will likely be required. The JPA will also cover USACE Section 10 permitting.</p> <p>Complete application requires the signature of each landowner on which there will be wetland impacts. There is legislation proposed in the 2011 state session to change the signature requirement.</p> <p>Will likely require preparation of stream crossing plans, details commensurate with risk to streams and whether ESA fish are present.</p>	
		State Lands Easement					X	X			<p>Application form for Easement Across a State Water Body</p>	2 months; submit prior to JPA	Required for structures in state-owned waters	

	Authorizing Agency	Permit or Compliance Vehicle	Alternative								Short Dam Raise	Required Studies & Documentation	Timeframe	Comments
			TBWSP Dam Raise (Fed Owned)	TBWSP Dam Raise (Non-fed Owned)	Willamette-Wilsonville	Portland	Willamette-Newberg West	Willamette-Newberg East	Northern Groundwater					
STATE	ODFW	Fish Handling Permit	X	X	X	X	X	X	X	X	Biological Assessment	4 to 6 weeks	Fish handling permit is required if fish will be entrapped and relocated.  Required for work in the Willamette River. De-watering smaller streams for trench crossings would require fish handling permit.	
		Fish Passage Plan Approval	X	X	X	X	X	X	X	X	Fish Passage Plan	6 weeks to 3 months		
		ODFW Habitat Mitigation Plan	P	X	P	P	P	P	P	P	Impacts analysis Habitat Mitigation Plan	6 to 12 months to analyze potential impacts and negotiate clearing of right-of-way occurs, especially forest habitat, when	For large/complex project compliance with ODFW Mitigation Policy is recommended, but not required. Would be an issue where pipeline is outside of road right of ways, places where permanent clearing of right-of-way occurs, especially forest habitat, when	
		Oregon ESA (Fish & Wildlife)	X	X	X	X	X	X	X	X	Evaluation of potential for occurrence of special status fish and wildlife	8 to 12 months (concurrent with Fed ESA activities)	ODFW does not issue incidental take permits. Primary role is as commenting agency specifically on DSL removal/fill permit. Can place conditions on this permit to minimize project impacts, ensure BMP's implemented, etc.	
	ODA	Oregon ESA (Plants)	X	X	X	X	X	X	X	X	Surveys for special status plants	8 to 12 months (concurrent with Fed ESA activities)	ODA administers the Oregon ESA for plants and can issue incidental take permits for impacts to rare plants. Oregon ESA may regulate species in addition to those plant species that are federally regulated under ESA	
	DEQ	NPDES 1200-C	X	X	X	X	X	X	X	X	NPDES Permit Application Erosion & Sediment Control Plan	2 to 4 months	Construction activities that disturb one acre or more, including clearing, grading and excavation, are required to have a National Pollutant Discharge Elimination System (NPDES) general permit #1200-C.	
		CWA. Section 401 Certification	X	X	X	X	X	X	X	X	Downstream water quality compliance Flow impacts assessment In-water construction impacts and restrictions Land Use Compatibility Statement (LUCS) from local jurisdiction	12 months (concurrent with USACE and DSL removal/fill permitting)	Required part of Corps/DSL Removal-Fill Permit. Usually issued concurrent to USACE permit decision; can take up to 1 year. Requires specific WQ information and a Land Use Compatibility Statement (LUCS) from the local jurisdiction.	
		Air Quality Permit	P	P	P	P	P	P	P	P		2 - 3 months	Air discharge permit may be needed if	



TABLE 1 POTENTIAL REGULATORY APPROVALS AND PERMITS

	Authorizing Agency	Permit or Compliance Vehicle	Alternative							Short Dam Raise	Required Studies & Documentation	Timeframe	Comments
			TBWSP Dam Raise (Fed Owned)	TBWSP Dam Raise (Non-fed Owned)	Willamette-Wilsonville	Portland	Willamette-Newberg West	Willamette-Newberg East	Northern Groundwater				
	OWRD	Well Installation Start Card							X		2 weeks	To be obtained by the well driller	
		Water Right Authorizaton	X	X	X		X	X	X	X	1 – 12 months	See Water Right Technical Memo	
	ODF	Oregon Forest Practices Act		X							Application Form	15 days	The FPA rules apply to harvesting , reforestation, road construction and repair, slash disposal, chemical use, and stream, lake, and wetland protection.
		Forest Practices Act Burn Permit		X							Application Form	15 days	This permit is applied for under the same FPA permit application discussed above.
	OPRD	Archaeological Permit		X							Application Form		This permit application is submitted to OPRD who coordinates issuance of the permit through SHPO.
	ODOT	Right-of-Entry Permit	X	X	X	X	X	X	X	X	Application Form	4 to 6 months	Pre-consultation with ODOT on route is highly encouraged to minimize permit processing time.
LOCAL	Clackamas County	Administrative Review			X					X	Application, Site Plan	5 to 6 months	
		Conditional Use Permit			X					X	Hearing	6 to 8 months	
	Columbia County	Conditional Use Permit							X		Application, Site Plan, Design Review, Public Hearing	5 to 6 months	
	Multnomah County	Administrative Review				X			X		Application, Site Plan	5 to 6 months	
		Conditional Use Permit				X			X		Application, Site Plan, Design Review, Public Hearing	5 to 6 months	
	Washington County	Administrative Review	X	X	X	X	X	X		X	Application, Site Plan	5 to 6 months	
		Type II Administrative Review	X	X	X	P	X	X		X	Application, Site Plan	5 to 6 months	
		Type III Hearing Officer Decision	X	X	X	P	X	X		X	Application, Site Plan, Design Review, Public Hearing	5 to 6 months	
	Yamhill County	Administrative Review					X	X			Application, Site Plan	5 to 6 months	
	City of Beaverton	Conditional Use Permit					X		X				
		Permit to Occupy Public ROW					X		X		Application Form		
	City of Forest Grove	Conditional Use Permit								X			
		Permit to Occupy Public ROW											
	City of Hillsboro	Administrative Review			X		X	X		X	Application, Site Plan	4 to 5 months	
		Type II: Administrative Review									Application, Site Plan	4 to 5 months	
Permit to Occupy Public ROW						X	X			Application Form			
City of Newberg	Conditional Use Permit					X	X						

	CITY	Authorizing Agency	Permit or Compliance Vehicle	Alternative							Short Dam Raise	Required Studies & Documentation	Timeframe	Comments
				TBWSP Dam Raise (Fed Owned)	TBWSP Dam Raise (Non-fed Owned)	Willamette-Wilsonville	Portland	Willamette-Newberg West	Willamette-Newberg East	Northern Groundwater				
CITY	City of Portland		Permit to Occupy Public ROW					X	X		Application Form			
			Conditional Use Permit			X			X		Application Form			
			Permit to Occupy Public ROW			X			X					
	City of Sherwood		Conditional Use Permit			X			X		Application, Site Plan, Design Review, Public Hearing	4 to 5 months		
			Permit to Occupy Public ROW			X			X		Application Form			
	City of Wilsonville		Administrative Review			X					Application, Site Plan	4 to 5 months		
			Conditional Use Permit			X					Application, Site Plan, Design	4 to 5 months		
			Permit to Occupy Public ROW			X					Application Form			
			RR Crossing Permit	X	X	X	X	X	X	X				
	OTHER	Metro		Open Spaces	X	X								
		Clean Water Services		Service Provider Letter	X	X	X	X	X	X		Natural Resources Assessment Mitigation Plan		
		Railroads		RR Crossing Permit	X	X	X	X	X	X		Application Form Mitigation Plan	3 to 6 months	

**LEGEND**

X = applies P = possibly applies

**Regulatory Agencies**

- DEQ Oregon Department of Environmental Quality
- DSL Oregon Department of State Lands
- EPA Environmental Protection Agency
- NMFS National Marine Fisheries Service
- ODA Oregon Department of Agriculture
- ODF Oregon Department of Forestry
- ODFW Oregon Department of Fish and Wildlife
- ODOT Oregon Department of Transportation
- OPRD Oregon Parks and Recreation Department
- OWRD Oregon Water Resources Department
- SHPO Oregon State Historic Preservation Office
- USACE United States Army Corp of Engineers
- USBR United States Bureau of Reclamation
- USFWS United States Fish and Wildlife Service

**Other Acronyms**

- BA Biological Assessment
- BEGE Bald Eagle and Golden Eagle Act
- BO Biological Opinion
- CWA Clean Water Act
- EIS Environmental Impact Statement
- ESA Endangered Species Act
- FPA Oregon Forest Practices Act
- ITP Incidental Take Permit
- JPA Joint Permit Application
- LUCS Land Use Compatibility Statement
- MBTA Migratory Bird Treaty Act
- NEPA National Environmental Policy Act
- NPDES National Pollutant Discharge Elimination System
- OHW Ordinary High Water Elevation
- ROW Right-of-Way
- TBWSP Tualatin Basin Water Supply Partners

## Permitting Constraints

Each option was evaluated for potential impacts to natural resources or urban and rural infrastructure that would result in requirements to obtain permits or other regulatory approvals described in Table 1. Environmental factors evaluated included potential in-water impacts including stream and river crossings and new river water intake structures, wetlands, major nature parks or natural areas, and potential occurrence of threatened or endangered species. Land use factors evaluated included railroad crossings, and number and type of jurisdictions (city, county) crossed by the option. These factors were evaluated using the following resources:

- USGS Topography Maps
- Metro Data Resource Center
- Local and National Wetland Inventory Maps
- Oregon Biodiversity Information Center: Biotics, Element Occurrence Record
- Soil Survey Maps
- Clean Water Service's Service Provider Boundary Map
- Recent Aerial Photography

Tables 2a and 2b provide summaries of the environmental and land use permitting constraints respectively for each option.

TABLE 2A ENVIRONMENTAL CONSTRAINTS  
Number of Natural Resources Other Required Environmental Compliance Requirements by Option

	TBWSP (Fed)	TBWSP (Non-Fed)	Willamette - Wilsonville	Portland Supply	Willamette-Newberg West	Willamette-Newberg East	Northern Groundwater
Major In-Water Work	1	1	1		1	1	
Major River Crossings	4	4	1	1	2	0	0
Perennial Stream Crossings	10	10	9	8	19	14	16
Intermittent Stream Crossings	5	5	7	11	10	14	
Major Wetland Crossing	2	2					
Wetland Crossings	3	3			4	2	
Wetlands adjacent	7	7	2	3	12	4	1
Major Park or Natural Area			2		1		
Stream/Wetland Buffer Regulations	1	1	1	1	1	1	1
OR Parks & Recreation		1					
OR Forestry Department		1					
Metro Open Space	2	1					
City of Portland				1			
NRCS Conservation Easement	1	1					
EIS (Fed)	1						
NEPA Compliance (Non-Fed)	1	1					

TABLE 2B LAND USE CONSTRAINTS  
Local Jurisdictions Crossed by Option

	TBWSP Raise (Fed)	TBWSP Raise (Non-Fed)	Willamette-Wilsonville	Portland Supply	Willamette-Newberg West	Willamette-Newberg East	Northern Groundwater
Clackamas County			X				
Columbia County							X
Multnomah County				X			X
Washington County	X	X	X	X	X	X	X
Yamhill County					X	X	
City of Beaverton				X			X
City of Hillsboro	X	X	X	X	X	X	X
City of Newberg					X	X	
City of Portland				X			X
Metro	X	X					
City of Sherwood			X			X	
City of Wilsonville			X				

TABLE 2B LAND USE CONSTRAINTS  
Local Jurisdictions Crossed by Option

	TBWSP Raise (Fed)	TBWSP Raise (Non-Fed)	Willamette- Wilsonville	Portland Supply	Willamette- Newberg West	Willamette- Newberg East	Northern Groundwater
Railroads (no. of crossings)	4	4	5	6	4	4	2

## Assumptions

Certain assumptions were also made:

- Crossings of perennial streams and rivers would be accomplished using micro-tunneling method.
  - No USACE Section 404 permit would be required for most crossings, thus no federal ESA compliance required.
  - Crossings of the Willamette and Tualatin Rivers would require USACE Section 10 permit (same application as Section 404), triggering federal ESA compliance including formal consultation for listed fish species.
- Crossings of intermittent streams would be accomplished using open cut method.
- Wetlands adjacent to alignments would be avoided.
- Groundwater wells would be constructed in uplands.

## Discussion

### TBWSP Option: Federally Owned Sub-Option

Major potential environmental constraints for the TBWSP Option: Federally Owned Sub-Option includes in-water work associated with raw water pump station construction, dam reconstruction, permanent loss of 33.4 acres of wetlands, loss of 691 acres of habitat around the reservoir due to construction or inundation, and loss of 58.1 acres of elk meadow. Additionally, two rare species, the Fender’s blue butterfly (Endangered) and its host plant Kincaid’s lupine (Threatened) were recently discovered around Hagg Lake. Other major permitting challenges are being reviewed by the project sponsors.

This option requires compliance with NEPA, but because the EPA delegates authority for NEPA compliance to the federal agencies, no coordination with EPA is required. In addition to evaluation of natural resource impacts, the NEPA process involves detailed evaluation of multiple other resources including air quality, transportation, socioeconomics, public safety, and energy, to name a few. This involves coordination and/or consultation with multiple resource agencies and public involvement components which can add time and uncertainty to the permitting schedule. Potential impacts to the rare butterfly and lupine will require coordination with state and federal agencies, including possible Section 7 consultation, to comply with state and federal Endangered Species Acts. This option crosses two identified Metro resources that are part of the Gales Creek Natural Area south of the existing Spring

Hill Pump Plant and south of the JWC water treatment plant. This option also passes through a Natural Resource Conservation Service conservation easement. This option passes through one county: Washington. Conditional Use Permits and various administrative reviews and approvals are required for work in these jurisdictions. Each of these jurisdictions will also require a Permit to Occupy Public Right-of-Way. This option includes railroad crossings, each requiring a Railroad Crossing Permit.

### **TBWSP Option: Non-Federally Owned Sub-option**

The existing Scoggins Dam is currently under federal ownership and local entities (Hillsboro for example) have access to the water impounded by Scoggins Dam under a contract with the Bureau of Reclamation. Therefore, the TBWSP was evaluated with the presumption that ownership by the federal government is maintained throughout the expansion of Scoggins Dam. However, the TBWSP has discussed acquiring ownership of Scoggins Dam from the federal government through a title transfer process. A change in ownership to the local level may involve differing permitting conditions and therefore discussion on a non-federally owned sub-option is warranted.

Major potential environmental constraints for the TBWSP Option: Non-Federally Owned Sub-option includes in-water work associated with dam reconstruction, impacts to 33.4 acres of wetlands, 691 acres of habitat around the reservoir due to construction or inundation, and 58.1 acres of elk meadow. Other major permitting challenges are being reviewed by the project sponsors. Additionally, two rare species, the Fender's blue butterfly (Endangered) and its host plant Kincaid's lupine (Threatened) were recently discovered around Hagg Lake. Other major permitting challenges are being reviewed by the project sponsors.

This option requires coordination with EPA through the NEPA process. In addition to evaluation of natural resource impacts, the NEPA process involves detailed evaluation of multiple other resources including air quality, transportation, socioeconomics, public safety, and energy, to name a few. This involves coordination and/or consultation with multiple resource agencies and public involvement components which can add time and uncertainty to the permitting schedule. Potential impacts to the rare butterfly and lupine will require coordination with state and federal agencies, including possible Section 7 consultation, to comply with state and federal Endangered Species Acts. This option will also require compliance with the Oregon Forest Practices Act and coordination with Oregon Parks and Recreation Department. This option also crosses two identified Metro resources that are part of the Gales Creek Natural Area south of the existing Spring Hill Pump Plant and south of the JWC water treatment plant. The difficulty of receiving approvals from Metro for impacts to these areas has been extremely high and JWC staff has yet to acquire easements for the raw water pipeline after several years of effort. This option also passes through a Natural Resource and Conservation Easement.

This option passes through one county: Washington. Conditional Use Permits and various administrative reviews and approvals are required for work in these jurisdictions. Each of these jurisdictions will also require a Permit to Occupy Public Right-of-Way. This option includes railroad crossings, each requiring a Railroad Crossing Permit.

## Willamette – Wilsonville Option

Major potential environmental constraints for the Willamette – Wilsonville Option include one crossing of the Tualatin River, a major waterway in the area. Use of the micro-tunneling technique at the Tualatin River crossing will minimize impacts, but because the Tualatin is a Section 10 navigable water, a Corps permit and consultation with NMFS for potential impacts to listed fish species will be required. This option also crosses two identified Metro resources: the Tonquin Geologic Area and the Graham Oaks Nature Park. The difficulty of receiving approvals from Metro for impacts to these areas are uncertain, however previous discussions between Willamette River Water Coalition and Metro (MSA, 2011) suggest that there may be potential for coordination with Metro on the route through the Tonquin Geologic Area as Metro implements a planned recreational trail through the area.

This option passes through two counties: Clackamas and Washington, and through three cities: Wilsonville, Sherwood, and Beaverton. Conditional Use Permits and various administrative reviews and approvals are required for work in these jurisdictions. Each of these jurisdictions will also require a Permit to Occupy Public Right-of-Way. This option also includes railroad crossings, each requiring a Railroad Crossing Permit.

## Portland Supply Option

Major potential environmental constraints for the Portland Supply Option include one crossing of the Willamette River, a major waterway in the area. Use of the micro-tunneling technique at this crossing will minimize impacts, but because the Willamette River is identified as a Section 10 navigable water, a Corps permit and consultation with NMFS for potential impacts to listed fish species will be required.

This option passes through two counties: Multnomah and Washington, and through three cities: Portland, Beaverton, and Hillsboro. Conditional Use Permits and various administrative reviews and approvals are required for work in these jurisdictions. These authorizations, particularly within the city of Portland, may be more difficult to acquire than for other options due to most of the proposed work being conducted in highly developed areas. Each of these jurisdictions will also require a Permit to Occupy Public Right-of-Way. This option also includes railroad crossings, each requiring a Railroad Crossing Permit.

The City of Portland also has an environmental overlay zone on the west side of Powell Butte which effectively prohibits traditional open-cut pipeline construction in that area. Since the transmission pipeline route analysis for this supply option parallels the existing Washington County Supply line route, trenchless construction through this area will minimize impacts but will result in cost implication shown in the cost analysis of Technical Memorandum 09.

The transmission pipeline alignment for this option also passes through Oaks Bottom Wildlife Refuge. Trenchless construction through this area will minimize impacts but will result in cost implication shown in the cost analysis of Technical Memorandum 09.

### **Willamette – Newberg West Sub-Option**

Major potential environmental constraints for Willamette – Newberg West Sub-option include installation of a new water intake structure in the Willamette River and three crossings of the Tualatin River. It may be possible to reduce the number of crossings of the Tualatin River through minor relocation of the alignment. Use of the micro-tunneling technique at these crossings will minimize impacts, but because the Tualatin is a Section 10 water, a Corps permit and consultation with NMFS for potential impacts to listed fish species will be required. This option also includes four crossings of potential wetland areas which will require state and/or federal permits.

Work in the Willamette River associated with the intake will require preparation of a biological assessment for potential impacts to listed fish species and likely formal consultation with NMFS along with state and federal removal/fill permits. This can extend the expected time frame for acquisition of permits as the permits are not issued until consultation has been completed. Additionally, the relatively large number of crossings of wetlands and waters will increase the level of effort required to conduct studies and obtain required permits and may raise questions from the agencies regarding avoidance and minimization of impacts compared with other options. This may result in delays in acquisition of permits.

This option passes through two counties: Yamhill and Washington, and through two cities: Newberg and Hillsboro. Conditional Use Permits and various administrative reviews and approvals are required for work in these jurisdictions. Each of these jurisdictions will also require a Permit to Occupy Public Right-of-Way. This option also includes railroad crossings, each requiring a Railroad Crossing Permit.

### **Willamette – Newberg East Sub-Option**

Major potential environmental constraints for Willamette – Newberg Supply Option: East Sub-option include installation of a new water intake structure in the Willamette River and one crossing of the Tualatin River. Use of the micro-tunneling technique at this crossing will minimize impacts, but because the Tualatin is a Section 10 water, a Corps permit and consultation with NMFS for potential impacts to listed fish species will be required. This option also includes two crossings of potential wetland areas which will require state and/or federal permits.

Work in the Willamette River associated with the intake will require preparation of a biological assessment for potential impacts to listed fish species and likely formal consultation with NMFS along to state and federal removal/fill permits. This can extend the expected time frame for acquisition of permits as the permits are not issued until consultation has been completed. Additionally, the relatively large number of crossings of wetlands and waters will increase the level of effort required to conduct studies and obtain required permits and may raise questions from the agencies regarding avoidance and minimization of impacts compared with other options. This may result in delays in acquisition of permits.

This option passes through two counties: Yamhill and Washington, and through three cities: Newberg, Sherwood, and Hillsboro. Conditional Use Permits and various administrative reviews and approvals are required for work in these jurisdictions. Each of these



jurisdictions will also require a Permit to Occupy Public Right-of-Way. This option also includes railroad crossings, each requiring a Railroad Crossing Permit.

### **Northern Groundwater Supply Option**

The major potential environmental constraint for the Northern Groundwater Supply Option is the proposed installation of eight groundwater collector wells. Well construction will require a separate Landowner's Well Permit and Bond for each well from the Oregon Water Resources Department. All the work must be in compliance with Oregon's Administrative Rules for Water Supply Well Construction and Maintenance (OAR 690 -230 through 690-240). Potential uncertainties associated with permitting for the groundwater wells increase the level of complexity of permit acquisition. Corps and DSL permits will likely be required for impacts to streams crossed in this alignment.

This option passes through three counties: Columbia, Multnomah and Washington, and through two cities: Beaverton and Hillsboro. Conditional Use Permits and various administrative reviews and approvals are required for work in these jurisdictions. In Washington County these authorizations may be more difficult to acquire due to generally higher permitting standards in these jurisdiction. Each of these jurisdictions will also require a Permit to Occupy Public Right-of-Way. This option also includes railroad crossings, each requiring a Railroad Crossing Permit.

## **Conclusions**

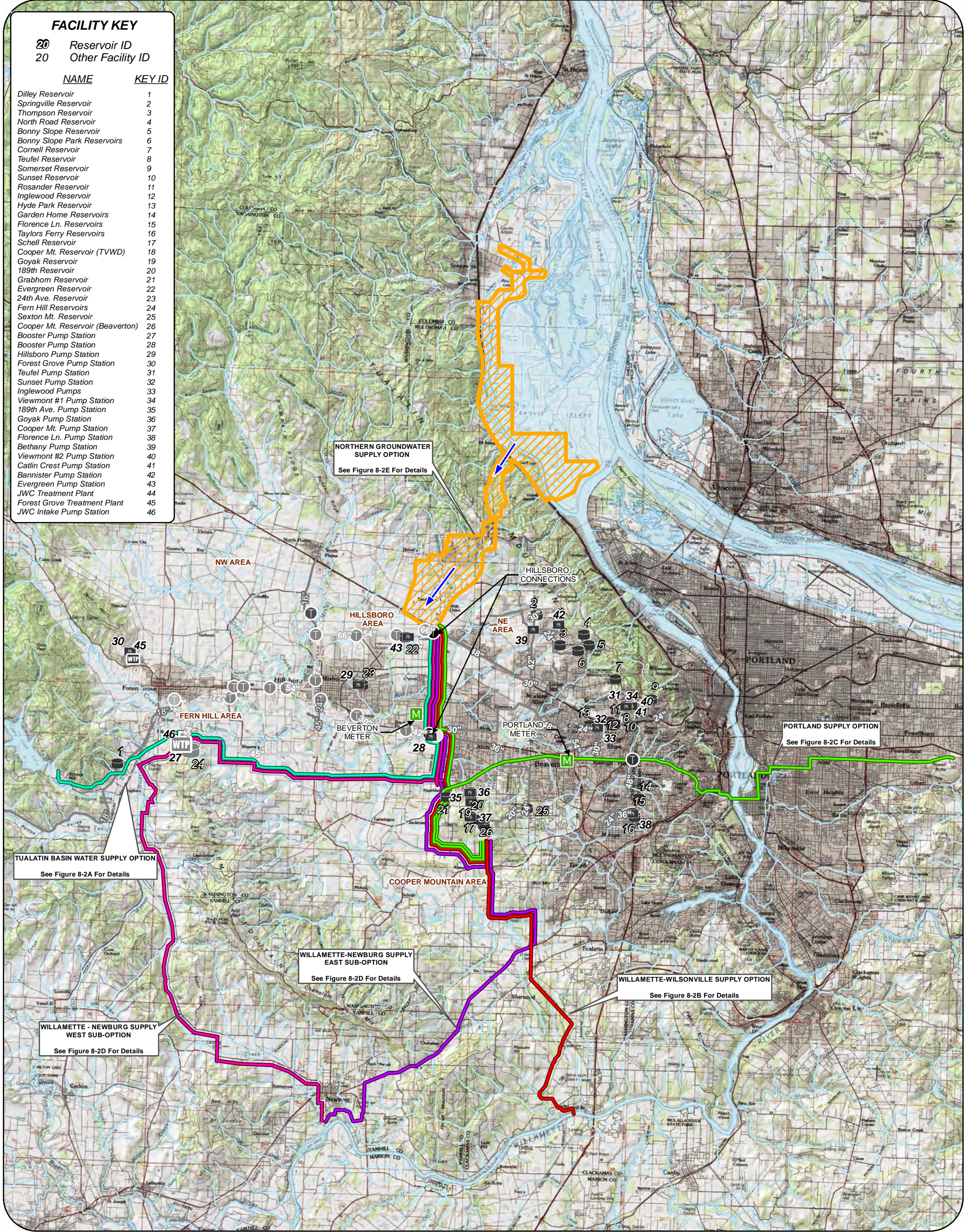
No fatal flaws were identified which would preclude acquiring the necessary environmental or land use permits for any of the proposed water supply options. However, the permitting process is likely to be lengthier and carry more uncertainties for some options compared with others.



**FACILITY KEY**

20 Reservoir ID  
20 Other Facility ID

NAME	KEY ID
Dilley Reservoir	1
Springville Reservoir	2
Thompson Reservoir	3
North Road Reservoir	4
Bonny Slope Reservoir	5
Bonny Slope Park Reservoirs	6
Cornell Reservoir	7
Teufel Reservoir	8
Somerset Reservoir	9
Sunset Reservoir	10
Rosander Reservoir	11
Inglewood Reservoir	12
Hyde Park Reservoir	13
Garden Home Reservoirs	14
Florence Ln. Reservoirs	15
Taylor's Ferry Reservoirs	16
Schell Reservoir	17
Cooper Mt. Reservoir (TVWD)	18
Goyak Reservoir	19
189th Reservoir	20
Grabhom Reservoir	21
Evergreen Reservoir	22
24th Ave. Reservoir	23
Fern Hill Reservoirs	24
Sexton Mt. Reservoir	25
Cooper Mt. Reservoir (Beaverton)	26
Booster Pump Station	27
Booster Pump Station	28
Hillsboro Pump Station	29
Forest Grove Pump Station	30
Teufel Pump Station	31
Sunset Pump Station	32
Inglewood Pumps	33
Viewmont #1 Pump Station	34
189th Ave. Pump Station	35
Goyak Pump Station	36
Cooper Mt. Pump Station	37
Florence Ln. Pump Station	38
Bethany Pump Station	39
Viewmont #2 Pump Station	40
Catlin Crest Pump Station	41
Bannister Pump Station	42
Evergreen Pump Station	43
JWC Treatment Plant	44
Forest Grove Treatment Plant	45
JWC Intake Pump Station	46



**NORTHERN GROUNDWATER SUPPLY OPTION**  
See Figure 8-2E For Details

**PORTLAND SUPPLY OPTION**  
See Figure 8-2C For Details

**TUALATIN BASIN WATER SUPPLY OPTION**  
See Figure 8-2A For Details

**WILLAMETTE-NEWBURG SUPPLY EAST SUB-OPTION**  
See Figure 8-2D For Details

**WILLAMETTE-WILSONVILLE SUPPLY OPTION**  
See Figure 8-2B For Details

**WILLAMETTE - NEWBURG SUPPLY WEST SUB-OPTION**  
See Figure 8-2D For Details

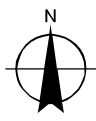
**LEGEND**

<b>FACILITIES</b>	<ul style="list-style-type: none"> <li> Beaverton Turnout</li> <li> Forest Grove Turnout</li> <li> Hillsboro Turnout</li> <li> North Plains Turnout</li> <li> TVWD - Portland Water Bureau Turnout</li> <li> TVWD Turnout</li> <li> JWC Meter</li> <li> Proposed Pump Station</li> <li> Proposed Reservoir</li> <li> Proposed Water Treatment Plant</li> </ul>	<ul style="list-style-type: none"> <li> JWC Transmission Main</li> <li> JWC-Member Transmission Main</li> <li> Portland Supply Option</li> <li> Willamette - Wilsonville Supply Option</li> <li> Willamette - Newburg Supply</li> <li> West Sub-Option</li> <li> East Sub-Option</li> <li> Tualatin Basin Water Supply Option</li> <li> Hillsboro North Connection</li> <li> Northern Groundwater Supply Option Corridor</li> </ul>	<ul style="list-style-type: none"> <li> JWC ASR Development focus Areas</li> <li> ASR Study Area</li> <li> Waterbody</li> <li> River</li> </ul>
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**FIGURE 8-1  
WATER SUPPLY  
OPTIONS**



**Project No.:** 161669  
**Sources:** Joint Water Commission (JWC)  
City of Hillsboro  
Tualatin Valley Water District (TVWD)  
Washington County  
Metro Data Resource Center



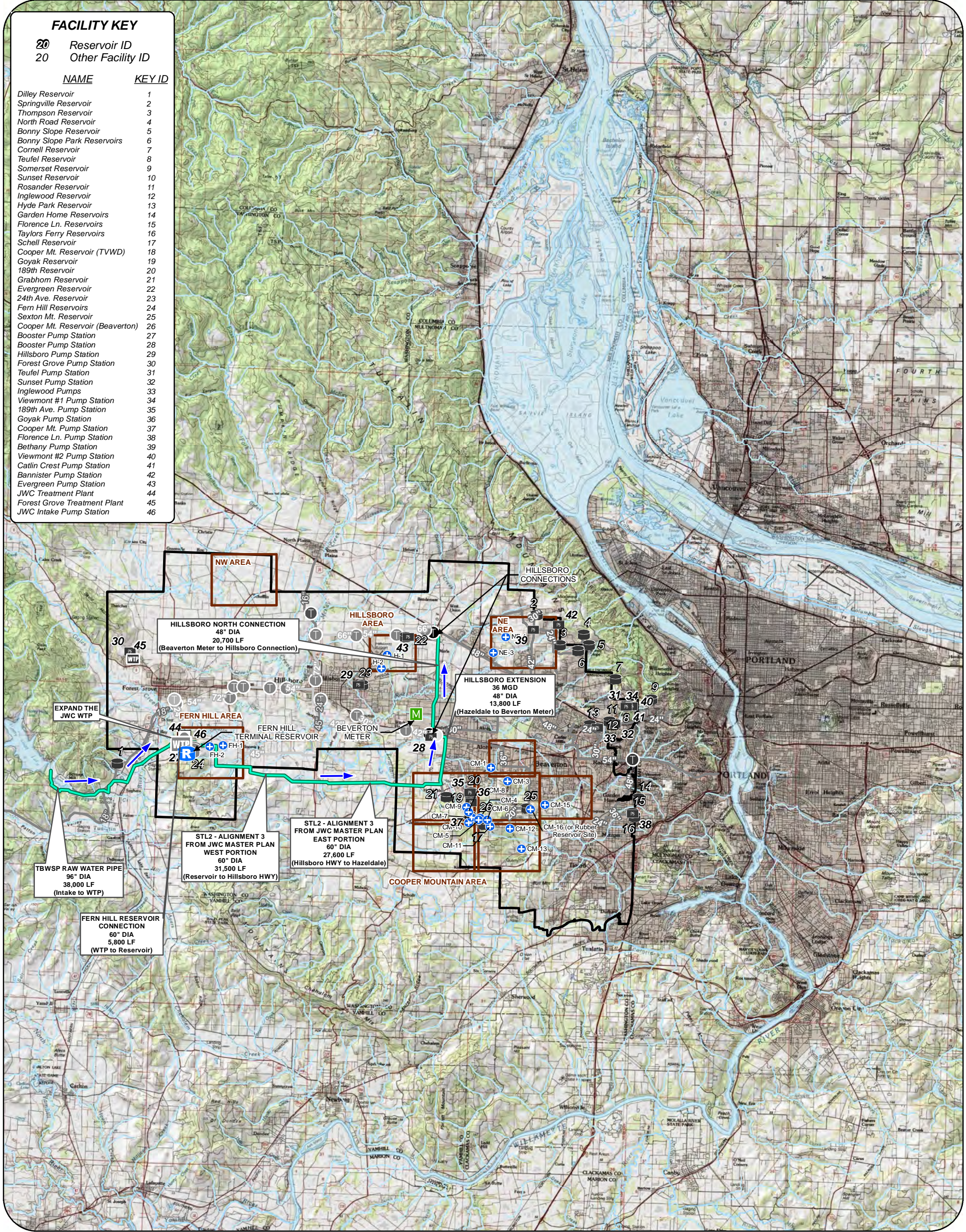


**FACILITY KEY**

20 Reservoir ID  
20 Other Facility ID

NAME KEY ID

Dilley Reservoir	1
Springville Reservoir	2
Thompson Reservoir	3
North Road Reservoir	4
Bonny Slope Reservoir	5
Bonny Slope Park Reservoirs	6
Cornell Reservoir	7
Teufel Reservoir	8
Somerset Reservoir	9
Sunset Reservoir	10
Rosander Reservoir	11
Inglewood Reservoir	12
Hyde Park Reservoir	13
Garden Home Reservoirs	14
Florence Ln. Reservoirs	15
Taylor's Ferry Reservoirs	16
Schell Reservoir	17
Cooper Mt. Reservoir (TVWD)	18
Goyak Reservoir	19
189th Reservoir	20
Grabhom Reservoir	21
Evergreen Reservoir	22
24th Ave. Reservoir	23
Fern Hill Reservoirs	24
Sexton Mt. Reservoir	25
Cooper Mt. Reservoir (Beaverton)	26
Booster Pump Station	27
Booster Pump Station	28
Hillsboro Pump Station	29
Forest Grove Pump Station	30
Teufel Pump Station	31
Sunset Pump Station	32
Inglewood Pumps	33
Viewmont #1 Pump Station	34
189th Ave. Pump Station	35
Goyak Pump Station	36
Cooper Mt. Pump Station	37
Florence Ln. Pump Station	38
Bethany Pump Station	39
Viewmont #2 Pump Station	40
Catlin Crest Pump Station	41
Bannister Pump Station	42
Evergreen Pump Station	43
JWC Treatment Plant	44
Forest Grove Treatment Plant	45
JWC Intake Pump Station	46



**FACILITIES**

	JWC Intake
	JWC Pump Station
	JWC-Member Pump Station
	JWC Reservoir
	JWC-Member Reservoir; City of Beaverton
	JWC Treatment Plant
	JWC-Member Treatment Plant
	ASR Well

**LEGEND**

	Beaverton Turnout
	Forest Grove Turnout
	Hillsboro Turnout
	North Plains Turnout
	TVWD - Portland Water Bureau Turnout
	TVWD Turnout
	JWC Meter
	Proposed Pump Station
	Proposed Reservoir
	Proposed Water Treatment Plant

**PIPES**

	JWC Transmission Main
	JWC-Member Transmission Main
	Tualatin Basin Water Supply (TBWS)
	JWC ASR Development focus Areas
	ASR Study Area
	Waterbody
	River

**FIGURE 8-2A  
TUALATIN BASIN  
WATER SUPPLY  
PROJECT OPTION**

Project No.: 161669  
Sources: Joint Water Commission (JWC)  
City of Hillsboro  
Tualatin Valley Water District (TVWD)  
Washington County  
Metro Data Resource Center

1 0 1 2 3 Miles

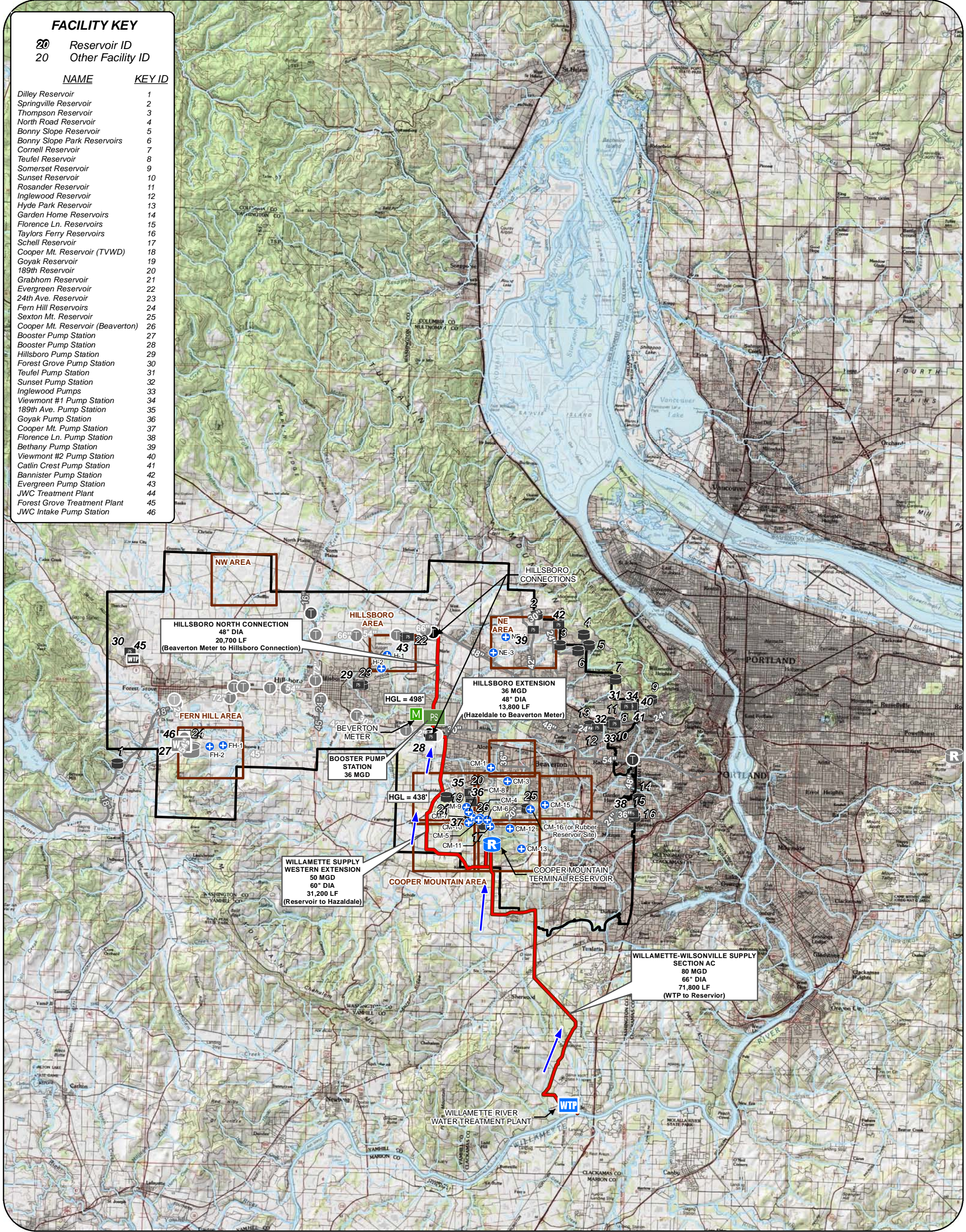


**FACILITY KEY**

20 Reservoir ID  
20 Other Facility ID

NAME KEY ID

Dilley Reservoir	1
Springville Reservoir	2
Thompson Reservoir	3
North Road Reservoir	4
Bonny Slope Reservoir	5
Bonny Slope Park Reservoirs	6
Cornell Reservoir	7
Teufel Reservoir	8
Somerset Reservoir	9
Sunset Reservoir	10
Rosander Reservoir	11
Inglewood Reservoir	12
Hyde Park Reservoir	13
Garden Home Reservoirs	14
Florence Ln. Reservoirs	15
Taylor's Ferry Reservoirs	16
Schell Reservoir	17
Cooper Mt. Reservoir (TVWD)	18
Goyak Reservoir	19
189th Reservoir	20
Grabhom Reservoir	21
Evergreen Reservoir	22
24th Ave. Reservoir	23
Fern Hill Reservoirs	24
Sexton Mt. Reservoir	25
Cooper Mt. Reservoir (Beaverton)	26
Booster Pump Station	27
Booster Pump Station	28
Hillsboro Pump Station	29
Forest Grove Pump Station	30
Teufel Pump Station	31
Sunset Pump Station	32
Inglewood Pumps	33
Viewmont #1 Pump Station	34
189th Ave. Pump Station	35
Goyak Pump Station	36
Cooper Mt. Pump Station	37
Florence Ln. Pump Station	38
Bethany Pump Station	39
Viewmont #2 Pump Station	40
Catlin Crest Pump Station	41
Bannister Pump Station	42
Evergreen Pump Station	43
JWC Treatment Plant	44
Forest Grove Treatment Plant	45
JWC Intake Pump Station	46



- FACILITIES**
- JWC Intake
  - JWC Pump Station
  - JWC-Member Pump Station
  - JWC Reservoir
  - JWC-Member Reservoir; City of Beaverton
  - JWC Treatment Plant
  - JWC-Member Treatment Plant
  - ASR Well

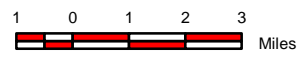
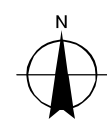
- LEGEND**
- Beaverton Turnout
  - Forest Grove Turnout
  - Hillsboro Turnout
  - North Plains Turnout
  - TVWD - Portland Water Bureau Turnout
  - TVWD Turnout
  - JWC Meter
  - Proposed Pump Station
  - Proposed Reservoir
  - Proposed Water Treatment Plant

- PIPES**
- JWC Transmission Main
  - JWC-Member Transmission Main
  - Willamette - Wilsonville Supply Option
  - JWC ASR Development focus Areas
  - ASR Study Area
  - Waterbody
  - River

**FIGURE 8-2B**  
**WILLAMETTE - WILSONVILLE**  
**OPTION**



Project No.: 161669  
Sources: Joint Water Commission (JWC)  
City of Hillsboro  
Tualatin Valley Water District (TVWD)  
Washington County  
Metro Data Resource Center



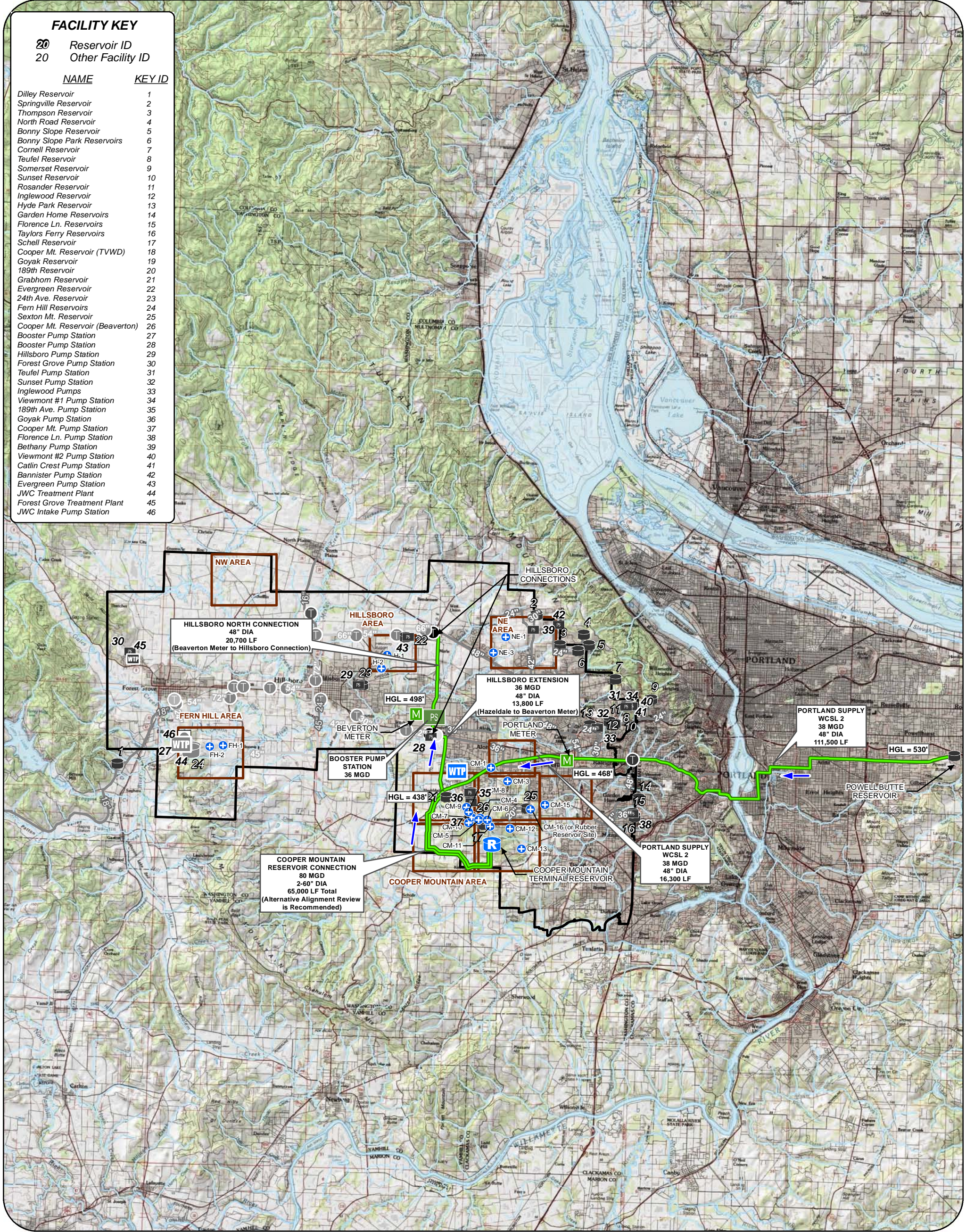


**FACILITY KEY**

20 Reservoir ID  
20 Other Facility ID

NAME KEY ID

Dilley Reservoir	1
Springville Reservoir	2
Thompson Reservoir	3
North Road Reservoir	4
Bonny Slope Reservoir	5
Bonny Slope Park Reservoirs	6
Cornell Reservoir	7
Teufel Reservoir	8
Somerset Reservoir	9
Sunset Reservoir	10
Rosander Reservoir	11
Inglewood Reservoir	12
Hyde Park Reservoir	13
Garden Home Reservoirs	14
Florence Ln. Reservoirs	15
Taylor's Ferry Reservoirs	16
Schell Reservoir	17
Cooper Mt. Reservoir (TVWD)	18
Goyak Reservoir	19
189th Reservoir	20
Grabhom Reservoir	21
Evergreen Reservoir	22
24th Ave. Reservoir	23
Fern Hill Reservoirs	24
Sexton Mt. Reservoir	25
Cooper Mt. Reservoir (Beaverton)	26
Booster Pump Station	27
Booster Pump Station	28
Hillsboro Pump Station	29
Forest Grove Pump Station	30
Teufel Pump Station	31
Sunset Pump Station	32
Inglewood Pumps	33
Viewmont #1 Pump Station	34
189th Ave. Pump Station	35
Goyak Pump Station	36
Cooper Mt. Pump Station	37
Florence Ln. Pump Station	38
Bethany Pump Station	39
Viewmont #2 Pump Station	40
Catlin Crest Pump Station	41
Bannister Pump Station	42
Evergreen Pump Station	43
JWC Treatment Plant	44
Forest Grove Treatment Plant	45
JWC Intake Pump Station	46



**FIGURE 8-2C  
PORTLAND SUPPLY  
OPTION**

**HILLSBORO WATER**

Project No.: 161669  
Sources: Joint Water Commission (JWC)  
City of Hillsboro  
Tualatin Valley Water District (TVWD)  
Washington County  
Metro Data Resource Center

1 0 1 2 3 Miles

**FACILITIES**

	JWC Intake
	JWC Pump Station
	JWC-Member Pump Station
	JWC Reservoir
	JWC-Member Reservoir; City of Beaverton
	JWC Treatment Plant
	JWC-Member Treatment Plant
	ASR Well

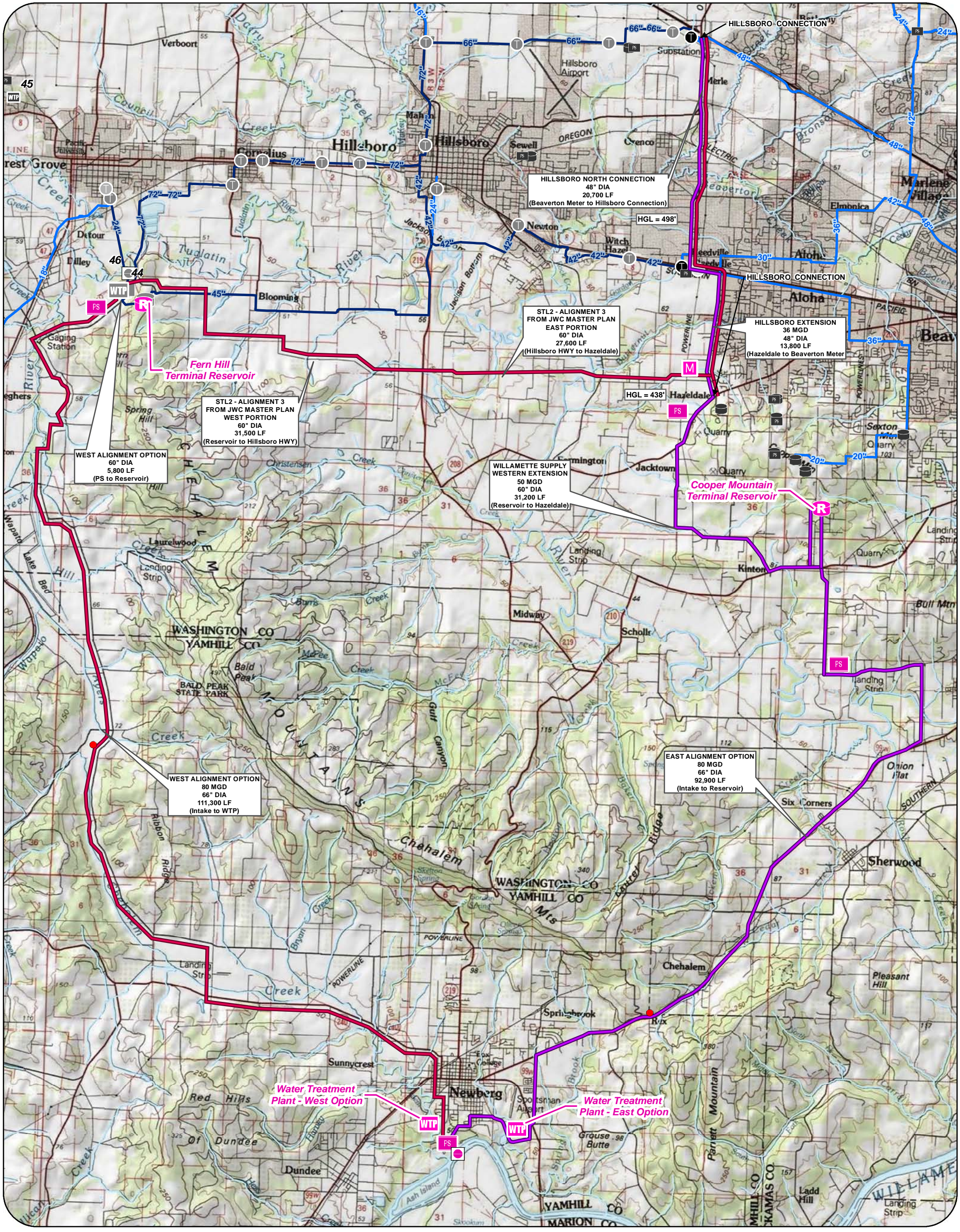
**LEGEND**

	Beaverton Turnout
	Forest Grove Turnout
	Hillsboro Turnout
	North Plains Turnout
	TVWD - Portland Water Bureau Turnout
	TVWD Turnout
	JWC Meter
	Proposed Pump Station
	Proposed Reservoir
	Proposed Water Treatment Plant

**PIPES**

	JWC Transmission Main
	JWC-Member Transmission Main
	Portland Supply Option
	JWC ASR Development focus Areas
	ASR Study Area
	Waterbody
	River





### FACILITIES

- JWC Intake
- JWC Pump Station
- JWC-Member Pump Station
- JWC Reservoir
- JWC-Member Reservoir
- JWC Treatment Plant
- JWC-Member Treatment Plant
- JWC-Meter

### LEGEND

- Proposed WTP
- Proposed Terminal Reservoir
- Proposed Pumping Station
- Proposed Intake
- Beaverton Turnout
- Forest Grove Turnout
- Hillsboro Turnout
- North Plains Turnout
- TVWD - Portland Water Bureau Turnout
- TVWD Turnout
- Divide Between Tualatin River Basin and Willamette River Basin

### PIPES

- JWC Transmission Main
- JWC-Member Transmission Main

### SUPPLY OPTIONS

- Proposed West Sub-Option
- Proposed East Sub-Option

### BASEMAP

- Freeway
- Major Arterial
- Waterbody
- River

## FIGURE 8-2D

# Willamette - Newberg Supply Options

Project No.: 161669  
 Sources: Joint Water Commission (JWC)  
 City of Hillsboro  
 Tualatin Valley Water District (TVWD)  
 Washington County  
 Metro Data Resource Center

0.5 0 0.5 1 1.5 Miles

1 inch = 1.5 miles



**FACILITY KEY**

20 Reservoir ID  
20 Other Facility ID

NAME KEY ID

Dilley Reservoir	1
Springville Reservoir	2
Thompson Reservoir	3
North Road Reservoir	4
Bonny Slope Reservoir	5
Bonny Slope Park Reservoirs	6
Cornell Reservoir	7
Teufel Reservoir	8
Somerset Reservoir	9
Sunset Reservoir	10
Rosander Reservoir	11
Inglewood Reservoir	12
Hyde Park Reservoir	13
Garden Home Reservoirs	14
Florence Ln. Reservoirs	15
Taylor's Ferry Reservoirs	16
Schell Reservoir	17
Cooper Mt. Reservoir (TVWD)	18
Goyak Reservoir	19
189th Reservoir	20
Grabhom Reservoir	21
Evergreen Reservoir	22
24th Ave. Reservoir	23
Fern Hill Reservoirs	24
Sexton Mt. Reservoir	25
Cooper Mt. Reservoir (Beaverton)	26
Booster Pump Station	27
Booster Pump Station	28
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Teufel Pump Station	31
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Viewmont #1 Pump Station	34
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Goyak Pump Station	36
Cooper Mt. Pump Station	37
Florence Ln. Pump Station	38
Bethany Pump Station	39
Viewmont #2 Pump Station	40
Catlin Crest Pump Station	41
Bannister Pump Station	42
Evergreen Pump Station	43
JWC Treatment Plant	44
Forest Grove Treatment Plant	45
JWC Intake Pump Station	46

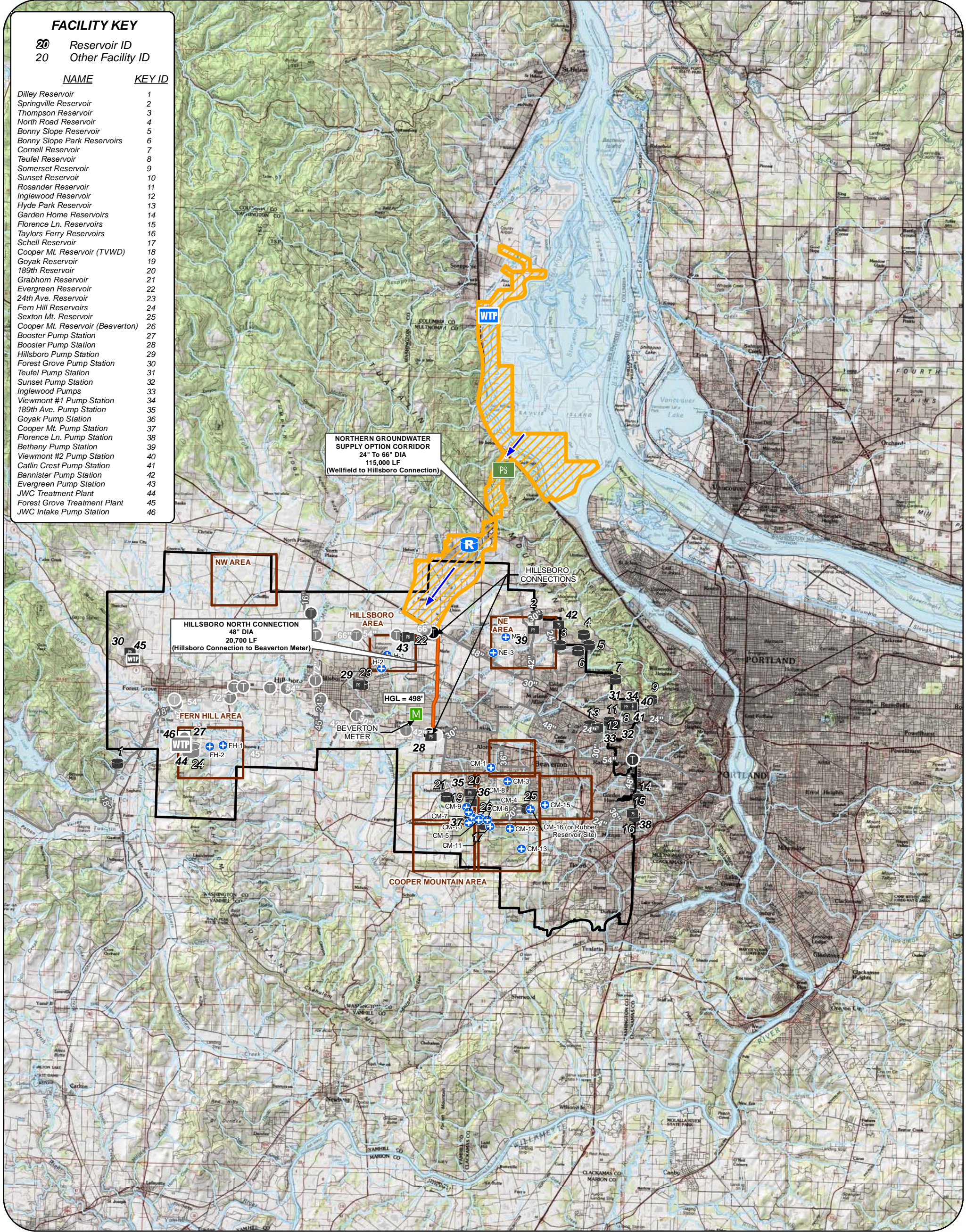


FIGURE 8-2E

**NORTHERN GROUNDWATER SUPPLY OPTION**

**FACILITIES**

- JWC Intake
- JWC Pump Station
- JWC-Member Pump Station
- JWC Reservoir
- JWC-Member Reservoir: City of Beaverton
- JWC Treatment Plant
- JWC-Member Treatment Plant
- ASR Well

**LEGEND**

- Beaverton Turnout
- Forest Grove Turnout
- Hillsboro Turnout
- North Plains Turnout
- TVWD - Portland Water Bureau Turnout
- TVWD Turnout
- JWC Meter
- Proposed Pump Station
- Proposed Reservoir
- Proposed Water Treatment Plant

**PIPES**

- JWC Transmission Main
- JWC-Member Transmission Main
- Hillsboro North Connection
- Northern Groundwater Supply Option Corridor
- JWC ASR Development focus Areas
- ASR Study Area
- Waterbody
- River



Project No.: 161669  
Sources: Joint Water Commission (JWC)  
City of Hillsboro  
Tualatin Valley Water District (TVWD)  
Washington County  
Metro Data Resource Center

