



# Lake Oswego · Tigard Water Partnership

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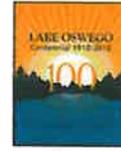
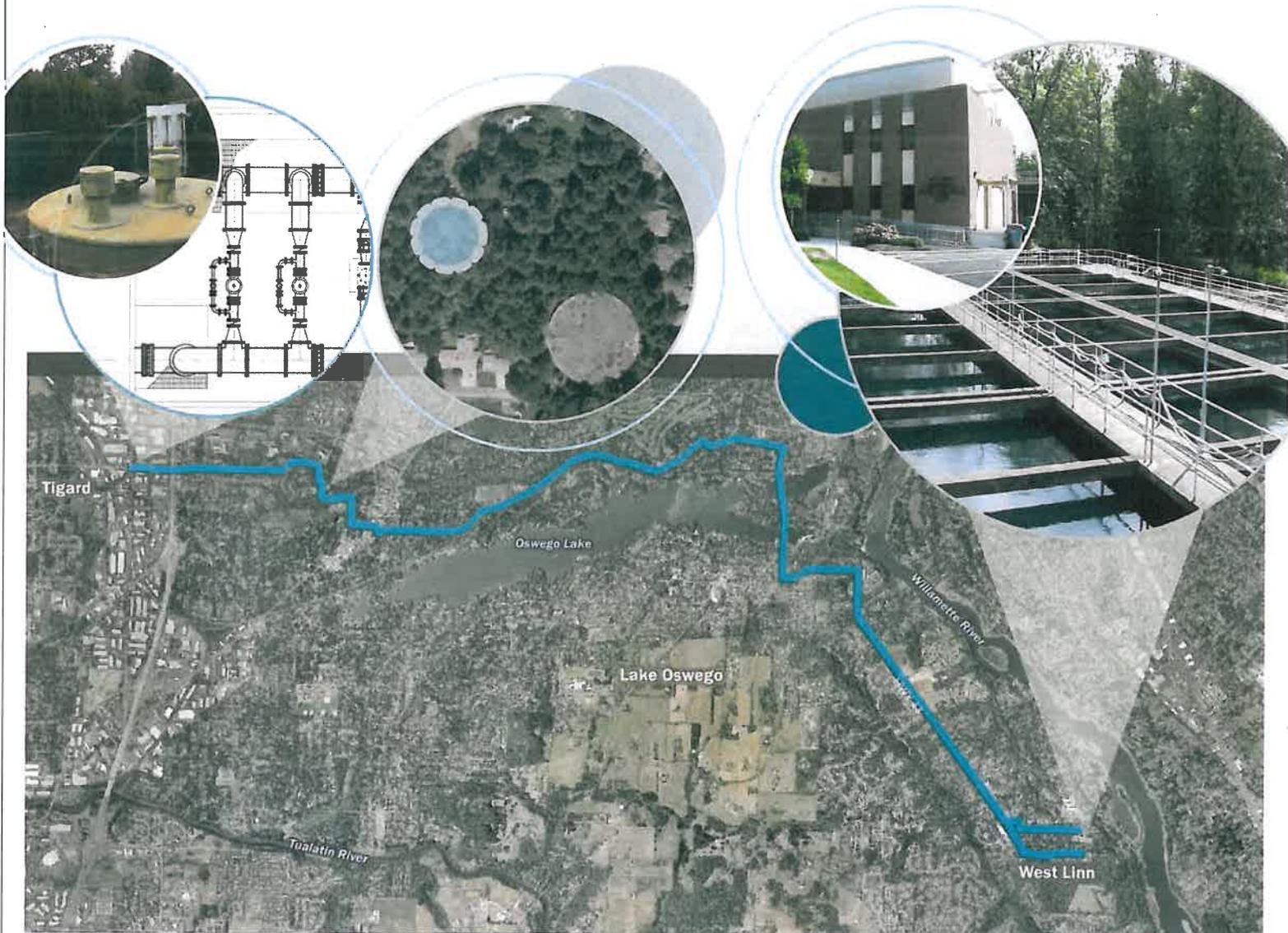


Exhibit 5 To Intergovernmental Agreement

# Supply Facilities Capital Improvement Program

November 29, 2010



# LAKE OSWEGO/TIGARD WATER PARTNERSHIP

## EXHIBIT 5 to IGA SUPPLY FACILITIES CAPITAL IMPROVEMENT PROGRAM

### Summary

**Project Name:** Lake Oswego/Tigard Water Supply Expansion  
**Project Description:** Plan, fund, and construct improvements to Lake Oswego's and Tigard's water systems, including an expansion of Lake Oswego's water supply system from its current capacity of 16 million gallons per day (mgd) to 32 mgd, and infrastructure required to provide additional flow to Tigard's water system.  
**Funded /Unfunded:** Funded  
**Estimated Date of Completion:** July 1, 2016  
**Justification:** Intergovernmental Agreement

The total projected revenues and expenses for the next five fiscal years are presented in Table 1.

Table 1. Water Supply Capital Improvements Projected Cash Flow							
Fiscal Year (\$ in 000's)							
Revenue Source <sup>(1)(2)</sup>	Description	2011-12	2012-13	2013-14	2014-15	2015-16	Total
(LO)	Operating	0	0	2,800	3,000	1,239	7,039
(LO)	SDC's	450	550	550	550	550	2,650
(LO)	Bonds	4,615	16,825	39,388	28,919	0	89,747
(LO)	subtotal	5,065	17,375	42,738	32,469	1,789	99,436
(Tigard)	Intergovt'l	5,835	20,015	49,232	37,401	2,061	114,544
Resources Total		10,900	37,390	91,970	69,870	3,850	213,980
Expenses <sup>(3)</sup>							
	Design	5,140	6,390	4,500	790	0	16,820
	Proj. Admin.	5,760	6,280	6,390	6,360	1,420	26,210
	Construction	0	24,720	81,080	62,720	2,430	170,950
Expenses Total		10,900	37,390	91,970	69,870	3,850	213,980

Notes:

(1) Lake Oswego share of costs = 0.4647

(2) Tigard share of costs = 0.5353

Total = 1.0000

(3) Expenses are based on Class 3 construction estimates with accuracy of -20% to +30%.

## Program Overview

The scope for the project includes design and construction of the following infrastructure:

- A new 38-mgd river intake pump station (RIPS) located on the Clackamas River in Gladstone. Initial capacity is 32 mgd but sizing will allow later expansion to the ultimate capacity of 38 mgd.
- Approximately 14,000 feet of new raw (untreated) water transmission piping (RWP) connecting the RIPS structure to the Lake Oswego Water Treatment Plant (WTP).
- Expansion of the WTP from its current capacity of 16 mgd to 32 mgd, with provision for future expansion to 38 mgd.
- Approximately 35,000 feet of new finished (treated) water piping (FWP) connecting the WTP to Lake Oswego's terminal reservoir located near Waluga Park.
- A new 3.5-million gallon (MG) water reservoir at Waluga Park.
- Replacement of Tigard's existing Bonita Pump Station (BPS) with capacity of 14 to 20 mgd.

The benefits of the IGA and the water supply improvement project include the following:

- Tigard's ownership in its water supply and decreased reliance on water supplied by Portland
- Joint financing of the project by Lake Oswego and Tigard
- Increases in pipe size for raw water and treated water transmission
- Increased water treatment plant capacity
- Increased treated water storage capacity
- Increased pumping capacity for Tigard's water distribution system
- Increased water transmission capacity to Tigard storage facilities

Table 2 provides a more detailed breakdown of costs by year, by project, and by Sponsor.

## Project Funding Source

**Lake Oswego:** The Water Fund is an enterprise fund used to account for all financial activity associated with the operation and maintenance of the city's water utility system. Water utility improvement projects are supported by water fees, which are restricted to purposes related to construction, repair, and operation of the water system. Additionally, system development charges are recovered from new development projects, but this is a minor portion of the overall funding for this program.

**Tigard:** The Water Fund is the primary operating fund and accounts for all costs associated with the water system, including ongoing maintenance. The Water Fund is an enterprise fund which regularly transfers revenues to the Water CIP Fund which accounts for various capital improvement projects, including the Lake Oswego/Tigard Water Partnership. Tigard also assesses system development charges which are allocated to appropriate capital improvements. Tigard has intergovernmental agreements with the cities of King City and Durham and with the Tigard Water District.

**Funding Status:** Funded

Table 2. CIP Cost Breakdown and Allocations

	2007/2010			2008/2011			2009/2012			2010/2013			2011/2014		
	Totals	Lake Oswego	Tigard	Totals	Lake Oswego	Tigard	Totals	Lake Oswego	Tigard	Totals	Lake Oswego	Tigard	Totals	Lake Oswego	Tigard
Program Administration															
Program Management, Permitting, CM	\$4,420,000	\$2,054,000	\$2,366,000	\$5,470,000	\$2,542,000	\$2,928,000	\$3,370,000	\$1,566,000	\$1,804,000	\$4,640,000	\$2,156,000	\$2,484,000	\$4,640,000	\$2,156,000	\$2,484,000
Sponsor, Land, Other Services	\$770,000	\$358,000	\$412,000	\$2,360,000	\$1,097,000	\$1,263,000	\$2,390,000	\$1,111,000	\$1,279,000	\$1,640,000	\$762,000	\$876,000	\$1,750,000	\$813,000	\$937,000
PROJECT TOTAL	\$5,190,000	\$2,412,000	\$2,778,000	\$7,830,000	\$3,639,000	\$4,191,000	\$5,760,000	\$2,677,000	\$3,083,000	\$6,280,000	\$2,918,000	\$3,362,000	\$6,390,000	\$2,969,000	\$3,421,000
RIPS															
Design and Engineering	\$0	\$0	\$0	\$830,000	\$386,000	\$444,000	\$850,000	\$236,000	\$294,000	\$130,000	\$60,000	\$70,000	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$5,710,000	\$2,681,000	\$3,089,000	\$5,700,000	\$2,681,000	\$3,089,000	\$5,700,000	\$2,681,000	\$3,089,000
PROJECT TOTAL	\$0	\$0	\$0	\$830,000	\$386,000	\$444,000	\$5,710,000	\$2,681,000	\$3,089,000	\$5,700,000	\$2,681,000	\$3,089,000	\$5,700,000	\$2,681,000	\$3,089,000
RWP															
Design and Engineering	\$0	\$0	\$0	\$0	\$0	\$0	\$950,000	\$441,000	\$509,000	\$880,000	\$441,000	\$509,000	\$880,000	\$441,000	\$509,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$6,240,000	\$2,940,000	\$3,340,000	\$6,240,000	\$2,940,000	\$3,340,000	\$6,240,000	\$2,940,000	\$3,340,000
PROJECT TOTAL	\$0	\$0	\$0	\$0	\$0	\$0	\$7,190,000	\$3,341,000	\$3,849,000	\$7,190,000	\$3,341,000	\$3,849,000	\$7,190,000	\$3,341,000	\$3,849,000
WTP															
Design and Engineering	\$0	\$0	\$0	\$1,270,000	\$590,000	\$680,000	\$3,040,000	\$1,413,000	\$1,627,000	\$2,920,000	\$1,357,000	\$1,563,000	\$2,780,000	\$1,060,000	\$1,720,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$3,040,000	\$1,413,000	\$1,627,000	\$3,040,000	\$1,413,000	\$1,627,000	\$3,040,000	\$1,413,000	\$1,627,000
PROJECT TOTAL	\$0	\$0	\$0	\$1,270,000	\$590,000	\$680,000	\$3,040,000	\$1,413,000	\$1,627,000	\$2,920,000	\$1,357,000	\$1,563,000	\$2,780,000	\$1,060,000	\$1,720,000
FMP															
Design and Engineering	\$0	\$0	\$0	\$0	\$0	\$0	\$1,030,000	\$479,000	\$551,000	\$1,830,000	\$850,000	\$980,000	\$1,020,000	\$474,000	\$546,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$5,940,000	\$2,760,000	\$3,180,000	\$5,940,000	\$2,760,000	\$3,180,000	\$5,940,000	\$2,760,000	\$3,180,000
PROJECT TOTAL	\$0	\$0	\$0	\$0	\$0	\$0	\$7,770,000	\$3,610,000	\$4,160,000	\$7,770,000	\$3,610,000	\$4,160,000	\$7,770,000	\$3,610,000	\$4,160,000
WR															
Design and Engineering	\$0	\$0	\$0	\$90,000	\$42,000	\$48,000	\$480,000	\$223,000	\$257,000	\$130,000	\$60,000	\$70,000	\$50,000	\$24,000	\$28,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$6,500,000	\$3,021,000	\$3,479,000	\$6,500,000	\$3,021,000	\$3,479,000	\$6,500,000	\$3,021,000	\$3,479,000
PROJECT TOTAL	\$0	\$0	\$0	\$90,000	\$42,000	\$48,000	\$7,380,000	\$3,244,000	\$3,736,000	\$7,380,000	\$3,244,000	\$3,736,000	\$7,380,000	\$3,244,000	\$3,736,000
BPS															
Design and Engineering	\$0	\$0	\$0	\$40,000	\$19,000	\$21,000	\$430,000	\$200,000	\$230,000	\$430,000	\$200,000	\$230,000	\$430,000	\$200,000	\$230,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$3,000,000	\$1,350,000	\$1,650,000	\$3,000,000	\$1,350,000	\$1,650,000	\$3,000,000	\$1,350,000	\$1,650,000
PROJECT TOTAL	\$0	\$0	\$0	\$40,000	\$19,000	\$21,000	\$4,300,000	\$2,150,000	\$2,510,000	\$4,300,000	\$2,150,000	\$2,510,000	\$4,300,000	\$2,150,000	\$2,510,000
SCADA															
Design and Engineering	\$0	\$0	\$0	\$0	\$0	\$0	\$270,000	\$125,000	\$145,000	\$270,000	\$125,000	\$145,000	\$270,000	\$125,000	\$145,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$70,000	\$32,000	\$37,000	\$70,000	\$32,000	\$37,000	\$70,000	\$32,000	\$37,000
PROJECT TOTAL	\$0	\$0	\$0	\$0	\$0	\$0	\$340,000	\$157,000	\$182,000	\$340,000	\$157,000	\$182,000	\$340,000	\$157,000	\$182,000
<b>FY Totals</b>	\$5,190,000	\$2,412,000	\$2,778,000	\$10,020,000	\$4,657,000	\$5,363,000	\$30,900,000	\$13,067,000	\$15,033,000	\$31,990,000	\$14,373,000	\$16,017,000	\$42,739,000	\$19,370,000	\$22,131,000

Table 2. (cont'd) CIP Cost Breakdown and Allocations

	2014/2015		2015/2016		2016/2017		Totals	
	Lake Oswego	Tigard	Lake Oswego	Tigard	Lake Oswego	Tigard	Lake Oswego	Tigard
	46.47%	53.53%	46.47%	53.53%	46.47%	53.53%	46.47%	53.53%
<b>Program Administration</b>								
Sponsor, Land, Other Services	\$2,156,000	\$2,484,000	\$70,000	\$80,000	\$0	\$0	\$12,700,000	\$14,630,000
<b>PROJECT TOTAL</b>	\$1,720,000	\$921,000	\$590,000	\$680,000	\$850,000	\$455,000	\$12,750,000	\$6,835,000
<b>RIPS</b>								
Design and Engineering	\$2,955,000	\$3,405,000	\$650,000	\$760,000	\$850,000	\$455,000	\$40,980,000	\$21,455,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$1,510,000	\$808,000
<b>PROJECT TOTAL</b>	\$2,955,000	\$3,405,000	\$650,000	\$760,000	\$850,000	\$455,000	\$42,500,000	\$22,263,000
<b>RWP</b>								
Design and Engineering	\$144,000	\$166,000	\$0	\$0	\$0	\$0	\$2,140,000	\$1,146,000
Construction	\$2,416,000	\$2,784,000	\$0	\$0	\$0	\$0	\$24,950,000	\$13,356,000
<b>PROJECT TOTAL</b>	\$2,560,000	\$2,950,000	\$0	\$0	\$0	\$0	\$27,090,000	\$14,502,000
<b>WTP</b>								
Design and Engineering	\$88,000	\$102,000	\$0	\$0	\$0	\$0	\$9,700,000	\$5,182,000
Construction	\$16,125,000	\$18,575,000	\$0	\$0	\$0	\$0	\$69,400,000	\$37,150,000
<b>PROJECT TOTAL</b>	\$16,213,000	\$18,677,000	\$0	\$0	\$0	\$0	\$79,100,000	\$42,332,000
<b>FWP</b>								
Design and Engineering	\$125,000	\$145,000	\$0	\$0	\$0	\$0	\$4,150,000	\$2,221,000
Construction	\$8,825,000	\$10,165,000	\$1,101,000	\$1,269,000	\$46,290,000	\$21,511,000	\$1,939,000	\$24,779,000
<b>PROJECT TOTAL</b>	\$8,950,000	\$10,310,000	\$1,101,000	\$1,269,000	\$47,390,000	\$23,440,000	\$2,089,000	\$27,000,000
<b>WR</b>								
Design and Engineering	\$0	\$0	\$0	\$0	\$0	\$0	\$700,000	\$375,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$7,090,000	\$3,795,000
<b>PROJECT TOTAL</b>	\$0	\$0	\$0	\$0	\$0	\$0	\$7,790,000	\$4,170,000
<b>BPS</b>								
Design and Engineering	\$9,000	\$11,000	\$0	\$0	\$0	\$0	\$810,000	\$434,000
Construction	\$1,613,000	\$1,857,000	\$0	\$0	\$0	\$0	\$6,500,000	\$3,479,000
<b>PROJECT TOTAL</b>	\$1,622,000	\$1,868,000	\$0	\$0	\$0	\$0	\$7,310,000	\$3,913,000
<b>SCADA</b>								
Design and Engineering	\$167,000	\$193,000	\$28,000	\$32,000	\$0	\$0	\$1,050,000	\$562,000
Construction	\$167,000	\$193,000	\$28,000	\$32,000	\$0	\$0	\$1,050,000	\$562,000
<b>PROJECT TOTAL</b>	\$334,000	\$386,000	\$56,000	\$64,000	\$0	\$0	\$2,100,000	\$1,124,000
<b>FY Totals</b>	\$69,870,000	\$37,403,000	\$3,850,000	\$2,064,000	\$995,000	\$405,000	\$230,000,000	\$107,000,000

## Program Area Descriptions

The water supply improvements include upgrades or replacement of the existing facilities. These existing facilities and the proposed improvements are described in the following sections.

### Existing Facilities

The existing water supply facilities either will be upgraded or replaced, as listed in Table 3.

Table 3. Modifications to Existing Facilities		
Facility	Expanded/replaced	Justification
RIPS	Replaced	<ul style="list-style-type: none"> <li>• Insufficient capacity for future water demands</li> <li>• Seismic vulnerability</li> <li>• Electrical equipment is old and worn and does not meet current standards</li> </ul>
RWP	Replaced (existing left in place)	<ul style="list-style-type: none"> <li>• Insufficient capacity for future water demands</li> <li>• Condition of existing pipeline unknown</li> <li>• Seismic vulnerability</li> </ul>
WTP	Expanded	<ul style="list-style-type: none"> <li>• Insufficient capacity for future water demands</li> <li>• Electrical equipment is old and worn and does not meet current standards</li> <li>• Finished water clear well is undersized to meet regulatory finished water quality standards</li> <li>• Existing direct filtration process requires significant operator attention</li> <li>• Chlorine dosing requirements may lead to increased disinfection byproducts formation</li> </ul>
FWP	Replaced	Insufficient capacity for future water demands
WR	Expanded (new reservoir installed adjacent to existing)	<ul style="list-style-type: none"> <li>• Insufficient storage capacity for current and future conditions</li> <li>• Occasional issues with insufficient water pressure in the nearby neighborhood</li> </ul>
BPS	Replaced	Insufficient capacity for future water demands

### Proposed Facilities

The proposed water supply facilities include a new RIPS, new raw and finished water pipelines, expansion of the Lake Oswego WTP, a new WR, and a new BPS.

## RIPS

A replacement RIPS will be constructed on the Clackamas River in the City of Gladstone, as shown in Figure 1. The replacement facility will pump water from the Clackamas River to water treatment facilities for subsequent distribution to users. It will have an initial capacity of 32 mgd and will be expandable to 38 mgd to supply future water demands.

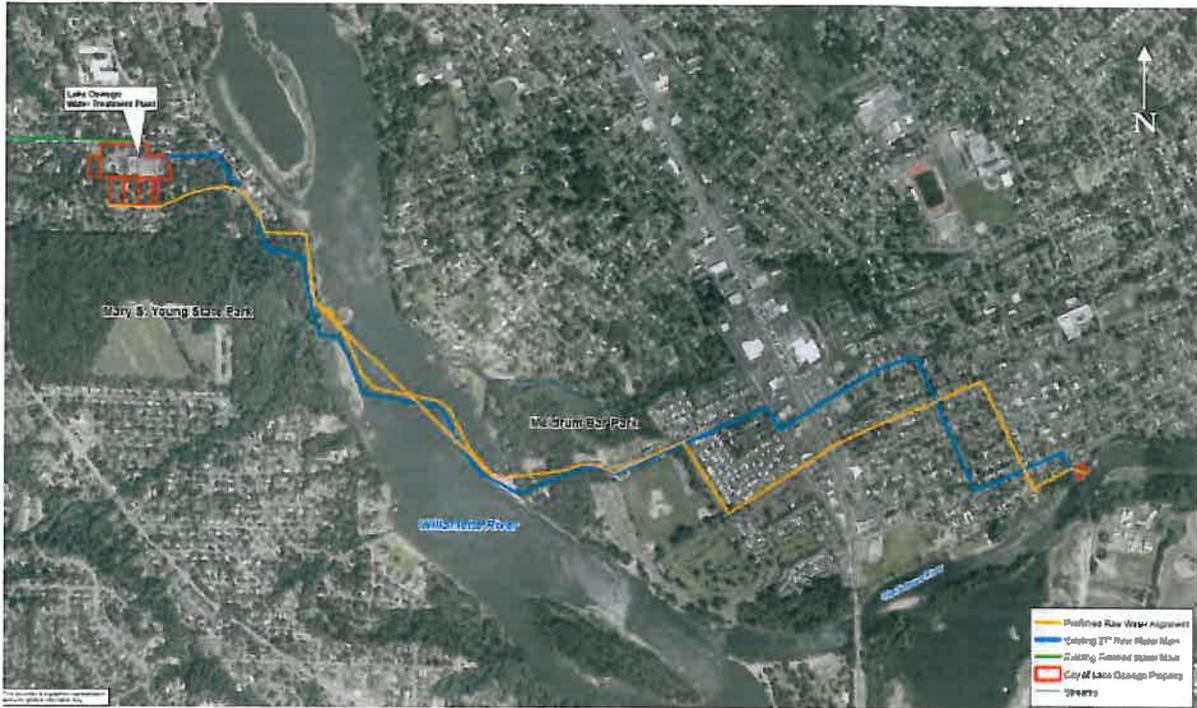
The new RIPS will be located adjacent to the existing intake structure and pump station, at the bottom of the Clackamas River Basin, at approximately river mile 0.8. The existing RIPS will likely be removed or abandoned.



Figure 1. Proposed Location of New River Intake Pump Station

## Raw Water Pipeline

Approximately 14,000 feet of new RWP will convey water from the RIPS to the Lake Oswego WTP, located in West Linn. The new 42-inch-diameter RWP will be installed parallel to the existing 27-inch-diameter RWP and will have a capacity of 38 mgd, as compared to 16 mgd for the existing RWP. The proposed alignment for the new RWP is shown in Figure 2.



**Figure 2. Proposed RWP Alignment**

## Lake Oswego WTP

The program includes provisions to upgrade and expand the existing Lake Oswego WTP. The capacity of the WTP will be increased from 16 to 32 mgd, with provisions for an ultimate expansion to 38 mgd consistent with the maximum water rights expected to be available from this source. The timing of the ultimate expansion to 38 mgd is not certain but may occur as early as 2015.

The existing WTP, built in 1968, has undergone numerous upgrades to improve its performance. The State of Oregon has designated the WTP as a direct filtration plant. The WTP includes a pump-based, rapid-mix system, three contact basins, six rapid sand, dual media gravity filters, a clear well, four sludge decanting and dewatering lagoons, and associated chemical feed systems (alum, poly-aluminum chloride, powdered activated carbon, poly-electrolytes, hydrated lime, carbon dioxide, and sodium hypochlorite).

The recommended plan to expand and upgrade the Lake Oswego WTP will be to reconfigure the plant to conventional filtration with pre-ozonation followed by biologically active granular media filtration. Other modifications include a new, larger clear well and finished water pump station, mechanical processes to treat process waste streams and residual solids, upgrades to chemical feed system, and miscellaneous improvements to existing buildings and site landscaping. The preliminary layout for the WTP expansion is shown in Figure 3. This layout will be revised subsequent to further discussions with WTP neighbors and the City of West Linn.

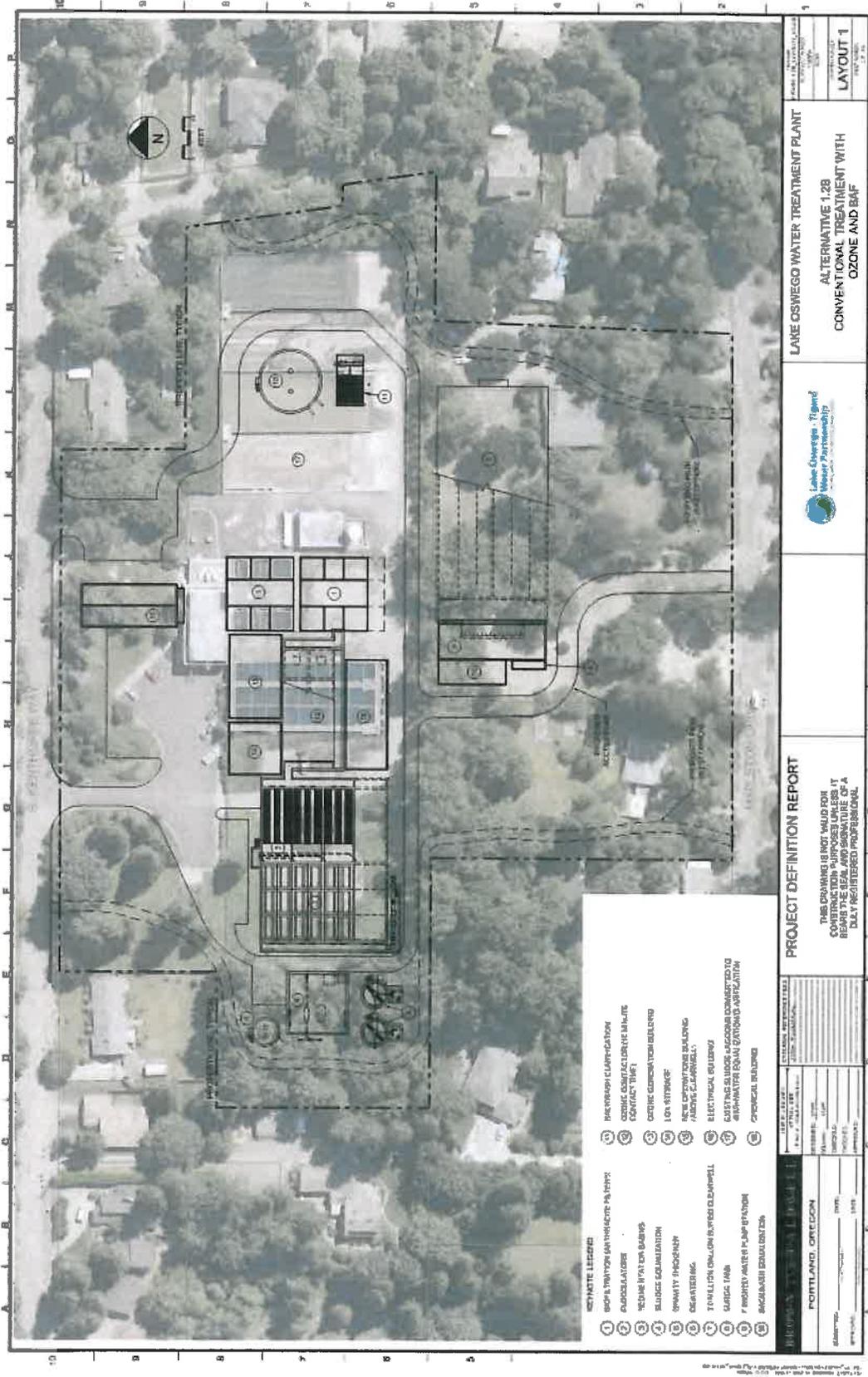
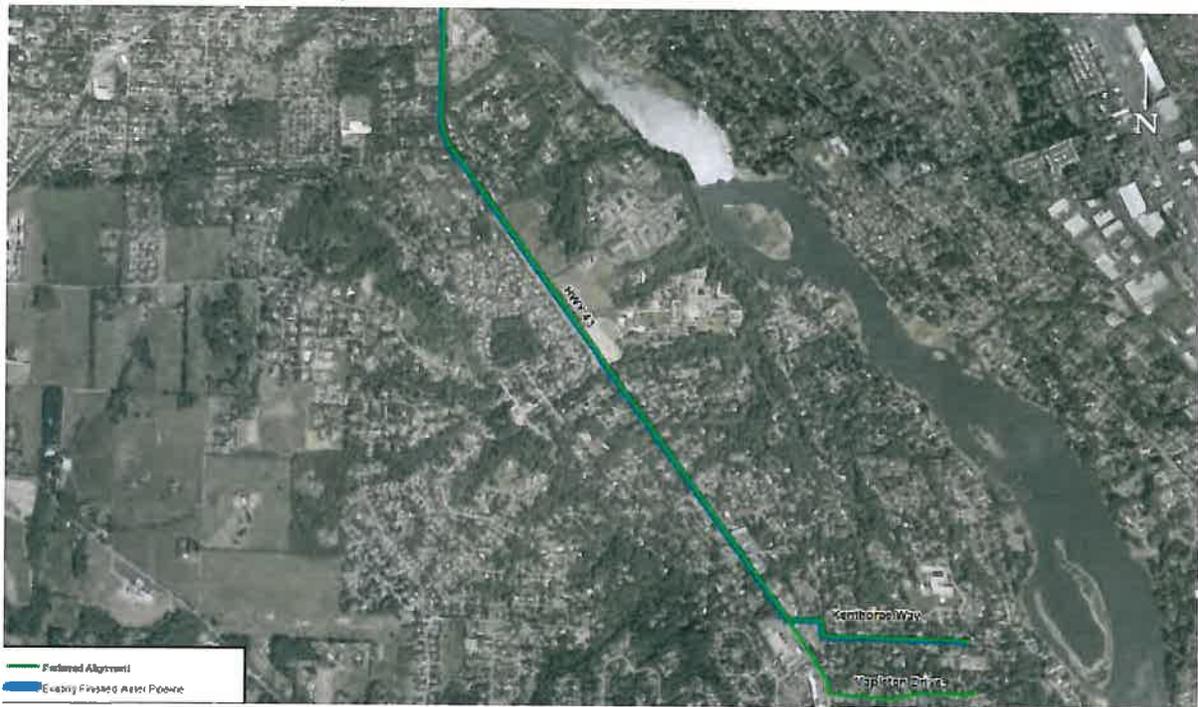


Figure 3. Proposed WTP Expansion

## Finished Water Pipeline

A new FWP will convey treated water from the Lake Oswego WTP in West Linn to the WRs in Lake Oswego. An optional FWP may be constructed from WRs to the BPS in Tigard depending on sponsor preference of design criteria. The pipeline will be sized to convey a maximum flow of 38 mgd and will consist of a combination of new larger pipelines to carry all flow and of existing pipelines coupled with new parallel pipelines. The proposed pipeline diameters range from 18 to 48 inches along the preferred alignment. Parallel pipeline diameters depends on results from modeling efforts, condition assessment of the existing lines, and design criteria. All pipeline alignments are anticipated to be within public rights-of-way or within easements. The preferred alignment is shown in Figures 4, 5, and 6.



**Figure 4. Proposed FWP Alignment – Southern Segment**



Figure 5. Proposed FWP Alignment – Central Segment

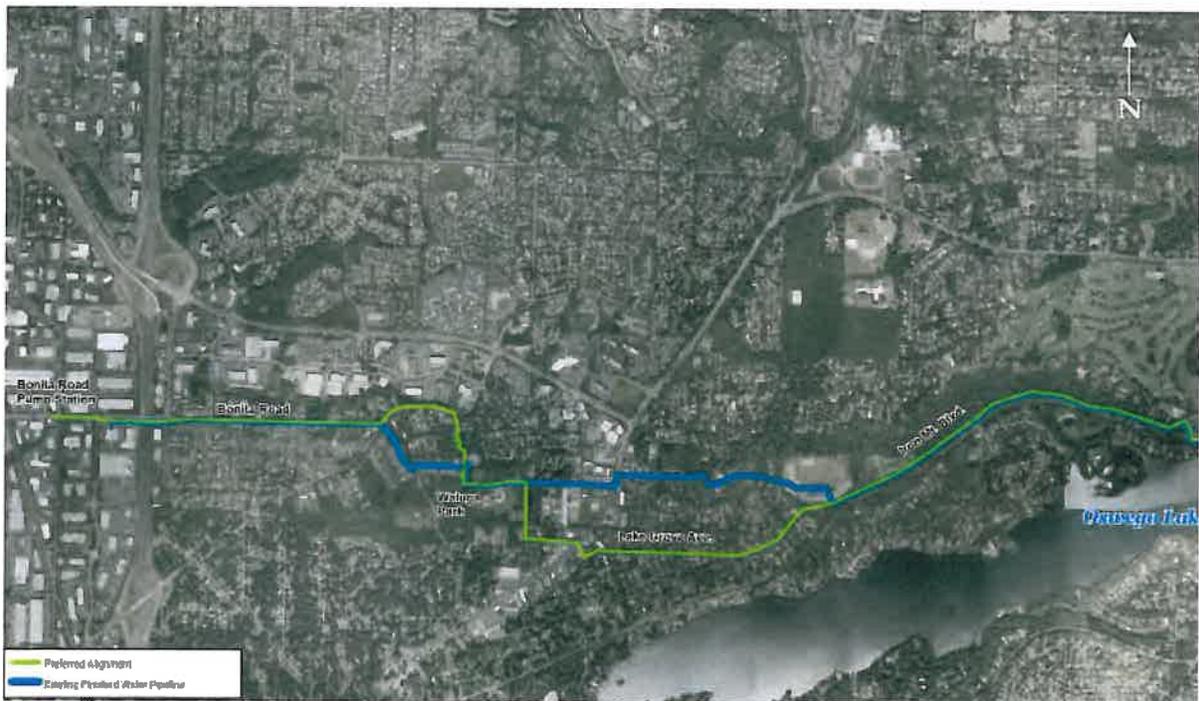


Figure 6. Proposed FWP Alignment – Western Segment

## Waluga Reservoir

As the WTP and water supply system capacity are expanded to serve demands forecast for Lake Oswego and Tigard, an increase in WR storage capacity of approximately 3.5 MG will be required. A new WR will be constructed alongside the existing tank to meet these additional water storage needs and will function along with the existing WR. The WR tanks will also supply the BPS through the FWP.

The proposed location of the new WR is on Lake Oswego-owned land and will be northwest of the existing WR, as shown in Figure 7.



Figure 7. Proposed Location of New WR

## BPS

The program includes provisions to design and construct a new BPS as part of the overall water system upgrades and expansion. The new BPS will deliver water from the FWP into the City of Tigard water system's 410 foot-elevation pressure zone. The proposed mechanical layout for the new BPS is provided in Figure 8.

As the WTP and water supply system are expanded, peak BPS water supply rates will need to increase to approximately 14 to 20 mgd to serve demands forecast for the City of Tigard. The configuration, capacity, location, and age of the existing BPS are such that it will be replaced with a new facility. The existing BPS installation likely will be removed or abandoned. Alternatively, the existing facility could be retained in reserve to provide a measure of redundancy for the new BPS.

The new BPS will also likely incorporate provisions for emergency water supply interconnections supporting pumped and/or gravity flow between the Lake Oswego and Tigard water systems, with potential emergency supply linkages for other area water systems.

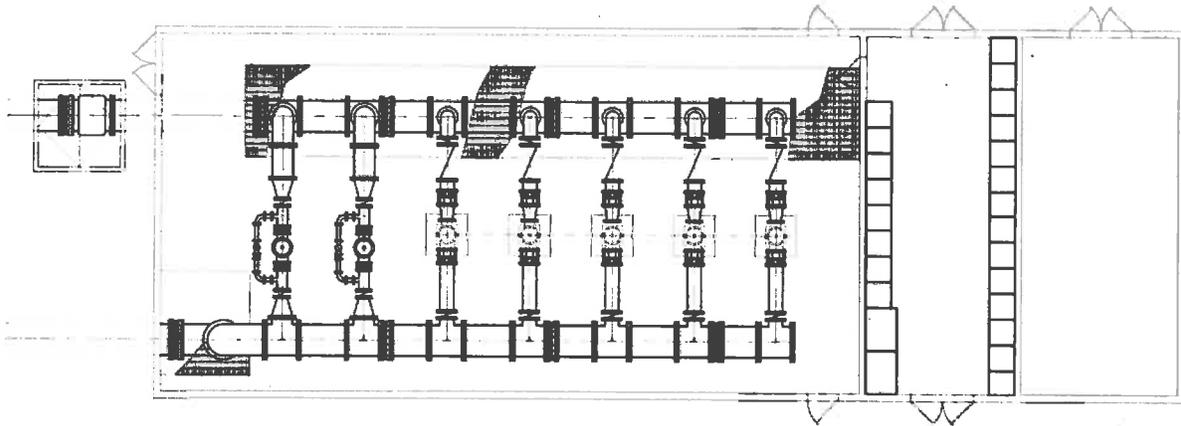
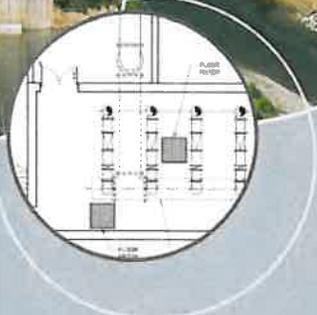
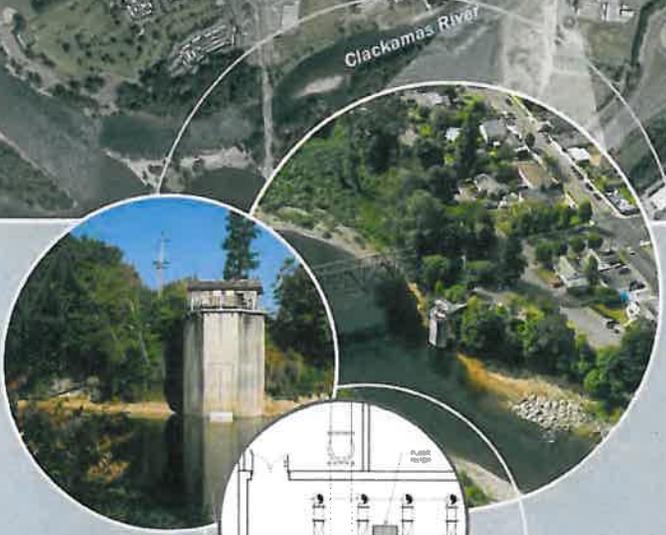
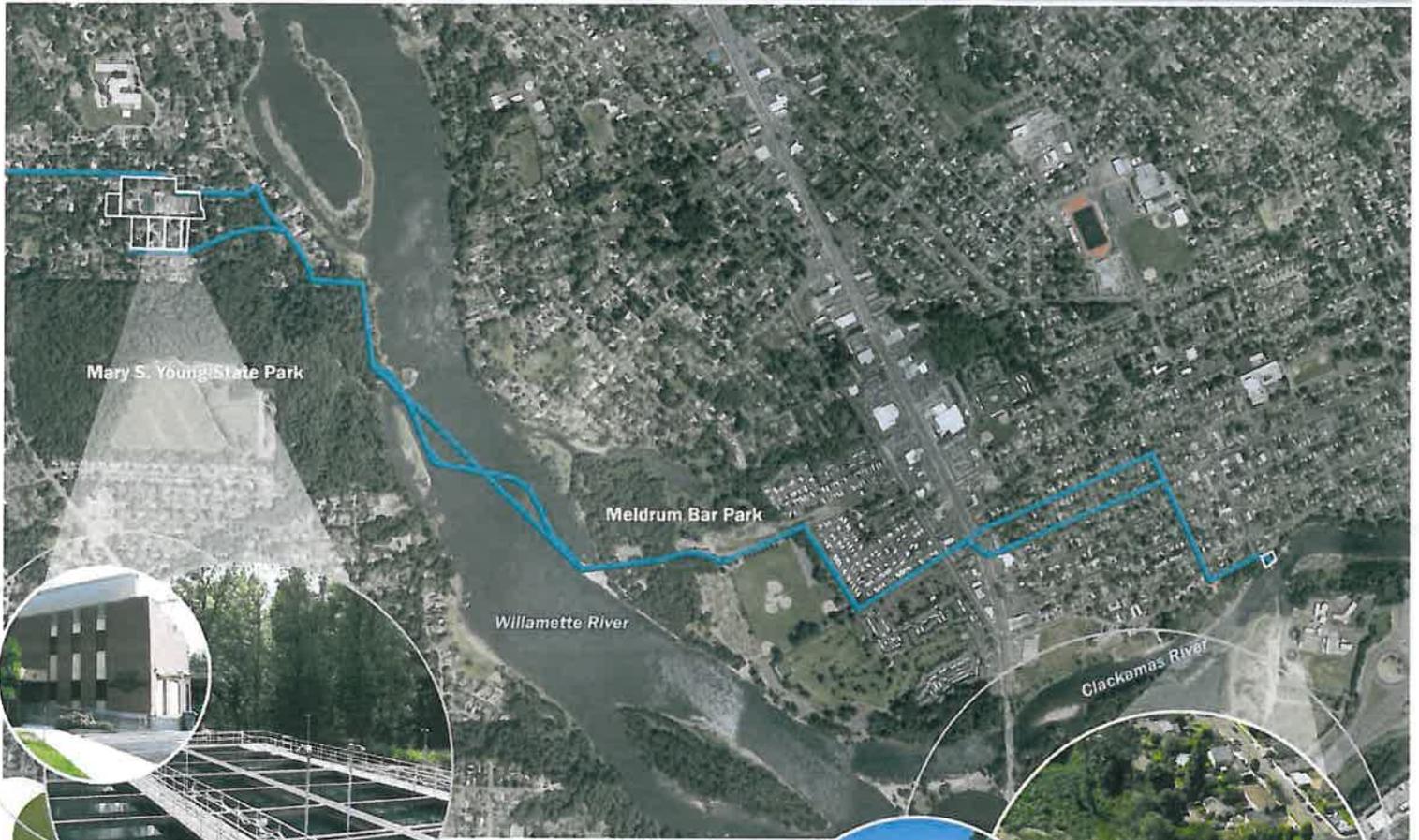


Figure 8. BPS Proposed Mechanical Layout



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