

Water Management and Conservation Plan Update

Port of Portland

JUNE 2020



Prepared for:



Prepared by:



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Oregon

Kate Brown, Governor

Water Resources Department

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July 10, 2020

Port of Portland
Attn: Dorothy Sperry, Senior Manager, Water Resources
PO Box 3529
Portland, OR 97208

Subject: Water Management and Conservation Plan

Dear Ms. Sperry:

Enclosed; please find the final order approving your Water Management and Conservation Plan and authorizing the diversion of up to **33.53 cfs** (*out of the total permitted 72.80 cfs*) of water under Permit **S-51547** and up to **22.64 cfs** (*out of the total permitted 23.53 cfs*) under Permit **G-13093**.

The attached final order specifies that the Port of Portland's plan shall remain in effect until **July 10, 2030**. Additionally, the Port of Portland is required to submit a progress report to the Department by **July 10, 2025**, detailing progress made toward the implementation of conservation benchmarks scheduled in the plan. Finally, the Port of Portland must submit an updated Water Management and Conservation Plan to the Department by **January 10, 2030**.

***NOTE:** The deadline established in the attached final order for submittal of an updated water management and conservation plan (consistent with OAR Chapter 690, Division 086) shall not relieve the Port of Portland from any existing or future requirement(s) for submittal of a water management and conservation plan at an earlier date as established through other final orders of the Department.*

We appreciate your cooperation in this effort. Please do not hesitate to contact me at 503-986-0919 or Kerri.H.Cope@oregon.gov if you have any questions.

Sincerely,

Kerri Cope
Water Management and Conservation Analyst
Water Right Services Division

Enclosure



cc: WMCP File
Application #S-72998 (Permit #S-51547)
Application #G-14341 (Permit #G-13093)
District 20 Watermaster, Amy Landvoigt
GSI Water Solutions Inc. Attn: Suzanne de Szoeker, 1600 SW Western Blvd. Suite 240, Corvallis,
OR 97333

**BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON**

In the Matter of the Proposed Water)	FINAL ORDER APPROVING A
Management and Conservation Plan for)	WATER MANAGEMENT AND
Port of Portland, Multnomah County)	CONSERVATION PLAN

Authority

OAR Chapter 690, Division 086, establishes the process and criteria for approving water management and conservation plans required under the conditions of permits, permit extensions and other orders of the Department. An approved water management and conservation plan may authorize the diversion and use of water under a permit extended pursuant to OAR Chapter 690, Division 315.

Findings of Fact

1. The Port of Portland submitted a Water Management and Conservation Plan (plan) to the Water Resources Department (Department) on August 28, 2019. The Department on August 28, 2019 also received the required statutory fee for review of the plan. The plan was required by a condition set forth under the Port's previously approved plan (Sp. Or. Vol. 77, Pgs. 198-200 issued on February 10, 2009).
2. The Department published notice of receipt of the plan on September 3, 2019, as required under OAR Chapter 690, Division 086. No comments were received.
3. The Department provided written comments on the plan to the Port on November 21, 2019. In response, the Port submitted a revised plan on April 9, 2020.
4. The Department reviewed the revised plan and finds that it contains all of the elements required under OAR 690-086-0125 and OAR 690-086-0130.
5. The projections of future water needs in the plan demonstrate a need for an additional 26.29 cfs of water available under Permit S-51547 and 22.64 cfs under Permit G-13093 to help meet overall projected 20-year demands. These projections are reasonable and consistent with the Port's land use plan.
6. The system is fully metered and the rate structure includes a base rate and volumetric charge. Unaccounted-for water is unknown.

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080, you may petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

7. The plan includes 5-year benchmarks for continuation of development of non-potable water sources and actively seek opportunities to provide industrial users with non-potable water; continue to use the Ports website to post information on water conservation measures encouraged and practiced by the Port and post signage and displays that promote water conservation; routinely check, calibrate and maintain Port meters; offer technical assistance to industrial non-potable water customers to help reduce their water consumption; and maintain landscape water conservation measures.
8. The plan includes 5-year benchmarks for evaluation, development, and implementation of programs:
 - a. Annual Water Audit
 - i. The Port will continue to identify opportunities to configure future distribution system expansions in a manner that will allow for water audits of industrial uses to be conducted.
 - ii. Beginning in 2021, the Port will begin conducting annual water audits on its existing non-potable water sub-systems, which currently consists of two sub-systems.
 - b. Leak Detection Program
 - i. Within two years, the Port will provide an initial analysis estimating the water loss of its two currently active non-potable water sub-systems, and if water loss exceeds 10 percent, the Port will identify potential factors for the loss and selected remedial actions. If those selected actions do not result in the reduction of water loss to 10 percent or less within five years of approval of this WMCP, the Port will take additional leak detection and repair measures as required under OAR 690-086-0150(4)(e)(B).
 - c. Other Conservation Measures
 - i. Within five years, the Port will revise specifications for both maintenance and new construction projects to maximize water efficiency, such as installing low-flow fixtures at PDX.
9. The revised plan identifies the Willamette River, Columbia River and ground water as the sources of the Port's water rights and accurately and completely describes the Willamette River and Columbia River within the affected reach has been 303(d) listed by the Oregon Department of Environmental Quality. The Port's groundwater sources are not in a designated critical groundwater area.
10. The water curtailment element included in the plan satisfactorily promotes water curtailment practices and includes a list of three stages of alert with concurrent curtailment actions.
11. The diversion of water under Permit S-51547 will be increased and diversion of water under Permit G-13093 will be initiated during the next 20 years and is consistent with OAR 690-086-0130(7), as follows:

- a. The revised plan meets OAR 690-086-0130(7)(a) as evidenced by the 5-year benchmarks described in Findings of Fact #7 and #8, the revised plan includes a schedule for continuation and/or implementation of conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources;
- b. The revised plan meets OAR 690-086-0130(7)(b) by establishing that increased use from the non-potable sources and conservation are the most feasible and appropriate water supply alternative available to the supplier; and
- c. The revised plan meets OAR 690-086-0130(7)(c) by containing documentation that the Port is complying with the required mitigation.

Conclusion of Law

The Water Management and Conservation Plan submitted by the Port of Portland is consistent with the criteria in OAR Chapter 690, Division 086.

Now, therefore, it is **ORDERED**:

Duration of Plan Approval:

1. The Port of Portland Water Management and Conservation Plan is approved and shall remain in effect until **July 10, 2030**, unless this approval is rescinded pursuant to OAR 690-086-0920.

Development Limitation(s):

2. The limitation of the diversion of water under Permit S-51547 established by the extension of time approved on June 14, 2005 is removed and, subject to other limitations or conditions of the permit, the Port of Portland is authorized to divert up to 33.53 cfs (*out of the total permitted 72.80 cfs*) under Permit S-51547.
3. The limitation of the diversion of water under Permit G-13093 established by the extension of time approved on June 14, 2005 is removed and, subject to other limitations or conditions of the permit, the Port of Portland is authorized to divert up to 22.64 cfs (*out of the total permitted 23.53 cfs*) under Permit G-13093.
4. Failure to meet the conservation benchmarks listed below may result in the reduction of the quantity of water authorized for diversion under Permit G-51547 and Permit G-13093 during review of the Port's next plan update.
 - a. Annual water audit (Finding of Fact 8(a))
 - b. Leak detection (Finding of Fact 8(b))

Plan Update Schedule:

5. The Port of Portland shall submit an updated plan meeting the requirements of OAR Chapter 690, Division 086 within **10 years** and no later than **January 10, 2030**.

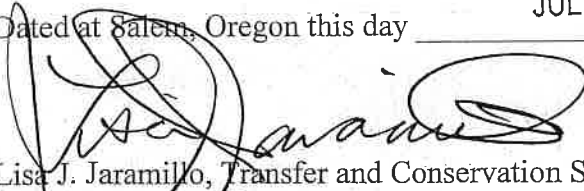
Progress Report Schedule:

6. The Port of Portland shall submit a progress report containing the information required under OAR 690-086-0120(4) by **July 10, 2025**.

Other Requirements for Plan Submittal:

7. The deadline established herein for the submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the Port of Portland from any existing or future requirement(s) for submittal of a Water Management and Conservation Plan at an earlier date as established through other final orders of the Department.

Dated at Salem, Oregon this day JUL 15 2020



Lisa J. Jaramillo, Transfer and Conservation Section Manager for
THOMAS M. BYLER, DIRECTOR
Oregon Water Resources

Mailing date: JUL 16 2020

Notice Regarding Service Members: Active duty service members have a right to stay these proceedings under the federal service members Civil Relief Act. For more information, contact the Oregon State Bar at 800-452-8260, the Oregon Military Department at 503-584-3571 or the nearest United States Armed Forces Legal Assistance Office through <http://legalassistance.law.af.mil>. The Oregon Military Department does not have a toll free telephone number.

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Appendix

Appendix A Letters Requesting Comments from Affected Local Governments

Abbreviations and Acronyms

ADD	average day demand
BIG	City of Portland Business, Industry and Government Water Efficiency Program
ccf	hundreds of cubic feet
cfs	cubic feet per second
COBU	claim of beneficial use
CRSA	Columbia River Sand Aquifer
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Units
ET	evapotranspiration
FAA	Federal Aviation Administration
GIS	geographic information system
gpm	gallons per minute
G-	groundwater permit
GR-	groundwater registration
MDD	maximum day demand
Metro	Metropolitan Regional Government
MG	millions of gallons
mgd	million gallons per day
MID	Marine and Industrial Development
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OAR	Oregon Administrative Rules
OD	Overbank Deposits
ODEQ	Oregon Department of Environmental Quality
OR	Oregon
ORS	Oregon Revised Statutes
OWRD	Oregon Water Resources Department
PIC	Portland International Center
PDX	Portland International Airport
POD	point of diversion
Port	Port of Portland
QTA	Quick Turnaround rental car wash facility
Rivergate	Rivergate Industrial District
RMC	Reynolds Metals Company
ROD	Record of Decision
RWSP	Regional Water Supply Plan
S-	surface water permit

T1	Marine Terminal 1
T2	Marine Terminal 2
T4	Marine Terminal 4
T5	Marine Terminal 5
T6	Marine Terminal 6
TGA	Troutdale Gravel Aquifer
UGA	Unconsolidated Gravel Aquifer
WA	Washington
WMCP	Water Management and Conservation Plan
WRC	Oregon Water Resources Commission

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Executive Summary

The Port of Portland (Port) is in the process of developing non-potable water supply systems in its service areas to reduce demand on potable water supplies. To develop non-potable water supply systems, the Port has secured municipal water rights to authorize use of water for its own operations, tenants on Port properties, and other potential commercial and industrial customers within its non-potable water service areas. The following Port water service areas have water rights that enable development of water supply systems to meet current and future demands for non-potable water:

1. Portland International Airport (PDX)/Portland Industrial Center (PIC) complex;
2. Swan Island Industrial District, which consists of three business parks (Mocks Landing, Port Center, and Swan Island Business Park) and one Port facility (Navigation Base) on Swan Island;
3. Rivergate Industrial District (Rivergate) and Marine Terminals 4, 5, and 6 (T4, T5, and T6);
4. Gresham Vista Business Park (GVBP);
5. Troutdale Reynolds Industrial Park (TRIP)/Troutdale Airport (TTD); and
6. West Hayden Island.

The Port does not supply potable water. Potable water is provided by municipal water systems in the Port's water service areas. Through development of non-potable water systems, the Port intends to convert potable water demand to non-potable water demand where practical and economically feasible.

The purpose of this updated Water Management and Conservation Plan (WMCP) is to provide a framework for managing the Port's non-potable water use over a 20-year timeframe. The Port recognizes that incorporating water conservation into this framework is essential to the sustainable development and operation of its facilities.

This WMCP also fulfills the requirement to submit an updated plan to the Oregon Water Resources Department (OWRD) that was included in a final order approving the Port's 2009 WMCP. Specific criteria outlined in administrative rules under OAR Chapter 690, Division 86 must be met for OWRD to approve the WMCP. This WMCP contains the required elements for WMCP approval, which are as follows:

- Requirements under OAR 690-086-0125
 - Descriptions of the water supplier, water conservation measures and 5-year water conservation benchmarks, a water curtailment plan, and projected water supply needs (i.e., water demand).
 - A list of affected local governments to whom the Port sent its draft WMCP, as well as any comments received by the affected local governments.
 - The Port's proposed date for submitting an updated WMCP: within 10 years of the

final order approving this WMCP. As required by OAR Chapter 690, Division 86, a progress report will be submitted to OWRD within 5 years of the final order.

- A statement that the Port is not requesting additional time to implement metering or a previous benchmark.
- Resources Issues under OAR 690-086-0140(5)(i)
 - The Port presents the fish species with state or federal protections in the Willamette River within the reach of the Port's point of diversion (~ RM 2, 5, and 9), the Columbia River within the reach of the Port's point of diversion (~ RM 103, 105, 109, and 112), and Spring 3, Stream 1, Unnamed Stream, Spring Area, Stream 2, and Stream 3 in the Arata Creek watershed, tributary to the Columbia River.
 - The Port presents Department of Environmental Quality's 303(d) listings for the Willamette River and the Columbia River in the reaches with Port PODs. No listings were found for Salmon Creek and the springs and tributaries to Arata Creek.
 - The Port states that its groundwater sources are not located within the boundaries of a designated critical groundwater area.
- Water Conservation Measures under OAR 690-086-0150(4) and (5)
 - This WMCP describes the Port's water management and conservation measures required under OAR 690-086-0150(4) and (5) along with its 5-year benchmarks for implementation of conservation measures, which are summarized in Exhibit ES-1.

Exhibit ES-1. Summary of Water Conservation Five-Year Benchmarks.

Five-Year Benchmark	Timeline
Identify opportunities to configure future distribution system expansions in a manner that will allow for water audits of industrial uses to be conducted.	Continuing
In 2021, the Port will begin conducting annual water audits on its existing non-potable water sub-systems, which currently consists of two sub-systems.	Annually
Install and map meters at all future connections to the Port’s non-potable water distribution system.	Continuing
Track the installation and removal of new Port-maintained meters.	Continuing
Check Port-maintained meters for malfunctions in conjunction with the Port’s routine meter reading program, and implement periodic calibration of Port-maintained meters according to manufacturer’s specifications.	Continuing
For any Port-maintained meters installed to measure industrial water use by Port operations and industrial and commercial customers within its non-potable water service areas, regularly review meter readings to identify unusually high or low readings that could indicate a meter maintenance problem or possible system leaks.	Continuing
Charge customers based, at least in part, on the quantity metered at the service connections.	Continuing
Bill customers on a monthly basis.	Continuing
Review water usage records monthly to look for indications of anomalous water usage that might indicate a system leak is occurring and promptly address any leaks discovered.	Continuing
Install submeters at points of connection for each new customer.	Continuing
Within two years of WMCP approval, the Port will provide an initial analysis estimating the water loss of its two currently active non-potable water sub-systems, and if water loss exceeds 10 percent, the Port will identify potential factors for the loss and selected remedial actions. If those selected actions do not result in the reduction of water loss to 10 percent or less within five years of approval of the WMCP, the Port will take additional leak detection and repair measures as required under OAR 690-086-0150(4)(e)(B).	Within 2 years of WMCP approval
For both non-potable and potable water systems, continue to identify and implement measures to inform and educate the general public regarding water conservation practices and resources.	Continuing
At Port facilities, continue to create displays or signage that encourages water conservation and identifies water conservation measures practiced by the Port.	Continuing
Use the Port’s public website for posting information on the water conservation measures encouraged and practiced by the Port.	Within 5 years of WMCP approval
Offer technical assistance to industrial non-potable water customers to help reduce their water consumption.	Continuing
When the Port is able to participate in the development of a new Port facility and/or when customers share information about ongoing operations, the Port will provide water conservation technical assistance to the customer.	Continuing
Consult with industrial non-potable water customers to identify potential water-saving fixtures.	Continuing
Actively seek opportunities to provide industrial users with non-potable water.	Continuing

Five-Year Benchmark	Timeline
Develop non-potable water rights to reduce demand on drinking water supplies.	Continuing
Implement landscape water conservation measures.	Continuing
Revise specifications for both maintenance and new construction projects to maximize water efficiency, such as installing low-flow fixtures at PDX.	Within 5 years of WMCP approval

- Water Curtailment Plan under OAR 690-086-0160
 - The Port’s water curtailment plan consists of three curtailment stages, which are described in detail along with their potential initiating conditions (i.e. triggers) in this WMCP. The curtailment stages include both voluntary and mandatory rationing, and the type of rationing depends on the cause, severity, and anticipated duration of the water shortage. Water curtailment may only be needed for certain Port service areas. Also, most non-potable water uses have a backup connection to a city municipal water supply system that could be used during shortages.
- Water Demand Projections under OAR 690-086-0170
 - The Port projects the following demands and the water rights needed to meet those demands:
 - PDX/PIC
 - The Port projects that non-potable water demand at PDX/PIC will reach 2.01 cfs (1.30 mgd) in 2028 and 2.63 cfs (1.70 mgd) in 2038. To develop these demand projections, the Port combined separate projections developed for PDX and PIC due to the distinct differences in current and future water demands of PDX and PIC.
 - Exhibit ES-2 presents the water rights and associated rates of diversion/appropriation that the Port anticipates it will need to meet the projected demands.

Exhibit ES-2. Water Rights Needed to Meet Projected Demands at PDX/PIC in 2038.

Water Right	Projected Rate of Use (cfs)	Comments
Permit G-17888	1.19	The Port has fully developed the permit and has submitted a Claim of Beneficial Use.
Permit G-10967	0.22	
Transfer T-12482	1.22	
Total	2.63	

- Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island
 - The Port projects that its non-potable water demand for the three service areas will reach 45.49 cfs (31.21 mgd) in 2028 and 58.40 cfs (37.75 mgd) in 2038.
 - Exhibit ES-3 presents the water rights and associated rates of diversion/appropriation that the Port anticipates it will need to meet the projected demands. Although these surface water and groundwater rights have sufficient rates to meet those demand projections, the Port’s ability to access water under the water use left intentionally blank permits is currently restricted to 7.24 cfs under extended permit S-51547 and 0.0 cfs under extended permit G-13093. To meet its future demands, the Port is requesting access to an additional 26.29 cfs of under extended permit S-51547 and an additional 22.64 cfs under extended permit G-13093.

Exhibit ES-3. Water Rights Needed to Meet Projected Demands at Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island in 2038.

Water Right	Projected Rate of Use (cfs)	Comments
Certificate 85688	2.23	
Permit S-51547	33.53	Requesting access to 26.29 cfs
Permit G-13093	22.64	Requesting access to 22.64 cfs
Total	58.40	

- GVBP
 - The Port projects that non-potable water demand at GVBP will reach 0.92 cfs (0.59 mgd) in 2028 and 1.15 cfs (0.74 mgd) in 2038. The Port plans to meet that demand using a combination of its four surface water rights (Certificates 93760, 93761, 93762, and 93763) and one groundwater right (Certificate 93764), which authorize total diversions/appropriation of up to 1.263 cfs at GVBP (when the water rights are used in combination and within maximum volume limitations of the water rights).
- TRIP/TDD
 - TRIP: The Port projects that non-potable water demand at TRIP will be 29.4 cfs (19.0 mgd) in 2028 and 32.6 cfs (21.1 mgd) in 2038, and plans to meet that demand using the Port’s groundwater Groundwater Registrations GR-462 and GR-1441, which authorize the use of rights of up to 32.6 cfs. The Port’s plan to use its groundwater rights to meet the TRIP demand projections assumes that the Port can work within the restrictions put on the groundwater rights for remediation of fluoride contamination. If water delivery cannot be achieved within the restrictions when the Port needs access to the water supply, then the Port will reconsider its water supply options for TRIP.

- TDD: The Port projects that non-potable water demand at TTD will be 0.020 cfs (0.013 mgd) in both 2028 and 2038, and plans to meet that demand using TRIP groundwater rights of up to 32.6 cfs under Groundwater Registrations GR-462 and GR-1441.

1. Introduction

The Port of Portland (Port) holds municipal water rights that authorize the Port to provide non-potable water to water supply systems within six Port service areas (described in Section 2). In these service areas, the Port is developing a non-potable water supply system for its own operations and for potential customers, including tenants on Port properties, and other commercial and industrial users.

The Port does not supply potable water. Potable water is supplied to Port service areas by the City of Portland and other cities within which the respective service areas are located. Thus, this updated Water Management and Conservation Plan (WMCP) focuses on the Port's non-potable water supply.

The purpose of this updated WMCP is to provide a framework for managing the Port's water use over a 20-year timeframe. The Port recognizes that this framework must incorporate water conservation, which is critical to the sustainable development and operation of Port facilities.

1.1 Plan Requirement

This WMCP fulfills the requirements of Oregon Administrative Rules (OAR) Chapter 690, Division 86 adopted by the Water Resources Commission in 2002, including each of the required elements under OAR 690-086-0125.

1.2 Plan Organization

This WMCP is organized into five sections, each addressing specific requirements of OAR Chapter 690, Division 86. Section 2 is a self-evaluation of the Port's water supply, water use, water rights, and water system. The information developed for Section 2 is the foundation for the sections that follow. The later sections use this information to consider how the Port can improve its water management and conservation and water supply planning efforts. The WMCP also includes an appendix with supporting information.

Section	Requirement
Section 1 – Water Supplier Plan	OAR 690-086-0125
Section 2 – Water Supplier Description	OAR 690-086-0140
Section 3 – Water Management and Conservation	OAR 690-086-0150
Section 4 – Water Curtailment Plan	OAR 690-086-0160
Section 5 – Water Supply	OAR 690-086-0170

Because the Port uses its municipal water rights to supply non-potable water demands rather than potable drinking water, the non-potable water system has been developed accordingly and is not suited in all cases to generate the same types of information as is typically available for a

potable water system. Nonetheless, this plan has been developed to comply with all WMCP requirements.

1.3 Background

The Port was chartered in 1891 by the Oregon Legislature to build and maintain a navigation channel on the Willamette and Columbia Rivers between the City of Portland and the Pacific Ocean. Given that the Port is responsible for connecting people, products, and places together, the Port's work has grown to include three major lines of business with 3 airports, 4 marine terminals, and several industrial parks. True to its original mission, the Port also continues to operate the Dredge Oregon to maintain the navigation channel on a contract with the U.S. Army Corps of Engineers. The Port's combined marine, aviation, and industrial activities has made the Port a significant economic driver for the region and the State of Oregon.

The Port is a regional government with facilities in Multnomah and Washington counties. Although not a municipality as that term is commonly used, the Port is defined by the Oregon Water Resources Department (OWRD) as a "municipal corporation" under OAR 690-300-0010(28).

The Port's operations and the commercial and industrial occupants within its non-potable water service areas are collectively a large water user in the region. In the early 1990s, the Port, working with the City of Portland's Water Bureau, began to examine ways to conserve and better manage water use to ease the demand for potable water supplied by the City's Bull Run water supply system. An outcome of this work was that, beginning in 1992, the Port secured a number of municipal water rights from surface water and groundwater sources to develop non-potable water systems for purposes such as irrigation, construction, industrial process uses, and ship washing within its service areas. The development of these non-potable water supply systems by the Port will reduce the growing demands on regional drinking water systems that provide potable water. While continuing to develop its non-potable water supply system, the Port also continues to actively promote conservation measures at all Port properties, under its Environmental Water Resource Policy and following its Water Conservation Strategy (revised in 2014).

1.4 Primary Information Sources

The primary sources of information used in the development of this updated WMCP are as follows:

- Port of Portland Water Management and Conservation Plan Update, August 2008
- Port of Portland Environmental Water Resource Policy, February 2014
- Port of Portland Water Conservation Strategy, August 2014
- Port of Portland WMCP Progress Report, April 2013
- Port of Portland staff

- OWRD annual water use reporting data for Port of Portland water rights

1.5 Affected Governments

OAR 690-086-0125(5)

In accordance with OAR 690-086-0120(8), 30 days before submitting the draft version of this updated WMCP to OWRD, the Port sent the following local affected governments the draft WMCP for review and requested comments related to the consistency of the draft WMCP with their comprehensive land use plans:

- City of Portland
- City of Troutdale
- City of Gresham
- Multnomah County
- Metropolitan Regional Government (Metro)
- City of Fairview
- City of Wood Village

The letters requesting this input are provided in Appendix A. The Port received no comments.

1.6 Plan Update Schedule

OAR 690-086-0125(6)

The Port anticipates submitting an update of this WMCP within 10 years of the final order approving this WMCP. As required by OAR Chapter 690, Division 86, a progress report will be submitted within five years of the final order.

1.7 Time Extension

OAR 690-086-0125(7)

The Port is not requesting additional time to implement metering or a previous benchmark.

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2. Water Supplier Description

This section of the Port's updated WMCP describes the Port's non-potable water supply systems, including the non-potable water system service areas and water users, current and historic water demand volumes, the Port's water sources and water rights, the adequacy and reliability of these sources, the major system features associated with each non-potable water system service area, and a description of system losses. The content of this section fulfills the requirements specified in OAR 690-086-0140.

2.1 Non-potable Water System Service Areas and Water Uses

OAR 690-086-0140(2); OAR 690-086-0140(6)

The Port is the largest developer of industrial and business parks in the Portland metropolitan area. The Port oversees five industrial and business parks, along with its commercial and general aviation airports, marine terminals, navigation facility, and undeveloped areas.

The Port is developing a non-potable water supply system for industrial and commercial uses in its service areas. The specific uses of non-potable water vary in nature according to the specific needs of a Port facility or the type of industrial or commercial customer. The Port does not have water rights associated with all of its properties. Water from cities' municipal water systems is used for all purposes on properties where the Port does not have water rights. Port non-potable water service areas include Port facilities with water rights and are the focus of discussions in this updated WMCP. They are as follows:

- Portland International Airport (PDX)/Portland Industrial Center (PIC) complex;
- Swan Island Industrial District, which consists of three business parks (Mocks Landing, Port Center, and Swan Island Business Park) and one Port facility (Navigation Base) on Swan Island;
- Rivergate Industrial District (Rivergate) and Marine Terminals 4, 5, and 6 (T4, T5, and T6);
- Gresham Vista Business Park (GVBP);
- Troutdale Reynolds Industrial Park (TRIP)/Troutdale Airport (TTD); and
- West Hayden Island.

Three of the Port's six water service areas are located within City of Portland limits (PDX/PIC, Swan Island Industrial District, and Rivergate/T4/T5/T6). TRIP/TTD is located in the City of Troutdale and GVBP is located in the City of Gresham. The future West Hayden Island service area is located in Multnomah County and borders the City of Portland's limits.

Within each of the six service areas, the Port is developing a non-potable water supply system to meet current and future demands for non-potable water for irrigation, construction and other commercial and industrial operations. The Port's goal in developing these non-potable water supply systems is to reduce pressure on potable water supplies especially in times of reduced availability. Demands for potable water in the Port's water service areas will continue to be provided by municipal water systems¹.

The Port's six service areas are shown in Exhibits 2-1 through 2-5. The Port's service areas are defined as the areas that are served by, and/or in the future potentially could be served by, a non-potable water supply system using the Port's existing water rights, which in some cases extends beyond the Port's boundary.² These service areas provide access to non-potable water for both Port and tenant operations on Port properties, as well as other potential users.

The Port's service areas do not include any residential populations and the Port does not supply any water for residential or potable purposes. Consequently, there is not a "population" that is served by the Port. The Oregon Employment Department's Quarterly Census of Employment and Wages provides estimates on the number of employees in Port service areas, which were as follows in 2017: 16,632 in PDX; 6,308 in Rivergate; 12,266 in Swan Island Industrial Park; 979 in GVBP; and 1,232 in TRIP. In addition, the Port's Economic Impact Study of Portland-Troutdale Airport (May 2016) reports 230 airport generated jobs at TTD.

Currently, the Port has only a few non-potable water customers that are directly metered. All other uses, such as irrigation and construction, are done by the Port and the Port meters its own uses.

The following are descriptions of each of the Port's six service areas, including the types of water uses that occur in each area.

¹ However, in the event of an emergency that precludes the City of Portland from providing potable water supply, the Port is taking steps to certify at least one well at PDX for emergency potable water supply.

² The WMCP approved in 2009 by OWRD reported service area size based on the service area only within the Port's boundaries. However, the Port currently serves water and has the potential to serve water beyond the Port's boundaries, such that updated acreages are provided in this WMCP.

Exhibit 2-1. Portland International Airport (PDX) and Portland International Center (PIC) Service Area.



Document Path: N:\GIS\Share\regut\NonPotable\MXD\Figure2-9_PDX_and_PIC_Nonpotable_Water_and_WRS.mxd

Exhibit 2-2. Swan Island Industrial District Service Area.



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Exhibit 2-3. Rivergate Industrial District (Rivergate); Marine Terminals 4, 5, and 6 (T4, T5, and T6); and West Hayden Island Service Areas.



Exhibit 2-4. Gresham Vista Business Park (GVBP) Service Area.



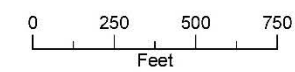
Gresham Vista Business Park

Port of Portland Water Management
and Conservation Plan Update

LEGEND

- Port POD, Reservoir:
Certificates 93761 and 93763
- Port POD, Common Channel:
Certificates 93760, 93761, 97362, and 93763
- Port POD, Spring:
Certificates 93761, 97362, and 93763
- Port POA, Certificate 93764
- Water Pipe
- ▭ Service Area Boundary

Abbreviations:
POD - Point of Diversion
POA - Point of Appropriation



Date: February 4, 2019
Data Sources: Port of Portland, City of Portland,
Metro, Esri



Document Path: N:\GIS\Share\regulr\NonPotable\MXD\Figure2-13_GVBP_Nonpotable_Water_and_WRs.mxd

Exhibit 2-5. Troutdale Reynolds Industrial Park (TRIP) and Troutdale Airport (TTD) Service Area.



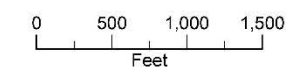
Troutdale Reynolds Industrial Park and Troutdale Airport
Port of Portland Water Management and Conservation Plan Update

LEGEND

- Port POD, S-54922
- Port POA, Groundwater Registration GR-462/T-11395
- ▭ Service Area Boundary

Abbreviations:

- S - Surface Water Permit
- GR - Groundwater Registration
- T - Groundwater Registration Modification
- POA - Point of Appropriation
- POD - Point of Diversion



Date: February 4, 2019
Data Sources: Port of Portland, City of Portland, Metro, Esri



Document Path: N:\GIS\Share\regutn\NonPotable\MXD\Figure2-14_TTD_Nonpotable_Water_and_WRs.mxd

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2.1.1 Portland International Airport and Portland International Center

Portland International Airport (PDX) and Portland International Center (PIC) are located along the Columbia River northeast of downtown Portland (Exhibit 2-1). The PDX/PIC non-potable water system service area covers 3,971 acres (the PDX facility covers 3,717 acres, and PIC covers 254 acres). PDX and PIC areas adjoin each other and are discussed jointly for the purposes of this updated WMCP.

Uses of the PDX property include aviation facilities, airport terminal services, air cargo facilities, rental car services, private businesses (express delivery services, hotels, and others), and the Oregon Air National Guard. The Port currently serves non-potable water for landscape irrigation, car washing, and construction water. In the future, non-potable water is planned to be used in the terminal for toilet flushing, and for washdown uses that would occur outside the airport terminal.

PIC, which includes Cascade Station, is located between PDX and Interstate 205. Current and planned industrial and commercial customers (tenants and other occupants) in this mixed-use facility include large-format retailers, office space, hotels, distribution warehouses, and light industry. A portion of PIC also is designated as Aviation Reserve and may be developed into long-term parking space or rental car operations and storage. Non-potable water uses currently consist of landscape irrigation and occasional construction activities. Future expansion of this system will likely be for irrigation by commercial users.

2.1.2 Swan Island Industrial District

The Swan Island Industrial District is located along the Willamette River north of downtown Portland, as shown in Exhibit 2-2. The 798-acre Swan Island Industrial District houses approximately 170 businesses and is a major corporate hub for distribution, warehousing, manufacturing activities, the Portland Shipyard, and the Port's Navigation Facility. Although the Port has sold much of its ownership within the industrial park over the years, the Port still owns certain parcels of land near the Willamette River, along and near Swan Island Lagoon, and in other dispersed locations. For these reasons, and because the Port owns a surface water right and has constructed a surface water intake in this area, the entire industrial park is within the Port's potential service area for non-potable water supply. With the exception of the Portland Shipyard, the Port does not currently supply water in the Swan Island Industrial District. (The City of Portland serves this area with potable water.)

The Portland Shipyard property is owned and operated by Vigor Industrial LLC and covers an area of approximately 60 acres along the Willamette River within the Swan Island Industrial District. The shipyard features dry docks, ship repair and lay-up berths, cranes, and full service ship repair capabilities. Although the Port sold the shipyard, it retained the ownership of a surface water right and associated river intake on the shipyard property. Vigor Industrial uses this Port-supplied non-potable water for fire protection for their drydocks and customer owned vessels, as well as for drydock washdown. The river intake (as well as City potable water) is also available for fire suppression. All other water uses at the shipyard are served by City of Portland potable water.

In addition to the current uses of non-potable water at the Portland Shipyard, future potential uses of non-potable water in the Swan Island Industrial District include landscape irrigation, industrial processes, facility and vehicle washdown, and construction activities (including dust control).

2.1.3 Rivergate Industrial District and Marine Terminals 4, 5 and 6

The Rivergate and Marine Terminals 4, 5, and 6 non-potable water system service area covers 5,229 acres and is located at the confluence of the Columbia and Willamette rivers (Exhibit 2-3).

Rivergate Industrial District

Rivergate Industrial District (Rivergate) encompasses 3,530 acres with a mix of Port-owned and privately owned land. Uses include warehousing, distribution, manufacturing and processing facilities that may be expanded or redeveloped to include other uses. Several hundred acres within the Rivergate area have been set aside as open space and natural areas.

The Port has installed two water supply wells and several miles of piping as part of a Port-owned non-potable water supply system designed to serve irrigation and industrial needs in the area. Water from the non-potable system currently is used for irrigation and construction activities. In the future, the Port could supply non-potable water for many purposes that currently use potable water serviced by the City of Portland. These uses include the warehouse/distribution, manufacturing, marine industrial, and large industrial use, such as a cogeneration facility. Non-potable water uses at sites could include process water use, process cooling, product and vehicle washdown activities, construction activities, and landscape irrigation.

Marine Terminals 4, 5 and 6

Terminals 4, 5 and 6 (T4, T5 and T6) are located adjacent to Rivergate, near the confluence of the Willamette River and Columbia River.

T4 covers 416 acres located along the Willamette River in North Portland and is used for auto imports and exports, mineral and liquid bulk exports, and manufacturing. It features seven ship berths capable of handling a variety of cargo including grain, autos, forest products, steel, and dry and liquid bulk items. The terminal site also contains rail access, truck gates, storage yards, and administrative and maintenance buildings. T4 does not have non-potable water uses. Future potential uses of Port-supplied non-potable water include landscape irrigation, toilets, industrial processes, facility and vehicle washdown, ship washdown and ship ballast, and construction activities (including dust control).

T5 occupies 374 acres. T5 is a mineral and bulk export facility with three berths. It features a rapid-handling grain elevator operated by Columbia Grain, Inc. The Portland Bulk Terminals exporting facility at T5 handles potash. T5 currently does not have non-potable water uses. Future potential uses of Port-supplied non-potable water include landscape irrigation, toilets, ship washdown, ship ballast, and construction activities (including dust control).

T6 occupies 909 acres. T6 is a multi-user auto and container facility that features one of the Pacific Northwest's premier deep-draft container terminals. It has seven cranes, five large ship

berths, eight rail tracks, truck gate facilities, storage yards, and administrative and maintenance buildings. Non-potable water is used for some landscape irrigation. Potable water supplied by the City of Portland is used to meet non-potable uses at T6, such as landscape irrigation, steam cleaning (wash water from steam cleaning is discharged to a sanitary sewer), and vehicle washing (vehicle wash water is discharged to a self-contained system). In the future, the Port could potentially supply non-potable water for those uses, as well as for toilets, ship washdown, ship ballast, and construction activities (including dust control).

The Port also has a Dredge Material Rehandling Facility to the east of the T6 property. The Port has a commercial/industrial surface water right that allows for withdrawal of up to 2.23 cfs (1,001 gpm) from the Columbia River at this location. Non-potable water is used under this water right to convey dredge materials from a barge into a settling pond. Use of the facility is an occasional activity.

2.1.4 Gresham Vista Business Park

Gresham Vista Business Park (GVBP) is a 361-acre property located in the City of Gresham, less than a mile from I-84 (Exhibit 2-4). The Port is working closely with the City of Gresham to develop the property into a center for businesses such as clean tech, manufacturing, food processing, logistics, professional services, and other traded sector companies that sell products and services globally. Current water uses at GVBP (drinking water, restrooms, fire suppression, and landscape irrigation) are served by City of Gresham potable water, except for irrigation of nursery plants and crops, which is served by the Port's non-potable water. Future potential uses of Port-supplied non-potable water at GVBP could include landscape irrigation, toilets, industrial processes, facility and vehicle washdown, and construction activities (including dust control).

2.1.5 Troutdale Reynolds Industrial Park /Troutdale Airport

Troutdale Reynolds Industrial Park (TRIP) and Troutdale Airport (TTD) are located between the Columbia and Sandy Rivers in the City of Troutdale (Exhibit 2-5). TRIP and TTD areas adjoin each other and are discussed jointly for the purposes of this updated WMCP. The TRIP/TTD non-potable water system service area covers 918 acres.

TRIP, the former site of Reynolds Metals Company (RMC), is the Port's second-largest industrial park. The 700-acre brownfield redevelopment park, which won the 2010 Phoenix Award for the top brownfield redevelopment project in the nation, is under development with 350 acres of industrial/commercial use and the remaining acres dedicated to natural resource areas. TRIP is located in the City of Troutdale, and it has direct access to I-84 and is in close proximity to I-205 and Portland International Airport (PDX). TRIP's location makes it a potential center of thriving commerce.

The Port acquired the former RMC property in 2007, as well as water rights appurtenant to the property. Several wells associated with the RMC water rights currently are being used to remediate groundwater contamination beneath this property. These remediation activities are occurring with the oversight of the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality (ODEQ). Some restrictions apply to the use of

groundwater and development of the non-potable water system due to the ongoing remedial activities. However, working within the restrictions, any use of groundwater is permissible.

Current water uses at TRIP (drinking water, restrooms, fire suppression, irrigation, and vehicle washdown) are served by City of Troutdale potable water. Future potential uses of Port-supplied non-potable water at TRIP include landscape irrigation, toilets, industrial processes, facility and vehicle washdown, and construction activities (including dust control).

TTD is a general aviation facility serving east Multnomah County and serves as a base for recreational pilots, flight training, and some specialized aviation service businesses. TTD is considered a regional reliever airport in the FAA's National Plan of Integrated Airport Systems (NPIAS). In 2017, TTD handled 117,824 operations, making it the third busiest airport in Oregon in terms of aircraft operations.

The Port manages TTD as part of its three-airport portfolio of aviation facilities, leveraging TTD to relieve local general aviation pressure on PDX. The airport consists of about 284 gross acres with one runway (7-25) that is 5,399 feet long and 150 feet wide. There is one Fixed Base Operator (FBO) that serves pilots and aircraft operating at TTD, and one flight school operation.

The TTD Master Plan was last updated in 2016. Current forecasts envision modest growth in operations (approximately 6 percent) over the next 20 years, but a slight decline in the number of based aircraft due to changes in the general aviation and flight training industries. Planned development includes reconstruction and reconfiguration of the runway, currently scheduled for construction in 2021. Following reconfiguration, the runway will be 4,500 feet long and 75 feet wide, which will accommodate 99 percent of current airport operations.

Longer term development over the next 20 years will see consolidation of aviation uses on the south side of the airport. Aviation facilities on the north side of the airfield will be relocated gradually to the south side as buildings age and need to be replaced. The north side land will then transition to non-aeronautical industrial uses to provide regional employment and generate revenue to support airport operations.

Current water uses at TTD (drinking water, restrooms, fire suppression, and landscape irrigation) are served by the City of Troutdale. Future potential uses of Port-supplied non-potable water at TTD include landscape irrigation, toilets, industrial processes, facility and vehicle washdown, and construction activities (including dust control). Development envisioned at TTD is not expected to significantly change current water usage patterns.

2.1.6 West Hayden Island

West Hayden Island (Exhibit 2-3) currently is undeveloped, but is a potential future non-potable water supply service area for the Port. In 1983, Metro approved the inclusion of West Hayden Island into the Urban Growth Boundary for marine uses. Recognizing the need for Portland's marine facilities to meet a forecasted tripling of regional exports by 2030, the Port acquired West Hayden Island in 1994. The 780 acres of Port-owned land on the island site are adjacent to the Columbia River navigation channel and are in close proximity to the main lines of the Union Pacific and Burlington Northern Santa Fe railroads and the interstate highway system. The

property has approximately 583 acres of potentially developable land for marine terminal facilities and remains in the Port's marine strategic reserves.

Given that future use of West Hayden Island may consist of any combination of natural resource mitigation, marine cargo, industrial facilities, or other yet to be determined activities, the future uses of water that potentially could be met by non-potable water sources are landscape irrigation, toilets, industrial processes, facility and vehicle washdown, ship washdown, ship ballast, and construction activities (including dust control).

2.1.7 Port Properties Outside the Six Non-potable Water System Service Areas

Two properties for which the Port has water rights but does not serve non-potable water supply, Government Island and the Randall Mitigation Site, are outside of the six non-potable water service areas and are addressed in section 2.3.4 of this updated WMCP. The Port's approximately 2,500-acre property on Government Island has a water right associated with it, which the Port anticipates using to expand its mitigation activities on the island for future projects yet to be defined. In the interim, the Port is leasing this water right instream. The Port's Randall Mitigation Site has a groundwater right associated with it that the Port currently holds in reserve.

The Port also operates Marine Terminal 2 (T2), which is supplied potable water from the City of Portland. The Port does not have a water right or a non-potable water system at T2, and this facility is not discussed further in this WMCP.

2.2 Quantity and Uses of Water Delivered

OAR 690-086-0140(4); OAR 690-086-0140(6)

As described in Section 2.1, Port-supplied non-potable water has been used by the Port primarily for irrigation, wetland enhancement, ship washing, dredge rehandling, and construction purposes. Currently, PDX/PIC, as well as some properties in Rivergate and GVBP, are irrigated using non-potable water supplied by the Port. Other uses of non-potable water are: (1) ship washing by Vigor Industrial at the Portland Shipyard (using water from the Willamette River), (2) dredge materials rehandling by the Port at the east end of T6, and (3) occasional construction and dust control use at PDX/PIC, and (4) car washing at PDX as of 2018. At TRIP, water is used in the remedial treatment process, as previously mentioned.

Exhibit 2-6 summarizes non-potable water demand at PDX/PIC, Swan Island Industrial District, Rivergate/T6 (T4 and T5 have not had water demand in recent years), and GVBP for the period 2007 through 2017, which is the period following the last year of water use reported in the approved 2009 WMCP. Trends in non-potable water delivery are further illustrated in Exhibits 2-7 and 2-8. West Hayden Island does not yet use non-potable water. Given that the demand data only go through 2017, consumption for car washing that began at PDX in 2018 is not included.

- Annual, Monthly, and Average Day Demand. Exhibit 2-6 summarizes non-potable water delivery by average day, month, and annually. As shown in Exhibits 2-7 and 2-8, the recorded annual water use volumes have varied from year to year within each of these

service areas. This variation arises from factors such as weather conditions (in the case of irrigation use at PDX/PIC), the installation of new water sources, and economic conditions. A graph of average day demands (annual demand divided by the number of days each year) mirror Exhibit 2-8. The Port currently only keeps monthly demand records; therefore, the Port cannot report maximum day demands.

Annual demand from 2007 through 2013 at PDX/PIC was generally similar to or slightly greater than annual demand from 2000 through 2006 (with the exception of 2004) and has been consistently greater since 2014. Annual demand at Swan Island has been similar to water demand from 2000 through 2006. During both time periods annual demands were below 15 MG most years, but had two years of significantly higher demands. (Demands in 2014 and 2017 spiked to around 30 MG; and increased to 57 MG in 2000 and 44 MG 2006.) Annual demand at Rivergate/T6 from 2007 through 2017 was less than demand reported in 2005 and 2006. Annual demand at GVBP for the past 10 years cannot be compared to the Port's 2008 WMCP because the Port acquired the property after completion of the plan.

- Seasonal Demand. Exhibit 2-9 presents average daily demand (ADD) during the typical irrigation season (June through September) and during the rest of the year (October through May, a period of greater rainfall and little or no irrigation). ADD is higher on average during the low rainfall months (June through September) than during the wetter months (October through May) due to irrigation, as shown by seasonal water use by PDX/PIC, Rivergate/T6, and GVBP. In contrast, deliveries of non-potable water for industrial uses (at the Portland Shipyard in Swan Island Industrial District) do not show this same type of seasonal pattern and instead vary considerably from month to month depending on the industrial process activities that are occurring at any given time.

The June through September ADD at PDX/PIC from 2007 through 2017 was much greater than during the period from 2000 through 2006. The June through September ADD at Swan Island from 2007 through 2017 was also greater in most years than during the period from 2000 through 2006. The June through September ADD at Rivergate/T6 fluctuated from year to year during 2007 through 2017, but it was generally less than the June through September ADD in 2005 and 2006. Seasonal demand at GVBP for the past 10 years cannot be compared to the Port's 2008 WMCP because the Port acquired the property after completion of the 2008 plan.

Exhibit 2-6. Demands at the Port's Service Areas.

Portland International Airport (PDX) and Portland International Center (PIC) (Groundwater Sources ^{1,2})																	
Year	Monthly Water Use (MG)												Annual Total		Annual ADD	Summer ADD	Non-Summer ADD
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	ccf	MG	mgd	mgd	mgd
2017	0	0.003	0.193	0.504	2.815	13.713	8.147	13.243	5.971	0.708	0.102	0.048	60,758	45.45	0.12	10.27	0.55
2016	0	0.003	1.232	3.434	8.195	5.621	10.189	10.848	9.932	0.656	0.231	0.204	67,575	50.55	0.14	9.15	1.74
2015	0.003	0.003	0.736	2.001	3.102	5.986	3.506	13.787	14.041	0.375	0	0	58,209	43.54	0.12	9.33	0.78
2014	0	0	0	0	0.655	4.373	8.133	8.866	8.759	1.815	0.277	0.036	44,003	32.91	0.09	7.53	0.35
2013	0	0	0.003	0.180	1.538	1.373	5.717	8.148	8.147	0.222	0.003	0	33,864	25.33	0.07	5.85	0.24
2012	0	0	0.004	0.096	3.000	1.694	6.106	8.323	7.225	0.473	0	0	35,991	26.92	0.07	5.84	0.45
2011	0	0.363	0	0	0.177	0.889	1.389	2.873	3.416	0.623	0	0	13,009	9.73	0.03	2.14	0.15
2010	0	0	0.001	0.010	0.510	2.340	3.612	3.264	2.265	0.738	0	0	17,031	12.74	0.03	2.87	0.16
2009	0	0	0	0	0.007	2.458	3.238	11.968	5.906	0.915	0	0	32,742	24.49	0.07	5.89	0.12
2008	0	0	0	0	1.772	4.510	7.873	5.965	3.531	0.998	0	0	32,954	24.65	0.07	5.47	0.35
2007	0	0	0	0	1.127	6.859	9.490	10.943	8.092	2.354	0	0	51,959	38.87	0.11	8.85	0.44
Average Annual Use													38,734	29.0	0.08	6.65	0.48

Swan Island Industrial Park (Surface Water Source (Willamette River) ³)																	
Year	Monthly Water Use (MG)												Annual Total		Annual ADD	Summer ADD	Non-Summer ADD
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	ccf	MG	mgd	mgd	mgd
2017	5.464	2.741	1.402	1.254	0.438	0.898	4.421	0.112	2.433	1.350	0.644	8.842	40,104	30.00	0.08	1.97	2.77
2016	0.694	0.205	0.808	0.714	0.257	0.358	0.042	0.443	4.797	0.015	1.220	3.985	18,100	13.54	0.04	1.41	0.99
2015	1.975	0.420	0.411	1.108	1.362	0.143	0.642	0.137	0.502	0.016	0.163	0.117	9,353	7.00	0.02	0.36	0.70
2014	9.945	6.605	9.860	0.283	3.793	0.046	0.108	0.039	2.636	0.577	0.267	0.274	46,033	34.43	0.09	0.71	3.95
2013	0.062	0.202	0.038	0.036	0.027	0.005	0.002	0.005	0.010	0.828	0.121	1.043	3,179	2.38	0.01	0.01	0.29
2012	0.026	0.014	0.032	0.009	0.026	0.008	0.020	0.020	0.001	0.005	0.006	0.010	235	0.18	0.00	0.01	0.02
2011	0.984	1.181	1.147	0.951	0.971	0.004	1.916	1.138	1.219	0.010	0.007	0.013	12,755	9.54	0.03	1.07	0.66
2010	1.518	1.602	0.191	1.616	1.901	1.598	1.146	1.043	1.104	0.904	0.997	1.078	19,652	14.70	0.04	1.22	1.23
2009	0.991	2.122	0.724	0.726	0.637	0.303	0.241	0.619	0.401	0.870	2.557	0.977	14,930	11.17	0.03	0.39	1.20
2008	0.077	0.723	0.720	0.813	0.875	0.668	0.666	0.524	1.606	1.372	0.317	0.495	11,840	8.86	0.02	0.87	0.67
2007	0.710	0.807	0.684	0.651	0.642	1.209	1.970	0.168	0.234	0.444	0.363	0.241	10,860	8.12	0.02	0.90	0.57
Average Annual Use													14,694	10.99	0.03	0.81	1.19

Exhibit 2-6. Demands at the Port's Service Areas Continued.

Rivergate Industrial District and Marine Terminals 5 and 6																	
Groundwater Sources																	
Year ^{2,4}	Monthly Water Use (MG)												Annual Total		Annual ADD	Summer ADD	Non-Summer ADD
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	ccf	MG	mgd	mgd	mgd
2017	0	0	0	0	0.050	0.050	0.050	0.050	0.050	0	0	0	334	0.25	0.0007	0.05	0.01
2011	0.011	0.010	0.007	0.003	0.002	0	0	0	0	0	0	0	45	0.03	0.0001	0.000	0.004
2010	0	0	0	0	0	0	0	0	0	0	0.011	0.022	43	0.03	0.0001	0.000	0.004
2008	0	0	0	0	0	0.562	1.954	2.567	1.456	0	0	0	8,743	6.54	0.018	1.635	0.000
2007	0	0	0	0	0	0.897	2.900	1.327	2.574	0.386	0	0	10,808	8.08	0.022	1.92	0.05
Average Annual Use													4,910	3.67	0.01	0.89	0.01
Surface Water Source (Columbia River) ⁵																	
Year ⁴	Monthly Water Use (MG)												Annual Total		Annual ADD	Summer ADD	Non-Summer ADD
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	ccf	MG	mgd	mgd	mgd
2013	0	0	0	0	0	0	0	0	3.643	0	0	0	4,870	3.64	0.0100	0.91	0.00
2012	0.114	0	0	0	0	0	4.552	5.350	0	0	0	0	13,391	10.02	0.0274	2.48	0.01
2011	0	0	0	0	0	0	0	0	0	0	0.326	0	436	0.33	0.0009	0.00	0.04
2009	0	0.255	0.230	0.168	0.327	0.425	0.490	0.545	0.426	0	0	0	3,831	2.87	0.0079	0.47	0.12
2008	0	0	0	0	0	0	6.177	0	0	0.427	0	0	8,828	6.60	0.0181	1.54	0.05
Average Annual Use													6,271	4.69	0.01	1.08	0.05
Gresham Vista Business Park (Groundwater Sources)																	
Year	Monthly Water Use (MG)												Annual Total		Annual ADD	Summer ADD	Non-Summer ADD
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	ccf	MG	mgd	mgd	mgd
2017	0	0	0	0	7.345	7.647	8.257	5.613	7.746	0	0	0	48,940	36.6	0.10	7.32	0.92
2016	0	0	1.629	11.405	11.405	11.405	11.405	11.405	11.405	0	0	0	93,660	70.1	0.19	11.40	3.05
2015	0	0	1.629	11.405	11.405	11.405	11.405	11.405	11.405	0	0	0	93,660	70.1	0.19	11.40	3.05
2014	0	0	0	11.405	11.405	11.405	11.405	11.405	11.405	0	0	0	91,482	68.4	0.19	11.40	2.85
2013	0	0	0	4.171	4.376	4.203	4.344	4.344	4.203	0	0	0	34,280	25.6	0.07	4.27	1.07
2012	0	0	0	4.203	4.344	4.203	4.344	4.344	4.203	0	0	0	34,280	25.6	0.07	4.27	1.07
2011	0	0	0	4.203	4.344	4.203	4.344	4.344	4.203	0	0	0	34,280	25.6	0.07	4.27	1.07
2010	0	0	0	4.041	4.344	4.203	4.344	4.344	4.203	0	0	0	34,062	25.5	0.07	4.27	1.05

Gresham Vista Business Park (Groundwater Sources)																	
Year	Monthly Water Use (MG)												Annual Total		Annual ADD	Summer ADD	Non-Summer ADD
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	ccf	MG	mgd	mgd	mgd
2009	0	0	0	4.041	4.344	4.203	4.344	4.344	4.203	0	0	0	34,062	25.5	0.07	4.27	1.05
2008	0	0	0	11.408	11.789	11.408	11.789	11.789	11.408	0	0	0	93,037	69.6	0.19	11.60	2.90
Average Annual Use													60,311	45.113	0.124	7.46	1.91

Notes:

¹Use has been primarily for irrigation, with occasional (temporary) use for construction.

²October through December 2017 are averages from the past five years

³Use has been for ship washing at the Portland Shipyard.

⁴Only years with reported data are listed.

⁵Use is associated with dredging activities. The Port anticipates continued future use of this water right for this purpose.

Data Source = Port of Portland water use data reported to Oregon Water Resources Department.

ccf = hundred cubic feet

MG = million gallons

mgd = million gallons per day

Exhibit 2-7. Annual Demand by Service Area from 2007 through 2017.

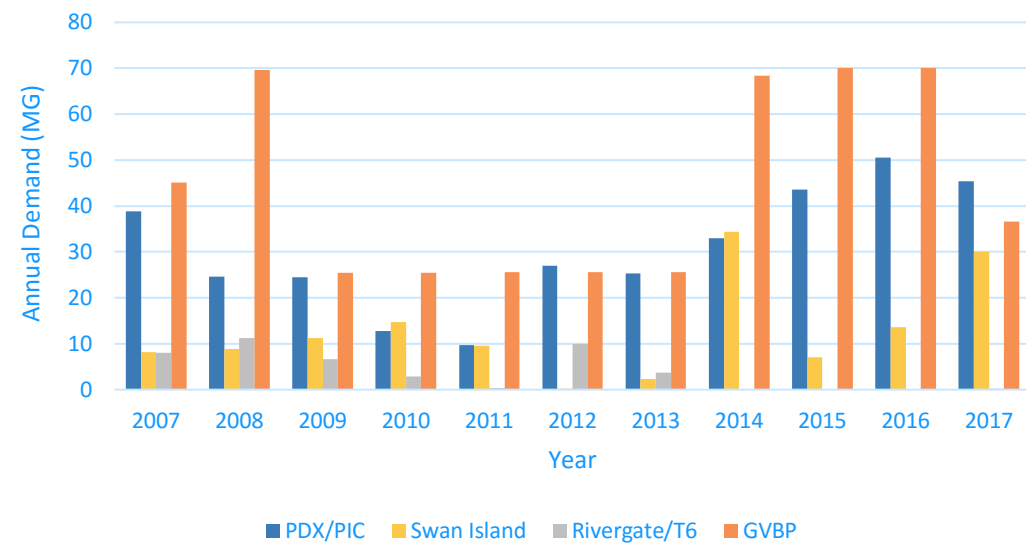


Exhibit 2-8. Average Day Demand by Service Area from 2007 through 2017.

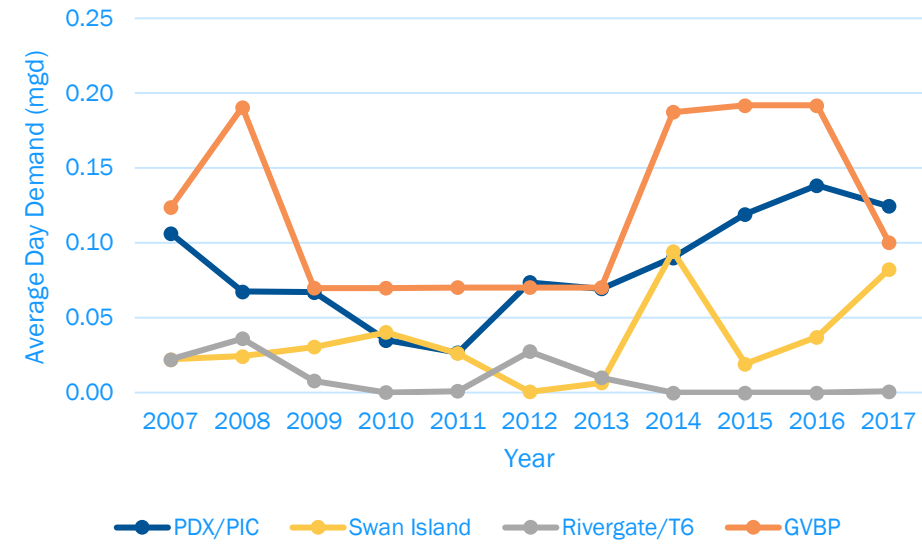
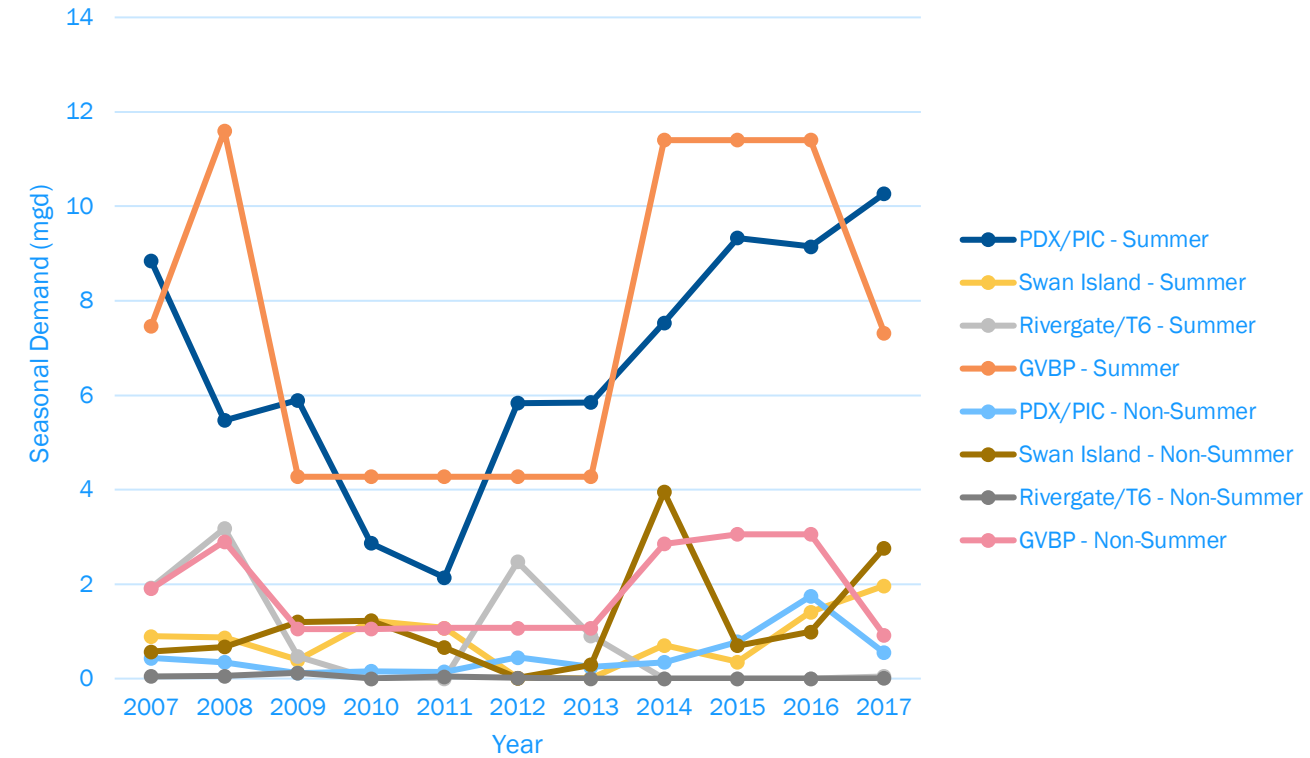


Exhibit 2-9. Seasonal Demand by Service Area from 2007 through 2017 (Summer = June-September; Non-Summer = October-May).



2.3 Sources of Supply, Port Water Rights, and Aquatic Resources

OAR 690-086-0140(1); OAR 690-086-0140(5)

Sources of non-potable water for the six Port non-potable water system service areas include a combination of surface water and groundwater sources. Details regarding the Port's surface water and groundwater rights within its six service areas are discussed below and presented in Exhibit 2-10.

2.3.1 PDX/PIC

The Port holds four groundwater rights for municipal use, one groundwater right for irrigation use, and one surface water right for municipal use in the PDX/PIC service area. Two of the groundwater rights for municipal use have priority dates of April 2, 1997, and were originally part of Permit G-13387, which authorized use of up to 2.9 cfs. On June 14, 2005, OWRD approved an extension of time for Permit G-13387 that stated that the Port shall put water under the permit to beneficial use by October 1, 2019, and required that the Port have a WMCP approved before it could use the full 2.9 cfs. The February 10, 2009 Final Order approving the Port's 2009 WMCP authorized the diversion of up to a maximum of 2.9 cfs under Permit G-13387. The permit was then partially perfected and Certificate 86571 was issued for a 1.71 cfs portion of the right. The 1.19 cfs portion remained in permit status. Subsequently, Transfer T-12482 (which added points of appropriation to former Certificate 86571) authorized the use of up to 1.71 cfs from five wells for municipal use. The Final Order approving Transfer T-12482 stated that the Port shall complete the transfer by October 1, 2037. The remaining 1.19 cfs unperfected portion of Permit G-13387 was modified by Permit Amendment T-12481, and is now Permit G-17888. However, the conditions under Permit G-13387 still apply to Permit G-17888, including that the Port has until October 1, 2019 to put the 1.19 cfs to beneficial use. The Port has fully developed Permit G-17888 and has submitted a Claim of Beneficial Use (COBU).

The Port's other groundwater rights for municipal use at PDX/PIC are two groundwater registrations (GR-1086 and GR-2946), which combined authorize up to 2.23 cfs, but are limited to a total annual volume of 358 acre-feet per year and are limited to use during the irrigation season (March through October). Groundwater registration GR-1086 modified by GR modification T-12483 (which added points of appropriation and changed the place of use and the character use from irrigation to municipal) claims a priority date of 1952 and allows the use of up to 0.89 cfs from eight wells. Groundwater registration GR-2946 modified by GR modification T-12484 (which added points of appropriation and changed the place of use and the character use from irrigation to municipal) claims a priority date of 1949 and allows the use of up to 1.34 cfs from eight wells. The Port's water right for irrigation use, Permit G-10967 has a priority date of December 28, 1989, and authorizes the use of up to 0.22 cfs of groundwater from the PIC Well for irrigation of 32.9 acres or lake maintenance. The Port has since discarded the idea of having a small pond or lake in the area, which will be described during the COBU report process.

In addition, the Port holds Permit S-51547 modified by Transfer T-10656 that authorizes the diversion of up to 15.41 cfs for municipal use in multiple service areas, including PDX/PIC. However, the Port intends to use its groundwater rights before using Permit S-51547.

Permit S-51547 (modified by Permit Amendment T-10656), authorizes the use of up to 72.80 cfs (32,673 gpm), being: 21.76 cfs (9,766 gpm) from the Willamette River for municipal use at Swan Island and Rivergate/T4/T5/T6; 15.41 cfs from the Columbia River for municipal use at PDX/PIC, Rivergate/T4/T5/T6, and West Hayden Island; and 35.63 cfs from the Columbia River for wetland enhancement at Smith, Bybee, and Ramsey Lakes. This permit has a priority date of November 18, 1992. Permit Amendment T-10656 (approved by OWRD on October 31, 2008) authorized a change in the place of use, a change in the POD for Swan Island 1A (7,000 feet downstream), and an additional POD at a portable pump station to be used within 600 feet of shoreline of specific locations along the following reaches: Willamette River west shoreline of the Rivergate Industrial District and Terminal 4, Columbia River north shoreline of the Rivergate Industrial District, and Columbia River north and south shorelines of West Hayden Island. OWRD issued a permit extension final order on June 14, 2005 that extended the date of completion of Permit S-51547 to October 1, 2044. The Final Order approving the Port's 2009 WMCP authorized the diversion of up to 25.31 cfs under Permit S-51547.

2.3.2 Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island

Three water rights are associated with Rivergate/T4/T5/T6: 2 surface water rights and 1 groundwater right. The surface water rights are Certificate 85668 and Permit S-51547. The groundwater right is Permit G-13093. Permit S-51547 is also associated with Swan Island Industrial District and West Hayden Island.

Certificate 85688 authorizes the use of up to 2.23 cfs from the Columbia River year-round for commercial and industrial use at the Port's Dredge Material Rehandling Facility at the east end of T6. The priority date of the right is July 25, 2002. Given that this water right is used in association with maintenance dredging activities under limited circumstances, the Port decided to lease Certificate 85688 instream during time periods when use of the facility is not anticipated. The water right is currently leased instream under IL-1457, which terminates on December 31, 2024. The lease protects 2.23 cfs (and a volume of 203.46 AF) instream from the point of diversion to the Columbia River from January 14 through February 28 annually.

As described above, Permit S-51547 (modified by Permit Amendment T-10656) authorizes the use of up to 72.80 cfs (32,673 gpm), being: 21.76 cfs (9,766 gpm) from the Willamette River for municipal use at Swan Island and Rivergate/T4/T5/T6; 15.41 cfs from the Columbia River for municipal use at PDX/PIC, Rivergate/T4/T5/T6, and West Hayden Island; and 35.63 cfs from the Columbia River for wetland enhancement at Smith, Bybee, and Ramsey Lakes. See above for more details.

Permit G-13093 (modified by Permit Amendment T-9244) authorizes the use of up to 23.53 cfs of groundwater from 7 wells year-round for municipal use within the Port's service area. The authorized rate is further limited to 13.96 cfs from Wells 1, 2, and 3 ("on the Willamette River

side”) and 9.573 cfs from Wells 4, 5, and 6 (“on the Columbia River side”). Diversion from the new well authorized by Permit Amendment T-9244 has no additional limitations on its rate. In addition, the amount of water appropriated under Permit G-13093, in combination with the amount diverted under Permit S-51547 cannot exceed a total of 72.80 cfs (the maximum authorized rate under Permit S-51547). The priority date of Permit G-13093 is July 9, 1996. The Final Order approving the Port’s 2004 WMCP granted access to up to 0.89 cfs under Permit G-13093. OWRD subsequently issued an extension final order on June 14, 2005, which extended the date of completion of Permit G-13093 to October 1, 2044, reset the portion of the permit to which the Port had access to 0.0 cfs, and required that the Port request access to water under Permit G-13093 in a subsequent WMCP in order to use water under the permit.

Swan Island Industrial District and West Hayden Island currently have no groundwater rights.

2.3.3 GVBP

The Port has four surface water rights (Certificates 93760, 93761, 93762, and 93763) and one groundwater right (Certificate 93764) associated with GVBP.

Certificate 93760 authorizes the use of up to 0.297 cfs, being 0.099 cfs from Spring 1, 0.099 cfs from Spring 2, and 0.099 cfs from Unnamed Stream (tributaries of Arata Creek) and 162.26 AF (in combination with water from Certificate 93763) for municipal use. Certificate 93760 has a priority date of May 8, 1941.

Certificate 93761 authorizes the use of up to 0.318 cfs from multiple sources for municipal use. Diversion under the certificate is further limited to 0.099 cfs from Spring Area, 0.03 cfs from Spring 3, 0.099 cfs from Stream 2 (limited to no more than 0.099 cfs in combination with the rate for Stream 2 under Certificate 93763), and 0.09 cfs from Stream 3 (limited to no more than 0.099 cfs in combination with the rate for Stream 3 under Certificate 93763) and up to 341.0 AF (including up to 7.0 AF from McGill Reservoir in combination with water from Certificate 93763). Certificate 93761 has a priority date of June 6, 1973.

Certificate 93762 authorizes the storage of up to 7 AF from Spring 3, Spring Area, Unnamed Stream 2, and Unnamed Stream 3 (tributaries of Arata Creek) for municipal use. Water may be appropriated for storage during the period November 1 through June 30, and released throughout the year. Certificate 93762 has a priority date of June 6, 1973.

Certificate 93763 authorizes the use of up to 0.207 cfs, being 0.045 cfs from Spring 3, 0.063 cfs from Stream 2 (limited to no more than 0.099 cfs in combination with the rate for Stream 2 under Certificate 93761), and 0.099 cfs from Stream 3 (limited to no more than 0.099 cfs in combination with the rate for Stream 3 under Certificate 93761) and up to 128 AF (including up to 7.0 AF from McGill Reservoir, in combination with Certificate 93761; provided use in combination with Certificate 93760 does not exceed 126.26 AF). The authorized use is year-round municipal use. Certificate 93763 has a priority date of June 6, 1973.

Certificate 93764 authorizes the use of up to 0.684 cfs of groundwater from Well 3 (limited to no more than 756.5 acre-feet per year) for municipal use. Certificate 93764 has a priority date of March 15, 2001.

2.3.4 TRIP/TTD

The Port holds five groundwater rights (Groundwater Registrations GR-462 modified by GR Modification T-11395 and GR-1441 modified by GR Modification T-11396, and Certificates 37761, 37762, and 41558) and one permit and two limited licenses for surface water (Permit S-54922 and Limited License LL-1659) at TRIP/TTD.

The Port's groundwater rights for this service area authorize the use of water for municipal and industrial purposes. Groundwater registration GR-462 modified by GR Modification T-11395 authorizes the use of up to 31.729 cfs of groundwater from Wells 1 through 15 (currently only Wells 3, 5, 7, and 8 exist) for municipal use and has a priority date of January 31, 1942. Certificate 37761 authorizes the use of up to 2.3 cfs from Well 16 for industrial use and has a priority date of December 27, 1966. Certificate 37762 authorizes the use of up to 2.3 cfs from Well 17 for industrial use and has a priority date of July 2, 1969. Certificate 41558 authorizes the use of up to 1.89 cfs from Well 18 for industrial use and has a priority date of January 9, 1970. However, the Port does not own all of the land to which Certificates 37761, 37762, and 41558 are appurtenant. As a result, the Port only has access to an estimated 1.98 cfs under Certificates 37761, 37762, and 41558 based on the percentage of the places of use owned by the Port. Groundwater registration GR-1441 modified by GR Modification T-11396 allows the use of up to 0.86 cfs (only 0.86 cfs out of 1.56 cfs of GR-1441 was assigned to the Port based on ownership) from Well FF-4 for municipal use and claims a priority date of 1943.

The Port's surface water rights authorize the use of water associated with a wetland. Permit S-54922 authorizes the use of up to 1.6 cfs from Salmon Creek for wetland enhancement. The priority date for Permit S-54922 is April 24, 2014 and the completion date is April 20, 2020. Limited License LL-1659 authorizes the use of up to 1.0 cfs (450 gpm) from Salmon Creek for irrigation to establish vegetation, and is in effect through June 30, 2020.

2.3.5 Government Island and Randall Mitigation Site

The Port holds two additional water rights that authorize use outside of its six water service areas. The Port holds Certificate 83964 (and the associated Instream Lease IL-1639) on Government Island and Certificate 19973 at the Randall Mitigation Site. Certificate 83964 authorizes the use of up to 2.08 cfs from the Columbia River for irrigation of 166.5 acres and has a priority date of June 22, 1988. Instream Lease IL-1639 leases the water under Certificate 83964 instream at a rate of 0.86 cfs (up to 416.25 acre-feet) from March 1 through October 31. Instream lease IL-1639 terminates on October 31, 2022. Certificate 19973 authorizes the use of up to 0.193 cfs from Dairy Creek for irrigation and has a priority date of April 16, 1946.

Exhibit 2-10. Port Water Rights.

ID Number				Priority Date	Source	Place of Use/ Port Non- potable Service Area	Type of Beneficial Use	Permitted Rates				Maximum Instantaneous		Average Monthly Diversion		Average Daily Diversion		Authorized Date of Completion	Comments
Application	Permit	Transfer	Certificate					Max Instantaneous		Max Annual		Rate Diverted To Date		Average Monthly Diversion		Average Daily Diversion			
								Allowed Rate		Allowed Volume		Under Each Permit		(MG/month)		(MG/Day)			
								cfs	gpm	MG	AF	cfs	gpm	2013-2017	2017	2013-2017	2017		
Surface Water Rights Inside Non-potable Water System Service Areas																			
S-72998	S-51547	T-10656	-	11/18/1992	Willamette River	Swan Island, Rivergate/T4/T5/T6	Municipal	21.76	9,766	-	-	7.24	3,250	1.275	2.032	0.042	0.067	10/1/2044	T-10656 authorized a change in POU, a change in the Swan Island 1 A POD, and an additional POD at a portable pump station to be used within 600 feet of shoreline along reaches of the Willamette River and Columbia River.
					Columbia River	PDX/PIC, Rivergate/T4/T5/T6, West Hayden Island	Municipal	15.41	6,916	-	-	0	0	0	0	0	0		
					Columbia River	Smith, Bybee, and Ramsey Lakes	Wetland enhancement ^(a)	35.63	15,991	-	-	0	0	0	0	0	0		
S-85248	S-53884	-	85688	7/25/2002	Columbia River	T6 (Dredge Material Rehandling Facility)	Commercial and Industrial ^(b)	2.23	1,001	-	-	2.23	1,001	0	0	0	0	-	
IL-1457	-	-	-	7/26/2002	Columbia River	T6 (Dredge Material Rehandling Facility)	Instream	2.23	1,001	66.3	203	-	-	-	-	-	-	12/31/2024	Protected instream: January 14 through February 28
S-19326	S-14906		93760	5/8/1941	Spring 1, Spring 2, and an Unnamed Stream, tributaries to Arata Creek	GVBP	Municipal	0.297 cfs, being 0.099 cfs from Spring 1, 0.099 cfs from Spring 2, and 0.099 cfs from Unnamed Stream	133	53.0	162.26 AF, in combination with water from Certificate 93763	0.297	133	-	-	-	-	-	

ID Number				Priority Date	Source	Place of Use/ Port Non- potable Service Area	Type of Beneficial Use	Permitted Rates				Maximum Instantaneous		Average Monthly Diversion		Average Daily Diversion		Authorized Date of Completion	Comments	
Application	Permit	Transfer	Certificate					Max Instantaneous		Max Annual		Rate Diverted To Date		(MG/month)		(MG/Day)				
								Allowed Rate		Allowed Volume		Under Each Permit		2013-2017		2017				
								cfs	gpm	MG	AF	cfs	gpm	2013-2017	2017	2013-2017	2017			
Surface Water Rights Inside Non-potable Water System Service Areas																				
S-50021	S-36765	-	93761	6/6/1973	Spring Area, Spring 3, Unnamed Stream 2, Unnamed Stream 3, and Reservoir constructed under Permit R-5964, tributaries of Arata Creek	GVBP	Municipal	0.318 cfs, being 0.099 cfs from Spring Area, 0.03 cfs from Spring 3, 0.099 cfs from Stream 2 (limited to no more than 0.099 cfs in combination with the rate for Stream 2 under Certificate 93763), and 0.09 cfs from Stream 3 (limited to no more than 0.099 cfs in combination with the rate for Stream 3 under Certificate 93763)	143	-	341.0 AF (including up to 7.0 AF from McGill Reservoir in combination with water from Certificate 93763)	0.318	143	-	-	-	-	-	-	-
R-50607	R-5964	T-11481	93762	6/6/1973	Spring 3, Spring Area, Unnamed Stream 2, and Unnamed Stream 3, tributaries of Arata Creek	GVBP	Municipal	-	-	-	7 AF	7 AF	-	-	-	-	-	-	-	Water may be appropriated for storage during the period November 1 through June 30, released throughout the year.

ID Number				Priority Date	Source	Place of Use/ Port Non- potable Service Area	Type of Beneficial Use	Permitted Rates				Maximum Instantaneous		Average Monthly Diversion		Average Daily Diversion		Authorized Date of Completion	Comments		
Application	Permit	Transfer	Certificate					Max Instantaneous		Max Annual		Rate Diverted To Date		Under Each Permit		(MG/month)				(MG/Day)	
								Allowed Rate		Allowed Volume		Under Each Permit		(MG/month)		(MG/Day)					
								cfs	gpm	MG	AF	cfs	gpm	2013-2017	2017	2013-2017	2017				
Surface Water Rights Inside Non-potable Water System Service Areas																					
S-50608	S-36772	T-11481	93763	6/6/1973	Spring 3, Unnamed Stream 2, Unnamed Stream 3, and Reservoir constructed under Permit R-5964, tributaries of Arata Creek	GVBP	Municipal	0.207 cfs, being 0.045 cfs from Spring 3, 0.063 cfs from Stream 2 (limited to no more than 0.099 cfs in combination with the rate for Stream 2 under Certificate 93761), and 0.099 cfs from Stream 3 (limited to no more than 0.099 cfs in combination with the rate for Stream 2 under Certificate 93761)	93	-	128 AF (including up to 7.0 AF from McGill Reservoir, in combination with Certificate 93761; provided use in combination with Certificate 93760 does not exceed 126.26 AF	0.207	93	-	-	-	-	-	-		
S-87974	S-54922	-	-	4/28/2014	Salmon Creek	TRIP	Wetland Enhancement	1.6	718	-	-	-	-	-	-	-	-	4/20/2020			
LL-1659	-	-	-		Salmon Creek	TRIP	Irrigation to establish vegetation	1.0	450	-	-	-	-	-	-	-	-		Issued: 8/3/2016 Expires: 6/30/2020		

ID Number				Priority Date	Source	Place of Use/ Port Non- potable Service Area	Type of Beneficial Use	Permitted Rates				Maximum Instantaneous		Average Monthly Diversion		Average Daily Diversion		Authorized Date of Completion	Comments
Application	Permit	Transfer	Certificate					Max Instantaneous		Max Annual		Rate Diverted To Date		(MG/month)		(MG/Day)			
								Allowed Rate		Allowed Volume		Under Each Permit							
								cfs	gpm	MG	AF	cfs	gpm	2013-2017	2017	2013-2017	2017		
Groundwater Rights Inside Non-potable Water System Service Areas																			
G-14341	G-13093 (c)	T-9244	-	7/9/1996	7 Wells	Rivergate/T4/T5/ T6	Municipal	23.53, being 13.96 cfs from Wells 1, 2, and 3 on the Willamette River side and 9.573 cfs from Wells 4, 5, and 6 the Columbia River side, as well as a new well as long as diversion of the new well it does not exceed the maximum rate and duty allowed under Permit G- 13093	10,560	-	-	0.89 (See comment)	400 (See comment)	0.004 (See comment)	0.210 (See comm ent)	0.000	0.007 (See comm ent)	10/1/2044	The Port currently has access to 0 cfs under Permit G-13093 due to the extension of time final order issued June 14, 2005. Diversions under the permit after 2005 were erroneously based on the Port's 2004 WMCP.
G-12005	G-10967	-	-	12/28/1989	PIC Well	PDX/PIC	Irrigation of 32.9 acres or lake maintenance	0.22	99	-	-	0.22	99	0.875	1.017	0.029	0.033	10/1/2030	
G-14488	G-13387	T-12482	86571	4/2/1997	Airport Way Well, PDX Well 2, ARFF Well, PDX MDX Well, PIC Well 2	PDX/PIC	Municipal	1.71	767	-	-	1.71	767					10/1/2037	
G-14488	G-17888	T-12481	-	4/2/1997	Airport Way Well, PDX Well 2, ARFF Well, PDX MDX Well, PIC Well 2	PDX/PIC	Municipal	1.19	534	-	-	1.19	534	2.415	2.790	0.079	0.091	10/1/2019	The Port has fully developed the permit and has submitted a Claim of Beneficial Use.

ID Number				Priority Date	Source	Place of Use/ Port Non- potable Service Area	Type of Beneficial Use	Permitted Rates				Maximum Instantaneous		Average Monthly Diversion		Average Daily Diversion		Authorized Date of Completion	Comments
Application	Permit	Transfer	Certificate					Max Instantaneous		Max Annual		Rate Diverted To Date		(MG/month)		(MG/Day)			
								Allowed Rate		Allowed Volume		Under Each Permit							
								cfs	gpm	MG	AF	cfs	gpm	2013-2017	2017	2013-2017	2017		
Groundwater Rights Inside Non-potable Water System Service Areas																			
GR-1086	-	T-12483	GR-1047	12/31/1952	Russell Tugboat Well, Russell Tugboat Well 2, Airport Way Well, PDX Well 2, PIC Well 2, ANG Well, Airtrans Rd Well, and 33rd Ave Well.	PDX/PIC	Municipal	0.89	400	58.4	179.16	-	-	-	-	-	-	-	
GR-2946	-	T-12484	GR-3924	7/1/1949	Northwest Packing, Russell Tugboat Well 2, Airport Way Well, PDX Well 2, PIC Well 2, ANG Well, Airtrans Rd Well, and 33rd Ave Well	PDX/PIC	Municipal	1.34	600	58.4	179.16	-	-	-	-	-	-	-	

ID Number				Priority Date	Source	Place of Use/ Port Non- potable Service Area	Type of Beneficial Use	Permitted Rates				Maximum Instantaneous		Average Monthly Diversion		Average Daily Diversion		Authorized Date of Completion	Comments
Application	Permit	Transfer	Certificate					Max Instantaneous		Max Annual		Rate Diverted To Date		Average Monthly Diversion		Average Daily Diversion			
								Allowed Rate		Allowed Volume		Under Each Permit		(MG/month)		(MG/Day)			
								cfs	gpm	MG	AF	cfs	gpm	2013-2017	2017	2013-2017	2017		
Groundwater Rights Inside Non-potable Water System Service Areas																			
GR-462	-	T-11395	GR-445	1/31/1942	Wells 1 through 15	TRIP	Municipal	31.729	14,240	-	-	31.729	14,240	The Port's use of these water rights is currently restricted by law because of ongoing remedial actions to address fluoride contamination. Groundwater remediation is in progress by the former owner, under oversight from Oregon DEQ and EPA Region 10. This groundwater remediation pumping occurs from wells under groundwater claim GR-462. Average groundwater production rates for the 5-year period of 2008 through 2012 were 78.4 million gallons per month and 2.6 million gallons per day.					
G-3761	G-3453	-	37761	12/27/1966	Well 16	TRIP	Industrial	2.3 ^(d)	1,032	-	-	2.3	1,032						
G-4922	G-4510	-	37762	7/2/1969	Well 17	TRIP	Industrial	2.3 ^(d)	1,032	-	-	2.3	1,032						
G-5069	G-4786	-	41558	1/9/1970	Well 18	TRIP	Industrial	1.89 ^(d)	848	-	-	1.89	848						
GR-1441	-	T-11396	GR-1587	12/31/1943	Well FF-4	TRIP	Municipal	0.856	384	-	-	0.856	384						
G-15348	G-15170	-	93764	3/15/2001	Well 3, in the Arata Creek Basin	GVBP	Municipal	0.684	307	246.5	756.5	0.684	307	4.513	3.051	0.148	0.100		

ID Number				Priority Date	Source	Place of Use/ Port Non- potable Service Area	Type of Beneficial Use	Permitted Rates				Maximum Instantaneous		Average Monthly Diversion		Average Daily Diversion		Authorized Date of Completion	Comments
Application	Permit	Transfer	Certificate					Max Instantaneous		Max Annual		Rate Diverted To Date		(MG/month)		(MG/Day)			
								Allowed Rate		Allowed Volume		Under Each Permit		2013-2017		2017			
								cfs	gpm	MG	AF	cfs	gpm	2013-2017	2017	2013-2017	2017		
Other Water Rights Inside Non-potable Water System Service Areas																			
S-69646	S-50680	-	83964	6/22/1988	Columbia River	Government Island	Irrigation	2.08	934	-	-	~1.2 to 2.0	~ 540 to 900	-	-	-	-	-	
IL-1639	-	-	-	6/23/1988	Columbia River	Government Island	Instream	0.86	386	135.66	416.25	-	-	-	-	-	-	10/31/2022	Protected instream: March 1 through October 31
S-21561	S-16905	-	19973	4/16/1946	Dairy Creek, tributary to the Tualatin River	Randall Mitigation Site	Irrigation	0.193	87	-	-	-	-	-	-	-	-	-	

Notes

- (a) On September 20, 2006, the Port requested that the portion of Permit S-51547 that is reserved for wildlife enhancement (35.63 cfs (15,991 gpm)) be cancelled because Metro and the Friends of Smith and Bybee Lakes have no plans to use this water. No action was taken by OWRD.
- (b) The entire rate of this water right (2.23 cfs) is leased instream under IL-1457, dated 4/27/2015 (end date 12/31/2019). The instream volume is 203.46 AF, the instream reach is from the POD to the Columbia River, and the period protected instream is January 14 through February 28.
- (c) Water developed under this groundwater permit is accounted against surface water permit S-51547.
- (d) The Port of Portland does not own all the land associated with these water rights; and as a result, does not currently have access to the full rate of water use authorized by the rights. The estimated Port rates based on ownership of 30 percent of the Place of Use are as follows: 0.70 cfs of Certificate 37761, 0.70 cfs of Certificate 37762, and 0.58 cfs of Certificate 41558. The Port is currently holding these water rights in reserve.

- = not available or not applicable

PDX/PIC = Portland International Airport/Portland International Center

Rivergate/T4/T5/T6 = Rivergate Industrial District and Marine Terminals 4, 5 and 6

TRIP = Troutdale Reynolds Industrial Park

GVBP = Gresham Vista Business Park

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2.3.6 Aquatic Resource Concerns

OAR 690-086-140(5) requires municipal water suppliers to identify the following for each of its water sources: 1) any listing of the source as water quality limited and the water quality parameters for which the source was listed; 2) any streamflow-dependent species listed by a state or federal agency as sensitive, threatened, or endangered that are present in the source; and 3) any designation of the source as being in a critical groundwater area.

Water Quality

The Clean Water Act Section 303(d) requires the Oregon Department of Environmental Quality (DEQ) to identify waters (instream) that do not meet water quality standards for various water quality parameters and to determine where a Total Maximum Daily Load (TMDL) pollutant load limit needs to be developed as a means of improving water quality. When a TMDL has been established (i.e., approved), water quality parameters may be removed from the 303(d) list. Other measures established to improve water quality, data demonstrating water quality improvements, and revisions of water quality standards may also result in removal of water quality parameters from the 303(d) list.

The Port has surface water rights with PODs on the Willamette River (~ RM 2, 5, and 9), Columbia River (~ RM 103, 105, 109, and 112), Salmon Creek, and springs and streams that are tributaries to Arata Creek. Exhibit 2-11 presents the DEQ's 303(d) listings for the Willamette River and the Columbia River in the reaches with Port PODs. DEQ delisted pentachlorophenol in 2012 for the Willamette River (RM 0 to 24.8) due to other control measures being put in place. No listings were found for Salmon Creek and the springs and tributaries to Arata Creek. For more information see: www.deq.state.or.us/wq/assessment/rpt2012/search.asp#db.

Exhibit 2-11. DEQ 303(d) listings in the reaches of Port Points of Diversion on the Willamette River (~ RM 2, 5, and 9) and Columbia River (~ RM 103, 105, 109, and 112).

River Miles	Parameter	Season	TMDL
Willamette River			
0 to 24.8	Aldrin	Year Round	Needed
0 to 24.8	Biological Criteria	Year Round	Needed
0 to 24.8	Chlordane	Year Round	Needed
0 to 24.8	Copper	Year Round	Needed
0 to 24.8	Cyanide	Year Round	Needed
0 to 24.8	DDE 4,4	Year Round	Needed
0 to 24.8	DDT 4,4	Year Round	Needed
0 to 24.8	DDT 4,4	Year Round	Needed
0 to 24.8	Dieldrin	Year Round	Needed
0 to 24.8	Dioxin (2,3,7,8-TCDD)	Year Round	Approved
0 to 24.8	Hexachlorobenzene	Year Round	Needed
0 to 24.8	Iron	Year Round	Needed
0 to 24.8	Lead	Year Round	Needed
0 to 24.8	Polychlorinated Biphenyls (PCBs)	Year Round	Needed
0 to 24.8	Polynuclear Aromatic Hydrocarbons	Year Round	Needed
0 to 54.8	Chlorophyll a	Summer	Needed
0 to 50.6	Temperature	Year Round (Non-spawning)	Approved
0 to 186.4	E. Coli	Fall/Winter/Spring	Approved
0 to 186.6	Mercury	Year Round	Needed
Columbia River			
98 to 142	DDE 4,4	Year Round	Needed
98 to 142	Dioxin (2,3,7,8-TCDD)	Undefined	Approved
98 to 142	Dioxin (2,3,7,8-TCDD)	Year Round	Approved
98 to 142	pH	Fall/Winter/Spring	Needed
98 to 142	Polychlorinated Biphenyls (PCBs)	Year Round	Needed
98 to 142	Polynuclear Aromatic Hydrocarbons	Year Round	Needed
98 to 142	Total Dissolved Gas	Year Round	Approved
0 to 303.9	Temperature	Year Round (Non-spawning)	Needed

Listed Streamflow-Dependent Species

Exhibit 2-12 shows the fish species with state or federal protections in the Willamette River within the reach of the Port’s point of diversion (~ RM 2, 5, and 9), the Columbia River within the reach of the Port’s point of diversion (~ RM 103, 105, 109, and 112), and Spring 3, Stream 1, Unnamed Stream, Spring Area, Stream 2, and Stream 3 in the Arata Creek watershed, tributary to the Columbia River.

Exhibit 2-12. Listed Fish Species in the Willamette River (within the reach of the Port’s Point of Diversion at (~ RM 2, 5, and 9), Columbia River (within the reach of the Port’s Point of Diversion at (~ RM 103, 105, 109, and 112), Salmon Creek, and the springs and unnamed streams in the Arata Creek Watershed (tributary to the Columbia River).

Listed Fish Species	Type of Listing		Evolutionarily Significant Unit (ESU) (i.e., Range of Federal/State Listing)
	Federal	State	
Fall Chinook	Threatened	Sensitive-Critical	Lower Columbia River
Spring Chinook	Threatened	Sensitive-Critical	Lower Columbia River, Willamette Species Management Unit (SMU)
Coastal Cutthroat		Sensitive-Vulnerable, below Willamette Falls	Lower Columbia River, including up to Willamette Falls; Coastal Cutthroat Trout Species Management Unit (SMU)
Coho Salmon	Threatened	Endangered	Lower Columbia River, including up to Willamette Falls
Winter Steelhead	Threatened	Sensitive-Critical; Sensitive	Lower Columbia River; Willamette Species Management Unit (SMU)
Chum Salmon	Threatened	Sensitive-Critical	Columbia River
Western Brook Lamprey		Sensitive-Vulnerable	Columbia River System
Pacific Lamprey	Petitioned for listing	Sensitive-Vulnerable	Columbia River System
Pacific Eulachon	Threatened	Sensitive-Vulnerable	Southern DPS, Northern Oregon and Washington

Sources:

Federal ESA listed species (T&E), from NOAA Fisheries Office of Protected Resources:
<https://www.fisheries.noaa.gov/species-directory/threatened-endangered>

Federal Sensitive species, from the Interagency Special Status/Sensitive Species Program for Oregon and Washington State: <http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/>

Oregon State ESA listed species, from the Oregon Department of Fish & Wildlife:
http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp

Oregon State Sensitive Species, from the Oregon Department of Fish & Wildlife:
http://www.dfw.state.or.us/wildlife/diversity/species/sensitive_species.asp

Federal Species of Concern, from the U.S. Fish & Wildlife Service, Oregon Fish & Wildlife Office:
<http://www.fws.gov/oregonfwo/Species/Data/PacificLamprey/default.asp>

Critical Groundwater Area

The Port's groundwater rights are not located within a critical groundwater area.

2.4 Adequacy and Reliability of Supply

OAR 690-086-0140(3)

This section discusses the adequacy and reliability of the Port's water supply serving or potentially serving properties in the Port's six service areas.

2.4.1 Surface Water

Columbia River and Willamette River

The lowest mean daily flow recorded from October 1, 1963 through June 29, 1970 and March 4, 2016 through June 14, 2018 for the Columbia River was 75,300 cfs (on September 9, 2016) (USGS gage 14144700 – Columbia River at Vancouver, Washington). The Port's authorized total maximum rate of withdrawal from the Columbia River is 17.64 cfs (2.23 cfs under Certificate 85688 + 15.41 cfs under Permit S-51547 = 17.64³). This rate represents approximately 0.02 percent of the lowest mean daily flow recorded. Given these historical streamflows, the Columbia River is expected to have sufficient flow to meet the demands under Certificate 85688 and Permit S-51547.

The lowest mean daily flow recorded from January 1, 1973 through January 1, 2017 was 3,800 cfs (on 10/21/2015) for the Willamette River (U.S. Geological Survey [USGS] gage 14211720 – Willamette River at Portland, Oregon; published and raw data) (USGS, 2017). The Port's authorized total maximum rate of withdrawal from the Willamette River is 21.76 cfs (under Permit S-51547), which represents approximately 0.57 percent of the lowest mean daily flow recorded. Thus, the Willamette River is expected to have sufficient flow to meet the Port's demands under Permit S-51547. Consequently, the Port anticipates that its Columbia River and Willamette River surface water sources will be adequate and reliable.

In addition, these rights are unlikely to be regulated in favor of senior water right holders. Although Permit S-51547 modified by Transfer T-10656 is junior to many water rights on the Willamette River and Columbia River, the streamflows are sufficiently great (as described above) that the Port considers this water right to be reliable. This assessment also applies to Certificate 85688 for the use of 2.23 cfs from the Columbia River, which has a priority date of July 25, 2002.

The Port is also monitoring efforts to convert the minimum perennial streamflows (MPSFs) in the Willamette Basin to instream water rights and is following the Willamette Basin Review (often called the "Reallocation Study") process, which will influence the extent to which stored water from USACE managed reservoirs in the Willamette River Basin is protected instream in the

³ This exclude the 35.63 cfs portion of the permit for water right for wildlife enhancement because the Port does not use this portion of the right and does not intend to request a certificate for that portion of the rate.)

future. Permit S-51547 modified by Transfer T-10656 has a priority date of November 18, 1992, which is junior to the June 22, 1964 priority date of the MPSF at Wilsonville. The Willamette River has MPSFs with both natural flow and released stored water components. At Wilsonville, the natural flow component of the MPSF is 1,500 cfs and the released stored water component is up to 4,700 cfs. The Port does not expect the conversion of the MPSF's to impact the reliability of Permit S-51547, however, the Port will continue to track the Reallocation Study and the MPSF conversion process.

Wetland Enhancement Portion of Permit S-51547

The 35.63 cfs (15,991 gpm) portion of Permit S-51547 for wetland enhancement at Smith, Bybee, and Ramsey Lakes has been determined to be unnecessary for that purpose. Consequently, the Port will not include the 35.63 cfs portion of Permit S-51547 when the Port makes proof on the permit. Currently, the Port plans to ultimately obtain a certificate for only the 37.17 cfs portion of the permit designated for municipal use.

GVBP Surface Water

The McGill Reservoir under Certificate 93762 is filled each year, so the Port reliably has access to the 7.0 AF under the water right. The flow of the springs and streams under Certificates 93760, 93761, 93762, and 93763 vary seasonally and are highly influenced by precipitation. During the late fall through spring, measured flows have been as high as 0.064 cfs at Spring 3 (Certificates 93761 and 93763) and 0.419 cfs at the Common Channel POD (for all sources under Certificates 93760, 93761, 93762, and 93763 other than Spring 3). In the summer, measured flows at the Common Channel POD have decreased to around 0.11 cfs. Although the live flow is insufficient to meet the authorized rate under the water rights, the combination of live flow and stored water from the reservoir do provide an adequate and reliable water supply for the Port.

TRIP Surface Water

Given that wetland enhancement is the designated use of water under the Port's Permit S-54922 (instead of municipal, commercial, industrial, or irrigation) and is not part of the municipal water supply system, the Port did not analyze of the reliability of this water right as a water supply source.

2.4.2 Groundwater

The Port's groundwater sources are from highly productive regional aquifers that historically have not experienced shortages in supply because of their proximity to natural sources of recharge.

Rivergate/T4/T5/T6

Rivergate/T4/T5/T6 currently has two wells operating under Permit G-13093 modified by Permit Amendment T-9244, which appropriate from a confined alluvial aquifer. Testing of these wells indicates they are in direct hydraulic connection with the river, and therefore, would not have any adequacy/reliability issues.

PDX/PIC

The Airport Way Well under Certificate 86571 and Permit G-13387 modified by Permit Amendment T-12482 appropriates from an alluvial aquifer called the Columbia River Sand Aquifer (CRSA)(the CRSA is a subset of the Unconsolidated Sedimentary Aquifer). Water level data from OWRD's State Observation Well MULT 1113 located at PDX/PIC shows that water levels generally have remained within the same range over the past few decades. To date, the Port has not experienced drops in water level outside of the seasonal pattern, the aquifer has stable static water levels, and the Port has not experienced well-to-well interference. The Airport Way Well produces 767 gpm and does not have any adequacy/reliability issues. Permit Amendment T-12482 added points of appropriation at PDX Well 2, ARFF Well, PDX MDX Well, and PIC Well 2. PDX Well 2, located adjacent to the new QTA facility, is capable of producing over 1,500 gpm and the other proposed wells have not yet been constructed. Groundwater Registration Modifications T-12483 and T-12484 added points of appropriation at Russell Tugboat Well 2, Airport Way Well, PDX Well 2, PIC Well 2, ANG Well, Airtrans Rd Well, and 33rd Ave Well, as well as changed the character of use for the authorized and proposed wells to municipal use. Russell Tugboat Well 2, PIC Well 2, ANG Well, Airtrans Rd Well, and 33rd Ave Well have not yet been constructed.

GVBP

The Port holds one groundwater right (Certificate 93764), which authorizes appropriation of up to 0.684 cfs from the Troutdale Sandstone Aquifer (TSA). Well 3 is able to produce water at this rate. Accordingly, the Port considers Certificate 93764 to produce a reliable source of supply.

TRIP/TTD

The Port holds five groundwater rights that authorize appropriation from the Unconsolidated Sedimentary Aquifer (USA) and the Sand and Gravel Aquifer (SGA), which are hydraulically connected and unconfined in the area beneath TRIP/TTD. These two units are very productive and directly connected to the adjacent Columbia River. These five groundwater rights are: Groundwater Registration GR-462 modified by GR Modification T-11395, Groundwater Registration GR-1441 modified by GR Modification T-11396, Certificate 37761, Certificate 37762, and Certificate 41558. A potential cause of reduction in non-potable water supply could result from a regulatory action that limits the amount of water the Port can obtain from its groundwater sources within TRIP. As described in Exhibit 2-10, the Port's use of its groundwater rights is currently restricted by law because of ongoing remedial actions to address fluoride contamination. Groundwater remediation is in progress by the former owner, under oversight from Oregon DEQ and EPA Region 10. This groundwater remediation pumping occurs from wells associated with Groundwater Registration GR-462. This would not impact the amount of water that can be sourced from wells located at Troutdale Airport. Given the information presented above, the Port's groundwater sources are expected to provide an adequate and reliable water supply for the foreseeable future assuming the Port can work within the groundwater remediation restrictions.

2.4.3 Water System Infrastructure

Although the Port's surface water and groundwater sources are expected to provide adequate and reliable water supplies, it should be noted that the ability to use that water is currently limited in all six service areas to some degree by the lack of non-potable water infrastructure. However, the Port can develop the necessary non-potable water infrastructure as demand requires.

2.5 Major Features of the Port's Non-potable Water System

OAR 690-086-0140(7); OAR 690-086-0140(8)

The Port's infrastructure for providing non-potable water is described below for each non-potable water system service area. Exhibits 2-1 through 2-5 show the service areas and sources of water, and distribution systems for each service area.

2.5.1 PDX/PIC

Exhibit 2-1 shows the non-potable water system service area and water sources for PDX/PIC. At PDX/PIC, irrigation and some construction activity demands are supplied by (1) an 800-gpm well (under Transfer T-12482 and Permit Amendment T-12481) and (2) a distribution pipeline that supplies the landscape irrigation system along Airport Way. A second well and distribution system was constructed to support landscape irrigation and supply non-potable water to the Rental Car Quick Turnaround Facility (QTA).

2.5.2 Swan Island Industrial District

Development of the non-potable water system at Vigor Industrial Portland Shipyard has been designed and constructed. The system consists of a river intake structure located in the Willamette River (see Exhibit 2-2); a pump station with three pumps having a combined capacity of 3,600 gpm; a distribution line; and service stations along the berths at the yard.

2.5.3 Rivergate/T4/T5/T6

Exhibit 2-3 shows the non-potable water system service area and water sources for Rivergate/T4/T5/T6.

Preliminary design of a non-potable system at Rivergate was completed in September 1992 and updated in February 1997 and September 2008. The original preliminary design was based on the sources of water being the Columbia River and Willamette River. However, the Port later conducted a well testing program and secured a groundwater permit (Permit G-13093 modified by permit amendment T-9244). As a result, the design now incorporates a groundwater source consisting of up to seven wells. To date, two of these wells have been constructed: the Leadbetter Well and Rivergate Well 1. The non-potable water distribution system currently consists of the Leadbetter Well (400 gpm capacity) and a distribution system, which serves the northern and southern portions of Rivergate. Given the flat topography of the Rivergate area, there is no reservoir site with adequate elevation to serve a gravity-flow system. Therefore, the non-potable water system operates as a closed-end pumping system. Water service currently is

provided solely for irrigation uses along roadways and in other common areas. The Rivergate Well 1 does not have a pump and is not connected to the system. Rivergate Well 1 can be put into service to address growing interest in non-potable water use by tenants and other industrial and commercial businesses in Rivergate.

In addition, the Port installed new piping at Rivergate that extends the non-potable system to T6 to irrigate some landscape for a portion of land leased to Auto Warehousing Corporation (AWC). The Port is also irrigating a new area of Port property. The Port also acquired a storage tank from the City of Portland at Rivergate, which currently does not store water and is not connected to a non-potable or potable water system. The tank is available for future use as needed with expansion of the system.

Currently, T4 and T5 are served by a single water system and all uses are met with potable water supplied by the City of Portland. The existing water supply systems at T6 is similar to that at T4 and T5, with potable and non-potable uses served by a single system with City of Portland-supplied water, except for a portion of landscaping that is served by Port non-potable water, as discussed above. In conjunction with development of the non-potable system at Rivergate, the Port anticipates serving industrial and irrigation non-potable demands at T4/T5/T6, and the Port has planned future surface water intakes accordingly. In general, the facilities will be similar to those at the Portland Shipyard, including a river intake structure, pump station, pumps, distribution line, and service stations.

The Dredge Material Rehandling Facility at the eastern end of the T6 property periodically requires non-potable water. The Port has a commercial/industrial surface water right (Certificate 85688) that allows for withdrawal of up to 2.23 cfs (1,001 gpm) from the Columbia River at this location. Non-potable water is obtained using a mobile pump mounted on a dredge barge and dredge materials from a barge are conveyed into a settling pond. The intakes for mobile dredge barge pumps are screened to protect fish. Inspection and maintenance of the screens will be conducted periodically as needed, when use of this facility is resumed. The facility is used infrequently during maintenance dredging. When the facility is not in use, the water right is leased for instream purposes.

The non-potable water system as a whole will be developed in phases to match capital expenditures with water demand development within the Rivergate/T4//T5/T6 service area and to coordinate with other construction activities in the area.

The Port has no interconnections between its water systems and other municipal water supply systems.

2.5.4 GVBP

Exhibit 2-4 shows the non-potable water system service area and water sources for GVBP. The GVBP has a limited amount of infrastructure used for irrigation.

2.5.5 TRIP/TTD

Exhibit 2-5 shows the non-potable water system service area and water sources for TRIP/TTD. No non-potable infrastructure currently exists at TRIP or TTD.

2.5.6 West Hayden Island

Exhibit 2-3 shows the non-potable water system service area and water sources for West Hayden Island, which currently has no non-potable water infrastructure.

2.6 Description and Quantification of System Losses

OAR 690-086-0140(9)

The Port's non-potable water supply system currently serves two separate sub-systems. For each sub-system, a meter is present at the well serving as the non-potable water source and submeters are located at the points of delivery, such that the Port can monitor water loss between the well and the submetered points of delivery. The first sub-system in PDX/PIC has a meter at the well and two submeters, one serving an irrigation system and one serving a commercial customer. The second sub-system located in Rivergate is set up similarly. Water used at Swan Island and GVBP are used immediately adjacent to the sources, such that the limited distance between the meter and the use does not provide an opportunity to quantify any water losses.

To date, the Port has not conducted formal water audits of its two sub-systems, but it has monitored meter readings monthly for indications of a leak and estimates that water loss is less than 10 percent. The short distances between the sources and points of delivery provide limited opportunities for leaks to occur. Nevertheless, the Port will begin conducting annual water audits of these two sub-systems, which the Port addresses in Section 3. New systems, such as those planned for the PDX/PIC service area, will include opportunities to conduct formal water audits. As the system expands in the future to provide customers with non-potable water for industrial use, additional meters/submeters will be installed to further track water system losses associated with the delivery of these non-potable commercial/industrial water supplies.

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3. Water Conservation

This section of the Port's updated WMCP presents information related to water conservation efforts at Port properties. The information includes a progress report on the Port's existing water conservation program, a description of water use measurement and reporting, and a description of water conservation activities and proposed 5-year benchmarks. The content of this section fulfills the requirements specified in OAR 690-086-0125(2) and OAR 690-086-0150.

3.1 Conservation Program Planning

The Port's 2014 Water Conservation Strategy identified eight strategies under which the Port will likely find the most success in identifying and implementing water conservation measures:

- Converting potable water uses to the Port's non-potable supplies where practical and economically feasible
- Water efficiency auditing (internal and for industrial and commercial customers within its non-potable water service areas)
- Ongoing facility maintenance programs
 - These programs include: major repairs/retrofits; submetering to receive sewer credits and thereby reduce City of Portland sewer charges; submetering to track water use and to detect and repair leaks
- Landscaping system efficiencies
- Lease and contract improvements (that incorporate water conservation incentives into utility charges)
- Education and outreach program
- Capital projects (embedding water conservation in the design phase)

These strategies are currently guiding the Port's current water conservation activities and planning for future water conservation efforts.

The Port has been recognized for its water conservation planning and implementation efforts. Specifically, in 2005, the Oregon Water Resources Commission (WRC) presented the Port with the WRC Conservation Award. The WRC presents awards annually to water providers responsibly managing, conserving, and restoring Oregon's water resources. With the proposed benchmarks described in Section 3.3 of this updated WMCP, the Port will continue to build upon its water conservation achievements to date.

3.2 Progress Report and Other Conservation Measures

OAR 690-086-0150(1); OAR 690-086-0150(3)

As a non-potable water provider, the Port provides water to meet a number of important needs that relate to public safety and welfare. For example, using water to minimize dust generation reduces air pollution, irrigation for landscape maintenance controls erosion, and non-potable water provides a supplemental source for fire suppression at the Portland Shipyard. The Port also provides non-potable water in part to relieve pressure on regional potable water supplies. While the use of water is important for public welfare, the Port also believes that water conservation measures play a key role in meeting future water supply needs within the region. The Port's goal is to make more efficient use of water at all Port facilities, including those outside its non-potable water service areas. This overall goal falls under the umbrella of the Port's Environmental Water Resource Policy (revised February 26, 2014), which states:

The Port will strive to conserve and protect water resources impacted by its operations and activities. The Port will employ an integrated approach to water resource management with a goal to balance human welfare, economic prosperity and healthy ecosystems.

The Port will:

- Identify the impacts of operations, land management and development activities on the water resource and consider alternatives that avoid or minimize adverse impacts;
- Apply a holistic approach for sustainable water management that considers all available sources of water as a potential resource;
- Ensure that Port activities are protective of the public water supply through promotion and implementation of water conservation measures;
- Seek and implement innovative practices that avoid or minimize the discharge of pollutants from Port activities to surface water and groundwater; and
- Encourage and facilitate partnerships, education and outreach to assist customers, tenants and stakeholders in protecting and conserving water resources;

This policy has been a driving force behind the development and implementation of the Port's water conservation strategies for all its properties. The Port has continued to develop its non-potable water supply system, implemented measures to conserve water use (from both potable and non-potable water supplies) in its landscaping and facility operations and to monitor water use as a means of detecting leaks, and implemented the Water Conservation Strategy it prepared in 2014.

The Port's 2009 WMCP described 5-year water conservation benchmarks for its water conservation program, and a progress report on these benchmarks is presented in Exhibit 3-1. Additional details regarding the Port's water conservation activities are presented in the remainder of Section 3.2 below.

Exhibit 3-1. Progress Report on Water Conservation Benchmarks.

Section Requirement	Sub-section Requirement	2008 Benchmarks	Benchmark Status (Non-potable water system)
<p>OAR 690-086-150 (4) A description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following conservation measures that are required of all municipal water suppliers:</p>	<p>(a) An annual water audit that includes a systematic and documented methodology for estimating any un-metered authorized and unauthorized uses</p>	<p>Identify opportunities to configure future distribution system expansions in a manner that will allow for water audits of industrial uses to be conducted.</p>	<p>The Port's non-potable water supply system currently serves two separate sub-systems. For each sub-system, a meter is present at the well serving as the non-potable water source and submeters are located at the points of delivery, such that the Port can monitor water loss between the well and the submetered points of delivery. The first sub-system in PDX/PIC has a meter at the well and two submeters, one serving an irrigation system and one serving a commercial customer (Water use by this customer began in 2018). The second sub-system located in Rivergate is set up similarly. Water used at Swan Island and GVBP are used immediately adjacent to the sources, such that the limited distance between the meter and the use does not provide an opportunity to quantify any water losses.</p> <p>To date, the Port has not conducted formal water audits of its two sub-systems, but it has monitored meter readings monthly for indications of a leak and estimates that water loss is less than 10 percent. The short distances between the sources and points of delivery provide limited opportunities for leaks to occur. Nevertheless, the Port will begin conducting annual water audits of these two sub-systems. New systems, such as those planned for the PDX/PIC service area, will include opportunities to conduct formal water audits. As the system expands in the future to provide customers with non-potable water for industrial use, additional meters/submeters will be installed to further track water system losses associated with the delivery of these non-potable commercial/industrial water supplies.</p>
		<p>Continue conducting water conservation evaluations annually at one or more Port-maintained irrigation systems.</p>	<p>Each year, the staff inspects its irrigation systems and repairs broken heads, leaking seals, plugged nozzles, line breaks, and other system problems. The Port will reinstate annual water conservation (efficiency) evaluations targeting at a minimum of one facility or irrigation system per year.</p>
	<p>(b) If the system is not fully metered, a program to install meters on all un-metered water service connections.</p>	<p>Install meters at all future connections on the Port's non-potable water distribution system.</p>	<p>The Port's non-potable water supply system is fully metered at each non-potable water source. The Port plans to maintain full metering of this system by maintaining existing meters and installing new meters at all future connections to the non-potable supply system.</p>
		<p>For industrial facilities that may be supplied with non-potable water from the Port's system in the future, identify additional locations where submeter installation may be appropriate to facilitate future water audits and leak detection activities.</p>	<p>For any industrial facilities that may be supplied with non-potable water from the Port's system, the Port will identify whether there are locations where installing one or more submeters (i.e., meters in locations beyond the primary meter connection to the Port's water system) potentially would facilitate future water audits and leak detection activities.</p>
	<p>(c) A meter testing and maintenance program</p>	<p>Continue tracking the installation and removal of new Port maintained meters and any city meters for which the Port pays for potable water use.</p>	<p>For all Port properties, the Port is refining the procedure for tracking new meter installations, meter removals, and change of ownership notifications. The Port has implemented the use of internal standardized reporting forms that capture both potable and non-potable system meters and are being used in conjunction with the Port's annual process of updating and reviewing its water use database to maintain an accurate accounting of water meters on Port properties. Meter Identification numbers and locations are mapped on the Port's Graphics Information System (GIS), as well.</p>
		<p>Continue checking the Port-maintained meters for malfunction in conjunction with the Port's routine meter reading program.</p>	<p>Port-maintained meters are checked for malfunctions by Port staff during monthly meter visits. Port staff report issues to maintenance staff for repairs.</p>
		<p>Continue implementing periodic calibration of Port-maintained meters according to manufacturer's specifications.</p>	<p>The Port is continuing to periodically check Port-maintained meters.</p>
		<p>Develop a program to evaluate the optimum life of Port-maintained meters, and identify a cost-effective replacement schedule (as necessary).</p>	<p>The Port has not developed a formal program to evaluate the optimum life of Port-maintained meters at this time. However, Port staff continue to monitor meters and to replace failed meters as needed.</p>
		<p>For industrial facilities that may be supplied with non-potable water from the Port's system in the future, identify additional locations where submeter installation may be appropriate to facilitate future water audits and leak detection activities.</p>	<p>For any industrial facilities that may be supplied with non-potable water from the Port's system, the Port will identify whether there are locations where installing one or more submeters (i.e., meters in locations beyond the primary meter connection to the Port's water system) potentially would facilitate future water audits and leak detection activities.</p>

Exhibit 3-1. Progress Report on Water Conservation Benchmarks Continued.

Section Requirement	Sub-section Requirement	2008 Benchmarks	Benchmark Status (Non-potable water system)
		For Port-maintained meters that measure industrial water use by Port tenants and operations, continue the current practice of regularly reviewing meter readings for unusually low or high readings.	The Port reviews monthly meter readings and usage values from the meters. The data are reviewed to identify unusually high or low readings that could indicate a meter maintenance problem or possible system leaks. Unusual data is conveyed to the appropriate facility manager and the resolution of the issue is documented.
	(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections	As future industrial users of the Port's non-potable water supply system are identified, establish a commodity-based rate structure and a billing schedule for non-potable water that will encourage water conservation, while also promoting non-potable water use to relieve pressure on regional potable water supplies.	An initial rate structure for the Port's non-potable water supply has been established, which consists of a base rate to cover administration costs plus a commodity rate based on the quantity of water metered at the service connections. This rate structure is intended to cover costs to provide water to various users. The Port expects to adjust the water rate annually based on the costs to provide water, such as the costs of operating and maintaining the water system, construction and replacement of infrastructure, meter reading and billing, providing customer service, and payment of debt service (if any). Additionally, the Port's rate may be adjusted if a user (or users) invests its own capital into the water system infrastructure.
	(e) If the annual water audit indicates that system leakage exceeds 10 percent, a regularly scheduled and systematic program to detect leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the municipal water supplier;	In conjunction with implementing the 5-year benchmark to identify opportunities to conduct water audits of future industrial non-potable water customers, begin planning for future development of a more formalized leak detection and repair program at facilities that will be using non-potable water for industrial purposes.	See OAR 690-086-150(4)(a). The Port reviews water usage records monthly to look for indications of anomalous water usage that might indicate a system leak is occurring and promptly addresses any leaks discovered. In addition, Port operations staff monitor irrigation systems at least monthly during the irrigation season and where practicable, promptly repair any leaks detected, so that loss from the system is minimized. Opportunities to configure the infrastructure to allow for water audits and a more systematic leak detection and repair program are expected to arise when the Port designs new portions of its non-potable water system. An example of one opportunity is the planned expansion of the Port's non-potable water system at the PDX Airport (currently in the design phase), including the terminal complex served by the Port's newest municipal well.

Exhibit 3-1. Progress Report on Water Conservation Benchmarks Continued.

Section Requirement	Sub-section Requirement	2008 Benchmarks	Benchmark Status (Non-potable water system)
	(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers	<p>Potable and Non-potable Water Systems</p> <p>Identify and implement measures to inform and educate the general public regarding water conservation practices and resources, including but not limited to:</p> <ul style="list-style-type: none"> - At PDX, making available to the public City of Portland published pamphlets and other existing literature on water conservation. - Including city-provided water conservation literature in water meter bills and Port-initiated mailers that are sent to Port operations and tenants. - At Port facilities, continue posting informational displays that identify the Port's water conservation policy and specific water conservation measures encouraged and practiced by the Port. 	<p>The Port continues to work to identify opportunities to inform and educate the general public, as well as its tenants and future non-potable water customers, regarding water conservation practices and resources. For the general public, the Port has developed new signage to engage Portland International Airport (PDX) travelers in using dual-flush handles properly to achieve water conservation savings in the terminal. The Port conducted a social marketing and media campaign to inform the redesign. The new signage was deployed throughout terminal restrooms in 2018.</p> <p>The Port also has taken steps to reduce single-use plastic at PDX to help improve the health of our waterways. A Green Plate Program allows PDX travelers and employees to get reusable plates and silverware when getting food "for here" at specific spots in the terminal. The Port promoted the program on social media and held news events to raise awareness.</p> <p>Updates on the Port's environmental programs were published regularly in Port Currents, its environmental and community news blog. These regular communications create awareness and share Port progress, such as attaining the Envision certification of the new PDX rental car quick turnaround facility (QTA). Starting in 2018, environmental updates shifted to be included in the Port's primary blog platform, Portside.</p> <p>The Port also continues to offer sustainability tours to external groups to educate them on water conservation features of the Port's Platinum LEED certified headquarters building, including the water savings features. For Port tenants, the Port conducts extensive outreach to minimize waste. The Port sets annual water conservation and protection targets that require assistance and commitment from various Port departments, collaboration with aviation and marine tenants, and consultation with other external stakeholders. Outreach materials are distributed to all Port staff members and external stakeholders promoting the Port's goals. The Port tracks progress so it can recognize and reward the attainment of goals, as well as evaluate why other goals were not attained. At Port facilities, the Port also continues to post informational displays that identify the Port's water conservation policy and specific water conservation measures that are encouraged and practiced by the Port. The Port has utilized Earth Day to raise awareness about the importance of environmental best practices among employees, including offering discounts for reusable water bottles. Extensive outreach to tenants to minimize waste is already occurring and new outreach focused on energy and water conservation are expected to achieve additional efficiencies.</p>

Exhibit 3-1. Progress Report on Water Conservation Benchmarks Continued.

Section Requirement	Sub-section Requirement	2008 Benchmarks	Benchmark Status (Non-potable water system)
<p>OAR 690-086-150 (6) If the supplier serves a population greater than 1,000 and proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), or if the supplier serves a population greater than 7,500, description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following measures; or documentation showing implementation of the measures is neither feasible nor appropriate for ensuring the efficient use of water and the prevention of waste</p>	<p>(a) A system-wide leak repair or line replacement program to reduce system leakage to 15 percent and if the reduction of system leakage to 15 percent is found to be feasible and appropriate, to reduce system leakage to 10 percent</p>	<p>Not applicable / not specified</p>	<p>See OAR 690-086-150(4)(a) and (e).</p>
	<p>(b) Technical and financial assistance programs to encourage and aid residential, commercial, and industrial customers in implementation of conservation measures; and</p>	<p>Actively seek opportunities to provide industrial users with non-potable water.</p>	<p>The Port continues to actively seek non-potable water users, including industrial users, on its existing and undeveloped properties.</p>
	<p>(c) Supplier financed retrofitting or replacement of existing inefficient water using fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation;</p>	<p>Upon initiating distribution of non-potable water from the Port's system to industrial customers, consult with the industrial customers to determine what technical assistance activities can help customers reduce their water consumption.</p>	<p>The Port remains ready to consult with current and future industrial non-potable water customers to identify the types of technical assistance activities that will help customers reduce their water consumption.</p>
	<p>(d) Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation;</p>	<p>None identified</p>	<p>The Port has established an initial commodity rate based structure. The Port bills non-potable water customers on a monthly basis, thereby providing timely feedback on water consumption.</p>
	<p>(e) Water reuse, recycling, and non-potable water opportunities; and</p>	<p>Continue use of the Port's non-potable water supply system for irrigation and ship washing, and continue to explore opportunities for expanding the system, including supplying non-potable water for industrial use.</p>	<p>The Port continues to use its non-potable water supply system for irrigation and continues to explore opportunities for expanding the system, including supplying non-potable water for industrial use. The Portland Shipyard is no longer owned or operated by the Port. Non-potable water uses (which may include ship washing) are controlled by the current owner, Vigor Industrial. The Port is actively seeking to expand its non-potable water supply system in the Rivergate Industrial District, Gresham Vista Business Park, Troutdale Reynolds Industrial Park, and PDX/PIC using Port-owned surface water and groundwater rights. The Port has also conducted a survey of all non-potable water used in the PDX/PIC service area that will help with planning the future development of the non-potable system.</p>
	<p>(f) Any other conservation measures identified by the water supplier that would improve water use efficiency.</p>	<p>See the "Annual Water Audits" section of this table. Continue retrofitting existing plumbing with low-flow fixtures at PDX. Include water conservation measures in construction of the new Port headquarters building at PDX.</p>	<p>See the prior discussions under Public Education regarding the Port's new headquarters building that opened in 2010 that features numerous water conservation measures and the dual-flush toilets at the airport accompanied by improved messaging. Elsewhere, the Port continues to pursue the retrofit of existing plumbing with low-flow fixtures as capital improvement projects are developed.</p>

3.2.1 Non-potable Water Supply Development

As described throughout this updated WMCP, one of the focuses of the Port's overall water management and conservation strategy has been to acquire and develop water rights. These water rights are intended to help meet non-potable water demands, such as irrigation and industrial uses at its major industrial properties, thereby reducing existing and future demands on the Bull Run drinking water supply. By using its non-potable water supply, the Port has been able to meet landscape irrigation needs for a total of nearly 400 acres at PDX/PIC, as well as non-potable water needs associated with construction activities at PDX. A new well adjacent to the PDX terminal will supply the Rental Car Quick Turnaround (QTA) Facility and future development at PDX.

The Port also converted from potable water to non-potable (river) water for ship washing operations at the Portland Shipyard (now owned and operated by Vigor Industrial), and installed additional piping at Rivergate to facilitate use of non-potable water by its industrial and commercial customers. The combined use of non-potable water systems at Port properties to date already has significantly reduced demands on the City of Portland's Bull Run water supply system, saving an average of 125.7 MG of potable water annually between 2014 and 2017.

3.2.2 Landscape Conservation Measures

In addition to using non-potable water for irrigation, the Port has undertaken several other landscape water conservation measures at many of its properties. These activities include:

At PDX, PIC, and other properties, the Port has planted tens of thousands of native plants requiring less water (i.e., slow-growing, deep-rooting ground cover) to replace grasses and other vegetation with higher water demand. New planting and lawn areas also are being amended with additional organic matter and topsoil, to enhance water retention in the soil.

The Port replaced a number of sprinkler systems with drip irrigation systems, which require far less water to meet the needs of grass turfs, plants, and trees. Drip irrigation systems work by continuously delivering small quantities of water close to where it is needed, thereby allowing the water to trickle slowly into the soil during long periods and permeate more deeply, compared to sprinkler systems. Drip irrigation minimizes evaporation rates, allowing vegetation to absorb most of the water being delivered by the irrigation system. However, these systems may be subject to clogging and are high maintenance, so they have limited application.

For other irrigation systems, the Port's Properties Maintenance staff adjusts irrigation watering times so as not to over-irrigate landscapes. At PDX, an extensive Rain Bird Maxicom® central irrigation control system was installed to further reduce water consumption. The Rain Bird Maxicom® is connected to a weather station via phone line connection, and constantly monitors humidity, temperature, and wind speed/direction to calculate irrigation needs.

3.2.3 Facilities Conservation Measures

The new QTA car wash will process about 1 million cars per year in a 16 bay facility equipped with wash and reverse osmosis reject water reclaim. The current design results in a savings of approximately 33 percent over traditional car wash designs. Rainwater will be harvested from

the QTA parking deck to provide about 2.8 million gallons per year of process water for the car wash. The new PDX Well 2 will supply the remaining QTA car wash to makeup water demand and irrigation needs. The Port estimates that approximately 18 million gallons of potable water will be saved each year by utilizing non-potable sources for operation.

3.3 Water Use Measurement and Reporting

OAR 690-086-0150(2)

Under OAR Chapter 690, Division 85, the Port is responsible for submitting annual water use reports for each of its municipal water rights. The Port's non-potable sources are metered at the points of appropriation and points of diversion, in compliance with OAR 690-085-0015(3). In most cases, the measurements are made using the Flow Meter Method (OAR 690-085-0015(5)(a)), with totalizing flowmeters capable of recording cumulative volume. The annual w

3.4 Required Conservation Programs

OAR 690-086-0150(4)

OAR 690-086-0150(4) requires that all water suppliers establish five-year benchmarks for implementing the following water management and conservation measures:

- Annual water audit
- System-wide metering
- Meter testing and maintenance
- Unit-based billing
- Water loss analysis
- Public education

Five-Year Benchmarks for Required Conservation Measures

During the next 5 years, the Port plans to initiate, continue, or expand the following conservation measures that are required of all municipal water suppliers when a condition of a water use permit, permit extension, or another order or rule requires a WMCP. Exhibit ES-1 provides a summary table of the five-year water conservation benchmarks presented below.

3.4.1 Annual Water Audit

OAR 690-086-0150(4)(a)

The Port's non-potable water supply system currently serves two separate sub-systems. For each sub-system, a meter is present at the well serving as the non-potable water source and submeters are located at the points of delivery, such that the Port can monitor water loss between the well and the submetered points of delivery. The first sub-system in PDX/PIC has a meter at the well and two submeters, one serving an irrigation system and one serving a commercial customer (Water use by this customer began in 2018). The second sub-system located in Rivergate is set up similarly. Water used at Swan Island and GVBP are used immediately adjacent to the sources, such that the limited distance between the meter and the use does not provide an opportunity to quantify any water losses.

To date, the Port has not conducted formal water audits of its two sub-systems, but it has monitored meter readings monthly for indications of a leak and estimates that water loss is less than 10 percent. The short distances between the sources and points of delivery provide limited opportunities for leaks to occur. Nevertheless, the Port will begin conducting annual water audits of these two sub-systems. New systems, such as those planned for the PDX/PIC service area, will include opportunities to conduct formal water audits. As the system expands in the future to provide industrial and commercial customers (tenants and other occupants within its non-potable water service areas) with non-potable water for industrial use, additional meters/submeters will be installed to further track water system losses associated with the delivery of these non-potable commercial/industrial water supplies.

The Port has a goal to develop a formal leak detection and repair program for both non-potable and potable systems in its service areas. Development of the formal leak detection and repair programs will coincide with development of the Port's water service areas (and installation of new submeters), which is expected to occur over the next 20 years, as described in Section 3.4.5 and Section 5. These actions will also help the Port analyze water use to identify opportunities to increase water use efficiency.

Five-Year Benchmarks: The Port will continue to identify opportunities to configure future distribution system expansions in a manner that will allow for water audits of industrial uses to be conducted. In 2021, the Port will begin conducting annual water audits on its existing non-potable water sub-systems, which currently consists of two sub-systems.

3.4.2 System-Wide Metering

OAR 690-086-0150(4)(b)

The Port's non-potable water supply system is fully metered at each non-potable water source. The Port plans to maintain full metering of this system by maintaining existing meters and installing new meters at all future connections to the non-potable supply system. In addition, for any industrial facilities that may be supplied with non-potable water from the Port's system, the Port will identify whether there are locations where installing one or more submeters (i.e., meters in locations beyond the primary meter connection to the Port's water system) potentially would

facilitate future water audits and leak detection activities. Meter Identification numbers and locations are mapped on the Port's Graphics Information System (GIS).

Five-Year Benchmark: The Port will continue to install and map meters at all future connections to the Port's non-potable water distribution system.

3.4.3 Meter Testing and Maintenance Program

OAR 690-086-0150(4)(c)

Meter testing and maintenance is conducted periodically by the Port on water system connections. For all Port properties, the Port is refining the procedure for tracking new meter installations, meter removals, and change of ownership notifications. The Port has implemented the use of internal standardized reporting forms for system meters that are being used in conjunction with the Port's annual process of updating and reviewing its water use database to maintain an accurate accounting of water meters on Port properties.

The Port periodically calibrates Port-maintained meters according to manufacturer's specifications and checks meters for malfunctions during monthly meter visits. Port staff report issues to maintenance staff for repairs. The Port reviews monthly meter readings and usage values from the meters to identify unusually high or low readings that could indicate a meter maintenance problem or possible system leaks. Unusual data are conveyed to the appropriate facility manager and a resolution of the issue is documented.

Five-Year Benchmarks: The Port will continue tracking the installation and removal of new Port-maintained meters. The Port will continue checking Port-maintained meters for malfunction in conjunction with the Port's routine meter reading program, and will continue implementing periodic calibration of Port-maintained meters according to manufacturer's specifications. For any Port-maintained meters installed to measure industrial water use by Port operations and industrial and commercial customers within its non-potable water service areas, the Port will continue its programs to regularly review meter readings to identify unusually high or low readings that could indicate a meter maintenance problem or possible system leaks.

3.4.4 Rate Structure

OAR 690-086-0150(4)(d)

The Port's water rates are designed to cover system costs and to encourage customers to use non-potable water for non-potable uses rather than potable water from the City of Portland. As such, the Port aims for the individual water rates that it establishes to be lower than the City of Portland's potable water rate.

An approach for structuring the individualized water rates of customers receiving non-potable water supply from the Port has been established, which consists of a base rate to cover administration costs plus a commodity rate based on the quantity of water metered at the service connections. The Port recognizes that before non-potable water is supplied to potential commercial and industrial users, a rate structure should be established that both encourages use

of non-potable water for appropriate uses (to help ease pressure on potable water supplies) while also encouraging efficient use of this water. As such, the Port established a commodity rate based structure approach that will cover costs to provide water to various users. Examples of costs used in determining the individualized rates of its customers include but are not limited to:

- Operating and maintaining the water system, including utilities used in operation of the system;
- Construction and replacement of water system infrastructure;
- Meter reading and billing;
- Providing customer service; and
- Payment of debt service, if any.

The Port expects to adjust the individual water rates annually (likely between 2 to 4 percent) based on the costs to provide water, such as the costs described above. Additionally, the Port's rates may be adjusted if a user (or users) invests its own capital into the water system infrastructure. The Port's rates will differ from customer to customer based on the Port's individual evaluation of cost factors described above.

Over time, where practicable and economically feasible, the Port will provide industrial and commercial customers (tenants and other occupants within its non-potable water service areas) with the opportunity to convert from City of Portland potable water to the Port's non-potable water for their uses not requiring potable supply. However, because these uses will be primarily for industrial process water, customers will require a reliable system and a backup supply. Consequently, customers will be connected to the City of Portland's potable water system, whether or not they also choose to connect to the Port's non-potable system. This means that the Port does not have control over the degree to which potable water will be used by its customers. However, the Port can influence the amount of non-potable water consumption by carefully establishing a rate structure that encourages customers to use non-potable water in lieu of potable water to the greatest degree possible.

Five-Year Benchmarks: The Port will continue to charge customers based, at least in part, on the quantity metered at the service connections.

3.4.5 Water Loss Analysis

OAR 690-086-0150(4)(e)

The Port's non-potable water supply system currently serves two separate sub-systems. For each sub-system, a meter is present at the well serving as the non-potable water source and submeters are located at the points of delivery, such that the Port can monitor water loss between the well and the submetered points of delivery. The first sub-system in PDX/PIC has a meter at the well and two submeters, one serving an irrigation system and one serving a commercial customer. The second sub-system located in Rivergate is set up similarly. Water

used at Swan Island and GVBP are used immediately adjacent to the sources, such that the limited distance between the meter and the use does not provide an opportunity to quantify any water losses.

To date, the Port has not conducted formal water audits of its two sub-systems, but it has monitored meter readings monthly for indications of a leak and estimates that water loss is less than 10 percent. The short distances between the sources and points of delivery provide limited opportunities for leaks to occur. Nevertheless, the Port will begin conducting annual water audits of these two sub-systems.

As described above, the Port reviews water usage records monthly to look for indications of anomalous water usage that might indicate a system leak is occurring and promptly addresses any leaks discovered. Opportunities to configure the infrastructure to allow for water audits and a more systematic leak detection and repair program are expected to arise when the Port designs new portions of its non-potable water system. An example of one opportunity is the planned expansion of the Port's non-potable water system at the PDX Airport (currently in the design phase), including the terminal complex served by the Port's newest municipal well.

As new systems are built and the existing system expands in the future to provide customers with non-potable water for industrial use, additional meters/submeters will be installed to further track water system losses associated with the delivery of these non-potable commercial/industrial water supplies.

The Port understands that OAR 690-086-0150(4)(e)(A) requires the Port to provide a description and analysis identifying potential factors of water loss and remedial actions to OWRD within two years of approval of this WMCP. Thus, the Port will determine water loss in these two sub-systems, identify potential factors of any water loss, and select remedial actions if water loss exceeds 10 percent, all within two years of approval of this WMCP. If those two sub-systems demonstrate a loss of more than 10 percent and those selected remedial actions do not result in the reduction of water loss to 10 percent or less within five years of approval of the WMCP, the Port understands that additional leak detection and repair measures are required under OAR 690-086-0150(4)(e)(B).

Five-Year Benchmarks: The Port will continue to identify opportunities to configure future distribution system expansions in a manner that will allow for water audits of industrial uses to be conducted. The Port will continue to review water usage records monthly to look for indications of anomalous water usage that might indicate a system leak is occurring and will promptly address any leaks discovered. The Port will continue to install submeters at points of connection for each new customer.

Two-Year Benchmark: Within two years of WMCP approval, the Port will provide an initial analysis estimating the water loss of its two currently active non-potable water sub-systems, and if water loss exceeds 10 percent, the Port will identify potential factors for the loss and selected remedial actions. If those selected actions do not result in the reduction of water loss to 10 percent or less within five years of approval of the WMCP, the Port will take additional leak detection and repair measures as required under OAR 690-086-0150(4)(e)(B).

3.4.6 Public Education Program

OAR 690-086-0150(4)(f)

The Port has a water conservation public education program that integrates efforts to reduce potable and non-potable water use. As such, measures described here result in potable and non-potable water conservation.

Conserving water in the workplace is an important facet of the Port's Water Resources program. The Port sets short and long-term environmental goals focusing on water conservation and protection as part of its Environmental Management System (EMS). Goals require assistance and commitment from various Port departments, collaboration with aviation and marine tenants, and consultation with other external stakeholders. Progress is tracked so that the Port can recognize and reward the attainment of goals, as well as evaluate why other goals were not attained. Starting in 2018, the Port began to incorporate environmental program updates, including water conservation, into its primary blog platform, Portside.

Internal Port actions focus on engagement and communications to create a culture that minimizes workplace waste. Each new employee receives an orientation presentation that focuses on the Port sustainability policy, environmental programs, and specific actions they can take to minimize waste. At Port facilities, water conservation measures are encouraged and practiced by the Port. For example, the Port headquarters building was awarded a Leadership in Energy and Environmental Design (LEED) platinum certification. The Port provides tours of the building to highlight water saving and other sustainability features for all who express interest. The water conservation measures in place at the new headquarters building also have been highlighted at public events where the Port has had a presence. The entrance display contains a Living Machine® system that came online in May 2010 to treat building wastewater onsite and recycle treated wastewater back to the building for flushing toilets and urinals. However, due to operational and pipe fouling issues, the system has been shut down and a new system to capture and use stormwater will be installed to replace it.

For the general public, the Port has developed new signage to engage PDX travelers in using dual-flush handles properly to achieve water conservation savings in the terminal. The Port conducted a social marketing campaign to understand the efficacy of previous signage. Interviews and audience feedback informed the redesign to make it easier to understand, simpler, and more colorful; feedback also affected placement of the signage. Post-surveys indicated a 28 percent increase in use of the water efficiency feature as a result of the new signage. The new signage was deployed throughout terminal restrooms in 2018 to further engage the public in water conservation.

The Port continues to work to identify opportunities to inform and educate the general public, as well as its industrial and commercial customers and future non-potable water customers, regarding water conservation practices and resources. PDX, in particular, provides a forum for reaching a large segment of the general public. Regular communications create awareness of and share progress toward conservation goals, such as attaining the Envision certification (a sustainability certification similar to LEED) of the new PDX rental car quick turnaround facility

(QTA). The Port will continue to look for new ways to influence user behavior to conserve water. To do so, the Port will evaluate specific behaviors of employees and the traveling public that impact water usage and consider the best ways to influence these audiences. Tenant engagement represents an opportunity for water conservation. Outreach to minimize waste is already occurring and new outreach focused on energy and water conservation are expected to achieve additional efficiencies.

Five-Year Benchmarks: For both non-potable and potable water systems, the Port will continue to identify and implement measures to inform and educate the general public regarding water conservation practices and resources. At Port facilities, the Port will continue to create displays or signage that encourages water conservation and identifies water conservation measures practiced by the Port. The Port will use its public website for posting information on the water conservation measures encouraged and practiced by the Port.

3.5 Additional Conservation Measures

OAR 690-086-0150(5)

OAR 690-086-0150(5) requires municipal water suppliers that either: (a) serve a population greater than 1,000 and propose to expand or initiate diversion of water under an extended permit for which resource issues have been identified, or (b) serve a population greater than 7,500, to provide a description of the specific activities, along with a five-year schedule to implement several additional conservation measures.

The Port's service areas do not include any residential populations and the Port does not serve any water for residential or potable purposes. Consequently, there is not a "population" that is served by the Port, and accordingly, this WMCP does not provide an estimate of the population served. The Port proposes to expand or initiate the diversion of water under extended permits S-51547 and G-13093, and resource issues have been identified for extended permit S-51547. Given the Port's unique situation in regards to population and plans for its extended permits, the Port is providing discussions regarding the following activities and five-year benchmarks related to the following additional measures:

- Technical and financial assistance programs
- Supplier financed retrofit or replacement of inefficient fixtures
- Rate structure and billing practices that encourage conservation
- Water reuse, recycling, and non-potable opportunities
- Other conservation measures

A summary of the Port's five-year benchmarks for additional conservation measures is provided below.

3.5.1 Technical and Financial Assistance Programs

OAR 690-086-0150(5)(a)

The Port works with maintenance crews to refine irrigation timing and locations to minimize water lost due to inefficiencies. The Port is seeking to expand the non-potable water system in its service areas to encourage conservation of the public drinking water supply.

Five-Year Benchmarks: The Port will continue to offer technical assistance to industrial non-potable water customers to help reduce their water consumption. When the Port is able to participate in the development of a new Port facility and/or when customers share information about ongoing operations with the Port, the Port will provide water conservation technical assistance to the customer.

3.5.2 Supplier-financed Retrofitting or Replacement of Inefficient Fixtures

OAR 690-086-0150(5)(b)

The Port has not provided water-efficient fixtures to industrial customers to date given the lack of non-potable industrial water customers, but in Port-owned buildings the Port has replaced employee restroom fixtures with low-flush toilets and automatic faucets and also included instructions that help to minimize water use.

Five-Year Benchmarks: The Port will continue to consult with industrial non-potable water customers to identify potential water-saving fixtures.

3.5.3 Rate Structure and Billing Practices that Encourage Conservation

OAR 690-086-0150(5)(c)

As previously described, the Port has established individualized water rates for its customers receiving non-potable water supply, which consists of a base rate to cover administration costs plus a commodity rate based on the quantity of water metered at the service connections. The Port recognizes that before non-potable water is supplied to potential commercial and industrial users, a rate structure should be established that encourages use of non-potable water for appropriate uses (to help ease pressure on potable water supplies) while also encouraging efficient use of this water.

The Port bills water customers monthly to provide timely water consumption feedback. Methods of billing by the Port vary, which makes including water conservation messages in water bills difficult to manage. Consequently, the Port encourages its customers to conserve water through its public education program, as described above.

Five-Year Benchmarks: The Port will continue to charge water customers based, at least in part, on the quantity metered at the service connections. The Port will continue to bill customers on a monthly basis.

3.5.4 Reuse, Recycling, and Non-potable Water Opportunities

OAR 690-086-0150(5)(d)

The Port serves non-potable water in the Rivergate Industrial District, Gresham Vista Business Park, Troutdale Reynolds Industrial Park, and PDX/PIC, which reduces demands on the potable water supply systems in these areas. The Port is actively seeking to expand its non-potable water supply systems in these areas. The Port has conducted a survey of all non-potable water used in the PDX/PIC service area that will help with planning the future development of the non-potable system. Future wells have been planned for areas of PDX and PIC that show the highest potential for non-potable water demand. As part of its ongoing Water Conservation Strategy work, the Port continues to look for opportunities where a parallel non-potable water system could become a viable alternative to potable water consumption for certain water uses within each of its service areas and developments.

In addition, the Port operates a Living Machine® system at Port Headquarters that previously recycled wastewater onsite but will soon recycle stormwater instead for reuse in the building's toilets. The Port is no longer using treated wastewater due to clogging in internal pipes and is currently in the process of converting the system to a stormwater collection system.

Five-Year Benchmarks: The Port will continue to actively seek opportunities to provide industrial users with non-potable water.

3.5.5 Other Activities

OAR 690-086-0150(5)(e)

As previously described, the Port's overall water management and conservation strategy has been to acquire and develop water rights intended to help meet non-potable water demands to reduce demands on the Bull Run drinking water supply. In addition, the Port has undertaken several other landscape water conservation measures at many of its properties, such as: replacing vegetation with native plants requiring less water and amending the soil at new planting sites to enhance water retention; replacing some sprinkler irrigation systems with drip irrigation systems, though additional drip irrigation systems will not be installed due to maintenance issues; and the Port's Properties Maintenance staff adjusts irrigation watering times to avoid overwatering landscapes and has installed a Rain Bird Maxicom® central irrigation control system at PDX to further reduce water consumption. Furthermore, Port staff monitors Port irrigation systems for signs of leaks and makes an effort to address any notable leaks discovered. The Port also has a new QTA car wash designed for approximately 33 percent water savings compared to traditional car wash designs. Furthermore, the new QTA car wash utilizes rainwater harvested from the QTA parking deck and supplemental non-potable water from PDX Well 2.

Five-Year Benchmarks: The Port will continue its strategy of developing its non-potable water rights to reduce demand on drinking water supplies. The Port will continue to implement landscape water conservation measures. Within five years of WMCP approval, the Port will revise specifications for both maintenance and new construction projects to maximize water efficiency, such as installing low-flow fixtures at PDX.

4. Water Curtailment

This section of the Port's updated WMCP describes the Port's water curtailment program and related information, including an assessment of water supply; a description of proposed stages of alert, triggers, and curtailment actions to be undertaken by the Port in the event of water shortage. The content of this section fulfills the requirements specified in OAR 690-086-0125(3) and OAR 690-086-0160.

4.1 Purpose of Curtailment Program

The Port began formulating a water curtailment plan during the mid-1990s after experiencing water use restrictions that were required by the City of Portland during the summer of 1992 (an unusually dry year during which the Governor of Oregon declared a drought emergency in Multnomah County). Because the Port did not require potable water to meet its irrigation and industrial needs, the Port applied for and obtained an Emergency Use Permit to enable it to divert non-potable water from the Willamette River and Columbia River to continue its water-dependent activities. The Port used non-potable water at PDX/PIC and the Portland Shipyard at Swan Island during the summer of 1992 drought. From this turn of events, the Port concluded that the use of non-potable water rather than drinking water is preferable from an environmental and water conservation standpoint. As a result, the Port, with support from the City of Portland, secured surface water rights from the Willamette River and Columbia River for the purpose of developing a non-potable water supply that reduces demand for city-supplied water.

The overall purpose of the Port's water curtailment plan for its non-potable water supply system is to specify processes for the Port to implement in order to respond to a drought or other water supply shortage that reduces non-potable water supplies. Specifically, the curtailment plan is intended to describe the activities that the Port will conduct to reduce the use of Port-supplied non-potable water in its service areas in the event of a short-term or long-term reduction in non-potable water supply.

4.2 Assessment of Water Supply

OAR 690-086-0160(1)

OAR 690-086-0160(1) requires a water supplier to describe the type, frequency, and magnitude of supply deficiencies within the past 10 years, and current capacity limitations. The description is expected to include an assessment of the ability of the supplier to maintain delivery during long-term drought or other source shortages, such as those that could be caused by a natural disaster (for example, flooding or a large earthquake in the region), source contamination, transmission system malfunctions, legal restrictions on water use, or other circumstances.

The Port's non-potable water supply system is still under development, and historically has not experienced any capacity problems arising from structural or natural limitations, or demand pressures in the past 10 years.

The water supply capacity for each Port water service area is currently limited by:

- PDX/PIC – Lack of infrastructure.
 - The Port has installed non-potable water lines serving a rental car facility (QTA) and will build additional infrastructure to suit new customers.
- Swan Island Business Park – Lack of infrastructure.
 - The Port will build infrastructure to suit new customers.
- West Hayden Island – No infrastructure.
 - The Port will build infrastructure to suit new customers.
- Rivergate/T4/T5/T6 – Lack of infrastructure.
 - The Port needs to install new POAs and PODs or interconnect non-potable water infrastructure.
- GVBP – Lack of infrastructure.
 - The Port will build infrastructure to suit new customers.
 - For the surface water rights at GVBP, the live flow is insufficient to meet the authorized rate under the water rights, but the combination of live flow and stored water from the reservoir do provide an adequate and reliable water supply for the Port. These water rights depend on precipitation and may be vulnerable to drought conditions.
- TRIP/TTD– Lack of Infrastructure.
 - The Port will build infrastructure to suit new customers.
 - For TRIP, infrastructure will be limited by groundwater remediation activities. System expansion will need to comply with regulatory restrictions on use of groundwater.

The most likely cause of a future reduction in non-potable water supply is a system failure at the water source or in the distribution system (in the form of mechanical, electrical, or transmission malfunctions). Disruption of non-potable water service also could occur because of an earthquake, flooding (such as a Columbia River levee break), a power outage, a fire, water supply contamination, or an intentional act, such as terrorism. As discussed in Section 2.5, the Port considers its Columbia River and Willamette River surface water supply and groundwater supply to be reliable and adequate. While the Port's ability to physically divert surface water could theoretically be impaired if river flows are severely low, this situation is unlikely given that historical flows in the Columbia River and Willamette River have been more than adequate.

In the event of a reduction in non-potable surface water supplies, the Port would rely on a combination of withdrawals from its groundwater sources, curtailment of nonessential water uses (as described below), and use of City of Portland potable water as a backup water supply to

maintain water delivery for industrial users and other critical uses, to the extent feasible. In the event of a reduction in groundwater supplies, the Port would rely on withdrawals from surface water sources, curtailment of nonessential water uses, and use of City of Portland potable water as a backup water supply.

4.3 Description of Curtailment Program

OAR 690-086-0160(2); OAR 690-086-0160(3); OAR 690-086-0160(4)

The Port’s water curtailment program has three stages of alert, with increasing severity:

- Stage I (Water Alert Status)
- Stage II (Serious Water Shortage)
- Stage III (Emergency Water Supply Shortage).

The Port’s three curtailment stages and their potential initiating conditions (i.e., triggers) are detailed in Exhibit 4-1. Implementation of a curtailment stage is triggered by conditions causing or having the potential to cause a water supply shortage. As discussed in Section 4.2, the Port’s ability to provide non-potable water potentially could be affected by the following: pumping and conveyance system failures, earthquakes, flooding (such as a Columbia River levee break), a power outage, a fire, an intentional malicious act, severely low river flows, contamination in the river water or in a wellfield, and a regulatory action that limits the amount of water the Port can obtain from its sources. The curtailment stages include both voluntary and mandatory rationing, and the type of rationing depends on the cause, severity, and anticipated duration of the water shortage. The Port may also determine that water curtailment is only needed for certain Port service areas.

Exhibit 4-1. Water Curtailment Stages and Potential Initiating Conditions.

Water Curtailment Stage	Potential Initiating Conditions
Stage I: Non-potable Water Alert	Short-term reduction in non-potable water supply system capacity is anticipated as a result of a natural or human-caused event (e.g., minor water system damage and minor mechanical problems)
Stage II: Serious Non-potable Water Shortage	Unanticipated significant short-term reduction in non-potable water supply system capacity is experienced as a result of a natural or human-caused event (e.g., minor contamination of a water source, major water system damage, and major mechanical problems) or the Port expects that an anticipated short-term reduction in non-potable water supply system capacity will become longer-term.
Stage III: Emergency Shortage of Non-potable Water Supply	The Port’s system is unable to meet a substantial part of its non-potable demands for any reason, including a major infrastructure failure and source water contamination, in one or more of the six Port service areas.

However, most non-potable water uses have a backup connection to City of Portland potable water supply. In the event that the Port needs to curtail when the City of Portland is not under curtailment, the Port intends to switch to using City of Portland potable water until the issue is resolved, except the Port may choose not to use potable water for nonessential water uses (e.g., irrigation). If the City of Portland is in curtailment, the Port will also need to go into curtailment.

In addition, these non-potable water supply curtailment stages will be triggered independently of the availability of potable water supplies. For example, a short-term emergency shortage in the City of Portland potable water supply (e.g., a landslide that disrupts the delivery of surface water from the Bull Run watershed) would trigger the Port's curtailment plan for potable water use, but would not trigger the Port's curtailment plan for non-potable water. Furthermore, the Port's non-potable water supply system may become a key source of water to certain Port properties during curtailment of City-provided potable water supplies. For example, PDX Well 2 could be used as a source of emergency drinking water supply.

Authority and Enforcement

The Port's business line manager and facilities manager jointly have the authority to declare a stage of water curtailment and to choose the voluntary and/or mandatory actions to curtail water use. Port staff will carry out enforcement of mandatory curtailment measures, which could include fines and/or suspension of water service.

4.4 Curtailment Plan Implementation

OAR 690-086-0160(4)

4.4.1 Stage I: Non-potable Water Alert

A Stage I Water Alert Status will be activated by the Port for a non-potable water system if a short-term reduction in non-potable water supply system capacity is anticipated as a result of a natural or human-caused event. Stage I will apply to the non-potable water service area(s) containing the affected source of non-potable water supply. Stage I will involve measures to encourage voluntary reductions in non-potable water use by all Port operations and industrial and commercial customers of Port service areas. The Port's business line manager and facilities manager will issue written correspondence to the tenant non-potable water users and Port non-potable water users, respectively, requesting voluntary reductions in water use. The written correspondence will include a summary of the current water situation, the reason for the requested cutback in use, and a warning that mandatory cutbacks may be required if the water supply reduction becomes longer-term or more severe.

4.4.2 Stage II: Serious Non-potable Water Shortage

A Stage II Serious Non-potable Water Storage Status will be activated by the Port for the non-potable water system if an unanticipated significant short-term reduction in non-potable water supply system capacity is experienced as a result of a natural or human-caused event or the Port expects that an anticipated short-term reduction in non-potable water supply system capacity

will become longer-term. Stage II will apply to the non-potable water service area(s) containing the affected source of non-potable water supply.

Specific curtailment measures for non-potable water usage under Stage II will include the following:

1. Use of non-potable water to irrigate lawns, grass, turf, and other groundcover will be reduced or curtailed unless:
 - It is a new planting that has been seeded by March 1 of the calendar year in which any restrictions are imposed, and in such cases, it may be watered as necessary until established; or
 - It is a landscaped or commercial use area deemed by the Port to be of a particular significance and value to the community that would warrant exception to the curtailment; or
 - Potable water supplies are available and have not been curtailed.
2. Use of non-potable water for washing, wetting down, or sweeping areas will be reduced or curtailed unless:
 - A need to continue the activity in order to meet public health or safety is demonstrated;
 - The curtailment or elimination of the activity would jeopardize the overall operation of the water user; or
 - Potable water supplies are available and have not been curtailed.
3. Use of non-potable water for washing cars, trucks, trailers, tractors, or other types of equipment will be reduced or curtailed unless:
 - The activity is part of a commercial establishment or fleet washing facility that recycles or reuses the water in its washing process;
 - The curtailment or elimination of the activity would jeopardize the overall operation of the water user; or
 - Potable water supplies are available and have not been curtailed.

4.4.3 Stage III: Emergency Shortage of Non-potable Water Supply

A Stage III Emergency Shortage of Non-potable Water Supply Status will be activated by the Port for the non-potable water system if the system is unable to meet a substantial part of its non-potable demands for any reason, including a major infrastructure failure and source water contamination, in one or more of the six Port service areas. Under this scenario the following actions will be implemented in the non-potable water system service area(s) affected by the shortage:

1. All landscape irrigation and other nonessential uses of non-potable water will be prohibited, unless potable water supplies are available and have not been curtailed.
2. Additional restrictions on non-potable water use will be implemented, if necessary. Such restrictions could include rationing of non-potable water and/or loss of non-potable water service on some Port properties, as appropriate.

4.5 Drought Declaration

In the event that the Governor of Oregon issues a drought declaration affecting the Portland metropolitan area, the Port will encourage voluntary reductions in non-potable water use by all Port operations and industrial and commercial customers of Port service areas, even if the declared drought does not appear to have affected the Port's water supply sources. The Port's business line manager and facilities manager will issue written correspondence to the tenant non-potable water users and Port non-potable water users, respectively, describing the current water situation and requesting voluntary implementation of indoor and outdoor water conservation measures that reduce nonessential water use.

5. Water Supply

This section of the Port's updated WMCP presents 10-year and 20-year forecasts of future demands for non-potable water in the Port's six service areas; compares the 20-year demands with the Port's non-potable water sources; identifies additional water volumes that the Port requests be authorized ("green light water" under existing extended permits); and discusses source alternatives for meeting the projected demands. This section satisfies the requirements of OAR 690-086-0170.

5.1 Delineation of Service Areas

OAR 690-086-0170(1)

The Port's six non-potable water system service areas encompass several discreet areas owned, maintained, or managed by the Port within the Cities of Portland, Troutdale, and Gresham. These areas include facilities where the Port currently provides non-potable water or will provide this water in the future, such that the Port's current and future (for the 20-year planning horizon of this WMCP) non-potable water service areas are the same. Exhibits 2-1 through 2-5 show the Port's current and future non-potable water service areas.

5.2 Population Projections

OAR 690-086-0170(1)

Given that the Port only supplies non-potable water to commercial and industrial customers (so the Port does not serve any water for residential or potable purposes), developing population projections is not applicable. Furthermore, the projected number of employees in the Port's water service areas does not have a bearing on projected non-potable water demands in the Port's service areas.

5.3 Demand Forecasts, Schedule to Exercise Permits, and Comparison of Projected Need to Available Sources

OAR 690-086-0170(3), OAR 690-086-0170(2), and OAR 690-086-0170(4)

The Port secured water rights specifically to develop non-potable water systems for its major industrial properties. The water rights permits were issued with the understanding that development of the non-potable water systems would be completed in phases, given both the sizes of the projects and their close relationship to the economic market conditions and corresponding water demands. Although some elements of the non-potable water supply systems have been completed, a significant portion of the overall system remains in the conceptual phase, particularly in the Port's industrial parks. The pace of system development and fully applying water to beneficial use was affected by the slowdown in economic growth during much of the past decade, which impacted the number of industries moving to the City of

Portland as well as decreased the growth rate of water demands. The Port continues to operate under a phased approach for developing the non-potable systems, and through its long-term planning and marketing efforts, has identified and currently is pursuing several potential users of non-potable water in its various industrial districts. The Port will facilitate development of non-potable water system infrastructure to suit the needs of future industrial customers.

The following describes the non-potable water demand projections, including assumptions, for each of the Port’s six non-potable water system service areas. Non-potable water demand projections were developed for peak-day demand conditions to reflect the anticipated supply capacity needs of the non-potable water supply system. These projections utilize demand per acre factors from the Port of Umatilla’s 2015 WMCP, a marine industrial demand per acre factor estimated by the Port of Portland based on historical data (2 gpm/acre; see page 5.2.5 in the 2009 WMCP), and an industrial demand per acre factor based on the historical demand data of a current food processor at the Port. This industrial (food processor) demand per acre factor was equivalent to the warehouse/manufacturing factor from the Port of Umatilla WMCP. These industrial demand per acre factors include potential minor outdoor irrigation by an industrial user. Exhibit 5-1 presents the demand per acre factors used in the demand projections.

Exhibit 5-1. Summary of Demand per Acre Factors

Type of Demand	Demand per Acre Factor (mgd/acre)	Source
Large Industrial	0.19	Port of Umatilla 2015 WMCP
Marine Industrial	0.00228	Port of Portland 2009 WMCP
Light assembly/office/service business users	0.001	Port of Umatilla 2015 WMCP
Warehouse/manufacturing	0.02	Port of Umatilla 2015 WMCP
Food processing	0.02	Port of Portland, 2018

5.3.1 PDX/PIC

The Port plans to expand non-potable water infrastructure within the PDX/PIC service area to accommodate improvements at the terminal and its vicinity and to meet irrigation needs. The PDX/PIC non-potable water service area encompasses approximately 3,971 acres in Northeast Portland, adjacent to the Columbia River and west of Interstate 205 (I-205). Conceptual-level planning for the overall non-potable water system at PDX and PIC was completed in 1999, but the system has not yet been fully developed. The Port’s development plans at PDX and PIC have significant internal guidelines that (1) seek to reserve the future developable land for business requiring transportation or airport access, and (2) incorporate Federal Aviation Administration (FAA) restrictions. Land use restrictions and the slowdown in the economy during much of the past decade have affected the pace of commercial development and the associated demands for non-potable water. However, with the improved economy in the past couple of years, the Port expects development to improve.

The Port projects that non-potable water demand at PDX/PIC will reach 2.01 cfs (1.30 mgd) in 2028 and 2.63 cfs (1.70 mgd) in 2038. To develop these demand projections, the Port combined separate projections developed for PDX and PIC. The distinct differences in current and future water demands of PDX and PIC led the Port to develop separate projections, which are described below.

- **Portland International Airport (PDX)**

PDX consists of aviation facilities and aviation support services. From 2007 through 2010, the Port participated in a collaborative process called Airport Futures in which the Port of Portland, the City of Portland, and the Portland-Vancouver metropolitan community created a long-range (through 2035) master plan for PDX and a City land use plan governing the PDX and its environs. This process reinforced the strong planning legacy of the participants and PDX's reputation as one of the premier airports in the country, as well as emphasized sustainability as a core theme. Since then, the Port has been taking steps to supply non-potable water for such uses as rental car washing at the QTA, irrigation, fire suppression, terminal restrooms, and vehicle washdown uses that would occur outside the airport terminal. The new QTA facility is completed and began operation in 2018. PDX Next projects (a series of large construction projects that will make the airport better for travelers, airlines, and employees) include redevelopment of restroom facilities and potentially other non-potable uses related to terminal expansion projects. A Master Plan for the PDX Maintenance facility (MDX) is being developed and the Port is exploring the potential for new non-potable water uses. In addition, locations such as the Aircraft Rescue and Fire Fighting (ARFF) Facility and deicing facility have proposed well sites. Furthermore, the Port sees opportunities to convert current industrial and commercial customers outside of the terminal to non-potable water and to meet ongoing construction activity and dust control water needs with non-potable water, both of which will be pursued where practical and economically feasible. Consequently, the Port expects considerable growth in non-potable water demands to occur at PDX over the next 20 years.

The Port projects that non-potable water demand at PDX will reach 0.48 cfs (0.31 mgd) in 2028 and 0.59 cfs (0.38 mgd) in 2038. To develop these projections, the Port calculated the 2017 annual consumption for uses that could be served non-potable water in the future: the Central Utility Plant (CUP), QTA, terminal restroom toilets, PDX terminal maintenance facility (MDX), Aircraft Rescue and Fire Fighting (ARFF), rental car staging lot, construction staging, transit bus service lot, and deicing tank area, as well as water consumed during construction within PDX and water consumed by industrial and commercial customers outside the terminal that could potentially use non-potable water. The Port anticipates that the CUP, QTA, and terminal restroom toilets will be served with non-potable water by 2028 and that projected demand by these uses will increase as the number of airline passengers grows at PDX. Consequently, the Port applied the growth rate of 2.75 percent to the 2017 baseline consumption values for CUP, QTA, and terminal restroom toilets to calculate projected demands in 2028 and 2038. Exhibit 5-2 shows 2017 consumption values for PDX water uses and Exhibit 5-3 shows projected annual

volume demands for PDX water uses. The 2.75 percent growth rate is based on the increase in number of airport passengers from 2013 through 2017. The Port assumed that the water needs of the others uses would remain at 2017 levels, so the Port estimated the projected demands for these uses to be equivalent to their 2017 consumption. However, the Port only used 95 percent of 2017 consumption at MDX to represent projected demand due to some water uses that cannot convert from potable to non-potable, such as uses in showers and breakrooms.

Exhibit 5-2. Consumption in 2017 and Demand Projections Approach by PDX Water Use.

PDX Water Uses	2017 Total Consumption (MG)	Demand Projections Approach
CUP	9.7	Numbers Grown by 2.75%
QTA	11.1	
Terminal Restrooms (toilets only)	10.0	
PDX Construction in 2017	2.7	Numbers Kept Static
Other (including MDX, ARFF, Rental Car Staging Lot, General Construction, Transit Bus Service Lot, Deicing Tank Area)	5.5	
PDX Tenant Demand	6.3	

Exhibit 5-3. Projected Annual Volume Demand in 2028 and 2038 by PDX Water Use.

PDX Uses	Demand in 2028 (MG)	Demand in 2038 (MG)
Passenger-dependent Demands (CUP+QTA+Terminal Restrooms)	41.7	54.9
PDX Construction	2.7	2.7
Other (including MDX, ARFF, Rental Car Staging Lot, General Construction, Transit Bus Service Lot, Deicing Tank Area)	5.5	5.5
Potential New Tenant Demands	6.3	6.3
Total	56.3	69.5

To estimate the projected demand as a rate, the Port divided the annual consumption volumes by 365 days to represent the projected ADDs and then multiplied the projected ADDs by a peaking factor of 2 to represent the projected MDDs, which is the peaking factor value that lies within the range of typical peaking factors for municipal water

providers in the region.

- Portland International Center (PIC)

PIC consists of mixed-use commercial and industrial areas located between PDX and I-205. Industrial development in PIC will be essentially complete after the current construction along Mt St Helens Road is complete, such that development in PIC will be limited and primarily for irrigation by commercial users, such as offices and distribution facilities in the only remaining parcels along Cascades Parkway. The acres reserved for aviation uses are likely to remain undeveloped beyond 2045, when the Rental Car services outgrow their new facilities and will be relocated to PIC. Accordingly, the Port expects growth to be primarily related to irrigation until after 2045.

The Port projects that non-potable water demand at PIC will reach 1.53 cfs (0.99 mgd) in 2028 and 2.04 cfs (1.32 mgd) in 2038. To develop these projections, the Port projected that the irrigated acres would triple current acreage by 2028 and quadruple current acreage by 2038, and as such, multiplied the 2017 ADD during the irrigation season (assuming 92 days in length) of approximately 0.33 mgd by those factors.

The Port intends to use the following water rights and rates of appropriation to meet the projected non-potable water demand at PDX/PIC of 2.63 cfs (1.70 mgd) in 2038: up to 1.19 cfs under Permit G-17888 (The Port has fully developed Permit G-17888 and has submitted a Claim of Beneficial Use.), up to 0.22 cfs under Permit G-10967 (by October 1, 2030 in accordance with the final order for the extended permit; this permit for irrigation use does not have a WMCP requirement nor limitation on the amount that can be diverted⁴), and 1.22 cfs under Transfer T-12482. Exhibit 5-4 presents the water rights that the Port intends to use to meet projected demands at PDX/PIC in 2038.

Exhibit 5-4. Water Rights Needed To Meet Projected Demands at PDX/PIC in 2038.

Water Right	Projected Rate of Use (cfs)	Comments
Permit G-17888	1.19	The Port has fully developed the permit and will has submitted a Claim of Beneficial Use.
Permit G-10967	0.22	
Transfer T-12482	1.22	
Total	2.63	

If the Port ultimately finds that it will not be able to fully develop Transfer T-12482 by October 1, 2037, then the Port will request an extension of time before that date.

⁴ The Final Order approving the Port's 2004 WMCP (dated August 11, 2004) approved diversion of water under Permit G-10967. However, the Port's understanding of the current administrative rules is that development limitations are not applied to water rights for irrigation use, such that the Port does not need to request access to "green light" water under *extended permit* G-10967. This conclusion appears to be supported by the lack of a requirement for a WMCP to gain access to water under *extended permit* G-10967 in the December 24, 2015 Final Order approving an extension of time for Permit G-10967.

As non-potable water demand in this area grows beyond the capacity of the Port's existing groundwater rights, the non-potable water system supplied by the Columbia River surface water right (Permit S-51547 modified by Transfer T-10656) will be used to meet a portion of this future demand.

5.3.2 Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island

Projected Demands

Given that the economy appears to no longer be in recession and to be growing quickly, the Port anticipates a development boom that will result in buildout of the Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island service areas in the next 20 years, which is based on their location in major transportation corridors, land availability, and sufficient water resources. Consequently, the Port projects that its non-potable water demand for the three service areas will reach 45.49 cfs (31.21 mgd) in 2028 and 58.40 cfs (37.75 mgd) in 2038. To develop these demand projections, the Port combined separate projections developed for Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island. Differences in current and future water demands of the service areas necessitated the development of separate projections while shared water rights across the service areas necessitated combining the separate demand projections. The demand projections for Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island are described below.

- **Swan Island Industrial District**

The Swan Island Industrial District non-potable water service area encompasses approximately 798 acres on the east side of the Willamette River north of the Fremont Bridge. The Swan Island Industrial District is mostly developed and includes commercial and industrial uses, such as warehousing and distribution facilities. The Portland Shipyard (Vigor Industrial) is included in the Swan Island Industrial District. The Port's existing non-potable water system at Swan Island supplies process water for the Portland Shipyard. This system is designed to meet the peak demands of the shipyard, which are approximately 4.68 mgd. Shipyard processes include fire protection for drydocks and for customer owned vessels, drydock washdown, and other ship yard activities not requiring drinking water. In addition, the Port recognizes that additional opportunities exist to expand the non-potable water supply system to meet commercial and industrial water demands throughout the Swan Island Industrial District, such as water demands for landscape irrigation, industrial processes, facility and vehicle washdown, and construction activities (including dust control).

The Port projects that non-potable water demand at Swan Island Industrial District will reach 7.58 cfs (4.90 mgd) in 2028 and 8.42 cfs (5.44 mgd) in 2038. These projections assume that the Portland Shipyard will meet its peak demand system capacity of 7.24 cfs (4.68 mgd) and the Port will serve additional new non-potable water demand to existing businesses that convert to non-potable water or redeveloped businesses, both of which may include some irrigation, which would consist of 20 acres (2.5 percent of the 798

acres) of warehouse and manufacturing users that have a water demand factor of 0.02 mgd/acre and 20 acres (2.5 percent of the 798 acres) of light assembly/office/service business users that have a water demand factor of 0.001 mgd/acre. The projection also assumes that 90 percent of total demand at Swan Island Industrial District will be met by 2028 and that 100 percent of total demand will be met by 2038.

- **Rivergate/T4/T5/T6**

The non-potable water service area for Rivergate/T4/T5/T6 encompasses approximately 5,229 acres at the confluence of the Willamette and Columbia rivers. Land uses in this service area include significant amounts of industrial land and marine terminal facilities. The Rivergate/T4/T5/T6 service area presents the greatest opportunity for development of a major non-potable water supply system to meet all of the non-potable water needs of the area, including on properties in Rivergate that are leased by the Port and owned by others. An existing non-potable supply system, which has been planned to be part of a larger future system, currently supplies water for some landscape irrigation needs along common area rights-of-way.

Future water demands for the undeveloped portions and the potential for redevelopment could vary significantly because of the wide range in the types of industrial customers that could move into the service area. In addition to the current industrial use of water at the Port's Dredge Material Rehandling Facility, future industrial water uses in the Rivergate/T4/T5/T6 service area include warehouse/distribution/manufacturing, marine industrial, light assembly/office/service business users, and large industrial.

The Port projects that non-potable water demand at Rivergate/T4/T5/T6 will reach 37.90 cfs (24.50 mgd) in 2028 and 47.38 cfs (30.63 mgd) in 2038. These projection assumes that:

- 39 acres (0.75 percent of the 5,229 acres) will serve large industrial users that have a water demand factor of 0.19 mgd/acre,
- 1,046 acres (20 percent of the 5,229 acres) will serve warehouse/manufacturing/food processing users that have a water demand factor of 0.02 mgd/acre,
- 784 acres (15 percent of the 5,229 acres) will serve marine industrial users that have a water demand factor of 0.00288 mgd/acre,
- 3,360 acres (64.25 percent of the 5,229 acres) will serve light assembly/office/service business users that have a water demand factor of 0.001 mgd/acre, and
- 80 percent of total demand will be met by 2028 and that 100 percent of total demand will be met by 2038.

- **West Hayden Island**

The Port owns 685 acres of the 780 acres of undeveloped land on the west end of West Hayden Island. Within this area, the Port has identified approximately 583 acres of property that are potentially developable as future marine terminal facilities. Non-

potable water demand at West Hayden Island will depend on the well-being of the economy, the type of water customers that occupy the property, and the timing of facility development of those customers. The Port assumes that any development on West Hayden Island may use the Port’s non-potable water supply to meet all non-potable water needs. The Port projects that demand for non-potable water at West Hayden Island will begin after 2028 and that 100 percent of total demand, being 2.6 cfs (1.7 mgd), will be met by 2038. This projection assumes that all 583 acres will serve marine industrial users that have a water demand factor of 0.00228 mgd/acre.

The Port intends to use the following water rights and rates of diversion/appropriation to meet the projected demands at Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island of 58.40 cfs in 2038: up to 2.23 cfs under Certificate 85688 to meet any Dredge Material Rehandling Facility demands, 33.53 cfs under extended permit S-51547, and 22.64 cfs under extended permit G-13093.

Exhibit 5-5 presents the water rights that the Port intends to use to meet projected demands at Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island in 2038. Although these surface water and groundwater rights have sufficient rates to meet those demand projections, the Port’s ability to access water under the water rights permits is currently restricted to the amount diverted to date and allowed under “green light” water authorizations in the Final Orders approving the Port’s 2004 and 2009 WMCP. To date, the Port has diverted up to 7.24 cfs under extended permit S-51547; therefore, the Port is requesting access to 26.29 cfs (33.53-7.24= 26.29) of “green light water” under extended permit S-51547 to meet projected demands. Currently, the Port does not have access to water under extended permit G-13093; therefore, the Port is requesting access to 22.64 cfs of “green light water” under extended permit G-13093 to meet projected demands.

Exhibit 5-5. Water Rights Needed To Meet Projected Demands at Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island in 2038.

Water Right	Projected Rate of Use (cfs)	Comments
Certificate 85688	2.23	
Permit S-51547	33.53	Requesting access to 26.29 cfs of “Green Light Water”
Permit G-13093	22.64	Requesting access to 22.64 cfs of “Green Light Water”
Total	58.40	

Assuming that the economy continues to grow and that new industrial and commercial customers with larger water demands will be added to the Port’s non-potable water system after 2038, the Port anticipates that extended permits S-51547 and extended permit G-13093 will be put to full beneficial use by October 1, 2044 in accordance with the final orders for the extended permits.

5.3.3 GVBP

GVBP has 361 acres available for development for such businesses as clean tech, manufacturing, food processing, logistics, professional services, and other traded sector companies that sell products and services globally. The Port is currently recruiting and seeking potential new industrial occupants. Non-potable water demand at GVBP will ultimately depend on the state of the economy, the type of non-potable water customers that occupy the property, and the timing of facility development of those customers. The Port assumes that any development at GVBP may include development of non-potable water supply to meet all needs not requiring potable water. Presently, non-potable water use at GVBP consists of crop irrigation by a tenant in the irrigation season. Future potential uses of Port-supplied non-potable water at GVBP include landscape irrigation, toilets, industrial processes, facility and vehicle washdown, food processing, and construction activities (including dust control).

The Port projects that non-potable water demand at GVBP will reach 0.92 cfs (0.59 mgd) in 2028 and 1.15 cfs (0.74 mgd) in 2038. These projections assume that 20 acres (6 percent of the 361 acres) will serve warehouse/manufacturing/food processing users that have a water demand factor of 0.02 mgd/acre and that 341 acres (94 percent of the 361 acres) will serve light assembly and other industrial users that have a water demand factor of 0.001 mgd/acre. The projection also assumes that 80 percent of total demand at GVBP will be met by 2028 and that 100 percent of total demand will be met by 2038.

The Port will meet the projected non-potable water demand at GVBP of 1.15 cfs in 2038 using a combination of its four surface water rights (Certificates 93760, 93761, 93762, and 93763) and one groundwater right (Certificate 93764), which authorize total diversions/appropriation of up to 1.263 cfs at GVBP (when the water rights are used in combination and within maximum volume limitations of the water rights). Although the live flow can be insufficient to meet the rate 1.263 (as described under water rights reliability in Section 2), the combination of live flow and stored water from the reservoir are expected to continue to provide enough water supply to meet the 1.15 cfs of projected demands. Given that the water rights are certificated, the Port has access to the entire rate under each water right.

5.3.4 TRIP/TTD

TRIP has 350 acres available for industrial/commercial uses. TRIP is located in the City of Troutdale with direct access to I-84 and close proximity to I-205 and the Portland International Airport (PDX), making it a prime location for industrial development. Based on the location of TRIP and available water rights, TRIP has potential for industrial development. The Port is currently recruiting and seeking potential new industrial occupants. Non-potable water demand at TRIP will ultimately depend on the state of the economy, the type of non-potable water customers that occupy the property, and the timing of facility development of those customers. The Port assumes that any development at TRIP may include development of non-potable water supply to meet all needs not requiring potable water. Future potential uses of Port-supplied non-potable water at TRIP include industrial processes (ranging from large to light industrial), landscape irrigation, toilets, facility and vehicle washdown, and construction activities (including dust control).

The Port projects that non-potable water demand at TRIP will reach 29.4 cfs (19.0 mgd) in 2028 and 32.6 cfs (21.1 mgd) in 2038. These projections assumes that 90 acres (26 percent of the 350 acres) will serve large industrial users that have a water demand factor of 0.19 mgd/acre, 200 acres (57 percent of the 350 acres) will serve warehouse/manufacturing/food processing users that have a water demand factor of 0.02 mgd/acre, and that 60 acres (17 percent of the 350 acres) will serve light assembly and other industrial users that have a water demand factor of 0.001 mgd/acre. The projection also assumes that 90 percent of total demand at TRIP will be met by 2028 and that 100 percent of total demand will be met by 2038.

The Port plans to meet the projected non-potable water demand at TRIP of 29.4 cfs (19.0 mgd) in 2028 and 32.6 cfs (21.1 mgd) in 2038 using the Port's groundwater rights of up to 32.6 cfs under Groundwater Registrations GR-462 and GR-1441. The Port's plan to use its groundwater rights to meet the TRIP demand projections assumes that the Port can work within the restrictions put on the groundwater rights for remediation of fluoride contamination. If water delivery cannot be achieved within the restrictions when the Port needs access to the water supply, then the Port will reconsider its water supply options for TRIP.

TTD is a general aviation facility that serves as a base for recreational pilots, flight training, and some specialized aviation service businesses, and as a regional reliever airport as described in Section 2. The 2016 TTD Master Plan projected modest growth in operations (approximately 6 percent) over the next 20 years, but a slight decline in the number of based aircraft due to changes in the general aviation and flight training industries. Planned development includes reconstruction and reconfiguration of the runway starting in 2021, which will accommodate 99 percent of current airport operations. Longer term development over the next 20 years will see consolidation of aviation uses on the south side of the airport and the north side land will then transition to non-aeronautical industrial uses to provide regional employment and generate revenue to support airport operations. Future potential uses of Port-supplied non-potable water at TTD include landscape irrigation, toilets, industrial processes, facility and vehicle washdown, and construction activities (including dust control). Development envisioned at TTD is not expected to significantly change current water usage patterns.

The Port projects that non-potable water demand at TTD will be 0.020 cfs (0.013 mgd) in both 2028 and 2038. The projection assumes that TTD will continue to maintain the 2017 ADD over the next 20 years and that 90 percent of that ADD will be supplied using non-potable water by 2028. The Port will meet the projected non-potable water demand of 0.020 cfs (0.013 mgd) in both 2028 and 2038 at TTD using some of the TRIP groundwater rights of up to 32.6 cfs under Groundwater Registrations GR-462 and GR-1441. Similar to the plan for TRIP, the Port's plan to use its groundwater rights to meet the TTD demand projections assumes that the Port can work within the restrictions put on the groundwater rights for remediation of fluoride contamination. If water delivery cannot be achieved within the restrictions when the Port needs access to the water supply, then the Port will reconsider its water supply options for TTD.

5.4 Analysis of Source Alternatives

OAR 690-086-0170(5)

OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet future water demand. The Port intends to expand diversion of water under Permit S-51547 and Permit G-13093 to meet its future water demands as described above.

5.4.1 Conservation Measures

The Port has demonstrated a strong commitment to water conservation, as shown by the water management and conservation activities and benchmarks described in Section 3. Those activities are largely related to the Port's ambitious efforts to develop non-potable water supply systems throughout its service areas, thereby reducing demand for potable water from the City of Portland. As stated in the conservation benchmarks, the Port will encourage commercial/industrial water customers to use the non-potable water efficiently, but cannot depend on any significant reductions in non-potable water demand by the customers at this point. Consequently, the Port's projected demand for additional non-potable water supply over the next 20 years will not likely be met through non-potable water conservation.

5.4.2 Interconnections

The Port currently has no interconnections between its non-potable water systems and other municipal water supply systems, and no municipal supply systems with significant non-potable water supplies are in the area. The Port's current and anticipated water customers are expected to use the Port's non-potable water supply system to meet their demands while also maintaining interconnections with cities, which provide potable water within Port non-potable water system service areas, in case of emergencies. Industrial users commonly require that emergency water sources be in place in the event that the primary source is out of service. The Port also expects existing entities who now are using potable water from a city to maintain this connection after they connect to the Port's non-potable water system.

Thus, the Port cannot satisfy its demand for additional water under Permits S-51547 and G-13093 through interconnections given that: 1) potable water interconnections with cities are only intended to be used for emergencies, 2) the Port is endeavoring to reduce demand on potable water supplies by using non-potable water, and 3) no municipal supply systems with significant non-potable water supplies are in the area.

5.4.3 Cost Effectiveness

OAR 690-086-170(c) requires an assessment of whether the projected water needs can be satisfied through other conservation measures that would provide water at a cost that is equal or less than the cost of other identified sources.

As described above, conservation, regardless of cost, cannot meet the Port's demands for additional non-potable water supply. While conservation may slow the demands for additional water under Permits S-51547 and G-13093, it cannot feasibly satisfy projected demands.

5.5 Quantification of Projected Maximum Rate and Monthly Volume

OAR 690-086-0170(6)

OAR 690-086-0170(6) requires a quantification of the maximum rate of withdrawal and maximum monthly use if any expansion or initial diversion of water allocated under an existing permit is necessary to meet demands in the 20-year planning horizon.

Within the next 20 years, the Port is planning to need approximately 33.53 cfs under Permit S-51547 to help meet its projected water demands at Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island. Assuming that the water right is used at a rate of 33.53 cfs (21.67 mgd), 24 hours per day for 31 days during the maximum month (likely July or August), the maximum monthly volume for the water right would be approximately 672.7 MG.

Within the next 20 years, the Port is planning to need approximately 22.64 cfs under Permit G-13093 to help meet its projected water demands at Swan Island Industrial District, Rivergate/T4/T5/T6, and West Hayden Island. Assuming that the water right is used at a rate of 22.64 cfs (14.63 mgd), 24 hours per day for 31 days during the maximum month (likely July or August), the maximum monthly volume for the water right would be approximately 452.6 MG.

5.6 Mitigation Actions under State and Federal Law

OAR 690-086-0170(7)

Under OAR 690-086-0170(7), for expanded or initial diversion of water under an existing permit, the water supplier is to describe mitigation actions it is taking to comply with legal requirements of the Endangered Species Act, Clean Water Act, and other applicable state or federal environmental regulations. The Port currently is only required to take any mitigation actions under federal law at TRIP, where several wells associated with the former RMC water rights currently are being used to remediate groundwater contamination beneath this property. These remediation activities (Federal Superfund) are occurring with the oversight of the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality (ODEQ).

5.7 New Water Rights

OAR 690-086-0170(8)

Under OAR 690-086-0170(8), if a municipal water supplier finds it necessary to acquire new water rights within the next 20 years in order to meet its projected demand, an analysis of alternative sources of the additional water is required. The analysis must consider availability, reliability, feasibility and likely environmental impacts and a schedule for development of the new sources of water.

The Port does not intend to acquire new water rights to meet the non-potable water demands described above within the next 20 years. The Port is considering an open loop geothermal heating and cooling systems in redevelopment of PDX, but that system would be separate from the non-potable water systems required to meet the projected demands and would require new water rights for that beneficial use. Consequently, this rule does not apply.

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Appendix A

Letters Requesting Comments from Local Governments



Water Solutions, Inc.

February 12, 2019

Chris Scarzello
City of Portland, Bureau of Planning and Sustainability
1900 SW 4th Ave, Suite 7100
Portland, OR 97201
chris.scarzello@portlandoregon.gov

Subject: Water Management and Conservation Plan for the Port of Portland

Dear Mr. Scarzello:

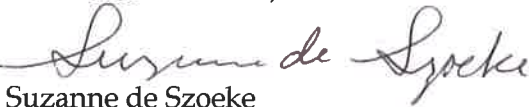
The Port of Portland (Port) has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier must make the Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the Port's Draft WMCP for your review.

Please provide comments within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comments to me at sdeszoeke@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9006 or sdeszoeke@gsiws.com. Thank you for your interest.

Sincerely,
GSI Water Solutions, Inc.


Suzanne de Szoeki
Water Resources Consultant

Enclosure



February 12, 2019

Chris Damgen, Senior Planner
Department of Planning and Community Development
City of Troutdale
2200 SW 18th Way
Troutdale, OR 97060
chris.damgen@troutdaleoregon.gov

Subject: Water Management and Conservation Plan for the Port of Portland

Dear Mr. Damgen:

The Port of Portland (Port) has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier must make the Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the Port's Draft WMCP for your review.

Please provide comments within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comments to me at sdeszoeke@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9006 or sdeszoeke@gsiws.com. Thank you for your interest.

Sincerely,
GSI Water Solutions, Inc.

A handwritten signature in cursive script that reads "Suzanne de Szoeki".

Suzanne de Szoeki
Water Resources Consultant

Enclosure



February 12, 2019

Amanda Lunsford
Department of Urban Design and Planning
City of Gresham
1333 N.W. Eastman Parkway
Gresham, OR 97030
Amanda.Lunsford@GreshamOregon.gov

Subject: Water Management and Conservation Plan for the Port of Portland

Dear Ms. Lunsford:

The Port of Portland (Port) has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier must make the Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the Port's Draft WMCP for your review.

Please provide comments within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comments to me at sdeszoeke@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9006 or sdeszoeke@gsiws.com. Thank you for your interest.

Sincerely,
GSI Water Solutions, Inc.

A handwritten signature in cursive script that reads "Suzanne de Szoeker".

Suzanne de Szoeker
Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 12, 2019

Michael Cerbone
Director, Land Use Planning Department
Multnomah County
1600 SE 190th Avenue
Portland, OR 97233
Michael.cerbone@multco.us

Subject: Water Management and Conservation Plan for the Port of Portland

Dear Mr. Cerbone:

The Port of Portland (Port) has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier must make the Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the Port's Draft WMCP for your review.

Please provide comments within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comments to me at sdeszoeke@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9006 or sdeszoeke@gsiws.com. Thank you for your interest.

Sincerely,
GSI Water Solutions, Inc.

Suzanne de Szoeki
Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 12, 2019

Elissa Gertler, Director
Metro, Planning and Development
Metro Regional Center
600 NE Grand Ave
Portland, OR 97232-2736
elissa.gertler@oregonmetro.gov

Subject: Water Management and Conservation Plan for the Port of Portland

Dear Ms. Gertler:

The Port of Portland (Port) has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier must make the Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the Port's Draft WMCP for your review.

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If you have any questions, please feel free to contact me at 541-257-9006 or sdeszoeke@gsiws.com. Thank you for your interest.

Sincerely,
GSI Water Solutions, Inc.

A handwritten signature in cursive script that reads "Suzanne de Szoek".

Suzanne de Szoek
Water Resources Consultant

Enclosure



March 3, 2020

Sarah Selden, Senior Planner
Department of Planning Services
City of Fairview
1300 NE Village Street
Fairview, OR 97204
seldens@ci.fairview.or.us

Subject: Water Management and Conservation Plan for the Port of Portland

Dear Ms. Selden:

The Port of Portland (Port) has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier must make the Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the Port's Draft WMCP for your review.

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If you have any questions, please feel free to contact me at 541-257-9006 or sdeszoeke@gsiws.com. Thank you for your interest.

Sincerely,
GSI Water Solutions, Inc.

A handwritten signature in cursive script that reads "Suzanne de Szoeki".

Suzanne de Szoeki
Water Resources Consultant

Enclosure



March 3, 2020

Department of Planning and Zoning
City of Wood Village
23335 NE Halsey
Wood Village, OR 97060
Building@WoodVillageOR.gov

Subject: Water Management and Conservation Plan for the Port of Portland

To whom it may concern:

The Port of Portland (Port) has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier must make the Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the Port's Draft WMCP for your review.

Please provide comments within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comments to me at sdeszoeke@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9006 or sdeszoeke@gsiws.com. Thank you for your interest.

Sincerely,
GSI Water Solutions, Inc.

A handwritten signature in blue ink that reads "Suzanne de Szoeker". The signature is written in a cursive style.

Suzanne de Szoeker
Water Resources Consultant

Enclosure