



# City of Pasco COMPREHENSIVE WATER SYSTEM PLAN



*murraysmith*



June 2018  
Revised January 2019

**COMPREHENSIVE WATER SYSTEM PLAN**

**FOR**

**CITY OF PASCO**

**JUNE 2018**

**REVISED JANUARY 2019**



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# Executive Summary

## **EXECUTIVE SUMMARY**

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### **ES.1 Introduction**

Located along the north shore of the Columbia River in Franklin County, the City of Pasco (City) is the major service center for the expanding agricultural industrial region of the Columbia Basin. This Comprehensive Water System Plan (CWSP) identifies the need for capital investment and summarizes those investments. The recommendations contained within this CWSP were developed to identify and address deficiencies within the supply, pumping, reservoir, and piping systems, with the ultimate goal of compliance with Washington Department of Health's (WDOH) regulations.

At the time of development of this CWSP, the City's population (2014) is 66,577, however the City's Water Utility currently provides water service to about 70,770 people, which includes areas outside the City limits within Franklin County.

#### ***ES.1.1 How This Plan Should Be Used***

This CWSP guides future system improvements, and should:

- Be reviewed annually to prioritize and budget improvement projects.
- Be updated every 10 years to address current conditions as required by WDOH.
- Have the system mapping and hydraulic model updated regularly to reflect ongoing development and construction.
- Have its specific project recommendations regarded as conceptual. The location, size, and timing of projects may change as additional site-specific details and potential alternatives are investigated and analyzed in the preliminary engineering phase of project design.
- Have its cost estimates updated and refined with preliminary engineering and final project designs.

#### ***ES.1.2 Purpose***

This CWSP provides a comprehensive update to the City's last CWSP developed in 2009 and amended in 2010. The planning period for this CWSP is 2022, 2027, and 2036. This CWSP presents the sources of information, methodology and key findings for each evaluation required to understand the hydraulics in the existing system, the expected growth, the projected demands in each planning horizon, and the performance criteria that dictate whether new infrastructure is required.

The proposed Capital Improvement Plan (CIP) is based on a number of technical evaluations with valuable input from the City's staff. This document describes and provides justification for each project in the CIP, including cost opinions and implementation timeframe. The

CWSP does not include an analysis of the City's water treatment plants (WTP), however it does provide the quantity and timing of supply required from those sources and a recommendation to complete a facility plan for the Butterfield WTP. The information presented in this CWSP and overall planning effort is subject to the quality of data available at this time.

### ***ES.1.3 Scope of Work***

The City selected Murraysmith, Inc. (Murraysmith) to update the 2009 Comprehensive Water System Plan. The CWSP is meant to act as a working document and tool for justifying improvements to the water system, while demonstrating the system's ability to meet WDOH requirements. The scope of work for this CWSP included the following major tasks:

- Evaluate the system performance under existing, 2022, 2027, and 2036 planning horizon conditions.
- Projections of annual average and peak water supply demands.
- Identification of existing and future water supply capacity.
- Development of a system-wide and comprehensive steady state water system model.
- Assessment of current and future drinking water quality regulations.
- Identification of current and projected deficiencies related to water supply, pumping, piping, and storage.
- Identify areas of deficient flow or pressure in the system through the 20-year planning period.
- Evaluation of fire flow availability under current and future conditions.
- Identification of discrete system improvements to correct current and anticipated deficiencies.
- Development of a comprehensive listing of proposed improvements.
- Summary of the financial program.
- Overview of the operations and maintenance program.

### ***ES.1.4 Organization of the CWSP***

This CWSP is organized into nine sections with an executive summary, as described in **Table ES-1**. Detailed technical information and support documents are included in the appendices.

**Table ES-1  
CWSP Organization**

Sections	Description
Executive Summary	Purpose and scope of the CWSP and summary of key components of each part of the plan.
1 – Water System Descriptions	Water system background with overview of the existing system, facilities, and other studies.
2 – Water Service Area and Planning Information	Description of the service area and service area agreements, and policies.
3 – Population and Water Demand	Population, customer, and water use projections to determine existing and future demands for each pressure zone.
4 – Water Supply Summary	Description of existing supply capacity, water rights, and water quality.
5 – Design and Construction Standards	Overview of system performance and design criteria.
6 – Water Distribution System Analysis	Discussion of approach to identify existing and future deficiencies and improvements.
7 – Capital Improvement Program	Improvement recommendations including cost opinions and timeframe for implementation.
8 – Financial Plan	Discussion of current and planned annual budgets, including summary of the 2015 water rate study to fund future capital projects.
9 – Operations and Maintenance Program	Describes current operations and maintenance procedures, summary of recommendations.

## ES.2 Existing Water System

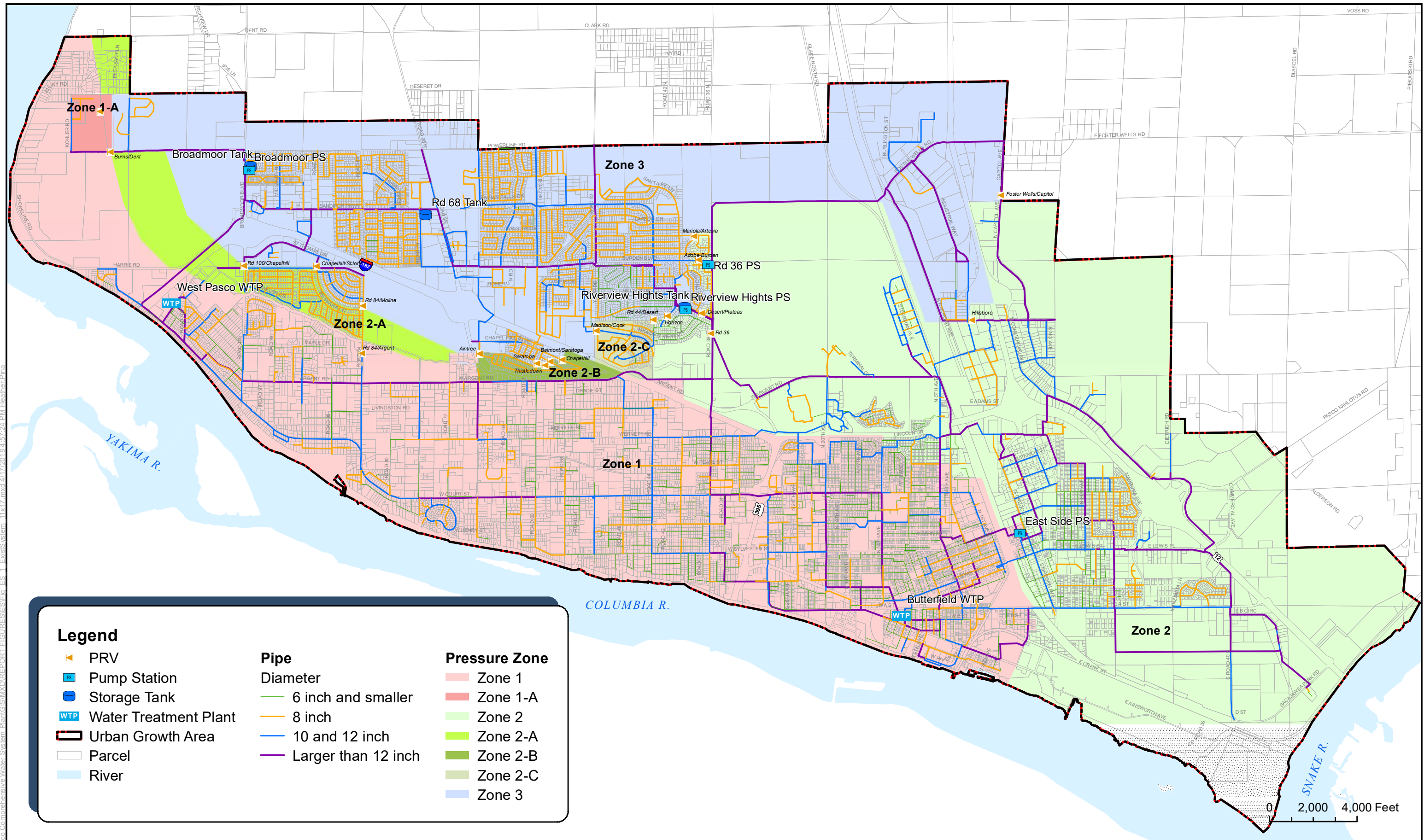
In 2017, the City’s water system inventory consisted of approximately 330 miles of piping, 6 booster stations, 3 reservoirs, 2 water treatment plants, and 20 pressure reducing valve (PRV) stations. **Figure ES-1** shows the existing system map. Service is presently provided to customers at a minimum elevation of 340 feet to a maximum elevation of 525 feet. The water system is divided into 3 large pressure zones to serve the range in service area elevations. The existing sources of supply are summarized in **Table ES-2**.

**Table ES-2  
Summary of Sources of Supply**

Source	Maximum Supply Capacity (mgd)	Comments
Butterfield WTP	26.8	The “reliable” capacity of 30 mgd is limited from by contact time, which is a result of services on the transmission main.
West Pasco WTP	6.0	Initial design capacity of 6 mgd – with ability to expand to 18 mgd.
<b>Total Supply Capacity</b>	<b>32.8 mgd</b>	

Note: mgd – million gallons a day

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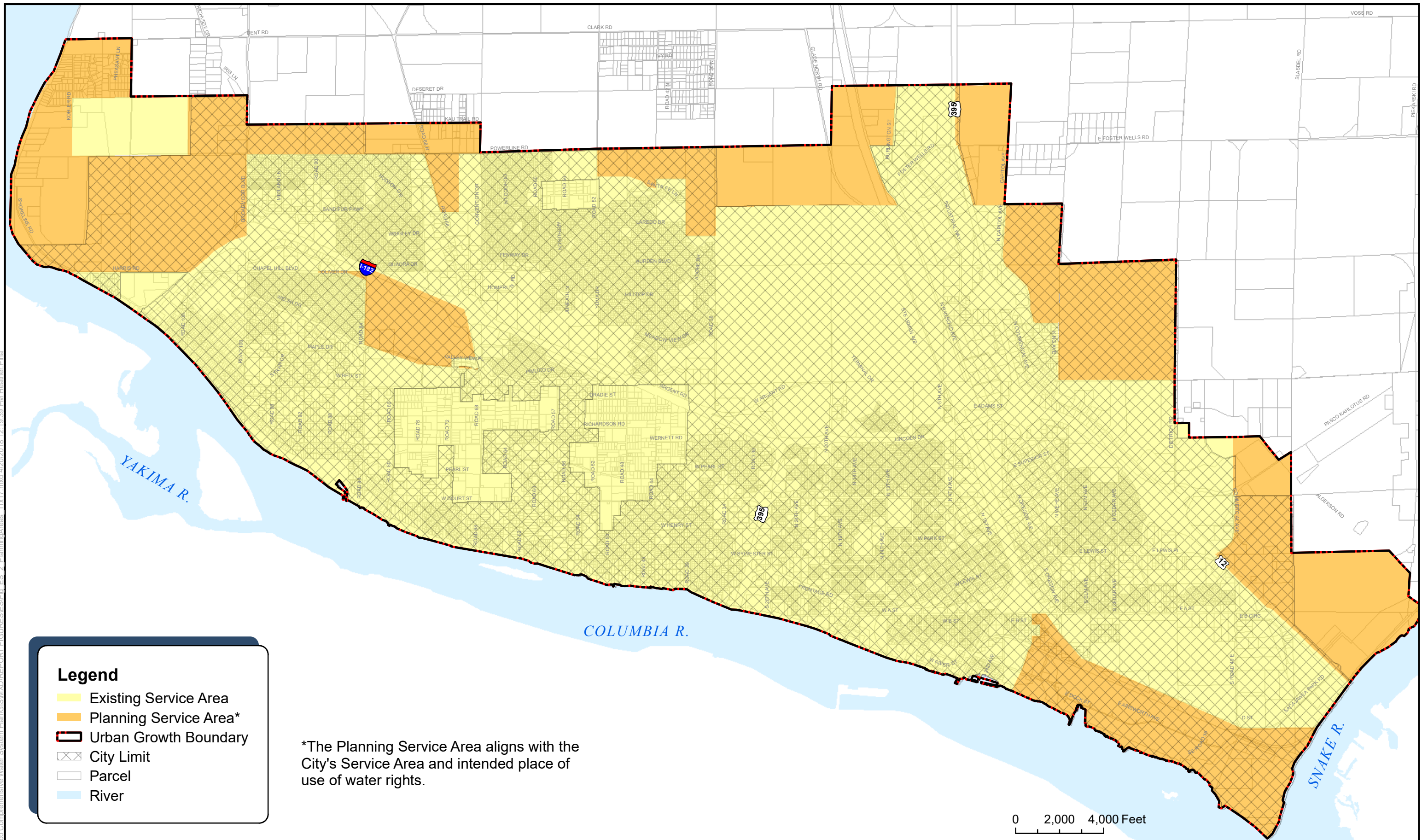
### ***ES.2.1 Irrigation System***

The City also owns and operates a non-potable water utility that provides irrigation water to residential customers and a limited number of commercial customers in the northwest part of the City. The irrigation system serves approximately 6,890 residential accounts and 39 commercial and public facility accounts. Providing a system for irrigation water separate from the drinking water utility allows the City's customers to avoid using treated drinking water to irrigate. Where non-potable irrigation is available per customer potable water use is much lower on average as discussed in **Section 3 - Population and Water Demand**.

### **ES.3 Water Service Area and Planning Information**

The City's existing water service area is described in detail in **Section 2 - Water Service Area and Planning Information**. The current water system service area is approximately 19,160 acres. This includes acreage within the City limits and some unincorporated areas within Franklin County. The planning service area corresponds to the City's 20-Year UGB (Urban Growth Boundary). The UGB was developed by the City through its Community Development Department, Planning Commission, and City Council with benefit of both citizen input and review, and has been approved by Franklin County. The planning service area is approximately 25,600 acres and is presented in **Figure ES-2**.

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## Comprehensive Water System Plan Update City of Pasco



Figure ES-2  
Planning Areas

## ES.4 Population and Water Demand

The City's water system service area goes beyond the existing City limits, including unincorporated areas within the UGB. The 2014 population for the existing water service area was approximately 70,770. At this time, the City's water system serves approximately 82 percent of the Franklin County population. The projected population for the 2036 City Water Service Area is 112,200, representing an increase of 70 percent from 2014.

**Table ES-3** shows the annual water production and average and maximum water usage for 2008-2014; this information was used to develop demands for system analysis.

**Table ES-3**  
**City of Pasco Total Annual Water Usage**

Year	Total Raw Water Produced (MG)	Total Net Water (MG) <sup>1</sup>	Average Water Usage (mgd) <sup>2</sup>	Maximum Water Usage (mgd) <sup>3</sup>	Maximum/Average Water Usage Peaking Factor
2008	4,227	4,215	11.5	24.8	2.1
2009	4,437	4,432	12.1	30.1	2.5
2010	4,350	4,338	11.9	25.3	2.1
2011	4,372	4,314	11.8	23.7	2.0
2012	5,131	5,061	13.9	23.8	1.7
2013	4,471	4,268	11.7	19.8	1.7
2014	4,598	4,416	12.1	20.2	1.7

Notes:

1 Total Net Water is the Total Raw Water minus the WTPs filter backwash

2 Based on Total Net Water

3 Based on City's Water Monthly Data reports

### ***ES.4.1 Water Use Efficiency Program***

The City is committed to ensuring its water resources are used efficiently to maintain the community's high quality of life for generations to come. In keeping with this commitment, the City's Water Use Efficiency (WUE) program includes incentives that encourage wise water use and utilizes technologies and processes associated with City activities to improve water savings.

### ***ES.4.2 Future Demands***

System-wide future consumption projections were estimated as a part of the *2016 Regional Water Forecast and Conservation Plan (RWFCP)*. Future demands in the RWFCP were estimated using current patterns of water use and projected population. **Table ES-4** presents the average and maximum day projections developed from the RWFCP.

**Table ES-4  
Future Water Supply Projections**

Year	Description	City of Pasco Water Service Area
<b>2014</b>	Water Service Population	70,770
	Total Supply (gallons)	4,597,500,000
	Total Supply (gpm)	8,747
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	29,707
<b>2022</b>	Water Service Population	82,500
	Total Supply (gallons)	5,359,527,342
	Total Supply (gpm)	10,197
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	34,631
<b>2027</b>	Water Service Population	93,775
	Total Supply (gallons)	6,091,996,079
	Total Supply (gpm)	11,591
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	39,364
<b>2036</b>	Water Service Population	112,200
	Total Supply (gallons)	7,288,957,185
	Total Supply (gpm)	13,868
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	47,098

Notes:

Source: Regional Water Forecast and Conservation Plan Report, January 2016

1 Based on an existing ERU = 424 gallons per day per residential family unit; gpdpd=gallons per dwelling per day

The key findings of the water use analysis (discussed in **Section 3 – Population and Water Demand**) are:

- In 2022, the City’s water distribution system must have adequate capacity to serve a maximum day demand of 31.0 mgd, with a peak hour demand of 39.3 mgd, for a growth of 16 percent when compared to current demands (2015). For this planning horizon, the expected additional industrial demand is 0.6 mgd.
- In 2027, the City’s water distribution system must have adequate capacity to serve a maximum day demand of 35.8 mgd, with a peak hour demand of 45.3 mgd, for a growth of 33 percent when compared to current demands (2015). For this planning horizon, the expected additional industrial demand is 1.0 mgd.
- In 2036, the City’s water distribution system must have adequate capacity to serve a maximum day demand of 41.9 mgd, with a peak hour demand of 53.4 mgd, for a growth of 56 percent when compared to current demands (2015). For this planning horizon, the expected additional industrial demand is 3.1 mgd.



- Per-capita water usage and other indicators of water use in the system were evaluated on a system-wide level and do not include impacts from the separate irrigation system water use. Water usage developed is conservative since there is the potential that future potable demands may be lower. As recommended in **ES.6 Capital Improvement Program** a water demand study would help to improve future projections.

### ***ES.4.3 Water Rights***

**Section 4 – Water Supply Summary** presents the water rights evaluation for City of Pasco. The City currently holds surface water rights for 13,613.50 acre-ft of annual withdrawal and 20,149 gpm (29 mgd) of instantaneous withdrawal. The source for these rights is the Columbia River which are to be used for domestic potable purposes. The City also holds individual groundwater rights sourced by various wells for separate irrigation purposes. Water rights held by the City are anticipated to increase in the future pending the following:

- Pending water rights transactions.
- The outcome of applications for new water rights made to Ecology in 2011 and 2015.
- Additional water rights available through subsequent distributions of water available under the regional Quad City Water Right (QCWR) permit. The QCWR permit identifies a total allocation of 178 cubic feet per second (cfs) (79,892 gpm) and 96,619 acre-feet, to be distributed amongst the Quad Cities (Pasco, Kennewick, Richland, and West Richland) in phases.
- Additional future water rights acquisitions.

### ***ES.4.4 Water Quality and Protection***

The City's complies with all drinking water regulations and has no water quality issues or violations. Both English and Spanish versions of the current Consumer Confidence Report which provides information on the water quality, are available on the City's website. **Section 4 – Water Supply Summary** also presents the City of Pasco's Watershed Control Program.

## **ES.5 Water Distribution System Analysis**

The adequacy of the system's various components was evaluated by comparing the existing capacity with the requirements dictated by the hydraulic criteria, for current and future demand conditions (2022 and 2036 planning horizons). The evaluation is subject to the low quality of data that is available at this time. Recommendations for the improvement data are defined in **ES.6 Capital Improvement Program**. The criteria are described in **Section 5 – Design and Construction Standards**.

The hydraulic model was used to assess the system's ability to convey flows under maximum day, peak hour, and fire flow conditions while maintaining minimum residual pressures. Additionally, supply, storage, and pumping capacity evaluations were performed to identify

the adequacy of those respective system components.

The methodology and results of the system analysis are presented in **Section 6 – Water Distribution System Analysis**. Here are the main conclusions of the system analysis:

- The results show that in general, the system has adequate capacity to provide for existing demands and to accommodate the 2022, 2027, and 2035 planning horizons.
- The supply capacity evaluation shows that the system has enough “reliable” capacity as defined in **Section 4 – Water Supply Summary** to serve 2022 needs. The planned expansion of the West Pasco WTP will provide the additional supply (3.2 mgd and 9.0 mgd) that will be required by 2027 and 2036 respectively.
- The storage capacity evaluation shows existing deficiencies in Zones 2 and 3 (combined deficiency of 5.8 MG). These deficiencies increase to 6.70 MG for 2022, 7.97 for 2027 and 9.05 MG for 2036.
- The hydraulic analysis confirms the existing network is able to deliver water to meet peak hourly demand at the required pressure to customers, under existing and future conditions.
- Fire flow availability was adequate in most of the system, with the exception of four locations under existing conditions and one location under future conditions. The associated improvement for these locations will be the upgrade or installation of short segments of pipe (less than 1,000 feet each).
- The transmission system is adequate to serve existing and future needs, with only one deficiency on the 20-inch transmission line from West Pasco WTP to Broadmoor Pump Station during 2036 PHD conditions.
- The City has partially developed infill areas with inadequate fire coverage and/or domestic water service area that have been identified. Specific improvements have not been defined at this time. As future infill development occurs the City will evaluate to determine required improvements required to improve fire flow and service.

## **ES.6 Capital Improvement Program**

The results of these evaluations were used to develop improvement concepts for each deficient area. Once improvement strategies were defined, conceptual alignment/location, size, cost opinion and timeframe were determined for each project. This information is presented in **Section 7 – Capital Improvement Program**.



The following process was used to develop the capital improvement projects:

- Improvements were sized to serve demands through 2036.
- Pipe improvements utilize standard 8-, 12-, 16-, 20-, 24-, 30- and 36-inch diameters. No improvements under 8 inches in diameter were recommended.
- Costs related to expanding the water treatment plant were developed by other consultants and provided by the City for inclusion in the CIP.

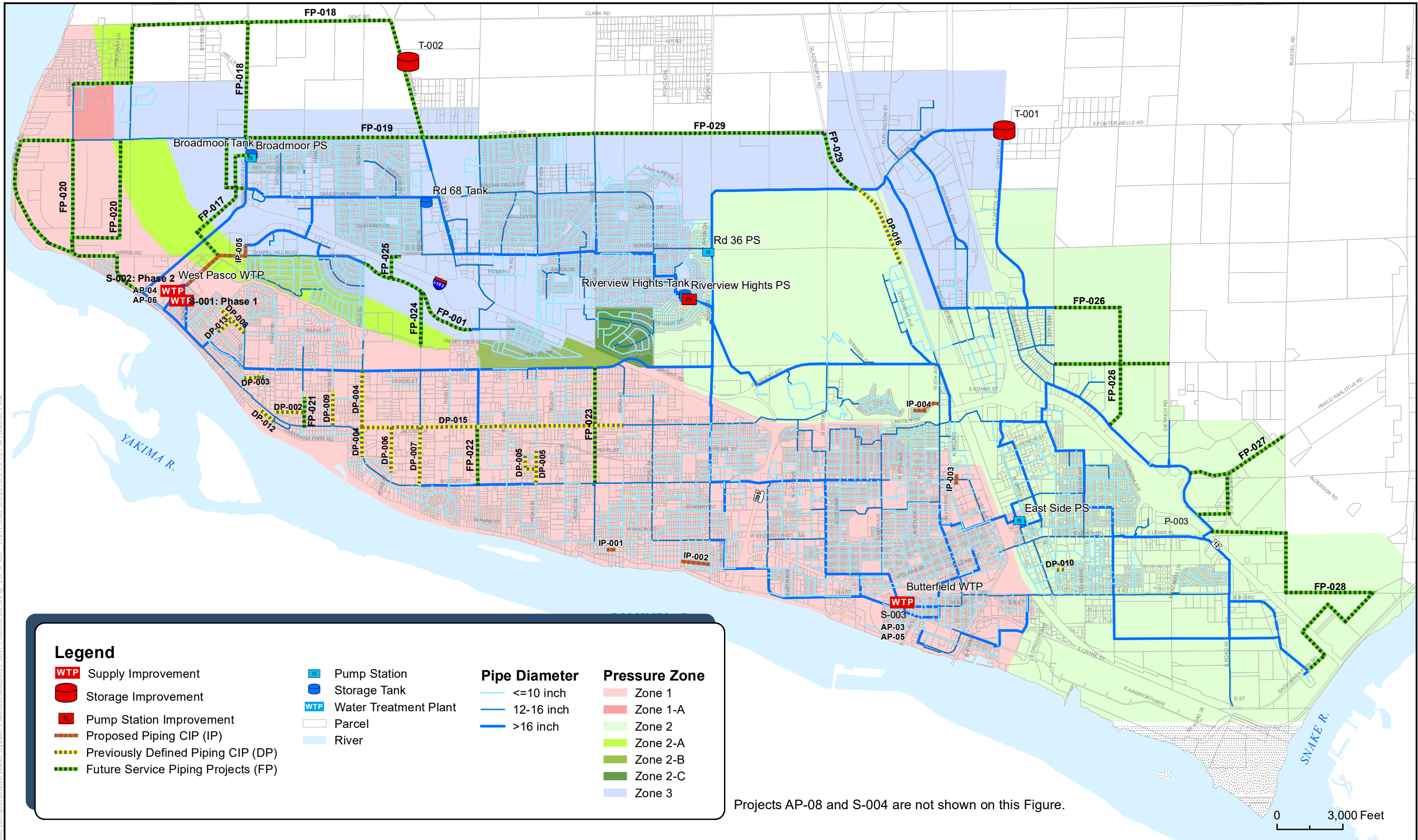
The CIP includes 31 projects through 2036, of these 28 capital projects and six studies are recommended by 2027. Another three capital projects are recommended for the long-term (11-20 years). The total expected cost per project type and timeframe are summarized in **Table ES-5**. To serve the growth within the City's planned future service area, concepts have been developed. The proposed future service area piping projects were developed with the intent of providing these areas with new pipes connecting to the existing system in different locations, creating loops to maintain redundancy and fire flow availability. Future service area projects are defined in **Table ES-6**, which provides an anticipated cost for expansion of the transmission system. The timing and funding of these projects is dependent on growth and development pressures with funding from the development community. **Figure ES-3** presents the location of the proposed capital projects and the future service piping project concepts.

The CWSP effort is an opportunity to improve and consolidate system information from different sources and to identify gaps or quality issues. Data quality or availability issues were identified throughout this CWSP; these include the following:

- Limited pipe database with system connectivity as well as diameter, material, pressure zone, and age information. Continued development of water distribution pipe network geographical information system would allow the City to better management their water distribution system element information.
- Characterization of the reduction in water demands for those customers that are served by separate irrigation coupled with spatial service meter demand information. Understanding of the location of use patterns will improve future demand projections and the results of future system evaluations.

To aid the City in the development of the next CWSP, **Table ES-7** summarizes the recommended data improvement studies and their cost. The cost ranges defined below are for planning purposes and will be further refined for each study as the City identifies the respective scopes of work.

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## Comprehensive Water System Plan Update City of Pasco



**Figure ES-3**  
**Capital Improvement  
Program**

**Table ES-5  
CIP Projects**

<b>Project ID</b>	<b>Type of Improvement</b>	<b>Project Title</b>	<b>Location</b>	<b>Time Frame</b>	<b>Cost</b>
AP-03	Supply CIP	Butterfield Water Treatment Plant PLC and Control Upgrades Project #00039	Zone 1	2017-2018	\$600,000
AP-04	Supply CIP	Columbia Water Supply Project #11001	Zone 1	2017-2018	\$8,705,000
AP-06	Supply CIP	West Pasco Water Treatment Plant Backwash Ponds Project #16008	Zone 1	2017-2020	\$2,226,000
S-005	Supply CIP	Riverview Heights PS Backup Power	Zone 1	2018	\$380,000
S-004	Supply CIP	ASR Feasibility Study	System Wide	2019	\$75,000
AP-05	Supply CIP	Butterfield Water Treatment Plant Chlorine Safety Improvements City Project #17004	Zone 1	2019-2020	\$325,000
S-003	Supply CIP	Butterfield WTP Facility Plan	Zone 1	2020	\$300,000
S-001	Supply CIP	West Pasco Water Treatment Plant Filter Expansion Phase 2	Zone 2	2024-2027	\$1,350,001
S-002	Supply CIP	West Pasco WTP Expansion - Phase 2	Zone 1	2035	\$1,350,000
S-002-PS1	Supply CIP	West Pasco WTP Expansion – Phase 2 – Pump Station Upgrade	West Pasco WTP	2035	\$910,000
T-001	Storage CIP	New Storage Reservoir: 5.75 MG Project #00041	Zone 2	2020-2023	\$11,700,000
T-002	Storage CIP	New Storage Reservoir: 3.5 MG	Zone 3	2035	\$7,469,000
IP-005	Proposed Piping CIP	Water Main Installation - Crescent - Chapel Hill Transmission Main	Zone 1-3	2018-2019	\$2,507,080
IP-001	Proposed Piping CIP	Waterline Extension -Irving Street (West to Road 49) Project #00047	Zone 1	2022	\$87,200
IP-003	Proposed Piping CIP	Waterline Extension - W Court St to N 3rd St.	Zone 1	2022	\$30,000
IP-002	Proposed Piping CIP	Waterline Extension - Riverhaven Street (Road 36 to Road 40) Project #00048	Zone 1	2023	\$305,200
IP-004	Proposed Piping CIP	Waterline Replacement - Along Empire Dr (West of N 5th Ave)	Zone 2	2026	\$327,000
DP-012	Previously Defined Piping CIP	Waterline Extension - Schuman Lane (West from Road 96) Project #00040	Zone 1	2018	\$ 80,000
DP-002	Previously Defined Piping CIP	Waterline Replacement - Richardson Road (Road 92 to Road 96) Project #00043	Zone 1	2019	\$460,000
AP-08	Previously Defined Piping CIP	Automated Meter Reading Project #00050	System Wide	2019-2023	\$4,750,000

Project ID	Type of Improvement	PROJECT TITLE	Location	Time Frame	Cost
DP-005	Previously Defined Piping CIP	Waterline Replacement - Road 60 (Pearl Street, Court Street, Agate Street, and 62nd Place) Project #00044	Zone 1	2020	\$900,000
DP-007	Previously Defined Piping CIP	Waterline Replacement - Road 76 (Wernett Road to Court Street) Project #00045	Zone 1	2020	\$826,000
DP-010	Previously Defined Piping CIP	Waterline Extension - Alton Street (Wehe Avenue to the alley west of Owen Street) Project #00046	Zone 2	2021	\$153,000
DP-013	Previously Defined Piping CIP	Waterline Extension - Road 103 (Maple Street to Willow Way) Project #00049	Zone 1	2023	\$113,000
DP-003	Previously Defined Piping CIP	Waterline Replacement - Star Lane (West of Road 97)	Zone 1	2024	\$113,000
DP-008	Previously Defined Piping CIP	Waterline Replacement - Maple Road (Road 100 to Road 104) CP7.WT.2R.15.20	Zone 1	2024	\$300,000
DP-009	Previously Defined Piping CIP	Waterline Replacement - Road 88 (Franklin Road to Court Street)	Zone 1	2024	\$200,000
DP-006	Previously Defined Piping CIP	Waterline Replacement - Road 80 (North along Agate Street)	Zone 1	2025	\$125,000
DP-004	Previously Defined Piping CIP	Waterline Replacement - Road 84 (Court Street to Argent Road)	Zone 2	2025-2026	\$450,000
DP-015	Previously Defined Piping CIP	Wernett Road Waterline CP7.WT.2A.14.01	Zone 1	2025-2026	\$873,000
DP-016	Previously Defined Piping CIP	East Airport Waterline (Port of Pasco)	Zone 2	2026-2027	\$895,000

**Table ES-6**  
**Future Service Area Piping Projects**

Project ID	Type of Improvement	Project Title	Location	Time Frame	Cost
FP-001	Future Service Area Piping Projects	Chapel Hill Boulevard Waterline (DNR Property)	Zone 3	2018	\$920,000
FP-024	Future Service Area Piping Projects	Road 76 (DNR Property)	Zone3	2024	\$918,000
FP-025	Future Service Area Piping Projects	I-182 Crossing (DNR Property)	Zone 3	2025	\$428,400
FP-017	Future Service Area Piping Projects	Waterline Loop - Broadmoor Blvd.	Zone 3	2026	\$1,420,764
FP-019	Future Service Area Piping Projects	Broadmoor to Road 52 Waterline Ext.	Zone 3	2026-2027	\$6,300,060
FP-021	Future Service Area Piping Projects	Road 92 (Riverview Service)	Zone 1	2027	\$440,946
FP-029	Future Service Area Piping Projects	Road 52 to N. Glade Rd Transmission Improvements	Zone 3	2028	\$4,925,000
FP-020	Future Service Area Piping Projects	West Pasco Loop	Zone 1	2028-2031	\$7,645,178
FP-022	Future Service Area Piping Projects	Road 68 (Riverview Service)	Zone 1	2029	\$1,054,000
FP-027	Future Service Area Piping Projects	Pasco Kahlotus Rd. Pipe Improvements	Zone 2	2029	\$2,266,800
FP-026	Future Service Area Piping Projects	WAST Property Loop Improvements	Zone 2	2030	\$3,132,300
FP-023	Future Service Area Piping Projects	Road 52 (Riverview Service)	Zone 1	2031	\$1,640,160
FP-018	Future Service Area Piping Projects	Road 100 Corridor North.	Zone 1-3	2031-2034	\$11,105,488
FP-028	Future Service Area Piping Projects	Tank Farm Transmission Loop Improvements	Zone 2	2034	\$5,319,000

Note: It is anticipated that funding for these projects will be from the development community to aid in the implementation. The final configuration and phasing of water system improvement will depend on future growth and development needs. The timing and funding of these projects is also dependent on growth and development in the future service areas.

**Table ES-7  
Recommended Studies**

<b>CIP ID</b>	<b>Recommended Study</b>	<b>Study Area</b>	<b>Time Frame</b>	<b>Cost</b>
O-001	Water System GIS Development	System-wide	2019-2022	\$50,000-\$75,000
O-002	Hillsboro PRV Flow Study	Local Study	2019-2022	\$5,000-\$10,000
O-003	Geocode Water Meters	System-wide	2019-2022	\$10,000-\$20,000
O-004	Demand Study - Characterize Demand Patterns in each Pressure Zone and separate irrigation impacts	System-wide	2019-2022	\$25,000-\$50,000
O-005	Audit of Authorized Unmetered Consumption	System-wide	2019-2022	\$50,000-\$75,000
O-006	Additional Calibration (after pipe inventory validation)	System-wide	2019-2022	\$10,000-\$20,000

### **ES.7 Financial Plan**

The cost to operate the City’s Water Utility is based on the following three main categories of expenditure, which are reviewed as part of the annual budgeting process:

1. Operations/maintenance/general administration/taxes;
2. Debt Service;
3. Capital Improvements.

The results of the 2015 Rate Study identified that the current rate schedules were not adequate to fund the Water Utility for operations, capital and reserves and that a 5 percent yearly rate increase was required starting in 2016 through 2021. This rate increase was approved by the City Council on November 20, 2015, Ordinance 4252. Additionally, the revenue requirements summarized in **Table 8-1**, assume that there will be a 2.5 percent rate increase for 2022 and 0 percent for 2023-2027. A “Cost-of-Service” analysis was performed with the goal to maintain equity for the water and sewer utilities. A conservation based (inclining block) rate structure evaluation was completed for the City focusing on the single family residential class, since it represents 87 percent of the total City accounts. The current single family residential rate for the City is composed of a fixed meter charge differentiated by meter size and a uniform rate for all usage. The financial considerations are summarized in **Section 8 – Financial Plan**.

### **ES.8 Operations and Maintenance Program**

Staff from the City’s Water Utility are responsible for the operation and maintenance of the treatment and distribution systems through the Water Treatment Plant Division and Water Distribution Division respectively. The Water Utility is structured and currently operated with 19 full-time equivalent employees (FTEs). The City maintains a Water Quality



Monitoring Program, Emergency Response Program, and Cross Connection Control Program to ensure a high-level service and safety to customers and staff.

The review of staffing indicates that the City should at a minimum add 2 FTEs for the implementation of the uni-directional flushing program. The addition of 1 to 3 FTEs should be considered over the next 5 years based on system expansion. This includes West Pasco WTP upgrades to double capacity and require full time onsite staff and implementation of the meter AMI/AMR upgrade program.

## **ES.9 Conclusion**

In general, the City's main distribution and transmission system is adequate to provide required flows at adequate pressure under existing and future conditions. There are partially developed areas with inadequate fire service and/or domestic water service that need to be addressed as future infill development occurs. The treatment systems will need to be expanded to meet future peak demands which can be accommodated at the West Pasco WTP. The quality of the water is high without the need for additional treatment to address specific contaminants. The City does need to make an investment in the quality of their data in particular with respect to the continued development of a water system Geographic Information System (GIS). This information will be used to improve the quality of their hydraulic model in addition to tracking the age, material, size and condition of their piping. Improvements to the demand information relative to customer location, availability of non-potable irrigation, and peak usage should also be completed prior to future planning projects.



# Section 1

## SECTION 1

### WATER SYSTEM DESCRIPTION

---

#### 1.1 Introduction

Located along the north shore of the Columbia River in Franklin County, the City of Pasco (City) is the major service center for the expanding agricultural industrial region of the Columbia Basin. At the time of development of this Comprehensive Water System Plan (CWSP) the City's population (2014) was 66,577, however they currently provide water service to about 70,770 people, which includes areas within Franklin County, through their water system. This Section provides a description of the water system's existing infrastructure and previous studies.

The Comprehensive Water System Plan (CWSP) planning period is 2022, 2027 and 2036. CWSP evaluations and the hydraulic modeling were based on the information summarized in this section. The main sources of information were:

- City's AutoCAD pipe infrastructure network inventory
- City's 2009 hydraulic model network
- City's Control Valve Settings Report
- Infrastructure information provided by City staff

The information presented in this section and overall planning effort is subject to the quality of the data available at this time. The CWSP effort is an opportunity to consolidate system information from different sources and to identify gaps or quality issues with the available system information. Data quality or availability issues were identified throughout the CWSP; the final Capital Improvement Plan (CIP) (presented in **Section 7 – Capital Improvement Program**) includes recommendations where the investment in new or improved data is required.

#### 1.2 System Summary and Background

The Pasco water utility (Water System ID 66400) came under City ownership in 1911 and originally provided untreated water. In 1949 the Butterfield Water Treatment Plant (WTP) was constructed to provide filtration of the raw Columbia River water prior to distribution to the system. The plant has undergone several expansions since its original construction. In 2010 the West Pasco WTP was constructed to provide additional supply to the system. Additionally, the City maintains a separate residential irrigation system in a portion of their water service area. Further details on this irrigation system are provided in this Section.

In 2017, the City's water system inventory consisted of approximately 330 miles of pipeline, 6 booster stations, 3 reservoirs, 2 water treatment plants, and 20 pressure reducing valve (PRV) stations. **Figure 1-1** shows the existing system map.

### 1.3 Pressure Zones

Service is presently provided from a minimum elevation of 340 feet to a maximum elevation of 525 feet. The water system is divided into 3 large pressure zones as summarized in **Table 1-1**, which is required by topography and system layout constraints: Zone 1, Zone 2, and Zone 3. From Zone 3, five smaller pressure zones are supplied via PRV stations.

**Table 1-1**  
**Pressure Zone Summary**

<b>Pressure Zone</b>	<b>Hydraulic Grade Line (HGL)</b>	<b>Average Ground Level (AGL)</b>
1	515 FT	400 FT
2	585 FT	450 FT
3	660 FT	500 FT

The service pressure in each zone typically varies from a minimum of 50 psi to a high of approximately 90 psi. The ground surface elevation within each pressure zone typically varies by no more than 70 feet.

The existing pressure zones are shown on **Figure 1-1**. **Figure 1-2** presents the hydraulic profile of the existing water system. The hydraulic profile is a schematic figure showing the hydraulic grade, associated ground level elevations and the interconnections allowing for the transfer of water between zones.

### 1.4 Sources of Supply

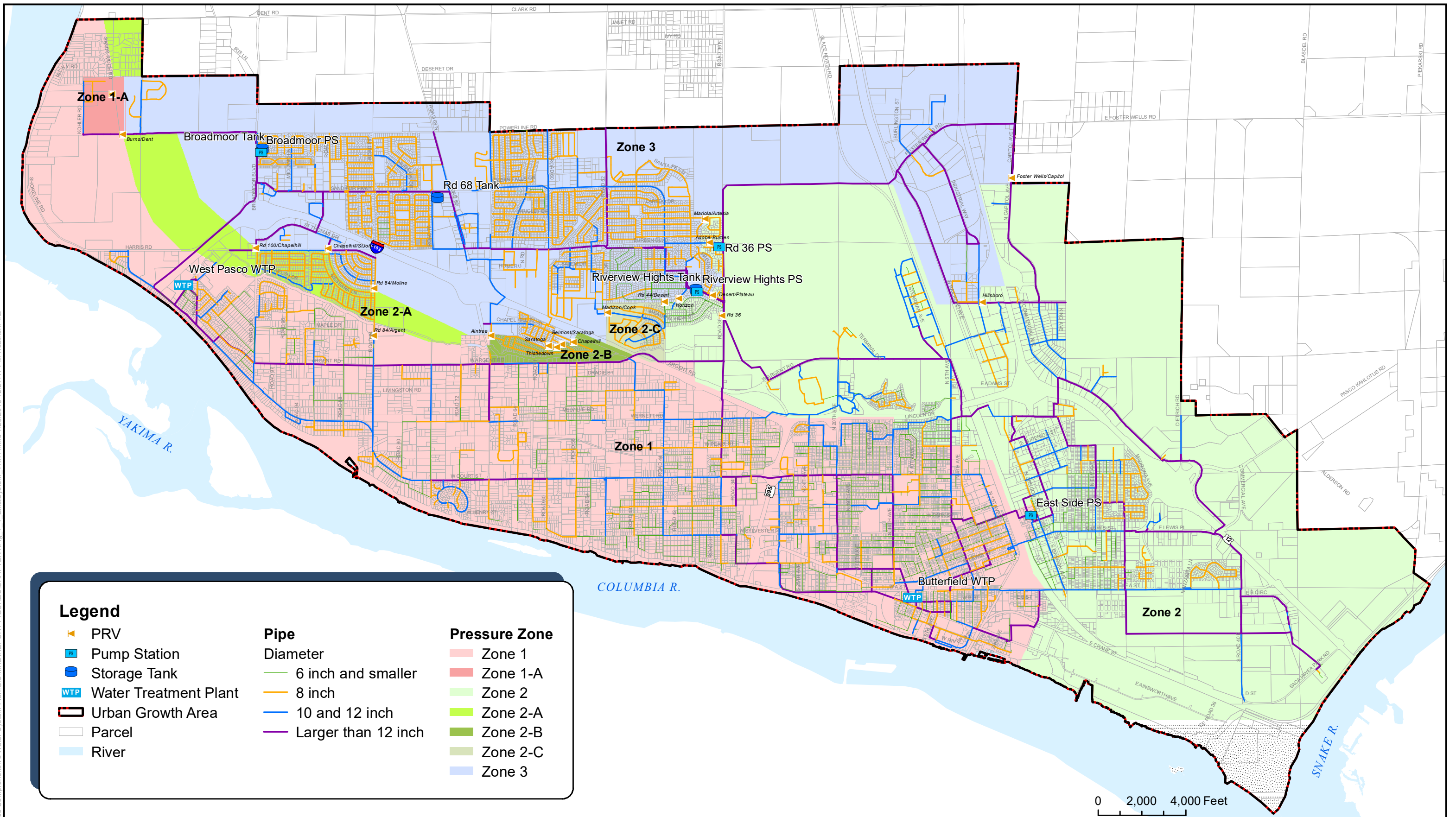
The City's water system is supplied from surface water withdrawals from the McNary Pool of the Columbia River. The City previously had four groundwater wells located in West Pasco off of Road 108 which are currently abandoned. The existing sources of supply are summarized in **Table 1-2** and the location is shown in **Figure 1-1**.

**Table 1-2**  
**Summary of Sources of Supply**

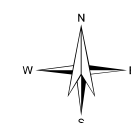
<b>Source</b>	<b>Maximum Supply Capacity (mgd)</b>	<b>Comments</b>
Butterfield WTP	26.8	The capacity is limited by contact time, which is a result of services on the transmission main.
West Pasco WTP	6.0	Initial design capacity of 6 mgd – with ability to expand to 18 mgd.
<b>Total Supply Capacity</b>	<b>32.8 mgd</b>	

Note: mgd – million gallons a day

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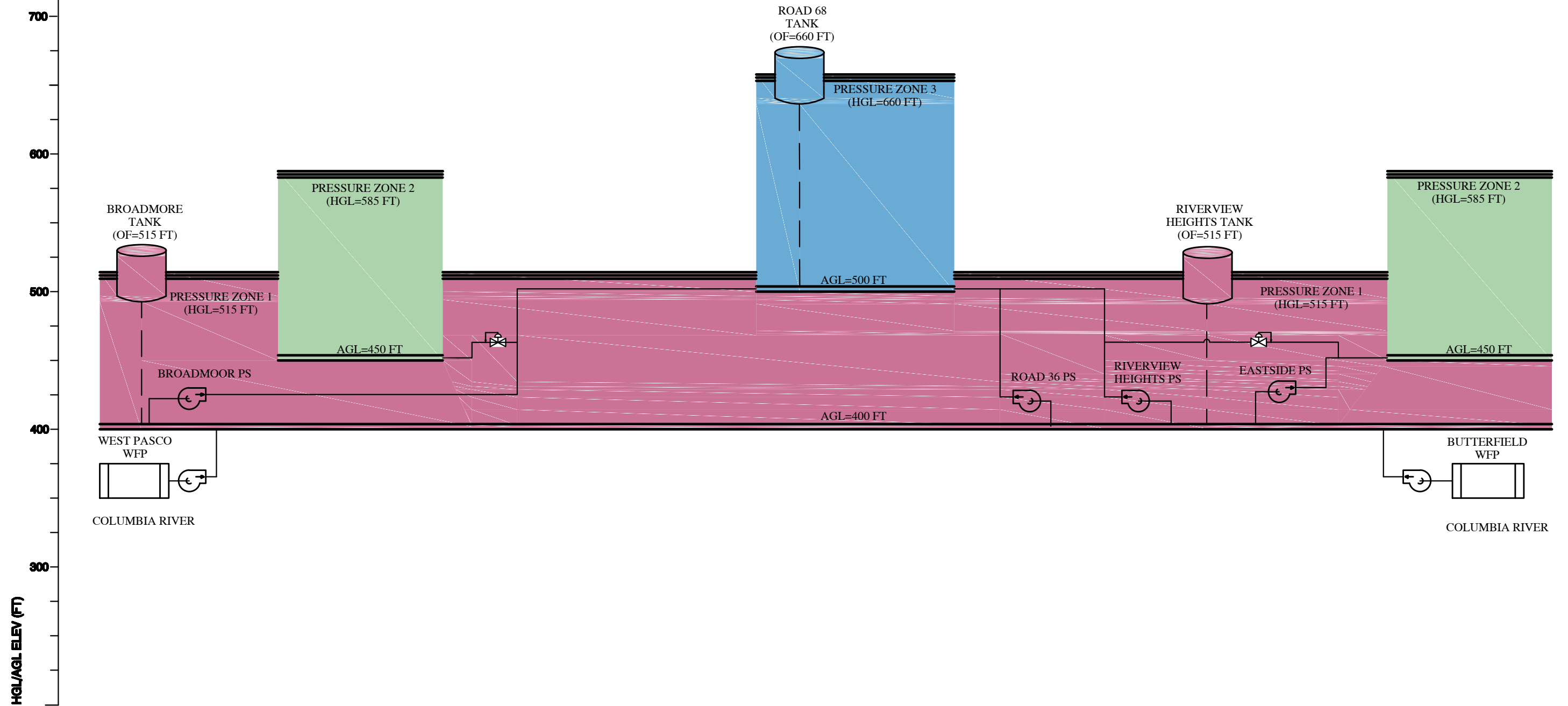


# Comprehensive Water System Plan Update City of Pasco



**Figure 1-1  
Existing System and  
Pressure Zones**

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# CITY OF PASCO HYDRAULIC PROFILE

June 2018



15-1710

FIGURE 1-2

## 1.5 Existing Water System

The system's Water Facility Inventory (WFI) is included in **Appendix 1-A**. The WFI updates are completed as facility change and improvements are made to the water system. The City will be updating the WFI with latest connection information and a correction to the owner name by the end of 2018. The following provides an overview of the City's water system information.

### 1.5.1 Distribution Network

The existing distribution system consists of approximately 330 miles of water mains ranging in size from 2 up to 36 inches in diameter. The majority of the pipelines are ductile iron (DI). There are some steel, asbestos cement and polyvinyl chloride (PVC) waterlines in the City system. The City currently does not have a complete inventory of the distribution system piping, but in general the downtown and adjacent areas to the north and east are 50 to 100 years old. Typically cast iron (CI) is 50 years and older, while PVC and DI were installed in the last 30 to 40 years. **Table 1-3** provides a summary of the size and length of water mains in the City's hydraulic model, which make up the distribution system as of 2015. The distribution system is also shown in **Figure 1-1**.

The City currently keeps the distribution network information in AutoCAD format. The AutoCAD inventory includes limited diameter information. The 2009 hydraulic model combined with the AutoCAD inventory were the sources of information for the summary presented here.

**Table 1-3**  
**Summary of Water Mains**

Diameter (in)	Length (ft)	Length (mi)
< 6	22,872	4.3
6	416,141	78.8
8	659,726	124.9
10	43,733	8.3
12	276,302	52.3
16	158,985	30.1
18	23,561	4.5
20	63,901	12.1
24	40,898	7.7
30	5,281	1.0
36	9,900	1.9
<b>Total</b>	<b>1,721,301</b>	<b>326</b>



### 1.5.2 Pump Stations

In addition to the high service pumps that currently supply the water system from the Butterfield WTP and West Pasco WTP, there are four booster stations located within the distribution system. These supply Pressure Zones 2 and 3. The location and capacity of these booster stations are summarized in **Table 1-4**. The location of the existing pump stations is shown in **Figure 1-1**.

**Table 1-4**  
**Summary of Existing Booster Stations**

Name	Suction Pressure Zone	Discharge Pressure Zone	Pump No.	HP	Capacity (gpm)	TDH <sup>1</sup> (ft)
Eastside Booster Station	1	2	1	10	225	100
			2	25	550	100
			3	40	950	100
			4	60	1,830	100
			5 <sup>2</sup>	75	2,000	100
			6 <sup>2</sup>	75	2,000	100
Riverview Heights Booster Station	1	3	1	125	2,600	162
			2	125	2,650	162
			3	75	1,460	162
			4	75	1,440	162
			5	150	1,625	162
Broadmoor Blvd. Booster Station	1	3	1	100	1,500	188
			2	100	1,500	188
			3	150	3,500	188
Butterfield WTP High Service Pumping Station	Butterfield WTP	1	1	450	7,000	230
			2	350	6,300	230
			3	300	5,000	230
			4	300	5,000	230
			5	300	5,000	230
West Pasco WTP High Service Pumping Station	West Pasco WTP	1	1	200	2700	205
			2	200	2700	205
Burden/Road 36 Booster Station	1	3	1	150	3,000	150
			2	150	3,000	150

Notes:

1 Total Dynamic Head (TDH): Based on Certified Performance Curve.

2 Proposed units, included in the Eastside Booster Station Improvements, online in 2016.

### 1.5.3 System Storage

The City's system storage consists of three water storage reservoirs located throughout the service area in addition to the 0.48 million gallon clearwell at the Butterfield WTP and the 1.62 million gallon clearwell at the West Pasco WTP. The location of the reservoirs is shown in **Figure 1-1**. **Table 1-5** summarizes the capacity, Pressure Zones, and overflow elevations of the City's reservoirs.

**Table 1-5**  
**Summary of Existing Reservoirs**

<b>Reservoir</b>	<b>Capacity (MG)</b>	<b>Overflow Elevation (ft)</b>	<b>Pressure Zone Served</b>	<b>Type of Reservoir</b>
Riverview Heights	10.0	519	1	Gravity supply to Zone 1, Ground level tank.
Broadmoor Blvd.	1.0	517	1	Gravity supply to Zone 1. Ground level tank.
Road 68	2.5	660	3	Gravity supply to Zone 3. Elevated tank

#### ***1.5.4 Pressure Reducing Valves (PRVs)***

There are 20 PRV stations located within the distribution system. These PRVs supply Zone 2 and the smaller pressure zones (1-A, 2-A, 2-B, and 2-C) from Zone 3. The location, size and settings of these valve stations is summarized in **Table 1-6**. The location of the existing PRV stations is shown in **Figure 1-1**.

**Table 1-6  
Summary of Existing PRV Stations**

<b>PRV Station</b>	<b>Valve</b>	<b>Elevation (ft)</b>	<b>Diameter (in)</b>	<b>Setting (psi)</b>	<b>Pressure Zone - from</b>	<b>Pressure Zone - to</b>
Adobe Burden	main	440	8	50	Zone 3	Zone 2
Aintree	by-pass	462	6	55	Zone 3	Zone 2-B
	main	454	2	60	Zone 3	Zone 2-B
Belmont/Saratoga	main	457	1.5	58	Zone 3	Zone 2-B
Burns/Dent	by-pass	376	8	45	Zone 3	Zone 1-A
	main	376	3	50	Zone 3	Zone 1-A
Chapel Hill	main	460	6	50	Zone 3	Zone 2-B
Chapel Hill/St. John	by-pass	467	12	50	Zone 3	Zone 2-A
	main	467	4	55	Zone 3	Zone 2-A
Desert Plateau	main	457	8	40	Zone 3	Zone 2
Foster Wells/Capital	main	461	12	55	Zone 3	Zone 2
Hillsboro	main	417	16	75	Zone 3	Zone 2
Horizon	main	462	10	45	Zone 3	Zone 2-C
Madison/Cook	by-pass	476	8	47	Zone 3	Zone 2-C
	main	477	3	52	Zone 3	Zone 2-C
Mariola/Artesia	by-pass	470	2	45	Zone 3	Zone 2
	main	470	6	40	Zone 3	Zone 2
Eagle Crest	TBD	TBD	TBD	TBD	Zone 3	Zone 1-A
Road 36	main	405	12	73	Zone 3	Zone 2
Road 44/Desert	main	447	4	56	Zone 3	Zone 2-C
Road 84/Moline	by-pass	448	6	55	Zone 3	Zone 2-A
	main	458	2	60	Zone 3	Zone 2-A
Road 84/Argent	main	386	8	50	Zone 3	Zone-1
Road 100/Chapel Hill	by-pass	445	12	56	Zone 3	Zone 2-A
	main	445	4	61	Zone 3	Zone 2-A
Saratoga	by-pass	447	6	55	Zone 3	Zone 2-B
	main	460	2	60	Zone 3	Zone 2-B
Thistledown	main	450	1.5	58	Zone 3	Zone 2-B

### ***1.5.5 Irrigation System***

The City also owns and operates a non-potable water utility that provides irrigation water to residential customers and a limited number of commercial customers in the northwest part of the City. The irrigation system serves approximately 6,890 residential accounts and 39 commercial and public facility accounts. Providing a system for irrigation water separate from the drinking water utility allows the City's customers to avoid using treated drinking water to irrigate. The City's existing irrigation system is supplied by water from 11 groundwater wells and water pumped from the Columbia River. The City acquired the first portions of the system in 2002 from a private irrigation utility. The system has grown considerably since that time. The City uses the irrigation system annually from April 1st to October 31st. The 2013 Irrigation System Master Plan (ISMP) recommended capital improvements to ensure the continued delivery of economical irrigation water to City's residents.

The irrigation service is available for a large portion of Zone 3, and minor pressure zones 2-A, 2-B, and 2-C, as it is shown in **Figure 1-3**. Irrigation services are not currently metered but billed as flat rate and as of 2013 the City served 5,434 residential customers. The separate non-potable water utility will have an impact on potable usage as defined in **Section 3 - Population and Water Demand**.

The expansion of the irrigation system is primarily limited to the existing service area in the northwest part of the City. This is through in-fill of new development and connections to irrigation pipe systems that were installed with new development but not connect due to proximity to the existing irrigation system. Expansion beyond the existing service area is based on the available irrigation water rights, which would allow for the additional place of use.

## **1.6 Summary of Previous Comprehensive Water System Plan and other Studies**

In 2009 the City completed a CWSP update, with a revision in October 2010. The CWSP identified existing and future water needs and developed a plan to correct deficiencies. The water system was determined to be capable of meeting the existing and projected demands through 2027. The CWSP recommended improvements to the system, including the construction of a 6 mgd WTP and upgrades to the Butterfield WTP to restore its 30 mgd capacity. This, together with the installation of water mains to provide looping in the distribution system, the system can meet the projected growth in population through expansion or fill-in of the service area.

Other recommendations listed in the 2009 CWSP included:

- Upgrades to the Broadmoor and East Side Booster Station (including Emergency Power).
- Cable Bridge Intertie with Kennewick, which did not move forward due to project costs.

- Participate in state and local Water Resource activities to assure early identification of critical issues impacting the City.
- Continue the program to identify and repair existing leaks in the water distribution system.
- Maintain an annual water audit program of water production and consumption.
- Acquire additional water rights.
- Review of City policy regarding Developer Extensions.

By 2015 the City had implemented most of the capital improvements from the 2009 CWSP, with the exception of some of Butterfield WTP capacity upgrades, distribution improvements related to development, and the intertie with Kennewick. The City is currently upgrading the East Side Booster Station.

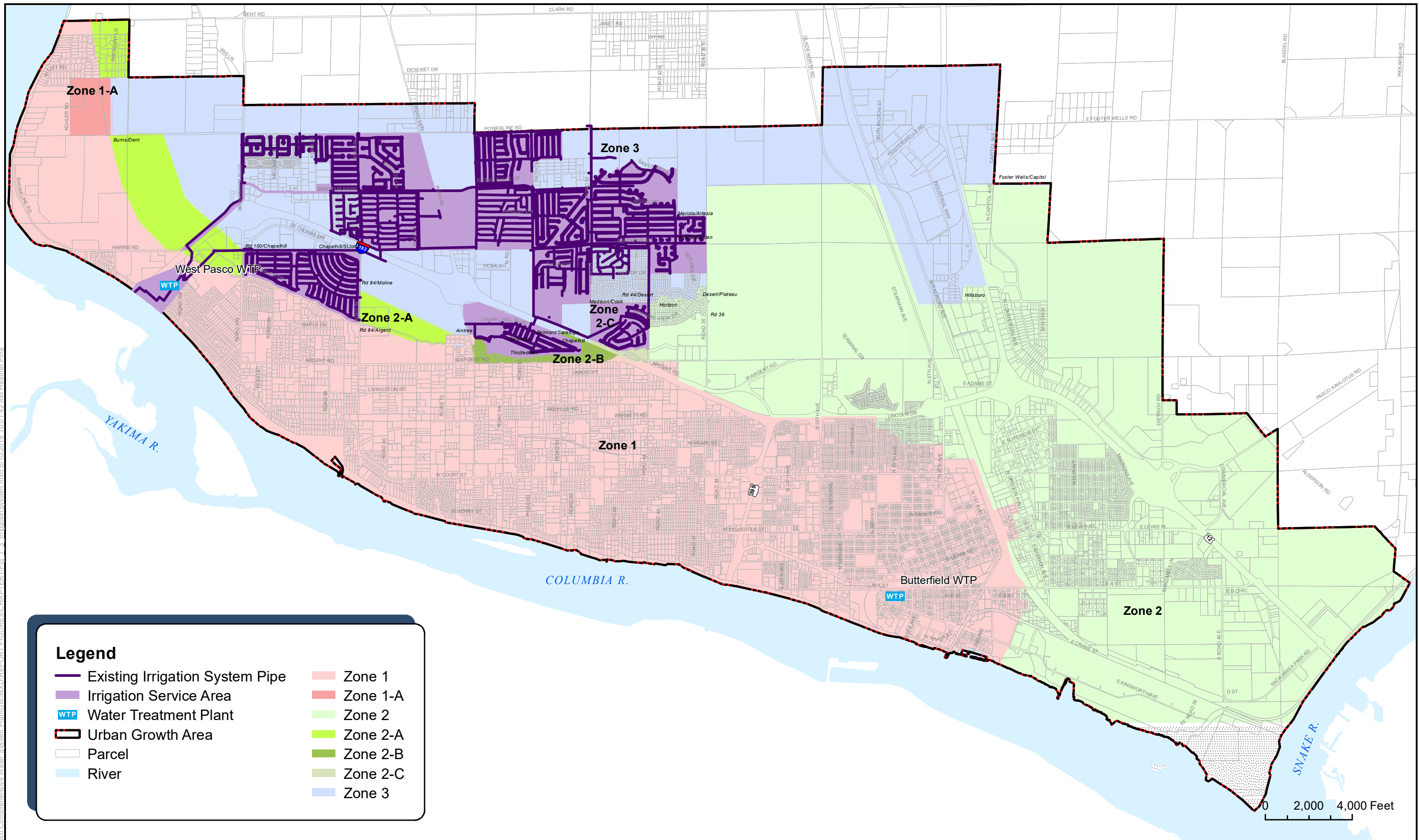
In addition to the 2009 CWSP, there have been a number of studies and plans prepared that are relevant to the water system. The most recent plans are listed below:

- City of Pasco Final Report, Water, Sewer, Stormwater, and Irrigation Rate Study – 2008, HDR Engineering.
- City of Pasco GMA Comprehensive Plan – 2008, City of Pasco.
- Butterfield Water Treatment Plant Tracer Testing – 2008, CH2M HILL.
- Irrigation System Master Plan – 2013, Murray, Smith & Associates Inc.
- Water Resources Management Plan – 2014, Murray, Smith & Associates Inc.
- Regional Water Forecast and Conservation Plan Update – 2016, RH2.

## **1.7 Ordinances/By Laws**

**Appendix 1-B** lists the Ordinances and Resolutions, which govern the City's water system.

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Comprehensive Water System Plan Update  
City of Pasco



Figure 1-3  
Irrigation System



## Section 2



## **SECTION 2**

### **WATER SERVICE AREA AND PLANNING INFORMATION**

---

#### **2.1 Introduction**

This Section describes the City of Pasco's (City) existing water system service area, future planning area and presents a general overview regarding information and related policies.

#### **2.2 Existing Service Area**

The City's existing water service area is presented in **Figure 2-1**. The current water system service area is approximately 19,160 acres. This includes acreage within the City limits and some unincorporated areas within Franklin County. In 2014, the City's water service area population was approximately 70,770. The Tri-Cities region has continued to experience a rate of rapid growth during the last 10 years. Increased growth in the City's water service area, in the form of infill as well as new residential housing construction, new business development, and new large industrial customers is expected to continue.

There are approximately 40 satellite water systems within the Urban Growth Boundary (UGB). The majority of these systems serve small commercial businesses and trailer parks. Due to the increasing regulatory requirements and the difficulty in obtaining water rights, the number of satellite systems is not expected to increase. At this time, the City is not planning to have any of these systems connect to their water system. The City would consider consolidation of a small water system if it is required due to failing infrastructure or addressing public health concerns. This would require the integration of the small water system at the time of the consolidation. Connection to the City system will require transfer of the owner's full or partial water right to the City.

**Appendix 2-A**, includes a placeholder for the Franklin County Local Government Consistency Agreement.

#### **2.3 Planning Service Area**

The planning service area corresponds to the City's 20-Year UGB. The UGB was developed by the City through its Community Development Department, Planning Commission, and City Council with benefit of both citizen input and review, and has been approved by Franklin County. The planning service area is approximately 25,600 acres and is presented in **Figure 2-1**.

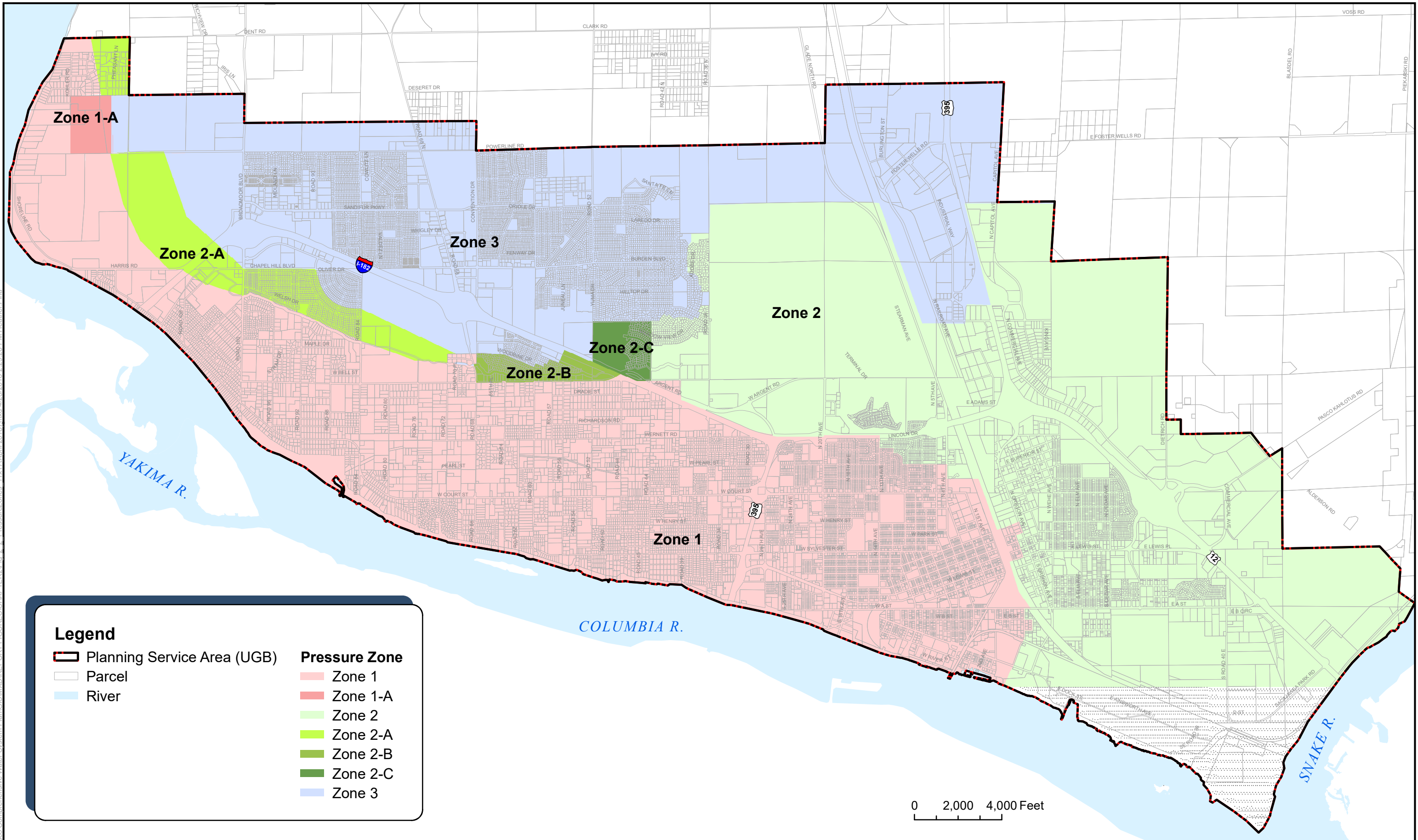
All improvements proposed within this Comprehensive Water System Plan (CWSP) are based on providing service from the City's existing water sources. This assumes that future service within the UGB will be supplied by direct connection to the City's water system.







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City of Pasco



Figure 2-2  
Pressure Zones

## 2.4 Planning Area Characteristics

### 2.4.1 Topography

The topography of the service area consists of flat and gently sloping terrain. The area slopes upward, south to north, from the banks of the Columbia River at elevation 340 feet to Riverview Heights at elevation 530 feet. Seasonal watercourses are oriented generally southerly as they drain toward the Columbia River. The service area's topography dictates the division of the water system into different pressure zones. A pressure zone is a subsection of the system with the same hydraulic gradient, controlled by a reservoir, pressure reducing valve (PRV) or pump station. The locations of the pressure zones are shown on **Figure 2-2**.

### 2.4.2 Climate

The climate is semiarid, characterized by low annual precipitation and large inter-seasonal temperature variations. Strong winds from the west and southwest occur throughout the year and are responsible for high evapotranspiration rates in summer. Annual precipitation seldom exceeds ten inches, with much of the total attributed to summer thunderstorms. Climatological information for the City of Pasco is summarized in **Table 2-1**.

**Table 2-1**  
**City of Pasco Summary of Climatological Information**

Annual Average Temperature	55 °F
Annual High Temperature	91 °F
Annual Low Temperature	27 °F
Annual Average Rainfall	8.5 inches

Source: 2009 Pasco Comprehensive Water Plan

### 2.4.3 Geology

The geology of the Pasco planning area is the result of the long history of volcanic activity, which has influenced the geology of the entire Columbia Basin. At the surface is a layer of unconsolidated alluvial and glaciofluvial materials ranging in depth from 0 to 120 feet. The depth of this overburden typically does not exceed 30 feet. The overburden rests on a thick series of basaltic strata known as the Columbia River Basalts, each of which may consist of many distinct basalt flows. These basalts are interbedded with two major and many minor sedimentary strata.

Locally significant hydrogeologic units occur in the Saddle Mountain and Wanapum basalts, in the Mabton Interbed, and in the overburden where its depth is sufficient.

### 2.4.4 Zoning/Land Use

**Figure 2-3** shows land uses within the UGB. The land uses shown are based on the City of Pasco's 2007 Comprehensive Plan. The current Comprehensive Plan indicates what types of

activities are currently authorized on a given property. Approximately 46 percent of the City's future water service area consists of residential development, 10 percent is designated as commercial, and 36 percent is zoned industrial. The major industrial customers comprise of food processors, which are located in the northeast part of the City near the Reuse Facility. Parks, schools, and other public facilities make up approximately 3 percent of the area, with 5 percent designated for open land. **Table 2-2** shows the acreage of each land use designation per the Comprehensive Plan.

**Table 2-2**  
**Comprehensive Plan Land Use within UGB**

<b>Land Use Designations</b>	<b>Area (acres)</b>
<b>Residential Lands</b>	
Low Density	9,619
Mixed Density	1,722
High Density	136
<b>Subtotal</b>	<b>11,477</b>
<b>Commercial Lands</b>	
Mixed Residential/Commercial	409
Commercial	2,176
<b>Subtotal</b>	<b>2,585</b>
<b>Industrial Lands</b>	
Industrial	9,140
<b>Subtotal</b>	<b>9,140</b>
<b>Public/Quasi-Public Lands</b>	
Public/Quasi-Public	736
<b>Subtotal</b>	<b>736</b>
<b>Open Space Lands/Roads</b>	
Open Space/Roads	1,662
<b>Subtotal</b>	<b>1,662</b>
<b>Total</b>	<b>25,600</b>

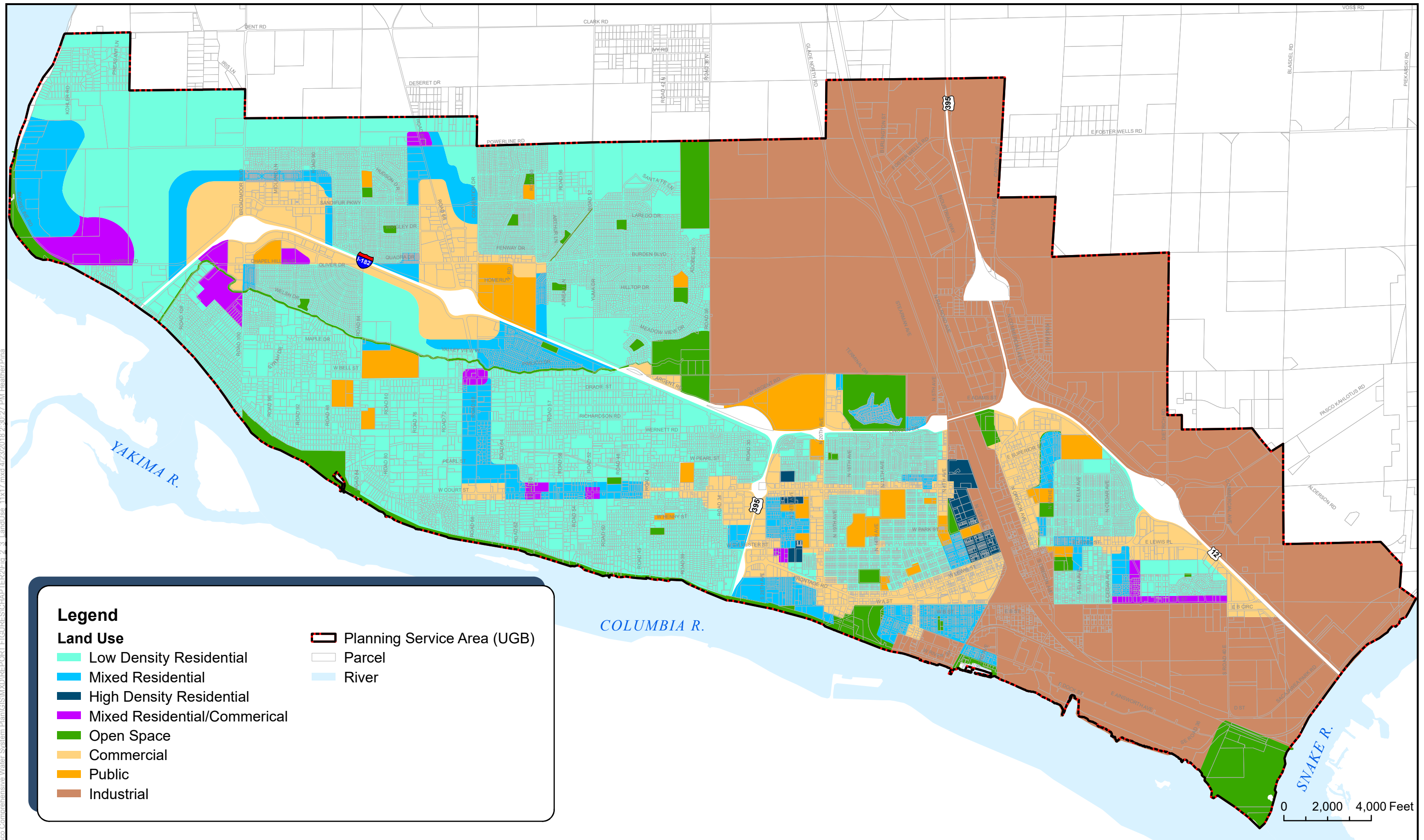
Source: City of Pasco's Planning Department land use GIS

## 2.5 Service Area Agreements

Currently the City has no service agreements with other municipalities or governmental agencies. The Columbia River physically separates Pasco from the Cities of Kennewick and Richland. Interties with these Cities have been considered but no formal agreements have been made. The City does not have a Franchise Agreement with Franklin County to install utility infrastructure within County right-of-way.



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Comprehensive Water System Plan Update  
City of Pasco



Figure 2-3  
Land Use

## 2.6 Service Area Policies

Service area policies for the water and sewer utility are defined in Title 13 and Title 14 of the City Municipal Code. This includes provisions for rationing and conservation of water during a water shortage, defines responsibility for operation of the water system, defines policies for metering of water, and for user charges both inside and outside the City limits. On June 6, 2005 the City Council approved Resolution 2875, a Drought and Water Shortage Response Plan that addresses restrictions and regulations, which may be imposed on domestic and irrigation water use. The City of Pasco has a cross-connection control program, which requires the installation of backflow prevention devices and periodic customer checks. Particularly those customers that utilize non-potable irrigation have the potential for cross-connections with the municipal water system. Cross connection is defined in Section 13.16.020 of the City Municipal Code and is described in further detail in **Section 9 – Operations and Maintenance Program** of this Plan.

Other service area policies include:

1. City requires water service into areas outside the present City Limits but within the service area boundary be annexed prior to receiving service, or where annexation is not practical, future annexation agreements be entered into. This policy has primarily been applied to the Riverview Area (West Pasco).
2. Local distribution lines are generally installed at developer and local improvement districts (LID) expense.
3. Transmission, storage, and treatment/processing responsibilities rest with the utility. The utility, in turn is reimbursed via system development fees paid by a new customer at the time of connection.
4. The over-sizing of local distribution lines that also serve as transmission lines is generally a utility expense. The City usually pays for the additional increment in cost for over-sizing.
5. Rates for service outside the corporate limits are surcharged 90 percent. The surcharge is based on the rate of return on In-City customer investment and/or incremental cost.
6. City Water System customers with access to the irrigation system are required to connect for outside water use. Residential developments within the water service area are required to relinquish any associated groundwater rights to the City of Pasco. The irrigation system area is presented in **Section 1 – Water System Description**.

## 2.7 State Legislation/Regulations/Guidelines

The City's water system is governed by the following legislation and regulations:



### ***2.7.1 Public Water System Coordination Act***

The Public Water System Coordination (PWSC) Act of 1977, as authorized by Section 70.116 RCW, is to maximize efficient and effective development of the State's public water supply systems. The Washington State Department of Health (WDOH) is to assist water purveyors by providing procedures based on regulations (WAC 246-290-100) to coordinate planning for public water supply systems. The PWSC Act does not currently apply to the City of Pasco water system as the Act has not been implemented within Franklin County. Future adoption by the County would require conformance with this Act.

### ***2.7.2 Guidelines for Public Water Systems***

A *Water System Planning Handbook* prepared by WDOH in 1997 provides guidelines to assist utilities in developing water system plans required under statute (WAC 246-290-100). The Water Use Efficiency Act of 1989 (RCW 43.20.230 (1)) provides that water conservation plans be included in water system plans. The *Conservation Planning Requirements* were prepared jointly by Washington Department of Ecology (WDOE), WDOH, and the Washington Water Utilities Council (WWUC), and provide guidelines for the development and implementation of a water conservation plan for public water systems.

### ***2.7.3 Growth Management Act***

The Growth Management Act (GMA) was enacted in 1990, and amended in 1991, to ensure the advancement of coordinated, planned urban growth throughout the State. The major emphasis was to manage "urban growth" including the type of growth, its intensity, its location, and the associated utility and service needs.

Land Use Comprehensive Plans prepared under the GMA must accommodate a 20-year growth projection prepared by the Office of Financial Management. The GMA requires the establishment of "Urban Growth Areas" based on OFM population projections to guide urban growth into areas that are most appropriate and to reduce urban sprawl. The GMA also requires designation and protection of agricultural lands, forestlands, mineral resource lands, and critical areas. Critical areas include wetlands, critical aquifer recharge areas that provide drinking water, fish and wildlife conservation areas, frequently flooded areas, and geologically hazardous areas.

The GMA requires cities and counties to coordinate their comprehensive plans. This coordinated planning effort includes all major aspects of urban development including the extension of utilities and other urban services. Under the GMA, Franklin County and the City of Pasco Water Utility must be coordinated with land use designation of the comprehensive plan and water supply plan to ensure that provisions have been made for drinking water supplies. This guarantees that building permits are not issued unless safe and reliable potable water can be provided.

## Section **3**

## SECTION 3

### POPULATION AND WATER DEMAND

---

#### 3.1 Introduction

A key element in the development of this Comprehensive Water System Plan (CWSP) is the estimation of existing and future demands and their distribution throughout the water system. Existing demands were estimated using production records. Future demands were projected based on unit demand factors (developed from existing consumption) and demographic growth forecasts from the Franklin County's 2008 Comprehensive Plan through 2030, as referenced in the *2016 Regional Water Forecast and Conservation Plan* (RWFCP), see **Appendix 3-A**.

This section presents a summary of the City of Pasco's (City) population information, production records, which were used for evaluating existing and future demands for the 2022, 2027 and 2036 planning horizons. Existing and future demands were estimated for the service boundaries described in **Section 2 – Water Service Area and Planning Information**.

The planning period for the 2016 RWFCP was 2021 for the 6-year supply projections and 2035 for the 20-year supply projections. These projections were based on information provided by the City and were used to define the future planning horizons population and demand projections for this CWSP.

#### 3.2 Population

The City's water system service area goes beyond the existing City limits, including unincorporated areas within the UGB. The 2014 population for the existing water service area was approximately 70,770. At this time, the City's water system serves approximately 82 percent of the Franklin County population. The projected population for the 2036 City Water Service Area is 112,200, representing an increase of 70 percent from the 2014 population. **Table 3-1** shows the population projections for the City's water service area and Franklin County.

**Table 3-1**  
**Population Projections for Franklin County and City of Pasco**

Year	Franklin County	City of Pasco Water Service Area
2014	86,800	70,770
2016	90,500	73,600
2022	106,800	82,500
2026	118,500	91,500
2027	121,480	93,775
2031	133,400	102,800
2036	149,500	112,200

### 3.3 Existing System-Wide Water Use

**Table 3-2** shows the annual water production and average and maximum water usage for 2008-2014; this information was used to develop demands for system analysis. The average and maximum water usage are based on total net water production and therefore include all water system usage, whether accounted for or unaccounted for, minus the filter backwash water from the water treatment plants (WTP).

Water use in the service area follows an expected seasonal pattern of summer highs and winter lows, increasing during the growing season as those customers without access to separate irrigation water utilize City water. The summer month's average usage (June through August) were compared to the winter months (November through March) as shown in **Table 3-3**. Summer average water use is more than three times the winter demand.

**Table 3-2**  
**City of Pasco Total Annual Water Usage**

Year	Total Raw Water Produced (MG)	Total Net Water (MG) <sup>1</sup>	Average Water Usage (mgd) <sup>2</sup>	Maximum Water Usage (mgd) <sup>3</sup>	Maximum/Average Water Usage Peaking Factor
2008	4,227	4,215	11.5	24.8	2.1
2009	4,437	4,432	12.1	30.1	2.5
2010	4,350	4,338	11.9	25.3	2.1
2011	4,372	4,314	11.8	23.7	2.0
2012	5,131	5,061	13.9	23.8	1.7
2013	4,471	4,268	11.7	19.8	1.7
2014	4,598	4,416	12.1	20.2	1.7

Notes:

- 1 Total Net Water is the Total Raw Water minus the WTPs filter backwash
- 2 Based on Total Net Water
- 3 Based on City's Water Monthly Data reports

**Table 3-3**  
**City of Pasco Seasonal Water Usage**

Year	Average Day Demand (mgd)	Winter Water Usage Nov. – Mar. (mgd) <sup>1</sup>	Summer Water Usage Jun. – Aug. (mgd) <sup>1</sup>
2008	11.5	5.9	18.2
2009	12.1	6.0	20.4
2010	11.9	6.6	18.6
2011	11.8	6.5	18.9
2012	13.9	6.2	18.8
2013	11.7	6.3	18.4
2014	12.1	6.3	19.1

Notes:

- 1 Based on Total Net Water: Total Raw Water minus WTP filter backwash

### 3.3.1 Large Users Demand

The City's water system serves several large industrial customers, which includes food processors. The food processors (large industrial related development) has been encouraged to locate in the northeast and eastern sections of the City near the Reuse Facility. The largest industrial users are summarized in **Table 3-4**. **Figure 3-1** presents the location of the large users in the existing system.

**Table 3-4**  
**Large User Demand**

Customer	2014 Annual Demand (MG)	2014 Annual Demand (mgd)	Address
Pasco Processing LLC	393	1.08	5815 Industrial Way
Twin City Foods	269	0.74	5410 N Commercial Avenue
Crf Frozen Foods LLC	206	0.56	1825 N Commercial Avenue
Reser's Fine Foods	117	0.32	5310 Industrial Way
Oregon Potato Company	43	0.12	302 N Venture Road
Grimmway Enterprises Inc	68	0.19	1315 Dietrich Road
Sundance Home Park 0324	30	0.08	925 N Elm Avenue
Lake View Mobile Home Park	23	0.06	1505 S Road 40 E
Flamingo Village	21	0.06	424 S 28th Avenue
<b>Total 2014 Large User Average Demand = 1,169 MG (3.2 mgd)</b>			

General Notes:

- Not including minor industries < 20gpm
- Source: City of Pasco's Customer Service (Utility Billing) Department
- Grimmway Enterprises Inc has two meter accounts

### 3.3.2 Per Capita Water Demand

System-wide per capita water demands for average annual winter and summer were developed based on the estimated population for the service area for the period from 2008 through 2014. The City's Community Development Department has estimated the water service population based on information obtained from the State Office of Financial Management (OFM) and the Benton-Franklin Council of Governments. **Table 3-5** presents the historical population and the system-wide per capita water demand in the City.

A review of the per capita water demand shows a decreasing trend from 2010 to 2014. The average for the period is 197 gallons per capita per day. There is a generally decreasing trend in per capita water use in summer and winter months. This is consistent with the general trend of reducing per capita water demands across the western portion of the United States over the past 20 years. This reduction is likely due to a number of factors including the change in the cost of water service, customer awareness, updates to the plumbing code, and the effectiveness of conservation measures implemented through the Water Use Efficiency (WUE) program. The per-capita demand unit includes commercial and industrial usage in

addition to unaccounted-for water such as system leakage, construction water and the flushing of hydrants.

**Table 3-5  
City of Pasco Per-Capita Water Demand (2008-2014)**

<b>Year</b>	<b>Estimated Population Served</b>	<b>Annual Average Per-Capita Demand (gpcd) <sup>1</sup></b>	<b>Winter Month Per-Capita Demand Jan. – Mar. Nov. – Dec. (gpcd) <sup>1</sup></b>	<b>Summer Month-Per Capita Demand Jun. – Aug. (gpcd) <sup>2</sup></b>
<b>2008</b>	54,855	211	108	331
<b>2009</b>	57,385	212	105	356
<b>2010</b>	59,800	199	111	311
<b>2011</b>	62,500	189	104	302
<b>2012</b>	65,300	212	94	287
<b>2013</b>	67,000	175	94	275
<b>2014</b>	70,770	171	90	270
<b>Average</b>		197	101	309

Notes:

1 gpcd: gallons per capita per day

2 Based on Total Net Water: Total Raw Water minus the Butterfield WTP filter backwash

### ***3.3.3 Separate Irrigation System***

The City owns and operates a non-potable water utility that provides irrigation water to residential customers and a limited number of commercial customers in the northwest part of the City. The extent of the irrigation system is presented in **Section 1 – Water System Description**.

The separate irrigation system allows the City to reduce the overall amount of treated water that the water system must provide during the summer months. Although the effect of the irrigation system on peak demands can be observed in the reduction of the peaking factors over time, the localized impact couldn't be measured due to the lack of metered irrigation consumption and georeferenced residential/commercial consumption in all pressure zones.

### ***3.3.4 Demand Distribution***

The spatial distribution of demand throughout the system is an important factor when analyzing the network and facilities. For this CWSP, the demand distribution was based on the existing hydraulic model, and location of new development since 2007. Based on these sources, the demands by pressure zone were estimated as it is presented in **Table 3-6**.

This current demand distribution provides for a high level evaluation of system demands, but does not provide an understanding of daily and seasonal demand patterns by customer and area. It is recommended that the City improve the demand distribution, which will provide a better picture for future planning horizons and system analysis. The understanding of daily

and seasonal demand patterns in the water distribution system and how they are impacted by the separate irrigation system is a key factor for the system analysis.

The City performed a Residential Water Use Study in 2007, where consumption patterns were characterized for several different neighborhoods, for those customers with separate irrigation system and those fully dependent on the City's water system. As the system has seen significant growth and changes in the last 9 years, including the Water Use Efficiency measures implemented since 2008, an updated demand evaluation, similar to the one performed in 2007, on the City's water system billing records is recommended to characterize the consumption (residential and commercial) in each pressure zone.

This demand evaluation requires the City to georeferenced all meters, currently approximately 4,400 water meters (out of the 17,145) don't have an associated georeferenced record.

**Table 3-6**  
**Demand by Pressure Zone (2015)**

Pressure Zone	ADD Demand (gpm)	MDD Demand (gpm)	PHD Demand (gpm)
1	2,528	5,240	6,674
1-A	69	144	181
2	2,660	5,512	7,021
2-A	132	27	347
2-B	28	64	76
2-C	236	487	625
3	3,306	6,862	8,722
Total	8,958	18,582	23,646

### 3.4 System Leakage

The WUE rule divides total supply into “authorized consumption” and “distribution system leakage” (DSL). Authorized consumption is defined as the volume of water authorized for use by the water system, which would include all revenue and non-revenue water. All other water that cannot be tracked is by definition, DSL. Because the City currently tracks their non-revenue water and includes this in their accounted-for water totals, their “unaccounted-for water” totals are equivalent to “DSL.”

The City accounts for non-billed government use, estimated fire department use, and Public Works water usage as non-revenue authorized consumption. The City summarizes this information in their yearly Water Use Efficiency Performance Report, which is submitted to the Washington State Department of Health (DOH). DSL calculations are based on the requirements in WAC 246-290-820. **Table 3-7** illustrates the results of the comparison of authorized consumption versus DSL from 2008 to 2014.



**Table 3-7**  
**City of Pasco Estimate of Distribution System Leakage (DSL)**

<b>Year</b>	<b>Total Raw Water (MG)</b>	<b>Total Authorized Consumption (MG)</b>	<b>Percent Distribution System Leakage</b>
2008	4,432	4,235	4.44%
2009	4,338	4,249	2.06%
2010	4,314	4,488	-4.03%
2011	5,061	4,984	1.52%
2012	4,268	4,247	0.49%
2013	4,416	4,439	-0.52%
2014	4,432	4,235	4.44%

The historical records show annual percentages less than five percent and part of this is attributed to the City's efforts to control losses throughout the system. Additionally, the City is reviewing the instances of negative DSL and potential link to meter data. The focus is on the Butterfield Treatment Plant, since West Pasco WTP is a new facility. The City's investigation has determined that the two 24-inch isolation valves on the discharge piping leak, which has not permitted accurate metering of flows. These valves are currently being replaced along with installation of new magnetic flow meters which will be online in 2017. The City will monitor to determine if this correction addresses the concerns with meter data quality. The City is also replacing service meters on a 10-year cycle. The City's strategy also includes leak detection survey, priority repair or replacement for leaky pipes, and the update of their water audit program. The updated WUE program is presented in **Appendix 3-B**.

### **3.5 Equivalent Residential Units**

To comply with the requirements for water system planning in the State of Washington, purveyors must report current water usage, future projections, and physical system capacity in terms of Equivalent Residential Units (ERUs).

An ERU is a unit of measure that equates all water usage in terms of the average annual consumption of a typical single residential home. The quantity of water associated with an ERU is system specific. An ERU in one system may not apply to another system with differing demographics or water use patterns. Also, the demand equivalent of one ERU for any specific system often changes with time as factors affecting water use evolve (demographics, conservation activities, etc.). The historical ERUs are presented in **Table 3-8**.

For planning purposes, future demands will be estimated with and without efficiency savings. The average ERU value from 2011-2015 will be used to estimate future demands without efficiency savings. Only the last four years were included in this average, because this period is representative of the changes in consumption patterns due to the successful implementation of WUE measures.

**Table 3-8  
City of Pasco Residential and Non-Residential ERUs**

Year	Population	Residential			Non-Residential	
		Total Residential Annual Volume (MG)	Residential Connections	ERU <sup>1</sup> (gallons per day per residential connection)	Total Annual Volume (MG)	Number of ERUs
2008	54,855	2,509	14,155	486	1,406	7,933
2009	57,385	2,552	14,561	480	1,509	8,608
2010	59,800	2,529	15,300	453	1,516	9,172
2011	62,500	2,536	15,868	438	1,781	11,143
2012	65,300	2,459	16,104	418	2,523	16,522
2013	67,000	2,570	16,414	429	1,673	10,686
2014	70,770	2,484	16,634	409	1,952	13,071
<b>Average ERU<sup>2</sup> (2011-2014): 424 gallons per day per residential connection</b>						

Notes:

1 ERU calculated as Residential Annual Volume per residential connection.

2 Based on last 4 years due to the decreasing water use per ERU trends.

### **3.6 Water Use Efficiency Program**

The City of Pasco is committed to ensuring its water resources are used efficiently to maintain the community's high quality of life for current residents and generations to come. In keeping with this commitment, the City's WUE program includes incentives that encourage wise water use and utilizes technologies and processes associated with City activities to improve water savings as shown below. The City currently uses a uniform water rate structure, charging the same price per unit (100 cubic feet) of water used above the base fee. This rate structure does directly link water supplied to cost of service since users pay for what they use. The City's updated WUE Plan is focused on maintaining the current DSL as it is considered low. The measures included in the WUE program are:

#### Supply-Side Measures

- Maintain a DSL at 8 percent or less on an annual basis
- Update the integrated water shortage and drought response plan by 2020
- Continue with regular water meter replacement program
- Implement installation of "Smart Meters"

#### Demand-Side Measures

- Maintain average demand per ERU at 470 gpd per ERU, excluding DSL through 2022
- Update large water user water audit program by December 31, 2020

- Encourage the utilization of xeriscaping and specialized turf seed mixes to lower irrigation water consumption
- Continue to offer Pasco residents retrofit kits that include low flow shower heads, toilet tank replacement bags, leak detection tablets, and other water use efficiency measures. The City will phase out this residential retrofit program before the next planning cycle as the City is close to reaching saturation of its target audience.
- Continue to perform WUE education in the Pasco School District
- Continue to promote public education on conservation through annual consumer confidence reports, customer billing statements, and other educational materials.

The WUE Plan is presented in **Appendix 3-B**. The success of the on-going WUE program can be observed in the low DSL level (see **Table 3-7**) and the reduction of the ERU value (see **Table 3-8**). See **Appendix 3-C** for the Water Use Efficiency Resolution.

### 3.7 Future Demands

System-wide future consumption projections were estimated as a part of the *2016 RWFCP*. Future demands in the RWFCP were estimated using current patterns of water use and projected population; **Table 3-9** presents the City's Future Water Supply Projections developed from the RWFCP. **Table 3-10** presents the average and maximum day projections also developed from the RWFCP.

The water demand forecast in **Table 3-9** and **Table 3-10** include the water savings from the WUE measures that have been and are continuing to be implemented, which is coordinated with RWFCP. The RWFCP can be found in **Appendix 3-A**. If water use efficiency measures are not implemented, the projected water demand will increase at least five percent above the projected demand in the RWFCP. See the WUE Plan in **Appendix 3-B** for further details.

**Table 3-9  
Future Water Supply Projections**

<b>Year</b>	<b>Description</b>	<b>City of Pasco Water Service Area</b>
<b>2014</b>	Water Service Population	70,770
	Total Supply (gallons)	4,597,500,000
	Total Supply (gpm)	8,747
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	29,707
<b>2022</b>	Water Service Population	82,500
	Total Supply (gallons)	5,359,527,342
	Total Supply (gpm)	10,197
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	34,631
<b>2027</b>	Water Service Population	93,775
	Total Supply (gallons)	6,091,996,079
	Total Supply (gpm)	11,591
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	39,364
<b>2036</b>	Water Service Population	112,200
	Total Supply (gallons)	7,288,957,185
	Total Supply (gpm)	13,868
	Supply per Capita (gallons/yr)	64,964
	ERUs <sup>1</sup>	47,098

Notes:

Source: Regional Water Forecast and Conservation Plan Report, January 2016

1 Based on an existing ERU = 424 gallons per day per residential family unit; gpdpd=gallons per dwelling per day

**Table 3-10**  
**Maximum Day Demand Projections**

Year	Description		City of Pasco
<b>2022-2036</b>	MDD/ADD Peaking Factor <sup>1</sup>		2.1
	PHD/ADD Peaking Factor <sup>2</sup>		2.64
<b>2022</b>	ADD	gpm	10,197
		mgd	14.7
	MDD	gpm	21,516
		mgd	31.0
	PHD	gpm	26,920
		mgd	38.8
<b>2027</b>	ADD	gpm	11,591
		mgd	16.7
	MDD	gpm	24,456
		mgd	35.2
	PHD	gpm	30,599
		mgd	44.1
<b>2036</b>	ADD	gpm	13,868
		mgd	20.0
	MDD	gpm	29,261
		mgd	42.2
	PHD	gpm	36,611
		mgd	52.8

Source: Regional Water Forecast Conservation Plan Report, 2016

1 MDD/ADD Peaking Factor: largest MDD/ADD factor observed in the last 5 years (see Table 3-2)

2 PHD/ADD Peaking Factor: historical factor, from 2009 Water Plan

3 This table is the base of maximum day demands but final peaking factors used in this study were changed due to the special demand distribution and patterns.

### 3.8 Water Supply Projections by Type of Use

Future water supply projections are based on the existing supply per capita factor, which includes: residential, non-residential and system losses. As the supply required per capita is assumed to remain constant in the future, it is implied that the residential and non-residential use ratios will also remain constant for the planning horizons.

**Table 3-11** presents the existing residential and non-residential ratios and the demand projection by type of use. Residential use includes single dwellings and multifamily connections and non-residential includes commercial, institutional, and industrial. For 2036, the additional residential supply is estimated at 4.0 mgd and the additional non-residential supply at 3.1 mgd. Based on City's Planning Department input, the additional non-residential is assumed to be mostly industrial with some commercial. It is not known where new

industrial users will develop; therefore, two likely locations were selected for evaluation of the capacity of the existing system. The location and impact of the future industrial demand is discussed in detail in **Section 6—System Analysis**.

**Table 3-11**  
**Water Supply Projections by Type of Use (Residential/Non-Residential)**

Planning Horizon	Projected Supply		Residential Consumption		Non-Residential Consumption		Other <sup>1</sup>
	(MG/yr)	(mgd)	(MG/yr)	(mgd)	(MG/yr)	(mgd)	
2014 <sup>2,3</sup>	4,598	12.6	2,484	6.8	1,952	5.3	162
Percentage of 2014 Supply	--		54%		42%		4%
2022 <sup>4</sup>	5,360	14.7	2,896	7.9	2,276	6.2	188
Increase 2014-2022	762	2.1	412	1.1	324	0.9	27
2027 <sup>4</sup>	6,092	16.7	3,291	9.0	2,586	7.1	214
Increase 2014-2027	1,494	4.1	807	2.2	635	1.7	53
2036 <sup>4</sup>	7,289	20.0	3,938	10.8	3,095	8.5	256
Increase 2014-2036	2,691	7.4	1,454	4.0	1,143	3.1	95

Notes:

- 1 Distribution System Leakage
- 2 Residential and non-residential consumption ratios were calculated from 2014 consumption data.
- 3 2014 estimates were based on measured data
- 4 Future projections were calculated using the 2014 ratios (residential/non-residential water use)

### 3.9 Summary

Population growth and water demand projections were developed for; 2014, 2022, 2027 and 2036 planning horizons. This information is based on the City's production records and water usage estimates.

The key findings of the water use analysis are:

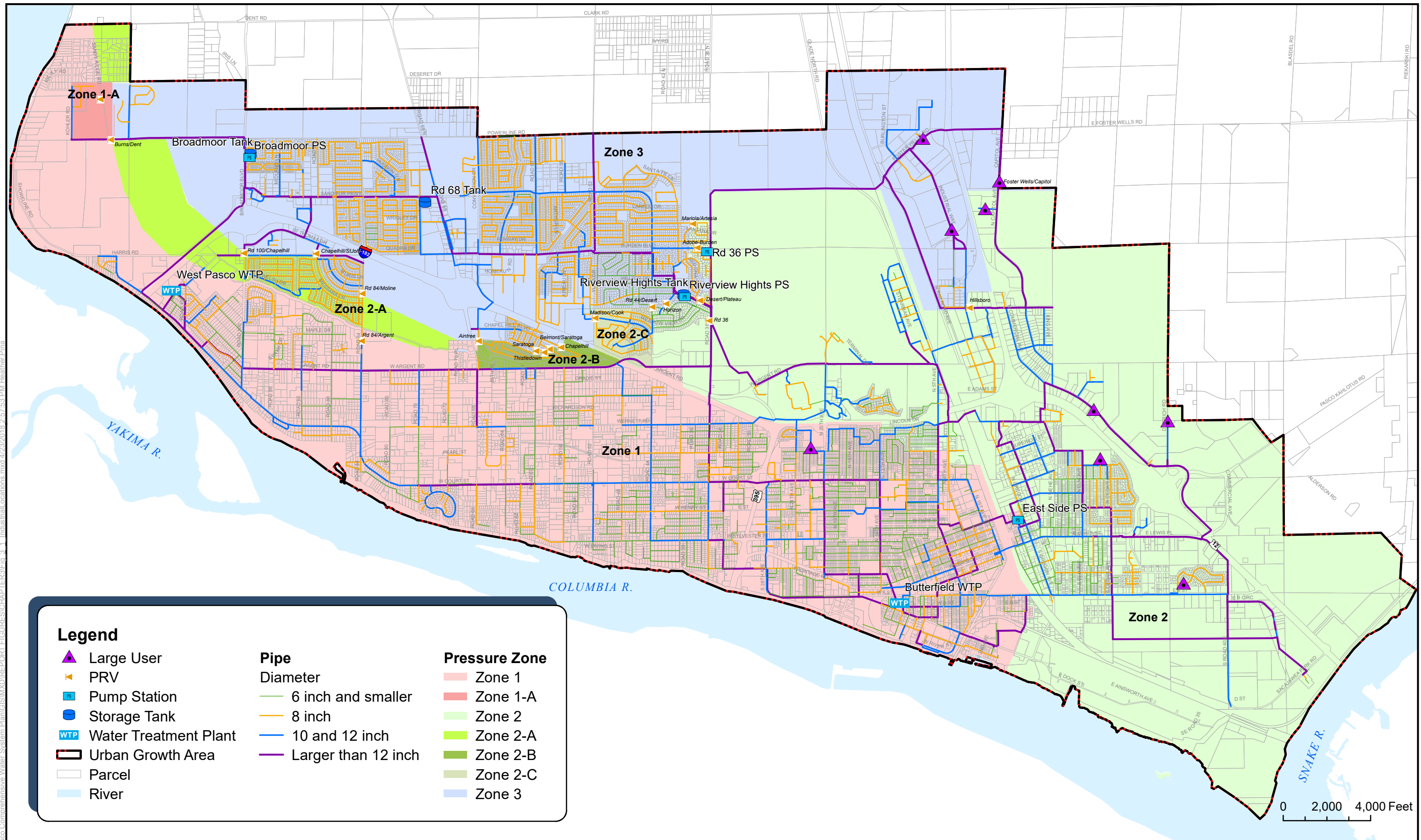
- In 2022, the City's water distribution system must have adequate capacity to serve a maximum day demand of 31.0 mgd, with a peak hour demand of 39.3 mgd, for a growth of 16 percent when compared to current demands (2014). For this planning horizon, the expected additional industrial demand is 0.6 mgd.

- In 2027, the City's water distribution system must have adequate capacity to serve a maximum day demand of 35.8 mgd, with a peak hour demand of 45.3 mgd, for a growth of 33 percent when compared to current demands (2014). For this planning horizon, the expected additional industrial demand is 1.0 mgd.
- In 2036, the City's water distribution system must have adequate capacity to serve a maximum day demand of 41.9 mgd, with a peak hour demand of 53.4 mgd, for a growth of 56 percent when compared to current demands (2014). For this planning horizon, the expected additional industrial demand is 3.1 mgd.
- Per-capita water usage and other indicators of water use in the system were evaluated on a system-wide level due to the limitation of georeferenced customer demand information.

There are geospatial tools available to obtain a better understanding of the distribution of demands in the system. In order to obtain a higher level of detail on the consumption parameters, the following studies and procedures are recommended:

- Create a georeferenced database of all water meters in the service area. The understanding of the existing use patterns will improve future demand projections and the results of future system evaluations. It is recommended to include and maintain the type of user (with or without access to separate irrigation) in the database.
- To assess the reduction in water demands for those customers served by separate irrigation, an evaluation of the City's water utility billing records is recommended. This would identify specific per capita demand patterns and peaking factors by pressure zone. This demand distribution will compare summer peak use in areas with and without a separate irrigation system and determine the different peaking factors for different areas of the system.
- Continue to implement the meter calibration program defined in the City's WUE Plan including the water meters at both the Butterfield and West Pasco WTPs with the purpose of refining the DSL estimates. The existing available data for total raw water, total net water and accounted for consumption suggest the possibility of an error in the accounting of total production.
- Complete an audit on unmetered authorized consumption (flushing, construction water, etc) to better assess DSL estimates.
- Develop a strategy for the acquisition of agricultural water rights to allow the expansion of the separate irrigation system.

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## Section **4**

## SECTION 4

### WATER SUPPLY SUMMARY

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#### 4.1 Introduction

The objective of this Section is to summarize ongoing efforts to supply sufficient quantity and quality of water to City of Pasco (City) customers. The capacity and reliability of the existing sources and the status of water rights provide an overview of the future water supply needs. The combined capacity of the existing sources was compared with projected demand for the 2022, 2027 and 2036 planning horizons to determine future supply deficiencies and the need for additional water rights acquisition. The water quality regulations and current treatment processes provide an overview of the City's water quality.

The City's water system is supplied from surface water withdrawals from the McNary Pool of the Columbia River. Although present within the service area, groundwater due to water quality concerns will not be as desirable as treated Columbia River water and its use will be limited to irrigation.

#### 4.2 Quantity of Service

##### *4.2.1 Existing Supply Description and Capacity*

Currently, the system is served by two surface water sources, Butterfield and West Pasco WTPs. **Figure 4-1** shows the location of the WTPs. The following provides a summary of the main characteristics of each plant:

##### 1) Butterfield WTP:

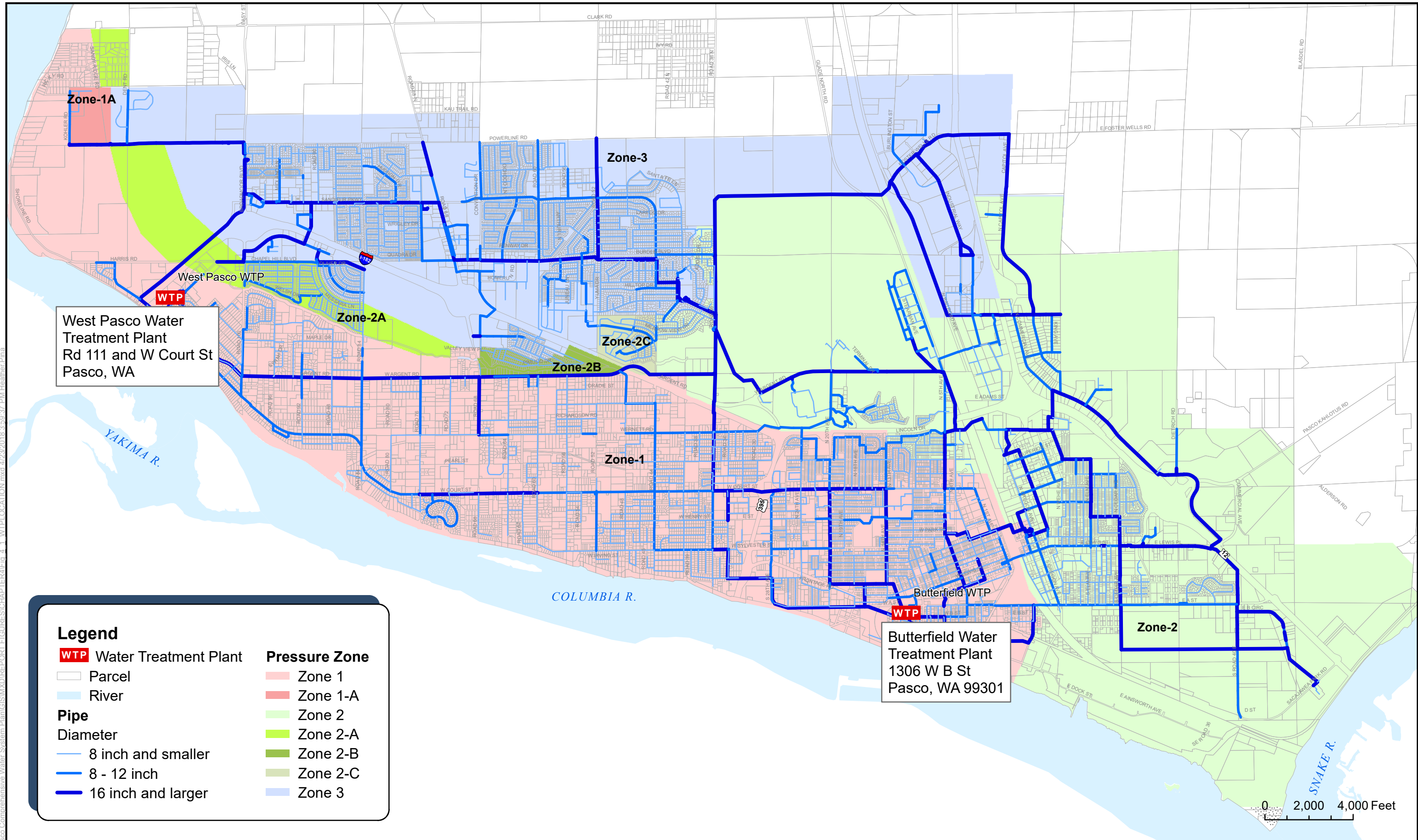
- Located south of A Street between 12th and 13th Avenues, was originally built and placed in service in 1948, and has undergone several phases of improvements since then, with the last one in 2008, when the facilities were rehabilitated and upgraded.
- The plant's raw water supply is the Columbia River, which has (historically) good water quality.
- The WTP's maximum supply capacity is 26.8 mgd, restricted by the pump station capacity. The treatment maximum capacity is 34.2 mgd, with a "reliable" capacity of 30 mgd with one filter out-of-service. The maximum capacity was measured in 2008 during a Tracer Study.
- The plant employs conventional filtration which includes: coagulation, flocculation, sedimentation, and filtration. The facility uses chlorine gas as the primary disinfectant and aluminum sulfide (alum) and polymer for coagulation. **Figure 4-2** presents a schematic of the Butterfield WTP.

- The existing plant produces finished water meeting current regulations, and serves as a reliable, cost effective, and easy to operate facility.
- The City currently fluoridates the finish water.
- The plant delivers water supply to Zone 1 through the high service pump station.

## 2) West Pasco WTP

- Located near West Court Street and Interstate-182. The plant went online in 2011.
- The existing facility is a Pressure Membrane Direct Micro-Filtration Plant. It has two parallel trains of ultrafiltration membranes, each with a capacity of 3 mgd. Upstream of the membranes are two motorized, self-cleaning Amiad strainers with 300 micron mesh screens. **Figure 4-2** presents a schematic of the West Pasco WTP.
- The plant has a current capacity of 6 mgd and is designed for expansion up to 18 mgd in 6 mgd increments.
- The plant includes an above ground reservoir which serves as a clearwell. The reservoir has a 100-foot inside diameter and has an operating level between 19 feet (minimum depth) and 27 feet (maximum depth). The minimum storage volume is about 1.1 MG and the maximum volume is about 1.6 MG with an operating volume of approximately 500,000 gallons.
- There are currently two high head pumps for delivering finished water from the clearwell into Zone 1. Each 100 hp pump operates on a variable frequency drive (VFD) and is capable of pumping 3 mgd. As the plant is expanded, the plan is to install one 400 hp, 6 mgd, constant speed pump in the next capacity increment and a second 400 hp, 6 mgd, constant speed pump in the final increment of capacity expansion.

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### Legend

- |                                  |                      |
|----------------------------------|----------------------|
| <b>WTP</b> Water Treatment Plant | <b>Pressure Zone</b> |
| Parcel                           | Zone 1               |
| River                            | Zone 1-A             |
| <b>Pipe</b>                      | Zone 2               |
| Diameter                         | Zone 2-A             |
| 8 inch and smaller               | Zone 2-B             |
| 8 - 12 inch                      | Zone 2-C             |
| 16 inch and larger               | Zone 3               |

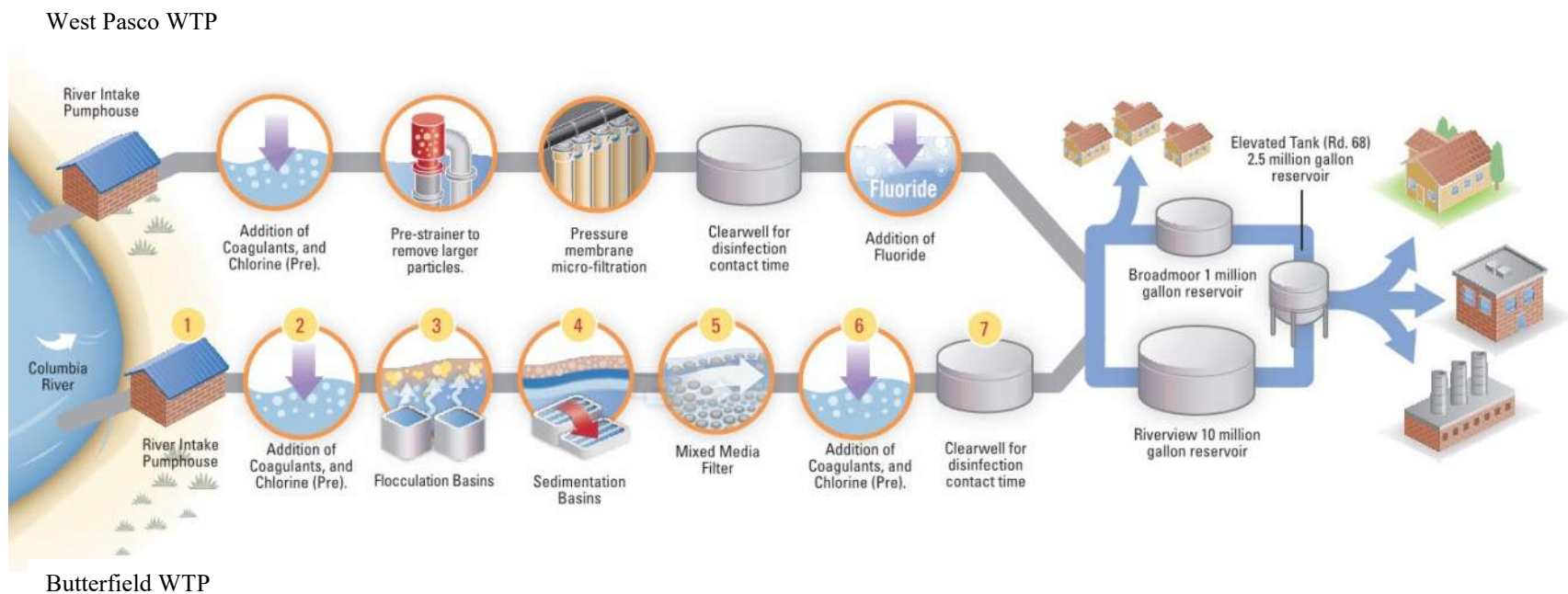


## Comprehensive Water System Plan Update City of Pasco



**Figure 4-1  
Water Treatment Plants  
Location**

**Figure 4-2  
Butterfield and West Pasco WTP Schematic**



#### ***4.2.2 Water Rights***

A water right is a legal authorization to use a specific amount of public water for a defined purpose from specified points of diversion or withdrawal and places of use. The water right amount is expressed in terms of instantaneous withdrawal rate ( $Q_i$ ) and annual withdrawal volume ( $Q_a$ ). Waters of Washington State collectively belong to the public and State law requires users (providers) to apply for and receive approval from the WA Department of Ecology prior to actual water use. This approval is granted in the form of a water right permit or certificate.

The City holds surface water rights for domestic potable water uses and individual surface and groundwater rights for separate irrigation purposes. Groundwater rights that the City holds for domestic supply have been transferred to surface water. The domestic rights include the direct pumping allowance from the McNary Pool of the Columbia River for the Butterfield and West Pasco WTPs.

The available domestic water rights for the City are summarized in **Table 4-1**. The City currently has a total annual allowance of approximately 13,269.25 acre-feet of domestic water rights. The City also has irrigation water rights for their separate irrigation system, which are presented in Table 2-3 of the City's Irrigation System Master Plan, December 2013. The City currently has a total annual allowance of approximately 7,153 acre-feet of irrigation water rights.

**Table 4-1  
Pasco Domestic Water Rights Summary**

<b>Record Number</b>	<b>Maximum Instantaneous Withdrawal Flow Rate, Qi (gpm)</b>	<b>Maximum Annual Withdrawal Volume, Qa (acre-ft)</b>
G3-20243(A) <sup>1</sup>	1,612	483.6
G3-20243(B) <sup>1</sup>	214	107.9
G3-27413(B) <sup>1</sup>	270	108.1
G3-27413(C) <sup>1</sup>	573.75	203.4
G3-27413(D) <sup>1</sup>	281.25	112.4
G3-27413(F) <sup>1</sup>	270	108
S3-*17908C	15,708	7,000
G3-*10704C(A) <sup>2</sup>	375	76.2
G3-*10704(B) <sup>2</sup>		132.8
G3-26081C(A) <sup>3</sup>	400	291.3
G3-25177C(A) <sup>3</sup>	300	
G3-26081C(B) <sup>3</sup>		190
G3-25177C(B) <sup>3</sup>		158.7
S4-30976 <sup>4</sup>	1,122	1,806.75
S4-30976 <sup>5</sup>	2,244	3,613.50
<b>Total Rights</b>	<b>20,149</b>	<b>13,269.25</b>
<b>Location for all rights: WTP Inlets</b>		
<b>Source for all rights: Columbia River</b>		

Notes:

- 1 Seasonal municipal supply from February 1 to October 31, each year. These rights are currently used for irrigation and are not counted in the total domestic water right.
- 2 Combined total of 375 gpm instantaneous and 209 acre-ft annually.
- 3 Combined total of 700 gpm instantaneous and 640 acre-ft annually.
- 4 The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.
- 5 Additional allocation approved by other QCWR municipalities.

### 4.2.3 Existing Water Rights Evaluation

**Table 4-2** summarizes City's water rights self-assessment. Water rights should be equal or larger than the expected maximum day consumption and total annual production. Currently the City of Pasco is in compliance with its water right quantities by borrowing a Quad City's water right. The annual maximum available volume authorized is 13,269.25 acre-feet and the existing consumption is 14,424 acre-feet. **Table 4-2** is a summary of the information included in WDOH's existing water rights evaluation form; the completed form is presented in **Appendix 4-A**.

The instantaneous authorized withdrawal rate is 20,149.00 gpm and the existing MDD is approximately 18,456 gpm. The authorized instantaneous rate is sufficient to meet MDD and fire suppression storage replenishment needs.

**Table 4-2**  
**Water Rights Self-Assessment - Existing Status**

Permit Certificate	Name on Document	Existing Water Rights	
		Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-ft)
Permits/ Certificates			
G3-20243(A) <sup>1</sup>	City of Pasco	1,612	483.6
G3-20243(B) <sup>1</sup>	City of Pasco	214	107.9
G3-27413(B) <sup>1</sup>	City of Pasco	270	108.1
G3-27413(C) <sup>1</sup>	City of Pasco	573.75	203.4
G3-27413(D) <sup>1</sup>	City of Pasco	281.25	112.4
G3-27413(F) <sup>1</sup>	City of Pasco	270	108
11660	City of Pasco	15,708	7,000
7205-A(A) <sup>2</sup>	City of Pasco	375	76.2
10192(B) <sup>2</sup>	City of Pasco		132.8
G3-26081C(A) <sup>3</sup>	City of Pasco	400	291.3
G3-25177C(A) <sup>3</sup>	City of Pasco	300	
G3-26081(B) <sup>3</sup>	City of Pasco		190
G3-25177C(B) <sup>3</sup>	City of Pasco		158.7
S4-30976 <sup>4</sup>	Richland, Kennewick, Pasco, West Richland	1,122	1,806.75
S4-30976 <sup>5</sup>	Richland, Kennewick, Pasco, West Richland	2,244	3,613.50
TOTAL		20,149	13,269.25
Existing Consumption		18,456	14,424.11
Current Water Right Status (Excess/Deficiency)		1,693.00	(1,154.86)
Pending water right transactions			
G3-01085C <sup>6</sup>	Cecil C. Hill	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	1,400	558
G3-20245	City of Pasco	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	600	138.4
G3-24546	City of Pasco	1,200	609.6
G3-20247	City of Pasco	5,200	2,101.6
G3-22491	City of Pasco	2,160	1,037
G3-22499	City of Pasco	1,440	744
G3-23867	City of Pasco	2,400	1,116
G3-25175	City of Pasco	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	450	170
S3-28788C	City of Pasco	139	56
S4-33044(A) <sup>7</sup>	City of Pasco	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	3,097	2,500



Permit Certificate	Name on Document	Existing Water Rights	
		Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-ft)
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	_9	_9

Notes:

- 1 Seasonal municipal supply from February 1 to October 31, each year. These rights are currently used for irrigation only and are not counted in the total domestic water right. 2 Combined total of 375 gpm instantaneous and 209 acre-ft annually.
- 3 Combined total of 700 gpm instantaneous and 640 acre-ft annually.
- 4 The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.
- 5 Additional allocation approved by other QCWR municipalities.
- 6 Pending reassignment.
- 7 Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).
- 8 Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).
- 9 Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.

#### 4.2.4 Future Water Rights

**Tables 4-3, 4-4 and 4-5** show the water rights self-assessment evaluation for the 2022, 2027, and 2036 planning horizons. These planning horizons are based on the 2014 per-capita demands and the projected population data from **Section 3 – Population and Water Demand**. **Tables 4-3, 4-4 and 4-5** summarize the information included in WDOH’s water rights evaluation form; the completed forms are presented in **Appendix 4-A**.

Deficits are forecasted for upcoming planning years. By year 2022, Qi and Qa are estimated to be deficient by 1,367 gpm and 3,178.42 acre-feet respectively. By year 2027, Qi and Qa fall short of projected demands by an estimated 4,307 gpm and 5,426.4 acre-feet respectively. By year 2036, Qi and Qa fall short of projected demands by an estimated 9,112 gpm and 9,099.08 acre-feet, respectively.

These deficits are currently being addressed through the pursuit of securing additional water rights through the various transactions listed in **Tables 4-3, 4-4 and 4-5** and **Appendix 4-A**. The pending transactions will provide 28,083gpm of additional instantaneous capacity and 16,674.6 acre-feet of additional annual withdrawal volume, enough to surpass the 2036 planning horizon deficits projected for Qi and Qa.

Two of the pending water rights transactions rely on an application collectively submitted in 2011 to Ecology’s Office of the Columbia River (OCR) by the Quad Cities (Pasco, Kennewick, Richland and West Richland). The S4-33044 application requested a water right permit to appropriate water from the Columbia River for municipal purposes for current and future growth. The application requested a Qi of 74,057 gpm and a Qa of 86,983 acre-ft. In 2015, the City of Pasco requested this application be split into two portions: the City requested a Qi of 3,097 gpm and a Qa of 5,000 acre-feet under Portion A. In 2016, the City

filed for an additional split from S4-33044 with OCR, requesting a Qa of 2,500 acre-feet. Permit approval of these applications will contribute to the City's ability to meet projected future demands. Additional municipal rights would be available for the Quad Cities under Portion B. All split portions of the application are in process at the time of this CWSP.

**Appendix 4-I** includes a copy of the Quad City Water Right (QCWR) issued under Surface Water Permit No. S4-30976P.

The City is also evaluating acquisition of additional water rights to meet future demands. The City is in discussions with the U.S. Bureau of Reclamation to potentially secure up to 5,000 acre-feet of additional water supply.

Pasco continues to maximize the use of their individual water rights in an attempt to minimize the use of the QCWR and to minimize the impact on the Columbia River instream flow. Examples of the City's attempts at minimizing QCWR water right utilization includes the use of reclaimed water at a Pasco-owned agricultural property and the use of groundwater wells for outdoor residential irrigation.

#### ***4.2.5 Mitigation Requirements***

The QCWR includes a provision requiring that consumptive water use under this permit be mitigated any time applicable flow objectives in the Columbia River are not met. Consumptive use is defined as the amount of water removed from the environment and not returned, and is considered a diminishment of the water source. Consumptive-use examples for municipal water supply uses (e.g., domestic, irrigation, industrial, and commercial) include evapotranspiration from outdoor watering of lawns and gardens; evaporation from cooling and heating processes, firefighting, and street washing; food preparation; and industrial product incorporation.

Based on the 2008 RWFCP, the consumptive-use portion that would require mitigation is 60 percent of the QCWR water utilized during these low-flow periods. Procedures for complying with this mitigation provision are summarized in the 2016 RWFCP (see **Appendix 3-A**) and described in the QCWR Permit BiOp Compliance Procedure document. Ecology provided the first phase of mitigation through procurement of existing water rights and water available through the Lake Roosevelt Incremental Storage Release Program. The cities will be required to procure additional water rights to mitigate their consumptive use for future QCWR phase distributions. Projected mitigation needs are presented in the 2016 RWFCP, though those reported for the City of Pasco are no longer accurate considering the City holds more water rights than were stated in the RWFCP.

The 2016 RWFCP projects mitigation requirements for years 2021 and 2035 under two mitigation alternatives. The two alternatives consider differences associated with how the water rights used for mitigation are accounted for throughout the year. The Quad Cities have requested that Ecology allow mitigation Alternative 1 (defined in Appendix E of the 2016 RWFCP) to be utilized for future mitigation. Alternative 1 mitigation projections presented in the RWFCP indicate that sufficient mitigation volume is available for all months through year 2021 from the Buckley, Byerly, and Phase 1 Lake Roosevelt mitigation water rights. Projections for year 2035 indicate that an additional 3,450 acre-feet of mitigation volume will

be required beyond what is available from the Bukley, Byerly, and the first two phases of Lake Roosevelt mitigation water.

Aquifer storage and recovery (ASR) has the ability to self-mitigate use of water under the QCWR permit. ASR involves the injection and storage of high quality water in a suitable aquifer during times it is available (e.g., winter and spring), and recovering that water for beneficial use during periods of high demand (e.g., summer and fall). By transferring surface water supply availability from the winter (when instream flow targets on the Columbia River are typically met) to the summer via ASR, impacts on low summer river flows and QCWR mitigation requirements are eliminated. Because of its role in reducing environmental effects of summer surface water diversion and reducing QCWR mitigation requirements, an ASR Feasibility Study is a recommended study identified in the **Section 7 – Capital Improvement Program**.

Further mitigation offsets by using ASR could be realized in the form of increased return flow to the river from the City's wastewater treatment plant or through increased non-consumptive return flow during the low-flow period (e.g., via domestic irrigation and septic returns). ASR would provide winter storage capacity that could be used to address summer instantaneous flow limitations and provide water for periods of peak demand. The stored ASR water would provide additional water to the system during the summer and proportionally increase return flows to the river.

#### 4.2.6 Interties

The City of Pasco currently does not have any interties with adjacent water purveyors or has any plan of connecting to other systems in the near future.

**Table 4-3**  
**Water Rights Self-Assessment - 2022 Status**

Permit certificate or claim number	Name on document	Existing Water rights	
		Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
Permits/Certificates			
G3-20243(A) <sup>1</sup>	City of Pasco	1,612	483.6
G3-20243(B) <sup>1</sup>	City of Pasco	214	107.9
G3-27413(B) <sup>1</sup>	City of Pasco	270	108.1
G3-27413(C) <sup>1</sup>	City of Pasco	573.75	203.4
G3-27413(D) <sup>1</sup>	City of Pasco	281.25	112.4
G3-27413(F) <sup>1</sup>	City of Pasco	270	108
11660	City of Pasco	15,708	7,000
7205-A(A) <sup>2</sup>	City of Pasco	375	76.2
10192(B) <sup>2</sup>	City of Pasco		132.8
G3-26081C(A) <sup>3</sup>	City of Pasco	400	291.3
G3-25177C(A) <sup>3</sup>	City of Pasco	300	
G3-26081 (B) <sup>3</sup>	City of Pasco		190
G3-25177C(B) <sup>3</sup>	City of Pasco		158.7

Permit certificate or claim number	Name on document	Existing Water rights	
		Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
S4-30976 <sup>4</sup>	Cities of Richland, Kennewick, Pasco and West Richland (c/o Richland)	1,122	1,806.75
S4-30976 <sup>5</sup>	Cities of Richland, Kennewick, Pasco and West Richland (c/o Richland)	2,244	3,613.50
<b>TOTAL</b>		<b>20,149.00</b>	<b>13,269.25</b>
<b>Forecasted Water Use from Sources (2022 demand)</b>		21,516	16,447.67
<b>Forecasted Water Right Status (Excess/Deficiency)</b>		(1,367.00)	(3,178.72)
<b>Pending water right transactions</b>			
G3-01085C <sup>6</sup>	Cecil C. Hill	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	1,400	558
G3-20245	City of Pasco	5,200	2,101.6
G3-20247	City of Pasco	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	600	138.4
G3-22491	City of Pasco	2,160	1,037
G3-22499	City of Pasco	1,440	744
G3-24546	City of Pasco	1,200	609.6
G3-23867	City of Pasco	2,400	1,116
G3-25175	City of Pasco	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	450	170
S3-28788C	City of Pasco	139	56
S4-33044(A) <sup>7</sup>	City of Pasco	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	3,097	2,500
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	- <sup>9</sup>	- <sup>9</sup>

Notes:

- 1 Seasonal municipal supply from February 1 to October 31, each year. These rights are currently used for irrigation and are not counted in the total domestic water right.
- 2 Combined total of 375 gpm instantaneous and 209 acre-ft annually.
- 3 Combined total of 700 gpm instantaneous and 640 acre-ft annually.
- 4 The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.
- 5 Additional allocation approved by other QCWR municipalities.
- 6 Pending reassignment.
- 7 Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).
- 8 Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).
- 9 Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.

**Table 4-4  
Water Rights Self-Assessment - 2027 Status**

Permit certificate or claim number	Name on document	Existing Water rights	
		Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
Permits/Certificates			
G3-20243(A) <sup>1</sup>	City of Pasco	1,612	483.6
G3-20243(B) <sup>1</sup>	City of Pasco	214	107.9
G3-27413(B) <sup>1</sup>	City of Pasco	270	108.1
G3-27413(C) <sup>1</sup>	City of Pasco	573.75	203.4
G3-27413(D) <sup>1</sup>	City of Pasco	281.25	112.4
G3-27413(F) <sup>1</sup>	City of Pasco	270	108
11660	City of Pasco	15,708	7,000
7205-A(A) <sup>2</sup>	City of Pasco	375	76.2
10192(B) <sup>2</sup>	City of Pasco		132.8
G3-26081C(A) <sup>3</sup>	City of Pasco	400	291.3
G3-25177C(A) <sup>3</sup>	City of Pasco	300	
G3-26081 (B) <sup>3</sup>	City of Pasco		190
G3-25177C(B) <sup>3</sup>	City of Pasco		158.7
S4-30976 <sup>4</sup>	Cities of Richland, Kennewick, Pasco and West Richland (c/o Richland)	1,122	1,806.75
S4-30976 <sup>5</sup>	Cities of Richland, Kennewick, Pasco and West Richland (c/o Richland)	2,244	3,613.50
TOTAL		20,149.00	13,269.25
Forecasted Water Use from Sources (2027 demand)		24,456	18,695.65
Forecasted Water Right Status (Excess/Deficiency)		(4,307.00)	(5,426.40)
Pending water right transactions			
G3-01085C <sup>6</sup>	Cecil C. Hill	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	1,400	558
G3-20245	City of Pasco	5,200	2,101.6
G3-20247	City of Pasco	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	600	138.4
G3-22491	City of Pasco	2,160	1,037
G3-22499	City of Pasco	1,440	744
G3-24546	City of Pasco	1,200	609.6
G3-23867	City of Pasco	2,400	1,116
G3-25175	City of Pasco	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	450	170
S3-28788C	City of Pasco	139	56
S4-33044(A) <sup>7</sup>	City of Pasco	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	3,097	2,500

Permit certificate or claim number	Name on document	Existing Water rights	
		Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	- <sup>9</sup>	- <sup>9</sup>

Notes:

- 1 Seasonal municipal supply from February 1 to October 31, each year. These rights are currently used for irrigation and are not counted in the total domestic water right.
- 2 Combined total of 375 gpm instantaneous and 209 acre-ft annually.
- 3 Combined total of 700 gpm instantaneous and 640 acre-ft annually.
- 4 The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.
- 5 Additional allocation approved by other QCWR municipalities.
- 6 Pending reassignment.
- 7 Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).
- 8 Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).
- 9 Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.

**Table 4-5**  
**Water Rights Self-Assessment - 2036 Status**

Permit certificate or claim number	Name on document	Existing Water rights	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/Certificates			
G3-20243(A) <sup>1</sup>	City of Pasco	1,612	483.6
G3-20243(B) <sup>1</sup>	City of Pasco	214	107.9
G3-27413(B) <sup>1</sup>	City of Pasco	270	108.1
G3-27413(C) <sup>1</sup>	City of Pasco	573.75	203.4
G3-27413(D) <sup>1</sup>	City of Pasco	281.25	112.4
G3-27413(F) <sup>1</sup>	City of Pasco	270	108
11660	City of Pasco	15,708	7,000
7205-A(A) <sup>2</sup>	City of Pasco	375	76.2
10192(B) <sup>2</sup>	City of Pasco		132.8
G3-26081C(A) <sup>3</sup>	City of Pasco	400	291.3
G3-25177C(A) <sup>3</sup>	City of Pasco	300	
G3-26081 (B) <sup>3</sup>	City of Pasco		190
G3-25177C(B) <sup>3</sup>	City of Pasco		158.7
S4-30976 <sup>4</sup>	Cities of Richland, Kennewick, Pasco, and West Richland (c/o Richland)	1,122	1,806.75
S4-30976 <sup>5</sup>	Cities of Richland, Kennewick, Pasco, and West Richland (c/o Richland)	2,244	3,613.50
TOTAL		20,149.00	13,269.25
Forecasted Water Use from Sources (2036 demand)		29,261	22,368.83

Permit certificate or claim number	Name on document	Existing Water rights	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Forecasted Water Right Status (Excess/Deficiency)		(9,112.00)	(9,099.08)
Pending water right transactions			
G3-01085C <sup>6</sup>	Cecil C. Hill	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	1,400	558
G3-20245	City of Pasco	5,200	2,101.6
G3-20247	City of Pasco	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	600	138.4
G3-22491	City of Pasco	2,160	1,037
G3-22499	City of Pasco	1,440	744
G3-23867	City of Pasco	2,400	1,116
G3-24546	City of Pasco	1,200	609.6
G3-25175	City of Pasco	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	450	170
S3-28788C	City of Pasco	139	56
S4-33044(A) <sup>7</sup>	City of Pasco	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	3,097	2,500
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	- <sup>9</sup>	- <sup>9</sup>

Notes:

1 Seasonal municipal supply from February 1 to October 31, each year. These rights are currently used for irrigation only and are not counted in the total domestic water right. -ft annually.

3 Combined total of 700 gpm instantaneous and 640 acre-ft annually.

4 The total for the Quad Cities Water Right Pact (QCWR), for all cities, is approximately 80,000 gpm.

5 Additional allocation approved by other QCWR municipalities.

6 Pending reassignment.

7 Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).

8 Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).

9 Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.

## 4.3 Water Quality

### 4.3.1 Drinking Water Regulations

The quality of drinking water in the United States is regulated by the Environmental Protection Agency (EPA). Under provisions of the Safe Drinking Water Act (SDWA), the EPA is allowed to delegate primary enforcement responsibility for water quality control to each State. In the State of Washington, the WDOH is the agency responsible for implementing and enforcing the drinking water regulations. WDOH's regulations are described in Section 246-290 of the Washington Administrative Code (WAC).

The City's complies with all drinking water regulations and has no water quality issues that cause a violation in the system. Both English and Spanish versions of the current Water Quality Report, which provides information on the water system and testing results in that year, are available on the City's website. The 2016 Consumer Confidence Report is available in **Appendix 4-B**.

#### **4.3.2 SDWA Rules**

The SDWA sets standards for the quality of drinking water and requires water treatment if these standards are not met. The SDWA also sets water testing schedules and methods that water systems must follow. The SDWA rules are:

- Disinfectants and Byproducts Rule
  - Stage 1 Disinfectant/Disinfectant By-Products (Stage 1 D/DBP) Rules
  - Stage 2 Disinfectant/Disinfectant By-Products (Stage 2 D/DBP) Rules
- Drinking Water Contaminant Candidate List (CCL)
- Total Coliform Rule (TCR)
- Groundwater Rule
- Radionuclide Rule
- Radon Rule
- Arsenic Rule
- Lead and Copper Rule (LCR)
- Chemical Phase Rules (Organic and Inorganic Contaminants)
  - Phase I Rule
  - Phase II Rule
  - Phase V Rule
- Surface Water Treatment Rule (SWTR)
- Enhanced Surface Water Treatment Rules (ESWTRs)
  - Interim Enhanced Surface Water Treatment Rule (IESWTR)
  - Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)
- Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

Each of these rules is explained in detail in **Appendix 4-C**.



### ***4.3.3 Water Treatment Process Description***

Current water treatment processes, monitoring schedules and plans are designed to meet with SDWA rules. The updated main plans are included in the Appendices:

- **Appendix 4-D:** Coliform Monitoring Plan
- **Appendix 4-E:** Stage 2 DBP Monitoring Plan
- **Appendix 4-F:** Risk Management Plan
- **Appendix 4-G:** Cross Connection Control Plan

The treatment processes and operation and maintenance conducted at the Butterfield and West Pasco WTPs are described further in **Section 9 – Operations Program**.

### **4.4 Watershed Control Program**

Existing drinking water system planning requirements (WAC 246-290-135) require all Group A systems using surface water as a source of supply to develop a watershed control program. The City's watershed control program is presented in **Appendix 4-H**. The program (1) identifies the watershed contributing to the City's source water supply, (2) provides an inventory of potential threats to source water quality, (3) identifies management strategies to reduce potential contamination of the water supply sources, and (4) describes emergency provisions to implement in the event of a temporary or permanent loss of the City's water supply sources. The program also includes recommendations for a regional watershed control program to be developed under a collaborative effort amongst all Quad Cities.

### **4.5 Summary**

The City's water system is supplied from surface water withdrawals from the McNary Pool of the Columbia River. Currently, the system is served by two surface water treatment plants, Butterfield, which is a conventional filtration plant and West Pasco is an ultrafiltration membrane plant. Overall "reliable" capacity is 30 mgd and 6 mgd respectively.

The City currently holds surface water rights for 13,269.25 acre-ft of annual withdrawal and 20,149 gpm (29 mgd) of instantaneous withdrawal. The source for these rights is the Columbia River and beneficial use is for domestic potable purposes. The City also holds individual groundwater rights sourced by various wells for separate irrigation purposes. Water rights held by the City are anticipated to increase in the future pending the following:

- Reassignment of water rights that the City currently holds in possession.
- The outcome of applications for new water rights made to Ecology in 2011 and 2015.
- Additional water rights available through subsequent distributions of water available under the regional Quad City Water Right (QCWR) permit. The QCWR permit identifies a total allocation of 178 cubic feet per second (cfs) (79,892 gpm) and

96,619 acre-feet, to be distributed amongst the Quad Cities (Pasco, Kennewick, Richland, and West Richland) in phases.

- Additional water rights the City may acquire in the future, including potential acquisition of up to 5,000 acre-feet of additional water supply from the U.S. Bureau of Reclamation.

The City complies with all drinking water regulations and has no water quality issues that cause a violation in the system. The current Consumer Confidence Report which provides information on the water system and testing results in that year are available on the City's website.

## Section 5

## **SECTION 5**

### **DESIGN AND CONSTRUCTION STANDARDS**

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#### **5.1 Introduction**

This Section describes the performance and design criteria to identify system deficiencies and to size improvements. These criteria include the required minimum and maximum service pressure, maximum velocity and head loss, fire flow availability and duration, the required size of storage components, and capacity of supply sources.

As a public water utility, the City is regulated by the Washington State Department of Health (WDOH). The performance and design criteria are based on the Washington Administrative Code (WAC) and WDOH Water System Design Manual, 2009. In addition, information is provided on current American Water Works Association (AWWA) guidelines, current practices of similar water utilities, and Murraysmith engineering experience.

The latest edition of Recommended Standards for Water Works (commonly called the Ten State Standards) (Ten State Standards, 2012) contains guidelines for good engineering practice; however, WDOH dictates the use of criteria specified in its manual when it differs from those found in the Ten State Standards.

This Section also references the City's Construction Standard Specifications and Standard Drawings which are reviewed regularly by the Public Works Department for implementation of recommended changes, additions, and deletions. To ensure adequately sized and consistent water system components are installed as new development occurs additional development construction requirements for water system expansion are recommended in this Section.

#### **5.2 Summary of Performance Criteria**

**Table 5-1** summarizes the proposed hydraulic criteria used for the system analysis in this CWSP. The remainder of the section provides a more detailed discussion of each criterion including relevant standards and the recommended values for the CWSP.

Water system infrastructure must meet minimum requirements for all appropriate design elements (source, transmission and distribution, storage, and treatment). All design factors must include minimum reliability requirements and adhere to industry standards (WAC 246-290).

**Table 5-1**  
**City of Pasco - Summary of Performance Criteria**

<b>Criterion</b>	<b>Element and Description</b>
Hydraulic Analysis	A comprehensive calibrated hydraulic model should be used to size and evaluate the existing and proposed distribution system. WDOH requires a detailed hydraulic analysis as part of a purveyor's CWSP. (WAC 246-290-230(1))
Demand Scenarios	Facilities should be sufficient to meet all customers' water demands during peak day or peak hour operating conditions (when water use is at its highest). The design/evaluation must consider the water system operation under a full range of expected demands and emergency conditions (fire flow). (WAC 246-290-221)
Supply to Distribution System	Water sources should be protected against power loss and potential water system depressurization. WDOH recommends on-site backup power equipment or gravity standby storage, regardless of the power grid reliability. (WAC 246-290-230)
General Supply Reliability	In addition to a source's ability to meet the design demands of a water system over time, reliability includes (1) the ability of the facilities to meet the designed performance criteria for the water system, and (2) the legal authority to use the water over time. (WAC 246-290-222)
Minimum Service Pressure	30 psi during peak hour demand (PHD) condition, when equalizing storage is depleted. (WAC 246-290-230(5)) 20 psi residual within the water distribution system during maximum day demand (MDD) plus fire flow, when equalizing and fire flow storage are depleted. (WAC 246-290-230(6))
Maximum Velocity	8 fps for peak hour demand condition 10 fps for maximum day plus fire flow
Fire Flows	Per 2012 International Fire Code (WAC 246-290-221(5)): Residential dwelling with fire flow area <sup>1</sup> less than 3,600 sqf: 1,000 gpm, 1 hr duration Residential dwelling with fire flow area <sup>1</sup> of 3,600 sqf or larger 1,500 gpm, 2 hrs duration Commercial and Industrial: based on area and type of construction (see Table 5-2). System must be able to provide MDD plus worst case fire flow requirement with a minimum pressure of 20 psi at all service connections.
Reservoir Storage	Storage components (WAC 246-290-235(3)): 1) Operational storage: based on individual system 2) Equalizing storage: (PHD-Total Supply Capacity)*150 min or calculate based on diurnal curve 3) Standby storage: Largest of 200 gal/ERU or 2days (ADD-Firm Supply Capacity) 4) Fire suppression storage: Per local fire protection authority, adequate to serve the largest fire requirement in the zone 5) Dead storage: based on each individual storage tank and is removed from the available storage included in capacity evaluation
Pumping Facilities	When supplying open systems (systems with a reservoir): Pump station total capacity must be equal or larger than MDD for the pressure zone or system. Pump station firm capacity must be equal or larger than ADD for the pressure zone or system. (WAC 246-290-222, Water System Design Manual 10.1.1)  When supplying closed systems (systems without a reservoir): Pump station must be able to provide PHD with the largest pump out-of-service, and MDD plus fire flow with the largest "routinely used" pump out-of-service. (WAC 246-290-660(1))

Note:

1 Fire flow area: total floor area of all floor levels within the exterior walls and under the horizontal projections of the roof of a building.

### 5.3 Fire Flow Design Standards

The fire flow design standards for the City's distribution system follow the 2012 International Fire Code (IFC). Per the 2012 IFC, a residential unit under 3,600 sqf is allowed a minimum of 1,000 gpm flow for a duration of 1 hr. Residential units of 3,600 sqf or larger require a minimum flow of 1,500 gpm flow for a duration of 2 hour. For other building types (commercial or industrial) the fire flow required is based on the type of construction and square footage, as it is presented in Table 5-2, 2012 IFC Table B105.1.

In addition to the rates and duration described in **Table 5-2**, the water system must be capable of supplying the MDD rate at a minimum of 20-psi residual pressure throughout the distribution system.

As building size information is not available for the entire City, for the system capacity evaluations (presented in **Section 6- System Analysis**), the fire flow availability during maximum day conditions was calculated throughout the system; that is the maximum flow available while providing a minimum of 20 psi at all service connections. The fire flow availability was compared to a reasonable minimum fire flow requirement for each land use type: residential: 1,000 gpm, commercial: 2,000 gpm or industrial: 3,500 gpm. Locations where the flows available are less than the suggested minimum flow were evaluated in detail to address the need for improvements. Also, localized fire flow evaluations were performed for the largest structure(s) per pressure zone; the fire flow requirement for these locations were based on **Table 5-2**.

The City requires that future developments be designed and constructed to meet current building and fire codes. A specific analysis of the water system should be performed to determine fire demand that can be provided to new developments and, if necessary, water system improvements needed to provide required fire protection to the proposed development and would have to be made by the developer.

**Table 5-2**  
**2012 International Fire Code TABLE B105.1 for**  
**Buildings other than One- and Two- Family Dwellings**

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gpm) <sup>2</sup>	Flow Duration (hours)
Type IA and IB <sup>1</sup>	Type IIA and IIIA <sup>1</sup>	Type IV and V-A <sup>1</sup>	Type IIB and IIIB <sup>1</sup>	Type V-B <sup>1</sup>		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

Notes:

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

<sup>1</sup> Types of construction are based on the International Building Code.

<sup>2</sup> Measured at 20 psi residual pressure.

## 5.4 Storage Components

Storage within a water system consists of five components. Each of the following five components must be considered for reservoir design.

- **Operational Storage (OS):** The volume of the reservoir devoted to supplying the water system, while under normal operating conditions when the sources of supply are “off”. The purpose of this storage is to minimize the number of pump start/stop cycles. This component of the storage reservoir is considered additive to the other components of storage.
- **Equalizing Storage (ES):** The storage that insures that maximum instantaneous demands can be met at any time. The water system sources are typically sized to meet maximum day demands and the maximum instantaneous demands are met by “equalizing storage” from reservoirs within the system. This permits economy in the sizing of the sources. Reservoirs assist in meeting peak demands and are typically refilled at night during periods of low demand.

**ES = (PHD – Q<sub>s</sub>) (150 minutes)**, but in no case less than zero

Where:

**ES** = Equalizing Storage, in gallons.

**PHD** = Peak Hour Demand, in gpm.

**Q<sub>s</sub>** = Sum of all installed and active sources, except emergency supply, in gpm.

- **Standby Storage (SB):** Provides a supply of water during emergency conditions such as a prolonged power outage or a transmission line failure. The WDOH provides guidelines for sizing of the standby storage component in the *Water System Design Manual*. Standby storage for systems with multiple sources such as the City’s are generally required to calculate the standby storage component with the equations listed in the *WDOH Water System Design Manual*. It is also recommended that standby storage be not less than 200 gallons per ERU. The purveyor has some options to reduce the amount of standby storage needed with the development of additional sources of supply. If the sources are not equivalent to gravity storage they would need to be supplied with auxiliary power that starts automatically when the primary power feed is disrupted.

**SB = (2 days)[(ADD)(N) – t<sub>m</sub> (Q<sub>s</sub> – Q<sub>L</sub>)]**

Where:

**SB** = Standby Storage, in gallons.

**ADD** = Average Day Demand per ERU, in gpd per ERU.

**N** = Number of ERUs.

**Q<sub>s</sub>** = Sum of all installed and continuously available sources, except emergency supply, in gpm. This value is identical to the Q<sub>S</sub> value presented in the Equalizing Storage section.



$Q_L$  = The capacity of the largest source available to the system, in gpm.  
 $t_m$  = Time the remaining sources are pumped on the day when the largest source is not available, in minutes. Unless otherwise restricted, this value is 1,440 minutes.

- Fire Suppression Storage (FSS): This assists in meeting fire flow planning level requirements under all conditions including power outages and/or loss of the source of supply. Fire flow storage is typically provided to meet the planning level required fire flow for the stated duration. Nesting of fire suppression and stand-by storage was not included in the storage analysis.

$$FF = (Q)(t_m)$$

Where:

$FF$  = Fire flow storage, in gpm.

$Q$  = Fire flow requirement flow rate, in gpm.

$t_m$  = Duration of fire flow, in minutes.

- Dead Storage (DS): The volume of stored water not available to all consumers at the minimum design pressure in accordance with WAC 246-290-230(5) and (6). Dead storage is not considered additive to the other components.

$$DS_{Feet} = [(Z_{Max}) + (20)(2.308)] - (Z_{Reservoir\ Base}) + 1$$

$$DS_{Vol} = (\pi/4)(d^2)(DS_{Feet})(7.4805) \text{ for circular tanks}$$

Where:

$DS$  = Dead storage.

$Z_{Max}$  = Maximum service elevation of pressure zone, in feet.

$Z_{Reservoir\ Base}$  = Reservoir base elevation, in feet.

$d$  = Reservoir diameter, in feet.

## 5.5 Construction Standard Specifications and Standard Drawings

The City of Pasco Public Works Department has developed Standard Drawings and a Materials List which provide minimum construction criteria for Public Works within the City or for which the City will take ownership. Section 2 of the Standard Specifications includes Standard Drawings for Water System construction. In addition, the City also utilizes the most recent edition of the Washington State Department of Transportation Standard Specifications for Road, Bridge, and Municipal Construction with APWA amendments. The current Amendments to the Standard Specifications and Standard Drawings are in **Appendix 5-A**, the latest version can also be found on the City's website.

The Standard Specifications and Standard Drawings are enforced on Construction Contracts let by the City, and on public improvements constructed by developers, property owners, or other public agencies for which the City will receive ownership, and/or operation, maintenance, and replacement responsibility.

All waterline construction plans are submitted to Public Works, Engineering, Fire Department and/or Building Department personnel for review, comments and recommended changes prior to approval and permits being issued. A professional engineer licensed in Washington must stamp all bid documents, including plans and specifications. City Engineering Inspectors review and oversee the installation of all water mains. City Building Inspectors review and oversee all on-site plumbing installations. The City's Cross Connection Control Specialist also reviews, approves, and maintains test records on all backflow prevention devices required.

The Standard Specifications and Standard Drawings are reviewed regularly by Public Works Department personnel for recommended changes, additions, and deletions to comply with changing Federal, State, and local requirements.

## **5.6 Development Recommendations for Water System Expansion**

The following standards have been recommended to ensure adequately sized and consistent water system components are installed as new development occurs. Incorporating these into the City's Standards will set minimum design and construction standards throughout the City's water distribution system. These are minimum standards, however other requirements may be included where deemed necessary by the City Engineer.

### ***5.6.1 Size of Pipe***

The City's standard sizes are 8, 10, and 12-inch for distribution mains. Transmission mains are: 16, 18, 24, 30, 36, 42 and 48-inch. In some instances, 12-inch piping may serve as transmission.

Minimum pipe size is 8-inch with the following exception, if approved by the City Engineer, of permanent dead-ends or cul-de-sacs where looping is physically impractical and a fire hydrant can be located on the mainline at the entrance to the dead-end, a 4-inch water line may be allowed for water quality considerations. Any dead-end that would have customer structures more than 300 feet from a fire hydrant must contain at least one fire hydrant and have pipe adequately sized to provide required fire flow.

### ***5.6.2 Pipe Network***

Proposed expansion of the water system will make every effort to create a gridded system. A grid system benefits the system as a whole by reducing dead-ends and providing at least two paths for water to flow to an area through a minimum of two separate connection points to the existing system, with sufficient valves so that water can be delivered through either connection point independent of the other. The system shall be looped to the maximum extent practicable. Generally, water mains should be placed on a 600-foot grid and shall be looped at a max of 1,200 feet. The max dead-end length will not exceed 600 feet. **Figure 5-1** shows a layout example of a gridded system.

The expansion of the transmission main grid will comprise of a 12-inch minimum pipe installed on a ½ mile grid to create a looped transmission system for servicing future development outside the current water distribution system infrastructure.

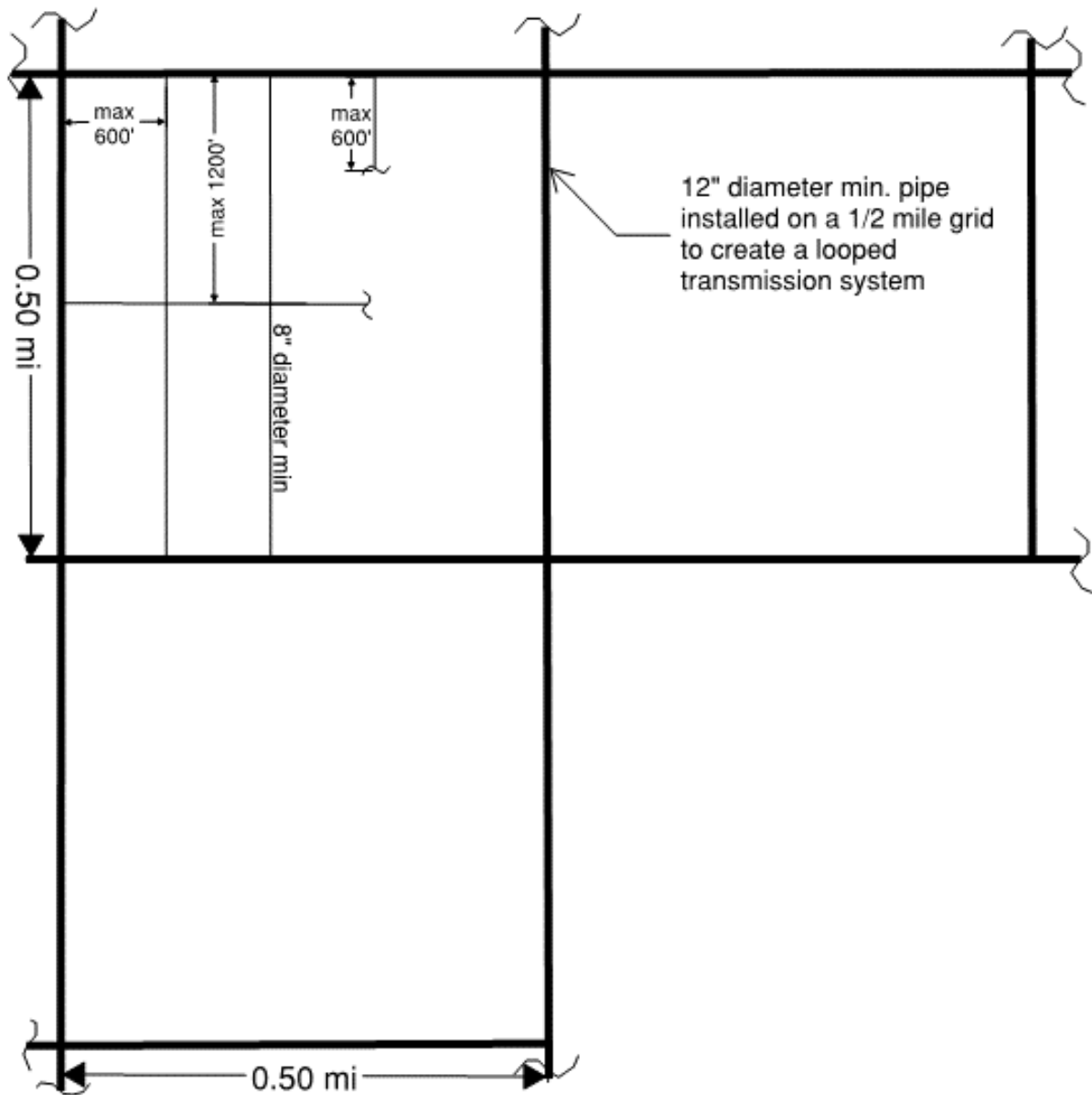
The water main must have adequate flow to meet both domestic and fire suppression requirements. If the required main does not exist or does not have sufficient flow to meet either domestic or fire needs, the developer must construct a water main extension prior to obtaining water service.

### ***5.6.3 Location***

New services must connect perpendicular to the City water mains located within the City's right-of-way.

Water mains must be located within the City's right-of-way. No easements will be allowed unless there are no other feasible routes. If an easement is to be used it must provide all weather access for two-wheel drive service vehicles. In addition, sleeving of the pipe within easements may be required as directed by the City Engineer

**Figure 5-1**  
**Gridded System Layout**



## Section **6**

## **SECTION 6**

### **WATER DISTRIBUTION SYSTEM ANALYSIS**

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#### **6.1 Introduction**

This Section describes the evaluations performed to identify deficiencies and associated improvements in the City of Pasco's (City) water system. The adequacy of the system's various components was evaluated by comparing the existing capacity with the requirements dictated by the hydraulic criteria, for current and future demand conditions (2022, 2027 and 2036 planning horizons). The criteria are described in **Section 5 – Design and Construction Standards** and demand conditions are described in **Section 3 – Population and Water Demands**.

The hydraulic model was used to assess the system's ability to convey flows under maximum day, peak hour, and fire flow conditions while maintaining minimum system residual pressures. Supply, storage, and pumping capacity evaluations were performed to identify deficiencies. Additionally, this Section also assesses partially developed infill areas that have been identified as having inadequate fire protection and/or domestic water service. The strategies to address the deficiencies discussed in this Section are the base for the CIP improvements recommended in **Section 7 – Capital Improvement Program**.

#### **6.2 Hydraulic Model Update and Calibration**

The City's hydraulic model is a computerized representation of the water system piping and associated infrastructure. The model was developed in WaterCAD V8i (Bentley). The updating process included a validation of the system infrastructure: storage, PRV, and pump station information. System information was updated using the City's inventory and computer-aided design (CAD) drawings.

The updated model includes approximately 330 miles of pipe, 3 storage tanks, 4 pump stations, 19 pressure reducing valves (PRV), and 2 water treatment plants (WTP). It allows the user the flexibility of representing different steady state operating conditions.

Existing system demands in the model were updated based on production records while maintaining the distribution from the 2007 model update, as explained in **Section 3 – Population and Water Demands**.

The updated model was calibrated for static conditions. The calibration approach and results are presented in **Appendix 6-A**.

#### **6.3 Summary of System Analysis Approach**

The following is a summary of the evaluations required to assess the capacity of each component of the water system:

1. Supply Capacity: the adequacy of the supply capacity was compared to existing and future average and maximum day demand (MDD).
2. Storage Capacity: the existing usable storage volume within each reservoir level was compared to the requirements per the hydraulic criteria. Usable storage is the available volume above a level that will provide minimum acceptable pressures during peak hour demand (PHD) or fire flow conditions. The total required storage is composed of equalization, fire suppression, emergency, and operational storage. No nesting of storage (when fire suppression storage is assumed included in the emergency storage portion) was assumed for this evaluation.
3. Pumping Capacity: the existing pump capacity (assuming the largest pump or the largest domestic pump unit is out-of-service) was compared to the required flow for each pump station. Pumping capacity requirements are different for open systems (areas with a reservoir) and for those areas served only by pumping (closed systems).
4. Distribution System: the updated hydraulic model was used to assess service pressures, velocities and available fire flows.

These evaluations were performed for the following demand scenarios:

- 2015 Planning Horizon - Existing Conditions
  - Maximum Day Demand
  - Peak Hour Demand
  - Maximum Day Demand + Fire Flow
- 2022 Planning Horizon
  - Maximum Day Demand
  - Peak Hour Demand
  - Maximum Day Demand + Fire Flow
- 2027 Planning Horizon
  - Maximum Day Demand
  - Peak Hour Demand
  - Maximum Day Demand + Fire Flow
- 2036 Planning Horizon
  - Maximum Day Demand
  - Peak Hour Demand
  - Maximum Day Demand + Fire Flow

## 6.4 Fire Flow Evaluation Approach

The network capacity was evaluated for fire flow conditions. The fire flow availability throughout the entire water system during maximum day conditions was calculated with the hydraulic model and then compared to the minimum required flow for each land use type: residential: 1,000 gpm, commercial: 1,500 gpm or industrial: 2,500 gpm. Fire flow availability is defined as the largest available flow while maintaining 20 psi at all service connections. Locations where the available flows are less than the suggested minimum flow were evaluated in detail to address the need for improvements. See **Figures 6-6, 6-9, and 6-12**.

Five individual industrial/commercial locations were evaluated due to their large fire flow requirement. For each location, the hydraulic model was used to determine if the system could maintain a pressure of 20 psi or higher at all service connections while providing the expected fire flow. The fire flow requirement for these locations are summarized in **Table 6-1**. These locations are presented in **Figure 6-1**.

For storage capacity evaluation, the largest fire flow in each pressure zone determines the size of the required fire suppression storage.

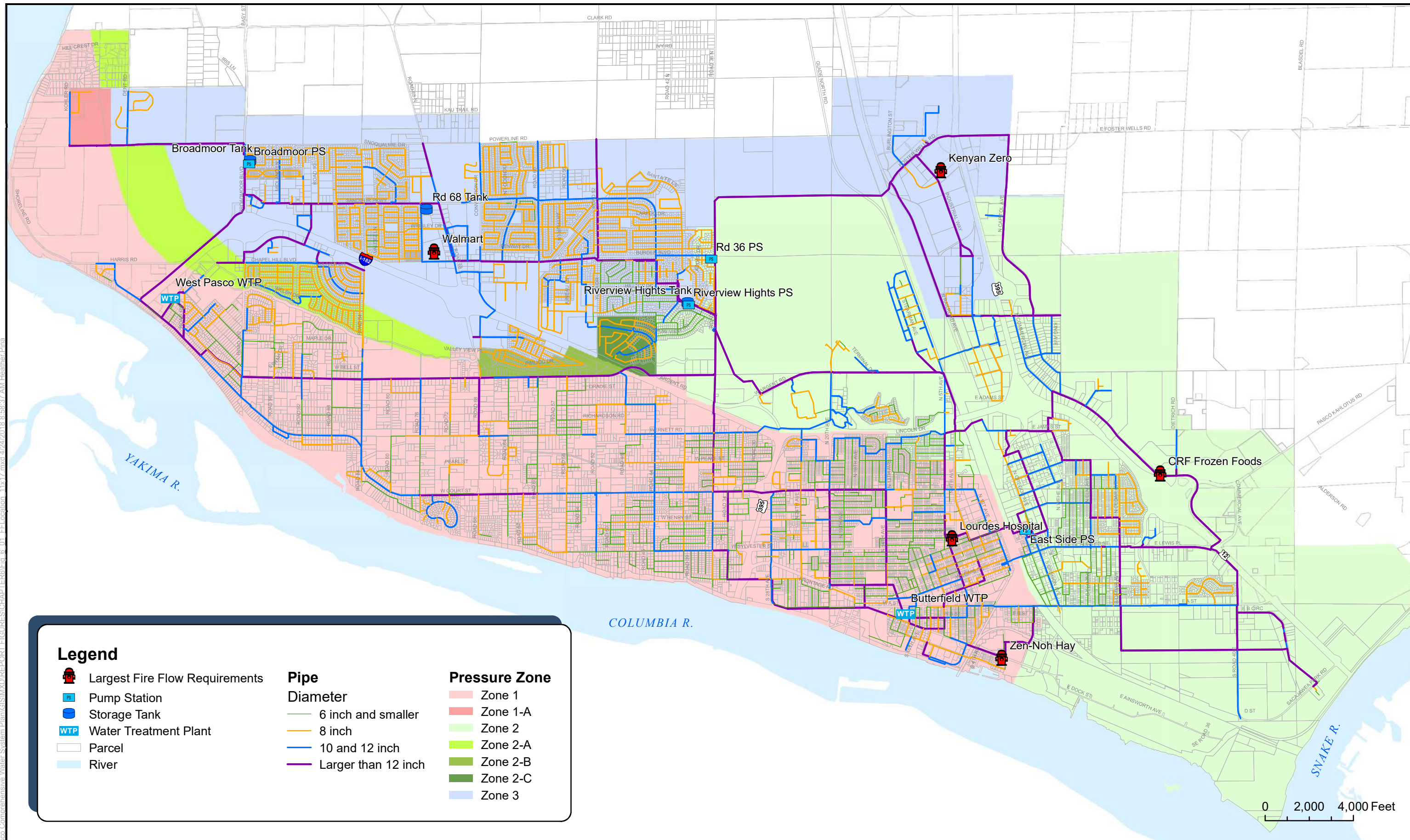
Fire flow availability evaluation for future planning horizons was consistent with the existing evaluation.

**Table 6-1**  
**Large Fire Flow Requirements**

<b>Pressure Zone</b>	<b>Highest Fire Flow</b>	<b>Location</b>	<b>Area (sf)</b>	<b>Required Fire Flow (gpm)</b>	<b>Duration (hr)</b>
1	Lourdes Hospital	520 N 4th Ave	160,000	4,250	4
1	Zen Hoh Hay	2444 E Dock St	282,500	6,000	4
2	CRF Frozen Foods	1825 N Commercial Ave	379,000	6,000	4
3	Kenyan Zero	5701 Industrial Way	400,000	6,000	4
3	Walmart	4820 Rd 68	215,000	5,000	4



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# Comprehensive Water System Plan Update City of Pasco



**Figure 6-1  
Location of Large  
Fire Flow Requirements**

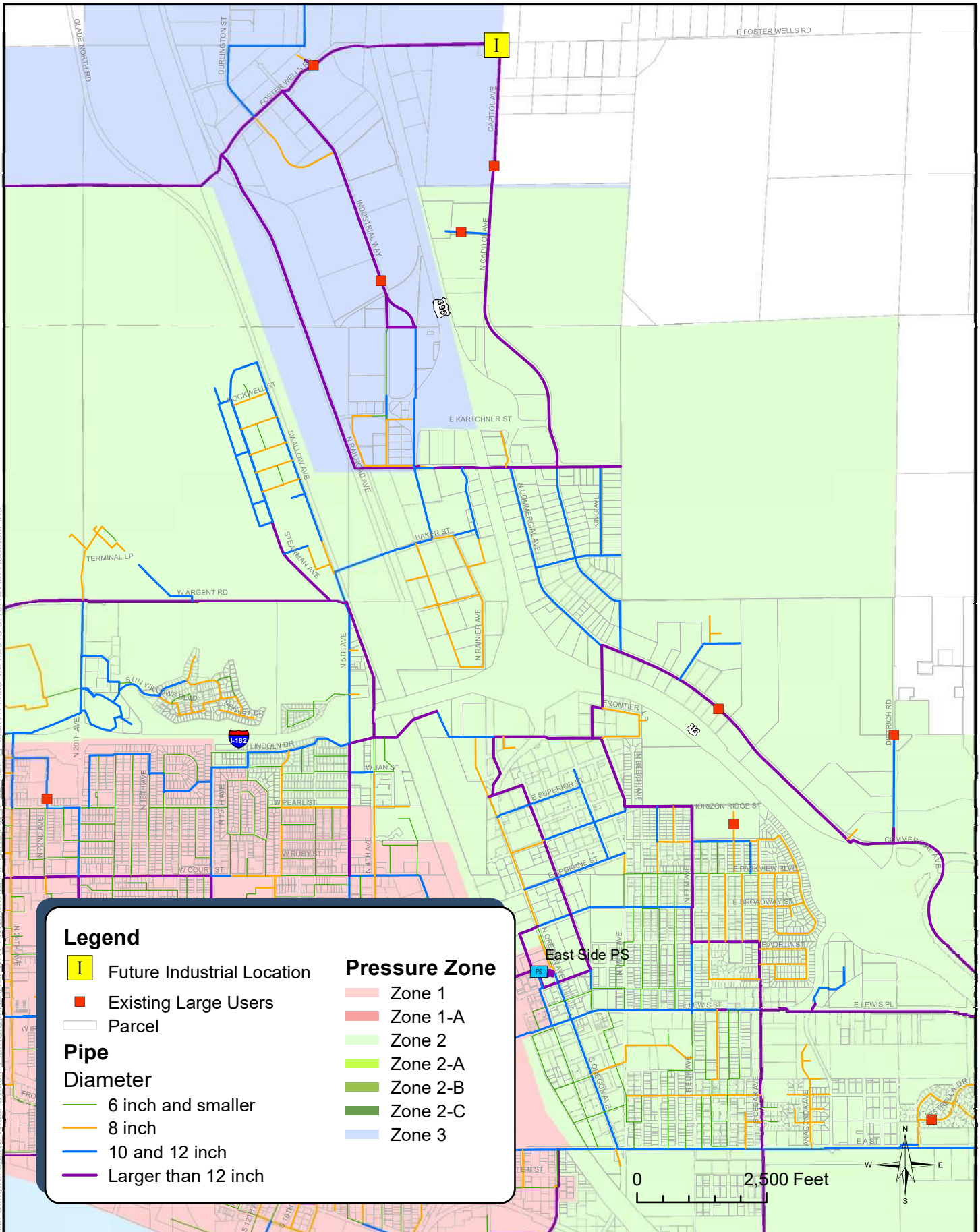
## 6.5 Future Scenarios and Industrial Growth

To determine future system deficiencies, demands were projected using population forecast and unit flow factors, as described in **Section 3 – Population and Water Demand**. For modeling purposes, the distribution of future residential demands utilized the expected growth per traffic analysis zones (TAZ). Consistent with the current pattern of water consumption, future industrial demands will be an important portion of the total system-wide demand, and their final location will have a localized impact. At the time of this planning effort the location of future industrial development is unknown, the future planning horizons were evaluated under two different alternatives:

- Alternative A: A new industrial development located in Zone 3, to represent the most critical location along the existing transmission main on Foster Wells Road, at the intersection of Capitol Avenue. The future industrial demand was estimated at 0.6 mgd for 2022, 1.0 mgd for 2027 and 3.1 mgd for 2036. The future industrial demand was assumed constant throughout the day. **Figure 6-2** shows the future industrial development location for Alternative A.
- Alternative B: Two new industrial developments located in Zone 2, to represent critical locations: along the existing transmission system on Commercial Avenue (Commercial Avenue and Dietrich Road) and the existing transmission system supplying the Port area (Cedar Avenue north of Crane Street). The demand assumptions were 0.6 mgd for 2022, 1.0 for 2027 and 2.1 mgd for 2036 at the Commercial Avenue location and 1 mgd for the 2036 planning horizon at the Cedar Avenue location (Port site). **Figure 6-3** shows the future industrial development locations for Alternative B.



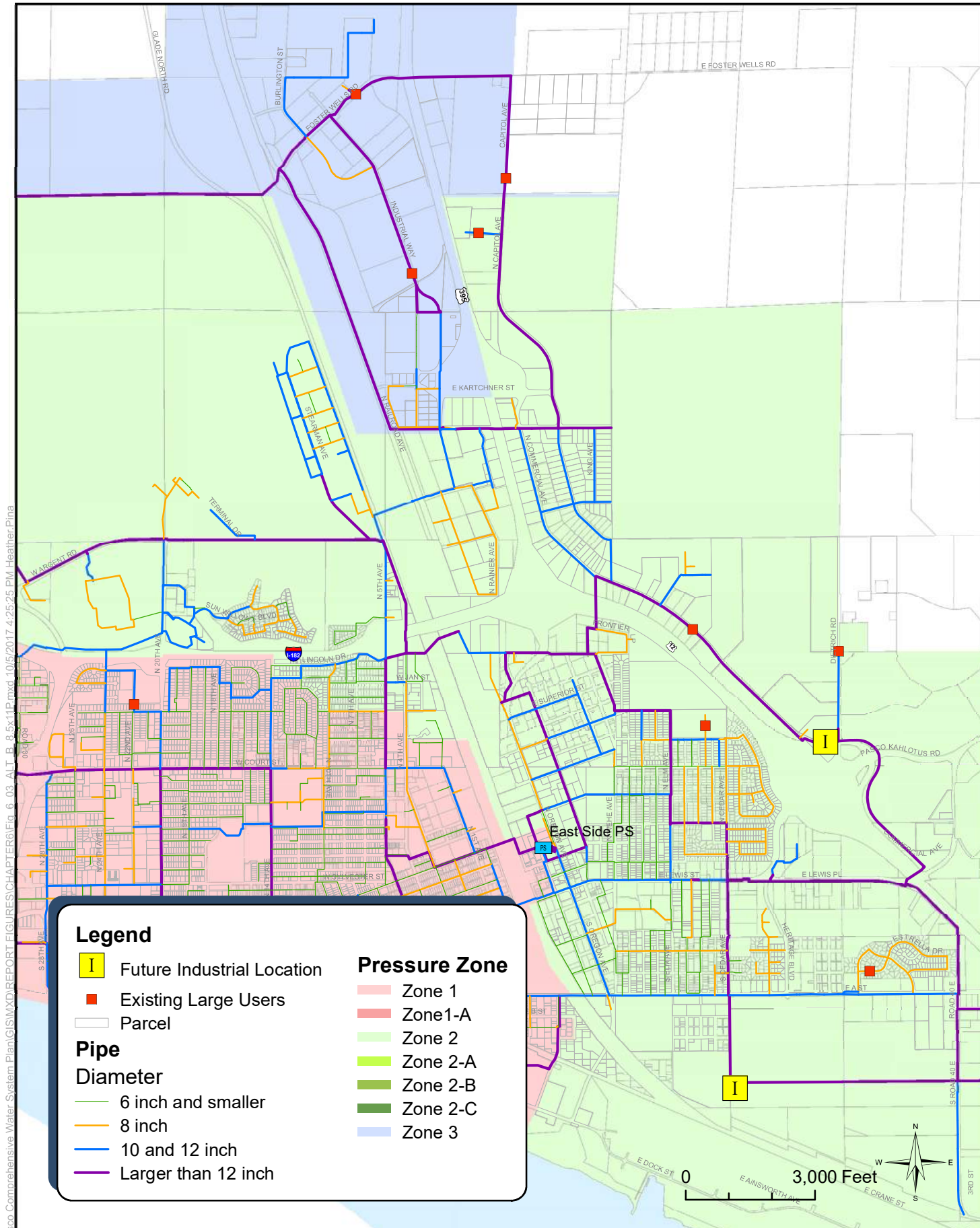
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**Comprehensive Water  
System Plan Update  
City of Pasco**

**Figure 6-2  
Alternative A Future  
Industrial User Location**





# Comprehensive Water System Plan Update City of Pasco

**Figure 6-3  
Alternative B Future  
Industrial User Location**



## 6.6 System Analysis Results

### 6.6.1 Supply Capacity Evaluation

Butterfield WTP has a maximum capacity of 34.2 mgd, with a “reliable” capacity of 30 mgd with one filter out-of-service. Due to contact time (CT) constraints (service lines connected to transmission), the maximum high service pump production is 26.8 mgd. West Pasco WTP “reliable” treatment capacity is 6 mgd, for a total existing reliable supply of 32.8 mgd. The West Pasco WTP “reliable” capacity is expandable to 18 mgd.

The existing sources (Butterfield and West Pasco WTPs) combined total capacity is larger than MDD for existing and 2022 demand conditions, meeting the hydraulic requirements. Total supply capacity is not adequate to serve 2027 and 2036 MDD demands, and results in a total deficiency of 3.2 and 9 mgd respectively. With the planned expansion of the West Pasco WTP to a “reliable” 18 mgd capacity this deficiency will be addressed.

**Table 6-2**  
**Supply Capacity Evaluation Results**

<b>Supply Capacity</b>	<b>gpm</b>	<b>mgd</b>
Butterfield WTP	18,600	26.8
West Pasco WTP	4,200	6.0
Total Supply Capacity	22,800	32.8
<b>2015</b>		
Maximum Day Demand	18,582	26.8
Total Capacity Surplus(+) or Deficiency(-)	4,218	6.1
<b>2022</b>		
Maximum Day Demand	21,483	31.0
Total Capacity Surplus(+) or Deficiency(-)	1,317	1.9
<b>2027</b>		
Maximum Day Demand	25,018	36.0
Total Capacity Surplus(+) or Deficiency(-)	(2,218)	(3.2)
<b>2036</b>		
Maximum Day Demand	29,056	41.9
Total Capacity Surplus(+) or Deficiency(-)	(6,256)	(9.0)

### **6.6.2 Storage Capacity Evaluation**

Storage capacity should provide operational, equalization, fire flow suppression, and emergency storage requirements in each pressure zone. Storage requirements are dictated by the reservoir service area demand, the capacity of the supply sources and the fire flow requirements.

The storage analysis was completed for the three main zones:

- Zone 1, currently served by the Broadmoor and Riverview Heights reservoir
- Zone 2, currently a closed system, with no reservoir
- Zone 3, currently served by the Road 68 Tank

Even though Zones 2A, 2B, and 2C have the same HGL as Zone 2, their networks are separated and hydraulically independent. These pressure zones are served by the Road 68 Tank through PRV stations and were included in the storage evaluation for Zone 3.

The storage capacity evaluation results are summarized in **Table 6-3**. The detailed evaluations are presented in **Appendix 6-B**. Zone 1 has a storage surplus throughout 2036. Zones 2 and 3 are deficient for existing and future conditions, with a total existing deficit of 5.82 MG, 6.70 MG for 2022, 7.97 for 2027 conditions and 9.05 MG for 2036. The location of the future industrial user will not affect the combined storage deficiency, however will determine the distribution of the required storage between Zones 2 and 3.

**Table 6-3**  
**Storage Capacity Evaluation Results (all values in MG)**

Storage Zone	Storage Requirement				Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus/ (Deficiency)
	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage			
Existing Conditions (2015)							
Zone 1	2.03	0	1.38	1.71	5.12	11.0	5.88
Zone 2	0.49	0	1.44	1.80	3.73	0.0	(3.73)
Zone 3	0.60	0	1.44	2.56	4.60	2.5	(2.10)
2015 Total Storage Deficiency							(5.82)
2022 Planning Horizon - Scenario A							
Zone 1	2.03	0	1.38	1.81	5.22	11.0	5.78
Zone 2	0.49	0	1.44	1.83	3.76	0.0	(3.76)
Zone 3	0.71	0	1.44	3.29	5.44	2.5	(2.94)
2022 Total Storage Deficiency							(6.70)
2022 Planning Horizon - Scenario B							
Zone 1	2.03	0	1.38	1.81	5.22	11.0	5.78
Zone 2	0.56	0	1.44	2.30	4.31	0.0	(4.31)
Zone 3	0.64	0	1.44	2.81	4.89	2.5	(2.39)
2022 Total Storage Deficiency							(6.70)
2027 Planning Horizon - Scenario A							
Zone 1	2.03	0	1.38	2.06	5.46	11.0	5.54
Zone 2	0.53	0	1.44	2.08	4.05	0.0	(4.05)
Zone 3	0.84	0	1.44	4.14	6.42	2.5	(3.92)
2022 Total Storage Deficiency							( 7.97)
2027 Planning Horizon - Scenario B							
Zone 1	2.03	0	1.38	2.06	5.46	11.0	5.54
Zone 2	0.67	0	1.44	3.03	5.14	0.0	(5.14)
Zone 3	0.70	0	1.44	3.20	5.34	2.5	(2.84)
2022 Total Storage Deficiency							(7.97)



Storage Zone	Storage Requirement				Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus/ (Deficiency)
	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage			
2036 Planning Horizon - Scenario A							
Zone 1	2.03	0	1.38	2.10	6.91	11.0	4.09
Zone 2	0.52	0	1.44	2.02	3.98	0.0	(3.98)
Zone 3	0.99	0	1.44	5.14	7.57	2.5	(5.07)
2036 Total Storage Deficiency							(9.05)
2036 Planning Horizon - Scenario B							
Zone 1	2.03	0	1.38	2.10	6.91	11.0	4.09
Zone 2	0.74	0	1.44	3.49	5.66	0.0	(5.66)
Zone 3	0.77	0	1.44	3.68	5.89	2.5	(3.39)
2036 Total Storage Deficiency							(9.05)

### **6.6.3 Pump Station Capacity Evaluation**

When boosting to a reservoir, pump station total capacity must be equal or larger than MDD for the pressure zone or system (Criterion 1) and its firm capacity (assuming the largest unit out-of-service) must be equal or larger than ADD for the pressure zone or system (Criterion 2). When supplying closed systems (systems without a reservoir) the pump station must be able to provide PHD with the largest pump out-of-service, and MDD plus fire flow with the largest “routinely used” pump out-of-service.

The pump station capacity analysis was completed for the three main pumping systems:

- Butterfield and West Pasco Pump Stations pumping to reservoirs in Zone 1
- East Pasco Pump Station, pumps to a closed system, Zone 2
- Broadmoor/Riverview Heights/Road 36 Pump Stations, pump to reservoir in Zone 3

Zone 3 partially supplies Zone 2 via PRVs. This supply system also serves pressure zones 1-A, 2-A, 2-B, and 2-C.

Zone 2 is a closed system supplied by the East Side Pump Station, and PRVs from Zone 3. To evaluate the requirements for this zone and thereby the required capacity of the East Pasco Pump Station, the supplemental supply to Zone 2 through the PRVs was assumed to be the excess pumping capacity of the Zone 3 supply system. For future planning horizons Zone 2 was evaluated as an open system, assuming a new reservoir will serve the pressure zone in the near future (before 2022), as the City already conducted preliminary studies as part of the East Side Pump Station capacity improvements. This project is included in the City’s existing CIP.

The results of the pumping capacity evaluation are summarized in **Table 6-4**. The results are presented in detail in **Appendix 6-B**. The system pump stations have adequate capacity to serve the Pasco’s system through 2036, for both future industrial location scenarios.

The results in Table 6-4 are the capacity evaluations based on MDD pumping requirements. All pump stations meet both MDD and ADD pumping requirements for existing and future planning horizons.

**Table 6-4**  
**Pumping Capacity Evaluation Results**

Pumping System (Pressure Zone Served)	Total Supply Capacity <sup>1</sup>	Firm Capacity	Average Day Demand	Maximum Day Demand	Required Capacity	Surplus or (Deficiency)
	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)
<b>2015</b>						
Butterfield and West Pasco (Zone 1)	33,700	26,700	8,936	18,582	18,582	15,118
Broadmoor/Riverview Heights/Road 36 (Zone 3)	19,190	16,190	3,766	7,793	7,793	11,397
East Side Pump Station (Zone 2) <sup>1</sup>	18,952	17,122	4,843	5,981	5,981	11,142
<b>2022 - Scenario A</b>						
Butterfield and West Pasco (Zone 1)	33,700	26,700	10,200	21,483	21,483	12,217
Broadmoor/Riverview Heights/Road 36 (Zone 3)	19,190	16,190	3,766	7,793	7,793	11,397
East Side Pump Station (Zone 2) <sup>1</sup>	17,081	15,251	2,698	5,232	5,232	11,849
<b>2022 - Scenario B</b>						
Butterfield and West Pasco (Zone 1)	33,700	26,700	10,200	21,483	21,483	12,217
Broadmoor/Riverview Heights/Road 36 (Zone 3)	19,190	16,190	4,144	8,970	8,970	10,220
East Side Pump Station (Zone 2) <sup>1</sup>	17,775	15,945	3,392	5,926	5,926	11,849
<b>2027 - Scenario A</b>						
Butterfield and West Pasco (Zone 1)	33,700	26,700	12,193	25,018	25,018	8,682
Broadmoor/Riverview Heights/Road 36 (Zone 3)	19,190	16,190	6,098	11,584	11,584	7,606
East Side Pump Station (Zone 2) <sup>1</sup>	15,161	13,331	3,067	5,957	5,957	9,214
<b>2027 - Scenario B</b>						
Butterfield and West Pasco (Zone 1)	33,700	26,700	12,193	25,018	25,018	8,682
Broadmoor/Riverview Heights/Road 36 (Zone 3)	19,190	16,190	4,710	10,196	10,196	8,994
East Side Pump Station (Zone 2) <sup>1</sup>	16,549	14,719	4,455	7,335	7,335	9,214
<b>2036 - Scenario A</b>						
Butterfield and West Pasco (Zone 1)	33,700	26,700	13,636	29,057	29,057	4,643
Broadmoor/Riverview Heights/Road 36 (Zone 3)	19,190	16,190	7,567	14,860	14,860	4,330
East Side Pump Station (Zone 2) <sup>1</sup>	11,885	10,055	2,980	6,175	6,175	5,709

Pumping System (Pressure Zone Served)	Total Supply Capacity <sup>1</sup>	Firm Capacity	Average Day Demand	Maximum Day Demand	Required Capacity	Surplus or (Deficiency)
	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)
<b>2036 - Scenario B</b>						
Butterfield and West Pasco (Zone 1)	33,700	26,700	13,636	29,057	29,057	4,643
Broadmoor/Riverview Heights/Road 36 (Zone 3)	19,190	16,190	5,417	12,710	12,710	6,480
East Side Pump Station (Zone 2) <sup>1</sup>	14,035	12,205	5,131	8,327	8,327	5,708

Note:

<sup>1</sup> Total and firm supply capacity for Zone 2 includes the surplus capacity of Zone 3.

#### **6.6.4 Network Capacity Evaluation**

The hydraulic model was used to evaluate the conveyance capacity of the system for existing and future (2022 and 3036) conditions. Note, no results have been included for 2027 since no significant changes between 2022 and 2027 were observed. The results of the modeling evaluations are presented in the following figures:

**Figure 6-4:** 2015 (Existing Conditions) - MDD Results

**Figure 6-5:** 2015 (Existing Conditions) - PHD Results

**Figure 6-6:** 2015 (Existing Conditions) - MDD + Fire Flow Results

**Figure 6-7:** 2022 Planning Horizon - MDD Results

**Figure 6-8:** 2022 Planning Horizon - PHD Results

**Figure 6-9:** 2022 Planning Horizon - MDD + Fire Flow Results

**Figure 6-10:** 2036 Planning Horizon - MDD Results

**Figure 6-11:** 2036 Planning Horizon - PHD Results

**Figure 6-12:** 2036 Planning Horizon - MDD + Fire Flow Results

The network analysis results are summarized below:

- For existing and future scenarios, the hydraulic modeling results show that the pressure range at all service connections throughout the system is within the required range for MDD and PHD conditions. There are some areas of low and high pressure shown on the figures. The low pressures were reviewed and are at facilities or on transmission mains, which are acceptable. High pressures are not excessive, just over a 100 psi and are acceptable, since on a transmission line and in an industrial area. It is recommended that the City monitor these areas and evaluate with the next planning cycle.
- Also, the only velocity criteria violations occurred at several of the PRV stations, since the pressure criteria within the distribution system was met this is acceptable.
- Fire flow availability throughout the system met the minimum per land use requirements at most of the service connections. There are a few locations where the residential minimum of 1,000 gpm was not met and were identified as deficiencies, these are shown on **Figure 6-13**. Small diameter dead-ends within 300 feet of adequate fire supply from other piping were not considered deficiencies.
- The fire flow availability for the large fire flows in Zones 1 and 2 is adequate for existing and future conditions. The system shows a velocity criterion violation on the

16-inch transmission line when serving fire flow in Zone 3. Since the pressure criteria was met this is acceptable and there are no improvement recommendations.

- For 2022 and 2036 planning horizons, both future industrial user locations (Alternative A and B) were simulated in the hydraulic model to determine their impact on service pressure, velocity and fire flow availability. The results show that the transmission network for both Zones 2 and 3 is adequate to serve a future industrial service.
- Even though there are no violations to the velocity criteria in the transmission or distribution system, the transmission line from West Pasco WTP to Broadmoor Pump Station shows high velocity and unit head loss approaching the criterion during 2036 PHD conditions. As this transmission line is critical for the supply of Zone 3, it is considered a deficiency.

**Table 6-5** shows a description of each deficiency location. These locations are presented in **Figure 6-13**.

**Table 6-5**  
**Pasco Water System Network Deficiencies**

Deficiency Area ID	Pressure Zone	Type	Planning Horizon	Location
D-001	Zone 1	Fire flow availability	2015	Area between W Court St, N 10th Ave, N 5th Ave, and W Octave St
D-002	Zone 3	High velocity during fire flow event	2015	Transmission line along Foster Well Rd between Railroad Ave and Industrial Way, then south along Industrial Way until Kenyan Zero.
D-003	Zone 1	Fire flow availability	2015	Area between Road 52, W Sylvester St, and Road 49
D-004	Zone 1	Fire flow availability	2015	Dead-ends between Road 36 and Road 39, along W River Haven St
D-005	Zone 1	Fire flow availability	2015	Dead-ends on N 3rd Ave and W Agate St and south of W Pearl St, west of the railroad
D-006	Zone 3	Fire flow availability	2036	Dead-end along Empire Dr, west of N 5th Ave
D-007	Zone 3	High velocity nearing performance criteria	2036	20-inch transmission line from West Pasco WTP to St Thomas Dr

## 6.7 Physical Capacity

The physical capacity of the City's water system is defined as the maximum number of ERUs that can be served by each system component. The results of the physical evaluation are summarized in **Table 6-6**.

The components evaluated are treatment, supply source pumping, standby storage, transmission, and water right capacity. This summary provides system capacity in terms of ERUs and allows to determine what component will limit servicing new customers.

The projected ERUs for the 2022, 2027 and 2036 planning periods are defined in **Table 3-9**, current ERUs within the water system are 29,707 and the planned 2022 and 2027 ERUs are 34,631, and 39,364 respectively. The demand per ERU is defined in **Table 3-8** as 424 gpd, based on ADD.

The following is a summary of the different system components:

**Treatment** – Based on the “reliable” capacity as defined in **Section 4**, the existing capacity is 36 mgd, and the 2022 and 2027 capacity is 42 mgd with the planned 6 mgd expansion of the West Pasco WTP.

**Supply Source Pumping** – Based on nameplate capacity of the high service pumps, which pump from the clear wells into the system, the existing total capacity is 32.8 mgd and the 2022 and 2027 capacity is 38.8 mgd with the planned 6 mgd expansion of the West Pasco WTP.

**Storage** – Based on system standby storage capacity at the minimum required 200 gpd per ERU, existing standby storage is 6.1 MG, the 2022 standby storage is 11.8 MG with the planned addition of 5.75 MG, and the 2027 standby storage is 15.3 MG with the planned addition of 3.5 MG. Note as defined in **Section 6.6.2 Storage Capacity Evaluation** there is not equalizing storage required for the system.

**Transmission** – Based on the capacity of the transmission mains from the supply sources within the system, which include Butterfield WTP, West Pasco WTP, Broadmoor Tank Road 68 Tank, and RiverView Tank. The maximum transmission system capacity for PHD conditions is defined as the maximum flow that the transmission system can convey without exceeding 5 feet per second (fps). The maximum transmission system capacity for MDD plus Fire Flow (FF) conditions is defined as the maximum flow that the transmission system can convey without exceeding 10 fps. The PHD system transmission capacity is 65 mgd and the MDD plus FF transmission capacity is 130 mgd.

**Water Rights** – Based on the City’s current water rights.

As summarized in **Table 6-6** water rights are the overall limitation on capacity, limiting the number of ERUs to currently 30,426, See **Section 4 – Water Supply Summary** for the City’s approach for addressing the need for additional water rights. The lowest characterize physical system capacity is standby storage, which has an existing capacity defined in ERUs as 30,634, 58,814 ERUs for 2022, and 76,314 ERUs for 2027. This physical capacity analysis indicates that the physical capacity of the system needs to be expanded as planned with the construction of additional water storage to meet the needs of future customers.



**Table 6-6  
Pasco Water System Physical Capacity Analysis**

<b>Year 2022</b>		
<b>Treatment</b>	<b>Capacity, mgd</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>	36	84,906
<i>2022 Capacity</i>	42	99,057
<b>Supply Source Pump</b>	<b>Capacity, mgd</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>	32.8	77,358
<i>2022 Capacity</i>	38.8	91,509
<b>Storage</b>	<b>Standby Storage, gallons</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>	6,126,887	30,634
<i>2022 Capacity</i>	11,762,768	58,814
<b>Transmission</b>	<b>Capacity, gpd</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>		
PHD	65,201,917	58,249
MDD+FF	130,403,834	146,455
<i>2022 Capacity</i>		
PHD	65,201,917	58,249
MDD+FF	130,403,834	146,455
<b>Existing Water Rights</b>	<b>Allowable, gpd</b>	<b>ERU Capacity</b>
<i>Annual Average (Qa)</i>	12,900,800	30,426
<i>Instantaneous (Qi)</i>	34,054,560	38,246
<b>Demand</b>	<b>Flow, mgd</b>	<b>ERU Requirement</b>
<i>Existing</i>	12.6	29,707
<i>2022</i>	14.7	34,631
<b>Year 2027</b>		
<b>Treatment</b>	<b>Capacity, mgd</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>	36	84,906
<i>2027 Capacity</i>	42	99,057
<b>Supply Source Pump</b>	<b>Capacity, mgd</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>	32.8	77,358
<i>2027 Capacity</i>	38.8	91,509
<b>Storage</b>	<b>Standby Storage, gallons</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>	6,126,887	30,634
<i>2027 Capacity</i>	15,262,768	76,314
<b>Transmission</b>	<b>Capacity, gpd</b>	<b>ERU Capacity</b>
<i>Existing Capacity</i>		
PHD	65,201,917	58,249
MDD+FF	130,403,834	146,455
<i>2027 Capacity</i>		
PHD	65,201,917	58,249
MDD+FF	130,403,834	146,455
<b>Existing Water Rights</b>	<b>Allowable, gpd</b>	<b>ERU Capacity</b>
<i>Annual Average (Qa)</i>	12,900,800	30,426
<i>Instantaneous (Qi)</i>	34,054,560	38,246
<b>Demand</b>	<b>Flow, mgd</b>	<b>ERU Requirement</b>
<i>Existing</i>	12.6	29,707
<i>2027</i>	16.7	39,364
Demand per ERU ADD = 424 gpd      PHD = 1,119 gpd MDD = 890 gpd      Minimum Standby Storage, 200 gpd per ERU		

## 6.8 Infill-Area Evaluation

The City has multiple partially developed areas with inadequate fire protection and/or domestic supply water service. Undeveloped areas are partially developed, which means only individual residential developments are likely to take place. **Section 5 – Design and Construction Standards** summarizes recommended development requirements to ensure adequately sized and consistent water system components are installed. Deficiencies were identified at areas, which did not meet the requirements identified in Section 5, such as, areas with undersized piping, exceedance of max fire hydrant spacing, and limited water main looping. These deficiencies of the system have been identified on **Figures 6-13 thru 6-17**. Specific improvements will not be defined at this time and due to the magnitude of the improvements necessary to provide adequate fire protection and proportionality considerations, water system improvements in the infill areas are unlikely to happen as part of concurrency compliance. As future infill development occurs the City will evaluate identified areas to determine required improvements to address the inadequate fire protection and domestic service. It is anticipated that the required improvements will be completed as part of the City’s annual system improvement project. This program address water system needs and enables the City to extend water lines to improve service to the community.

## 6.9 Summary

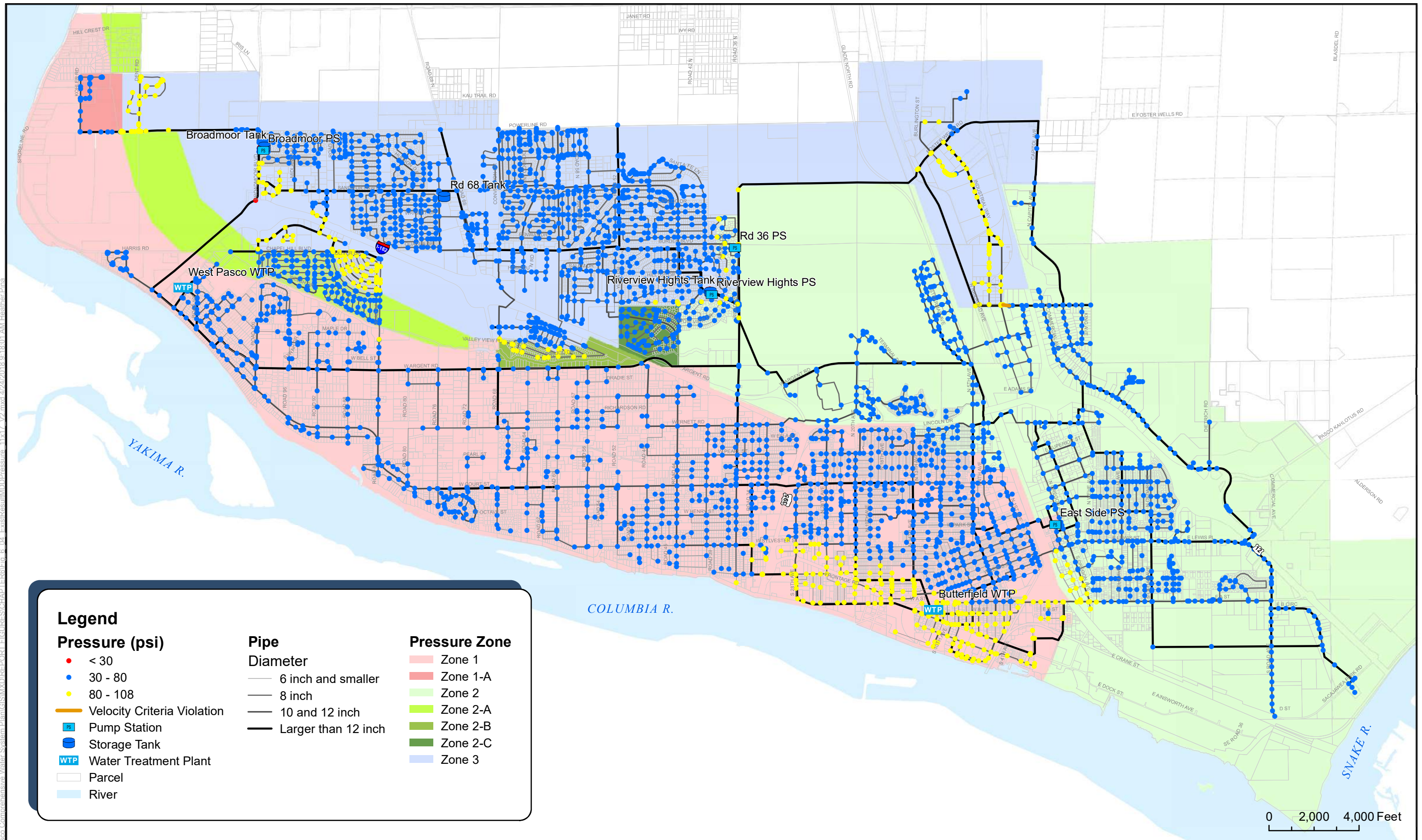
The capacity evaluations for the City’s water system included supply, pump stations, storage, and piping network for existing and future planning horizons (2022, 2027, and 2036). Here are the main conclusions of the system analysis:

- The results show that in general, the system has adequate capacity to provide for existing demands and to accommodate 2022, 2027, and 2035 planning horizons.
- The supply capacity evaluation shows that the system has enough “reliable” capacity to serve 2022 needs. The planned expansion of the West Pasco WTP will provide the additional supply of 3.2 and 9.0 mgd that will be required by 2027 and 2036 respectively.
- The storage capacity evaluation shows existing deficiencies in Zones 2 and 3 (combined deficiency of 5.8 MG). These deficiencies increase to 6.70 MG for 2022, 7.97 MG for 2027 and 9.05 MG for 2036. The location of the future industrial user will not affect the combined deficiency but its distribution between Zones 2 and 3.
- The hydraulic model results show the existing network is able to deliver adequate water to meet peak hourly demand at the required pressure at every existing service connection, for existing and future conditions.
- Fire flow availability was adequate in most of the system, with few exceptions; those were identified as deficiencies (five locations). The associated improvement for these locations will be the upgrade or installation of short segments of pipe (less than 1,000 feet).

- The transmission system is adequate to serve existing and future needs, with only one deficiency on the 20-inch transmission line from West Pasco WTP to Broadmoor Pump Station during 2036 PHD conditions.
- The physical capacity of the system excluding water rights is able to handle the current, 2022, and 2027 demand requirements based on the planned growth of ERUs within the system.
- The City has partially developed infill areas with inadequate fire protection and/or domestic water service that have been identified. Specific improvements have not been defined at this time. As future infill development occurs the City will evaluate to determine required improvements required to improve fire flow and service.

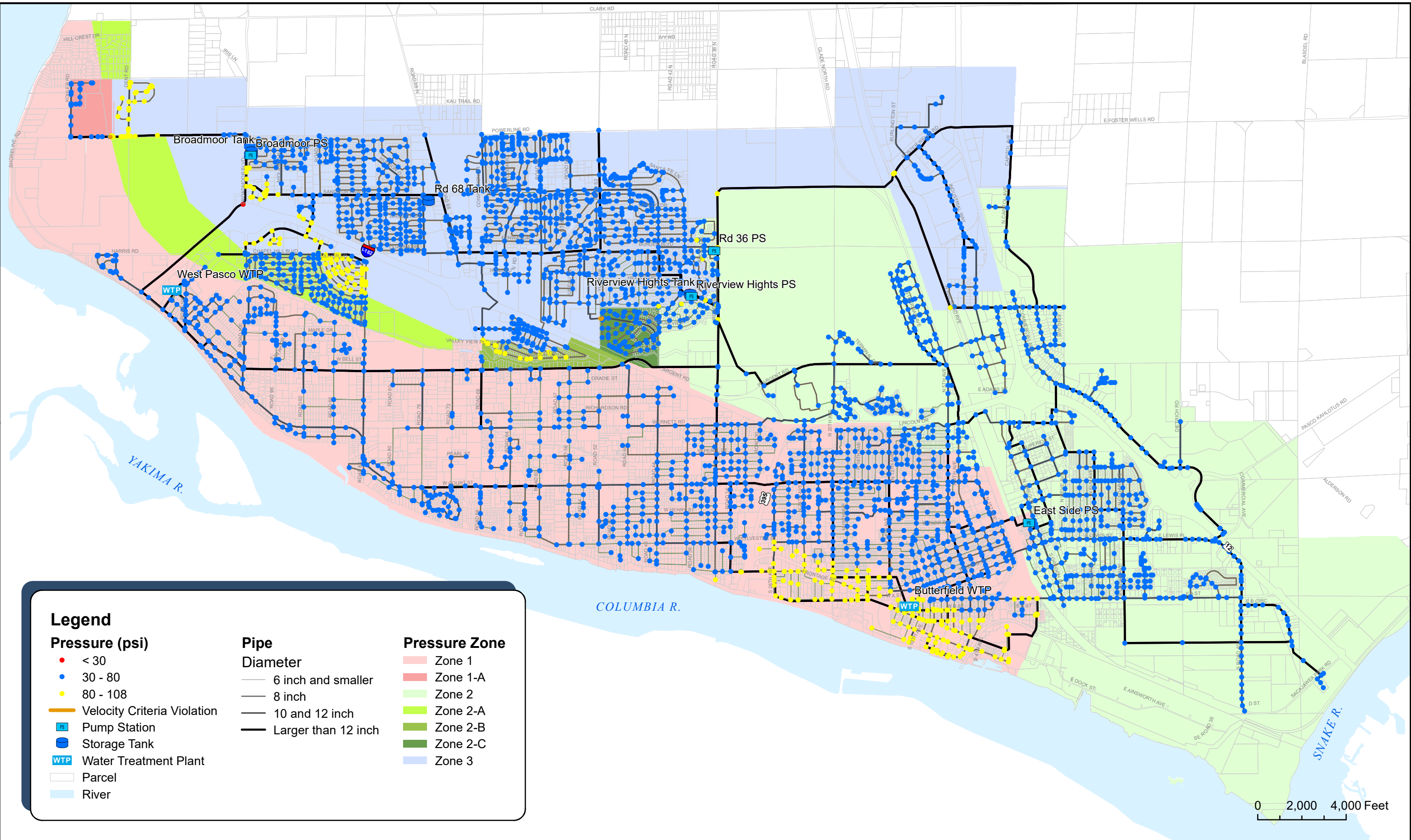
The strategies and projects recommended to address these deficiencies are described in detail in **Section 7 – Capital Improvement Program**.

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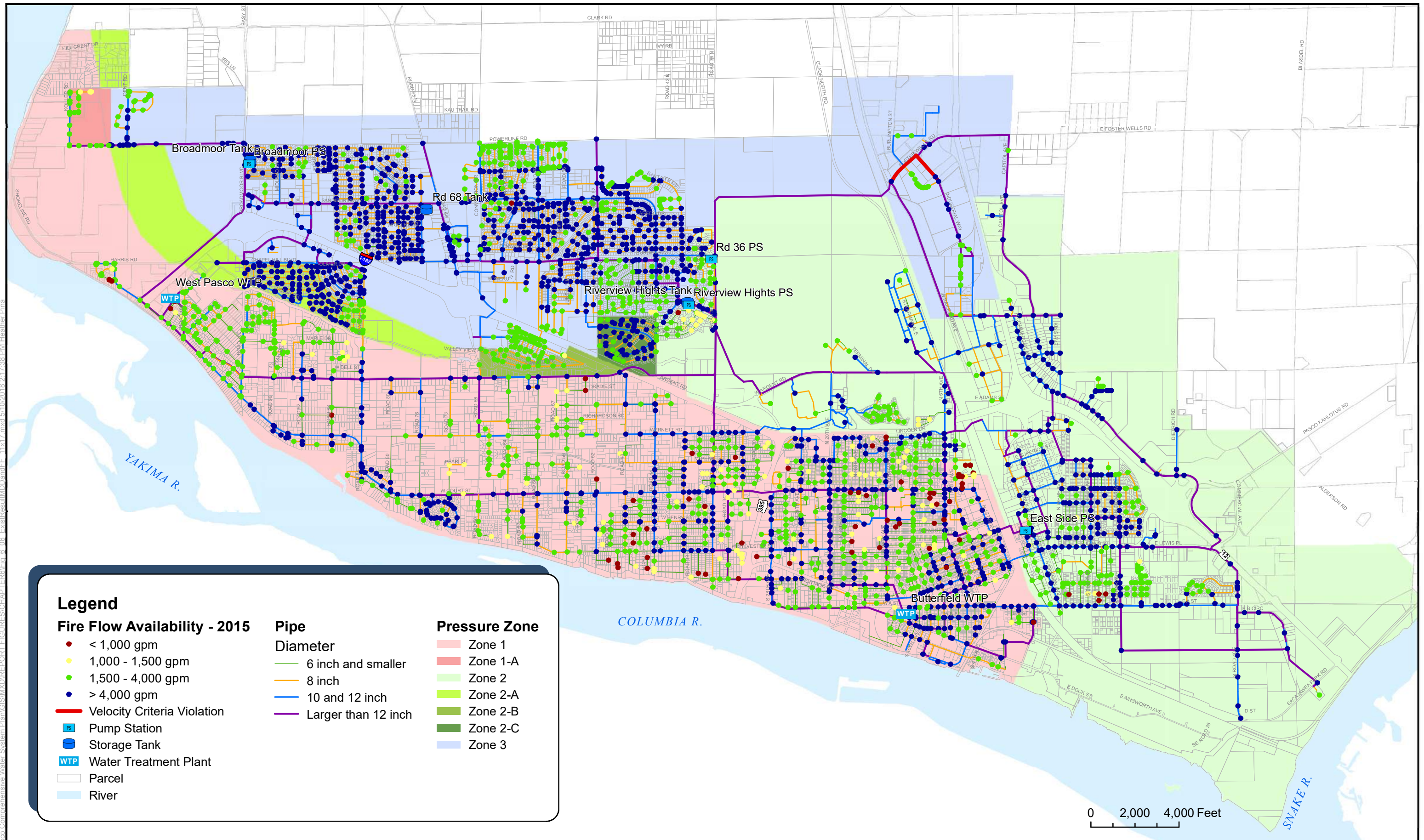


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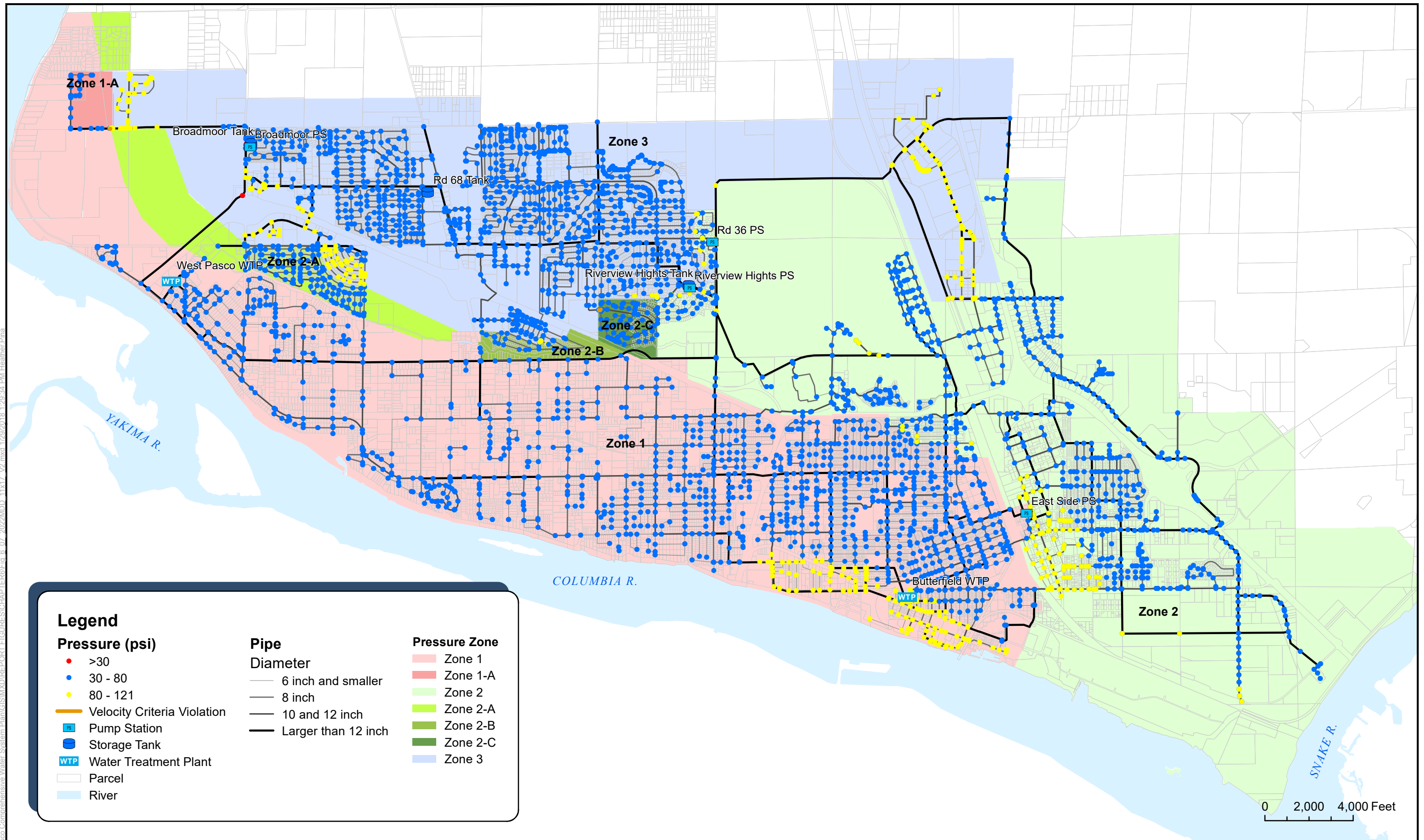
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Figure 6-6  
Existing Conditions  
Fire Flow Availability



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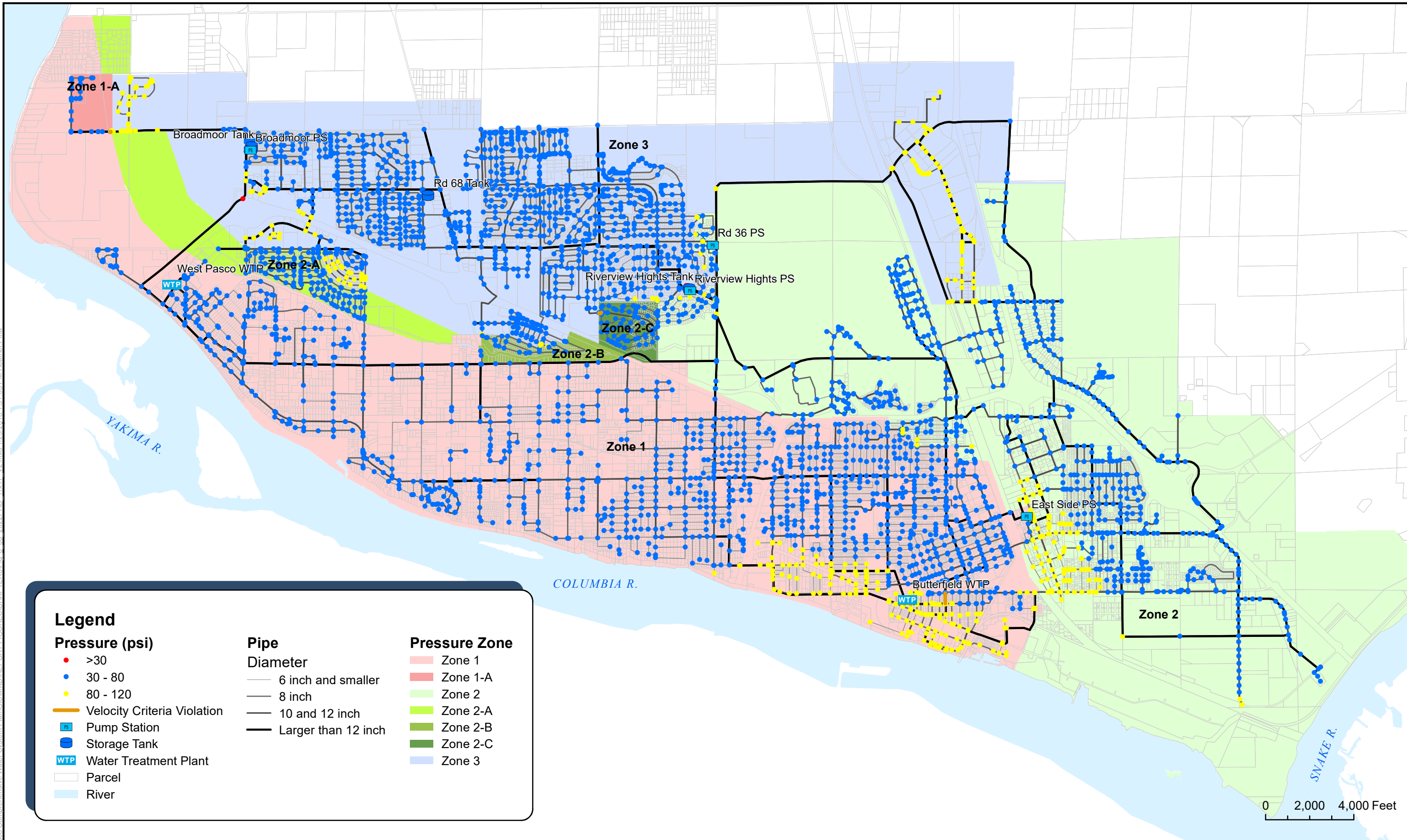


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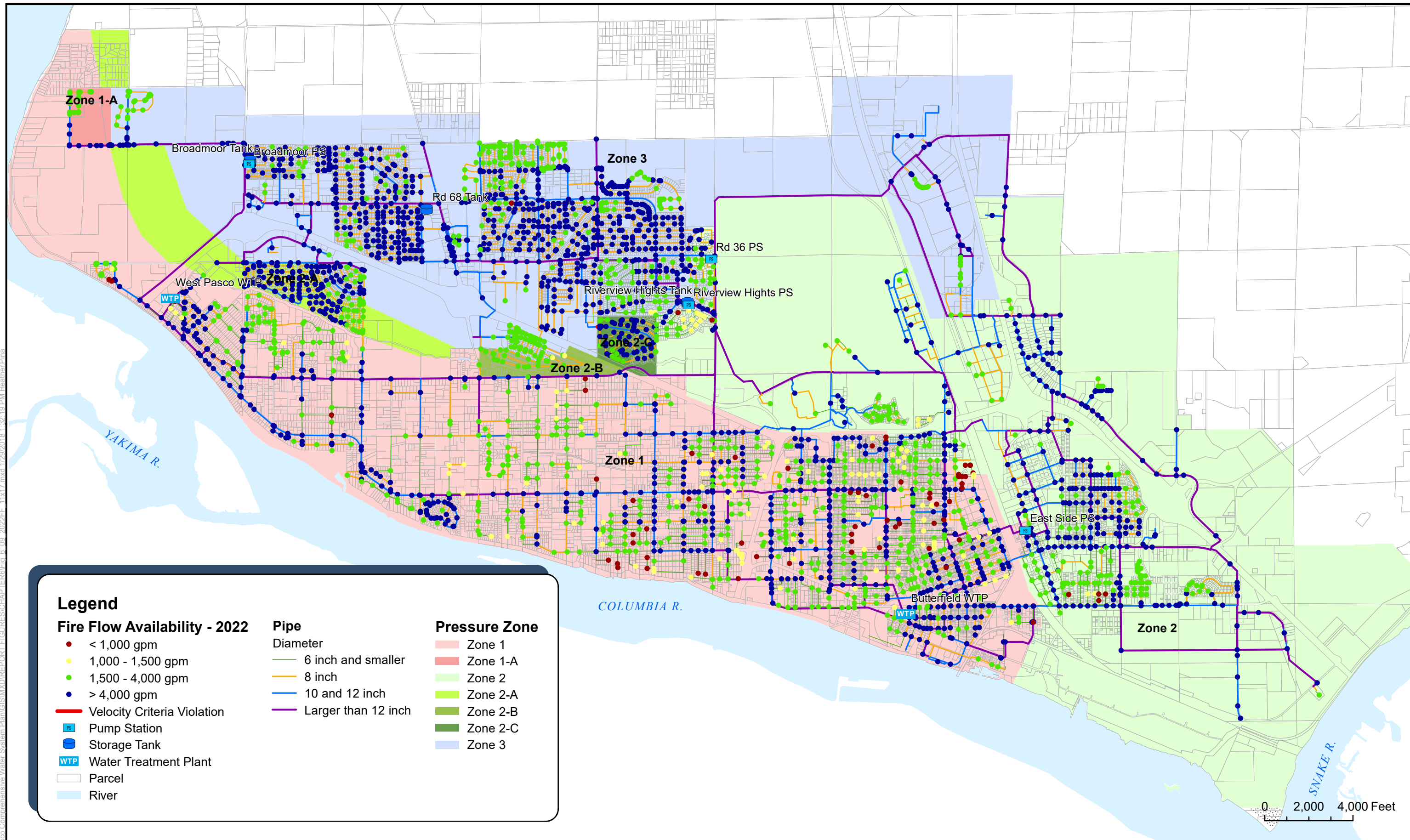
**Figure 6-7**  
**2022 Conditions**  
**MDD Analysis Results**

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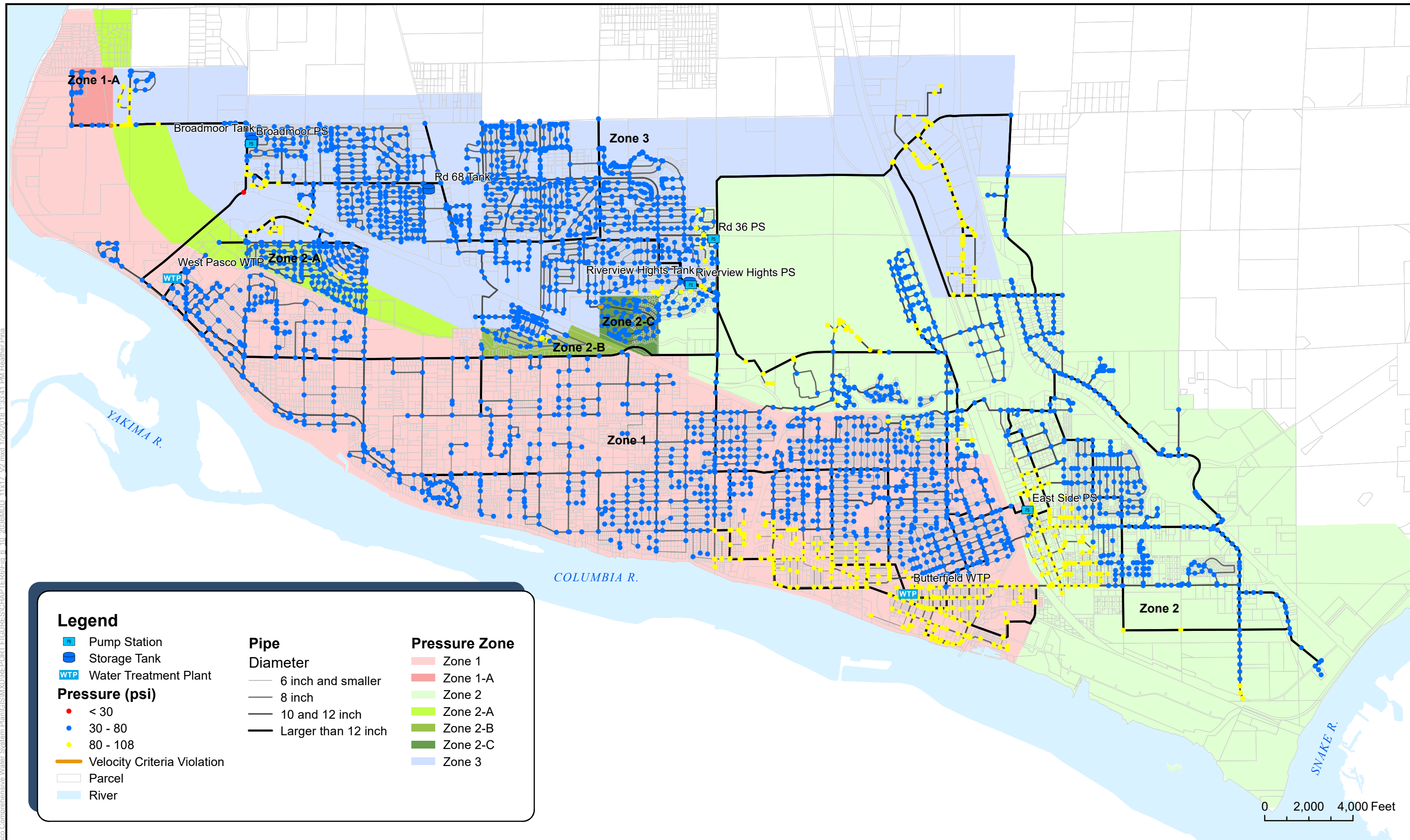


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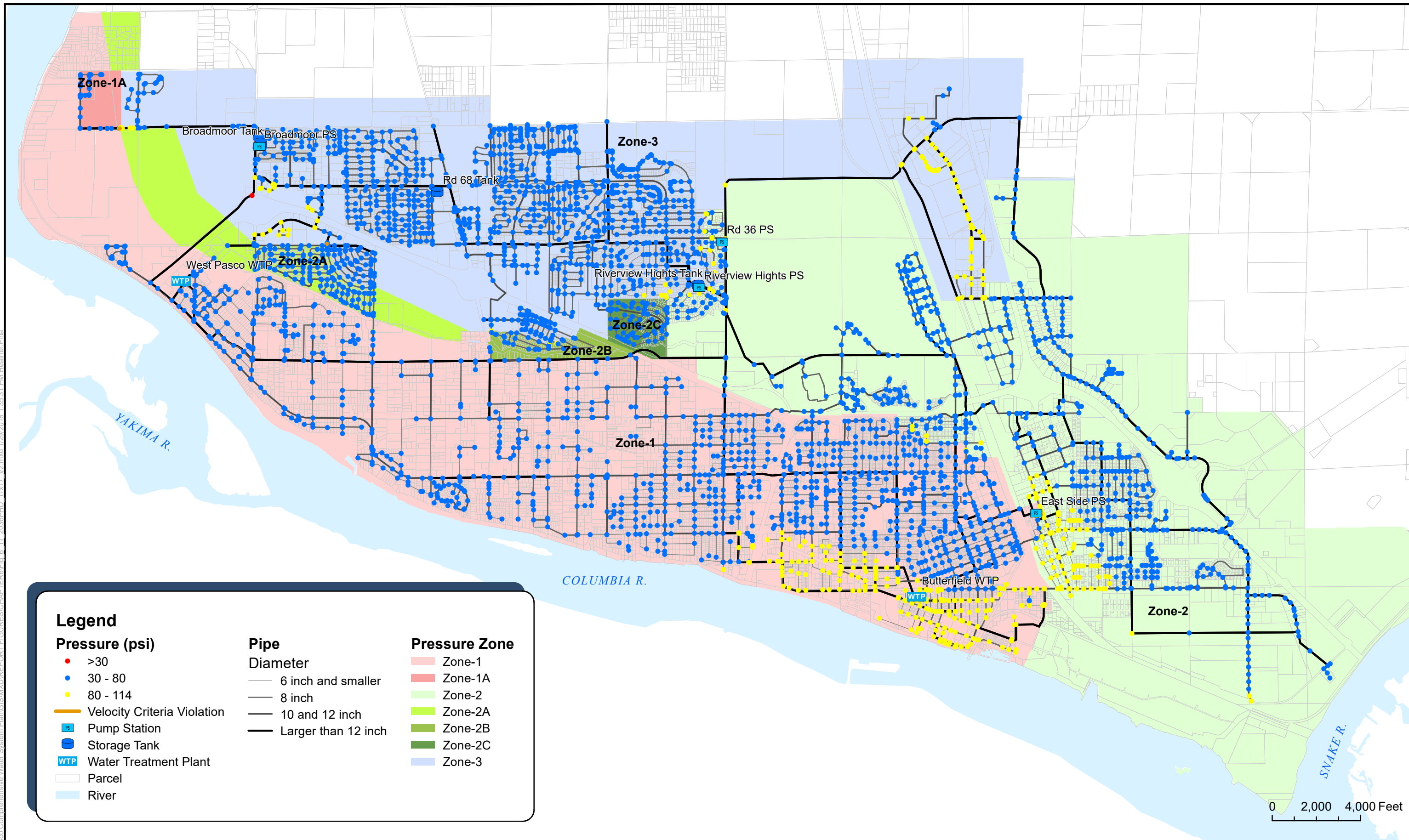




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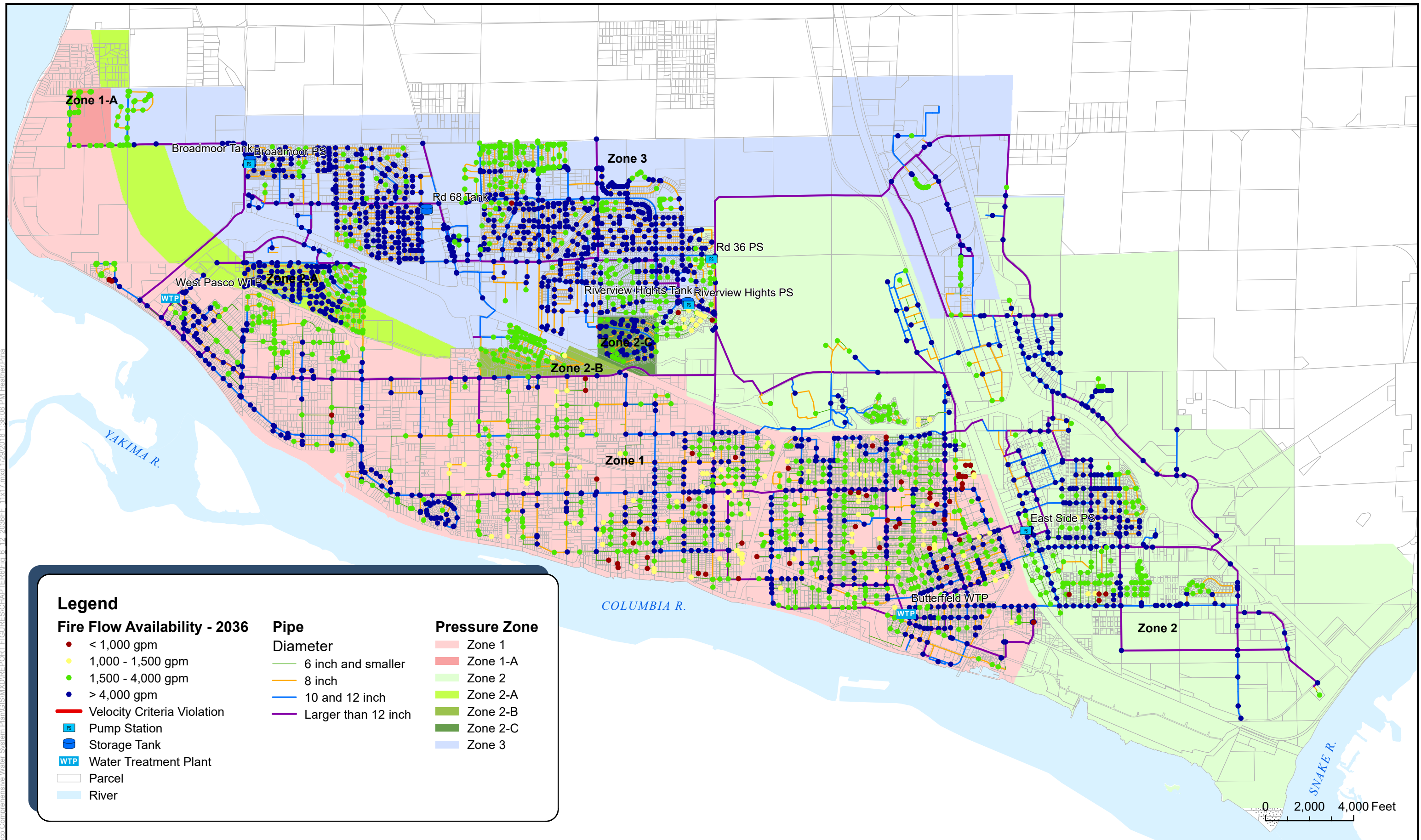


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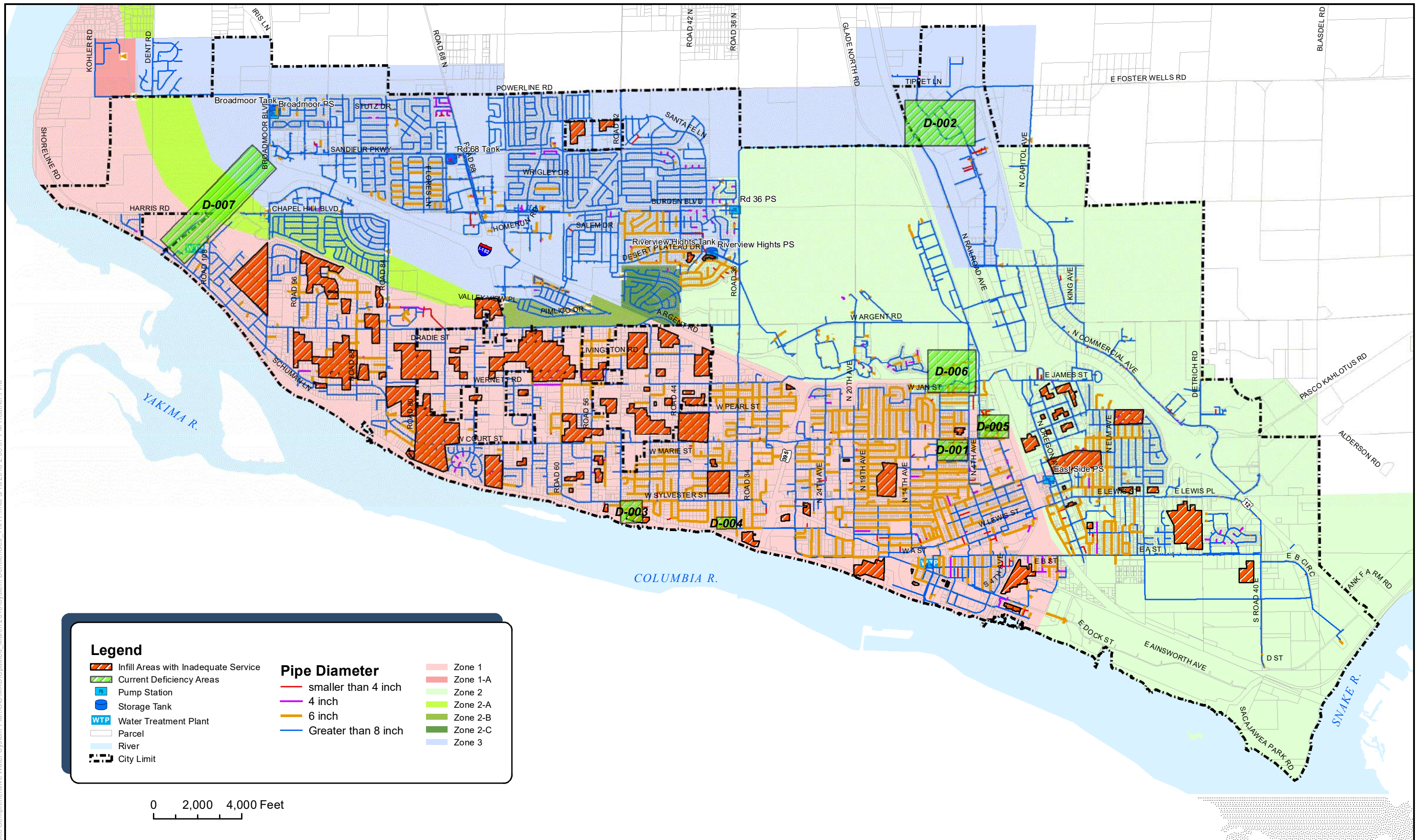


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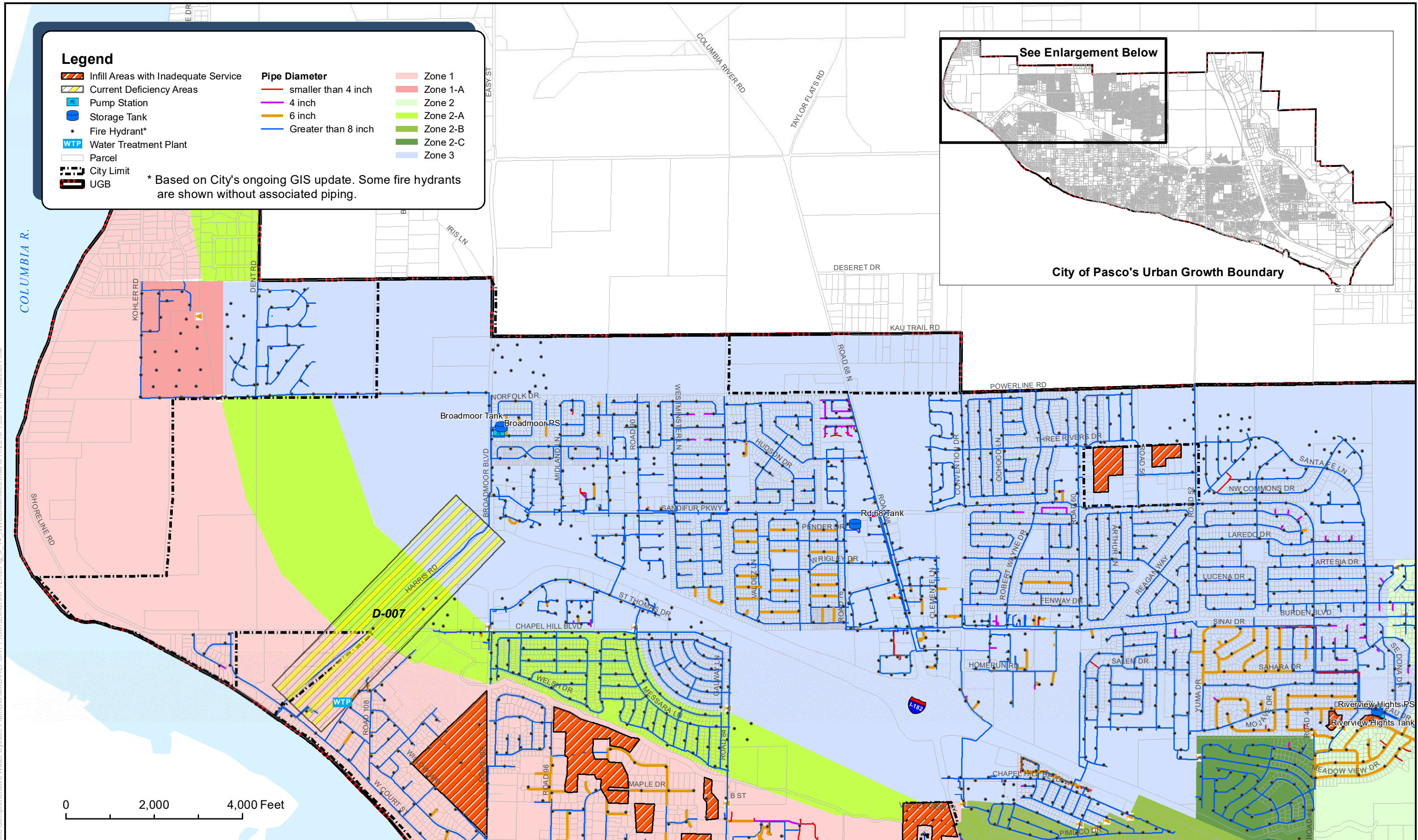
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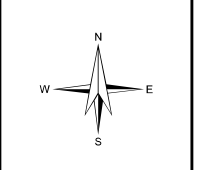
**Figure 6-13**  
**System Analysis**  
**Deficiency Areas**



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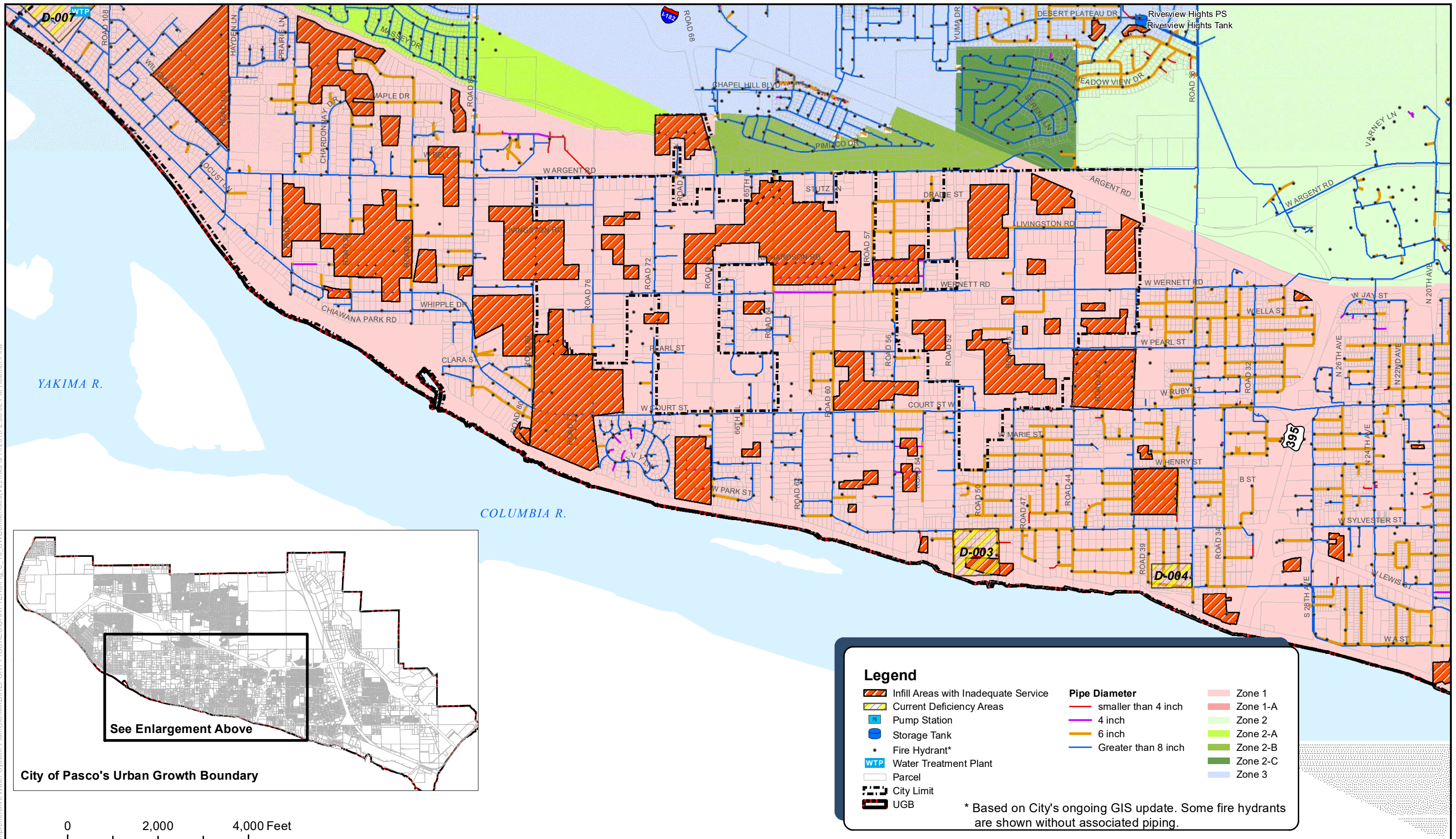
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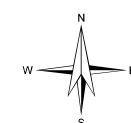
**Figure 6-14  
Northwest Area  
Deficiencies**



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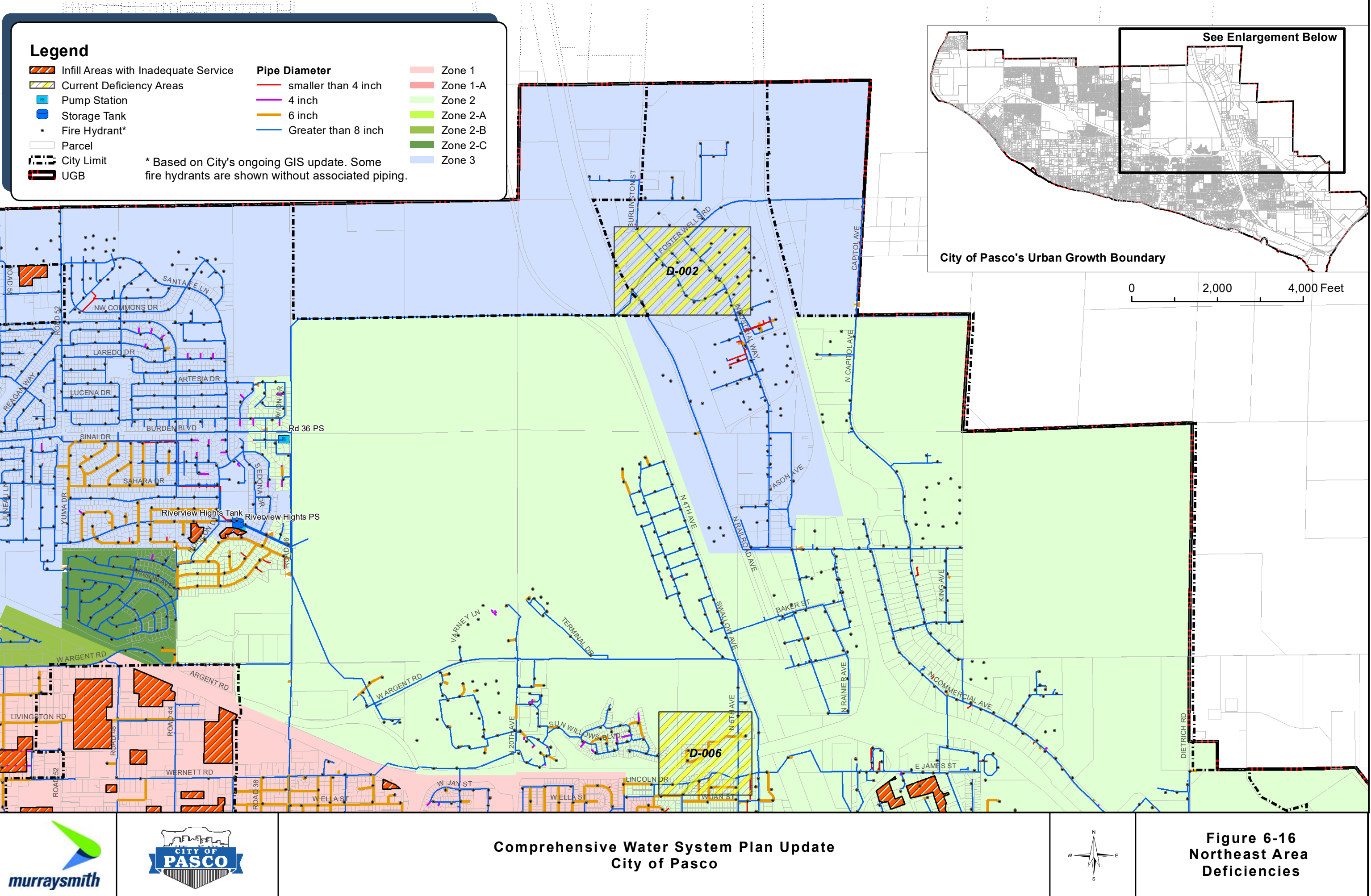
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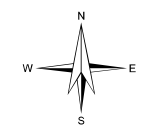
**Figure 6-15  
Southwest Area  
Deficiencies**



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Comprehensive Water System Plan Update  
City of Pasco







## Section **7**

## SECTION 7

### CAPITAL IMPROVEMENT PROGRAM

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#### 7.1 Introduction

This Section presents the recommended water system improvements developed to address the deficiencies identified in **Section 6 – Water Distribution System Analysis**. The strategy to correct each deficiency was developed working jointly with City of Pasco (City), with the ultimate purpose of maintaining the level of service expected by their customers and dictated by Washington Department of Health (WDOH) requirements.

As stated in **Section 1 – Water System Description** the City has not implemented all the distribution improvements that were defined in the 2009 CWSP. Also, the present and previous City Capital Improvement Plans (CIP) list additional piping projects that have not been completed to date. These recommendations were identified as major distribution pipes that needed replaced or installation of new pipes necessary to serve infill areas within the City's existing service area to maintain adequate pressures throughout each Pressure Zone during maximum day demand and fire flow conditions.

The recommendations presented in this Section were developed in accordance with the City of Pasco UT-1 Goal (per the 2007-2027 Comprehensive Plan): Provide adequate utility services to the urban growth area to assure that the anticipated 20-year growth is accommodated. The proposed future service area piping projects were developed to define concepts for new pipes to service these areas that creates a looped networked system to maintain redundancy and fire flow availability as development occurs.

#### 7.2 Approach for Developing Improvements

As detailed in **Section 6 – Water Distribution System Analysis**, capacity evaluations for the following major components of the system were performed: supply, storage, pumping, and piping for existing and future conditions (2022, 2027, and 2036 planning horizons). The results of these evaluations were used to develop improvement concepts for each deficient area. Additionally, as mentioned in **Section 6 – Water Distribution System Analysis**, the infill-areas with deficient fire protection and/or domestic water coverage will be evaluated as future infill development occurs to determine required improvements.

Once improvement strategies were defined, conceptual alignment/location, size, cost opinion and timeframe were determined for each project. This process was followed to develop the capital improvements:

- The improvements were sized to serve demands through 2036.
- Pipe improvements utilize standard 8-, 12-, 16-, 20-, 24-, 30- and 36-inch diameters. No improvements under 8 inches in diameter were recommended.

- Costs related to expanding the water treatment plant were developed by other consultants and provided by the City for inclusion in the Capital Improvement Plan (CIP).

The proposed improvements include additional supply capacity (expansion of West Pasco WTP), new storage tanks in Zone 2 and/or 3, and pipe improvements to increase the fire flow availability. These recommendations also include the City projects listed in the current Capital Improvement Plan 2018-2023 (2018 CIP), Capital Improvement Plan 2017-2022 (2017 CIP), and the projects listed in the 2009 Comprehensive Water System Plan (2009 CWSP) that have not been completed to date.

This Section also recommends non-capital improvement projects, focusing on the City's water system infrastructure data, studies to further refine future CIP projects, and future service areas.

### **7.3 Basis for Capital Cost Opinions**

The cost opinions developed for each recommended improvement are based on information provided by the City, construction costs for similar projects across the Northwest, the 2015 RS Means Heavy Construction Cost Data (RSMeans), and information provided by local suppliers. All costs identified in this Section reference 2016 dollars. The *Engineering News Record Construction Cost Index* (ENR CCI) basis is 10,315 (20-City Average, May 2016).

All project descriptions and cost estimates in this CWSP represent planning-level accuracy (+50%, -30%). During the design phase of each improvement project, its definition, scope, and specific information (e.g., pipe diameter and length) should be verified. **Appendix 7-A** presents a detailed discussion of the development of unit costs for the CIP projects.

### **7.4 Recommended CIP Projects**

This section presents the recommended CIP projects for each type of infrastructure project: supply, storage, and piping. No pumping projects (excluding those at the WTPs) are recommended in this CWSP, as the capacity evaluations didn't indicate deficiencies through 2036. Current and previously defined City CIP projects are identified in this Section as well.

#### **7.4.1 Supply**

The supply evaluation focused on meeting the capacity requirements for all planning horizons (2016, 2022, 2027 and 2036). The existing combined capacity of Butterfield and West Pasco WTPs is adequate to accommodate short and 5-year demands. The existing capacity is not adequate to serve 2027 and 2036 demands.

This deficiency will be addressed by the planned expansion of the West Pasco WTP. The expansion of the West Pasco WTP also increases supply redundancy. The proposed expansion plan will be implemented in the following phases:

- Phase 1 – 6 mgd expansion (total “reliable” capacity of 12 mgd)
- Phase 2 – 6 mgd expansion (total “reliable” capacity of 18 mgd)

The West Pasco WTP expansion phases are presented as individual projects in the CIP. Cost estimates for the treatment expansion improvements were provided by the City and are presented in **Table 7-1**.

In addition to the treatment capacity upgrade, the West Pasco WTP high service pump station will require new pumping units to supply the system. The high service pump station upgrades were not included in the City’s current Phase 1 capital improvement but are included in the current City’s CIP (project #16008), West Pasco Water Treatment Plant Backwash Ponds Project. This project also includes the expansion of filter backwash capability. The Phase 2 capital improvement will also require high service pump station improvements.

The completion of a Water Treatment Facility Plan and associated preliminary design for the Butterfield WTP is recommended to evaluate an overall plant and determine improvements to increase the “reliable” capacity to 30 mgd. The WTP capacity is currently limited by contact time, reducing the “reliable” capacity to 26.8 mgd.

In addition, an Aquifer Storage and Recovery (ASR) Feasibility Study is recommended to evaluate opportunities to store treated surface water from the Columbia River in the basalt aquifer system below the City. ASR has the ability to self-mitigate use of water under the Quad City Water Right (QCWR) permit by transferring surface water supply availability from the winter to the summer. ASR could also provide economical storage benefits compared to traditional above ground storage. Additionally, it would address instantaneous flow limitations and reduce associated environmental effects of summer surface water diversion.

As defined in **Section 9 – Operations and Maintenance Program**, the City is also interested in adding backup power to the Riverview Heights Pump Station (PS), as it is the main source of supply to Pressure Zone 3. The upgrades would include an onsite generator and transfer switch to allow for a fully functional pump station during a power failure. The last three supply projects listed in **Table 7-1** are currently defined CIP projects in the 2018 CIP. **Appendix 7-C** expands on the description of the projects listed in **Table 7-1**.

**Table 7-1  
Supply CIP Projects**

Project ID	Description	Location	Time Frame	Cost
AP-03 <sup>1</sup>	Butterfield Water Treatment Plant PLC and Control Upgrades Project #00039	Zone 1	2017-2018	\$600,000
AP-04 <sup>1</sup>	Columbia Water Supply Project #11001	Zone 1	2017-2018	\$8,705,000
AP-06 <sup>1</sup>	West Pasco Water Treatment Plant Backwash Ponds Project (City Project #16008)	West Pasco WTP	2017-2020	\$2,226,000
S-005 <sup>1</sup>	Riverview Heights PS Backup Power	Riverview PS	2018	\$380,000
S-004	ASR Feasibility Study	System Wide	2019	\$75,000
AP-05	Butterfield Water Treatment Plant Chlorine Safety Improvements (City Project #17004)	Zone 1	2019-2020	\$325,000
S-003	Butterfield WTP Facility Plan	Butterfield WTP	2020	\$300,000
S-001 <sup>1</sup>	West Pasco WTP Expansion – Phase 1	West Pasco WTP	2024-2027	\$1,350,000
S-002 <sup>1</sup>	West Pasco WTP Expansion – Phase 2	West Pasco WTP	2035	\$1,350,000
S-002-PS <sup>1</sup>	West Pasco WTP Expansion – Phase 2 – Pump Station Upgrade	West Pasco WTP	2035	\$910,000
<b>Total Supply CIP Cost</b>				<b>\$16,221,000</b>

Note: Project costs were provided by the City and do not include all the assumptions defined in Appendix 7-A.

#### **7.4.2 Storage**

As part of the storage capacity evaluation, pressure zones where the existing usable storage does not meet the equalization, fire suppression or emergency criteria were identified. **Table 7-2** shows the recommended storage improvements, implementation timeframe, and associated cost opinions. Land acquisition costs are not included. **Figure 7-1** presents the approximate location of storage improvements. Cost estimates for the planned Zone 2 reservoir were provided by the City and are presented in **Table 7-2**. **Appendix 7-C** expands on the description of the projects listed in **Table 7-2**.

**Table 7-2  
Storage CIP Projects**

Project ID	Description	Location	Time Frame	Volume MG	HGL (FT)	Cost
T-001 <sup>1</sup>	New storage reservoir – ground elevation storage (City Project #00041)	Zone 2	2020-2023	5.75	585	\$11,700,000
T-002 <sup>1</sup>	New storage reservoir – Elevated tank	Zone 3	2035	3.5	660	\$7,469,000
<b>Total Storage CIP Cost</b>						<b>\$19,169,000</b>

Note: Cost based on elevated storage.

### **7.4.3 Piping**

#### **7.4.3.1 Defined Piping Deficiencies**

The following transmission and distribution improvements are recommended based on the results of the hydraulic model evaluation. The model was used to assess the distribution system's ability to meet peak demand, and fire flow, for existing and future demands (2022 and 2036 planning horizons) while maintaining adequate system pressure. Deficiency areas were identified, and projects were proposed to address each after discussing alternatives with the City's staff. As mentioned in **Section 6 – Water Distribution System Analysis**, no results have been included for 2027 since no significant changes between 2022 and 2027 were observed.

**Table 7-3** presents the proposed piping improvements, cost, location, and the deficiency addressed; the deficiency ID refers to **Table 6-5** in **Section 6 – Water Distribution System Analysis**. **Figure 7-1** presents the location of the pipe improvements. Two deficiencies, D-001 and D-002, do not have associated proposed piping improvements. Deficiency D-001 involves the need for crossing private property to improve fire flows and the City is investigating if this is an option. Deficiency D-002 is a high velocity deficiency but pressure and flow can be maintained, therefore it was decided that an improvement was not required. **Appendix 7-C** expands on the description of the projects listed in **Table 7-3**.

**Table 7-3  
Proposed Piping CIP Projects**

<b>Project ID</b>	<b>Description</b>	<b>Deficiency ID<sup>1</sup></b>	<b>Type of Deficiency</b>	<b>Time Frame</b>	<b>Diameter (in)</b>	<b>Length (ft)</b>	<b>Cost</b>
IP-005	New 20-in transmission pipe connecting to existing 20-inch at Ione St and Road 108, then north along Crescent Rd up to Chapel Hill Blvd, then east up to Broadmoor Blvd, then north up to St Thomas Dr, connecting to existing 24-inch	D-007	Transmission line capacity, high velocity nearing performance criteria	2018-2019	20	5,350	\$2,507,080
IP-001	New 8-inch pipe (400-ft) along W Irving St connecting to existing 6-inch on Road 49 (City Project #00047)	D-003	Fire flow availability	2022	8	400	\$87,200
IP-003	New 8-inch pipe connection, possibly from W Court St up N 3 <sup>rd</sup> Ave 60 feet. Final location to be determined by City.	D-005	Fire flow availability	2022	8	60	\$30,000
IP-002	New 8-inch pipe (700-ft) along W Riverhaven St between Road 38 and Road 36 (City Project #00048)	D-004	Fire flow availability	2023	8	1,400	\$305,200
IP-004	Replace existing 6-inch with an 8-inch pipe (1,500-ft) along Empire Dr, west of N 5th Ave	D-006	Fire flow availability	2026	8	1,500	\$327,000
<b>Total Piping CIP Projects</b>							<b>\$3,256,480</b>

Note:

1 Deficiency from Table 6-5.



#### *7.4.3.2 Previously Defined Piping Projects*

The 2009 CWSP, the 2017 CIP, and the 2018 CIP list additional piping projects that were defined based on the City's plans for main extension, replacement or to address infill areas. The recommendations were identified as major distribution pipes that needed replaced or necessary to serve areas within the City's existing service area to maintain adequate pressures throughout each Pressure Zone during maximum day demand and fire flow conditions. As stated in **Section 1– Water System Description** the City has not implemented all the distribution improvements that were defined in the 2009 CWSP. **Table 7-4** shows the previously defined distribution projects, implementation timeframe, and associated cost opinions. Associated cost opinions were provided from the City. **Figure 7-1** shows the location of the previously defined piping projects. **Appendix 7-C** expands on the description of the projects listed in **Table 7-4**.

**Table 7-4**  
**Previously Defined Piping CIP**

<b>Project ID</b>	<b>Description</b>	<b>Time Frame</b>	<b>Cost<sup>1</sup></b>
DP-012	Waterline Extension - Schuman Lane (West from Road 96) Project #00040	2018	\$80,000
DP-002	Waterline Replacement - Richardson Road (Road 92 to Road 96) City Project #00043	2019	\$460,000
AP-08	Automated Meter Reading City Project #00050	2019-2023	\$4,750,000
DP-005	Waterline Replacement - Road 60 (Pearl Street, Court Street, Agate Street, and 62nd Place) City Project #00044	2020	\$900,000
DP-007	Waterline Replacement - Road 76 (Wernett Road to Court Street) City Project #00045	2020	\$826,000
DP-010	Waterline Extension - Alton Street (Wehe Avenue to the alley west of Owen Street) City Project #00046	2021	\$153,000
DP-013	Waterline Extension - Road 103 (Maple Street to Willow Way) City Project #00049	2023	\$113,000
DP-003	Waterline Replacement - Star Lane (West of Road 97)	2024	\$113,000
DP-008	Waterline Replacement - Maple Road (Road 100 to Road 104) CP7.WT.2R.15.20	2024	\$300,000
DP-009	Waterline Replacement - Road 88 (Franklin Road to Court Street)	2024	\$200,000
DP-006	Waterline Replacement - Road 80 (Agate St North 1,000 feet)	2025	\$125,000
DP-004	Waterline Replacement - Road 84 (Court Street to Argent Road)	2025-2026	\$450,000
DP-015	Wernett Road Waterline CP7.WT.2A.14.01	2025-2026	\$873,000
DP-016	East Airport Waterline (Port of Pasco)	2026-2027	\$895,000
<b>Total Previously Defined CIP Projects</b>			<b>\$ 10,238,000</b>

Note: Project costs were provided by the City and do not include all the assumptions defined Appendix 7-A.

### 7.5 Future Service Area Piping Projects

To serve the growth within the City's planned service area, concepts have been developed to provide future service. The future growth areas within the City's Urban Growth Area (UGA) include, but not limited to, the Riverview Area, DNR property, Northwest Service Area, Northeast/East Service Area, and the Industrial Area.

The proposed piping projects were developed with the intent of providing these future service areas with new pipes connecting to the existing system in different locations, creating loops to maintain redundancy and fire flow availability. The final configuration and phasing of water system improvement will depend on future growth and development needs. The timing and funding of these projects is also dependent on growth and development pressures. Additionally, it is anticipated that funding for these projects will be from the development community. The City will need to work closely with the development community in order to understand the timing and support development in these future service areas. **Table 7-5** shows the proposed piping projects, implementation timeframe, and associated cost opinions. **Figure 7-1** presents the locations of these proposed pipe improvements. **Appendix 7-C** expands on the description of the projects listed in **Table 7-5**.

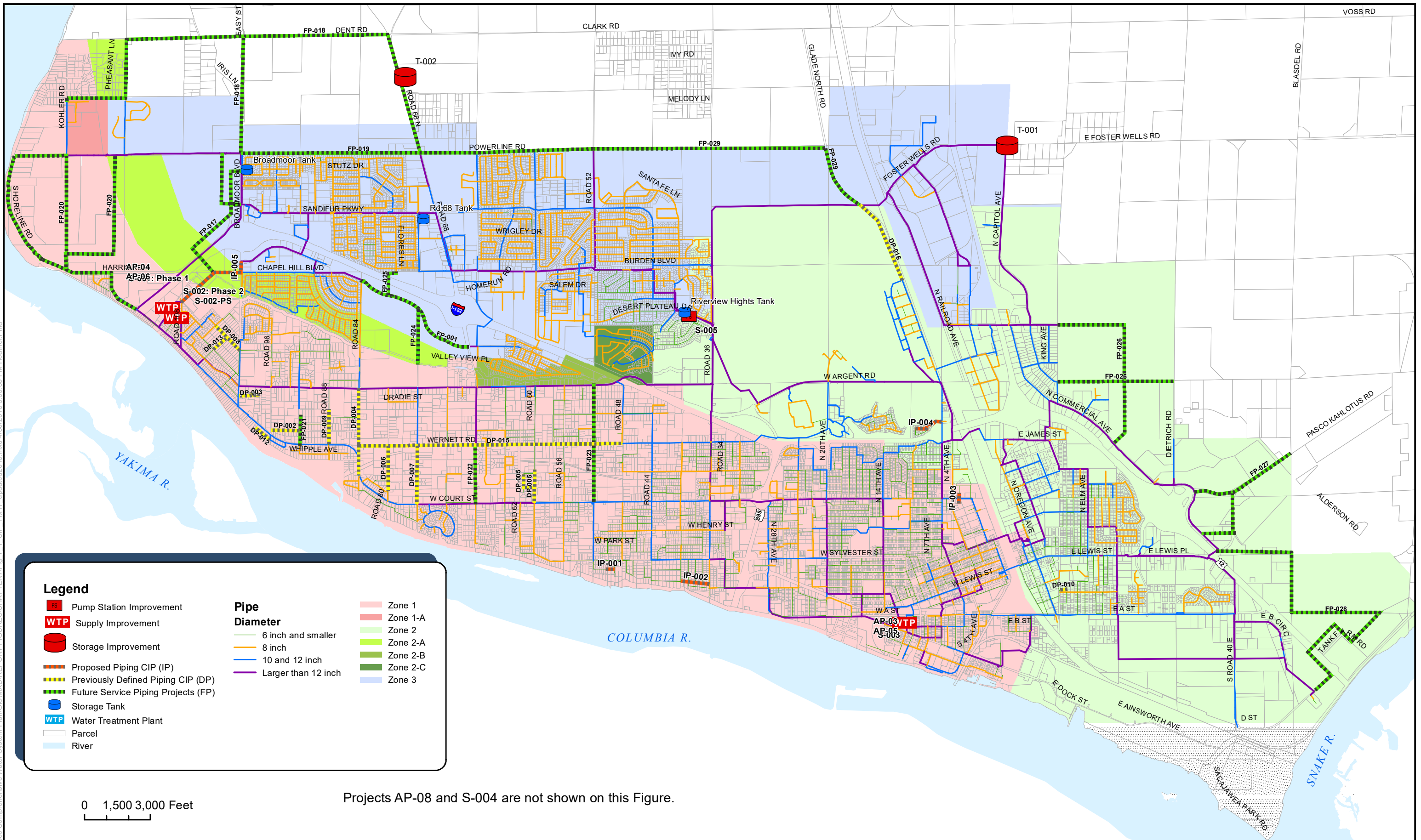
**Table 7-5**  
**Future Service Area Piping Projects**

Project ID	Description	Preliminary Time Frame	Cost <sup>2</sup>
FP-001 <sup>1</sup>	Chapel Hill Boulevard Waterline (DNR Property)	2018	\$920,000
FP-024	Road 76 (DNR Property)	2024	\$918,000
FP-025	I-182 Crossing (DNR Property)	2025	\$428,400
FP-017	Waterline Loop - Broadmoor Blvd.	2026	\$1,420,764
FP-019	Broadmoor to Road 52 - Waterline Ext.	2026-2027	\$6,300,060
FP-021	Road 92 (Riverview Service),	2027	\$440,946
FP-029	Road 52 to N. Glade Rd Transmission Improvements	2028	\$4,925,000
FP-020	West Pasco Loop	2028-2031	\$7,645,178
FP-022	Road 68 (Riverview Service)	2029	\$1,054,000
FP-027	Pasco Kahlotus Rd. Pipe Improvements	2029	\$2,266,800
FP-026	WAST Property Loop Improvements	2030	\$3,132,300
FP-023	Road 52 (Riverview Service)	2031	\$1,640,160
FP-018	Road 100 Corridor North	2031-2034	\$11,105,488
FP-028	Tank Farm Transmission Loop Improvements	2034	\$5,319,000
<b>Total Future Service Area CIP Projects</b>			<b>\$47,516,096</b>

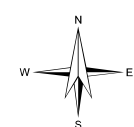
Note:

- 1 In 2018 CIP, price based on upsizing developer proposed line from 8" to 16".
- 2 It is anticipated that funding for these projects will be from the development community to aid in the implementation. The final configuration and phasing of water system improvement will depend on future growth and development needs. The timing and funding of these projects is also dependent on growth and development in the future service areas.

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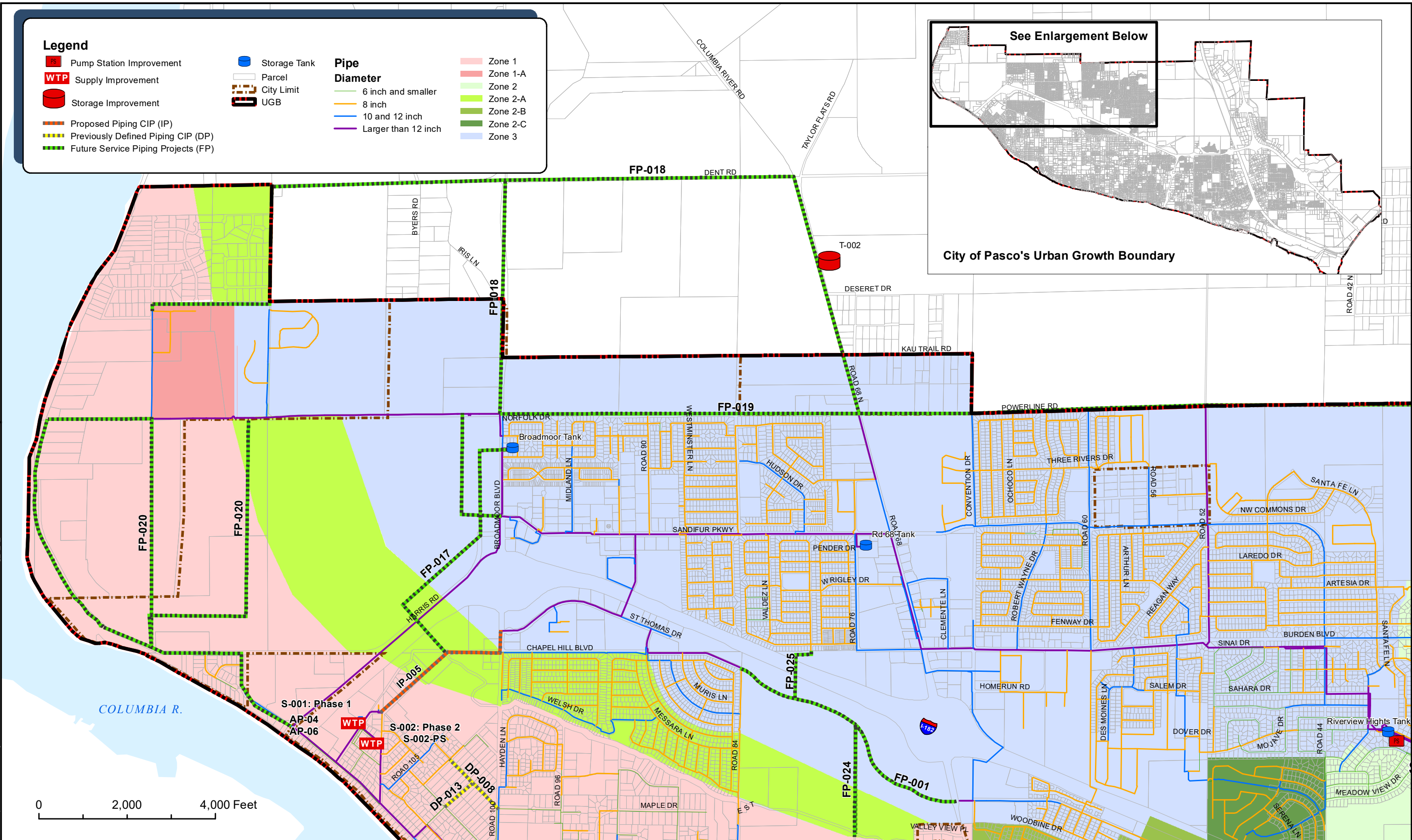
## Comprehensive Water System Plan Update City of Pasco



**Figure 7-1  
Capital Improvement  
Program**

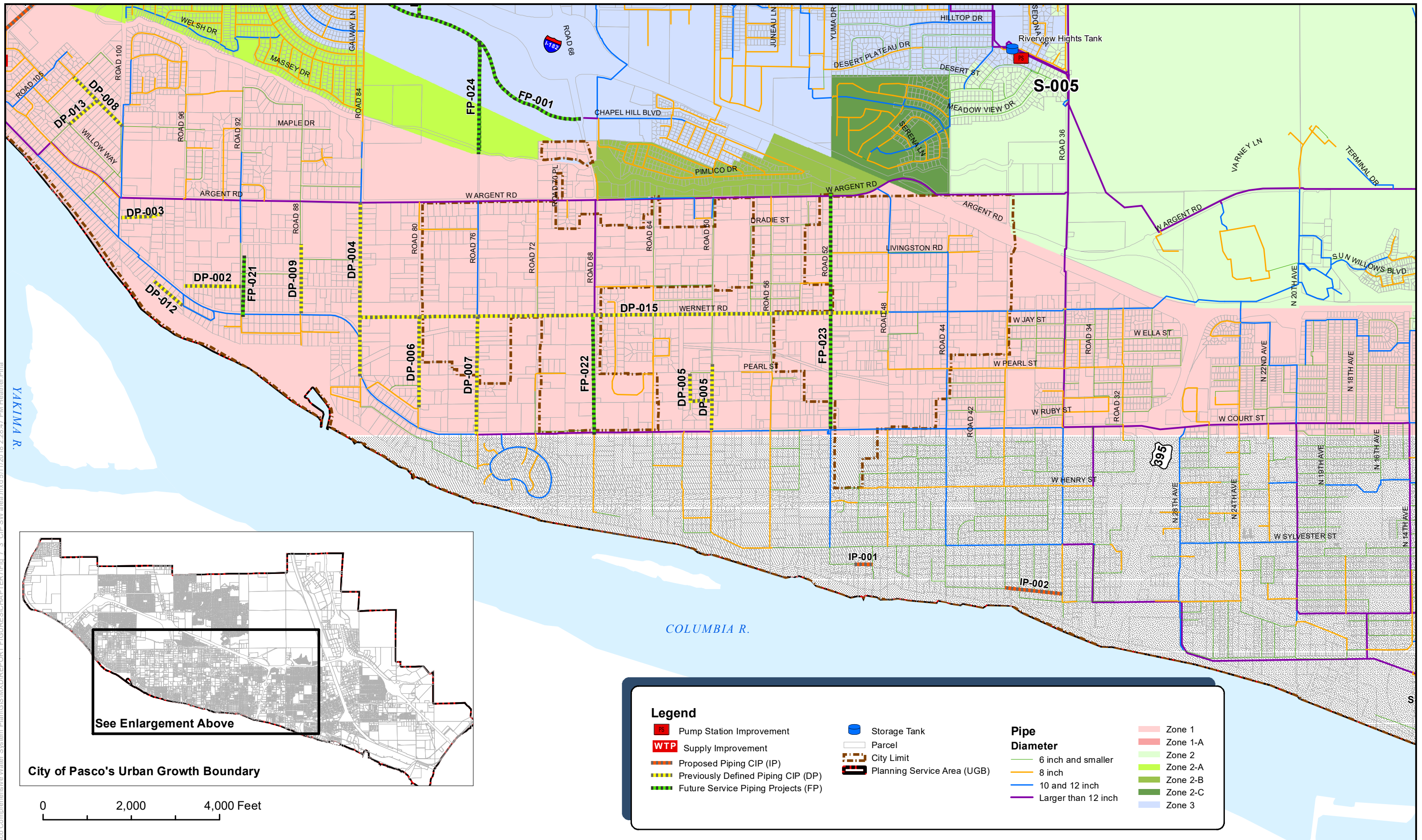


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Comprehensive Water System Plan Update  
City of Pasco

Figure 7-3  
Capital Improvement  
Program  
Southwest Area











## 7.6 Recommended Studies

The CWSP effort is an opportunity to consolidate system information from different sources and to identify gaps or quality issues with the available system information. Data quality or availability issues were identified throughout the CWSP. To aid the City in the next CWSP planning cycle these recommended studies need to be completed in the next 5 years:

- Completion of a water system ArcGIS Geodatabase, that includes all pipes in the system, and serves as inventory of the system connectivity and repository of the following information: diameter, material, pressure zone, and age. This will allow the City to validate all distribution piping through an updated GIS inventory. This will serve as asset management tool, allow efficient mapping, and provide accurate information for planning and operations. The City currently has a partially developed GIS water system database. The piping inventory is also kept in AutoCAD, and is purely graphical, containing no attributes for each segment. This prohibited the overall model network from being validated with a high level of confidence.
- A localized evaluation at Hillsboro PRV, to measure flow during all demand conditions is recommended. As Zone 2 is served by Zone 1 (via Eastside Booster Station) and by Zone 3 (via PRVs), the available supply through the PRVs will determine the required flow from the booster station. The model results indicate that Hillsboro PRV is one of the largest supplies for Zone 2. This is not consistent with information received from the City's staff. This study would involve installing a strap on meter within the PRV vault to measure flow over several weeks. The flow information will allow the City to assess if modifications to PRV settings are needed to adjust system operation.

Developing a more accurate understanding of the distribution of demand in the system under both winter and summer conditions is also recommended. In order to obtain a higher level of detail on the consumption parameters throughout the system, the following studies and procedures are recommended:

- Complete the development of a georeferenced database of all water meters in the service area. Currently the City has 4,400 meters out of 17,145 that still need to be georeferenced by City staff with a Global Positioning System (GPS) unit. The understanding of the location of use patterns will improve future demand projections and the results of future system evaluations. It is recommended the database include the type of user and note whether separate irrigation is available.
- To assess the reduction in water demands for those customers that are served by separate irrigation, an evaluation of the City's water utility billing records is required. This would identify specific per capita demand patterns and peaking factors by pressure zone, customer type, and if the customer is served by a separate irrigation service. This would improve demand distribution and compare summer peak use in

areas with and without a separate irrigation system and determine the different peaking factors for various areas of the system.

- Complete an audit on unmetered authorized consumption (flushing, construction water, etc) to better assess DSL estimates.
- After the water system GIS database development is completed and the demand distribution is defined, the hydraulic model should be updated based on that information. At that point a comprehensive calibration effort should be conducted. The calibration effort should include at least 10 fire flow test locations within each of the major pressure zones.

**Table 7-6** summarizes the recommended studies and their cost. The cost ranges defined below are for planning purposes will be further refined for each study as the City better assess the quality of available data.

**Table 7-6  
Recommended Studies**

<b>CIP ID</b>	<b>Recommended Study</b>	<b>Study Area</b>	<b>Time Frame</b>	<b>Cost</b>
O-001	Water System GIS Development	System-wide	2019-2022	\$50,000-\$75,000
O-002	Hillsboro PRV Flow Study	Local Study	2019-2022	\$5,000-\$10,000
O-003	Geocoding all water meters in service area - Validation	System-wide	2019-2022	\$10,000-\$20,000
O-004	Demand Study - Characterization of demand patterns in each Pressure Zone and separate irrigation impacts	System-wide	2019-2022	\$25,000-\$50,000
O-005	Unmetered authorized consumption audit	System-wide	2019-2022	\$50,000-\$75,000
O-006	Calibration refinement (after pipe inventory validation), 10 locations by pressure zone	System-wide	2019-2022	\$10,000-\$20,000

## 7.6 CIP Summary

The CIP includes 31 projects, of these 28 capital projects and six studies are recommended within the next 10 years. Another three capital projects are recommended for the long-term (11-20 years). The total expected cost per project and timeframe are summarized in **Table 7-7**. **Table 7-8** provides a summary of capital improvement costs by year. To serve the growth within the City's planned future service area another 14 projects have been identified. **Table 7-9** summarizes the anticipated cost for expansion of the transmission system.



**Table 7-7  
CIP Projects**

Project ID	Type of Improvement	Project Title	Location	Time Frame	Cost
AP-03	Supply CIP	Butterfield Water Treatment Plant PLC and Control Upgrades Project #00039	Zone 1	2017-2018	\$600,000
AP-04	Supply CIP	Columbia Water Supply Project #11001	Zone 1	2017-2018	\$8,705,000
AP-06	Supply CIP	West Pasco Water Treatment Plant Backwash Ponds Project #16008	Zone 1	2017-2020	\$2,226,000
S-005	Supply CIP	Riverview Heights PS Backup Power	Zone 1	2018	\$380,000
S-004	Supply CIP	ASR Feasibility Study	System Wide	2019	\$75,000
AP-05	Supply CIP	Butterfield Water Treatment Plant Chlorine Safety Improvements City Project #17004	Zone 1	2019-2020	\$325,000
S-003	Supply CIP	Butterfield WTP Facility Plan	Zone 1	2020	\$300,000
S-001	Supply CIP	West Pasco Water Treatment Plant Filter Expansion Phase 2	Zone 2	2024-2027	\$1,350,001
S-002	Supply CIP	West Pasco WTP Expansion - Phase 2	Zone 1	2035	\$1,350,000
S-002-PS1	Supply CIP	West Pasco WTP Expansion – Phase 2 – Pump Station Upgrade	West Pasco WTP	2035	\$910,000
T-001	Storage CIP	New Storage Reservoir: 5.75 MG Project #00041	Zone 2	2020-2023	\$11,700,000
T-002	Storage CIP	New Storage Reservoir: 3.5 MG	Zone 3	2035	\$7,469,000
IP-005	Proposed Piping CIP	Water Main Installation - Crescent - Chapel Hill Transmission	Zone 1-3	2018-2019	\$2,507,080
IP-001	Proposed Piping CIP	Waterline Extension -Irving Street (West to Road 49) Project #00047	Zone 1	2022	\$87,200
IP-003	Proposed Piping CIP	Waterline Extension - W Court St to N 3rd St.	Zone 1	2022	\$30,000
IP-002	Proposed Piping CIP	Waterline Extension - Riverhaven Street (Road 36 to Road 40) Project #00048	Zone 1	2023	\$305,200
IP-004	Proposed Piping CIP	Waterline Replacement - Along Empire Dr (West of N 5th Ave)	Zone 2	2026	\$327,000
DP-012	Previously Defined Piping CIP	Waterline Extension - Schuman Lane (West from Road 96) Project #00040	Zone 1	2018	\$ 80,000
DP-002	Previously Defined Piping CIP	Waterline Replacement - Richardson Road (Road 92 to Road 96) Project #00043	Zone 1	2019	\$460,000
AP-08	Previously Defined Piping CIP	Automated Meter Reading Project #00050	System Wide	2019-2023	\$4,750,000

Project ID	Type of Improvement	PROJECT TITLE	Location	Time Frame	Cost
DP-005	Previously Defined Piping CIP	Waterline Replacement - Road 60 (Pearl Street, Court Street, Agate Street, and 62nd Place) Project #00044	Zone 1	2020	\$900,000
DP-007	Previously Defined Piping CIP	Waterline Replacement - Road 76 (Wernett Road to Court Street) Project #00045	Zone 1	2020	\$826,000
DP-010	Previously Defined Piping CIP	Waterline Extension - Alton Street (Wehe Avenue to the alley west of Owen Street) Project #00046	Zone 2	2021	\$153,000
DP-013	Previously Defined Piping CIP	Waterline Extension - Road 103 (Maple Street to Willow Way) Project #00049	Zone 1	2023	\$113,000
DP-003	Previously Defined Piping CIP	Waterline Replacement - Star Lane (West of Road 97)	Zone 1	2024	\$113,000
DP-008	Previously Defined Piping CIP	Waterline Replacement - Maple Road (Road 100 to Road 104) CP7.WT.2R.15.20	Zone 1	2024	\$300,000
DP-009	Previously Defined Piping CIP	Waterline Replacement - Road 88 (Franklin Road to Court Street)	Zone 1	2024	\$200,000
DP-006	Previously Defined Piping CIP	Waterline Replacement - Road 80 (North along Agate Street)	Zone 1	2025	\$125,000
DP-004	Previously Defined Piping CIP	Waterline Replacement - Road 84 (Court Street to Argent Road)	Zone 2	2025-2026	\$450,000
DP-015	Previously Defined Piping CIP	Wernett Road Waterline CP7.WT.2A.14.01	Zone 1	2025-2026	\$873,000
DP-016	Previously Defined Piping CIP	East Airport Waterline (Port of Pasco)	Zone 2	2026-2027	\$895,000

Table 7-8  
CIP Summary by Year

CIP ID	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
AP-03	\$ 100,000	\$ 500,000																	
AP-04	\$6,121,000	\$2,584,000																	
AP-06	\$ 100,000	\$ 800,000	\$ 726,000	\$ 600,000															
DP-012		\$ 80,000																	
S-005		\$ 380,000																	
IP-005		\$ 501,000	\$2,006,000																
S-004			\$ 75,000																
DP-002			\$ 460,000																
AP-05			\$ 75,000	\$ 250,000															
AP-08			\$ 750,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000												
DP-005				\$ 900,000															
DP-007				\$ 826,000															
S-003				\$ 300,000															
T-001				\$1,000,000	\$2,000,000	\$4,200,000	\$4,500,000												
DP-010					\$ 153,000														
IP-001						\$ 87,200													
IP-003						\$ 30,000													
IP-002							\$ 305,200												
DP-013							\$ 113,000												
DP-003								\$ 113,000											
DP-008								\$ 300,000											
DP-009								\$ 200,000											
S-001								\$ 130,000	\$ 500,000	\$ 720,000									
DP-006									\$ 125,000										
DP-004									\$ 100,000	\$ 350,000									
DP-015									\$ 70,000	\$ 803,000									
IP-004										\$ 327,000									
DP-016										\$ 45,000	\$ 850,000								
T-002																			\$7,469,000
S-002-PS1																			\$ 910,000
S-002																			\$1,350,000
TOTAL	\$6,321,000.00	\$4,845,000.00	\$4,092,000.00	\$4,876,000.00	\$3,153,000.00	\$5,317,200.00	\$5,918,200.00	\$743,000.00	\$795,000.00	\$2,245,000.00	\$850,000.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$9,729,000.00

**Table 7-9**  
**Future Service Area Piping Projects**

<b>Project ID</b>	<b>Type of Improvement</b>	<b>Description</b>	<b>Location</b>	<b>Time Frame</b>	<b>Cost</b>
FP-001	Future Service Area Piping Projects	Chapel Hill Boulevard Waterline (DNR Property)	Zone 3	2018	\$920,000
FP-024	Future Service Area Piping Projects	Road 76 (DNR Property)	Zone3	2024	\$918,000
FP-025	Future Service Area Piping Projects	I-182 Crossing (DNR Property)	Zone 3	2025	\$428,400
FP-017	Future Service Area Piping Projects	Waterline Loop - Broadmoor Blvd.	Zone 3	2026	\$1,420,764
FP-019	Future Service Area Piping Projects	Broadmoor to Road 52 Waterline Ext.	Zone 3	2026-2027	\$6,300,060
FP-021	Future Service Area Piping Projects	Road 92 (Riverview Service)	Zone 1	2027	\$440,946
FP-029	Future Service Area Piping Projects	Road 52 to N. Glade Rd Transmission Improvements	Zone 3	2028	\$4,925,000
FP-020	Future Service Area Piping Projects	West Pasco Loop	Zone 1	2028-2031	\$7,645,178
FP-022	Future Service Area Piping Projects	Road 68 (Riverview Service)	Zone 1	2029	\$1,054,000
FP-027	Future Service Area Piping Projects	Pasco Kahlotus Rd. Pipe Improvements	Zone 2	2029	\$2,266,800
FP-026	Future Service Area Piping Projects	WAST Property Loop Improvements	Zone 2	2030	\$3,132,300
FP-023	Future Service Area Piping Projects	Road 52 (Riverview Service)	Zone 1	2031	\$1,640,160
FP-018	Future Service Area Piping Projects	Road 100 Corridor North.	Zone 1-3	2031-2034	\$11,105,488
FP-028	Future Service Area Piping Projects	Tank Farm Transmission Loop Improvements	Zone 2	2034	\$5,319,000

Notes:

- 1 In 2018 CIP, price based on upsizing developer proposed line from 8" to 16".
- 2 It is anticipated that funding for these projects will be from the development community to aid in the implementation. The final configuration and phasing of water system improvement will depend on future growth and development needs. The timing and funding of these projects is also dependent on growth and development in the future service areas.

## Section **8**



## SECTION 8

### FINANCIAL PLAN

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#### 8.1 Introduction

This Section summarizes the financial status of the City of Pasco's Water Utility, including the cost for providing service. The November 2015 *City of Pasco Utilities Rate Study*, prepared by FCS Group, Inc. (2015 Rate Study) is also summarized and includes the currently adopted rates.

#### 8.2 Past and Present Financial Status

The three main categories of expenditure for the Water Utility, addressed on an ongoing basis, within the annual budget are:

1. Operations/maintenance/general administration/taxes
2. Debt Service
3. Capital Improvements

The City Manager is required by City code to advise the City Council of the financial needs of the utility to meet current and projected needs with a recommendation on required rate adjustments.

Bond covenants prescribe at a minimum that the utility must generate sufficient revenue to meet debt service and operating expenses together with an amount equal to 25 percent of debt service to be used for capital purposes. The City's existing outstanding revenue bond debt service is \$31,020,000. The yearly repayment is approximately \$1.5 million over the next 5 years. This is based on repayment of 5 current revenue bonds.

Based on the 2015 Rate Study, the Water Utility rates were addressing the City's initial operating and debt service expenses in 2015, but as expenses grow in the future and new debt is added to fund capital improvements, the Water Utility becomes deficient. Thus, it was determined that current rates did not provide adequate revenues to meet the legal requirements of the utility.

#### 8.3 Summary of the 2015 Water Rate Study

Water revenue requirements were used to determine the adequacy of the Water Utility Rates in the 2015 Rate Study. Revenue and expenditure requirements for the 2014-2021 time period were projected from review of the accounting and billing records, capital plans, and debt service obligations of the City. The 2014 fiscal year budget was used as a starting point for the 2015 Rate Study. Escalation factors were developed for the various types of expenses which ranged from 1 percent to 3.26 percent per year. **Table 8-1** provides a summary of the anticipated water revenue requirements of the Water Utility over the 2016-2027 time period based on information from the 2015 Rate Study.

Table 8-1  
City of Pasco Water System Revenue Requirements (2016-2027)

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Revenues</b>												
Rate Revenues (After Rate Increase)	\$ 9,591,583	\$ 9,431,250	\$ 10,299,075	\$ 10,922,169	\$ 11,582,960	\$ 12,283,729	\$ 12,729,063	\$ 12,869,433	\$ 12,998,127	\$ 13,128,108	\$ 13,259,389	\$ 13,391,983
Non-Rate Revenues	\$ 1,262,906.72	\$ 1,085,540.00	\$ 1,104,723.96	\$ 1,118,712.87	\$ 1,137,301.59	\$ 1,166,401.03	\$ 1,169,902.00	\$ 1,182,785.94	\$ 1,194,692.69	\$ 1,206,963.18	\$ 1,219,373.38	\$ 1,231,925.07
<b>Total Revenues</b>	<b>\$ 10,854,489</b>	<b>\$ 10,516,790</b>	<b>\$ 11,403,799</b>	<b>\$ 12,040,882</b>	<b>\$ 12,720,262</b>	<b>\$ 13,450,130</b>	<b>\$ 13,898,965</b>	<b>\$ 14,052,219</b>	<b>\$ 14,192,820</b>	<b>\$ 14,335,071</b>	<b>\$ 14,478,763</b>	<b>\$ 14,623,908</b>
<b>Expenses</b>												
Cash Operating Expenses	\$ 6,710,990	\$ 6,821,987	\$ 6,883,938	\$ 7,123,385	\$ 7,369,405	\$ 7,546,014	\$ 7,878,168	\$ 7,912,709	\$ 8,102,100	\$ 8,296,620	\$ 8,496,395	\$ 8,701,581
Existing Debt Service	1,761,666	2,121,111	2,119,711	2,297,967	2,296,207	2,296,093	2,092,393	2,089,038	2,088,103	2,089,912	1,806,503	1,804,066
New Debt Service	-	-	-	420,951	420,951	1,178,664	1,178,664	1,178,664	1,178,664	1,178,664	1,178,664	1,178,664
Rate Funded System Reinvestment	-	-	\$ 500,000.00	\$ 550,000.00	\$ 600,000.00	\$ 650,000.00	-	-	-	-	-	-
<b>Total Expenses</b>	<b>\$ 8,472,656</b>	<b>\$ 8,943,098</b>	<b>\$ 9,503,649</b>	<b>\$ 10,392,304</b>	<b>\$ 10,686,564</b>	<b>\$ 11,670,770</b>	<b>\$ 11,149,225</b>	<b>\$ 11,180,411</b>	<b>\$ 11,368,867</b>	<b>\$ 11,565,195</b>	<b>\$ 11,481,562</b>	<b>\$ 11,684,310</b>
<b>Net Surplus (Deficiency)</b>	<b>\$ 2,322,497</b>	<b>\$ 1,457,367</b>	<b>\$ 1,712,819</b>	<b>\$ 1,389,009</b>	<b>\$ 1,696,912</b>	<b>\$ 1,360,069</b>	<b>\$ 2,282,626</b>	<b>\$ 2,398,253</b>	<b>\$ 2,345,662</b>	<b>\$ 2,286,803</b>	<b>\$ 2,509,297</b>	<b>\$ 2,446,815</b>

Notes:  
Rate Revenues based on 5% annual rate adjustment starting in 2016 to 2021. Rate Revenues based on 2.5% for 2022 and 0% thereafter.  
Non-Rate Revenues include miscellaneous fees, such as Disconnect (Process Svc) Fee, After Hour Service Fee,  
Water Rights Impact, Accounts Receivable & Collection Interest. Net Surplus takes into account the decrease for additional in-lieu of taxes from rate increase.

The results of the 2015 Rate Study identified that the current rate schedules were not adequate to fund the Water Utility for operations, capital and reserves and that a 5 percent yearly rate increase was required starting in 2016 through 2021. This rate increase was approved by the City Council on November 20, 2015, Ordinance 4252. Additionally, the revenue requirements summarized in **Table 8-1**, assume that there will be a 2.5 percent rate increase for 2022 and 0 percent for 2023-2027.

A “Cost-of-Service” analysis was performed with the goal to maintain equity for the water and sewer utilities. A conservation based (inclining block) rate structure evaluation was completed for the City focusing on the single family residential class, since it represents 87 percent of the total City accounts. The current single family residential rate for the City is composed of a fixed meter charge differentiated by meter size and a uniform rate for all usage. **Table 8-2** demonstrates that in order to satisfy the revenue requirement as proposed in the existing financial model, an increasing block rate structure would result in a Block 1 rate of \$0.70 per ccf (100 cubic feet = 1 ccf) for usage up to 10 ccf, a Block 2 rate of \$0.85 per ccf for usage between 10.01 and 40 ccf and a Block 3 rate of \$1.05 per ccf for all usage over 40 ccf monthly.

**Table 8-2  
Block Rate Development**

Block Rate Calculation	Block 1	Block 2	Block 3	Total
<b>Block Ranges</b>				
Monthly Block Thresholds (ccf)	10	40	40+	
Monthly Block Ranges (ccf)	(0-10)	(10.01 - 40)	(> 40)	
Total Residential Usage (ccf)				2,754,292
Distribution of Bills (%)	65.06%	25.96%	8.98%	
Distribution of Usage (%)	45.99%	35.46%	18.55%	
Distribution of Usage (ccf)	1,266,754	976,569	510,968	
<b>Calculating Block Rates</b>				
Total 2018 Variable Revenue Target (\$)				\$2,253,683
\$ Rate per 100 Cubic Foot	\$ 0.70	\$ 0.85	\$ 1.05	

Under the proposed rate structure, a single family residential customer with a use of 10 ccf per month would have a bill reduction of \$1.20, water use of 20 ccf per month would see a \$0.90 reduction and a user with 50 ccf per month would see an increase of \$2.01. The initial block rate structure is intended to get the conservation rate concept in place. As the rate structure matures the block thresholds can be adjusted to increase the conservation price signal.

At this time the City has decided not to implement an increasing block rate structure, but is planning for a further rate structure evaluation during the next rate study update over the next

5 years. To ensure that any rate structure change recovers the necessary amount of revenue, customer statistics should be updated in conjunction with the next rate study to ensure the most current data is used.

**Table 8-3** presents a summary of the current water rate schedules. The rate structure is comprised of a monthly meter charge and a uniform commodity charge for all water consumed. Customers outside the City limits pay a 90 percent higher meter and commodity charge.

**Table 8-3**  
**City of Pasco Water Rate Schedule**

Description	Fee / Charge		
	2016	2017	2018
<b>Inside City:</b>			
Consumption – per 100 cubic foot	\$0.74	\$0.77	\$0.81
Bulk – per 1000 gallons	\$1.21	\$1.27	\$1.33
Residential – single family base fees:			
¾ and 5/8 inch – per month	\$17.06	\$17.92	\$18.81
1 inch – per month	\$25.57	\$26.85	\$28.19
Outside City; effective 11/1/02	90% Surcharge		
<b>Commercial – multi-family, irrigation, commercial base fees:</b>			
¾ inch – per month	\$25.05	\$25.25	\$26.51
1 inch – per month	\$35.18	\$36.93	\$38.78
1-1/2 inch – per month	\$67.73	\$71.11	\$74.67
2 inch – per month	\$108.62	\$114.05	\$119.76
3 inch – per month	\$148.37	\$155.78	\$163.57
4 inch – per month	\$213.78	\$224.47	\$235.69
6 inch – per month	\$333.69	\$350.37	\$367.89
Outside City; effective 11/1/02	90% Surcharge		

## 8.4 Financial Program

The City's Water/Sewer Utility operates as an enterprise-funded entity within the overall municipal organizational framework. An enterprise-funded entity operates in a manner much like a commercial enterprise, with all operational and capital needs met by funding sources entirely under the control of that entity. In the case of a municipal enterprise, the administrative and organizational constraints of the "parent" municipality apply to the operations of the entity. As such, certain operational requirements are served by the administrative functions of the municipality, such as personnel, information systems, building maintenance, vehicle fleet services, and the like.

### 8.4.1 Operating Budget

The City prepares an annual operating and capital budget for the upcoming fiscal year. As an operating entity under the municipal organization, the Water Utility is responsible for operating within the budgetary constraints as approved by the City Council. Under the City

Charter, each operating and capital budget must be balanced with respect to planned revenue and expenses, with excess or insufficient funds being applied to the reserve balances for the applicable funds. Allowable reserve balances are based on statutory requirements, policy directives of the City Council, and the requirements of certain debt obligations. **Table 8-4** presents the results of operations for the Water Utility during the period of 2013 through 2015 and the 2016 operating budget for the Combined Water/Sewer Enterprise Fund as the City does not separately fund each component. For each of the years, the City's revenues have exceeded their expenses, resulting in excess funds. These excess funds are typically utilized to increase the operating reserves of the Water/Sewer Utility. These reserves are then used to respond to unforeseen needs as they develop.

**Table 8-4**  
**Water/Sewer Utilities Fund**

<b>Revenues</b>				
<b>Function</b>	<b>2013 Actual</b>	<b>2014 Actual</b>	<b>2015 Amended Budget As of 9/30</b>	<b>2016 Budget-City Manager Level</b>
Intergovernmental	41,848	22,818	50,000	-
Charges for Services	17,850,903	19,895,362	20,369,655	22,324,587
Miscellaneous <sup>1</sup>	213,716	232,894	155,900	187,968
Other Financing Sources <sup>2</sup>	13,221,020	3,385,400	11,774,500	12,294,000
Interfund Transfers <sup>3</sup>	450,000	200,000		-
<b>Total Revenue</b>	<b>31,777,487</b>	<b>23,736,474</b>	<b>32,350,055</b>	<b>34,806,555</b>
Beginning Fund Balance	5,822,906	10,249,250	9,946,994	14,260,220
<b>Total Resources</b>	<b>37,600,393</b>	<b>33,985,724</b>	<b>42,297,049</b>	<b>49,066,775</b>
<b>Expenses</b>				
<b>Function</b>	<b>2013 Actual</b>	<b>2014 Actual</b>	<b>2015 Amended Budget As of 9/30</b>	<b>2016 Budget-City Manager Level</b>
Salaries and Wages	2,599,431	2,830,832	3,386,306	3,566,435
Personnel Benefits	1,113,138	1,330,549	1,503,878	1,676,042
Supplies	1,121,492	1,492,845	2,128,811	1,980,410
Other Services/Charges <sup>4</sup>	7,291,511	7,738,008	9,003,568	8,996,524
Interfund Transfers <sup>3</sup>	252,913	50,180	14,495	-
Capital Outlay	8,312,043	4,447,590	9,023,804	20,532,000
<b>Sub-Total Expenditures</b>	<b>27,351,143</b>	<b>23,376,646</b>	<b>30,036,829</b>	<b>42,434,327</b>
<b>Ending Fund Balance</b>				
<b>Function</b>	<b>2013 Actual</b>	<b>2014 Actual</b>	<b>2015 Amended Budget As of 9/30</b>	<b>2016 Budget-City Manager Level</b>
Ending Fund Balance	10,249,250	10,609,078	12,260,220	6,632,448
<b>Total</b>	<b>37,600,393</b>	<b>33,985,724</b>	<b>42,297,049</b>	<b>49,066,775</b>

Notes:

1. Includes funding sources not included in other categories
2. Monies from incurred debt, i.e. loans, LIDs, etc
3. Interfund Transfers – Monies that are transferred from one fund to another, always is coupled with an “Expenses Interfund Transfers” item
4. Service related, i.e. professional consultants, janitorial, phones, legal counsel



### **8.4.2 Revenue Collection**

Like similar commercial enterprises, the management of cash flow is critical to the successful operation of the Water Utility. The City has implemented the following practices with respect to maintaining the collection of revenues:

- Water Billing – Account holders are provided with a bi-monthly bill that summarizes usage for the billing period and a total amount due.
- Connection Fees – Any development of property is required to have the appropriate water service for the lot as dictated by the zoning and property use. The development of commercial properties and residential subdivisions are required to extend water mains necessary to serve the property. The extent of the water system extension is considered in developing the connections fees for each lot being served.

The City budgets for a certain proportion of their fees and charges to be uncollectable. This uncollectable allowance is determined each budget period based on previous experience, projections related to economic conditions, and the judgment of the City's financial planning team, including the senior managers of the Water Utility.

### **8.4.3 Capital Improvements Planning**

The City, as part of its annual planning process, prepares a six-year Capital Improvements Plan (CIP) for all City entities, including the Water Utility. The current (2018-2023) Water CIP anticipates that a total of \$36,804,000 will be spent on the capital project needs of the Water Utility over the six-year period. This CWSP includes an additional \$785,000 of capital projects that have not be incorporated into the current CIP. The long-term capital projects (2024-2036) total \$14,400,000. The City re-evaluates identified improvements through their yearly budgeting cycling, the next cycle starts mid-2018 for 2019 fiscal year.

In general, to qualify as a capital project, the City states:

*“A capital improvement project is any major, non-recurring expenditure for land, facilities, or equipment that have a useful life of five (5) years or more, and a minimum cost of \$25,000. Capital related expenditures that do not meet the criteria stated above and not included in this [budget] are included in the capital outlay section of the City's operating budget.”*

Capital improvements financed by City utility funds may only be paid for in the following manner:

- Debt to be repaid by user fees and charges and/or connection or capacity fees
- Current assets, including reserves, current revenue, grants, etc.
- A combination of debt and current assets

## 8.5 Summary

The summary of the City's financial program based on the 2015 Rate Study, indicate that a 5 percent yearly rate increase was required starting in 2016 through 2021 to be able to fund the Water Utility for operations, capital and reserves. A 2.5 percent rate increase will be required in 2022 to meet the revenue requirements projected by the City's financial model, based on the capital improvement projects defined in this CWSP. The City re-evaluates identified improvements through their yearly budgeting cycling and is planning to review the recommendations from the 2015 Rate Study in the next 5 years to confirm that there are no rate implications based on potential future changes.

## Section 9

## **SECTION 9**

### **OPERATIONS AND MAINTENANCE PROGRAM**

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#### **9.1 Introduction**

This Section describes the City of Pasco's (City) water system Operations and Maintenance (O&M) program. This section updates the previous O&M program and is based on information provided by City staff.

#### **9.2 System Overview**

The following list provides an overview of the City's water system:

- System serves approximately 70,770 people.
- Service Area: 29.9 square miles.
- Volume of water produced (approximate 2015 values).
  - Average Daily Demand (ADD): 12.9 mgd.
  - Maximum Daily Demand (MDD): 26.8 mgd.
  - Peak Hourly Demand (PHD): 34.1 mgd.
- Distribution System Loss: Less than 3%.
- Total length of water line: 326 miles.
- Number of services: 18,958 (approximate 2015 value).
- Number of booster pumping stations: 6.
- Number of finished water tanks: 3.
- Number of pressure zones: 3.
- Number of pressure reducing valve (PRV) stations: 20.
- Average equivalent residential unit (ERU): 424 gallons per day (gpd).
- Size of most residential connections: 3/4 inch.
- Source: Two surface water treatment plants, Butterfield Water Treatment Plant (WTP) is a dual media filtration plant "reliable capacity" 26.8 mgd; West Pasco WTP is an ultra-filtration membrane facility with a "reliable capacity" 6 mgd capacity and expansion capacity of up to 18 mgd.
- Water Utility Staffing Full-time Equivalents (FTEs): 19 (not including management)

#### **9.3 Organization**

The Pasco Water System (System ID # 664003) operates under the direction of the Public Works Department. The Public Works Director provides the policy direction, signs operating permits, and provides oversight of the utility. The City Council is responsible for adopting ordinances and policy decisions together with budget adoption.

**Figure 9-1** illustrates the organizational structure of the Water Utility. The Water Utility is separated into three service divisions: 1) Water Treatment Plant Division; 2) Water Distribution Division, and 3) Cross Connection Division.

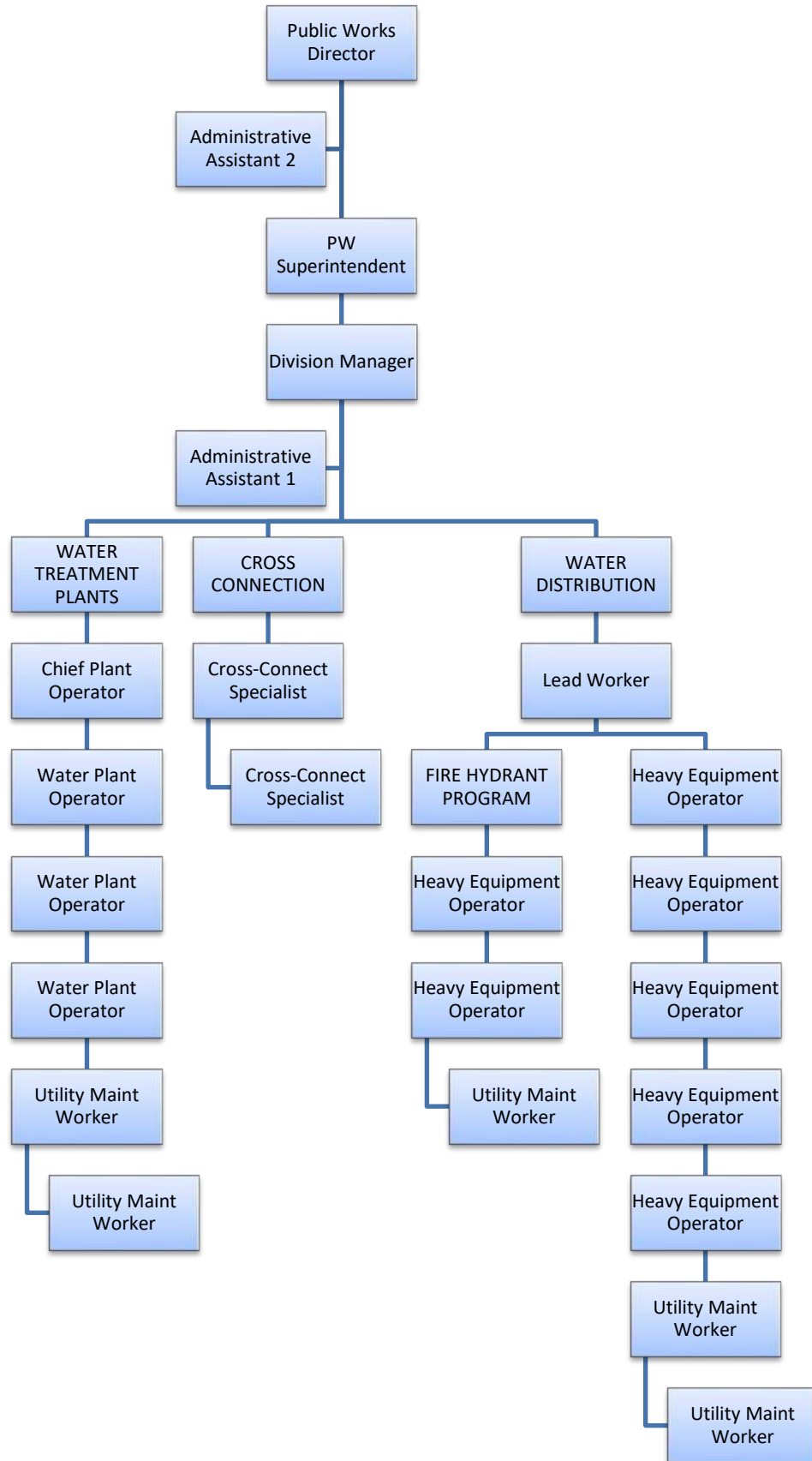
Responsibility of respective functions is generally as listed in **Table 9-1**, but are subject to change at the discretion of the Public Works Director. In addition to those positions listed in **Table 9-1**, the utility is also assisted by a variety of personnel within Public Works and Engineering as well as other departments in order to perform the listed functions.

**Table 9-1**  
**City of Pasco Water Utility Position Responsibilities**

<b>Position</b>	<b>Responsible for Function*</b>	<b>Assists with Function*</b>
City Council	a,b,c,d	
City Manager	a,b,c,d	
City Attorney	x	
Public Works Director	a,b,c,d,e,f,g,o,p	
Field Division Manager	f,h,k,n,o,w	a,b,c,d,e,g,p
Plant Division Manager	f,h,k,n,o,w	a,b,c,d,e,g,p
Water Distribution Lead	h,i,k,l,n,w	a,b,d,e,f,g,l,o,q,r,s,v
City Engineer	n,o,r,u,v	a,b,c,d,e,f,g,k,l,p
Equipment Operators/Utility Maintenance Workers		a,d,h,i,k,l,n,o,q,r,w
Cross Connection Specialist	m	a,d,h,i,k,l,n,o,q,r,u,v,w
Chief Plant Operator	h,i,j,k,l,n,o,q,t,w	a,b,d,e,f,g
Water Treatment Plant Operators		a,d,h,i,j,k,l,n,o,q,t,w
Utility Engineer	b,n,o,q,r,u	a,c,d,g,i,k,l,v
* List of Functions for Water Utility: a. Goals b. Comprehensive Planning c. Rate Structure Formulation d. Budget Formulation e. Fund Management f. Program Planning and Management g. Capital Improvement Planning h. Day-to-Day Operations i. Preventive Maintenance j. Water Quality Monitoring k. Emergency Response l. Troubleshooting m. Cross Connection Control n. Response to Complaints o. Public Relations p. Media Response q. Repairs to System Infrastructure r. Installation of New System Infrastructure s. Underground Utility Locating t. General Plant Operation u. Development Plan Review v. Field Engineering w. Safety Compliance x. Legal Counsel		



**Figure 9-1**  
**City of Pasco Water Utility Organizational Structure**



The Water Treatment Plant Division is responsible for the day to day operations and maintenance of the raw water intakes, Butterfield Water Treatment Plant, the West Pasco Water Treatment Plant, reservoirs, PRVs and the booster stations in the distribution system. The State classifies the City's Butterfield Water Treatment Plant as a Level 4 facility and the West Pasco Water Treatment Plan as a Level 3 facility based on size and complexity. The chief operator in charge of day-to-day operations must hold at least a Water Treatment Plant Operator (WTPO) 4 certification. All shift operators are required to hold a WTPO 3 certification.

The Cross Connection Division is responsible for protecting the City's domestic water supply from possible contamination and to investigate possible contamination sources. The focus is mostly on landscape irrigation systems, which is the most common source of possible contamination. The City has two cross connect specialist on staff.

The Water Distribution Division is responsible for the operation and maintenance of the potable water transmission and distribution mains within the City's service area. There include approximately 326 miles of water mainline in the distribution system as of the end of 2015. The State classifies the distribution system as Group 4. Based on the system size, the state requires a Water Distribution Manager (WDM) 4 certification for the individual in direct charge of the system.

The Engineering Division is mainly responsible for review of extensions to the water system, future planning to accommodate growth, and troubleshooting any system problems. They are not generally involved with the day to day operation of the system.

## **9.4 System Operation and Control**

The Water Utility provides for treatment and conveyance of the community's potable water supply. Any interruption of this service may result in a public health hazard and considerable inconvenience to the customers.

### ***9.4.1 Water Treatment Plant Division***

The Chief Plant Operator (CPO) is responsible for activities at the Butterfield WTP, West Pasco WTP, system reservoirs, PRVs, and booster pump stations. His main priority is to ensure that water quality meets or exceeds state and federal standards. The CPO plans, organizes, schedules work activities, monitors the operation of the treatment facilities, and prepares required reports. The CPO directs other Water Treatment Plant Operators and employees to assist in accomplishing these goals.

The Water Treatment Plant Operators perform technical work in the monitoring, testing, calibrating, repairing, and adjusting of water quality treatment equipment within the City water system. Operators also monitor and adjust chemical dosages to assure safe drinking water at all times. They are responsible for operation and maintenance of the treatment plants, storage facilities, pump stations, and water intake facilities. Operators also assist in addressing water quality concerns, regulatory compliance, and recordkeeping.

The Butterfield WTP is staffed from 7:00 a.m. through 3:30 p.m. (8.5 hours per day) every day of the year. The West Pasco WTP is controlled remotely through the SCADA system, but is staffed 2 to 4 hours a day depending on scheduled operational activities. The City anticipates increased hours of operation at the West Pasco WTP with the planned Phase 2 expansion, which is anticipated to be online by 2019. When operators are not physically present, the system is monitored by a SCADA network with preset alarm conditions. Operators are mandated to respond to alarm conditions within 30 minutes of notification. On call operators have the ability to directly access control systems through a virtual private network (VPN) while offsite.

The treatment plants and associated facilities are operated and maintained in accordance with detailed O&M documents. These documents prescribe the operation of each specific system component. Preventative maintenance activities are scheduled and recorded via Hach JobCal™ software.

It is recommended that the CPO develop and maintain a list of critical components for each operating system at the WTPs to ensure critical backup parts/components are on hand and their storage location is known. A parts inventory system would be used to ensure availability of adequate spare parts needed to repair and maintain system facilities. The Water Distribution Lead would need establish order set points for each inventory item, taking into account frequency of use and lead time for delivery. The Water Treatment Plant Division and Water Distribution Division should also keep an updated list of suppliers for routine and unique/hard-to-find items.

The major water system components that are operated by the Water Utility are the McNary Pool Columbia River Butterfield Intake, West Pasco McNary Pool Columbia River Intake, the Butterfield WTP, West Pasco WTP, five storage facilities, four booster stations; and approximately 326 miles of transmission and distribution piping. The following is a brief description of the normal operation of each component.

#### *9.4.1.1 Reservoir Maintenance*

Reservoir maintenance includes the draining, cleaning, and inspection activities to ensure both consistent water quality and structural integrity of the reservoir. Cleaning removes the silt build up on the reservoir bottom, which minimizes the chance for bacterial regrowth. The City inspects and cleans reservoirs on a routine basis. Additionally, the Road 68 Elevated Reservoir has a cathodic protection system to reduce the effects of corrosion on the water tank. The cathodic protection system is inspected annually.

#### *9.4.1.2 Columbia River Raw Water Intake for Butterfield WTP*

Raw water is supplied to the Butterfield Water Treatment Plant (WTP) by a raw water pipeline connected to the intake facility adjacent to the McNary Pool of the Columbia River. The Butterfield Raw Water Pump Station is located approximately 1,800 feet from the WTP. The multi-level intake consists of two Bilfinger barrel screens rated for of flow of 18 mgd each. These screens are designed to meet criteria for endangered species protection as

mandated by state and federal law. The screens are cleaned via air burst supplied to each screen by an air piping manifold with a series of orifices located behind each screen. The cleaning cycle is initiated automatically based on timer set points input by plant operators. The screens are located on the river bed 35 feet from the intake structure. The lowest level of the intake is a wet well housing the four raw water pump columns and valves. The highest level of the Raw Water Pump Station contains the motors, drives, MCC, and local control panels. The Butterfield Raw Water Pump Station is operated remotely with staff assessing conditions visually on a routine basis. Pump staging at the Butterfield WTP is chosen based on a flow band set by operators. The raw water flow rates are controlled to maintain a constant level of 9 feet in the Butterfield clearwell. Pump control is directed from the water treatment plant via direct link fiber optic communications. In the event of communication failure, the Raw Water Pump Station can be operated in manual control.

#### *9.4.1.3 Butterfield WTP*

The Butterfield WTP is a class 4 treatment facility. This classification is designated by Washington Department of Health and is based on system complexity and service factor. The plant is typically in operation 24 hours per day with personnel present for 8 hours (one shift) per day. Production flowrates are set by operational staff based on forecasted and historical system demand. Chemical feeds are flow paced with chlorine application further controlled by desired residual level setting. Coagulant monitoring is provided by an online streaming current meter.

Filtration at the Butterfield WTP is provided by eight twin bay dual media filters. Each filter is effluent rate of flow regulated. In emergency situations, filters can be operated in a manual fixed rate of flow. Backwash of the filters can be operated manually or by operator initiated SCADA control.

The Butterfield WTP clearwell is pumped through the high service pumps directly into Pressure Zone 1. Water in excess of demand is stored in the Riverview Heights Reservoir.

In recognition of the typical 16-hour per day unmanned operation, a number of safeguards are built into the system including automatic shutdown and notification to an “on-call” operator via phone dialer. The three operators participate in a standby rotation outside normal working hours. Water quantity and system information is monitored through SCADA control software. Mandated records are maintained and logged in a historical data historian at the Public Works Shop.

#### *9.4.1.4 Columbia River Raw Water Intake for West Pasco WTP*

Raw water is supplied to the West Pasco WTP by a pipeline connected to the intake facility adjacent to the McNary Pool of the Columbia River. The West Pasco WTP Intake is located approximately 900 feet from the WTP. The current intake consists of three barrel screens rated for a total flow of 15 mgd. These screens are designed to meet criteria for endangered species protection as mandated by state and federal law. The screened intake and piping to the pump columns are shared with the City’s irrigation department. A temporary structure

houses the 2 raw water pump motors and necessary valves. A corrugated metal roof provides protection for drives, MCC, and local control panels. The City is currently designing a new raw water intake structure for the West Pasco WTP and the existing intake will be converted to supply the City's irrigation system. The new intake will consist of 2 barrel screens with a rated capacity of 12.5 mgd each. A new structure housing two pumps initially with a capacity of 5 mgd each will be constructed. The pump station structure has space for 5 pumps as well as drives, MCC, and control panels.

The West Pasco WTP Intake is operated remotely with staff assessing conditions visually on a routine basis. Pump staging at the West Pasco WTP is controlled by pressure and flow demands from the PALL membrane modules. Pump control is directed from the water treatment plant via direct link fiber optic communications.

#### *9.4.1.5 West Pasco WTP*

The West Pasco WTP is a class 3 treatment facility. This classification is designated by Washington Department of Health and is based on system complexity and service factor. When capacity is expanded to 12 mgd the plant is expected to be recertified at class 4. The plant is typically in operation 24 hours per day. Operations personnel are usually present between 2 and 4 hours per day. Production flow rates are set by operational staff based on forecasted and historical system demand. Chemical feed and disinfection are flow paced with raw water flow.

Filtration at the West Pasco WTP utilizes a PALL pressure membrane module system. Modules are configured in racks capable of treating up to 3 mgd. Currently the West Pasco WTP is functioning with two modules (6 mgd initial capacity). The ultimate capacity of the West Pasco WTP is 18 mgd consisting of six sets of pressure membrane modules of 3 mgd capacity each. The pressure membrane system can be operated in either manual fixed flow rate or automatically control based on clearwell level.

Backwash of the pressure membrane system is initiated automatically by the plant process control scheme. Typically, this occurs based on a preset volume interval for each membrane module. In addition to routine backwashing, each module is taken offline for more intensive cleaning after set volumes have been filtered. This cleaning process takes the entire module offline for upwards of 2 hours.

Finished water from the West Pasco WTP is discharged through the high service pumps directly into Pressure Zone 1. Due to distribution system hydraulics, most of this water is directed towards the Broadmoor Reservoir. During future expansion of the West Pasco WTP (12 mgd), the City will have the option to discharge to either Zone 1 or Zone 3.

In recognition of the typical 16-hour per day unmanned operation, a number of safeguards are built into the system including automatic shutdown and notification to an "on-call" operator via phone dialer. The three operators participate in a rotation for being on standby outside normal working hours. Water quantity and system information is monitored through



SCADA control software. Mandated records are maintained and logged in a digital data historian at the Public Works Shop.

#### *9.4.1.6 East Side Booster Station*

The East Side Booster Station serves to boost water from Pressure Zone 1 to Pressure Zone 2. This station uses stage sequencing for pump selection. The station's automatic control self regulates pump operation by cycling pumps on and off based on specific flow and pressure set points. An Operations and Maintenance Manual provides functions, operations, and maintenance information in detail. This station is currently being upgraded in 2016 as part of the "Eastside Booster Pump Station Upgrade" CIP project from the 2009 CWSP.

#### *9.4.1.7 Riverview Heights Reservoir*

The Riverview Heights Reservoir is a partially buried storage tank in Pressure Zone 1. This reservoir is divided into two sections with a combined capacity of 10 million gallons. It is visually examined on a daily basis and the interior is inspected by contract divers on a routine basis. The reservoir level is monitored via the SCADA network. When a full reservoir level setting is triggered, the Butterfield WTP high service pumps is set to automatically shut down. This prevents water from discharging through the overflow outlet on to land owned by the Port of Pasco.

#### *9.4.1.8 Riverview Heights Booster Station*

The Riverview Heights Booster Station operates as an in-line booster station whose output is controlled by consumption demands in Pressure Zone 3. Pumps are called into sequence based on real time levels at the Road 68 Elevated Storage Tank. Up to four pumps can be called into service to meet demand. A fifth diesel powered pump is reserved for emergency use. Operating conditions are monitored via the SCADA network. Communication between the Butterfield WTP and Road 68 Elevated Storage Tank is achieved through a fiber optic network operated by Franklin County PUD. An Operations and Maintenance Manual for the station provides function, along with operations and maintenance information in detail.

#### *9.4.1.9 Road 36 Booster Station with Isolation Valve*

The Road 36 Booster Station operates to meet industrial demands in Pressure Zone 3. Water from Pressure Zone 1 is pumped to serve customers in the Pasco Industrial Processing Area. Two pumps are operated based on real time pressure readings in Zone 3. Operating conditions are monitored via the SCADA network. Communication to the Butterfield WTP is achieved through a fiber optic network operated by Franklin County PUD. This station also includes a check valve and isolation valve. The isolation valve serves to separate Zone 1 from Zone 3 when the Road 36 Booster Station is not in operation. The check valve provides back up to the Industrial Processing Area from Zone 3 if low pressure is experienced. An Operations and Maintenance Manual provides function, along with operations and maintenance information in detail.

#### *9.4.1.10 Road 68 Elevated Storage Tank*

The Road 68 Elevated Storage Tank has a capacity of 2.7 million gallons and supplies Zone 3 by gravity. The tank is visually examined on a daily basis and the interior is inspected by contract divers on a routine basis. Operating conditions at the site are monitored via the SCADA network. Communication to the Butterfield WTP is achieved through a fiber optic network operated by Franklin County PUD. Tank levels are monitored in real time to provide pump control for the Riverview Heights and Broadmoor booster stations. The tank overflow outlet drains to a 620,000-gallon retaining pond located onsite.

#### *9.4.1.11 Broadmoor Ground Storage Tank*

The Broadmoor Ground Storage Tank is in Pressure Zone 1 and has a capacity of 1.0 million gallons. The tank is visually examined on a daily basis and the interior is inspected by contract divers on a routine basis. Operating conditions at the site are monitored via the SCADA network. Communication to the Butterfield WTP is achieved through a fiber optic network operated by Franklin County PUD. The tank is primarily supplied by the West Pasco WTP. The tank overflow outlet drains to a 20,000-gallon retaining pond located onsite.

#### *9.4.1.12 Broadmoor Booster Station*

The Broadmoor Booster Station presently operates with three pumps supplying Pressure Zone 3. This booster station supplements peak demand and adds additional fire protection in the Broadmoor Boulevard area. Pumps are operated based on real time levels at the Road 68 Elevated Storage Tank. Operating conditions are monitored via the SCADA network. Communication to the Butterfield WTP is achieved through a fiber optic network operated by Franklin County PUD. This station also includes a backup generator capable of providing power to the highest capacity pump during an emergency. An Operations and Maintenance Manual provides function details, along with operations and maintenance information for this booster station.

### **9.4.2 Water Distribution Division**

In the Water Distribution Division, the Lead Worker assigns day to day tasks to a Water Distribution crew consisting of skilled craft workers, equipment operators, and laborers (see Organization Chart, **Figure 9-1**). The Water Division is tasked with supplying each customer with a sufficient volume of water at adequate pressure and quality.

Maintenance goals center around keeping the system operational on a cost effective basis. Typically, the most cost effective maintenance programs are those which stress preventive maintenance. The objective of a preventive maintenance program is to anticipate problem areas and initiate action before problems occur. The following details each program and provides the basis for the listed level of effort.

#### *9.4.2.1 Water Line Flushing*

The City is developing a comprehensive Uni-Directional Flushing (UDF) Program to take a proactive and effective approach to flushing the water system. UDF utilized the strategic closing of valves to flow water through designated mains at high velocity. This UDF program improves upon past water line flushing practices that focused on dead end lines. This program will also help alleviate the problem of stagnant water and cleanse the lines of natural build up of sediment. The program includes standard operating procedures along with sequence flushing maps for entire distribution system.

The primary benefit of UDF is to provide high quality water to the flushed areas. UDF has also been proven to help restore flow and pressures in distribution systems where significant sedimentation and/or tuberculation has occurred. It also uses less water when compared to conventional flushing methods. This ultimately leads to lower operation costs as well.

#### *9.4.2.2 Valve Turning*

There are approximately 8,200 valves within the water distribution system as of 2015. These valves are necessary and must operate completely in order to isolate segments of the water distribution system. Operable valves are critical for fighting fires, for locating and isolating mainline leaks, for isolating sections of the system known to be contaminated, etc. The City goal is to exercise all valves once per year.

#### *9.4.2.3 Air Release Valves*

The existing water system contains a number of air release and air vacuum valves, which provide protection against transient conditions and air trapped in the water system. These valves are inspected and maintained annually.

#### *9.4.2.4 Fire Hydrant Maintenance*

The City system in 2016 had approximately 2,740 fire hydrants. Regular maintenance and repair is critical to ensure the hydrants are in proper working order when fire flows are required. Fire hydrants are repaired on an as needed basis. In 2014, the Water Distribution crews took over the maintenance of fire hydrants from the Fire Department. Currently the hydrants are on a schedule to have maintenance performed every 2 years.

#### *9.4.2.5 Pressure Reducing Valve (PRV) Maintenance*

Similar to the valve turning program, testing and repair of pressure reducing valves (PRV's) is necessary to ensure that proper pressure limits are met within each of the City's three pressure zones. PRV's are used to convey water from a higher to a lower pressure zone within the City water system. Inoperable valves can create excessive or inadequate pressures that can be unsafe to the customers as well as permanently damage City water mains. The City contracts with GC Systems to inspect and maintain the City's PRV's. The valves are inspected annually and rebuilt approximately every five years.

#### *9.4.2.6 Water Main and Service Line Repairs*

Lines known to be leaking are scheduled for repair or replacement by City crews. In addition to the crew activities, the City conducts an annual program of water main replacement with Water Distribution Division staff and private contractors. Approximately \$50,000 per year is spent in replacement of pipelines that are undersized, constructed of Asbestos-Cement or steel that has been in service for 30 years or longer, or where major street improvements are being proposed and the water line is identified as being in need of replacement.

To maintain a high level of service, the City should assess and identify critical components of the distribution system. To improve water distribution system O&M, it is recommended that the City develop a pipe replacement program based on a 100-year cycle, which would require approximately 17,000 feet of pipe per year. This will require increased funding within the City's CIP. The prioritization should include at a minimum:

1. Known capacity and condition issues – Targeted replacements.
2. Pipe material – Based on record of issues (pipe material and era of manufacture).
3. Pipe age – Coordinate replacement of pipes 50 years or older with other City pipe utilities and street (City, County, State) projects.

#### *9.4.2.7 Large Meter Testing and Replacement*

There are approximately 281 meters which are 3 inches and larger in the system. These services account for approximately 20 to 25 percent of water revenue. Testing is done when there is an indication of meter inaccuracy, which is based on noted billing discrepancy from historical records. Funding for testing and repair comes from the meter replacement budget item. The City currently plans for replacement of large meters approximately every 10 years. It is recommended that the City develop a large meter testing program, which would be on a 5-year cycle or less.

#### *9.4.2.8 Small Meter Testing and Replacement*

In addition to the large meters, the City also has approximately 18,700 small meters as of 2015. As meters age they become worn and under register the amount of water that actually passes through the meter; therefore, revenue is being lost by not maintaining or replacing the meters. Meters are replaced when there is an indication of meter inaccuracy, which is based on noted billing discrepancy from historical records. The City currently has a budget available annually to replace small water meters on a 10-year schedule. The City has been spending between \$100,000-\$125,000 per year. The City is currently evaluating Advanced Metering Infrastructure(AMI)/Automatic Meter Reading (AMR) systems from different manufacturers. Implementation is planned for 2017 and 2018.

#### 9.4.2.9 Utility Locating

The “Call Before You Dig” Washington State Law requires that utilities respond to requests for locates of their underground infrastructure. The City responds to these calls on an as needed basis.

#### 9.4.3 Staffing

The City currently has 6 full time equivalent (FTEs) employees in the Water Treatment Plant Division, 2 FTEs in the Cross Connection Division, and 11 FTEs in the Water Distribution Division. This does not include the Division Manager and Administrative Assistant. The staff are assigned to operate and maintain the water supply and distribution facilities. To assess the City’s staffing requirements, the number of staff in 2005 and the system size was compared to the number staff and system size in 2015. **Table 9-2** provide a summary of the comparison.

**Table 9-2**  
**Staffing Requirements Comparison Summary**

Year	FTEs	Population	Miles of Water Pipelines	Number of Services	Number of Hydrants	Number of WTPs
2005	16	44,190	274	14,002	1,741	1
2015	19	72,100	326	19,397	2,737	2
Percent Increase (%)	19	63	19	39	57	100

As shown in **Table 9-2**, the number of City’s Water Utility staff has not increased at the same rate as the growth in system components. This suggests that staffing may be inadequate to meet the requirements of operating and maintaining the system. Additionally, the City is just beginning to implement a uni-directional flushing program along with a meter AMI/AMR upgrade program in 2017 and 2018. It is estimated that 2 more FTEs would be needed to successfully implement the uni-directional flushing program. Further, the need for additional staff will grow as the system expands, water flows increase, and regulatory requirements change and typically become more stringent over time.

Based on the staffing review above, the City should at a minimum add 2 FTEs for the implementation of the uni-directional flushing program. The addition of 1 to 3 FTEs should be considered over the next 5 years based on system expansion. This includes West Pasco WTP upgrades to double capacity and require full time onsite staff and implementation of the meter AMI/AMR upgrade program. This will enable the City maintain a high level of service in implementing the defined operations and maintenance programs.

#### 9.4.4 Response to Water Quality Complaints

Historically, most water quality complaints have been based on aesthetics. This includes concerns relate to taste & odor, discoloration, and/or particulates. These quality issues are

typically caused by low system flows, poor maintenance of household plumbing fixtures and appliances, or appliance manufacturer defects.

On average, the water system responds to 35 customer complaints per year, that require direct action to be resolved. Every customer complaint concerning water quality is documented and investigated within 24 hours of receipt. A brief explanation of the problem is discussed with the customer, analyzed, and the appropriate action(s) are implemented. The action(s) taken may include performing bacteriological analysis, disinfectant residual measurement, providing advice on proper household plumbing/appliance maintenance, and flushing at the meter

City crews also receive and respond to all water system related calls. This ranges from requests to shut off water at the meter, to a water main break resulting from contractor excavation.

## **9.5 Water Quality Monitoring**

The purpose of this section is to outline the required water quality monitoring necessary to conform to the requirements for public water systems in WAC 246-290-300. Present water quality monitoring consists of:

- Bacteriological
- Turbidity
- Inorganic Chemical
- Organic Chemical
- Disinfection Byproducts
- Radionuclides
- Lead/Copper Sampling
- Fluoride
- Chlorine Residual

When any applicable Maximum Contaminant Levels (MCLs) (WAC 246-290-310) are exceeded, all follow-up action is taken in accordance with WAC 246-290-320. All sample analyses are completed by the Washington Department of Health Laboratories or a laboratory certified by the Washington Department of Health.

- Bacteriological: Bacteria sampling shall be in accordance with the present approved City of Pasco “Coliform Monitoring Plan” and meet those requirements set forth in WAC 246-290-300 2(b). The Coliform Monitoring Plan is kept at the Butterfield WTP and is updated and maintained under the direction of the Chief Operator. A copy of the City’s Coliform Plan is included in **Appendix 4-E**. Currently a total of 70 routine samples are collected each month. In addition, both newly installed main lines and existing lines are sampled as per DOH regulation.



- **Turbidity:** At the Butterfield WTP, continuous turbidity monitoring of each of eight mixed media filters is practiced prior to clearwell storage with averages reported every 4 hours on daily sheets and pursuant to WAC 246-290-664 and WAC 246-290-638. Turbidity at the West Pasco WTP is monitored continuously at the discharge from the pressure membrane racks with averages reported every 4 hours on the daily sheets.
- **Inorganic Chemical Monitoring:** Samples are taken at the water plants (Butterfield and West Pasco) tap after treatment pursuant to the surface water source requirements listed in an approved Inorganic Chemical Monitoring Plan that conforms with WAC 246-290-300 (3)(d).
- **Organic Chemical Monitoring:** Samples are taken at the water plants (Butterfield and West Pasco) tap after treatment pursuant to surface water source requirements listed in an approved Organic Chemical Monitoring Plan that conforms to WAC 246-290-300 (7)(e).
- **Disinfection Byproducts:** Quarterly samples are taken that represent maximum residence time (and other criteria) of the undiluted treated source in the distribution system.
- **Radionuclides:** Samples are taken prior to treatment at the water plants (Butterfield and West Pasco) tap every four- (4) years and are analyzed for contaminants listed in WAC 246-290-300 (9)(a) and (b).
- **Lead & Copper Monitoring:** Lead and copper monitoring is conducted at targeted sites in the distribution system in accordance with 40 CFR 141.86, 141.87 and 141.88.
- **Fluoride:** Samples are taken at the water plants (Butterfield and West Pasco) tap after treatment pursuant to WAC 246-290-460.
- **Chlorine Residual:** Chlorine residual is monitored at representative points in the distribution system on a daily basis and at the same time and location of routine and repeat coliform sample collection pursuant to WAC 246-290-451.

## **9.6 Emergency Response Program**

Overall the City has developed a highly reliable water system. The intent in design and operation is to mitigate reliance on any one major facility within the water system.

As previously described, the City is supplied by surface waters (Butterfield and West Pasco WTPs). If an emergency event caused production to cease at one treatment plant, the system could continue to be supplied by the other facility. Butterfield is currently capable of meeting current system MDD of 26.8 mgd without supplement from the West Pasco WTP. If Butterfield were to cease production, then supply to the system would be severely limited since maximum production from the West Pasco WTP is only 6 mgd. When phase two

additions to the plant (12 mgd capacity) are complete, the system will be better supplied during emergency events. The West Pasco WTP has backup power capable of sustaining 6 mgd production. As of this time, there is no backup power available at the Butterfield WTP.

As an added protection from mechanical failures, pumping and booster stations are all equipped with multiple pumps capable of sustaining operations. In the event of electrical grid failures, backup power generation is available at the Broadmoor Pump Station. This source allows for continued operation at 50% pumping capacity. Riverview Heights Pump Station does not have backup power available, but has one motor driven fire pump. As the main source of supply to Pressure Zone 3 it is recommended that backup power be added to this site to provide for a fully functional pump station during a power failure. The Water Division maintains a portable generator for use during sustained power failures. Currently the only sites capable of utilize this source is the West Pasco Raw Water Pump Station and Eastside Pump Station. If other sites were adapted for connection, then this resource would be of even greater benefit during emergency conditions.

Electrical controls and SCADA networks are maintained by City staff. The Water Department relies on support from the City's I&C technician and Information Services staff during emergency conditions affecting these systems. In addition, outside assistance could be provided by vendor and consultant personnel. As of this time no service support agreements are in effect.

City staff hire required service support on case by case basis and work cooperatively to restore system integrity during emergency events. In the event of a prolonged outage, City staff would issue public notifications restricting water use. During this time, the system would be served by water in storage until production could be restored.

The Water Utility follows a **Risk Management Plan, Vulnerability Assessment, Contingency Procedures** and **Emergency Response Plan**. Plan maintenance and updates are the responsibility of the Engineering Division and plan implementation is the primary responsibility of the Water Division Manager. The **Emergency Call Roster, Radio Contact Roster, and Personnel List** are updated regularly and distributed to Emergency Dispatch; Benton/Franklin Emergency Management; Pasco Police, Fire and Parks Departments; and all divisions of Public Works. (The Public Works department remains involved in regional emergency preparedness by cooperation with Benton/Franklin County Emergency Management.) A copy of the **Risk Management Plan** is included in **Appendix 4-G**. The **Vulnerability Assessment** and **Emergency Response Plan** are filed at the Butterfield WFP and will be filed at the West Pasco WTP. Both of these documents are not considered Public Documents due the sensitive nature of the contents as they affect security and operations of the Water Utility.

### ***9.6.1 Safety Training***

The dangers associated with water system operation substantiate the need for safety practices. Physical injuries are a continuous threat. An ongoing safety training program requires a minimum of 24 hours per employee annually. Monthly meetings of the operations

staff for discussion relating to safety require a 1-hour period each month. In addition, special training programs are offered on a statewide basis for water system personnel. Operators are meeting their state certification requirements which include Safety Training. Safety training also includes those specific activities of the Water Utility staff that are needed to accomplish other maintenance activities: flagging traffic while equipment and personnel are working in City streets, operating ventilating equipment, confined spaces entry, and chemical handling and storage.

## **9.7 Cross-Connection Control Program**

The City of Pasco maintains a Cross Connection Control Program, which is required by the Washington Department of Health. The program is authorized by Pasco Municipal Code PMC 13.16.020, with the primary goal is to protect the purveyors and consumers from potential health or contamination commonly found in most non-potable water supply systems. The program is the responsibility of the Director of Public Works who delegates the administration primarily to the Water Division Manager. There are two Cross Connection Control Specialists, a State certified Cross Connection Specialist and a Backflow Assembly Tester, who report to the Water Division Manager. Other personnel certified in Backflow Assembly Testing within the Water Distribution crew are utilized as necessary to accomplish the requirements of the City's program.

The City's program is one of quality assurance and quality control. The program is focused on protecting all water customers served by the City's water system and governs those whose activities relate in any manner to the City's water system; e.g., plumbers, irrigation system installers, etc. The designated cross connection control staff members review building permits to ensure that cross connection control devices are appropriately installed at new facilities. This includes quality assurance audits over contractors performing annual device testing, reviews of initial device testing, providing necessary repair work or overseeing other contractors' repair work on faulty devices. Water consumption records are reviewed for water use trends indicating potential cross connections. This may include corresponding as necessary with water customers and installation and testing contractors to ensure program compliance, and maintenance all required records of the program. A copy of the City's Cross-Connection Control Regulations and sample forms and letters are included in **Appendix 4-H**.

## **9.8 Satellite Management System**

To date, the City has not been approached to operate, manage, or provide technical assistance to any outlying system or individual system within the Water Service Area. It is possible at some point in the future the City might be approached to provide such a service. In general, the City would consider the potential of assuming certain responsibilities of operating other systems in their service area on a case by case basis.

Any considerations and terms of any such agreement to operate or otherwise provide assistance to any satellite system would include the following items:

- Liability
- Design Standards
- Ultimate Transfer of Ownership to the City
- Construction Standards
- Rates and Fees
- Future Annexation

## 9.9 Summary

The overview of the City's water system operations and maintenance (O&M) program included several recommendations that are summarized below.

The City should consider developing a pipe replacement program based on a 100-year cycle. The prioritization should include at a minimum:

1. Known capacity and condition issues – Targeted replacements.
2. Pipe material – Based on record of issues (pipe material and era of manufacture).
3. Pipe age – Coordinate replacement of pipes 50 years or older with other City pipe utilities and street (City, County, State) projects.

The City should develop and maintain a list of critical components for each operating system at the WTPs to ensure critical backup parts/components are on hand and their storage location is known.

It is recommended that the City develop a large meter testing program, which would be on a 5-year cycle or less. Additionally, it is recommended that backup power be added to Riverview Heights Pump Station to provide for a fully functional facility during a power failure.

The review of staffing indicates that the City should at a minimum add 2 FTEs for the implementation of the uni-directional flushing program. The addition of 1 to 3 FTEs should be considered over the next 5 years based on system expansion. This includes West Pasco WTP upgrades to double capacity and require full time onsite staff and implementation of the meter AMI/AMR upgrade program.

# Appendix







# WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1

Updated: 01/09/2018

Printed: 6/6/2018

WFI Printed For: On-Demand

Submission Reason: Contact Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO. 66400 3	2. SYSTEM NAME PASCO WATER DEPARTMENT	3. COUNTY FRANKLIN	4. GROUP A	5. TYPE Comm
6. PRIMARY CONTACT NAME & MAILING ADDRESS  DEREK A. WIITALA PO BOX 293 PASCO, WA 99301		7. OWNER NAME & MAILING ADDRESS  PASCO, CITY OF RICK TERWAY PO BOX 293 PASCO, WA 99301-0293  PUBLIC WORKS DIRECTOR		8. OWNER NUMBER: 004449
STREET ADDRESS IF DIFFERENT FROM ABOVE  ATTN ADDRESS 525 N 3RD AVE CITY PASCO STATE WA ZIP 99301		STREET ADDRESS IF DIFFERENT FROM ABOVE  ATTN ADDRESS 525 N THIRD AVE CITY PASCO STATE WA ZIP 99301		
9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION		
Primary Contact Daytime Phone: (509) 545-3463		Owner Daytime Phone: (509) 543-5738		
Primary Contact Mobile/Cell Phone: (509) 948-8487		Owner Mobile/Cell Phone: (509) 947-0558		
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx		
Fax:	E-mail: xxxxxxxxxxxxxxxxxxxx	Fax: (509) 543-5737	E-mail: xxxxxxxxxxxxxxxxxxxx	
WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.				
11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)				
<input checked="" type="checkbox"/> Not applicable (Skip to #12)				
<input type="checkbox"/> Owned and Managed SMA NAME: SMA Number:				
<input type="checkbox"/> Managed Only				
<input type="checkbox"/> Owned Only				
12. WATER SYSTEM CHARACTERISTICS (mark all that apply)				
<input type="checkbox"/> Agricultural				
<input checked="" type="checkbox"/> Commercial / Business				
<input checked="" type="checkbox"/> Day Care				
<input checked="" type="checkbox"/> Food Service/Food Permit				
<input checked="" type="checkbox"/> 1,000 or more person event for 2 or more days per year				
<input checked="" type="checkbox"/> Hospital/Clinic				
<input checked="" type="checkbox"/> Industrial				
<input checked="" type="checkbox"/> Licensed Residential Facility				
<input checked="" type="checkbox"/> Lodging				
<input checked="" type="checkbox"/> Recreational / RV Park				
<input checked="" type="checkbox"/> Residential				
<input checked="" type="checkbox"/> School				
<input type="checkbox"/> Temporary Farm Worker				
<input checked="" type="checkbox"/> Other (church, fire station, etc.):				
13. WATER SYSTEM OWNERSHIP (mark only one)			14. STORAGE CAPACITY (gallons)	
<input type="checkbox"/> Association			15,000,000	
<input type="checkbox"/> County				
<input type="checkbox"/> Investor				
<input type="checkbox"/> Special District				
<input checked="" type="checkbox"/> City / Town				
<input type="checkbox"/> Federal				
<input type="checkbox"/> Private				
<input type="checkbox"/> State				

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

# WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.		2. SYSTEM NAME										3. COUNTY					4. GROUP	5. TYPE	
66400 3		PASCO WATER DEPARTMENT										FRANKLIN					A	Comm	

15	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY										19 USE	20	21 TREATMENT					22 DEPTH	23	24 SOURCE LOCATION						
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER.  Example: WELL #1 XYZ456  IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
			S01	Columbia River									X			X			Y		X	X	X			18000	SW NE	03
S02	InAct 03/24/1993 Well 1A&1B		X											X				X				180	200	NE NW	18	09N	29E	
S03	InAct 10/26/1992 WP Well 2				X									X				X				160	2000	NE NW	18	09N	29E	
S04	InAct 10/26/1992 WP Well 3				X									X				X				200	200	NE NW	18	09N	29E	
S05	InAct 11/17/1998 Dradie St Well 4		X											X							X	130	350	NE NE	22	09N	29E	
S06	InAct 03/24/1993 WP WF/S03,4,7,8			X										X				X					2200	NE NW	18	09N	29E	
S07	InAct 08/13/1996 WP Well 1A				X									X				X				180	100	NE NW	18	09N	29E	
S08	InAct 08/13/1996 WP Well 1B				X									X				X				179	108	NE NW	18	09N	29E	
S09	Columbia River-West. Pasco WTP									X			X			Y		X	X	X			4200	NE NE	18	09N	29E	

# WATER FACILITIES INVENTORY (WFI) FORM - Continued

<b>1. SYSTEM ID NO.</b> 66400 3	<b>2. SYSTEM NAME</b> PASCO WATER DEPARTMENT	<b>3. COUNTY</b> FRANKLIN	<b>4. GROUP</b> A	<b>5. TYPE</b> Comm
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	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
<b>25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)</b>		22673	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	17001		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
<b>26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)</b>			
A. Apartment Buildings, condos, duplexes, barracks, dorms	508		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	5672		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
<b>27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)</b>			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	2026	2026	
<b>28. TOTAL SERVICE CONNECTIONS</b>		24699	

<b>29. FULL-TIME RESIDENTIAL POPULATION</b>												
A. How many residents are served by this system 180 or more days per year? <span style="float: right;">70550</span>												

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?												
B. How many days per month is water accessible to the public?												

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	80	80	80	80	80	80	80	80	80	80	80	80

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

**35. Reason for Submitting WFI:**

☐ Update - Change   
 ☐ Update - No Change   
 ☐ Inactivate   
 ☐ Re-Activate   
 ☐ Name Change   
 ☐ New System   
 ☐ Other \_\_\_\_\_

**36. I certify that the information stated on this WFI form is correct to the best of my knowledge.**

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**PRINT NAME:** \_\_\_\_\_ **TITLE:** \_\_\_\_\_

<u>WS ID</u>	<u>WS Name</u>
66400	PASCO WATER DEPARTMENT

Total WFI Printed: 1



## Appendix 1-B

### Ordinances/By Laws

Table A-1 summarizes the Ordinances and Resolutions, which govern the Pasco water system.

**Table A-1**  
**Pasco Water System Table of Ordinances and Resolutions**

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
52	02-May-1906		An Ordinance granting a franchise to F.E. Elmendorf, his successors and assigns, to construct, maintain, own and operate a system of water works in the town of Pasco, and for that purpose, to occupy and use so much of the streets, avenues, alleys, lanes and thoroughfares thereof, as may be necessary for the same, and to supply water to the town of Pasco and its inhabitants, and to charge and collect rates therefore.
118	17-Jan-1911	After 27-Feb-1911	An Ordinance providing for the construction, purchase and acquisition of a system of waterworks as a public utility...
2316	16-Nov-81	25-Nov-81	An Ordinance enacting Section 13.22.015 to the PMC and establishing a water system capital expansion/replacement charge for water service outside the city limits.
2480	28-Nov-83	07-Dec-83	An Ordinance levying a Surcharge on Water Rates, Creating a Water Filtration Plant Improvement Fund and Adding Chapter 13.21 PMC.
2716	21-Feb-89	25-Feb-89	An Ordinance concerning water and sewer service rates, rules and regulations; and amending Section 13.16.030 and .050; 13.20.020, .030, 040, .050 and .090; 13.40.20, .030 and .040.
2813	01-Apr-91	10-Apr-91	An Ordinance authorizing the extensions and betterment of the City's water system.



<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
2961	16-Aug-93	01-Oct-93	An Ordinance concerning water and sewer lines, connections and testing; increasing the water system development charge, the water line extension fee, and the sewer line extension fee; and amending Sections 13.16.100, 13.24.030, 13.28.060, 13.22.010, 13.22.020, 13.36.010, 13.36.020, 13.36.030, 13.36.040, 13.36.050, 13.44.010, 13.44.011, 13.52.140, and 13.54.060 of the PMC.
2963	20-Sep-93	01-Oct-93	An Ordinance concerning new water service and sewerage connections; and adding new Section 13.22.015 to the PMC.
2973	15-Nov-93	26-Nov-93	An Ordinance concerning new water service and sewer connections; amending PMC Section 13.22.015.
2997	22-Feb-94	04-Mar-94	An Ordinance concerning connection to new service lines inside the City and amending PMC 13.36.010.
3103	21-Aug-95	21-Aug-95	An Ordinance concerning water rules and regulations for cross-connections; and amending PMC 13.16.020.
3104	21-Aug-95	27-Aug-95	An Ordinance repealing Ordinance #2143 and adopting a Comprehensive Plan for the City of Pasco.
3180	21-Oct-96	01-Nov-96	An Ordinance concerning water rates and charges and amending Chapter 13.20 of the PMC.
3286	17-Feb-1998	25-Feb-1998	An Ordinance of the city of Pasco, WA, amending section 13.16.035 "Advance billing" to provide for refund or transfer of advance billing.
3314	31-Aug-1998	10-sep-1998	An Ordinance relating to the waterworks utility of the city, including the sanitary sewerage system and the system of storm or surface water sewer as a part thereof; adopting a system or plan of additions to and betterments and extensions of the waterworks utility of the ...

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3323	21-Dec-1998	1-Jan-1999	An Ordinance adopting the city of Pasco operating budget for the year 1999.
3324	21-Dec-1998	1-Jan-1999	An Ordinance adopting the city of Pasco capital projects budget for the year 1999.
3332	21-Dec-1998	12-Jan-1999	An Ordinance relating to supplemental capital improvements budget for the year 1998
3350	15-Mar-1999	21-Mar-1999	An Ordinance of the city of Pasco, WA, amending section 13.16.120 entitled “unauthorized turn on” to provide for an administrative remedy for the assessment of service fees for unauthorized reconnection of water and/or repair costs.
3397	20-Dec-1999	26-Dec-1999	An Ordinance relating to supplemental capital improvements budget for the year 1999.
3399	31-Dec-1999	31-Dec-1999	An Ordinance increasing the tax levied upon the privilege of doing cable television, solid waste, water and sewer business within the city of Pasco to eight and one-half percent (8.5%).
3443	27-Nov-2000	4-Dec-1999	An Ordinance of the City of Pasco, WA, providing for the re-enactment of ordinance No. 3399, entitled “An ordinance increasing the tax levied upon the privilege of doing cable television, solid waste, water and sewer business within the city of Pasco to eight and one-half percent (8.5%).
3446	18-Dec-2000	1-Jan-2001	An Ordinance adopting the city of Pasco operating budget for the year 2001.
3447	18-Dec-2000	1-Jan-2001	An Ordinance adopting the city of Pasco capital projects budget for the year 2001.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3451	18-Dec-2000	27-Dec-2000	An Ordinance amending the 2000 annual budget of the city of Pasco by providing a supplemental thereto; by appropriating and re-appropriating revenue; by providing transfer and expenditure authority; by adjusting the expenditure program of various funds and the budget within funds; and declaring an emergency;
3452	18-Dec-2000	27-Dec-2000	An Ordinance relating to supplemental capital improvement projects budget for the year 2000.
3496	14-Sep-2001	25-Sep-2001	An Ordinance of the city of Pasco, WA, amending section of title 13.16.110 of the Pasco municipal code entitled “unlawful connections”.
3509	17-Dec-2001	1-Jan-2002	An Ordinance adopting the city of Pasco operating budget for the year 2002.
3510	17-Dec-2001	1-Jan-2002	An Ordinance adopting the city of Pasco capital projects budget for the year 2002.
3519	17-Dec-2001	26-Dec-2001	An Ordinance relating to supplemental capital improvement projects budget for the year 2001.
3543	6-Mar-2002	14-May-2002	An Ordinance creating chapter 3.07 - Fee Summary incorporating the various fees and charges authorized throughout the Pasco municipal code.
3547	3-Jun-2002	13-Jun-2002	An Ordinance of the City of Pasco, WA, providing for the assignment of water rights upon the extension of city water services and incident to the subdivision of land.
3548	3-Jun-2002	13-Jun-2002	An Ordinance of the City of Pasco, WA, requiring the installation of irrigation lines incident to the subdivision of land in the city of Pasco, creating section 26.04.116 “Installation of Irrigation lines”.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3553	17-Jun-2002	27-Jun-2002	An Ordinance of City of Pasco, WA, amending Chapter 3.07 entitled “Fee Summary”.
3575	21-Oct-2002	1-Nov-2002	An Ordinance providing for an increase in water and sewer rates and changes in 2003 and 2004 and amending section 3.07.160, 3.07.170.
3585	16-Dec-2002	1-Jan-2003	An Ordinance adopting the city of Pasco operating budget for the year 2003.
3586	16-Dec-2002	1-Jan-2003	An Ordinance adopting the city of Pasco capital projects budget for the year 2003.
3594	16-Dec-2002	26-Dec-2002	An Ordinance relating to supplemental capital improvement projects budget for the year 2002.
3607	3-Mar-2003	13-Mar-2003	An Ordinance of the city of Pasco, WA, creating a new chapter “irrigation water utility” as chapter 13.61 of the Pasco municipal code providing for the management and operation of the city’s irrigation water service system.
3608	3-Mar-2003	13-Mar-2003	An Ordinance of the city of Pasco, amending various sections of title 13 “water and Sewers” of the Pasco municipal code regarding fees and changes.
3610	3-Mar-2003	13-Mar-2003	An Ordinance of the city of Pasco, amending chapter 3.07 “Fee Summary” of the Pasco municipal code.
3638	15-Dec-2003	1-Jan-2004	An Ordinance adopting the city of Pasco operating budget for the year 2004.
3639	15-Dec-2003	1-Jan-2004	An Ordinance adopting the city of Pasco capital projects budget for the year 2004.
3644	22-Dec-2003	30-Dec-2003	An Ordinance relating to supplemental capital improvement projects budget for the year 2003.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3654	2-Feb-2004	10-Feb-2004	An Ordinance of the city of Pasco, WA, amending title 13 of Pasco municipal code regarding utility system capital expansion/replacement charges.
3655	2-Feb-2004	10-Feb-2004	An Ordinance of the city of Pasco, amending chapter 3.07 "Fee Summary", Section 3.07.160 "Water Use Fees" and section 3.07.170. "Sewer Use fee" of the Pasco municipal code.
3659	15-Mar-2004	24-Mar-2004	An Ordinance of the City of Pasco, WA, amending Chapter 13.61 of the Pasco Municipal Code regarding irrigation utility fees.
3665	15-Mar-2004	24-Mar-2004	An Ordinance of the City of Pasco, WA, amending Chapter 3.07 "Fee Summary," Section 3.07.210 "Irrigation Water Utility."
3679	2-Aug-2004	1-Nov-2004	An Ordinance of the City of Pasco, amending Chapters 13.61 and 3.07 of the Pasco Municipal Code, providing for changes to the irrigation water utility regulations and rates.
3693	18-Oct-2004	1-Jan-2005	An Ordinance of the city of Pasco, WA, amending chapter 3.07 and repealing section 13.22.015 of the Pasco municipal code regarding water and sewer capital expansion fees.
3699	20-Dec-2004	1-Jan-2005	An Ordinance adopting the city of Pasco operating budget for the year 2005.
3700	20-Dec-2004	1-Jan-2005	An Ordinance adopting the city of Pasco capital projects budget for the year 2005.
3704	20-Dec-2004	4-Jan-2005	An Ordinance amending the 2004 annual budget of the city of Pasco by providing supplemental thereto; by appropriating and re-appropriating revenue; by providing transfer and expenditure authority; by adjusting the expenditure program of various funds and the budget within funds; and declaring an emergency.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3705	20-Dec-2004	4-Jan-2005	An Ordinance relating to supplemental capital improvement projects budget for the year 2004.
3740	21-Nov-2005	28-Nov-2005	An Ordinance relating to the waterworks utility of the city, including the sanitary sewerage system and the system of storm or surface water sewer as a part thereof; adopting a system or plan of additions to and betterments and extensions of the waterworks utility of the city; providing for the issuance and sale of \$4,400,000 par value of water and sewer revenue bonds, 2005, for the purpose of carrying out the system or plan adopted by this ordinance and to pay the cost of issuing and selling those bonds; fixing the date, form, denomination, maturities, interest rates, terms and covenants of the bonds authorized herein; providing for bond insurance; and providing for sale and delivery of the bonds to banc of America securities LLC of Seattle, WA.
3743	19-Dec-2005	1-Jan-2006	An Ordinance adopting the city of Pasco operating budget for the year 2006.
3744	19-Dec-2005	1-Jan-2006	An Ordinance adopting the city of Pasco capital projects budget for the year 2006.
3747	19-Dec-2005	12-Jan-2006	An Ordinance relating to supplemental capital improvement projects budget for the year 2005.
3806	18-Dec-2006	1-Jan-2007	An Ordinance adopting the city of Pasco capital projects budget for the year 2007.
3827	7-May-2007	31-May-2007	An Ordinance authorizing a change in the hydrant meter refundable deposit amount and amending chapter 3.07.160 of Pasco municipal code entitled "water use fees".
3845	17-Dec-2007	1-Jan-2008	An Ordinance adopting the city of Pasco operating budget for the year 2008.
3846	17-Dec-2007	1-Jan-2008	An Ordinance adopting the city of Pasco capital projects budget for the year 2008.



<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3852	17-Dec-2007	27-Dec-2007	An Ordinance relating to supplemental capital improvement projects budget for the year 2007.
3892	15-Dec-2008	1-Jan-2009	An Ordinance adopting the City of Pasco Operating Budget for the year 2009
3893	15-Dec-2008	1-Jan-2009	An Ordinance adopting the City of Pasco Capital Projects Budget for the year 2009
3900	15-Dec-2008	20-Dec-2008	An Ordinance relating to supplemental Capital Improvement Projects Budget for the Year 2008.
3915	6-Apr-2009	11-Apr-2009	An Ordinance relating to the Waterworks Utility of the City.
3926	15-Jun-2009	1-Jul-2009	An Ordinance of the City of Pasco, Washington, Increasing the Fee for a Utility/Lien Search and Amending Chapter 3.07 Entitled Fee Summary,” and amending section 3.07.090 Entitled “Miscellaneous”.
3929	20-Jul-2009	26-Jul-2009	An Ordinance concerning prequalification for public works construction, and amending Section 14.10.020 of the Pasco Municipal Code.
3945	21-Dec-2009	1-Jan-2010	An Ordinance adopting the City of Pasco operating budget for the year 2010
3946	21-Dec-2009	1-Jan-2010	An Ordinance adopting the City of Pasco Capital Projects Budget for the year 2010
3950	21-Dec-2009	26-Dec-2009	An Ordinance relating to supplements capital improvement projects budget for the year 2010

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3961	3-May-2010	1-Jul-2010	An Ordinance of the City of Pasco, amending Pasco Municipal Code Section 3.07.160 (Water User Fees), 3.07.170 (Sewer User Fees) and 3.07.210 (Irrigation Water Utility) regarding utility rates.
3962	17-May-2010	22-May-2010	An Ordinance relating to the Waterworks Utility of the City,
3965	6-Jul-2010	11-Jul-2010	An Ordinance of the City of Pasco, amending Pasco Municipal Code Section 13.16.020 “Cross-Connections-service Conditions Backflow Prevention Device Required When.”
3979	15-Nov-2010	20-Nov-2010	An Ordinance of the City of Pasco, Washington, amending chapter 14.08 of the Pasco Municipal Code, Public Works Construction standards, and Section 3.07.180 Regarding Public Works Inspections.
3981	13-Dec-2010	1-Jan-2011	An Ordinance adopting the City of Pasco operating budget for the year 2011.
3982	13-Dec-2010	1-Jan-2011	An Ordinance adopting the City of Pasco Capital Improvement Projects Budget for the year 2011.
3984	20-Dec-2010	25-Dec-2010	An Ordinance relating to supplements Capital Improvement Projects Budget for the year 2011.
4017	1-Aug-2011	6-Aug-2011	An Ordinance of City of Pasco, Washington, amending Pasco Municipal Code Section 11.02.010, regarding applicability of procedures for “Civil Infractions” to include violations of Title 13,”Water and Sewers.”
4028	19-Dec-2011	1-Jan-2012	An Ordinance adopting the City of Pasco operating budget for the year 2012.
4029	19-Dec-2011	1-Jan-2012	An Ordinance adopting the City of Pasco Capital Projects Budget for the year 2012.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
4030	5-Dec-2011	10-Dec-2011	An Ordinance of the City of Pasco, amending Title 13 of the Pasco Municipal Code regarding water and irrigation water utility rules and regulations.
4033	19-Dec-2011	24-Dec-2011	An Ordinance relating to supplements Capital Improvement Projects Budget for the year 2012.
4037	19-Dec-2011	24-Dec-2011	An Ordinance of the City of Pasco, amending Title 13 of the Pasco Municipal Code regarding water and irrigation water utility rules and regulations.
4081	17-Dec-2012	1-Jan-2013	An Ordinance adopting the City of Pasco operating budget for the year 2013.
4082	17-Dec-2012	1-Jan-2013	An Ordinance adopting the City of Pasco Capital Projects Budget for the year 2013.
4091	17-Dec-2012	22-Dec-2012	An Ordinance relating to supplements Capital Improvement Projects Budget for the year 2012.
4126	18-Nov-2013	24-Nov-2013	An Ordinance relating to the Waterworks Utility of the City,
4129	16-Dec-2013	1-Jan-2014	An Ordinance adopting the City of Pasco operating budget for the year 2014.
4130	16-Dec-2013	1-Jan-2014	An Ordinance adopting the City of Pasco Capital Projects Budget for the year 2014.
4133	16-Dec-2013	21-Dec-2013	An Ordinance relating to supplements Capital Improvement Projects Budget for the year 2013.
4160	2-Jun-2014	7-Jun-2014	An Ordinance of the City of Pasco, Washington, Creating a New Section 13.36.012 "Connection Outside City Limits – Water Rights";
4162	7-Jul-2014	12-Jul-2014	An Ordinance of the City of Pasco, Washington, Amending Section 16.06.020 "Exemptions" to Utility Connections.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
4187	16-Dec-2014	1-Jan-2015	An Ordinance adopting the City of Pasco Operating Budget for the year 2015.
4188	16-Dec-2014	1-Jan-2015	An Ordinance adopting the City of Pasco Capital Projects Budget for the year 2015.
4195	15-Dec-2014	20-Dec-2014	An Ordinance relating to supplements Capital Improvement Projects Budget for the year 2014.
4235	17-Aug-2015	22-Aug-2015	An Ordinance, amending the 2015 Annual Operating Budget by providing a Budget Supplement increasing,
4236	17-Aug-2015	22-Aug-2015	An Ordinance, amending the 2015 Capital Improvement Projects (CIP) Budget , by providing a Budget Supplement decreasing,
4250	7-Dec-2015	1-Jan-2016	An Ordinance adopting the City of Pasco Operating Budget for the year 2015.
4251	7-Dec-2015	1-Jan-2016	An Ordinance adopting the City of Pasco Capital Projects Budget for the year 2016.
4252	30-Nov-2015	1-Jan-2016	An Ordinance of the City of Pasco, amending Pasco Municipal Code Section 3.07.160 (Water User Fees) and 3.07.170 (Sewer User Fees).
4254	30-Nov-2015	5-Dec-2015	An Ordinance relating to the Waterworks Utility of the City,
<b>Resolution Number</b>			
2206	05-Sep-95	05-Sep-95	A Resolution adopting a Comprehensive Water Plan, including a Water Conservation Plan.
2301	03-Mar-97	03-Mar-97	A Resolution declaring certain water towers surplus and authorizing their disposal.
2374	18-May-1998		A Resolution expressing primary goals of the city of Pasco

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
2406	01-Nov-98	01-Nov-98	A Resolution authorizing the fluoridation of the City of Pasco municipal water supply system.
2518	3-Apr-2000		A Resolution expressing primary goals of the city of Pasco for the ensuing calendar years 2000-2001.
2601	16-Jun-2001		A Resolution adopting the comprehensive water system plan as updated
2656	16-Apr-2002		A Resolution establishing primary goals of the City of Pasco for the ensuing calendar years 2002-2003.
2659	6-May-2002		A Resolution providing limited authority for new water system connections outside the city.
2727	3-Feb-2003		A Resolution of the City of Pasco, WA, authorizing the inter-department transfer of real property from the water/sewer fund to the general fund to facilitate an existing of real property with Franklin county, WA.
2812	5-Apr-2004		A Resolution establishing primary goals of the city of Pasco for the ensuing calendar years 2004-2005.
2872	4-Apr-2005		A Resolution adopting a water-management plan for the city of Pasco.
2875	6-Jun-2005		A Resolution approving a drought management plan
2878	5-Jul-2005		A Resolution defining community process to select the paint design for the current water reservoir and water reservoir to be constructed at Road 76 and Sandifur.
3039	4-Sep-2007		A Resolution declaring the preferred Urban Growth Boundary for the City of Pasco
3044	1-Oct-2007		A Resolution approving the purchase of certain real property by the water utility fund
3060	7-Jan-2008		A Resolution establishing water use efficiency goals

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3079	21-Apr-2008		A Resolution Accepting work performed by Sharpe & Preszler Construction Company, INC. under for the water sampling station installation project, #07-2-05
3097	18-Aug-2008		A Resolution accepting work performed by Dunk& Bush, INC., under contract for the coating of Road 68 water tank standpipe, project No. 08-5-01
3099	2-Sep-2008		A Resolution accepting work performed by Gamache Landscaping, INC. under contract for the Road 36 Pump Station Landscaping, project # 07-2-09
3105	6-Oct-2008		A Resolution accepting work performed by J7B Construction, INC. under contract for the Road 68 Reservoir Site Improvement (Landscaping), project #07-2-06
3111	6-Oct-2008		A Resolution Approving the Capital Improvement Plan for Calendar Years 2009-2014.
3114	20-Oct-2008		A Resolution accepting work performed by Rotschy, INC. under contract for the Road 84/Argent sewer and water improvements, project #07-1-06.
3183	8-Sep-2009		A Resolution accepting work performed by Intermech/Thompson Mechanical under contract for the Butterfield WTP modification, valve replacement and weirs installation, project #07-2-05
3185	8-Sep-2009		A Resolution accepting work performed by Vincent Brothers under contract for the Raw Water Pumphouse Roof Replacement, project #08-2-05
3231	19-Apr-2010		A Resolution accepting work performed by Premier Excavation under contract for the Commercial Avenue Water and Sewer Pipeline, project #10-2-01



<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3271	7-Sep-2010		A Resolution Approving the Capital Improvement Plan for Calendar Years 2011-2016
3306	7-Feb-2011		A Resolution adopting the Comprehensive Water System Plan as updated.
3336	6-Sep-2011		A Resolution Approving the Capital Improvement Plan for Calendar Years 2012-2017
3355	21-Nov-2011		A Resolution accepting work performed by Sharpe & Preszler Construction Company, INC., under contract for the Commercial Avenue Water Line Extension, project #C4-10-05
3358	5-Dec-2011		A Resolution accepting work performed by Michels Pipe Services, under contract for the "A" Street Water Line Repair, project No. M4-11-60-WTR.
3373	6-Feb-2012		A Resolution accepting work performed by Booth & Son Construction INC., under contract for the Broadmoor Pump Station Improvements, project #10-2-05.
3380	19-Mar-2012		A Resolution authorizing the transfer of land, wells, other related infrastructure and an obligation of future debt service payments from the Waterworks Utility to the Economic Development and Infrastructure Fund.
3416	6-Aug-2012		A Resolution Approving the Capital Improvement Plan for Calendar Years 2013-2018
3450	7-Jan-2013		A Resolution accepting the Planning Commission's recommendation and approving a special permit for a water pump station in the 1100 block of Harris Road.
3476	14-Jun-2013		A Resolution accepting work performed by Big D's Construction of Tri-Cities., under contract for the Road 56 Water main Replacement, project #C7-WT-2R-12-05.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3485	15-Jul-2013		A Resolution accepting the planning commission's recommendation and approving a special permit for a water intake facility at 11412 West Court Street.
3490	29-Jul-2013		A Resolution Approving the Capital Improvement Plan for Calendar Years 2014-2019.
3495	29-Jul-2013		A Resolution accepting work performed by Apollo, INC., under contract for the West Pasco Water Treatment Plant, Project #C1-09-03-WTR.
3496	29-Jul-2013		A Resolution accepting work performed by Pall Corporation under contract for the West Pasco Water Treatment Plant, Project #C1-09-03-WTR.
3509	16-Sep-2013		A Resolution accepting work performed by Sharpe & Preszler Construction Company, INC., under contract for the Commercial Avenue/US-12/Lewis Street Water Line Project.
3511	16-Sep-2013		A Resolution accepting work performed by Apollo, INC., under contract for the Wastewater Treatment Plant Optimization Improvements, Project #C3-10-51-SWR.
3518	4-Nov-2013		A Resolution accepting work performed by C&E Trenching, LLC., under contract for the Riverview Pump Station meter/Chlorine Vault Replacement Project.
3519	4-Nov-2013		A Resolution accepting work performed Poland & Sons, under contract for the 4th & Clark Waterline Project.
3556	2-June-2014		A resolution establishing a Water Resources Action Plan.
3575	21-Jul-2014		A Resolution approving the Capital Improvement Plan for Calendar Years 2015-2020.

<b>Ordinance Number</b>	<b>Date Approved</b>	<b>Date Effective</b>	<b>Title</b>
3588	6-Oct-2014		A Resolution Waiving Competitive Bidding Requirements for the purchase of two(2) 17 Million Gallon per Day(MGD) Barrel Screens and one(1) Hydroburst™ Air Cleaning System from Bilfinger Water Technologies, INC., and Authorizing the Purchase.
3604	1-Dec-2014		A Resolution accepting work performed by Kbec, LLC under contract for the Waterline Extension – Broadmoor Tank Project.
3642	15-Jun-2015		A Resolution accepting work performed by Puget Sound Utility Services, INC., under contract for the 2015 Water Meter Relocation Project.
3654	8-Sep-2015		A Resolution approving the Capital Improvement Plan for Calendar Years 2016-2021.
3669	16-Nov-2015		A Resolution accepting work performed by Ballard Marine Construction, INC., under contract for the Butterfield WTP Intake Screens Project.
3687	1-Feb-2016		A Resolution Granting a Special Permit for WSU Extension Services Farm in an RS-12 (Suburban Residential) District.



## Local Government Consistency Determination Form

Water System Name: Pasco Water Department PWS ID: \_\_\_\_\_

Planning/Engineering Document Title: Comprehensive Plan Plan Date: \_\_\_\_\_

Local Government with Jurisdiction Conducting Review: Franklin County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.		Yes
b) The <u>growth projection</u> used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Page 3-8	Yes
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Appendix 1-B	Not Applicable
d) <u>Service area policies</u> for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Appendix 1-B	Not Applicable
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Page 3-7 WUE, 4-5 Water Rights 4-16 Water control program	Not Applicable

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Craig Erdman  
Signature

6/4/2018  
Date

## Consistency Review Guidance

### ***For Use by Local Governments and Municipal Water Suppliers***

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

**A) Documenting Consistency:** The planning or engineering document must include the following when applicable.

- a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.
- b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*
- d) All **service area policies** for how new water service will be provided to new customers.
- e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

**B) Documenting an Inconsistency:** Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

**C) Documenting a Lack of Local Review for Consistency:** Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.



The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).



# ***Regional Water Forecast and Conservation Plan***

*City of Kennewick*

*City of Pasco*

*City of Richland*

*City of West Richland*

*January 2016*



Prepared By RH2 Engineering, Inc., Richland, Washington

# ***Regional Water Forecast and Conservation Plan***

*City of Kennewick*

*City of Pasco*

*City of Richland*

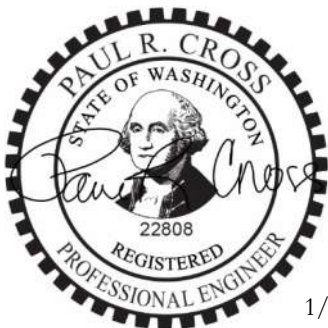
*City of West Richland*

***January 2016***

Prepared by RH2 Engineering, Inc.

Prepared for the City of Kennewick.

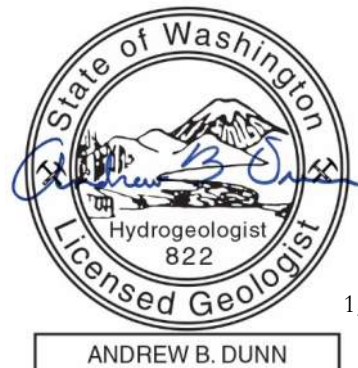
Note: This Plan was completed under the direct supervision of the following Licensed Professional Engineers registered in the State of Washington.



1/28/2016



1/28/2016



1/28/2016

# City of Kennewick

## Regional Water Forecast and Conservation Plan

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# ***Introduction and Background***

1

## **AUTHORIZATION AND PURPOSE**

The Cities of Kennewick, Pasco, Richland, and West Richland authorized RH2 Engineering, Inc., (RH2) to prepare this Regional Water Forecast and Conservation Plan (RWFCP) to update the 2010 version of the RWFCP. These four cities share the Quad City Water Right (QCWR) issued under Surface Water Permit No. S4-30976P on September 15, 2003. This updated RWFCP combines the water conservation and demand projection data presented in each city's individual water system plan, and presents them in one document. Additionally, the purpose of this RWFCP is as follows:

- To describe the local area geology, climate, population, and municipal subdivisions;
- To summarize the municipal water rights for each city and the mechanisms for transmitting regional supplies to each city;
- To describe existing and proposed water conservation measures within each jurisdiction and regionally;
- To perform a water balance and determine net consumptive use within the municipal service areas;
- To tabulate the 2021 (6-year) and 2035 (20-year) allocation of the QCWR and where it is anticipated to be used; and
- To describe mitigation required by each city based on the allocation of the QCWR.

Combining the water conservation plans for the quad cities in this document will provide consistency with the Settlement Agreement terms of the QCWR, assist in ensuring a reliable future water supply for the region, and protect fish, wildlife, and the environment. Effective water conservation and efficiency plans can delay the need for new or replacement water system infrastructure within the existing quad cities water systems. Each city recognizes that water is a valuable and essential natural resource that needs to be used wisely, and the individual water use efficiency plans for each city meet or exceed the current Washington State Department of Health (DOH) requirements.

Water supply to the quad cities is provided by surface water treatment plants, Ranney collector wells, and groundwater wells. Each city has a variety of additive and non-additive water rights that define the quantity of water that can be used to supply each water system. The majority of the future water supply to each city will be regulated by the QCWR, which permits a maximum instantaneous use of 178 cubic feet per second (cfs), and an annual use of 96,619 acre-feet per year (afy). An initial 10 cfs (instantaneous) and 7,227 afy (annual) portion of the QCWR has been distributed evenly between the four cities, with a priority date of June 24, 1980. Additional quantities of water may be made available following review of this or subsequent RWFCPs, which are required to be updated on a 6-year basis, as described in the water right permit presented as **Appendix A**.



### SUMMARY OF PLAN CONTENTS

A brief summary of the content of each chapter in this RWFCP is as follows.

- **Chapter 1** introduces the reader to the purpose of the RWFCP and its organization.
- **Chapter 2** presents a description of the local area geology, climate, population, and municipal subdivisions.
- **Chapter 3** presents the conservation program components.
- **Chapter 4** presents the regional joint use strategy for the QCWR.

### DEFINITION OF TERMS

The following terms are used throughout this RWFCP.

**Consumption:** The true volume of water used by a water system's customers. The volume is measured at each customer's connection to the distribution system.

**Demand:** The quantity of water required from a water supply source over a period of time necessary to meet the needs of domestic, commercial, industrial, and public uses, and to provide enough water to supply fire fighting, system losses, and miscellaneous water uses. Demands are normally discussed in terms of flow rate, such as million gallons per day (MGD) or gallons per minute (gpm), and are described in terms of a volume of water delivered during a certain time period. Flow rates pertinent to the analysis and design of water systems are:

- **Average Day Demand (ADD):** The total amount of water delivered to the system in a year divided by the number of days in the year;
- **Maximum Day Demand (MDD):** The maximum amount of water delivered to the system during a 24-hour time period of a given year; and
- **Peak Hour Demand (PHD):** The maximum amount of water delivered to the system, excluding fire flow, during a 1-hour time period of a given year. A system's PHD usually occurs during the same day as the MDD.

**Distribution System Leakage (DSL):** Water that is measured as going into the distribution system but not metered as going out of the system.

**Potable:** Water suitable for human consumption.

**Purveyor:** An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

**Supply:** Water that is delivered to a water system by one or more supply facilities, which may consist of supply stations, booster pump stations, springs, and wells.

**Storage:** Water that is "stored" in a reservoir to supplement the supply facilities of a system and provide water supply for emergency conditions.

# Area Description

## INTRODUCTION

This chapter provides a thorough description of the quad cities area, specifically including the Cities of Kennewick, Pasco, Richland, and West Richland.

## GEOLOGY AND CLIMATE

The Cities of Kennewick, Pasco, Richland, and West Richland, referred to herein as the quad cities, are located in the Columbia Basin, approximately at the confluence of the Columbia, Snake, and Yakima rivers, in southcentral Washington. Columbia River basalts lie beneath the quad cities, which stretch from Idaho, through Oregon and Washington, to the Pacific Ocean. The topography of the quad cities area varies greatly, with low elevations of approximately 320 feet above mean sea level adjacent to the Columbia River, and high elevations of approximately 3,000 feet above mean sea level at the top of surrounding peaks.

The climate is semi-arid with precipitation arriving in the spring and fall as rain, and falling in the winter as snow. The summers are warm and dry. The climatic data for the City of Kennewick, which is representative of the quad cities, is shown in **Table 2-1**.

**Table 2-1**  
**Historical Climatic Data**

Year	Temperature (°F)			Annual Rainfall (inches)
	Annual Average	Annual High	Annual Low	
1995	55	100	9	10.81
1996	53	104	-11	13.66
1997	55	103	13	7.80
1998	57	108	7	7.58
1999	56	101	25	4.05
2000	54	104	18	9.04
2001	55	102	22	6.16
2002	55	106	22	5.32
2003	57	107	15	6.81
2004	56	103	-6	5.23
2005	55	102	10	6.85
2006	56	109	13	10.18
2007	55	105	10	5.73
2008	54	104	3	6.24
2009	54	105	5	6.72
2010	55	101	5	12.05
2011	54	99	11	5.24
2012	56	105	15	9.44
2013	55	108	10	5.49
2014	57	108	9	5.59

## CHAPTER 2

### POPULATION

The quad cities have experienced rapid population growth and extensive physical development in recent years. The populations of Kennewick, Pasco, Richland, and West Richland increased approximately 24, 35, 16, and 26 percent, respectively, between 2007 and 2014. Historical and projected future growth for Kennewick, Richland, and West Richland was presented in Benton County's 2013 *Comprehensive Plan* update through 2034, and for Pasco in Franklin County's 2008 *Comprehensive Plan* through 2030. These projections, which are shown in **Table 2-2**, include the population within the city limits, as well as the unincorporated areas of each city's urban growth area (UGA). Population projections beyond 2034 for Kennewick, Richland, and West Richland were assumed to occur at an average annual growth rate that is the same as the 2029 to 2034 projections for each city. Pasco provided the projected 2035 city limit population. The population projections for Kennewick, Pasco, and Richland are in accordance with each city's current comprehensive plan. West Richland's comprehensive plan projections are more aggressive than the Benton County's projections. Future calculations and analyses will be based on West Richland's more aggressive comprehensive plan and water system plan population projections for conservatism.

**Table 2-2**  
**Historical and Population Projections for Each City**

Description	Year	Kennewick	Pasco	Richland	West Richland	Total
<b>City Population</b>						
Historical	2007	62,520	50,210	45,070	10,850	168,650
Historical	2010	73,917	59,781	48,058	11,811	193,567
Base Year	2014	77,700	67,770	52,090	13,620	211,180
+6 Years	2021	86,444	78,898	60,254	14,550	240,145
+20 Years	2035	103,931	101,153	76,581	16,410	298,075
<b>Water Service Area Population</b>						
Historical	2007	67,871	54,060	45,409	10,850	178,190
Historical	2010	70,286	61,221	50,047	11,965	193,520
Base Year	2014	74,720	70,770	56,232	13,626	215,347
+6 Years	2021	83,319	80,224	62,133	18,509	244,185
+20 Years	2035	101,160	111,862	73,700	25,308	312,030

The actual number of people served by each city's water system is different than the population within each city. Projected future growth for each city's water service area is shown in the bottom portion of **Table 2-2**. The projected water service area population data is presented in each city's existing water system plan, through either 2029 or 2030. The water service area projections beyond these years were assumed to occur at an average annual growth rate that is the same as the preceding years. The projections for Kennewick, Pasco, and Richland's water service area are in accordance with the current Benton and Franklin County planning documents. West Richland's projections, presented in the 2013 update to the West Richland comprehensive plan, are more aggressive than the Benton County's projections. The water service area projections for each city will be used to calculate the future water demands of each water system.

### COMPOSITION OF CUSTOMERS SERVED

In 2014, Kennewick provided water service to 23,205 connections; Pasco to 18,643 connections; Richland to 18,414 connections; and West Richland to 4,472 connections, as shown in **Table 2-3**.

Of the 64,734 connections served in all four water systems in 2014, 55,700 connections (86 percent) were single-family residential customers, 2,273 connections (4 percent) were multi-family residential customers, 5,406 connections (8 percent) were commercial and industrial customers, and 1,355 connections (2 percent) were municipal, educational, and all other land use types. Information regarding the number of multi-family residential units served was not immediately available from each city; therefore, a breakdown of the single- and multi-family residential population was not considered in this study.

**Table 2-3**  
**2014 Connections by Customer Class**

<b>City/Service Area</b>	<b>Single-family Residential</b>	<b>Multi-family Residential</b>	<b>Commercial/Industrial</b>	<b>Municipal/Educational/Other</b>	<b>Total</b>
Kennewick	19,540	1,220	2,274	170	<b>23,205</b>
Pasco	16,142	492	1,493	516	<b>18,643</b>
Richland	15,807	468	1,510	629	<b>18,414</b>
West Richland	4,210	93	129	40	<b>4,472</b>
<b>Total</b>	<b>55,700</b>	<b>2,273</b>	<b>5,406</b>	<b>1,355</b>	<b>64,734</b>

## ***MUNICIPAL WATER SYSTEMS AND IRRIGATION DISTRICTS***

### **City of Kennewick**

Kennewick's potable water system is supplied by two Ranney collector wells on Clover Island, which have an existing combined capacity of approximately 10,417 gallons per minute (gpm) (15 million gallons per day (MGD)), and by the city's Columbia River Water Treatment Plant (WTP), which also has an existing capacity of 10,417 gpm (15 MGD), with the infrastructure to be expanded to 30 MGD in the future.

Kennewick also operates two wells in Columbia Park: the Kiwanis Well is a 25 gpm well used for irrigation in the park; and the Columbia Park Campground Well is a 70 gpm well that is a separate water system used to supply a seasonal campground.

Separate irrigation systems operated by the Kennewick Irrigation District (KID) and Columbia Irrigation District (CID) are available for some of Kennewick's potable water system customers. Potable water is used for irrigation by Kennewick customers outside of KID and CID's operating areas.

### **City of Pasco**

Pasco's potable water system is supplied by two Columbia River WTPs. The Butterfield WTP has an existing capacity of 19,444 gpm (28 MGD), and the West Pasco WTP has an existing capacity of 4,200 gpm (6 MGD).

In addition to the potable water system, Pasco operates a separate irrigation system supplied by Columbia River surface water and multiple groundwater wells to provide irrigation water to some potable water customers. Franklin County Irrigation District No. 1 also operates a separate irrigation system to provide irrigation water to some of Pasco's potable water system customers. Potable water is used for irrigation by Pasco customers in areas without separate irrigation systems.

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### City of Richland

Richland's main source of potable water supply is the 36 MGD Columbia River WTP, with five other well fields providing additional supply. Water is pumped from the Columbia River to the WTP and to the North Richland Well Field (NRW). At the NRW the water is used for aquifer recharge before being repumped to the treatment and distribution systems. Richland also operates well pumps at the Columbia, Duke, and Wellsian well fields, which pump naturally occurring groundwater into Richland's water system. The total treatment capacity of Richland's water system is 36,900 gpm (53.1 MGD).

In addition to the potable water system, Richland operates two separate irrigation systems that supply irrigation water to some customers within the city limits. Badger Mountain Irrigation District (BMID), KID, and CID also operate separate irrigation systems to provide irrigation water to some of Richland's potable water system customers. A small percentage of Richland potable water system customers are also served by private irrigation systems. Potable water is used for irrigation by Richland customers in areas without separate irrigation systems.

### City of West Richland

West Richland's potable water system is supplied by six groundwater wells and an intertie with Richland's water system. The existing pumping capacity of West Richland's non-emergency wells is approximately 4,860 gpm (7 MGD). An intertie with Richland's water system is used to meet the peak demands of the system during the summer months. The current joint contract allows up to 2,500 gpm (3.6 MGD) of water from Richland's water system, but the cities have planned for as much as 5,000 gpm to be transferred from Richland to West Richland's water system through this intertie. The intertie is located at the intersection of Kennedy Road and Arena Road.

Separate irrigation systems operated by KID and CID, as well as private irrigation systems, supply irrigation water to some West Richland potable water system customers. Potable water is used for irrigation by West Richland customers in areas without separate irrigation systems.

## MUNICIPAL WATER RIGHTS

The Cities of Kennewick, Pasco, Richland, and West Richland share the Quad City Water Right (QCWR) issued under Surface Water Permit No. S4-30976P on September 15, 2003. This water right permits a maximum instantaneous use of 178 cubic feet per second (cfs), and an annual use of 96,619 acre-feet per year (afy). An initial 10 cfs (instantaneous) and 7,227 afy (annual) portion of the QCWR has been distributed evenly between the four cities, with a priority date of June 24, 1980. Additional quantities of water may be made available following review of this and subsequent RWFCPs, which are updated on a 6-year interval, as described in the water right permit. A summary of the potable water rights evaluation for each city, both with and without the QCWR, is shown in **Table 2-4**. Standalone irrigation water rights are not included in the values presented in **Table 2-4**, and water utilized by the standalone irrigation systems operated by the Cities of Pasco and Richland are not included in future projections. The water rights evaluation presented in Richland's water system plan included four categories: potable non-additive, potable additive, potable claims, and other sources. These categories are presented in **Table 2-4** for consistency with Richland's water system plan.

**Table 2-4  
Existing Water Rights**

Description <sup>1</sup>	Existing Water Rights		
	Maximum Qi		Maximum Qa
	(gpm)	(cfs)	(afy)
<b><i>Kennewick Municipal without QCWR<sup>2</sup></i></b>	<b><i>44,850</i></b>	<b><i>99.93</i></b>	<b><i>16,200.00</i></b>
Kennewick Domestic with QCWR <sup>3</sup>	45,972	102.43	18,006.75
Kennewick Irrigation	100	0.22	7.20
Kennewick Total Water Rights <sup>4</sup>	46,072	102.65	18,013.95
<b><i>Pasco Domestic without QCWR<sup>2</sup></i></b>	<b><i>16,784</i></b>	<b><i>37.40</i></b>	<b><i>7,849.00</i></b>
Pasco Domestic with QCWR <sup>3</sup>	17,906	39.89	9,655.75
Pasco Irrigation	17,164	38.24	7,152.80
Pasco Total Water Rights <sup>4</sup>	35,070	78.14	16,808.55
<b><i>Richland Municipal without QCWR<sup>5</sup></i></b>	<b><i>42,664</i></b>	<b><i>95.06</i></b>	<b><i>33,141.20</i></b>
Richland Domestic with QCWR <sup>3</sup>	43,786	97.56	34,947.95
Richland Other	27,129	60.44	14,148.92
Richland Total Water Rights <sup>4</sup>	70,915	158.00	49,096.87
<b><i>West Richland Domestic without QCWR<sup>5</sup></i></b>	<b><i>7,420</i></b>	<b><i>16.53</i></b>	<b><i>4,661.00</i></b>
West Richland Domestic with QCWR <sup>3</sup>	8,542	19.03	6,467.75
West Richland Irrigation	200	0.45	150.00
West Richland Total Water Rights <sup>4</sup>	8,742	19.48	6,617.75
<b><i>Municipal Total without QCWR</i></b>	<b><i>111,718</i></b>	<b><i>248.91</i></b>	<b><i>61,851.20</i></b>
(1) Water rights descriptions (municipal, domestic, irrigation, and other) for each city are consistent with the descriptions presented in water rights documents.			
(2) Pre-QCWR municipal/domestic annual volume of Kennewick and Pasco consistent with 2009 RWFCP Table 2-4.			
(3) QCWR split evenly for each City resulting in 1,122 gpm (2.5 cfs) and 1,806.75 afy shown for each city.			
(4) All water rights held by each city are suitable for municipal water supply purposes. The water rights are broken down in this table for consistency with each city's water rights documents.			
(5) Pre-QCWR municipal/domestic annual volume of Richland and West Richland inconsistent with 2009 RWFCP Table 2-4, which showed a higher water right value for both cities.			

Richland and West Richland have a wholesale water service agreement that states that Richland will withdraw, treat, and pump West Richland's portion of the QCWR. The official agreement can be found in **Appendix B**.



# Conservation Program Components

## 3

### INTRODUCTION

Throughout the past 10 years, beginning with the quad cities *2005 Interim Regional Water Forecast and Conservation Plan* (RWFCP), the Cities of Kennewick, Pasco, Richland, and West Richland have implemented water conservation plans to ensure that the region has a reliable supply of water and is using water in an efficient manner. The quad cities have been implementing individual water use efficiency programs since 2007 that comply with the Washington State Department of Health Water Use Efficiency (WUE) Rule. Additionally, the RWFCP serves as a combined and unified WUE program for the quad cities to ensure that WUE is a key component in the regional supply and demand strategy.

The Washington State Department of Health (DOH) implemented the WUE Rule, effective on January 22, 2007, as required by the Municipal Water Supply – Efficiency Requirements Act, also known as the Municipal Water Law, passed by the Washington State Legislature in September 2003. The intent of this rule is to help reduce the demand that growing communities, agriculture, and industry have placed on our state's water resources, and to better manage these resources for fish and other wildlife. Municipal water suppliers are obligated under the WUE Rule to enhance the efficient use of water by the system and/or its consumers.

The WUE Rule applies to all municipal water suppliers and requires suppliers to:

- Develop WUE goals through a public process and report annually on their performance;
- Maintain distribution system leakage at or below 10 percent of production based on a 3-year rolling average;
- Meter all existing and new service connections;
- Collect production and consumption data, calculate distribution system leakage (DSL), and forecast demands;
- Evaluate WUE measures; and
- Implement a WUE program.

### WATER USE EFFICIENCY GOALS AND OBJECTIVES

The original combined WUE goals and objectives of the quad cities, developed in the 2005 Interim RWFCP, have proven to be effective and will continue to be met through implementation of the WUE measures in each city's WUE program. These goals and objectives, as most recently presented in the 2008 RWFCP, are as follows.

- Inform customers of simple, effective water wise activities.
- Develop a regional marketing campaign.

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- Encourage customers to reduce water waste and become more water wise.
- Encourage commercial, industrial, and residential customers to use water wisely.
- Ensure all municipal activities and programs are water wise.
- Encourage wise water use to irrigate large park-like areas.
- Measure the net consumptive water use from the Columbia River.
- Perform a water balance for the region every 6 years as part of each city's comprehensive water system plan updates.
- Focus conservation program on using water efficiently.

The proposed goals and objectives of each city's currently-adopted or proposed WUE programs consist of the following.

### ***City of Kennewick***

- Maintain annual average demand per capita below 170 gallons per day (gpd), based on the 6-year period between 2008 and 2013.

### ***City of Pasco***

- Supply-side goals
  - Maintain DSL at 8 percent or less on an annual basis.
  - Develop an integrated water shortage and drought response plan by 2018.
  - Continue with regular water meter replacement program.
  - Implement installation of "Smart Meters".
- Demand-side goals
  - Maintain average demand per ERU at 470 gpd per ERU, excluding DSL through 2020.
  - Develop a large water user water audit program by December 31, 2018.
  - Encourage the utilization of xeriscaping and specialized turf seed mixes to lower irrigation water consumption.
  - Continue to offer Pasco residents retrofit kits that include low flow shower heads, toilet tank displacement bags, leak detection tablets, and other water use efficiency measures. The City will phase out this residential retrofit program before the next planning cycle as the City is close to reaching saturation of its target audience.
  - Continue to perform WUE education in the Pasco School District.

- Continue to promote public education on conservation through annual consumer confidence reports, customer billing statements, and other educational materials.

### *City of Richland*

- Maintain DSL at 10 percent or less on an annual basis.
- Promote education on water conservation.
- Offer a residential retrofit program for the public.
- Consider a conservation rate in a water rate study.
- Maintain the average demand per equivalent residential unit (ERU) at 534 gpd per ERU.

### *City of West Richland*

- Maintain DSL at 10 percent or less based on a 3-year rolling average.
- Maintain average demand per ERU at 455 gpd per ERU through 2022.

## CONSERVATION MEASURES

Each city's evaluation of WUE measures and selected levels of implementation are presented within this section. The measures fall within three categories of implementation: 1) mandatory measures that must be implemented; 2) measures that must be evaluated; and 3) additional measures selected by the city that must be either evaluated or implemented.

Based on the number of each city's water service connections in 2014 (as presented in **Chapter 2**), Kennewick, Pasco, and Richland must evaluate or implement at least nine WUE measures, and West Richland must evaluate or implement at least six WUE measures. Measures that are mandatory cannot be credited towards the system's WUE measures. **Table 3-1** shows each city's compliance with the mandatory implementation and evaluation measures, as well as the WUE measures currently implemented by each city. As can be seen in **Table 3-1**, each city implements more than the required number of WUE measures, as many of the implemented measures apply to all four customer classes.

**Table 3-1  
WUE Measures**

WUE Measure	Kennewick				Pasco				Richland				West Richland			
Mandatory WUE Measures																
Source Meters Installed	✓				✓				✓				✓			
Service Meters Installed	✓				✓				✓				✓			
Meter Calibration Compliance	✓				✓				✓				✓			
Water Loss Control Action Plan	Not Applicable				Not Applicable				Not Applicable				Not Applicable			
Customer Education	✓				✓				✓				✓			
WUE Measures That Must Be Evaluated																
Rate Structure	✓				✓				✓				✓			
Reclamation Opportunities	✓				✓				✓				✓			
Selected WUE Measures																
Customer Class	SF	MF	CI	MEO	SF	MF	CI	MEO	SF	MF	CI	MEO	SF	MF	CI	MEO
Plumbing Retrofit Program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Displays at Fairs and Events	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Use Audits			✓				✓				✓					
School Outreach	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Bill Showing Consumption History	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Irrigation Management												✓				
Using Reclaimed Water							✓									
Total Selected WUE Measures	17				18				18				16			
SF = Single-family Residential MF = Multi-family Residential CI = Commerical/Industrial MEO = Municipal/Institutional/Other																

## Mandatory Measures

### Source Meters

The volume of water produced by the each system's sources must be measured using a source meter or other meter installed upstream of the distribution system. Source meters are currently installed and operating at each city's sources. If any new sources are installed in the future, they will be equipped with a source meter. A description of each city's source meter testing and repair history and protocols is as follows.

- Kennewick tests source meters for proper operation on an annual basis, and calibrates the meters if needed. In 2014, the city verified that the source meters at the Ranney collectors and the Kennewick Water Treatment Plant met American Water Works Association standards.

- Pasco calibrates all source meters every 5 years. All West Pasco Water Treatment Plant source meters were calibrated in 2014. Butterfield Water Treatment Plant raw water meters were replaced in 2014, and finished water meters were replaced in 2011.
- Richland services all source meters on an annual basis, and performs repairs if needed. Two source meters are scheduled for replacement in winter 2015.
- West Richland tests source meters for proper operation on an annual basis, and calibrates the meters if needed. In 2014, West Richland calibrated source meters at Wells 1, 2, 7, and 9.

### **Service Meters**

All public water systems that supply water for municipal purposes must install individual service meters for all water users. Service meters are currently installed and operating at all connections throughout each city's distribution system. All future connections that are installed or activated will be equipped with a service meter.

### **Meter Calibration – Large Meters (2-inch and Larger)**

The cities must calibrate and maintain meters based on generally accepted industry standards and manufacturer information. A description of each city's large meter testing and repair history and protocols is as follows.

- Kennewick has tested all large meters on an annual basis over the last 5 years. As of 2014, 87 large meters were installed in Kennewick's water system. Of the 87 large meters, 83 met the 95 percent or better accuracy target over the three flow ranges (low, medium, and high) used in the tests. Meters not meeting this goal were repaired, replaced, or scheduled for replacement.
- Pasco tests all large meters on a regular schedule, consistent with generally accepted industry standards and manufacturer information. As of 2014, 321 large meters were installed in Pasco's water system. Pasco replaces meters outside of the regular testing schedule if they are discovered to be leaking, have stopped reading, or if the dial has rolled over two or more times.
- Richland tests all 2-inch meters every 4 years, and all 3-inch meters every 2 years. Meters not meeting generally accepted industry or manufacturer standards are replaced or scheduled for replacement.
- West Richland tests all large meters based on manufacturer recommendations. As of 2014, eight large meters were installed in West Richland's water system.

### **Meter Calibration – Small Meters (Less than 2-inch)**

Each city has procedures to test the performance of small meters and to repair and replace the meters if they are found not to be within generally accepted industry standards and manufacturer information. A description of each city's small meter testing and repair history and protocols is as follows.

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- Kennewick repairs or replaces small meters if they are discovered to be defective or not properly measuring water use. Kennewick periodically replaces old meters with meters compatible with an automatic read system.
- Pasco repairs or replaces small meters on a recurring 10-year schedule, consistent with manufacturer recommendations.
- Richland repairs or replaces small meters if they are discovered to be defective or not properly measuring water use. All small meters originally installed prior to 1990 have been replaced. No small meters installed prior to 1990 are currently installed in Richland's water system.
- West Richland repairs or replaces small meters if they are discovered to be defective or not properly measuring water use.

### **Water Loss Control Action Plan**

To control leakage, systems that do not meet the distribution system leakage (DSL) standard must implement a Water Loss Control Action Plan (WLCAP). Each city's rolling 3-year average DSL is below 10.0 percent in 2014, based on the 3-year period of 2012 through 2014. Therefore, a WLCAP is not required to be implemented.

### **Customer Education**

Annual customer education regarding the importance of using water efficiently is a required element of all WUE programs. Customer education is provided in each city's annual Consumer Confidence Report (CCR) to customers and includes information on the system's DSL, progress towards meeting WUE goals, and tips for customers on using water more efficiently.

### ***Measures That Must Be Evaluated***

#### **Rate Structure**

A rate structure that encourages WUE and provides economic incentives to conserve water must be evaluated by each city, but is not required to be implemented. Each city's current utility rates are designed to discourage excessive water use, with additional charges applied to customers that use more water than allocated within a base allotment.

#### **Reclamation Opportunities**

Each city has evaluated reclamation opportunities, and Pasco currently uses reclaimed water to irrigate city-owned agricultural land. A description of each city's evaluation and implementation of reclaimed water use is as follows.

- Kennewick has evaluated using reclaimed water based on the existing wastewater treatment plant effluent quality (Class D – Reclaimed Water), but no reclaimed water is currently used within Kennewick's water service area.
- Pasco uses reclaimed water from food processors to irrigate city-owned agricultural land. Pasco continues to evaluate additional uses for reclaimed water within its water service area.



- Richland has evaluated using reclaimed water to irrigate golf courses and parks adjacent to the wastewater treatment plant. However, Richland has existing irrigation rights from the Columbia River through a separate non-potable system; using reclaimed water is not cost effective in comparison. The non-potable systems are in place and have very low relative costs.
- West Richland has evaluated using reclaimed water within its water service area, including for irrigation of the golf course adjacent to the wastewater treatment plant. However, it has been determined that using reclaimed water is not currently cost effective.

### ***Selected Measures***

Each city has chosen to implement a variety of WUE measures in addition to those that are mandatory or required to be evaluated. Many of the measures are implemented for multiple customer classes.

#### **Plumbing Retrofit Program**

Each city currently distributes water conservation items to all customer classes, including low flow showerheads, kitchen and bathroom faucet aerators, and toilet dye kits, at no cost to the customers. The program has had mixed success, especially in West Richland, where a majority of structures were constructed after 1993 when the updated plumbing code required water conservation fixtures for new construction.

#### **Displays at Fairs and Events**

Each city currently participates in WUE education by providing information on city websites and in educational brochures and displays at the annual Benton-Franklin County Fair. Additionally, Pasco provides educational brochures and displays at the annual Home and Garden Show, which is attended by customers living in all four cities.

#### **Water Use Audits**

Each city currently has an audit program for large commercial and industrial users. Additionally, Richland performs audits for city-owned facilities connected to the potable water system.

#### **School Outreach**

Schools within each city are provided WUE education programs presented through partnerships with the Benton-Franklin Health Department and the Franklin Conservation District. These outreach programs help students and teachers learn about water quality and WUE. Richland also provides an environmental education school outreach program relating to municipal operations and the environment.

#### **Water Bill Showing Consumption History**

Each city currently shows consumption history charts and information on water bills for all customer classes.

### **Irrigation Management**

Richland has installed a centralized irrigation computer system that communicates via radio to automatically shut down laterals or systems that have received programmed volumes of water, sends alarms in the event of unexpected flows or malfunctions, and remotely controls system flows based on weather conditions.

### **WUE PROGRAM DATA COLLECTION, ANALYSIS, AND EVALUATION**

One way to evaluate the WUE program's effectiveness is through a regional water balance, which measures net consumptive use. This net consumptive use is the volume of water that is not returned to the supply sources, and is therefore "consumed" by water system customers. The value of the net consumptive use is found from the difference in production volumes and return flow volumes, as measured by source and customer meters. Additional unmetered data is included in the water balance, such as return flows from septic systems, irrigation water, and water loss within the water system. Estimates have been made to approximate the return flows for these unmetered cases. The 2014 regional water balance is shown in **Table 3-2**, and a more detailed water balance for each city is shown in **Table 3-3**.

Table 3-2  
2014 Regional Water Balance

Description	January	February	March	April	May	June	July	August	September	October	November	December	Annual Total
Source of Supply Meter Readings (MG)													
Kennewick (Includes Recharge Volume)	184.56	166.90	214.35	352.29	450.54	515.32	562.79	510.48	404.38	299.41	193.09	192.84	4,046.97
Pasco	187.90	170.70	217.10	341.00	445.60	538.20	650.50	647.90	560.80	416.20	225.10	196.50	4,597.50
Richland - WTP Influent	213.22	180.63	263.47	485.63	695.98	805.12	981.22	872.84	718.91	472.07	220.77	197.19	6,107.06
Richland - Raw Water for Recharge	0.00	0.00	0.00	0.00	455.40	440.60	439.90	434.85	417.40	427.00	34.36	0.00	2,649.51
West Richland	19.09	12.52	21.07	53.50	71.10	74.53	91.78	89.82	74.97	48.63	28.94	27.93	613.89
West Richland - Intertie	0.00	12.79	25.79	32.18	41.22	58.77	71.81	51.36	44.64	21.77	2.62	4.09	367.02
Total Supply	604.77	543.54	741.79	1,264.60	2,159.84	2,432.55	2,798.01	2,607.26	2,221.09	1,685.09	704.88	618.55	18,381.95
Non-revenue Water Use (MG)													
Kennewick (Includes Recharge Volume)	4.43	13.35	1.23	19.02	33.01	43.71	20.76	0.29	1.35	0.61	3.71	0.18	141.65
Pasco	7.90	7.50	11.10	14.50	16.80	23.60	25.70	25.30	23.00	16.50	6.40	5.80	184.10
Richland	12.12	12.16	15.42	22.77	19.55	15.37	22.53	12.68	19.75	12.56	6.20	7.41	178.53
West Richland	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	4.83
Total Non-revenue Water Use	24.85	33.41	28.16	56.69	69.76	83.08	69.39	38.68	44.51	30.07	16.71	13.79	509.11
Billable Water Use (MG)													
Kennewick	194.83	178.92	182.12	207.37	255.05	521.34	521.34	598.65	402.48	474.30	285.26	196.45	4,018.12
Pasco	186.00	179.90	168.70	196.20	317.20	404.60	533.90	585.30	628.90	570.90	428.60	238.70	4,438.90
Richland - within City	187.36	155.93	167.58	423.86	528.38	597.72	866.31	779.49	743.81	559.36	247.31	174.03	5,431.13
Richland - to West Richland	13.73	12.80	25.80	23.19	41.24	58.80	71.84	51.38	44.66	21.78	2.62	1.09	368.92
West Richland	26.64	27.06	18.88	46.18	84.46	118.41	124.43	149.66	135.00	92.63	40.70	28.75	892.79
Total Billable Water Use	608.56	554.61	563.08	896.81	1,226.33	1,700.86	2,117.82	2,164.48	1,954.85	1,718.96	1,004.48	639.02	15,149.87
Total Authorized Consumption (MG)													
Kennewick	199.26	192.27	183.35	226.39	288.06	565.05	542.10	598.94	403.83	474.91	288.97	196.63	4,159.77
Pasco	193.90	187.40	179.80	210.70	334.00	428.20	559.60	610.60	651.90	587.40	435.00	244.50	4,623.00
Richland	213.21	180.88	208.81	469.83	589.17	671.88	960.68	843.55	808.22	593.70	256.13	182.53	5,978.58
West Richland	27.04	27.46	19.28	46.58	84.87	118.81	124.83	150.07	135.40	93.03	41.10	29.15	897.62
Non-revenue + Billable Water Use	633.41	588.01	591.24	953.50	1,296.09	1,783.95	2,187.21	2,203.16	1,999.35	1,749.04	1,021.19	652.81	15,658.97
Distribution System Leakage (MG)													
Kennewick	(14.70)	(25.37)	31.00	125.90	162.48	(49.74)	20.69	(88.46)	0.54	(175.49)	(95.87)	(3.79)	(112.80)
Pasco	(6.00)	(16.70)	37.30	130.30	111.60	110.00	90.90	37.30	(91.10)	(171.20)	(209.90)	(48.00)	(25.50)
Richland	0.01	(0.25)	54.66	15.81	106.81	133.24	20.54	29.29	(89.31)	(121.63)	(35.36)	14.66	128.47
West Richland	(7.96)	(2.15)	27.58	39.09	27.45	14.49	38.76	(8.88)	(15.79)	(22.63)	(9.55)	2.86	83.28
Total DSL (MG)	(28.64)	(44.47)	150.55	311.10	408.35	208.00	170.89	(30.76)	(195.66)	(490.95)	(350.68)	(34.26)	73.46
Total DSL (%)	(4.74%)	(8.18%)	20.30%	24.60%	18.91%	8.55%	6.11%	(1.18%)	(8.81%)	(29.14%)	(49.75%)	(5.54%)	0.40%
Population													
Retail Water Service Area	215,347	215,347	215,347	215,347	215,347	215,347	215,347	215,347	215,347	215,347	215,347	215,347	215,347
City Limits Only	211,180	211,180	211,180	211,180	211,180	211,180	211,180	211,180	211,180	211,180	211,180	211,180	211,180
Connections by Customer Class													
Single-family Residential	38,926	39,120	39,209	39,265	39,372	39,387	39,549	39,548	39,608	39,704	39,665	39,736	55,700
Multi-family Residential	2,269	2,274	2,272	2,276	2,272	2,273	2,274	2,275	2,273	2,273	2,277	2,280	2,273
Commercial/Industrial	3,851	3,854	3,863	3,872	3,888	3,885	3,897	3,903	3,913	3,924	3,955	3,942	5,406
Municipal/Educational/Other	2,209	2,808	2,813	2,818	2,842	2,840	2,832	2,842	2,845	2,847	2,888	2,900	1,355
Total Connections	47,255	48,056	48,157	48,231	48,374	48,385	48,552	48,568	48,639	48,748	48,785	48,858	64,734
McNary Pool Return Flows (MG)													
Wastewater Treatment Plant	470.74	424.48	470.89	471.15	502.63	501.68	540.55	548.80	522.87	519.79	475.52	483.60	5,932.70
Septic Systems	24.12	24.23	24.21	24.24	24.21	24.25	24.26	24.26	24.27	24.24	24.13	24.21	290.63
City Irrigation	0.00	0.00	0.00	31.34	53.26	67.59	85.84	76.59	58.21	31.01	0.00	0.00	403.84
Unaccounted-for Water Return	(11.46)	(17.79)	60.22	124.44	163.34	83.20	68.36	(12.30)	(78.27)	(196.38)	(140.27)	(13.71)	29.38
Source Backflow	11.81	10.72	16.72	25.00	25.70	33.02	36.21	34.54	30.97	22.55	10.01	9.25	266.50
Infiltration and Recharge	0.00	0.00	0.94	18.70	485.40	483.60	453.60	434.85	417.40	427.00	34.36	0.00	2,755.84
Total Return Flows	495.21	441.64	572.97	694.87	1,254.55	1,193.34	1,208.82	1,106.72	975.45	828.21	403.75	503.35	9,678.89
Net Withdrawals and Consumption													
Net Withdrawals (MG)	109.56	101.90	168.81	569.73	905.29	1,239.21	1,589.18	1,500.53	1,245.64	856.88	301.12	115.20	8,703.05
Net Consumption	18%	19%	23%	45%	42%	51%	57%	58%	56%	51%	43%	19%	47%

Table 3-3  
2014 Water Balance by City

Description	Kennewick			Pasco			Richland			West Richland			Quad Cities Combined Total		
	February	July	Annual	February	July	Annual	February	July	Annual	February	July	Annual	Low	High	Annual
Withdrawals (MG)															
Surface Water	166.90	553.94	3,977.94	170.70	650.50	4,597.50	173.35	1,154.01	7,162.49	0.00	0.00	0.00	510.95	2,358.46	15,737.92
Ground Water	0.00	8.85	69.04	0.00	0.00	0.00	7.28	267.11	1,594.08	12.52	91.78	613.89	19.80	367.74	2,277.00
Intertie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.79	71.81	367.02	12.79	71.81	367.02
Withdrawal Total	166.90	562.79	4,046.97	170.70	650.50	4,597.50	180.63	1,421.12	8,756.57	25.31	163.59	980.91	543.54	2,798.01	18,381.95
Returns (MG)															
Wastewater Treatment Plant	137.70	185.32	1,955.10	115.29	147.34	1,642.84	152.51	184.73	2,079.20	18.98	23.15	255.55	424.48	540.55	5,932.70
Septic Systems	15.52	15.52	186.30	5.52	5.52	66.18	0.38	0.38	4.59	2.80	2.84	33.56	24.23	24.26	290.63
City Irrigation	0.00	18.56	87.86	0.00	22.48	109.85	0.00	38.19	175.76	0.00	6.61	30.37	0.00	85.84	403.84
Unaccounted-for Water Return	---	---	(45.12)	---	---	(10.20)	---	---	51.39	---	---	33.31	---	---	29.38
Source Backflow	---	---	---	7.30	25.40	181.50	3.42	10.81	85.00	---	---	---	10.72	36.21	266.50
Infiltration and Recharge	0.00	13.70	106.33	---	---	---	0.00	439.90	2,649.51	---	---	---	0.00	453.60	2,755.84
Returns Total	153.23	233.11	2,290.47	128.10	200.73	1,990.17	156.32	674.01	5,045.45	21.78	32.61	352.80	459.43	1,140.47	9,678.89
Net Consumption															
Net Consumption (MG)	13.68	329.68	1,756.50	42.60	449.77	2,607.33	24.31	747.11	3,711.11	3.52	130.98	628.11	84.11	1,657.54	8,703.05
Net Consumption	8%	59%	43%	25%	69%	57%	13%	53%	42%	14%	80%	64%	15%	59%	47%



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The net consumption of the four water systems is 47 percent based on 2014 water system data, compared to 48 percent based on the 2007 water system data presented in the 2009 RWFCP. The net consumption is presented for each month of 2014, but is typically analyzed on an annual basis to eliminate monthly inconsistencies with meter reading dates and for comparison with annual water rights. A definition of each water balance component is as follows.

**Source of Supply Meter Readings** – Volume of water supplied to each water system as measured with a source meter. The water produced by each city's sources, the volume of water transferred to and from each city via an intertie connection, the volume of water Kennewick uses for aquifer recharge, and the volume of water Richland uses for groundwater infiltration is presented individually for each city in **Table 3-2**. Total supply to all four cities in 2014 was 18,381,950,000 gallons.

**Non-revenue Water Use** – Volume of water supplied to each water system for an authorized, but non-revenue use, such as fire hydrant usage, water main flushing, and filter backwashing. Although real losses from the distribution system, such as reservoir overflows and leaking water main, should be tracked for accounting purposes, these losses must be considered leakage, and not non-revenue water use. Each city has an ongoing leak detection program to identify and fix water system leaks in an effort to minimize DSL. Total non-revenue water use for all four cities in 2014 was 509,110,000 gallons.

**Billable Water Use** – Volume of water used by all customers of each water system, as measured by the customers' meters. Total billable water use in all four cities in 2014 was 15,149,870,000 gallons.

**Total Authorized Consumption** – Sum of billable and non-revenue water use. Total authorized consumption in all four cities in 2014 was 15,658,970,000 gallons.

**Distribution System Leakage** – Difference between the total supply and total authorized consumption is the amount of DSL. Total DSL in all four cities in 2014 was 73,460,000 gallons, which equates to 0.40 percent of the total supply. Kennewick's DSL includes the volume of water used for groundwater recharge because this water is conveyed through the city's distribution system to the recharge location. Richland's DSL does not include the volume of water used for groundwater infiltration because raw water from the Columbia River is pumped directly to the city's infiltration basins, and the water does not enter the distribution system. The 2014 and historical DSL percentages for each city's water system is shown in **Table 3-4**.

**Table 3-4**  
**Distribution System Leakage**

Water System	Year			
	2000 <sup>1</sup>	2004 <sup>1</sup>	2007 <sup>1</sup>	2014
Kennewick	7.1%	8.0%	5.9%	(2.8%)
Pasco	8.1%	5.0%	4.2%	(0.6%)
Richland	27.2%	9.5%	4.4%	2.1%
West Richland	30.0%	14.0%	1.8%	8.5%

(1) Reproduced from Table 3-4 in the 2009 RWFCP.

**Population** – Each city's retail water service area and city limits population is presented in **Table 3-2**. The total population served by the four cities in 2014 was 215,347.

**Connections by Customer Class** – Number of water service connections within each customer class. The total number of water service connections in all four cities in 2014 was 64,734.

**McNary Pool Return Flows** – Volume of water supply returned to the McNary Pool, including wastewater treatment plant (WWTP) effluent, filter backwashing, irrigation infiltration, and septic system draining. A description of each return flow element is as follows.

- **WWTP Effluent** – Volume of water discharged by each city's WWTP. Kennewick, Pasco, and Richland's WWTPs discharge into the Columbia River (McNary Pool), and West Richland's WWTP discharges into the Yakima River just upstream of the McNary Pool.
- **Septic Systems** – Volume of water discharged from septic drain fields and returned to the McNary Pool. The return flow from septic tanks was calculated based on the winter-time ratio of WWTP effluent water to total water consumption, which was calculated to be 82 percent. The septic system return flow is calculated as 82 percent of the winter-time single-family residential consumption, as measured by each city's customer meters. The resulting septic system return flow in 2014 is estimated to be 290,630,000 gallons.

It was assumed that the septic system return flows were consistent year-round, and therefore the winter-time return flows calculated based on the preceding equation were assumed to be the same septic system return flows that occur during the other seasons. The resulting septic system return flow in 2014 is estimated to be approximately 24 million gallons (MG) per month, or 294 MG on an annual basis.

The septic system return flow calculations were compared with the return flow calculation methods presented in *Return Flow to Ground Water from Onsite Wastewater Systems*, prepared by the New Mexico Environment Department<sup>1</sup>. Two calculation methods were presented in this evaluation. Applying these calculation methods to the quad cities, the resulting septic system return flows are calculated as 306 MG and 338 MG based on 2014 data. These results are very similar to the results calculated based on the quad cities actual WWTP effluent and water consumption data. The septic system return flows were assumed to be 290,630,000 gallons for conservatism and to better represent the local data and conditions.

- **City Irrigation** – Volume of water returned to the McNary Pool through infiltration of irrigation water. The average supply during non-irrigation months (November through March) was applied to the supply of the irrigation months (April through October) to estimate the volume of water used for irrigation. Based on the 2009 RWFCP and the *2006 Tri-Cities Urban Area Landscape Irrigation Plan*, 5 percent of irrigation supply is estimated to return to the McNary Pool. Each city's irrigation return flows shown in **Table 3-2** are based on 5 percent of the 2014 irrigation supply returning to the McNary Pool.

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<sup>1</sup> McQuillan, D.M. and Bassett. 2009. Return Flow to Ground Water from Onsite Wastewater Systems. 18<sup>th</sup> Annual NOWRA Technical Conference and Expo, April 6-9, 2009, Milwaukee, Wisconsin.  
<https://www.env.nm.gov/fod/LiquidWaste/documents/McQuillanandBassettNOWRA09.pdf>

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- Unaccounted-for Water Return – Volume of DSL that leaks into aquifers that are under the influence of surface water and ultimately return to the McNary Pool. Consistent with the 2009 RWFCP, 40 percent of all DSL was assumed to return to the McNary Pool.
- Source Backflow – Volume of water used to backwash filters at each city's supply sources. Kennewick's backwashing water is discharged to the wastewater system, and is considered within the WWTP effluent values. West Richland does not have a surface water source and therefore does not have filter backwash volumes. Pasco and Richland's filter backwashing at surface water treatment plants is included in this category.
- Infiltration and Recharge – Volume of water used by Kennewick and Richland for groundwater recharge and infiltration, respectively.

The resulting 47 percent net consumption in 2014 is consistent with the 48 percent net consumption value calculated for 2007 in the 2009 RWFCP. The cities will continue to evaluate the performance of the individual WUE programs and implemented measures by analyzing demand data and determining the long-term trend towards reducing water usage per equivalent residential unit (ERU) and meeting WUE goals. Source meter records will be reviewed on an annual basis to determine the effectiveness of each of the implemented WUE measures and to determine if the estimated water savings are being met. If the results of the program monitoring show that WUE goals for water use per ERU are not being met, more rigorous program implementation or additional program items will be considered.

The cities will continue to provide WUE performance reports to the consumers in the annual consumer confidence reports, and will detail the results of water use monitoring and progress towards achieving each system's WUE goals.



# ***Regional Joint Use Strategy***

# **4**

## **AGREEMENT ON WATER RIGHTS CONDITIONS**

The Cities of Kennewick, Pasco, Richland, and West Richland signed a Memorandum of Understanding with the Washington State Department of Ecology (Ecology) on July 15, 1999, to manage the existing domestic water rights of the four individual cities as well as the regional Quad City Water Right (QCWR), which, after the cities entered into a Settlement Agreement (shown in **Appendix C**) with Ecology and the Center for Law and Policy (CELP) on August 19, 2003, was ultimately issued under Surface Water Permit No. S4-30976P on September 15, 2003. The permit contains many requirements, one of which is the preparation of this Regional Water Forecast and Conservation Plan update.

Prior to issuance of the QCWR, minimal collaboration took place between the four cities for water system planning purposes, with coordination typically taking place only during planning or design of a joint-use facility. As a result of issuance of the QCWR and the Settlement Agreement, the cities agreed to integrate future water system hydraulics to minimize capital improvements and to facilitate regionally-efficient water systems. The cities also agreed to voluntarily relinquish selected individual city water rights and to withdraw some pending water right applications in the spirit of utilizing the QCWR to meet future water system demands.

The cities, Ecology, and CELP participated in identifying which individual city water rights, combined with the QCWR, are anticipated to be necessary to meet the forecasted water demands of each city.

The QCWR includes a provision requiring that all consumptive use under this water right be fully mitigated when flows in the Columbia River do not meet specific target flows. The cities have developed and implemented procedures for complying with the mitigation provision. A copy of the BiOp compliance procedures are shown in **Appendix D**.

## **HISTORICAL QCWR ALLOCATION AND USE**

### ***INITIAL QCWR HISTORY***

The QCWR permit was issued on September 15, 2003. While this permit identified a total allocation of 178 cubic feet per second (cfs) and 96,619 acre-feet per year (afy), this instantaneous rate and annual volume were projected to meet the needs of the cities through 2051. The permit was written in such a way that the allocation would be distributed in phases, once there was adequate mitigation in place and a demand demonstrated, the next phase would be authorized. Ecology agreed to provide the first phase of mitigation, which was based on the use being 80-percent consumptive, which meant that the mitigation totaled 8 cfs and 5,781.6 afy. With Ecology's mitigation agreement, an initial phase of 10 cfs and 7,227 afy of the QCWR was authorized to be diverted by the four cities, with a priority date of June 24, 1980 (consistent with the water reserved in the John Day/McNary Pools reach for municipal supply, as specified in WAC 173-531A-050(3)). The

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cities agreed to divide the initial allocation evenly, with 2.5 cfs and 1,806.75 afy allocated to each city. The initial allocation allowed some of the cities to resolve existing and near-term water right deficiencies.

As part of the QCWR allocation, Ecology was required to provide the water right mitigation for the Phase 1 authorization, with the cities required to procure water rights to mitigate their consumptive use for future QCWR phases of authorization.

### **RECENT QCWR CHANGES**

Ecology procured the Buckley and Byerly water rights for mitigation, but these water rights only accounted for 7 cfs and 1,767.23 afy of the full mitigation requirement, which left a deficit of 1 cfs and 4,013.37 afy. The Simplot water rights that were mentioned in the report of examination (ROE) (identified as the Grandview Farm Water Right Certificates and Permit) were not able to be acquired by Ecology. Failure to acquire the Simplot water rights meant that Ecology had not fulfilled its mitigation requirement for the first phase of municipal supply under the permit.

In 2006, Ecology instituted the Lake Roosevelt Incremental Storage Release Program, through the newly formed Office of Columbia River, which allowed for the issuance of up to 25,000 afy in municipal and industrial water rights for water right applicants located downstream of Grand Coulee Dam, and that could prove that the tapped water was in hydraulic connection with the Columbia River. The perpetual cost of this water is \$35 per afy, and is billed, based on the annual volume of water allocated, as opposed to the annual volume of water actually used. The cities and Ecology entered into a memorandum of agreement (MOA) in December 2011 that intended to resolve the remaining uncertainty in the 2003 Settlement Agreement and QCWR permit provisions (**Appendix E**). This report contains the mutual agreement and understanding of the provisions of the QCWR with respect to the mitigation provided by Ecology and the consumptive use under the water right that needed to be mitigated.

Ecology agreed that it would provide at least 8 cfs and 5,781.6 afy of mitigation, which was the previously-calculated mitigation needed for the original municipal allocation of 10 cfs and 7,227 afy, based on 80-percent consumptive use.

In the 2011 MOA, Ecology agreed to make 13.25 cfs and 4,014.37 afy available from the Lake Roosevelt program to fulfill its mitigation obligation of 5,781.6 afy under the QCWR. According to the 2011 MOA, the Lake Roosevelt mitigation water is available for mitigation for the months of April through August. Ecology and the cities agree that the Lake Roosevelt water, combined with the Buckley and Byerly water rights, fulfill the mitigation requirement promised by Ecology when the permit issued.

The 2011 MOA documented the consumptive use, that needed to be mitigated, was reduced from 80 percent, as had been indicated in the permit, to 60 percent, based on data that had been presented in the 2008 Regional Water Forecast and Conservation Plan (RWFCP). The reduction in consumptive use from 80 percent to 60 percent had the effect of reducing the rate and volume of mitigation needed to cover the initial QCWR phase of 10 cfs and 7,227 afy that was allocated to the cities for municipal supply under the permit from 8 cfs and 5,781.6 afy to 6 cfs and 4,336.2 afy. According to the 2011 MOA, this leaves 2 cfs and 1,445.4 afy of Lake Roosevelt water available to mitigate Phase 2 of the municipal allocation. It should be noted that the instantaneous rate needed to produce 1,445.4 afy over the months of April through August is actually 4.77 cfs. The cities have

assumed that the mention of 2 cfs being available for Phase 2 is a minimum, and that the actual rate available is at least 4.77 cfs, since it is the rate that is physically necessary.

The MOA states that Ecology will be responsible for paying for the Lake Roosevelt water used to mitigate the first phase of municipal use (\$35 per af per year \* 2,568.97 af equals \$89,913.95 per year), whereas the cities will be responsible for paying for any of the Lake Roosevelt water used to mitigate future phases of the municipal allocation. At a cost of \$35 per afy, the cost to the cities of the Lake Roosevelt water that has already been set aside by Ecology, but that is beyond the mitigation requirement for Phase 1, will be \$50,589 per year ((\$35 per af per year \* 1,445.4 af equals \$50,589 per year), and it will provide the cities with an additional 2,409 afy of water for municipal use (1,445.4 afy / 60 percent consumptive = 2,409 afy).

On November 28, 2011, the cities jointly filed water right application S4-33044. This application requests 165 cfs and 86,983 afy of water from the same points of diversion identified under the QCWR (S4-30976P). This application was filed to cover the as-of-yet unmitigated municipal allocation that was made under the QCWR. If the cities decide to have this application processed, they could have Ecology process the application in the Lake Roosevelt Incremental Storage Release queue with the other qualifying applications. Issuance of a mitigated water right in this manner would mean that the cities would have to pay Ecology for the entire water right, not just the consumptively-used portion. So, if the cities wanted an additional 4,000 afy of water (1,000 afy per city) the annual cost of that water right would be \$140,000, as opposed to the potential cost of 60 percent of that, or \$84,000 per year, if it is used to mitigate consumptive use under the existing QCWR.

## **MITIGATION DOCUMENTATION**

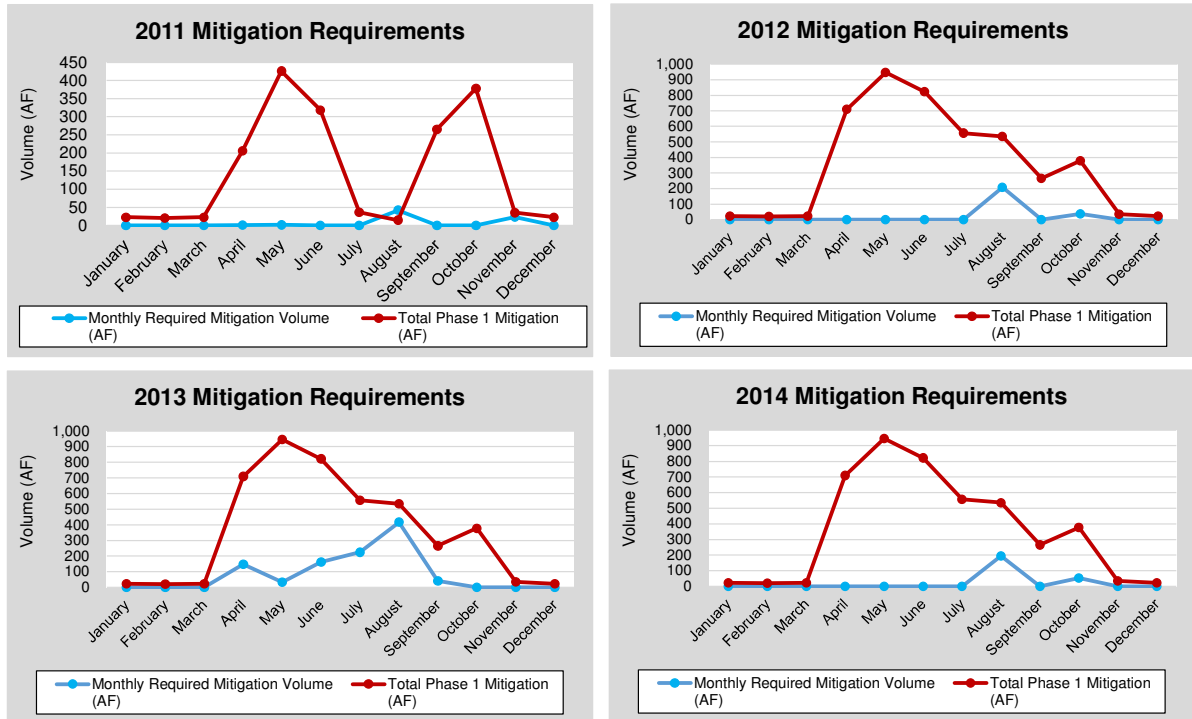
The cities document the mitigation requirements on a monthly basis for compliance with the Columbia River BiOp. Historical QCWR mitigation requirements are shown for 2011 through 2014 in **Table 4-1** and **Chart 4-1**. The total available mitigation volume increased beginning in 2012, based on the procurement of the Lake Roosevelt water for mitigation. The Buckley, Byerly, and the Phase 1 Lake Roosevelt mitigation water rights have provided sufficient mitigation water for all months between 2012 and 2014. The 2008 RWFCP presented retroactive mitigation compliance reviews for 2005 and 2007, which are presented in **Table 4-2** and **Chart 4-2**, for reference.

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Table 4-1  
2011 to 2014 QCWR Phase 1 Mitigation Requirements

Month	Daily Diverted Volume (AF/day)	Daily Return Volume (AF/day)	Daily Volume Difference (CF/day)	Days to be Mitigated	Monthly Required Mitigation Volume (AF)	Phase 1 Mitigation			
						Buckley (AF)	Byerly (AF)	Lake Roosevelt (AF)	Total Phase 1 Mitigation (AF)
2011									
January	19.40	12.76	6.64	0	0.00	0.00	22.47	0.00	22.47
February	19.44	12.79	6.65	0	0.00	0.00	20.30	0.00	20.30
March	20.93	13.76	7.17	0	0.00	0.00	22.47	0.00	22.47
April	0.13	0.05	0.08	10	0.80	187.35	18.40	0.00	205.75
May	0.21	0.05	0.16	9	1.44	406.95	19.02	0.00	425.97
June	0.27	0.07	0.20	0	0.00	299.97	18.40	0.00	318.37
July	3.53	0.85	2.68	0	0.00	21.78	14.32	0.00	36.10
August	5.04	1.21	3.83	11	42.13	0.00	14.49	0.00	14.49
September	34.43	8.29	26.14	0	0.00	251.46	14.02	0.00	265.48
October	37.66	13.90	23.76	0	0.00	355.61	22.22	0.00	377.83
November	21.97	14.19	7.78	3	23.34	13.46	21.75	0.00	35.21
December	18.71	12.08	6.63	0	0.00	0.00	22.47	0.00	22.47
Total					67.71				1,766.91
2012									
January	0.00	0.00	0.00	2	0.00	0.00	22.47	0.00	22.47
February	0.00	0.00	0.00	0	0.00	0.00	20.30	0.00	20.30
March	0.00	0.00	0.00	0	0.00	0.00	22.47	0.00	22.47
April	26.80	10.29	16.51	0	0.00	187.35	18.40	503.72	709.47
May	39.02	9.85	29.17	0	0.00	406.95	19.02	520.51	946.48
June	41.75	10.53	31.22	0	0.00	299.97	18.40	503.72	822.09
July	40.54	10.23	30.31	0	0.00	21.78	14.32	520.51	556.61
August	23.22	5.86	17.36	12	208.32	0.00	14.49	520.51	535.00
September	11.14	2.81	8.33	0	0.00	251.46	14.02	0.00	265.48
October	6.61	2.54	4.07	9	36.63	355.61	22.22	0.00	377.83
November	0.00	0.00	0.00	5	0.00	13.46	21.75	0.00	35.21
December	0.00	0.00	0.00	0	0.00	0.00	22.47	0.00	22.47
Total					244.95				4,335.88
2013									
January	0.00	0.00	0.00	0	0.00	0.00	22.47	0.00	22.47
February	0.00	0.00	0.00	0	0.00	0.00	20.30	0.00	20.30
March	0.00	0.00	0.00	1	0.00	0.00	22.47	0.00	22.47
April	33.83	12.73	21.10	7	147.70	187.35	18.40	503.72	709.47
May	43.37	10.24	33.13	1	33.13	406.95	19.02	520.51	946.48
June	53.08	12.54	40.54	4	162.16	299.97	18.40	503.72	822.09
July	21.01	4.96	16.05	14	224.70	21.78	14.32	520.51	556.61
August	17.62	4.16	13.46	31	417.26	0.00	14.49	520.51	535.00
September	17.79	4.20	13.59	3	40.77	251.46	14.02	0.00	265.48
October	0.37	0.14	0.23	0	0.00	355.61	22.22	0.00	377.83
November	0.00	0.00	0.00	19	0.00	13.46	21.75	0.00	35.21
December	0.00	0.00	0.00	0	0.00	0.00	22.47	0.00	22.47
Total					1,025.72				4,335.88
2014									
January	1.39	0.96	0.43	2	0.86	0.00	22.47	0.00	22.47
February	1.40	0.99	0.41	0	0.00	0.00	20.30	0.00	20.30
March	9.55	6.76	2.79	0	0.00	0.00	22.47	0.00	22.47
April	17.90	6.36	11.54	0	0.00	187.35	18.40	503.72	709.47
May	18.57	4.37	14.20	0	0.00	406.95	19.02	520.51	946.48
June	19.83	4.67	15.16	0	0.00	299.97	18.40	503.72	822.09
July	23.03	5.42	17.61	0	0.00	21.78	14.32	520.51	556.61
August	21.23	5.00	16.23	12	194.76	0.00	14.49	520.51	535.00
September	19.03	4.48	14.55	0	0.00	251.46	14.02	0.00	265.48
October	9.29	3.30	5.99	9	53.91	355.61	22.22	0.00	377.83
November	0.27	0.19	0.08	5	0.40	13.46	21.75	0.00	35.21
December	0.40	0.29	0.11	0	0.00	0.00	22.47	0.00	22.47
Total					249.93				4,335.88

**Chart 4-1**  
**2011 to 2014 QCWR Phase 1 Mitigation Requirements**

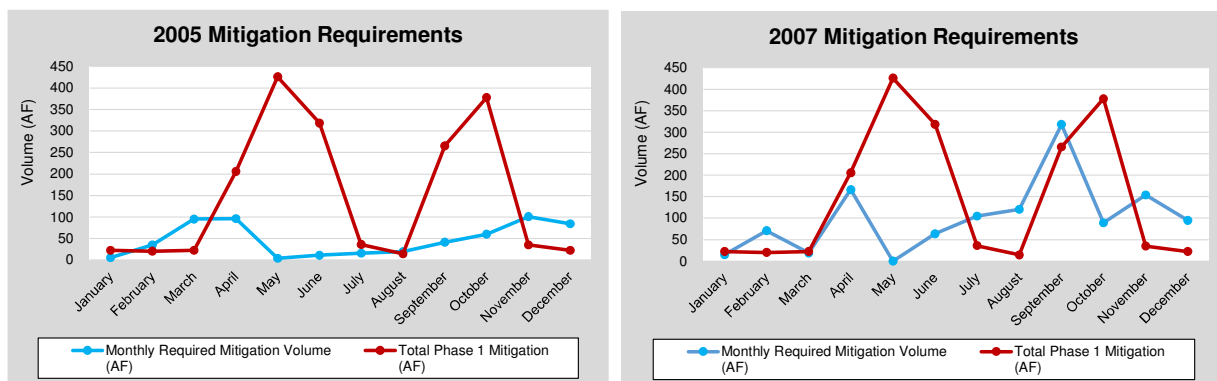


## CHAPTER 4

Table 4-2  
2005 and 2007 QCWR Phase 1 Mitigation Requirements

Month	Daily Diverted Volume (AF/day)	Daily Return Volume (AF/day)	Daily Volume Difference (CF/day)	Days to be Mitigated	Monthly Required Mitigation Volume (AF)	Phase 1 Mitigation			
						Buckley (AF)	Byerly (AF)	Lake Roosevelt (AF)	Total Phase 1 Mitigation (AF)
2005									
January	16.01	10.90	5.11	1	5.11	0.00	22.47	0.00	22.47
February	15.81	10.77	5.04	7	35.28	0.00	20.30	0.00	20.30
March	21.32	14.52	6.80	14	95.20	0.00	22.47	0.00	22.47
April	8.40	4.03	4.37	22	96.14	187.35	18.40	0.00	205.75
May	0.35	0.00	0.35	11	3.85	406.95	19.02	0.00	425.97
June	0.42	0.00	0.42	26	10.92	299.97	18.40	0.00	318.37
July	0.66	0.00	0.66	24	15.84	21.78	14.32	0.00	36.10
August	0.63	0.00	0.63	31	19.53	0.00	14.49	0.00	14.49
September	7.55	2.41	5.14	8	41.12	251.46	14.02	0.00	265.48
October	28.99	14.00	14.99	4	59.96	355.61	22.22	0.00	377.83
November	16.61	11.31	5.30	19	100.70	13.46	21.75	0.00	35.21
December	15.52	10.57	4.95	17	84.15	0.00	22.47	0.00	22.47
Total					567.80				1,766.91
2007									
January	15.68	10.68	5.00	3	15.00	0.00	22.47	0.00	22.47
February	15.85	10.79	5.06	14	70.84	0.00	20.30	0.00	20.30
March	19.62	13.34	6.28	3	18.84	0.00	22.47	0.00	22.47
April	17.87	8.64	9.23	18	166.14	187.35	18.40	0.00	205.75
May	0.23	0.00	0.23	0	0.00	406.95	19.02	0.00	425.97
June	4.44	0.70	3.74	17	63.58	299.97	18.40	0.00	318.37
July	4.59	0.70	3.89	27	105.03	21.78	14.32	0.00	36.10
August	4.58	0.70	3.88	31	120.28	0.00	14.49	0.00	14.49
September	33.12	10.39	22.73	14	318.22	251.46	14.02	0.00	265.48
October	34.60	16.76	17.84	5	89.20	355.61	22.22	0.00	377.83
November	17.86	12.16	5.70	27	153.90	13.46	21.75	0.00	35.21
December	15.69	10.69	5.00	19	95.00	0.00	22.47	0.00	22.47
Total					1,216.03				1,766.91

Chart 4-2  
2005 and 2007 QCWR Phase 1 Mitigation Requirements



## **INITIAL QCWR WATER USE PLAN**

Each city has prepared a preliminary plan for utilizing the initial QCWR allocation within their own water systems. A summary of each city's historical use of the QCWR water is presented in the subsequent section, and **Table 4-3** presents the annual water volume diverted by each city from 2011 through 2014 that counts toward the QCWR. These values were calculated on an annual basis by the cities based on assumptions and understandings that the cities no longer deem applicable for future water use. The diversion volumes presented in **Table 4-3** have not been revised to reflect the cities revised water use strategy in order to provide consistency with historical reports provided by the cities to regulatory agencies.

**Table 4-3**  
**QCWR Annual Diversions**

<b>City/Service Area</b>	<b>QCWR Annual Diversion Volume (AF)</b>			
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Kennewick	0.00	0.00	0.00	0.00
Pasco	5,077.68	5,282.02	5,013.86	3,059.04
Richland	71.04	82.89	180.43	109.10
West Richland	369.05	416.70	500.65	1,168.46
<b>Total</b>	<b>5,517.77</b>	<b>5,781.61</b>	<b>5,694.94</b>	<b>4,336.60</b>

### **City of Kennewick**

The City of Kennewick's (Kennewick) individual water rights have been sufficient to meet the needs of the water system, and therefore Kennewick has not diverted any QCWR water. Kennewick has completed construction of an aquifer storage and recovery (ASR) project, and is currently performing cycle testing and finalizing permitting of the ASR well with Ecology. The ASR well allows Kennewick to store water in an underground aquifer during non-peak demand periods when mitigation is minimal or not required. Kennewick can then pump the water out of the aquifer and into the water system during high demand periods without requiring mitigation. To be conservative, the ASR project has not been included as a future supply at this point since it is not yet fully authorized.

### **City of Pasco**

The City of Pasco's (Pasco) individual water rights are not sufficient to meet recent water demands. Pasco, therefore, relies on the inclusion of the QCWR to provide adequate water rights to meet the water system's demand requirements. Prior to issuance of the QCWR in 2003, Pasco did not have sufficient water rights to meet the 2003 water demands of the system. Pasco continues to maximize the use of their individual water rights in an attempt to minimize the use of the QCWR and to minimize the impact on the Columbia River instream flows. Examples of Pasco's attempts at minimizing QCWR water right utilization includes the use of reclaimed water at a Pasco-owned agricultural property, and the use of groundwater wells for outdoor residential irrigation.



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### City of Richland

The City of Richland's (Richland) individual water rights are currently sufficient to meet recent water demands, but small quantities of QCWR water have been assigned to the city's historical supply for accounting purposes. Richland has limited the use of QCWR water through the use of an aggressive leak-elimination program that included the replacement of 82 miles of thin-walled steel water main. Richland also has separate, non-potable, irrigation systems in portions of the retail water service area that utilize irrigation water rights, providing Richland the flexibility to maximize the use of the existing potable water rights for potable water needs.

### City of West Richland

The City of West Richland's (West Richland) individual water rights are currently sufficient to meet recent water demands. For accounting purposes, the cities have historically considered supply to West Richland via the Intertie Booster Pump Station (BPS) to be QCWR water instead of being considered from Richland's individual water rights. The cities plan to begin using Richland's water rights to supply West Richland via the Intertie BPS to maximize the availability of the QCWR for the region. West Richland has limited the use of QCWR water with the implementation of an aggressive water use efficiency (WUE) program and improvements to the overall water system management strategy.

## PROJECTED QCWR ALLOCATION AND USE

### FUTURE WATER DEMANDS

**Table 4-4** presents the projected 6- and 20-year supply projections for each city, based on the 2014 per-capita demands for each city, and the projected population data from **Chapter 2**. The actual 2014 supply without groundwater infiltration and recharge volumes is also shown in **Table 4-4** for comparison purposes.

**Table 4-4**  
**Future Water Supply Projections**

Description	Kennewick	Pasco	Richland	West Richland
<b>2014</b>				
Water Service Population	74,720	70,770	56,232	13,626
Total Supply (gallons) <sup>1</sup>	3,871,602,000	4,597,500,000	6,022,058,000	980,906,000
Supply per Capita (gallons/year)	51,815	64,964	107,093	71,988
<b>2021</b>				
Water Service Population	83,319	80,224	62,133	18,509
Total Supply (gallons) <sup>1</sup>	4,317,154,535	5,211,669,351	6,654,037,924	1,332,422,512
Supply per Capita (gallons/year)	51,815	64,964	107,093	71,988
<b>2035</b>				
Water Service Population	101,160	111,862	73,700	25,308
Total Supply (gallons) <sup>1</sup>	5,241,622,024	7,266,999,364	7,892,756,941	1,821,845,065
Supply per Capita (gallons/year)	51,815	64,964	107,093	71,988

(1) Kennewick and Richland supply does not include groundwater infiltration or recharge volumes, as these volumes were assumed to be independent of actual supply per capita.

The projected maximum day demand (MDD) for each city was also calculated, based on the peaking factors presented in each city's water system plan, and is shown in **Table 4-5**. The resulting 6- and 20-year MDDs are compared with each city's instantaneous water right in a subsequent section of this chapter. The calculated 2014 MDDs are shown in **Table 4-5**, for comparison.

**Table 4-5**  
**Maximum Day Demand Projections**

Description	Kennewick	Pasco	Richland	West Richland
<b>Peaking Factors</b>				
Maximum Day Demand / Average Day Demand	1.79	2.11	2.00	2.49
<b>2014</b>				
Average Day Demand (gpm)	7,366	8,747	11,457	1,866
Maximum Day Demand (gpm)	13,185	18,456	22,915	4,647
Maximum Day Demand (cfs)	29.38	41.12	51.05	10.35
<b>2021</b>				
Average Day Demand (gpm)	8,214	9,916	12,660	2,535
Maximum Day Demand (gpm)	14,703	20,922	25,320	6,312
Maximum Day Demand (cfs)	32.76	46.61	56.41	14.06
<b>2035</b>				
Average Day Demand (gpm)	9,973	13,826	15,017	3,466
Maximum Day Demand (gpm)	17,851	29,173	30,033	8,631
Maximum Day Demand (cfs)	39.77	65.00	66.91	19.23

## **WATER RIGHTS EVALUATION**

### **Annual Water Rights**

An evaluation of each city's existing water rights was performed to determine the sufficiency of the water rights to meet both existing and future water demands. **Table 4-6** compares each city's annual supply volume (presented in **Table 4-4**) with each city's annual water right (presented in **Chapter 2**). The QCWR diversion volumes presented in **Table 4-6** are based on the cities revised water use strategy, which differs from the past strategy which resulted in the QCWR diversion volumes presented in **Table 4-3**. The cities revised strategy consists of utilizing city-held water rights on an annual and instantaneous basis prior to utilizing the QCWR in order to reduce the need for additional QCWR volumes and to reduce the mitigation requirements associated with utilizing the QCWR. As shown in **Table 4-6**, Kennewick, Richland, and West Richland have sufficient annual water rights to meet the 2014 through 2021 demands of their customers. In 2014, Pasco had a 6,260 acre-feet (AF) deficiency that was met by utilizing the QCWR. In 2021, Pasco is projected to have an 8,145 AF annual water right deficit, which exceeds the Phase 1 QCWR volume of 7,227 AF, resulting in an annual water right deficiency of 918 AF if Pasco is allotted the entirety of the Phase 1 QCWR.

**Table 4-6  
Annual Water Rights Evaluation**

Description	Kennewick	Pasco	Richland	West Richland	Total
<b>2014 <sup>1</sup></b>					
Annual Supply Volume (AF)	11,882	14,109	18,481	3,010	---
Annual Water Right (City Rights Only) (AF)	16,200	7,849	33,141	4,661	---
QCWR Needed to Meet Annual Supply Volume (AF)	0	6,260	0	0	6,260
QCWR Available (AF)	0	6,260	0	0	7,227
Surplus (or Deficient) Water Rights (AF)	0	0	0	0	967
<b>2021</b>					
Annual Supply Volume (AF)	13,249	15,994	20,421	4,089	---
Annual Water Right (City Rights Only) (AF)	16,200	7,849	33,141	4,661	---
QCWR Needed to Meet Annual Supply Volume (AF)	0	8,145	0	0	8,145
QCWR Available (AF)	0	7,227	0	0	7,227
Surplus (or Deficient) Water Rights (AF)	0	(918)	0	0	(918)
<b>2035</b>					
Annual Supply Volume (AF)	16,086	22,302	24,222	5,591	---
Annual Water Right (City Rights Only) (AF)	16,200	7,849	33,141	4,661	---
QCWR Needed to Meet Annual Supply Volume (AF)	0	14,453	0	930	15,383
QCWR Available (AF)	0	6,297	0	930	7,227
Surplus (or Deficient) Water Rights (AF)	0	(8,156)	0	0	(8,156)

(1) Richland and West Richland's QCWR volume assumed to be zero due to the surplus of each city's existing water rights, instead of each city utilizing a portion of the QCWR for accounting purposes, as has been historically reported and shown in Table 4-3.

In 2035, Kennewick and Richland are projected to have annual demands that can be met by its existing annual water rights. West Richland has a projected annual water rights deficiency of 930 AF, which is less than West Richland's portion of the initial increment of the QCWR (1,806.75 AF per city). Therefore, West Richland's 2035 projected demands can be met by utilizing the necessary volume of the QCWR. The remaining QCWR volume of 6,297 AF is shown in **Table 4-6** as being applied to Pasco's water rights, resulting in an annual water deficiency of 8,156 AF in 2035.

## Instantaneous Water Rights

**Table 4-7** compares each city's MDD (presented in **Table 4-5**), with each city's instantaneous water right limit (presented in **Chapter 2**). As shown in **Table 4-7**, Kennewick, Richland, and West Richland have sufficient instantaneous water rights to meet the 2014 and 2021 MDDs of their customers. In 2014, Pasco had a 3.73 cfs deficiency that was met by utilizing the QCWR. In 2021, Pasco is projected to have a 9.22 cfs deficiency, which can also be met by utilizing the QCWR.

**Table 4-7**  
**Instantaneous Water Rights Evaluation**

Description	Kennewick	Pasco	Richland	West Richland	Total
<b>2014 <sup>1</sup></b>					
Maximum Day Demand (cfs)	29.38	41.12	51.05	10.35	---
Instantaneous Water Right (City Rights Only) (cfs)	99.93	37.40	95.06	16.53	---
QCWR Needed to Meet Maximum Day Demand (cfs)	0.00	3.73	0.00	0.00	3.73
QCWR Available (cfs)	0.00	3.73	0.00	0.00	10.00
Surplus (or Deficient) Water Rights (cfs)	0.00	0.00	0.00	0.00	6.27
<b>2021</b>					
Maximum Day Demand (cfs)	32.76	46.61	56.41	14.06	---
Instantaneous Water Right (City Rights Only) (cfs)	99.93	37.40	95.06	16.53	---
QCWR Needed to Meet Maximum Day Demand (cfs)	0.00	9.22	0.00	0.00	9.22
QCWR Available (cfs)	0.00	9.22	0.00	0.00	10.00
Surplus (or Deficient) Water Rights (cfs)	0.00	0.00	0.00	0.00	0.78
<b>2035</b>					
Maximum Day Demand (cfs)	39.77	65.00	66.91	19.23	---
Instantaneous Water Right (City Rights Only) (cfs)	99.93	37.40	95.06	16.53	---
QCWR Needed to Meet Maximum Day Demand (cfs)	0.00	27.60	0.00	2.70	30.30
QCWR Available (cfs)	0.00	7.30	0.00	2.70	10.00
Surplus (or Deficient) Water Rights (cfs)	0.00	(20.30)	0.00	0.00	(20.30)

(1) Richland and West Richland's QCWR volume assumed to be zero due to the surplus of each city's existing water rights, instead of each city utilizing a portion of the QCWR for accounting purposes, as has been historically reported and shown in Table 4-3.

In 2035, Kennewick and Richland are projected to have sufficient instantaneous water rights to meet the projected MDDs of their systems. Pasco and West Richland are projected to have 27.60 and 2.70 cfs instantaneous water right deficiencies, respectively. Each city's portion of the initial increment of QCWR is 2.5 cfs per city. With this initial increment allocated to Pasco and West Richland, Pasco is projected to have a 25.10 cfs deficiency and West Richland is projected to have a 0.20 cfs deficiency. The unused 5.0 cfs (2.5 cfs each) from Kennewick and Richland can be credited toward Pasco and West Richland's deficiencies, resulting in West Richland's instantaneous water rights needs being met, and Pasco's instantaneous water right deficiency being reduced to 20.30 cfs, as shown in **Table 4-7**.

## **FUTURE MITIGATION**

When the QCWR was originally issued, the average annual consumptive use estimate was 80 percent. As specified in the 2011 MOA, and supported by the 2008 RWFCP, the consumptive-use estimate used for planning purposes was lowered to 60 percent. **Chapter 3** presents calculations showing the consumptive use by the cities. Based on these calculations, the consumptive use is 47 percent for the cities. The data presented in **Chapter 3** supports continuing to use 60 percent as the average annual consumptive-use rate for mitigation calculations within this RWFCP and over the next 6-year period.

While the previous plan identified a habitat conservation project in the Amon Creek basin, the cities decided that was not a sufficient form of mitigation, and so it has been removed from consideration in this RWFCP update.

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Per the January 2008 Memorandum of Understanding between Ecology and Kennewick, Ecology will obtain funding from the Columbia River Management Program toward Kennewick's ASR project in order to provide additional water storage along the Columbia River to capture water during high-flow periods in the river, and reduce the water need during low-flow periods in order to enhance instream flows for endangered and protected species. State money contributed toward Kennewick's ASR project will also serve to partially mitigate Kennewick's portion of the initial increment (2.5 cfs of the initial 10 cfs) of the QCWR that Ecology is responsible for mitigating. Since the ASR permit has not been finalized yet, this will not be included in the calculations for the next 6-year period.

Ecology provided two mitigation alternatives for the cities to evaluate. The two alternatives reflect differences in how the Buckley and Byerley water rights are accounted for throughout the year. Alternative 1 is the original mitigation alternative presented by Ecology, which uses the Buckley and Byerley monthly breakdown from Appendix A of the MOA (**Appendix E**). Alternative 1 mitigation is presented for the historical mitigation calculations in **Tables 4-1** and **4-2**. Alternative 2 uses the Buckley and Byerley monthly breakdown from a table titled "Amended Appendix A" of the MOA, which was obtained from Ecology on November 15, 2015, and is presented as **Appendix F** of this plan. The mitigation required for each alternative is calculated in the following sections for the 6 and 20-year planning periods.

### Projected 2021 Mitigation

**Tables 4-6** and **4-7** identify the projected 2021 QCWR usage as 8,145 afy (annual) and 9.22 cfs (instantaneous). Although the projected 2021 annual QCWR needs exceed the initial 7,227 afy allotment, 8,145 afy was used to calculate the projected mitigation requirements for conservatism, should additional QCWR be issued.

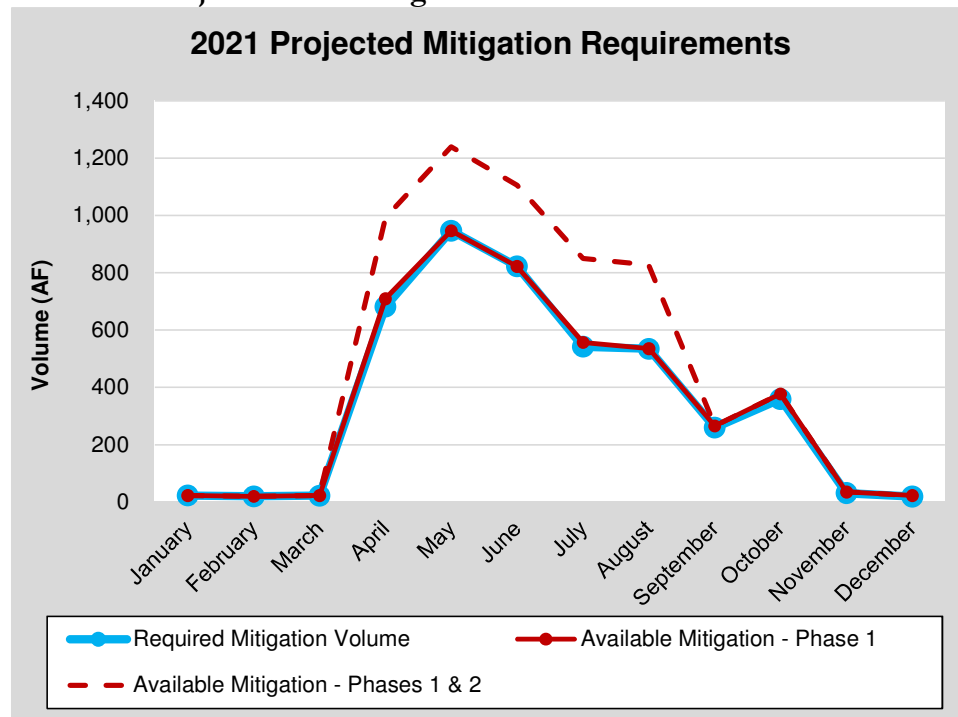
### Projected 2021 Mitigation – Alternative 1 (Original)

The mitigation volume available within Alternative 1 decreases between the spring and fall months. The mitigation required, if 8,145 afy of QCWR is diverted in 2021, is presented in **Table 4-8** and **Chart 4-3**. Buckley and Byerly mitigation volumes are shown in **Table 4-8**, as is the Phase 1 Lake Roosevelt mitigation volume, which does not require payment from the cities. As described previously in this chapter, additional Lake Roosevelt mitigation water is available for purchase by the cities at a rate of \$35 per afy. The additional Lake Roosevelt mitigation volume available for purchase is shown with a dashed line in **Chart 4-3**. The results of the projected 2021 Alternative 1 mitigation calculations indicate sufficient mitigation volume is available in each month if each city's existing annual water rights are allocated strategically to result in nearly-full utilization of the mitigation available each month. Based on the calculations presented in **Table 4-8**, Phase 2 Lake Roosevelt mitigation water will not be required in 2021.

Table 4-8  
Projected 2021 Mitigation Volumes – Alternative 1

Month	Daily Diverted Volume (AF/day)	Daily Return Volume (AF/day)	Daily Volume Difference (AF/day)	Days to be Mitigated	Monthly Required Mitigation Volume (AF)	Phase 1 Mitigation				Mitigation Difference (Available - Required) <sup>1</sup> (AF)
						Buckley (AF)	Byerly (AF)	Lake Roosevelt (AF)	Available Mitigation (AF)	
2021 Projections										
January	4.12	2.52	1.60	14	22.41	0.00	22.47	0.00	22.47	0.06
February	3.46	2.11	1.34	15	20.17	0.00	20.30	0.00	20.30	0.13
March	2.04	1.25	0.79	28	22.21	0.00	22.47	0.00	22.47	0.26
April	39.54	16.83	22.71	30	681.33	187.35	18.40	503.72	709.47	28.14
May	48.62	18.10	30.52	31	946.17	406.95	19.02	520.51	946.48	0.31
June	43.64	16.25	27.40	30	821.96	299.97	18.40	503.72	822.09	0.13
July	27.84	10.36	17.48	31	541.77	21.78	14.63	520.51	556.92	15.15
August	27.48	10.23	17.25	31	534.83	0.00	14.49	520.51	535.00	0.17
September	25.86	9.63	16.24	16	259.80	251.46	14.02	0.00	265.48	5.68
October	39.06	16.63	22.43	16	358.95	355.61	22.22	0.00	377.83	18.88
November	2.94	1.79	1.14	27	30.82	13.46	21.75	0.00	35.21	4.39
December	2.08	1.27	0.81	24	19.44	0.00	22.47	0.00	22.47	3.03
Total					4,259.86				4,336.19	0.00
(1) The total mitigation difference only includes months requiring mitigation in excess of the mitigation available in Phase 1 (i.e. negative values in the mitigation difference column).										

Chart 4-3  
Projected 2021 Mitigation Volumes – Alternative 1



A description of each column in **Table 4-8** is as follows:

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**Daily Diverted Volume** – The calculated average day diversion of QCWR water from the four cities. This volume is calculated for each city, based on the projected QCWR water used by each city to meet the projected monthly supply. For each month in 2021, Kennewick, Richland, and West Richland are projected to not use any QCWR water. Pasco’s projected use of the QCWR water was based on diverting QCWR volumes that result in nearly-full utilization of the mitigation available each month.

**Daily Return Volume** – The calculated daily return volume is based on the product of the monthly QCWR diverted volume and a monthly return flow percentage calculated individually for each city. These monthly return flow percentages are calculated for each season, based on the 2014 supply and return volumes for each city presented in **Chapter 3**, and are shown in **Table 4-9**.

**Table 4-9**  
**Seasonal Return Flow Percentages**

City	Winter	Spring and Fall	Summer
Kennewick	81.5%	53.8%	43.3%
Pasco	61.1%	42.6%	37.2%
Richland	81.3%	36.1%	28.9%
West Richland	78.9%	37.6%	25.7%

(1) Winter months include January, February, March, November, and December.

(2) Spring and Fall months include April and October.

(3) Summer months include May through September.

**Daily Volume Difference** – The calculated difference between the diverted and return volumes.

**Days to be Mitigated** – The number of days requiring mitigation, which is described in the BiOp Compliance Procedures, and is based on the seasonal instream flows at Bonneville (November 1 through April 9) and McNary Dams (April 10 through October 31). The estimated number of days requiring mitigation for the future mitigation calculations was assumed to be the same as the number of days requiring mitigation in 2001, which has been the year with the most mitigation days required since 2000, and is also consistent with the calculations presented in the 2008 RWFCP. As shown in **Table 4-1**, the number of days requiring mitigation between 2011 and 2014 has been much less than was required in 2001.

**Monthly Required Mitigation Volume** – The calculated product of the volume difference and the days to be mitigated columns.

**Buckley, Byerly, and Lake Roosevelt Mitigation** – Volume of water available for mitigation from each source. Includes only Phase 1 of the Lake Roosevelt Mitigation, which requires no monthly or annual payments from the cities.

**Available Mitigation** – Sum of the Buckley, Byerly, and Lake Roosevelt mitigation columns.

**Mitigation Difference** – The calculated difference between the available mitigation and the required mitigation volumes.

### **Projected 2021 Mitigation – Alternative 2 (Amended)**

The mitigation volume available within Alternative 2 is approximately constant throughout the spring and summer months, with less mitigation volume available in the fall months compared to Alternative 1. The total mitigation available for Alternative 2 is approximately 4 afy greater than that

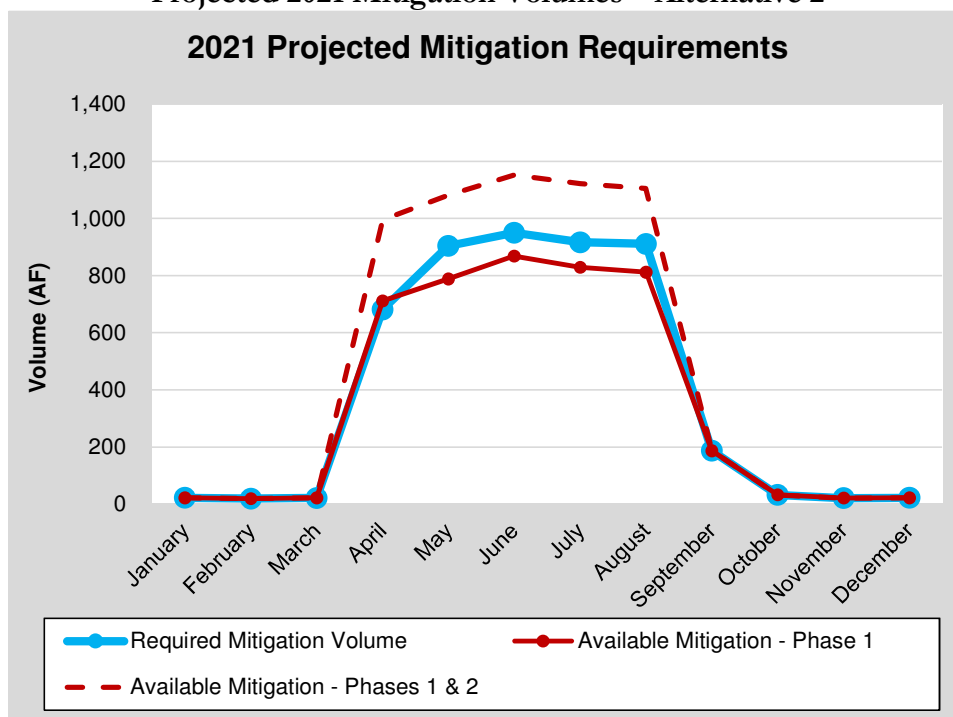


of Alternative 1. The mitigation required for Alternative 2 if 8,145 afy of QCWR is diverted in 2021, is presented in **Table 4-10** and **Chart 4-4**. Buckley and Byerly mitigation volumes are shown in **Table 4-10**, as is the Phase 1 Lake Roosevelt mitigation volume, which does not require payment from the cities. The additional Lake Roosevelt mitigation volume available for purchase is shown with a dashed line in **Chart 4-4**. The results of the projected 2021 Alternative 2 mitigation calculations indicate sufficient Phase 1 mitigation volume is available for January through April, and September through December, but Phase 2 Lake Roosevelt mitigation water is required between May and August. Based on the calculations presented in **Table 4-10**, approximately 383 AF of mitigation volume is required beyond the Buckley, Byerly, and Phase 1 Lake Roosevelt mitigation.

**Table 4-10**  
**Projected 2021 Mitigation Volumes – Alternative 2**

Month	Daily Diverted Volume (AF/day)	Daily Return Volume (AF/day)	Daily Volume Difference (AF/day)	Days to be Mitigated	Monthly Required Mitigation Volume (AF)	Phase 1 Mitigation				Mitigation Difference (Available - Required) <sup>1</sup> (AF)
						Buckley (AF)	Byerly (AF)	Lake Roosevelt (AF)	Available Mitigation (AF)	
2021 Projections										
January	4.12	2.52	1.60	14	22.41	0.00	22.47	0.00	22.47	0.06
February	3.46	2.11	1.34	15	20.17	0.00	20.30	0.00	20.30	0.13
March	2.04	1.25	0.79	28	22.21	0.00	22.47	0.00	22.47	0.26
April	39.54	16.83	22.71	30	681.33	189.54	18.40	503.72	711.66	30.33
May	46.46	17.29	29.16	31	904.11	249.43	19.02	520.51	788.96	-115.15
June	50.41	18.76	31.65	30	949.40	346.61	18.41	503.72	868.74	-80.66
July	47.11	17.54	29.58	31	916.86	293.83	14.63	520.51	828.97	-87.89
August	46.82	17.43	29.39	31	911.19	277.13	14.49	520.51	812.13	-99.06
September	18.63	6.94	11.70	16	187.14	173.25	14.02	0.00	187.27	0.13
October	3.58	1.52	2.05	16	32.87	10.80	22.22	0.00	33.02	0.15
November	2.07	1.27	0.80	27	21.72	0.00	21.75	0.00	21.75	0.03
December	2.41	1.47	0.94	24	22.45	0.00	22.47	0.00	22.47	0.02
Total					4,691.87				4,340.21	-382.76
(1) The total mitigation difference only includes months requiring mitigation in excess of the mitigation available in Phase 1 (i.e., negative values in the mitigation difference column).										

Chart 4-4  
Projected 2021 Mitigation Volumes – Alternative 2



## Projected 2035 Mitigation

Tables 4-6 and 4-7 identify the projected 2035 QCWR usage as 15,383 afy (annual) and 30.30 cfs (instantaneous). Although the projected 2035 annual QCWR needs exceed the initial 7,227 afy allotment, 15,383 afy was used to calculate the projected mitigation requirements for conservatism, should additional QCWR be issued.

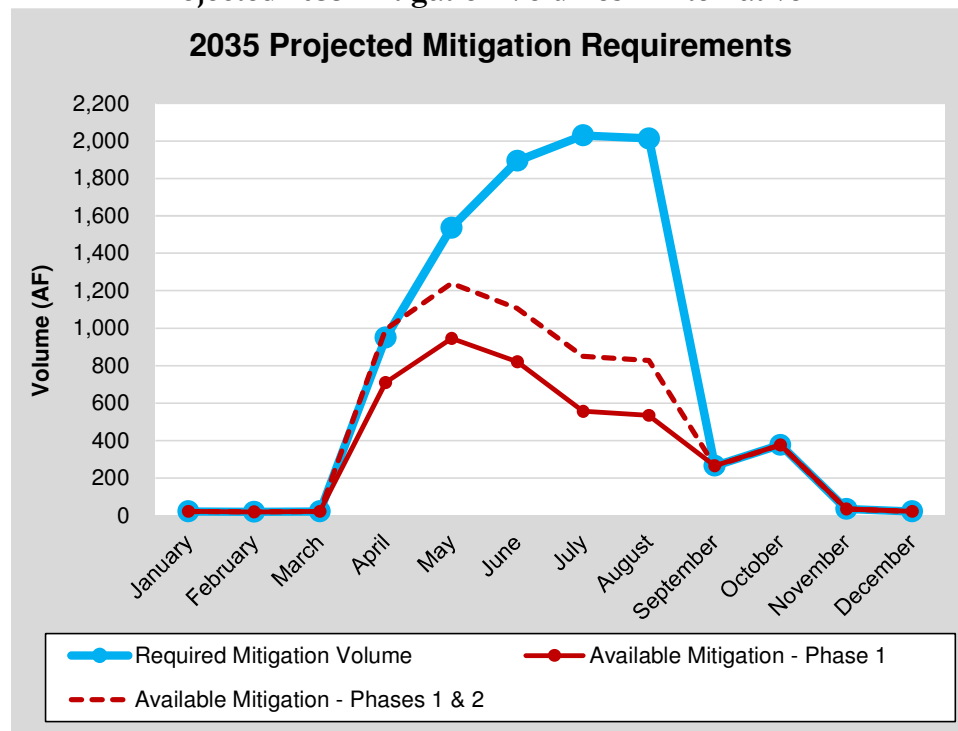
### Projected 2035 Mitigation – Alternative 1 (Original)

The mitigation volume available within Alternative 1 decreases between the spring and fall months. The mitigation required for Alternative 1, if 15,383 afy of QCWR is diverted in 2035, is presented in Table 4-11 and Chart 4-5. A breakdown of the Phase 1 and Phase 2 Lake Roosevelt mitigation volumes is presented in Table 4-11. Similar to the 2021 mitigation calculations described in the previous section, the QCWR diversion volume was calculated for each month to result in nearly-full utilization of the mitigation available each month. Phase 1 mitigation water is sufficient for January through March, and September through December, but Phase 2 Lake Roosevelt mitigation water is required between April and August. The diversion volumes were adjusted to show that the Phase 2 Lake Roosevelt mitigation water is sufficient for April, with exceedances projected for May, June, July, and August. Based on the calculations presented in Table 4-11, approximately 4,853 AF of mitigation volume is required beyond the Buckley, Byerly, and Phase 1 Lake Roosevelt mitigation, and approximately 3,450 AF is required in excess of the Buckley, Byerly, and Phases 1 and 2 Lake Roosevelt mitigation.

Table 4-11  
Projected 2035 Mitigation Volumes – Alternative 1

Month	Daily Diverted Volume (AF/day)	Daily Return Volume (AF/day)	Daily Volume Difference (AF/day)	Days to be Mitigated	Monthly Required Mitigation Volume (AF)	Phase 1 Mitigation					Phases 1 & 2 Mitigation	
						Buckley (AF)	Byerly (AF)	Lake Roosevelt (AF)	Available Mitigation (AF)	Mitigation Difference (Available - Required) <sup>1</sup> (AF)	Available Mitigation (AF)	Mitigation Difference (Available - Required) <sup>1</sup> (AF)
2035 Projections												
January	4.11	2.51	1.60	14	22.38	0.00	22.47	0.00	22.47	0.09	22.47	0.09
February	3.47	2.12	1.35	15	20.21	0.00	20.30	0.00	20.30	0.09	20.30	0.09
March	2.04	1.24	0.79	28	22.16	0.00	22.47	0.00	22.47	0.31	22.47	0.31
April	55.14	23.47	31.67	30	950.03	187.35	18.40	503.72	709.47	-240.56	992.88	42.85
May	76.94	27.36	49.58	31	1,537.07	406.95	19.02	520.51	946.48	-590.59	1,239.33	-297.74
June	98.43	35.32	63.11	30	1,893.30	299.97	18.40	503.72	822.09	-1,071.21	1,105.50	-787.80
July	102.19	36.72	65.47	31	2,029.52	21.78	14.63	520.51	556.92	-1,472.60	849.79	-1,179.73
August	101.40	36.47	64.93	31	2,012.68	0.00	14.49	520.51	535.00	-1,477.68	827.85	-1,184.83
September	26.41	9.83	16.58	16	265.29	251.46	14.02	0.00	265.48	0.19	265.48	0.19
October	41.09	17.49	23.60	16	377.63	355.61	22.22	0.00	377.83	0.20	377.83	0.20
November	3.33	2.04	1.29	27	34.96	13.46	21.75	0.00	35.21	0.25	35.21	0.25
December	2.39	1.46	0.93	24	22.33	0.00	22.47	0.00	22.47	0.14	22.47	0.14
Total					9,187.53				4,336.19	-4,852.63	5,781.58	-3,450.10
(1) The total mitigation difference only includes months requiring mitigation in excess of the mitigation available in Phase 1 (i.e., negative values in the mitigation difference column).												

Chart 4-5  
Projected 2035 Mitigation Volumes – Alternative 1



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### Projected 2035 Mitigation – Alternative 2 (Amended)

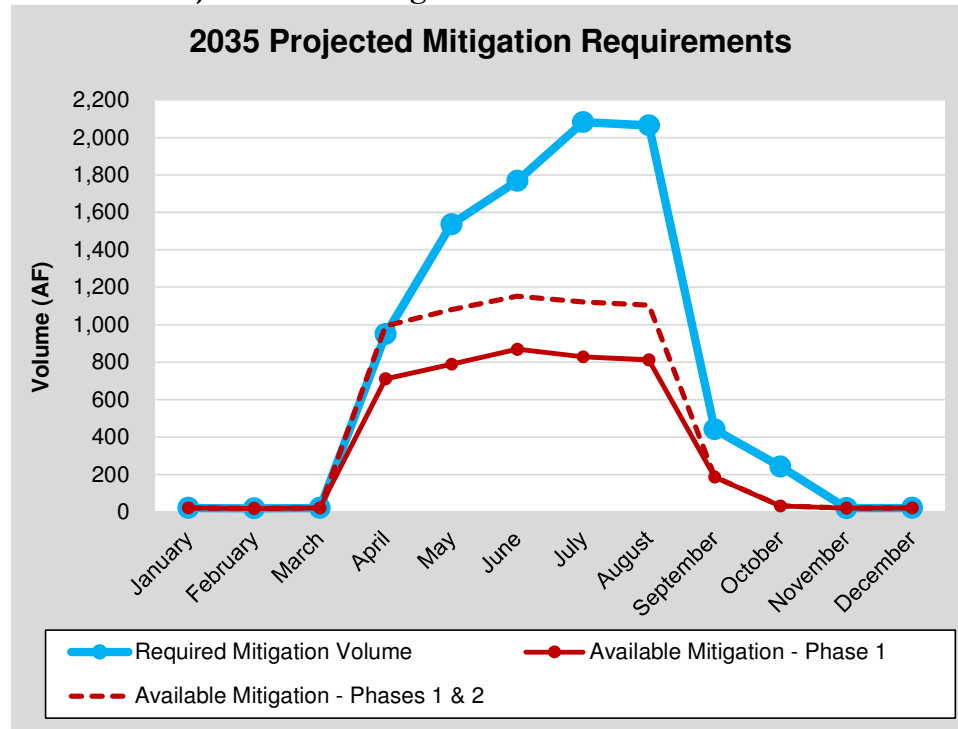
The mitigation volume available within Alternative 2 is approximately constant throughout the spring and summer months, with less mitigation volume available in the fall months compared to Alternative 1. The total mitigation available for Alternative 2 is approximately 4 afy greater than that of Alternative 1. The mitigation required for Alternative 2, if 15,383 afy of QCWR is diverted in 2035, is presented in **Table 4-12** and **Chart 4-6**. Similar to the other mitigation calculations described in previous sections, the QCWR diversion volume was calculated for each month to result in nearly-full utilization of the mitigation available each month. Phase 1 mitigation water is sufficient for January through March, and November and December, but Phase 2 Lake Roosevelt mitigation water is required between April and August. The diversion volumes were adjusted to show that the Phase 2 Lake Roosevelt mitigation water is sufficient for April, with exceedances projected between May and October. Based on the calculations presented in **Table 4-12**, approximately 4,855 AF of mitigation volume is required beyond the Buckley, Byerly, and Phase 1 Lake Roosevelt mitigation, and approximately 3,454 AF is required in excess of the Buckley, Byerly, and Phases 1 and 2 Lake Roosevelt mitigation. The annual Alternative 2 mitigation volume exceedances are approximately equivalent to those presented for mitigation Alternative 1.

**Table 4-12**  
**Projected 2035 Mitigation Volumes – Alternative 2**

Month	Daily Diverted Volume (AF/day)	Daily Return Volume (AF/day)	Daily Volume Difference (AF/day)	Days to be Mitigated	Monthly Required Mitigation Volume (AF)	Phase 1 Mitigation					Phases 1 & 2 Mitigation	
						Buckley (AF)	Byerly (AF)	Lake Roosevelt (AF)	Available Mitigation (AF)	Mitigation Difference (Available - Required) <sup>1</sup> (AF)	Available Mitigation (AF)	Mitigation Difference (Available - Required) <sup>1</sup> (AF)
2035 Projections												
January	4.11	2.51	1.60	14	22.38	0.00	22.47	0.00	22.47	0.09	22.47	0.09
February	3.47	2.12	1.35	15	20.21	0.00	20.30	0.00	20.30	0.09	20.30	0.09
March	2.04	1.24	0.79	28	22.16	0.00	22.47	0.00	22.47	0.31	22.47	0.31
April	55.14	23.47	31.67	30	950.03	189.54	18.40	503.72	711.66	-238.37	995.07	45.04
May	76.94	27.36	49.58	31	1,537.07	249.43	19.02	520.51	788.96	-748.11	1,081.81	-455.26
June	91.76	32.84	58.92	30	1,767.75	346.61	18.41	503.72	868.74	-899.01	1,152.15	-615.60
July	104.85	37.71	67.14	31	2,081.31	293.83	14.63	520.51	828.97	-1,252.34	1,121.84	-959.47
August	104.06	37.46	66.60	31	2,064.47	277.13	14.49	520.51	812.13	-1,252.34	1,104.98	-959.49
September	44.01	16.38	27.63	16	442.07	173.25	14.02	0.00	187.27	-254.80	187.27	-254.80
October	26.42	11.24	15.17	16	242.75	10.80	22.22	0.00	33.02	-209.73	33.02	-209.73
November	2.06	1.26	0.80	27	21.66	0.00	21.75	0.00	21.75	0.09	21.75	0.09
December	2.39	1.46	0.93	24	22.33	0.00	22.47	0.00	22.47	0.14	22.47	0.14
Total					9,194.17				4,340.21	-4,854.69	5,785.60	-3,454.34

(1) The total mitigation difference only includes months requiring mitigation in excess of the mitigation available in Phase 1 (i.e., negative values in the mitigation difference column).

**Chart 4-6**  
**Projected 2035 Mitigation Volumes – Alternative 2**



## BIOP COMPLIANCE PLAN

The cities have been making calculations consistent with those provided in the BiOp Compliance Plan, which was Appendix G of the 2008 RWFCP update. There are a few revisions to the BiOp Compliance Plan in this RWFCP update, to allow the plan to better match how the calculations were actually being made, and those are specifically called-out here (**Appendix D**).

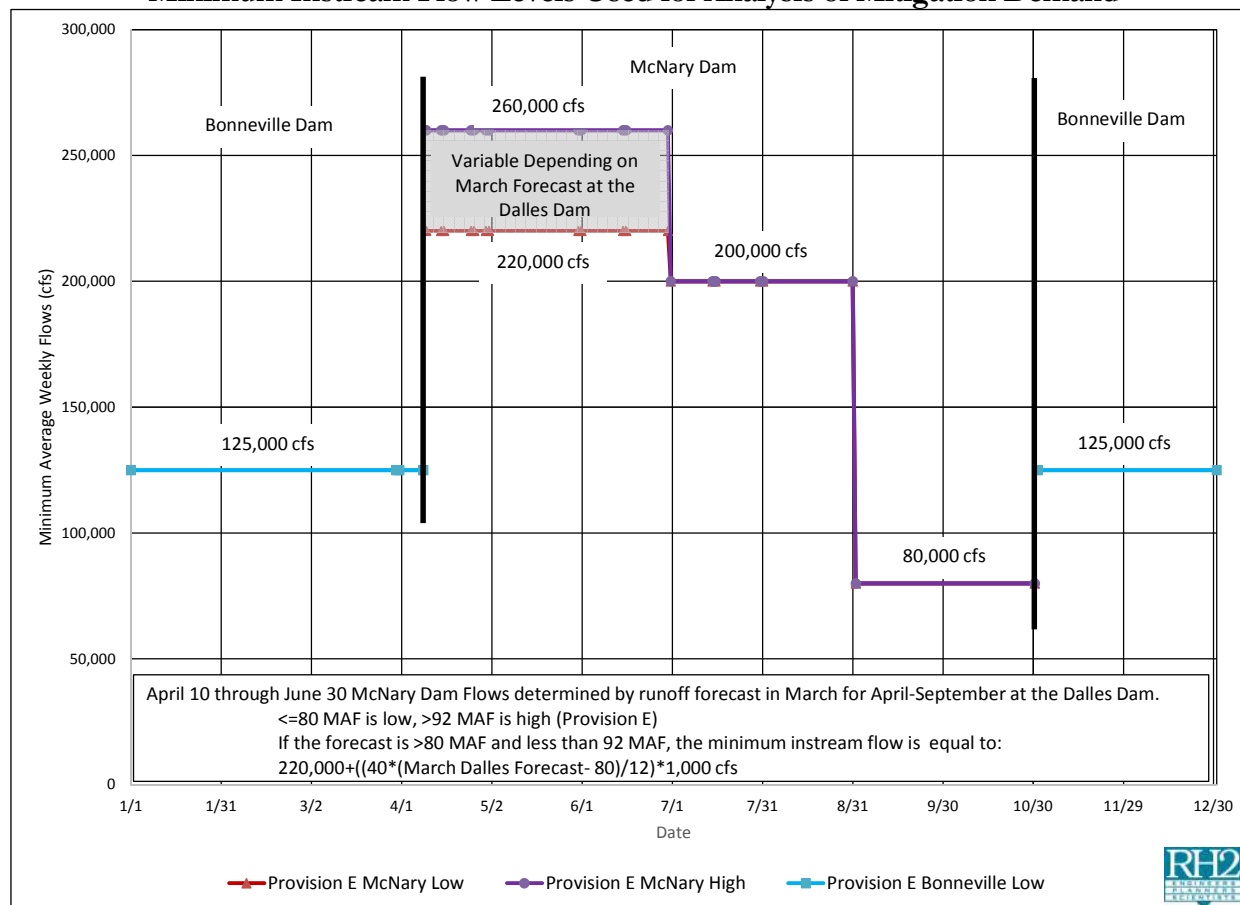
First, the older plan stated that “The trigger for this procedure shall be an early March forecast of Columbia River in-stream flow at the Dalles Dam of less than sixty (60) million acre feet.” This language is similar to the language contained in WAC 173-563-056, which identifies the trigger for when interruptible water rights issued under the Instream Resources Protection Program for the Main Stem Columbia River in Washington State were to be regulated, based on the actual flow of the river compared to the minimum instream flows. However, the instream flow provision on the QCWR is different from the minimum instream flow provision in Chapter 173-563 WAC. The minimum instream flows specified in the QCWR are in effect every day of the year, regardless of the early March forecast. Therefore, that language has been removed from the BiOp Compliance Plan.

Second, in the QCWR, the minimum instream flows specified for the period of November 1 through April 9 is specified as follows: “Between November 1 and April 9, the minimum flow measured at Bonneville Dam will range from 125,000 to 160,000 cfs, with the specific flow objective to be set by the FCRPS Technical Management Team every two weeks during that period.” Ms. Nancy Aldrich, City of Richland, indicated that the Federal Columbia River Power System (FCRPS) Technical Management Team does not actively meet and set specific flow objectives for the period of

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November 1 through April 9, as envisioned in the QCWR permit provision. In the absence of variable flow recommendations from this group, the cities have been using a consistent minimum instream flow of 125,000 cfs during this period. The minimum instream flow levels that have been used throughout the year are displayed graphically in **Chart 4-7**.

**Chart 4-7**  
**Minimum Instream Flow Levels Used for Analysis of Mitigation Demand**



Using the updated BiOp Compliance Plan (**Appendix D**), the cities have demonstrated, in **Table 4-1** and **Chart 4-1**, that the mitigation for Phase 1 has adequately mitigated the cities' consumptive use under the QCWR since 2012. The only years in which the mitigation was insufficient were those years prior to Ecology fulfilling its obligation to provide the full mitigation for the first phase of the allocation.

The BiOp Compliance Plan was also used to project forward and determine if the existing mitigation would be sufficient to mitigate if the actual stream flows were consistent with those observed during 2001, during which the Columbia River experienced the lowest flows in recent years. **Tables 4-8** and **4-10**, and **Charts 4-3** and **4-4** summarize the results for year 2021, and **Tables 4-11** and **4-12**, and **Charts 4-5** and **4-6** summarize the results for year 2035.

## **REQUEST FOR ADDITIONAL AUTHORIZATION UNDER QCWR**

Based on the analysis and justification provided in this report, the cities would like to make the following requests to Ecology:

1. Alteration of the instantaneous rate allowed under Phase 1.

The Phase 1 municipal allocation under the QCWR was 10 cfs and 7,227 afy. This allocation is very close to being equal to the instantaneous rate diverted continuously over the entire year to equal the annual volume. This allocation represents a baseload supply, which does not match the actual use of water by the cities and does not allow the cities to pump at a high enough rate to fully utilize the mitigation secured by Ecology for Phase 1. For the month of May, Ecology secured 946.48 AF of mitigation water under Phase 1. Assuming each city is using its share of the QCWR, the combined measured consumptive use for the cities during that month is 66 percent (**Table 4-9**). That means that for this month, the mitigation water would support municipal diversion of 1,434 AF. In order to be able to divert 1,434 AF for municipal supply during the month of May, the cities will need to divert water under the QCWR at a constant rate of 23.3 cfs for that month.

**The cities request that Ecology issue an additional 13.3 cfs under Phase 2, to make the combined municipal water right equal to 23.3 cfs and 7,227 afy to match the mitigation that was obtained by Ecology for the first phase of development.**

2. Within the next six years, the City of Pasco is projected to use more municipal water rights than was allocated to all of the cities under Phase 1 of the QCWR.

Pasco has requested a new individual water right from the Lake Roosevelt Incremental Storage Release Program. Based on the facts that water is still available to be allocated from this program, and the city has an identified immediate and future need, it is assumed that this water right will be granted. Granting of this water right, making sure that appropriate instantaneous rate and annual volume are authorized, will allow the cities to continue to equally share and use Phase 1 of the QCWR through the next six-year period.

**The cities request that Ecology process the individual water right, split out from application S4-33044, for the City of Pasco.**

3. Identification of a future mitigation alternative.

Based on the projected 2021 mitigation requirements, no Phase 2 mitigation is required within mitigation Alternative 1, whereas 383 AF is required within mitigation Alternative 2. Based on the projected 2035 mitigation requirements, 3,450 AF of Phases 1 and 2 mitigation is required for Alternative 1, and 3,454 AF of Phases 1 and 2 mitigation is required for Alternative 2. Although mitigation Alternative 2 provides 4 afy of additional mitigation volume, the monthly Phase 1 mitigation allotments of Alternative 1 are sufficient through 2021.

**The cities request that mitigation Alternative 1 (presented as Appendix E of this study and consistent with the 2011 MOA) be utilized for future mitigation.**

4. Recalculation of the level of mitigation needed for Phase 1 and future phases.

Based on the BiOp Compliance Plan, approved in the 2008 RWFCP, the cities plan for the future by looking at the days that flows were not met during the 2001 drought year. In that year, target flows



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were not met on 293 out of 365 days, or 80 percent of the year. The months where mitigation is only required on some of the days include January (14 days), February (15 days), March (28 days), September (16 days), October (16 days), November (27 days), and December (24 days). This means that to mitigate the consumptive use when target flows are not met, mitigation is only needed for 80 percent of the water diverted if it is diverted equally year round. So, while diverting 7,227 afy for municipal supply, the actual volume of diverted water that will be subject to mitigation could be approximately 5,782 afy, although this number is variable depending on when the water is diverted throughout the year because of monthly return flow variations and days per month requiring mitigation. An average 60 percent of that volume is equal to a total-needed Phase 1 mitigation volume of 3,469 afy. This volume is less than the 4,336.2 afy described in the 2011 MOA, due to the fact that it is not anticipated that mitigation will be needed on more than 80 percent of the days and that the actual calculated average consumptive use is less than 60 percent. If this level of mitigation certainty is approved, that would mean that a total of 2,312.6 afy of Lake Roosevelt mitigation water that has been reserved by Ecology for the cities would be available to the cities to mitigate future phases of the municipal allocation, and the cities would be responsible for covering the cost of the Lake Roosevelt water in Phase 2 and beyond.

If this recalculation of mitigation volume needed is not approved, then the cities will cease to use the 2001 flow data in their forecasts and will be forced to assume that mitigation will be required every day that the QCWR is used in the future. The BiOp Compliance Plan (**Appendix D**) will no longer be necessary.

**The cities request that Ecology consider planning to mitigate 80 percent of the time (consistent with the 2001 flow data and BiOp compliance plan) is deemed sufficient, and 2,312.6 afy of Lake Roosevelt mitigation water is considered to be reserved for use by the cities for mitigation of future phases of the QCWR.**

5. Phase 2 of the QCWR mitigated by previously reserved Lake Roosevelt mitigation water.

This request is based on the outcome of the above requests.

**If Pasco is able to obtain new individual water rights of sufficient rate and volume such that its 2021 demand is satisfied by its existing rights, the new water right, and its portion of Phase 1 of the QCWR, then the cities will only need to request the additional additive instantaneous rate under Phase 2 of the QCWR, as discussed under request 1 above, at this time (Table 4-13).**

**If Pasco is unable to acquire additional individual water rights, then the cities will need an annual volume allocation under Phase 2 to meet their 2021 demand, as identified in Table 4-14.** Ecology's response to request 4, above, will alter the amount of water necessary to mitigate Phase 1. However, since the Lake Roosevelt mitigation water is only utilized in April through August, which require mitigation on every day (per the 2001 instream flow data), the same volume of mitigation water is requested for Phase 2, regardless if either 80 percent or 100 percent mitigation is required. When Phase 2 is issued, the cities consider that the municipal combined instantaneous rate of the two phases (26.4 cfs) can be utilized to divert the combined annual volume of the two phases (8,145 afy).

**Table 4-13**  
**Phase 2 QCWR Request for 2021 if Pasco Does Get a New Water Right**

Phase	Municipal Supply		Mitigation if 80 percent accepted			Mitigation if 100 percent required		
	Instantaneous Rate	Annual Volume	Byerly and Buckley	Lake Roosevelt	Total	Byerly and Buckley	Lake Roosevelt	Total
	(cfs)	(afy)	(afy)	(afy)	(afy)	(afy)	(afy)	(afy)
1	10.0	7,227	1,767.23	1,701.73	3,468.96	1,767.23	2,568.97	4,336.20
2 (2021)	13.3	0	0.00	0.00	0.00	0.00	0.00	0.00
Total	23.3	7,227	1,767.23	1,701.73	3,468.96	1,767.23	2,568.97	4,336.20
Remaining mitigation water								
				2,312.64		1,445.40		
Assumes that the additional instantaneous rate needed to perfect the Phase 1 annual volume is provided under Phase 2.								
Phase 2 (2021) represents the water associated with the forecast demand through the next 6 years, which is through 2021.								

**Table 4-14**  
**Phase 2 QCWR Request for 2021 if Pasco Does Not Get a New Water Right**

Phase	Municipal Supply		Mitigation if 80 percent accepted			Mitigation if 100 percent required		
	Instantaneous Rate	Annual Volume	Byerly and Buckley	Lake Roosevelt	Total	Byerly and Buckley	Lake Roosevelt	Total
	(cfs)	(afy)	(afy)	(afy)	(afy)	(afy)	(afy)	(afy)
1	10.0	7,227	1,767.23	1,701.73	3,468.96	1,767.23	2,568.97	4,336.20
2 (2021)	16.4	918	0.00	605.88	605.88	0.00	605.88	605.88
Total	26.4	8,145	1,767.23	2,307.61	4,074.84	1,767.23	3,174.85	4,942.08
Remaining mitigation water								
				1,706.76		839.52		
Instantaneous rate under Phase 2 sufficient to divert Phase 1 and 2 annual volume, given mitigation available.								
Phase 2 (2021) represents the water associated with the forecast demand through the next 6 years, which is through 2021.								
Lake Roosevelt mitigation water is used in the summer months when consumptive use is approximately 66 percent.								



## **APPENDIX 3-B**

### **WATER USE EFFICIENCY PROGRAM**

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#### **Introduction**

This report presents the City of Pasco's (City) Water Use Efficiency (WUE) Program applicable for the next six years. In 2003, the Washington State Legislature passed the Municipal Water Supply – Efficiency Requirements Act, otherwise known as the Municipal Water Law. The Washington State Department of Health (WDOH) was directed to oversee and enforce a WUE Program. As a result WDOH adopted the water use efficiency rule, which became effective in January of 2007. Under the rule utilities are required to develop a WUE Program for approval of comprehensive water system plans and for issuance of water right permits.

The water use efficiency rule requires water suppliers to:

- Establish water saving goals through a public process
- Install service meters within 10 years
- Meet a distribution system leakage standard of 10 percent
- Develop a WUE program
- Evaluate or implement WUE measures to manage water use
- Report annually, by July 1, on progress towards meeting goals and using water efficiently

The Quad City Water Right (QCWR), utilized by the City of Pasco to meet service area demand, also requires the cities of Pasco, Kennewick, Richland, and West Richland to create a Regional Water Forecast and Conservation Plan (RWFCP). In January 2016 the latest edition of the RWFCP was finalized. The RWFCP also addresses water use and conservation in the City of Pasco.

The City is committed to ensuring its water resources are used efficiently to protect and preserve the community's high quality of life for current residents and generations to come. In keeping with this commitment, the City employs a comprehensive approach to water use efficiency that combines water system design, engineering, and operations with community education and outreach. The City's WUE Program activities affect thousands of its water utility customers annually. The program engages incentives that encourage wise water use and utilizes technologies and processes associated with City activities to improve water savings.

#### **Water Supply Characteristics**

The City water system is supplied from surface water withdrawals from the McNary Pool of the Columbia River. The City's water rights are not sufficient to meet existing water demands, as a result the City relies on the QCWR to provide additional water rights to meet the water system's demands. The City continues to maximize the use of their individual

water rights in order to minimize use of the QCWR and the impact on the Columbia River instream flows.

Two surface water treatment plants that serve the City, the Butterfield Water Treatment Plant (26.8 mgd) and the West Pasco Water Treatment Plant (6 mgd). Two high service pump stations supply the water system from these treatment plants.

The water system is divided into three major Pressure Zones, and includes four booster stations. The existing distribution system consists of approximately 326 miles of water main ranging in size from less than 6 inches in diameter up to 36 inches in diameter. The majority of the pipelines are ductile iron.

Three water storage reservoirs are located throughout the service area in addition to the 0.485 million gallon clearwell at the Butterfield Water Treatment Plant and the 1.62 million gallon clearwell at the West Pasco Water Treatment Plant.

Potable water is used for irrigation by City's customers in areas without separate irrigation systems. This WUE addresses domestic and irrigation water conservation for the City's potable water system. As part of the City's proactive approach to management and conservation of water a City of Pasco, Washington Water Resources Management Plan was developed in 2014 addressing water use efficiency for the separate irrigation. For more information on the water supply characteristics see Section 1 of the City of Pasco's 2018 Comprehensive Water System Plan.

### **Current WUE Program Description**

The City adopted its existing water use efficiency goals and measures, which were established through a public process by the Pasco City Council in Resolution 3060 in January 2008. Water use efficiency plan development and demand forecasting was developed as part of the 2008 RWFCP and the City of Pasco's 2009 Comprehensive Water System Plan. Information from those documents is presented in this WUE plan to provide a concise WUE report in compliance with the requirements of WDOH. The 2008 goals and measures established include the following:

#### ***2008 Goals***

- A residential retrofit program to provide the public with low flow shower heads, toilet tank displacement bags, leak detection tablets, and other water use efficiency measures
- Perform a water audit program for large water users by December 31, 2010
- Perform water use efficiency education in the Pasco School District
- Reach a goal of 12 percent or less distribution system leakage by December 31, 2010

- Reduce outdoor water use for domestic users by 2 to 3 percent by December 31, 2010
- Promote public education through the annual consumer confidence report, customer bills statements, and other education materials
- Ensure water sources are accurately monitored by December 31, 2010

### ***2008 Selected Measures***

- Leak detection and repair for water distribution system pipelines
- Source meter testing and repair
- Large meter testing and repair
- Residential meter testing, repair, and replacement on an on-going schedule recommended by manufacturer
- Residential retrofit measures continued since 2001
- Water audit for large water users by December 31, 2010
- Water curtailment plan supported by Municipal Code. Pasco has the right to give preference to certain customers and limit irrigation usage in the event of an emergency.
- Public and school education accomplished through informative websites, brochures, school outreach, and water consumption history on water bills

Distribution System Leakage (DSL) is defined water usage that is not authorized. Water production, authorized usage, and total usage are used to calculate non-authorized usage. Although the distribution system is fully metered some authorized uses must be estimated to calculate DSL. Examples of authorized usage that is not metered may include fire-fighting, hydrant testing or flushing, and construction use. Under estimates made by the City of these non-metered authorized uses may contribute to a higher calculated DSL. Over-estimates of non-metered authorized usage may result in under-estimates of DSL. **Table 3-B-1** provides historical estimated DSL from 2008 to 2014. These values are based on the City's Total Net Water provided to the distribution system from sources, and total authorized consumption. **Table 3-B-1** shows that DSL in the City is decreasing and small, calculated negative leakage values are thought to primarily represent the error involved in estimating authorized non-metered consumption. DSL is below the 10 percent threshold that would make a water loss control plan mandatory. The average DSL from 2009 to 2014 excluding negative values was approximately 2.1 percent. The 2014 DSL was nearly zero.

**Table 3-B-1**  
**City of Pasco Estimate of Distribution System Leakage (DSL)**

<b>Year</b>	<b>Total Raw Water (MG)</b>	<b>Total Authorized Consumption (MG)</b>	<b>Percent Distribution System Leakage</b>
2009	4,432	4,235	4.44%
2010	4,338	4,249	2.06%
2011	4,314	4,488	-4.03%
2012	5,061	4,984	1.52%
2013	4,268	4,247	0.49%
2014	4,416	4,439	-0.52%

As shown in **Table 3-B-2**, the year to year change in annual average per capital water demand has been variable since 2008. From 2009 to 2014 the average annual DSL was approximately 2.1 percent. The calculated negative DSL in 2011 and 2014 serve as evidence that some error exists in each year's estimate, however DSL is overall considered to be small. 2014 DSL is considered to be insignificant.

**Table 3-B-2**  
**City of Pasco Per-Capita Water Demand (2008-2014)**

<b>Year</b>	<b>Estimated Population Served</b>	<b>Annual Average Per-Capita Demand (gpcd) <sup>a</sup></b>	<b>Change Average Annual in Demand</b>
2008	54,855	211	-
2009	57,385	212	0.5%
2010	59,800	199	-6.1%
2011	62,500	189	-4.8%
2012	65,300	212	12.3%
2013	67,000	175	-17.8%
2014	70,770	171	-2%
<b>Average (2010-2014)</b>		<b>197</b>	<b>-3.7%</b>

<sup>a</sup> Based on Total Net Water: Total Raw Water minus the Butterfield Water Treatment Plant filter backwash



**Table 3-B-3** provides estimated historical water demand with and without the implementation of the water use efficiency measures.

**Table 3-B-3**  
**City of Pasco Demands with and without Water use Efficiency Measures (last 6 years)**

<b>Year</b>	<b>Estimated Population Served</b>	<b>Average Day Demand Without Conservation (mgd)<sup>1</sup></b>	<b>Average Day Demand With Conservation (mgd)<sup>2</sup></b>	<b>Water Savings (mgd)</b>
2008	54,855		11.5	
2009	57,385	12.2	12.1	0.09
2010	59,800	12.7	11.9	0.80
2011	62,500	12.3	11.8	1.47
2012	65,300	13.9	13.9	-0.03
2013	67,000	14.2	11.7	2.53
2014	70,770	15.0	12.1	2.93

<sup>1</sup> Based on 2009 annual average per capita demand of 212 gallons per capita day.

<sup>2</sup> Based on actual annual average gpcd water use with applied efficiency measures as shown in Table 3-5

As indicated in Section 3 of the Comprehensive Water System Plan, the impact of City' separate irrigation on calculated per capita demand isn't well defined at this time. Data collection efforts as recommended and described in Section 3 will improve the per capita data.

### **Updated Water Use Efficiency Goals**

The City is planning to adopt the following updated water use efficiency goals and measures, which will be established through a public process by the Pasco City Council when the 2018 Comprehensive Water System Plan is approved. These goals and measures replace those defined in the previous Pasco City Council Resolution 3060, January 2008. The goals and measures to be established include the following:

#### ***Updated Goals***

- Supply-side goals
  - Maintain a DSL at 8 percent or less on an annual basis
  - Update the integrated water shortage and drought response plan by 2020
  - Continue with regular water meter replacement program
  - Implement installation of "Smart Meters"
- Demand-side Goals
  - Maintain average demand per ERU at 470 gpd per ERU, excluding DSL through 2022

- Update large water user water audit program by December 31, 2020
- Encourage the utilization of xeriscaping and specialized turf seed mixes to lower irrigation water consumption
- Continue to offer Pasco residents retrofit kits that include low flow shower heads, toilet tank replacement bags, leak detection tablets, and other water use efficiency measures. The City will phase out this residential retrofit program before the next planning cycle as the City is close to reaching saturation of its target audience.
- Continue to perform WUE education in the Pasco School District
- Continue to promote public education on conservation through annual consumer confidence reports, customer billing statements, and other educational materials.

The City anticipates that the implementation of these conservation goals will maintain the level of water use efficiency currently demonstrated throughout the system. During the next update of the Water System Comprehensive Plan and the Regional Water Forecast and Conservation Plan, the impact of both the regional conservation goals and those adopted by the City can be further evaluated.

**Table 3-B-4** presents the City Equivalent Residential Unit (ERU) demand. This table provides support for development of the demand side goal to maintain average demand per ERU at 470 gpd per ERU, excluding DSL through 2020. The table shows that the calculated ERU usage from 2008 to 2014 has been decreasing from 486 gallons per day (gpd) to 409 gpd.

**Table 3-B-4**  
**City of Pasco Residential and Non-Residential ERUs**

Year	Population	Residential			Non-Residential	
		Total Residential Annual Volume (MG)	Residential Connections	ERU <sup>1</sup> (gallons per day per residential connection)	Total Annual Volume (MG)	Number of ERUs
2008	54,855	2,509	14,155	486	1,406	7,933
2009	57,385	2,552	14,561	480	1,509	8,608
2010	59,800	2,529	15,300	453	1,516	9,172
2011	62,500	2,536	15,868	438	1,781	11,143
2012	65,300	2,459	16,104	418	2,523	16,522
2013	67,000	2,570	16,414	429	1,673	10,686
2014	70,770	2,484	16,634	409	1,952	13,071
<b>Average ERU<sup>2</sup> (2011-2014):</b>				<b>424 gallons per residential connection</b>		

*1 ERU calculated as Residential Annual Volume per residential connection.*

*2 Based on last 4 year due to the decreasing ERU tendency, potentially the result of Water Use Efficiency measures*

## Updated Water Use Efficiency Measures

As part of the City's WUE Program the following measures have been implemented or evaluated. The efficiency measures focus both on supply side and demand side efficiency measures.

### *Mandatory Measures*

To meet the state WUE requirements there are several mandatory measures. Some of these measures are mandatory to implement, some are mandatory to evaluate. For measures that are only mandatory to evaluate, implementation may be used as a selected additional measure. The following is a summary of mandatory measures, and what the City is doing to meet them.

- Implement Installation of Source Meters: The WTP supply pumps have flow meters to totalize system supply from each of the City's water sources.
- Implement Installation of Service Meters: The City is fully metered for domestic water use.
- Implement Calibration of Meters: The City does testing and repair or replacement on service meters on an on-going schedule consistent with manufacturer recommendations. The City repairs or replaces small meters on a recurring 10-year schedule. The City has only 14 large meters greater than or equal to 6 inches. All have been tested. The City of Pasco intends to test and replace large meters according to the manufacturer's recommendations. The City is also testing all source meters to ensure that they meet the manufacturer's recommendations.
- Implement a Water Loss Control Plan if DSL is Over 10 percent: The 7-year period average distribution leakage for the City of Pasco's system is currently estimated to be in the range of near zero to 0.7 percent, which is below the 10 percent threshold. **With DSL below 10 percent, implementation of a water loss control plan is not mandatory**, however a leak repair and replacement program is currently in place.
- Implement Water Use Efficiency Education: Educate customers about water use efficiency at least once per year. Public education is a component of the regional and individual water conservation plans in the Quad Cities area. In 2007, the Quad Cities signed a memorandum of understanding (MOU) with the Benton-Franklin Health District ("District") to develop and implement a water conservation public education and outreach program for the Quad Cities. When their funding stopped, an agreement was made with the Franklin Conservation District for the school education and outreach administered by the City of Kennewick. The Quad Cities partnered with the District because the District currently conducts water quality education within all of Benton and Franklin Counties. The Quad Cities and the District will promote conservation through an annual regional water conservation media campaign which explains the importance of conservation and provides examples of easy ways to

conserve. The campaign will include a mix of media types, such as radio, T.V., print, web, billing stuffers, and press releases, and will focus on water wise irrigation and, therefore, will be implemented during the irrigation season. Further information on the components of the partnership program, and a copy of the MOU, can be found in the 2008 RWFCP.

- Evaluate a Rate Structure that Encourages WUE: The current rate structure for the City can be found in **Section 8, Table 8-2**. This is a uniform rate structure which charges the same price per unit of water used. This rate structure does directly link water supplied to cost of service since users pay for what they use. The City recently completed a Water, Sewer, Stormwater, and Irrigation Rate Study in 2015. The rate study recommended a rate increase of 5% to fund operations, capital, and reserves through 2021. The City has considered an inclining block water rate structure and as part of the initial evaluation the City looked at the impact to the different customer classes to avoid cost-of-service inequities. Concerns were risen due to the large industrial demand within the City related to the food processors which have a relatively constant demand. Increasing the cost on these customers will not directly lead to reduction in water demand without development of a more efficient process. Thus this rate would be focused primary on the residential customer and encouraging more efficient use of water during peak demand periods. Therefore, at this time the City's elected officials have chosen to not pursue further under the current economic climate. Additionally, the City is concerned about the potential volatility of revenue due to an inclining block rate structure and the need for a rate stabilization fund.
- Evaluate Reclamation Opportunities: The City has both evaluated and implemented recycle and reuse opportunities. Currently, reuse water from food processors is being used for direct irrigation on City owned farm circles at the Process Water Reuse Facility.

### ***Additional Selected Measures***

The City needs to implement or evaluate a minimum of nine additional water use efficiency measures that support their goals. Based on the City's records, it currently has low usage and low DSL so the identified measures are selected to conservatively maintain the City's current WUE performance. Some of these measures were defined in Resolution 3060 which was adopted by the City in January 2008 and have been selected for implementation again in the next cycle. The following list of measures has been implemented or evaluated.

- Utility Financed Retrofit (Residential, Commercial, Multi-Family): The Residential Appliance Efficiency Program was conducted by the Franklin County PUD in cooperation with the Bonneville Power Administration. The City fully supported the program and encouraged users to participate in the showerhead and faucet aerator replacement. The Franklin County PUD program was completed in 1996. The City then started a similar program in 2001.

Since 2009, over 5,200 retrofit devices or leak detection tablet kits have been distributed to the City's customers. These may include low flow showerhead inserts, kitchen or bathroom faucet aerators, toilet tank displacement bags, or leak detection tablet dye kits. The retrofit program is supported by its inclusion in this WUE Program. The program is also a requirement of the QCWR.

- Water Audits for Commercial Customers: The City completed all water audits for large water users by April 2008. In 2020, the City will begin the cycle of water audits of large water users again.
- Public Education: The City changed their billing format in September 2000 from a postcard bill to a full sheet invoice. This new format shows consumptive history and allows the City to use "bill stuffers" for education on water use efficiency measures with each billing cycle. Between 2009 and 2014, Pasco has included a water conservation brochure. Water conservation information was included in the City Crier. Information was distributed from booths at the Home and Garden Show in 2012, 2013 and 2014, and at the Benton-Franklin County Fair in August 2009.
- Outdoor Water Efficiency (Residential, Multi-Family, Commercial): The City is planning through specific education related to irrigation efficiency to assist customers in learning best practices to improve outdoor water use efficiency. This could be considered by highlighting the value of soil moisture or rain shutoff devices that provide feedback to the automated irrigation system to reduce over watering of green areas. Additionally, the City may consider an ordinance for outdoor summer watering restrictions. This would limit the use of water during the heat of the day when most water that is applied for irrigation is wasted through evaporation.
- Implement On-going Pipeline Replacement and Leak Detection: Because the City's DSL is below the 10 percent threshold, implementation of a water loss control program is not mandatory, however an ongoing leak detection and pipeline replacement program is in place. The leak detection program was initiated in 1998. The average leak found was 0.25 gpm. Identified leaks were scheduled for repair using funds from the annual Miscellaneous Water Improvements budget item of \$80,000 per year. In 1995 the City implemented a water pipeline replacement program to replace leaking pipelines. All known pipelines leaking due to corrosion have been replaced. The City has replaced 95 percent of all known A/C pipeline. Factors that may contribute to the existing DSL, include estimates of non-metered authorized use that are used to calculate DSL. These uses may include water used for fighting fires, water meter inaccuracies and water used for construction purposes. To further improve the accuracy of the overall water budget and future estimates of DSL, improved accounting or metering of these unbilled uses recommended whenever possible.
- Implement Reclamation Opportunities: The City has been an active participant in recycle and reuse opportunities. Currently, reuse water from food processors is being

used for direct irrigation on the City owned farm circles at the Process Water Reuse Facility. Each farm circle currently has associated groundwater rights. With the substitution of the McNary Pool water from the Columbia River from the Water Utility on the farm circles, the quantity of groundwater applied to the farm circles is reduced, and there is no net increase in the collective water rights used due to the food processing plant operation. The City also considered direct reuse to the water treatment plant but the level of treatment required and the cost benefit did not balance.

- Evaluate the use of “Smart Meters”: Automated Meter Reading (AMR) can support water use efficiency in several ways. The timing of water usage for individual customers can be captured through automated meter reading and used to identify water inefficiencies such as irrigation during non-ideal times of day. The sensitivity of available data from AMR can be used to identify customer usage patterns that never reach zero, suggesting a customer side leak. AMR is often cost effective, saving the water utility in operating costs over time and can be implemented in phases. Evaluation of the costs and savings associated with AMR for Pasco, as well as potential water efficiency benefits will be completed before the next planning cycle.
- Evaluation of Xeriscaping (Residential, Multi-Family, Commercial): The City has considered implementing a xeriscaping education program as a water use efficiency measure for commercial, residential, and multi-family landscaping. The program would offer free classes on xeriscaping to interested customers and include funding from the City of Pasco for 50 percent of the cost of the conversion to xeriscaping landscaping. Based on an assumed annual 1-acre residential and 5-acre multi-family and commercial conversion to xeriscaping landscaping, the savings would be approximately 12.5 million gallons per year, or 1/2 percent of total 2007 production. The cost to the City of Pasco of such a program would be approximately \$483,560. This cost is based on paying the fees for two instructors for a 3-day class (assuming fees of \$50 per hour), covering travel costs of \$1,000 per instructor, and contributing approximately \$43,560 for each acre landscaped. The cost of the water saved through this program, based on a cost of \$0.0013 per gallon of water produced, would total approximately \$15,104, per year, for 11-acres of xeriscaping landscaping. The City of Pasco has elected not to implement this water use efficiency measure at this time, because it feels that this money could be better spent on water use efficiency measures that would reach more customers or address system-wide efficiency issues.
- Xeriscaping Ordinance: The City of Pasco has addressed Xeriscaping and the use of water efficient landscaping in PMC Title 25.75 Landscaping and Screening. This ordinance describes requirements for xeriscape areas that may use alternate forms of irrigation, low-water demand turf grasses and plant materials, as well as other ground covers.

The over-all projected average annual water usage takes into account historical water savings. Historical water use rates based on historical measures were used to project future

water usage. Water projections and estimated water savings (based on the average annual historical water savings rate of approximately 9.2 percent) is shown in **Table 3-B-5**.

**Table 3-B-5**  
**Future Projected City of Pasco Demands with and without Water use Efficiency Measures**

<b>Year</b>	<b>Average Day Demand Projected With Conservation (mgd)<sup>1</sup></b>	<b>Average Day Demand Projected Without Conservation (mgd)<sup>2</sup></b>	<b>Projected Savings (mgd)<sup>2</sup></b>
2014 (Actual)	12.6	13.8	1.16
2022	14.7	16.0	1.35
2036	20.0	21.8	1.84

<sup>1</sup> Based on projected total supply

<sup>2</sup> Based on the estimated average annual savings rate of 9.18% from 2009 to 2014

### **Description of Program Evaluation Process**

The City staff evaluates the WUE program's effectiveness annually through the yearly reporting process required by the WUE regulations. To support this reporting the City of Pasco maintains monthly records, which allows them to monitor trends on water use, distribution leakage, and information related to incentives. The City's water supply planning efforts related to the RWFCP are updated on a biannual basis. This allows for updates to modify or include new water use efficiency measures to change water demand projections.





RESOLUTION NO. 3840

**A RESOLUTION ESTABLISHING WATER USE EFFICIENCY GOALS.**

**WHEREAS**, the Washington State Legislature passed the Municipal Water Supply – Efficiency Requirements Act in 2003, and

**WHEREAS**, the current resolution supersedes resolution No. 3060 and updates the Water Use Efficiency Goals set forth in said resolution, and

**WHEREAS**, The Pasco City Council held a Public Hearing on June 4, 2018 to consider appropriate Water Use efficiency goals,

**NOW, THEREFORE,**

**BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF PASCO:**

**1.** The Pasco City Council hereby establishes Water Use Efficiency Goals as follows:

- a. Maintain a Distribution System Leakage (DSL) at 8 percent or less on an annual basis.
- b. Update the integrated water shortage and drought response plan by 2020.
- c. Continue with regular water meter replacement program.
- d. Implement installation of “Smart Meters”.
- e. Maintain average demand per ERU at 470 gpd per ERU, excluding DSL through 2022.
- f. Update large water user water audit program by December 31, 2020.
- g. Encourage the utilization of xeriscaping and specialized turf seed mixes to lower irrigation water consumption.
- h. Continue to offer Pasco residents retrofit kits that include low flow shower heads, toilet tank replacement bags, leak detection tablets, and other water use efficiency measures. The City will phase out this residential retrofit program before the next planning cycle as the City is close to reaching saturation of its target audience.
- i. Continue to perform WUE education in the Pasco School District.
- j. Continue to promote public education on conservation through annual consumer confidence reports, customer billing statements, and other educational materials.

**2.** The City Manager is hereby authorized and directed to employ municipal water resources as necessary and appropriate to achieve the goals established herein.

**3.** Passed by City Council of City of Pasco this 4th day of June, 2018.



Matt Watkins, Mayor

ATTEST:



Daniela Erickson, City Clerk

APPROVED AS TO FORM:



Leland B. Kerr, City Attorney



**Table 4-2**  
**Water Rights Self-Assessment - Existing Status**

Permit Certificate	Name on Document	Priority Date	Source Name and Number	Any portion supplemental?	Existing Water Rights		Existing Consumption		Current Water Right Status (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
Permits/ Certificates										
G3-20243(A) <sup>1</sup>	City of Pasco	06/06/1972	Columbia River WTP and I-182 River Intakes	no	1,612	483.6				
G3-20243(B) <sup>1</sup>	City of Pasco	06/02/1972	Columbia River WTP and I-182 River Intakes	no	214	107.9				
G3-27413(B) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108.1				
G3-27413(C) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	573.75	203.4				
G3-27413(D) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	281.25	112.4				
G3-27413(F) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108				
11660	City of Pasco	5/13/1963	Columbia River WTP and I-182 River Intakes	no	15,708	7,000				
7205-A(A) <sup>2</sup>	City of Pasco	5/12/1970	Columbia River WTP and I-182 River Intakes	no	375	76.2				
10192(B) <sup>2</sup>	City of Pasco	3/12/1970	Columbia River WTP and I-182 River Intakes	no		132.8				
G3-26081C(A) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no	400	291.3				
G3-25177C(A) <sup>3</sup>	City of Pasco	1/13/1977	Columbia River WTP and I-182 River Intakes	no	300					
G3-26081 (B) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no		190				
G3-25177C(B) <sup>3</sup>	City of Pasco	01/13/1977	Columbia River WTP and I-182 River Intakes	no		158.7				
S4-30976 <sup>4</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	1,122	1,806.75				
S4-30976 <sup>5</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	2,244	3,613.50				
TOTAL					20,149.00	13,269.25	18,456	14,424.11	1,693.00	(1,154.86)

Pending water right transactions	Name on application	Date submitted	Any portion supplemental?	Pending water rights	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
G3-01085C <sup>6</sup>	Cecil C. Hill	03/01/1966	no	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	12/17/1970	no	1,400	558
G3-20245	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	12/11/1972	no	600	138.4
G3-24546	City of Pasco	08/07/1975	no	1,200	609.6
G3-20247	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-22491	City of Pasco	02/04/1974	no	2,160	1,037
G3-22499	City of Pasco	02/04/1974	no	1,440	744
G3-23867	City of Pasco	10/24/1974	no	2,400	1,116
G3-25175	City of Pasco	01/13/1977	no	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	12/03/1987	no	450	170
S3-28788C	City of Pasco	07/24/1980	no	136	56
S4-33044(A) <sup>7</sup>	City of Pasco	11/28/2011	no	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	11/28/2011	no	3,097	2,500
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	11/28/2011	no	_ <sup>9</sup>	_ <sup>9</sup>

Notes:

<sup>1</sup> These rights are currently used for irrigation only and are not counted in the total domestic water right.

<sup>2</sup> Combined total of 375 gpm instantaneous and 209 acre-ft annually.

<sup>3</sup> Combined total of 700 gpm instantaneous and 640 acre-ft annually.

<sup>4</sup> The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.

<sup>5</sup> Additional allocation approved by other QCWR municipalities

<sup>6</sup> Pending reassignment.

<sup>7</sup> Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).

<sup>8</sup> Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).

<sup>9</sup> Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.

**Table 4-3**  
**Water Rights Self-Assessment - 2022 Status**

Permit Certificate	Name on Document	Priority Date	Source Name and Number	Any portion supplemental?	Existing Water Rights		Forecasted Water Use from Sources (6-yr demand)		Forecasted Water Right Status (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
Permits/ Certificates										
G3-20243(A) <sup>1</sup>	City of Pasco	06/06/1972	Columbia River WTP and I-182 River Intakes	no	1,612	483.6				
G3-20243(B) <sup>1</sup>	City of Pasco	06/02/1972	Columbia River WTP and I-182 River Intakes	no	214	107.9				
G3-27413(B) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108.1				
G3-27413(C) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	573.75	203.4				
G3-27413(D) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	281.25	112.4				
G3-27413(F) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108				
11660	City of Pasco	5/13/1963	Columbia River WTP and I-182 River Intakes	no	15,708	7,000				
7205-A(A) <sup>2</sup>	City of Pasco	5/12/1970	Columbia River WTP and I-182 River Intakes	no	375	76.2				
10192(B) <sup>2</sup>	City of Pasco	3/12/1970	Columbia River WTP and I-182 River Intakes	no		132.8				
G3-26081C(A) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no	400	291.3				
G3-25177C(A) <sup>3</sup>	City of Pasco	1/13/1977	Columbia River WTP and I-182 River Intakes	no	300					
G3-26081 (B) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no		190				
G3-25177C(B) <sup>3</sup>	City of Pasco	01/13/1977	Columbia River WTP and I-182 River Intakes	no		158.7				
S4-30976 <sup>4</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	1,122	1,806.75				
S4-30976 <sup>5</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	2,244	3,613.50				
TOTAL					20,149.00	13,269.25	21,516	16,447.67	(1,367)	(3,178.42)

Pending water right transactions	Name on application	Date submitted	Any portion supplemental?	Pending water rights	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
G3-01085C <sup>6</sup>	Cecil C. Hill	03/01/1966	no	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	12/17/1970	no	1,400	558
G3-20245	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	12/11/1972	no	600	138.4
G3-24546	City of Pasco	08/07/1975	no	1,200	609.6
G3-20247	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-22491	City of Pasco	02/04/1974	no	2,160	1,037
G3-22499	City of Pasco	02/04/1974	no	1,440	744
G3-23867	City of Pasco	10/24/1974	no	2,400	1,116
G3-25175	City of Pasco	01/13/1977	no	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	12/03/1987	no	450	170
S3-28788C	City of Pasco	07/24/1980	no	136	56
S4-33044(A) <sup>7</sup>	City of Pasco	11/28/2011	no	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	11/28/2011	no	3,097	2,500
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	11/28/2011	no	_ <sup>9</sup>	_ <sup>9</sup>

Notes:

<sup>1</sup> These rights are currently used for irrigation only and are not counted in the total domestic water right.

<sup>2</sup> Combined total of 375 gpm instantaneous and 209 acre-ft annually.

<sup>3</sup> Combined total of 700 gpm instantaneous and 640 acre-ft annually.

<sup>4</sup> The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.

<sup>5</sup> Additional allocation approved by other QCWR municipalities

<sup>6</sup> Pending reassignment.

<sup>7</sup> Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).

<sup>8</sup> Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).

<sup>9</sup> Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.



Table 4-4  
Water Rights Self-Assessment - 2027 Status

Permit Certificate	Name on Document	Priority Date	Source Name and Number	Any portion supplemental?	Existing Water Rights		Forecasted Water Use from Sources (10-yr demand)		Forecasted Water Right Status (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
Permits/ Certificates										
G3-20243(A) <sup>1</sup>	City of Pasco	06/06/1972	Columbia River WTP and I-182 River Intakes	no	1,612	483.6				
G3-20243(B) <sup>1</sup>	City of Pasco	06/02/1972	Columbia River WTP and I-182 River Intakes	no	214	107.9				
G3-27413(B) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108.1				
G3-27413(C) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	573.75	203.4				
G3-27413(D) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	281.25	112.4				
G3-27413(F) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108				
11660	City of Pasco	5/13/1963	Columbia River WTP and I-182 River Intakes	no	15,708	7,000				
7205-A(A) <sup>2</sup>	City of Pasco	5/12/1970	Columbia River WTP and I-182 River Intakes	no	375	76.2				
10192(B) <sup>2</sup>	City of Pasco	3/12/1970	Columbia River WTP and I-182 River Intakes	no		132.8				
G3-26081C(A) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no	400	291.3				
G3-25177C(A) <sup>3</sup>	City of Pasco	1/13/1977	Columbia River WTP and I-182 River Intakes	no	300					
G3-26081 (B) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no		190				
G3-25177C(B) <sup>3</sup>	City of Pasco	01/13/1977	Columbia River WTP and I-182 River Intakes	no		158.7				
S4-30976 <sup>4</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	1,122	1,806.75				
S4-30976 <sup>5</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	2,244	3,613.50				
TOTAL					20,149.00	13,269.25	24,456	18,695.65	(4,307)	(5,526.40)

Pending water right transactions	Name on application	Date submitted	Any portion supplemental?	Pending water rights	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
G3-01085C <sup>6</sup>	Cecil C. Hill	03/01/1966	no	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	12/17/1970	no	1,400	558
G3-20245	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	12/11/1972	no	600	138.4
G3-24546	City of Pasco	08/07/1975	no	1,200	609.6
G3-20247	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-22491	City of Pasco	02/04/1974	no	2,160	1,037
G3-22499	City of Pasco	02/04/1974	no	1,440	744
G3-23867	City of Pasco	10/24/1974	no	2,400	1,116
G3-25175	City of Pasco	01/13/1977	no	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	12/03/1987	no	450	170
S3-28788C	City of Pasco	07/24/1980	no	136	56
S4-33044(A) <sup>7</sup>	City of Pasco	11/28/2011	no	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	11/28/2011	no	3,097	2,500
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	11/28/2011	no	_ <sup>9</sup>	_ <sup>9</sup>

Notes:

<sup>1</sup> These rights are currently used for irrigation only and are not counted in the total domestic water right.

<sup>2</sup> Combined total of 375 gpm instantaneous and 209 acre-ft annually.

<sup>3</sup> Combined total of 700 gpm instantaneous and 640 acre-ft annually.

<sup>4</sup> The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.

<sup>5</sup> Additional allocation approved by other QCWR municipalities

<sup>6</sup> Pending reassignment.

<sup>7</sup> Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).

<sup>8</sup> Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).

<sup>9</sup> Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.

Table 4-5  
Water Rights Self-Assessment - 2036 Status

Permit Certificate	Name on Document	Priority Date	Source Name and Number	Any portion supplemental?	Existing Water Rights		Forecasted Water Use from Sources (20-yr demand)		Forecasted Water Right Status (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft	Maximum Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Qa) acre-ft
Permits/ Certificates										
G3-20243(A) <sup>1</sup>	City of Pasco	06/06/1972	Columbia River WTP and I-182 River Intakes	no	1,612	483.6				
G3-20243(B) <sup>1</sup>	City of Pasco	06/02/1972	Columbia River WTP and I-182 River Intakes	no	214	107.9				
G3-27413(B) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108.1				
G3-27413(C) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	573.75	203.4				
G3-27413(D) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	281.25	112.4				
G3-27413(F) <sup>1</sup>	City of Pasco	11/24/1982	Columbia River WTP and I-182 River Intakes	no	270	108				
11660	City of Pasco	5/13/1963	Columbia River WTP and I-182 River Intakes	no	15,708	7,000				
7205-A(A) <sup>2</sup>	City of Pasco	5/12/1970	Columbia River WTP and I-182 River Intakes	no	375	76.2				
10192(B) <sup>2</sup>	City of Pasco	3/12/1970	Columbia River WTP and I-182 River Intakes	no		132.8				
G3-26081C(A) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no	400	291.3				
G3-25177C(A) <sup>3</sup>	City of Pasco	1/13/1977	Columbia River WTP and I-182 River Intakes	no	300					
G3-26081 (B) <sup>3</sup>	City of Pasco	10/21/1978	Columbia River WTP and I-182 River Intakes	no		190				
G3-25177C(B) <sup>3</sup>	City of Pasco	01/13/1977	Columbia River WTP and I-182 River Intakes	no		158.7				
S4-30976 <sup>4</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	1,122	1,806.75				
S4-30976 <sup>5</sup>	Richland, Kennewick, Pasco, West Richland	09/23/1991	Columbia River WTP and I-182 River Intakes	no	2,244	3,613.50				
TOTAL					20,149.00	13,269.25	29,261	22,368.83	(9,112)	(9,099.08)

Pending water right transactions	Name on application	Date submitted	Any portion supplemental?	Pending water rights	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
G3-01085C <sup>6</sup>	Cecil C. Hill	03/01/1966	no	500	22.4
G3-01243C <sup>6</sup>	State of Washington, Department of Natural Resources	12/17/1970	no	1,400	558
G3-20245	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-20662C <sup>6</sup>	Cecil C. Hill	12/11/1972	no	600	138.4
G3-24546	City of Pasco	08/07/1975	no	1,200	609.6
G3-20247	City of Pasco	06/02/1972	no	5,200	2,101.6
G3-22491	City of Pasco	02/04/1974	no	2,160	1,037
G3-22499	City of Pasco	02/04/1974	no	1,440	744
G3-23867	City of Pasco	10/24/1974	no	2,400	1,116
G3-25175	City of Pasco	01/13/1977	no	1,200	520
G3-28452C <sup>6</sup>	Ray M. Burden	12/03/1987	no	450	170
S3-28788C	City of Pasco	07/24/1980	No	136	56
S4-33044(A) <sup>7</sup>	City of Pasco	11/28/2011	no	3,097	5,000
S4-33044(--) <sup>8</sup>	City of Pasco	11/28/2011	no	3,097	2,500
S4-33044(B)	Cities of Richland, West Richland, Kennewick and Pasco	11/28/2011	no	_ <sup>9</sup>	_ <sup>9</sup>

Notes:

<sup>1</sup> These rights are currently used for irrigation only and are not counted in the total domestic water right.

<sup>2</sup> Combined total of 375 gpm instantaneous and 209 acre-ft annually.

<sup>3</sup> Combined total of 700 gpm instantaneous and 640 acre-ft annually.

<sup>4</sup> The total for the Quad Cities Water Right (QCWR) Pact, for all cities, is approximately 80,000 gpm.

<sup>5</sup> Additional allocation approved by other QCWR municipalities

<sup>6</sup> Pending reassignment.

<sup>7</sup> Water right application requesting the application no. S4-33044 be split into two portions: Portion A and Portion B. City of Pasco is requesting Qa of 5,000 acre-ft and Qi of 6.9 cfs (3,097 gpm) under Portion A (S4-33044(A)).

<sup>8</sup> Water right application (in process w/ Office of Columbia River) requesting that application no. S4-33044 be split into a third portion: City of Pasco is requesting Qa of 2,500 acre-ft and Qi of 6.9 cfs (3,097 gpm).

<sup>9</sup> Portion B, Qi=70,955 gpm and Qa=81,983 ac-ft divided among the Quad Cities, final portion not currently defined.



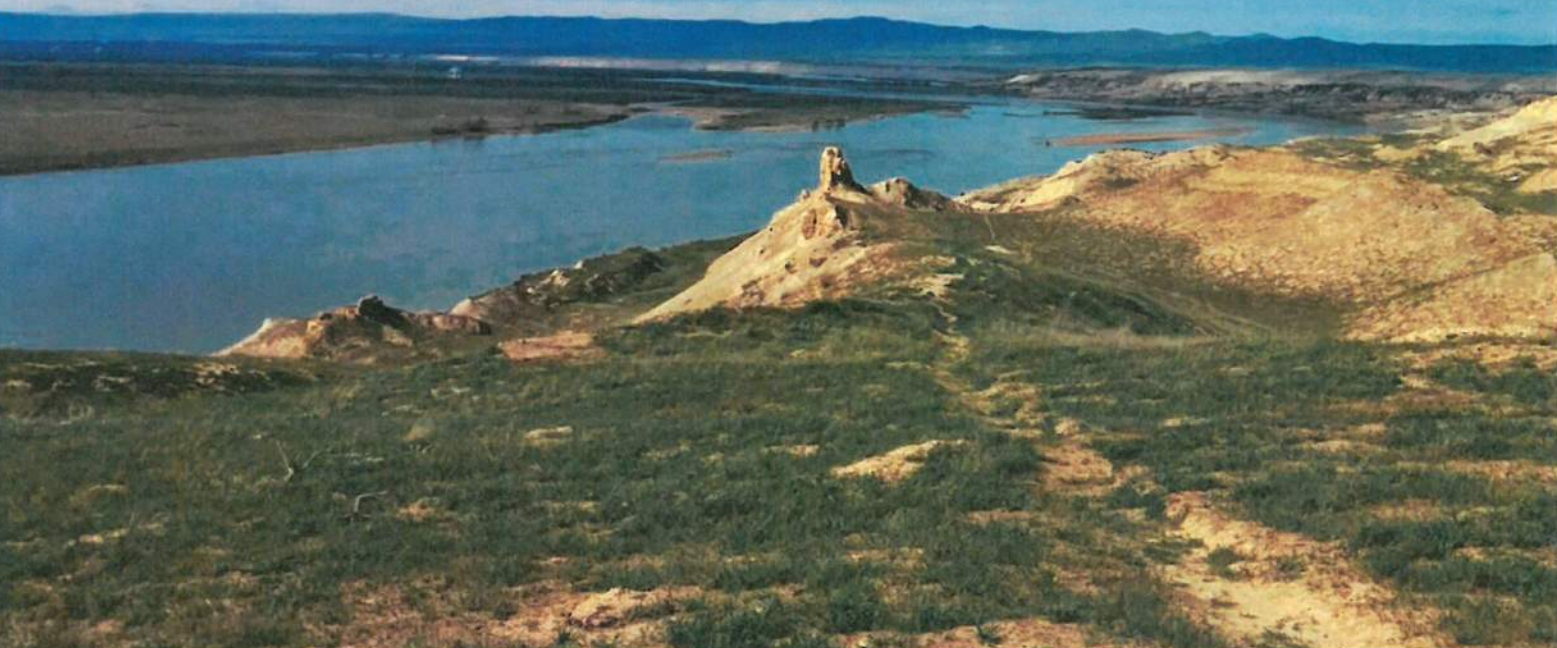




# WATER QUALITY

## REPORT 2016

PWS ID# WA0664003



This report contains important information about your drinking water. You can access this report in English or Spanish on the City of Pasco's website, or pick up a copy of either at Customer Service in City Hall.

Este informe contiene informaci3n importante acerca de su agua potable. Usted puede acceder a este informe en ingl3s o espa3ol en el sitio de web de la Ciudad, o recoger una copia de cualquiera de los dos en el Departamento de Atenci3n al Cliente en el Alcalde Municipal.

## City of Pasco provides high quality water for you!

Once again we are proud to present our annual water quality report. This edition covers all testing completed from January through December 2016. We are pleased to tell you that our compliance with all state and federal drinking water laws remains exemplary. As in the past, we are committed to delivering the best quality drinking water. To that end, we remain vigilant in meeting the challenges of source water protection, water conservation, and community education while continuing to serve the needs of all of our water users.

For more information, or for any questions relating to your drinking water, please call Derek Wiitala, Public Works Division Manager, at (509) 545-3463.

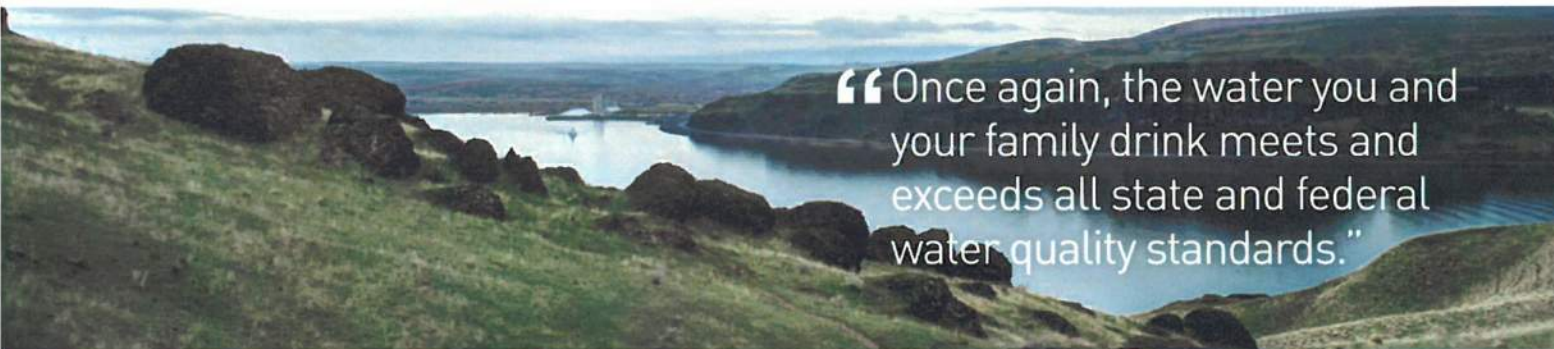


## COMMUNITY PARTICIPATION

Your input on water quality is always welcome. The City Council meets every Monday (except for the 5th Monday of the month) at 7:00 p.m. in Council Chambers at City Hall (525 N. 3rd Avenue, Pasco). Please feel free to participate in these meetings, or watch them live on PSC-TV Channel 12 on Charter Cable in Pasco, or online at [www.pasco-wa.gov/psctv](http://www.pasco-wa.gov/psctv).

Photo Credit: Lyn Topinka





“Once again, the water you and your family drink meets and exceeds all state and federal water quality standards.”

## Taking care of our precious resources today helps ensure a livable city for the future.

The City of Pasco continues to experience a steady growth in both residential, commercial, and industrial development. Yet, our overall water demand and production has remained at a fairly consistent level over the last several years.

Thanks to your continued conservation efforts.

Our Butterfield and West Pasco Water Treatment Plants enable the City to meet current and future growth and water demand. Current treatment design capacity is 35 MGD, with the capability to produce 48 MGD when the West Pasco plant is built out in the future. Current daily peak flows run between 4.4 MGD in the winter to more than 25 MGD during the summer. Annually, the City of Pasco withdraws approximately 4.8 billion gallons of water from the Columbia River.

The City of Pasco, (along with most water systems in Washington), has embarked on a mandatory pro-active water conservation program over the last several years.

Some of our methods and goals for this ongoing program include:

- Leak reduction in the system
- Providing water conservation devices to the public
- Water conservation education
- Per Capita reduction in usage

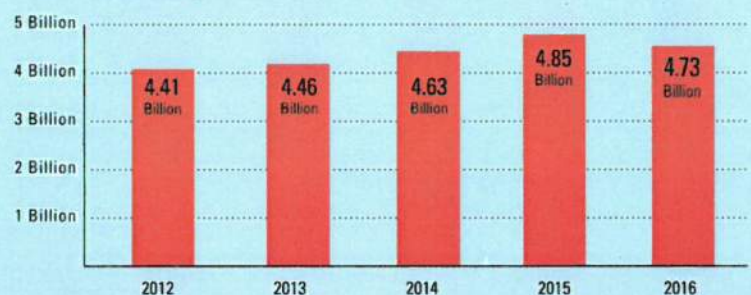
You can play a role in conserving water and saving yourself money in the process by becoming conscious of the amount of water your household is using and by looking for ways to use less whenever you can. It is not hard to conserve water.

### Here are a few tips:

- Automatic dishwashers use 15 gallons for every cycle, regardless of how many dishes are loaded. So get the most for your money and load it to capacity.
- Turn off the tap when brushing your teeth.
- Check every faucet in your home for leaks. Just a slow drip can waste 15 to 20 gallons a day. Fix it and you can save almost 6,000 gallons per year.
- Check your toilets for leaks by putting a few drops of food coloring in the tank. Watch for a few minutes to see if the color shows up in the bowl. It is not uncommon to lose up to 100 gallons a day from an invisible toilet leak. Fix it and you save more than 30,000 gallons a year.
- Use your water meter to detect hidden leaks. Simply turn off all taps and water using appliances. Then check the meter after 15 minutes. If it moved, you have a leak.

Average water usage per person in a household, (without any leaks) is about 100 gallons every day.

### Pasco Water Usage 2012 - 2016



## Why provide a water quality report?

A source water assessment has been conducted for your water source, the Columbia River. The purpose of the assessment was to determine the susceptibility of the Columbia River to potential contaminant sources and establish a relative susceptibility rating of high, moderate, or low.

The assessment reported a high susceptibility rating for the Columbia River. Please understand that this susceptibility rating does not imply poor water quality; rather, it signifies the system's potential to becoming contaminated.

The source water assessment for the City of Pasco can be accessed on the internet through the Washington State Department of Health, Drinking Water Division, Web site at <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/SourceWater/Assessment>

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, wildlife, and domestic pets.

- Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
- Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Environmental Protection Agency regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

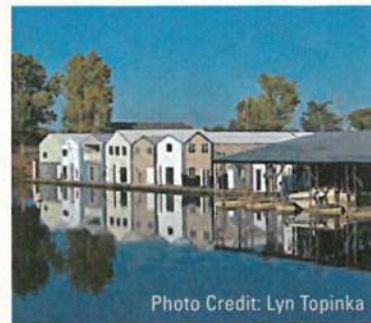


# Where does our water come from? And how is it treated?

The Columbia River supplies all of the City of Pasco's domestic water supply. Our water is treated through 2 distinctive water treatment plants of differing technologies. The Butterfield WTP is known as a "conventional" plant and has been in existence for many years. The Butterfield plant has gone through several upgrades over the years to improve efficiency and to keep up with ever-changing and improving technology. The treatment process at Butterfield is depicted in the graphic below. It is located near the Columbia River in the vicinity of the Cable Bridge.

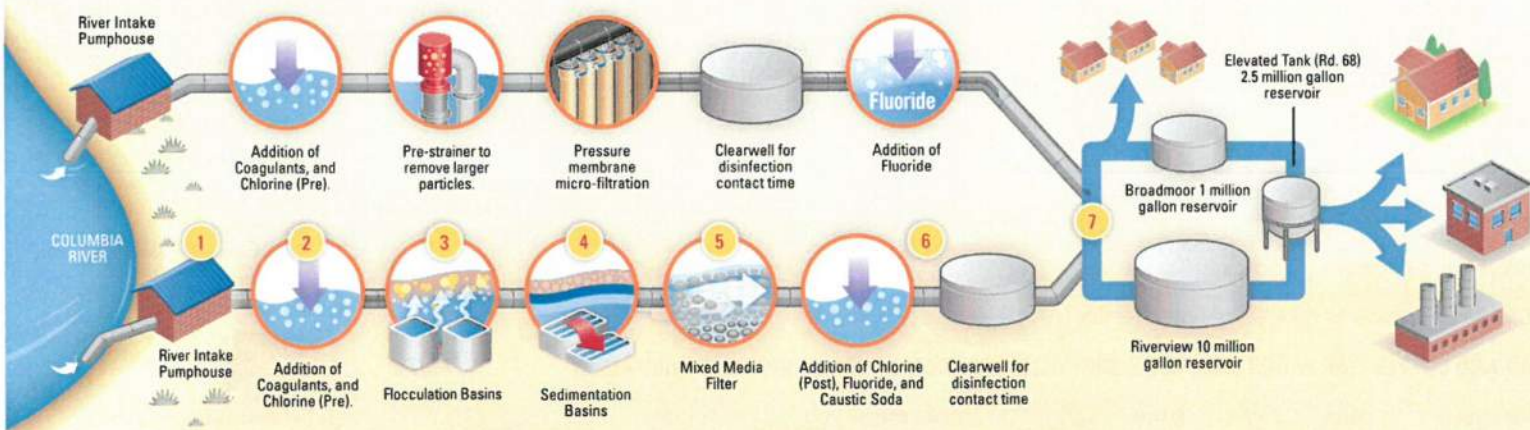
The West Pasco WTP is known as a "Pressure Membrane Direct Micro-Filtration" Plant. It went online in April of 2011. Unlike the Butterfield WTP, water is forced through a filter of fibers encased in a vertical column (a filter) capable of filtering out particles (and microbes) down to 0.1 microns in size. There are 116 of these filters per rack. Currently the plant has 2

racks with the capability of treating 6 MGD, 4 more racks will be added over the next couple of years, along with a new river pump station, for a total production capacity of 18 MGD. Its treatment process is also depicted in the graphic below. It is located at the far west end of Pasco in the vicinity of the I-182 Bridge.



Together, the 2 plants treated a total of 4.73 billion gallons of water in 2016: that's an average of 394 million gallons of water a month, or 12.9 million gallons of water a day.

## WEST PASCO WATER TREATMENT PLANT



## BUTTERFIELD WATER TREATMENT PLANT

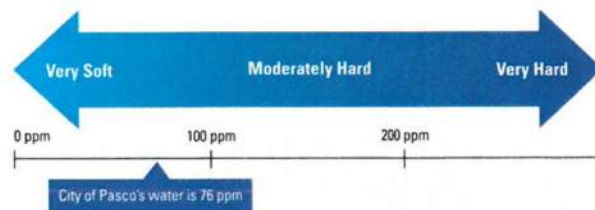
- 1 Water is pumped from the Columbia River to the WTP. As the water enters the plant, Potassium Permanganate is added to oxidize the organics in the raw water. This helps to control taste and odors, and to enhance the disinfection process.
- 2 Coagulants are added to attract small particles together to form larger particles (floc), which are more readily removed during sedimentation and filtration processes. Dosages of the coagulant are varied according to the purity of the untreated water.  
  
Chlorine is also added at this point to kill disease-causing organisms. The chemicals are rapidly mixed into the untreated water, as it flows to a series of basins.
- 3 The coagulant continues to mix in the water and create floc as the water makes its way through the flocculation basins and into the sedimentation basins.
- 4 The larger floc particles, and other existing solids, settle out as the water slowly makes its way through the sedimentation basins on its way to the mixed media filters.

- 5 The water then flows through mixed media filters (silica, sand and coal), which filter out the remaining unsettled particulate matter.
- 6 Filtered water enters the clear well tank which provides contact time for the post-chlorinated water. This allows for disinfection of any bacterial contamination in the water and provides a chlorine residual for the distribution system. Fluoride (Hydrofluosilicic Acid) is added in accordance with Department of Health Regulations. Caustic Soda is added for pH adjustment and corrosion control. Chlorine levels are set in accordance with Department of Health regulations.
- 7 The water is then pumped to the City's distribution and storage system. The water is distributed throughout Pasco for residential, business, and industrial use via more than 200 miles of pipeline.

The entire process is continually monitored and tested in order to ensure that the process and the water meets or exceeds state and federal regulations. After the clear well tank, the water is of excellent quality and is ready for distribution and use.

## Is my water hard?

If substantial amounts of Calcium or Magnesium, both nontoxic minerals, are present in drinking water, the water is said to be hard. Hard water does not dissolve soap readily, so making lather for washing and cleaning is difficult. Conversely, water containing little Calcium or Magnesium is called soft water.





# SAMPLING Results

DURING THE PAST YEAR we have taken hundreds of water samples in order to determine the presence of contaminants. The table below shows those contaminants detected in the water. Although all of the substances listed here are under the Maximum Contaminant Level (MCL), we feel it is important that you know exactly what was detected and how much of the substance was present in the water.

## REGULATED SUBSTANCES

Substances (Unit of Measure)	Year Sampled	MCL	MCLG	CONCENTRATION IN SAMPLE			Violation	Typical Source
				Highest Result	Sample Range	Running Average		
<b>Total Coliform Bacteria</b>	2016	Presence in more than 5% of monthly samples	0	Presence detected in 2.5% of January's samples	Presence detected in 2 of the 839 routine samples	NA	No	Naturally present in the environment
<b>Chlorine (ppm)<sup>1</sup></b>	2016	MRDL = 4	MRDLG = 4	1.3	.1 - 1.3	.7	No	Water additive used to control microbes

## TURBIDITY

<b>Butterfield WTP (NTU)</b>	2016	TT	95% of samples < 0.3 NTU	.07	.02 - .07	.03 100% <0.3 NTU	No	Soil runoff
<b>West Pasco WTP (NTU)</b>	2016	TT		.079	.008 - .079	.013 100% <0.3 NTU	No	
<b>Fluoride (ppm)</b>	2016	4	4	1.25	.46 - 1.25	.72	No	Erosion of natural deposits; Hydrofluosilicic Acid, a water additive which promotes dental health.
<b>Nitrate (ppm)</b>	2016	10	10	0.5	Butterfield WTP: 0.5 West Pasco WTP: 0.4		No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
<b>TOCs (ppm)</b>	2016	TT	NA	.75	.61 - .75	.73	No	Naturally present in the environment

## DISINFECTION BY-PRODUCTS (Stage 2 Rule as of Dec. 2013)

<b>HAAs (ppb)</b>	2016	60	NA	40.7	18.5 - 40.7	25.4 (Highest LRAA)**	No	By-product of drinking water disinfection
<b>TTHMs (ppb)</b>	2016	80	NA	53.3	16.4 - 53.3	38.2 (Highest LRAA)**	No	By-product of drinking water disinfection

\*\*Stage 2 Rule requires sampling at multiple sites with conformance determined by site-specific results or "Local Running Annual Average" (LRAA)

## LEAD AND COPPER (TAP WATER SAMPLES WERE COLLECTED FROM 32 HOMES IN THE SERVICE AREA)

Substance (Unit of Measure)	Year Sampled	Action Level	MCLG [MRDLG]	Amount Detected (90th%tile)	Homes Above Action Level	Violation	Typical Source
<b>Copper (ppm)</b>	2014	1.3	1.3	0.268	0	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives
<b>Lead (ppb)</b>	2014	15	0	3	0	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives

1 Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system. During the reporting year, turbidity is measured continuously from a sample stream of our finished water. All measurements exceeded water quality standards.

2 Lead was not detected in 14 out of 32 homes sampled.

## MESSAGE FROM THE EPA

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

## FACTS ABOUT LEAD IN YOUR DRINKING WATER

Lead is a toxic heavy metal that is found in the earth's crust. Lead does not usually naturally occur in drinking water, but it can be present in household plumbing or water service lines and contaminate drinking water through corrosion of plumbing materials.

Measures taken during the last 30 years have greatly reduced exposures to lead in tap water. These measures include actions taken under the requirements of the 1986 and 1996 amendments to the Safe Drinking Water Act and the U.S. Environmental Protection Agency's (EPA's) Lead and Copper Rule.

Even so, lead still can be found in some metal water taps or water pipes connecting a house to the main water line in the street. But lead found in drinking water usually comes from the

corrosion of older fixtures or from the solder that connects pipes in household plumbing. When water sits in these pipes for several hours, lead can leach into the water supply. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your drinking water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and other steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at [www.epa.gov/safewater/lead](http://www.epa.gov/safewater/lead).

The amount of lead corroded from metal plumbing generally increases as water acidity increases. Generally, acidic water with a pH below 7 is considered more corrosive than water with a pH higher than 7. The City of Pasco adjusts and maintains the pH in the treated water to what is considered a little higher than a neutral level, (a pH of 7.4 - 7.5). This helps to reduce corrosion throughout the water system.

Over the past 25 years, the City of Pasco has approached the lead issue with a proactive philosophy. A lead and copper monitoring program was implemented around 1990 in conformance with all EPA and Department of Health (DOH) regulatory requirements. The most recent results of lead and copper monitoring can be found in the table elsewhere in this report.

Also over this time period, the City of Pasco has systematically replaced any suspected pipe or service lines containing lead materials. That effort continues today during any repairs, retrofits, or waterline replacements. All materials used in new water service or pipe installations are lead free.

The City of Pasco continues to work with the Washington State Dept. of Health to ensure optimal results during these programs, and to reach our ultimate goal of a completely lead-free water system.

## TABLE DEFINITIONS

**AL (Action Level):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

**MRDL (Maximum Residual Disinfectant Level):** The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

**MRDLG (Maximum Residual Disinfectant Level Goal):** The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

**MCLG (Maximum Contaminant Level Goal):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

**MCL (Maximum Contaminant Level):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

**NA:** Not applicable

**ND:** Not detected

**TT (Treatment Technique):** A required process intended to reduce the level of a contaminant in drinking water.

**ppm (parts per million):** One part substance per million parts water (or milligrams per liter).

**ppb (parts per billion):** One part substance per billion parts water (or micrograms per liter).

**NTU (Nephelometric Turbidity Units):** Measurement of the clarity, or turbidity, of water.

**WTP** Water Treatment Plant

**TOC** Total organic carbon

**HAA** Haloacetic Acids

**TTHM** Total Trihalomethanes

**LRAA** Local Running Annual Average





**Appendix 4-C**  
**City of Pasco**  
**Water Quality Regulations**  
**Safe Drinking Water Act (SDWA)**

**Introduction**

This document presents a summary of the regulations included in the Safe Drinking Water Act (SDWA).

**SDWA Rules**

Since being introduced in 1974, the SDWA has been amended twice, once in 1986 and more recently in 1996. The intent of these amendments is to strengthen the 1974 Safe Drinking Water Act, primarily in the area of setting regulations to ensure that public water supplies are safe. The EPA was mandated by Congress to establish rules and regulations relating to the SDWA and subsequent Amendments.

Since 1986, a number of rules and regulations have been updated and/or proposed by the EPA for the purpose of implementing the SDWA and its Amendments, including:

- Disinfectants and Byproducts Rule
  - Stage 1 Disinfectant/Disinfectant By-Products (Stage 1 D/DBP) Rules
  - Stage 2 Disinfectant/Disinfectant By-Products (Stage 2 D/DBP) Rules
- Drinking Water Contaminant Candidate List (CCL)
- Revised Total Coliform Rule (RTCR)
- Groundwater Rule
- Radionuclide Rule
- Radon Rule
- Arsenic Rule
- Lead and Copper Rule (LCR)
- Chemical Phase Rules (Organic and Inorganic Contaminants)
  - Phase I Rule
  - Phase II Rule
  - Phase V Rule
- Surface Water Treatment Rule (SWTR)
- Enhanced Surface Water Treatment Rules (ESWTRs)
  - Interim Enhanced Surface Water Treatment Rule (IESWTR)
  - Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)
  - Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

## **Stage 1 Disinfectants/Disinfection By-Products Rule**

Historically, the disinfection by-products (DBPs) that have been regulated are total trihalomethanes (TTHMs). Requirements on TTHMs were first established by the EPA in 1979 when an interim primary Maximum Contaminant Level (MCL) of 100 parts per billion (ppb) was set for TTHMs.

Stage 1 of the Disinfectants/Disinfection By-Products (D/DBP) Rule was finalized in December 1998. The rule applies to all community and non-transient non-community water systems that treat their water with a chemical disinfectant, such as chlorine. Large systems were required to comply with the rule by January 2002, while small groundwater systems were to meet the requirements by January 2004.

The Stage 1 D/DBP Rule establishes MCLs of 80 ppb for TTHMs and 60 ppb for five haloacetic acids (HAA5). For most systems, DBP sampling consists of at least four (4) quarterly samples taken from the distribution system. Based on completing at least one year of routine monitoring and having running annual averages for TTHM and HAA5 of no more than 40 µg/l and 30 µg/l respectively, these sampling requirements can be reduced to annual monitoring during the month of warmest water temperature. Compliance for DBPs under the Stage 1 Rule is based on a running annual average of the quarterly values. It should be noted that the EPA also set a maximum contaminant level goal (MCLG) of zero for most DBPs.

The Stage 1 D/DBP Rule also contains maximum residual disinfectant levels (MRDLs). Both chlorine and chloramines have an MRDL of 4.0 mg/L as Cl<sub>2</sub>, based on a running annual average (RAA). Samples for chlorine and chloramines are required to be taken at the same points in the distribution system as samples taken for Total Coliform Rule (TCR) compliance.

In addition to the DBP requirements stated above, the Stage 1 D/DBP Rule attempts to reduce general DBP formation by requiring specific levels of total organic carbon (TOC) removal by coagulation (termed “enhanced coagulation”).

## **Stage 2 Disinfectants/Disinfection By-Products Rule**

The Stage 2 Disinfectants/Disinfection By-Products (Stage 2 D/DBP) Rule was passed in January 2006. The rule is designed to decrease DBP occurrence peaks in the distribution system based on changes to compliance monitoring provisions.

The Stage 2 D/DBP Rule applies to all public water systems that are community or non-transient non-community water systems that add a primary or residual disinfectant other than ultraviolet light (UV). The Stage 2 Rule sets forth requirements for MCLs and MCLGs for TTHM and HAA5, and adjusts how levels are averaged using locational averages rather than running averages. The specific requirements of the Stage 2 D/DBP Rule are outlined in the following paragraphs.

## ***Maximum Contaminant Level Goals for Disinfection By-Products***

The following are revisions to the Stage 1 Rule:

- Chloroform: MCLG = 0.07 mg/L based on cancer reference dose
- Monochloroacetic acid: MCLG = 0.07 mg/L
- Trichloroacetic acid: MCLG = 0.02 mg/L

## ***Maximum Contaminant Level Determination and Monitoring Requirements***

The Stage 2 Rule will require the use of locational running annual averages (LRAAs) to determine compliance with the MCLs for TTHMs and HAA5. The LRAA will be calculated for each monitoring location in the distribution system. This differs from the RAA approach outlined in Stage 1 D/DBP, where compliance was determined by calculating the running annual average of all samples across the system combined.

## ***Initial Distribution System Evaluation (IDSE)***

Compliance monitoring must have been preceded by an initial distribution system evaluation (IDSE) with the purpose of selecting site-specific optimal sampling points for capturing peaks of TTHMs and HAA5. Water systems then recommended new or revised monitoring sites based on the IDSE study. All community water systems and large non-transient non-community water systems that add a primary or residual disinfectant other than UV or that deliver water that has been treated with a primary or residual disinfectant other than UV were required to conduct an IDSE.

There are three possible approaches to fulfill the IDSE requirements:

1. Standard monitoring program: The standard monitoring program requires one year of monitoring on a specified schedule. A monitoring program must be prepared prior to implementing the program. The frequency and number of samples is determined based upon source water type, number of treatment plants and system size.
2. System-specific study: A system-specific study may be used based on earlier monitoring studies if they provide equivalent or better information than the standard monitoring program.
3. 40/30 certification: Systems may certify to their primacy agency that all required Stage 1 D/DBP Rule compliance samples were collected and analyzed properly during the two years prior to the start of the IDSE. All compliance samples must have been less than or equal to 40 ppb for TTHM and 30 ppb for HAA5. Samples must be in compliance with Stage 1 D/DBP Rule requirements.

Groundwater systems serving between 10,000 and 99,999 people must collect samples every quarter at four distribution system sites. All systems must collect IDSE samples during the peak historical month for TTHM levels or water temperature. Systems subject to the IDSE

requirement must submit a report to the primacy agency which includes recommendations for the location and schedule for monitoring. Generally, a system must recommend locations with the highest LRAAs.

### ***Compliance Schedule***

All systems without a waiver should have submitted an IDSE plan in 2007 and completed monitoring and submitted the IDSE report by 2010. The time when compliance monitoring will be implemented is based upon the size of the system. For systems serving between 50,000 and 99,999 people, LRAA monitoring for compliance with the Stage 2 D/DBP Rule begins October 1, 2013.

For more information on the Disinfectants and Byproducts Rule go to:

<http://www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules>

### **Drinking Water Contaminant Candidate List**

As amended in 1996, the SDWA requires the EPA to establish a list of contaminants that are known, or anticipated to occur in public water systems and may require regulation under the SDWA. The first Contaminant Candidate List (CCL) for drinking water was published in the Federal Register in March 1998 and includes 60 contaminants under consideration for regulation. The EPA is required to reissue new CCLs on a five-year cycle after the first publication.

The CCL addresses both microbiological and chemical contaminants. The first CCL (published in 1998) contained 50 chemical and 10 microbiological contaminants. The second CCL (published in 2005) contains 42 chemical and 9 microbiological contaminants. The third list (published in 2009) contains 104 chemical and 12 microbiological contaminants. The Draft CCL 4 includes 100 chemicals or chemical groups and 12 microbial contaminants.

For more information on the CCL go to: <http://www.epa.gov/ccl>

### **Revised Total Coliform Rule**

The Revised Total Coliform Rule (RTCR) was published in 2013 to revise the 1989 Total Coliform Rule. The primary goal of the RTCR is health protection through reduction of potential pathways of entry for fecal contamination into distribution systems. The RTCR applies to all public water systems. Compliance with the provisions of the rule by April 2016.

The RTCR modifies monitoring requirements, public notification, the MCL and MCLG, and includes assessment requirements and corrective action requirements. The RTCR links monitoring frequency to water quality and system performance. The RTCR requires public notification when an *E. coli* violation occurs or when a utility fails to conduct the required assessments and corrective actions. The RTCR establishes a 0 MCLG and an MCL for *E.*



*coli* but eliminates the MCLG and MCL for total coliforms (both fecal coliforms and *E. coli*). The assessment requirements of the RTCR are in place identify sanitary defects when there are total coliform or *E. coli* exceedances. The correction actions are intended to fix any sanitary defect identified through assessments.

For more information on the RTCT go to: <http://www.epa.gov/dwreginfo/revised-total-coliform-rule-and-total-coliform-rule>

## **Groundwater Rule**

The final Groundwater Rule was published in November 2006. In writing the rule, the EPA was particularly concerned about ground water systems that are susceptible to fecal contamination. The rule reduces the risk of illness caused by microbial contamination and includes treatment technique requirements, compliance monitoring and source water monitoring. Treatment technique requirements include providing treatment that reliably achieves 4-log (99.99%) treatment of viruses and correcting all significant deficiencies. Compliance monitoring is composed of testing for minimum disinfectant residual concentrations. Source water monitoring adds fecal indicator bacterial testing of each water source in operation, as well as regulatory steps, should a test return positive for fecal indicators during sampling.

For more information on the Groundwater Rule go to: <http://www.epa.gov/dwreginfo/groundwater-rule>

## **Radionuclide Rule**

The original Radionuclide Rule was proposed in July 1991, but court action delayed its final promulgation until December 7, 2000. In the final rule, the EPA set the MCL for uranium at 30 ppb, using its authority under the SDWA to set a standard higher than the feasible level based on cost-benefit considerations. The standard for combined radium-226/228 remains at 5 picoCuries per liter (pCi/L). However, the rule requires improved monitoring for radium. The final rule retains the interim standards for gross alpha particles at 15 pCi/L and for beta and photon emitters at 4 millirems (mrem).

The Radionuclide Rule only applies to community water systems; non-community water systems, including transient and non-transient, are exempt from the rule. A summary of the provisions contained in the final Radionuclide Rule is provided below.

- MCLG set to zero for all radionuclides, including combined radium-226/228, gross alpha, beta particles, photon emitters and uranium
- Combined Ra-226 and Ra-228 MCL = 5 pCi/L
- Beta and Photon Emitter MCLs:
  - ≤ 4 mrem/yr to the total body or any internal organ except for tritium (H-3) and Sr-90
  - H-3 MCL = 20,000 pCi/L

- Sr-90 MCL = 8 pCi/L
- Total dose from co-occurring beta/photon emitters must be  $\leq 4$  mrem/yr to the total body or any internal organ
- Gross alpha MCL = 15 pCi/L excluding uranium and radon, but including Ra-226
- Uranium MCL = 30 ppb

For more information on the Radionuclide Rule go to:

<http://www.epa.gov/dwreginfo/radionuclides-rule>

## **Radon Rule**

Radon is a naturally-occurring radioactive gas. Radon in drinking water increases the risk to public health, primarily from inhalation of the gas that is discharged from the water through normal household use, such as showering. The proposed Radon Rule applies to all community water systems that use groundwater or mixed groundwater and surface water supply sources.

On November 2, 1999, the long anticipated and heavily debated Radon Rule was formally proposed, but the EPA missed the SDWA deadline of August 2000 for promulgation. The proposed rule is still under review and it is not known when the final rule will be promulgated.

The Radon Rule includes a two-option approach that allows states and water suppliers to reduce radon risks in indoor air while protecting public health from the highest levels of radon in drinking water. The proposed rule includes the following provisions:

- MCLG of zero
- MCL of 300 pCi/L
- Alternative MCL (AMCL) of 4,000 pCi/L

The AMCL provision of the rule applies to water systems or states that adopt and comply with a multimedia mitigation (MMM) program aimed at reducing household indoor air health risks from the soil as well as from the tap water. The AMCL of 4,000 pCi/L is based on the National Research Council's recommended estimate of 10,000 to 1 as the transfer factor from water to air and the national average outdoor radon concentration of 0.4 pCi/L in air. Thus, an estimate of 0.4 pCi/L in air would be equivalent to 4,000 pCi/L in water.

If a state develops a MMM program that is approved by the EPA, public water systems in that state will be able to comply with the AMCL rather than the MCL for radon. Alternatively, if a state chooses not to adopt its own MMM program, or its program does not meet EPA approval, an individual public water supplier can submit an MMM program for approval.

## **Arsenic Rule**

The original arsenic MCL of 50 ppb was set by the EPA in 1975 based on a Public Health Service Standard published in 1942. A new proposed Arsenic Rule was released in June 2000. The EPA was originally under a court-imposed deadline to promulgate this rule by November

1992. However, the EPA received extensions to examine health effects and occurrence data. The new rule was published under the Clinton administration in January 2001, but was placed on a 60-day stay for review by the Bush administration. A notice published in the Federal Register on April 23, 2001 delayed the promulgation of the final rule to February 22, 2002.

The following is a summary of the major provisions and requirements of the Arsenic Rule:

- MCLG for arsenic set to zero
- MCL for arsenic revised from 50 ppb down to 10 ppb by January 23, 2006
- Beginning with Consumer Confidence Reports (CCRs) due by July 1, 2002, all community water systems must provide health information and arsenic concentrations in the CCRs for water that has arsenic concentrations in excess of 5 ppb (one half of the MCL)

The rule applies to all community and non-transient, non-community water systems. All water systems that exceed the MCL of 10 ppb are required to come into compliance within 5 years after publication of the final rule.

For more information on the Arsenic Rule go to: <http://www.epa.gov/dwreginfo/arsenic-rule-compliance-community-water-system-owners-and-operators>

and <http://www.epa.gov/dwreginfo/drinking-water-arsenic-rule-history>

## **Lead and Copper Rule**

The Lead and Copper Rule (LCR) was promulgated in June 1991 and went into effect December 1992, with minor revisions released in April 2000. The rule applies to all community and non-transient, non-community water systems. The rule developed MCLGs and action levels for both lead and copper in drinking water. The major difference between this regulation and most others is that the water is to be monitored at the customer's tap instead of the treatment plant discharge point. Lead and copper must be monitored at the customer's tap every six months at the highest risk locations. The highest risk locations are defined as:

- Piping with lead solder installed after 1982
- Lead water service lines
- Lead interior piping

In order for a water system to comply with the LCR, the samples at the customer's tap must not exceed the following action levels:

- Lead concentration of 0.015 mg/L detected in the 90th percentile of all samples
- Copper concentration of 1.3 mg/L detected in the 90th percentile of all samples

If the action levels are exceeded for either lead or copper, the water system must collect source water samples and submit all data to the state with a treatment recommendation to reduce concentrations below the action level. In addition, the water system must also provide a public education program to its customers within 60 days of the action level exceedance. The public education program must be continued as long as the water system exceeds the lead action levels.

All water systems that exceed the lead or copper action levels are also required to conduct a corrosion control study. Corrosion control studies must compare the effectiveness of pH and alkalinity adjustment, calcium adjustment, and addition of a phosphate- or silica-based corrosion inhibitor. Large and medium systems are also required to monitor many other water quality parameters at the entry point to the distribution system and customer taps.

After a corrosion control study is completed, a water system must develop a corrosion control program and submit it for approval to the primacy agency. Once approval of the program is received, water systems have 24 months to install and implement the treatment methods for corrosion control and 12 additional months to collect follow-up sampling.

In 2000, minor revisions to the LCR were promulgated to streamline requirements and to reduce some of the burdens on water systems. No changes to the MCLs or the MCLGs were made. Small changes were made to reduce the frequency of monitoring for systems with low lead and copper tap levels, and to update the analytical methods used for compliance.

For more information on the LCR go to: <http://www.epa.gov/dwreginfo/lead-and-copper-rule>

### **Chemical Phase Rules (Organic and Inorganic Contaminants)**

Chemical contaminants have been regulated in phases, which are referred to as the Chemical Phase Rules. The chemicals regulated fall in three categories: Inorganic Chemicals (IOC), Synthetic Organic Chemicals (SOC) and Volatile Organic Chemicals (VOC). The Chemical Phase rules provide public health protection through the reduction of chronic risks from cancer, organ damage and circulatory, nervous and reproductive system disorders. The rules also help to reduce the occurrence of Methemoglobineamia, or “blue baby syndrome”, by regulating nitrite and nitrate levels in water.

For more information on the Chemical Phase Rules go to:  
<http://www.epa.gov/dwreginfo/chemical-contaminant-rules>

#### ***Phase I Volatile Organic Chemical (VOC) Rule***

The Phase I Volatile Organic Chemical (VOC) Rule established MCLGs and MCLs for eight VOCs. The rule was promulgated in July 1987 and became effective in January 1989. Monitoring requirements include sampling at each entry point to the distribution system. If no VOCs were detected during the initial monitoring, repeat monitoring is required every three to five years, depending on the vulnerability of the source. If VOCs are detected, quarterly

samples must be analyzed. Compliance requires that VOC levels be lower than the MCLs, based on the annual average of quarterly samples.

The Phase I VOC Rule also requires monitoring of 51 additional unregulated VOCs. Repeat monitoring is required every five years; however, the EPA revises the list of unregulated contaminants, thereby changing the constituents to be monitored.

### ***Phase II Volatile Organic Chemical (VOC), Synthetic Organic Chemical (SOC) and Inorganic Chemical (IOC) Rule***

The Phase II VOC/SOC/IOC Rule applies to all public water systems. The rule was promulgated in January 1991 (33 contaminants) and July 1991 (5 contaminants), and added the categories SOC and IOC alongside the VOC category. This rule established MCLs and treatment techniques for 38 synthetic and inorganic contaminants. Monitoring for Phase II contaminants occurs in a standardized three-year cycle, which began in January 1993. Compliance with the Phase II MCLs is based on the average of quarterly samples.

### ***Phase V Synthetic Organic Chemical (SOC) and Inorganic Chemical (IOC) Rule***

The Phase V SOC/IOC Rule was promulgated on July 1992 and set MCLGs and MCLs for 23 contaminants. Compliance monitoring for these contaminants follows the same standardized monitoring framework introduced with the Phase II Rule. Some of the Phase V contaminants were previously on the unregulated contaminants monitoring lists under other rules. To eliminate duplication, these contaminants were withdrawn from the other lists.

## **Surface Water Treatment Rule**

The Surface Water Treatment Rule (SWTR) was implemented in 1989 to reduce the potential for pathogenic contamination in drinking water. The rule applies to all public water systems that use surface water or groundwater under the direct influence of surface water (GWUDI). The SWTR addresses:

- Criteria under which filtration is required
- Performance criteria for filtration
- Disinfection requirements for both filtered and unfiltered systems
- Monitoring requirements for all surface water supplies

The SWTR requires that source waters be treated to achieve a minimum 3-log (99.9%) removal and/or inactivation of *Giardia* cysts and a 4-log (99.99%) removal and/or inactivation of enteric viruses. Partial credit is given to systems that provide adequate filtration. The actual amount of credit given for filtration depends upon the specific treatment processes that are used. For well-operated conventional treatment plants, a 2.5-log credit is awarded for *Giardia* removal, and a 2-log credit is awarded for virus removal. For well-operated direct filtration plants, a 2-log credit is given for *Giardia* removal and a 1-log credit is given for viruses. The remainder of the removal/inactivation credit must be achieved through chemical disinfection.

Inactivation credit for chemical disinfection is based on published microbial inactivation tables. These tables are based on the calculation of disinfectant CT, which is a measure of the disinfectant concentration and contact time. The CT is expressed in units of mg·min/L, where C is the disinfectant concentration (mg/L units) and T is the  $t_{10}$ , the 10th percentile detention time (minutes) during which the water is in contact with the disinfectant. The EPA has published a guidance manual that lists the chemical inactivation credit awarded for *Giardia* and viruses at a given contact time and disinfectant concentration for specific water temperatures and pH values.

In addition to the microbial removal and inactivation requirements by filtration and primary disinfection, the SWTR requires secondary disinfection to provide an additional barrier against microbial contamination of the distribution system. The secondary disinfection mandate requires that the residual disinfectant concentration in the water entering the system not be less than 0.2 mg/L for more than 4 hours, and that residual disinfectant concentration in the distribution system cannot be undetectable in more than 5 percent of the samples each month for two consecutive months. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/mL is deemed to have a detectable disinfectant residual.

For more information on the SWTR go to: <http://www.epa.gov/dwreginfo/surface-water-treatment-rules>

### ***Enhanced Surface Water Treatment Rule***

In 1992, the EPA initiated the Enhanced Surface Water Treatment Rule (ESWTR) to provide additional microbial and disinfection controls for systems using surface water or GWUDI.

### ***Interim Enhanced Surface Water Treatment Rule***

The Interim Enhanced Surface Water Treatment Rule (IESWTR) was issued in December 1998 and provided improved control of microbial pathogens in drinking water. The rule builds on the provisions contained in SWTR and further reduced the possibility of *cryptosporidium*, *giardia* and other waterborne bacteria or viruses in finished drinking water supplies.

### ***Long-Term 1 Enhanced Surface Water Treatment Rule***

The purpose of the Long-Term 1 Enhanced Surface Water Treatment Rule is to increase protection of finished water from contamination by *cryptosporidium* and other microbial pathogens. The final rule was published in January 2001 and is intended to extend IESWTR to small systems serving less than 10,000 people.

### ***Long-Term 2 Enhanced Surface Water Treatment Rule***

The purpose of the Long-Term 2 Enhanced Surface Water Treatment Rule is to provide increased public health protection against microbial pathogens in public water systems. The

rule, published in January 2006, supplements previous regulations and targets additional *cryptosporidium* treatment requirements to higher risk systems.

### ***Watershed Protection***

The SWTR also developed watershed protection requirements for filtered and unfiltered systems. Source protection is the first barrier in reducing drinking water contaminants. Because information on the inactivation of *Cryptosporidium* is limited, watershed protection is a particularly important barrier for protection against this organism in unfiltered systems that rely on surface water.

Under the SWTR, public water systems must maintain a watershed control program that minimizes potential for source water contamination by viruses and *Giardia* cysts. A watershed control program must accomplish the following objectives:

- Characterize watershed ownership and hydrology
- Identify characteristics of the watershed and activities within the watershed that might have an adverse effect on water quality
- Minimize the potential for source water contamination by *Giardia* and viruses

The public water system must demonstrate, through ownership and/or written agreements with landowners within the watershed, that it can control all human activities which may have an adverse impact on microbiological quality of the source water. Both natural and human-caused sources of watershed contamination to be controlled are listed in the EPA guidance manual for watershed protection. These sources include wild animal populations, wastewater treatment plants, grazing animals, feedlots and recreational activities.

The public water system must also undergo an annual on-site inspection to assess the watershed control program and disinfection treatment process. A report of the on-site inspection summarizing all findings must be prepared every year.

### **Enhanced Surface Water Treatment Rules**

In 1992, the EPA initiated the Enhanced Surface Water Treatment Rules (ESWTRs) in order to provide additional microbial and disinfection controls for systems using surface water or GWUDI. The rules were to be implemented through stages as the Interim Enhanced Surface Water Treatment Rule (IESWTR), and Stage 1 and Stage 2 Long Term Enhanced Surface Water Treatment Rules (LT1ESWTR and LT2ESWTR) to allow for development of adequate information concerning pathogen occurrence and inactivation. The three phases of the ESWTRs are briefly discussed in the following paragraphs.



### ***Interim Enhanced Surface Water Treatment Rule (IESWTR)***

The IESWTR was initiated in December 1998. This rule builds upon the provisions contained in the SWTR, provides improved public health protection against *Cryptosporidium* and addresses risk tradeoffs with disinfection by-products. The rule applies to public water systems that use surface water or GWUDI, and serve 10,000 or more people.

The IESWTR amends the SWTR to include a MCLG of zero for *Cryptosporidium*, a 2-log *Cryptosporidium* removal requirement for filtration systems, more stringent filter effluent turbidity standards, disinfection benchmarking provisions and requirements for sanitary surveys. Requirements were also added that deal with additional criteria for GWUDI systems and the filtration avoidance criteria for surface water supplies.

For more information on the IESWTR go to: <http://www.epa.gov/dwreginfo/interim-enhanced-surface-water-treatment-rule-documents>

### ***Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)***

The purpose of the LT1ESWTR is to build upon the provisions of the IESWTR for better protection of the public health and risks posed by *Cryptosporidium* and other pathogens. The final LT1ESWTR was promulgated in January 2002, and it applies the requirements of the IESWTR to small surface water systems serving less than 10,000 customers, and to non-community water systems. The LT1ESWTR requires small systems to comply with the same disinfection profiling and benchmarking, *Cryptosporidium* removal and filter turbidity performance standards as those established in the IESWTR.

For more information on the LT1ESWTR go to: <http://www.epa.gov/dwreginfo/long-term-1-enhanced-surface-water-treatment-rule-documents>

### ***Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)***

The purpose of the LT2ESWTR is to provide additional public health protection against microbial pathogens in public water systems. The rule builds upon the provisions of the IESWTR and LT1ESWTR. The LT2ESWTR applies to all public water systems that use surface water or GWUDI. The rule establishes additional requirements for *Cryptosporidium* treatment, disinfection profiling and benchmarking, and finished water storage facilities.

For more information on the LT2ESWTR go to: <http://www.epa.gov/dwreginfo/long-term-2-enhanced-surface-water-treatment-rule-documents>



# COLIFORM MONITORING PLAN

Butterfield Water Treatment Plant  
Pasco, Washington

## SYSTEM INFORMATION:

City of Pasco  
Butterfield Water Treatment Plant  
1306 W. "B" St.  
PO Box 293  
Pasco, WA 99301

System Contact: Fred Vanecek, Operations Chief - (509) 545-3469

PWS ID# 664003

## Sources:

DOH Source 01 Columbia River/Lake Wallula  
Butterfield Raw Water Pumping Station  
1304 S. 12<sup>th</sup> St.  
N.E. ¼ Sec. 31, T.9N, R.30E  
(Approximately 600' upstream from the 10<sup>th</sup> St. Pasco-Kennewick  
Cable Bridge.)

DOH Source 09 Columbia River/Lake Wallula  
West Plant Raw Water Pumping Station  
11315 W. Court St.  
N.W. ¼ Sec. 18, T.9N, R.29 E.W.M.  
(At the I-182 highway bridge to Richland.)

## Population & Connections:

The city serves a population of 68,648 with 24,337 metered services.

## Storage:

Facility Type	Capacity	Facility Name
Storage Tank	1.2 MG	Broadmoor Tank
Elevated Storage	2.5 MG	Road 68
Reservoir	10 MG	Riverview Heights

## Treatment:

The Butterfield Water Treatment Plant is a class 3, conventional treatment potable water facility located in the first Pressure Zone, capable of producing up to 18,000 gpm. The system is supplied by one source of water, which is the Columbia River/Lake Wallula.

Chemicals used for treatment are: Chlorination for disinfection and system residual, Potassium Permanganate for taste and odor control, Aluminum Sulfate, for coagulation, Filter Aid Polymers for enhanced filtration, Sodium Hydroxide for system pH adjustment, and Fluorosilicic Acid (Fluoride) for health benefits.

The West Pasco Water Treatment Plant (WPWTP) is a class 3, pressure membrane, microfiltration potable water facility located at the far west end of the first pressure zone. Its current design capacity is 4,000 gpm with a “built out” capacity of 12,000 gpm. The WPWTP went online continuously in April of 2011. Chemicals used for treatment are: Sodium Hypochlorite for disinfection and system residual, Aluminum Chlorohydrate to create floc for enhanced direct filtration, and Fluorosilicic Acid (Fluoride) for health benefits.

### **Booster Stations:**

<b>Station Name</b>	<b>Pressure Zones</b>	<b>Capacity</b>
Oregon Avenue Booster Station	First to Second Zone	5,000 GPM
Riverview Heights Pump Station	First to Third Zone	9,000 GPM
Broadmoor Booster Pump Station	First to Third Zone	4,500 GPM
RD 36 & Burden Booster Station	First to Third Zone	6,000 GPM

### **Pressure Zones:**

The City is divided into three pressure zones.

	<b>Serves Ground Elevation</b>		<b>Normal Pressure</b>	
<b>Zone</b>	<b>Low Elevation</b>	<b>High Elevation</b>	<b>Low Elevation</b>	<b>High Elevation</b>
Zone 1	340	410	75	45
Zone 2	390	470	84	50
Zone 3	450	530	100	65

## **SAMPLING INFORMATION**

Routine Sampling Required by Regulation: 70 samples per month.

Informational Samples:        8 raw water samples- Butterfield Treatment Plant  
    8 raw water samples- West Pasco Treatment Plant

### **Routine Samples:**

Pressure Zone 1                24 effluent samples  
 Pressure Zone 2                30 effluent samples  
 Pressure Zone 3                18 effluent samples

A minimum of 72 effluent bacteriological samples and 16 raw water bacteriological samples are taken each month.

The City of Pasco now has an exclusive Sample Station infrastructure installed throughout the Distribution System to better provide a more comprehensive sampling representation. New stations are installed on an as-needed basis as development continues to expand the distribution system. The stations provide sampling event options which may include periodic location adjustments to this Coliform Monitoring Plan.

In many areas of our distribution system, the water flow may be reversed, thus causing water to flow in the opposite direction of “normal”. Reverse flow is due to the increase or decrease of customer demands on the water system, pumping configurations, and/or the operation of the two water treatment plants located at each end of the system.

## **ROUTINE SAMPLE SITES**

### Raw Samples:

Pressure Zone 1	Butterfield Water Treatment Plant 1306 W. “B” St.
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Pressure Zone 1	West Pasco Water Treatment Plant 11315 W. Court St.
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### Routine Distribution Samples:

#### **Pressure Zone 1**

1. Public Works Shop– 1025 S. Grey (Sample Station @ E. End)  
Upstream: P/W Shop Lunchroom  
Downstream: Columbia Concrete - Maitland Ave. / C St.
2. City Hall – 525 N. 3<sup>rd</sup> Ave. (Sample Station @ N/W Cor.)  
Upstream: City Hall Parks & Rec Class Room  
Downstream: 603 N. 2<sup>nd</sup> Ave. (Residence)
3. Emerson School – N. 18<sup>th</sup> Ave.& W. Henry St. (Sample Station)  
Upstream: 1711 W. Henry St. (Residence)  
Downstream: Physicians Health Center - 1200 N. 14<sup>th</sup> Ave.
4. Pasco Animal Hospital – 3012 Road 92 (Sample Station)  
Upstream: 3012 Road 92 (Water Service)  
Downstream: 3112 Chardonnay Dr. (Residence)
5. Franklin County Fire District #34 Station – 2108 Road 84 (Sample Station)  
Upstream: 8405 Clara (Residence)  
Downstream: 8610 W. Court St. (Day Care Center)

6. Kingdom Hall 7020 Argent Rd. (Sample Station)  
Upstream: 6916 Argent Rd. (Strip Mall)  
Downstream: 7021 Argent Rd. (Veterinary Clinic)
7. Heritage Park – Road 42 & Park St. (Sample Station)  
Upstream: 4104 W. Park St. (Residence)  
Downstream: 820 43<sup>rd</sup> Wy. (Residence)
8. 816 N. 28<sup>th</sup> Ave, (N. of Sylvester St.)  
Upstream: 2819 Sylvester St. (Church)  
Downstream: 1015 N. 28<sup>th</sup> Ave. (Church)

## **Pressure Zone 2**

9. Lakeview Mobile Home Park – 1505 Road 40 East (Sample Station)  
Upstream: FH North of LVMH Park on Rd. 40E  
Downstream: FH @ South End Road 40 East & Sacajawea Park Rd.
10. Eastside Booster Station – 316 N. Oregon Ave. (Sample Station)  
Upstream: 535 N. 1<sup>st</sup> Ave. (Intra Modal Station)  
Downstream: 310 N. Oregon Ave. (Fire Station #81)
11. City View Cemetery – 1300 N. Oregon Ave. (Sample Station)  
Upstream: 1300 N Oregon Ave. (Cemetery Office)  
Downstream: Parks Maintenance Facility
12. 1900 Commercial Ave. (Sample Station)  
Upstream: 1802 Commercial Ave. (Pacific Pride Fuel Station)  
Downstream: 1960 Commercial Ave. (Dwight Leavitt Trucking)
13. King City Restaurant - 2100 E. Hillsboro Rd. (Sample Station)  
Upstream: 2125 E. Hillsboro Rd. (King City Mini Mart)  
Downstream: 2215 E. Hillsboro Rd. (Subway)
14. Lucas Park, 14<sup>th</sup> & Lincoln Dr. (Sample Station)  
Upstream: 2112 N. 12<sup>th</sup> Ave. (Residence)  
Downstream: 2128 N. 14<sup>th</sup> Ave. (Residence)
15. Airport Fire Station #82 – 3502 Varney Ln. (Sample Station)  
Upstream: Columbia Basin College, Staff Lounge  
Downstream: Port of Pasco Airport – Terminal Bldg. 3601 N. 20<sup>th</sup> Ave.
16. Road 84 & Moline Dr. (Sample Station)  
Upstream: 4417 Galway (Residence)  
Downstream: 4209 Galway (Residence)

17. Kohler Rd & Ramsey Dr. (Sample Station)

Upstream: TBD

Downstream: TBD

### **Pressure Zone 3**

18. S/E Cor – Industrial Way & Foster Wells Rd. (Sample Station)

Upstream: Connel Sand & Gravel – 6220 Burlington Rd.

Downstream: Pasco Processing - 5815 Industrial Way

19. Riverview Booster Station – 4015 Desert Plateau Dr.

Upstream: Zone 1 FH

Downstream: 3904 Desert Plateau Dr. (residence)

20. N/W Cor of Adobe & Burden Rd. (Sample Station)

Upstream: 4711 Santa Fe Ln. (Residence)

Downstream: 4808 Adobe Dr. (Residence)

21. Lincoln Park – Wrigley & Jackson Ln. (Sample Station)

Upstream: 5602 Wrigley Dr. (Residence)

Downstream: 5205 Jackson Ln. (Residence)

22. S/Side of Homerun Rd. (Sample Station)

Upstream: Franklin RV Park - Homerun Rd

Downstream: Trac Center – 6600 Burden Rd.

23. N/E Cor of Rd 84 & Hudson (Sample Station)

Upstream: 8404 Hudson Dr. (Residence)

Downstream: 8307 Hudson Dr. (Residence)

24. 9250 Sandifur Pkwy. (Sample Station)

Upstream: 9527 Sandifur Pkwy. (In Home Medical)

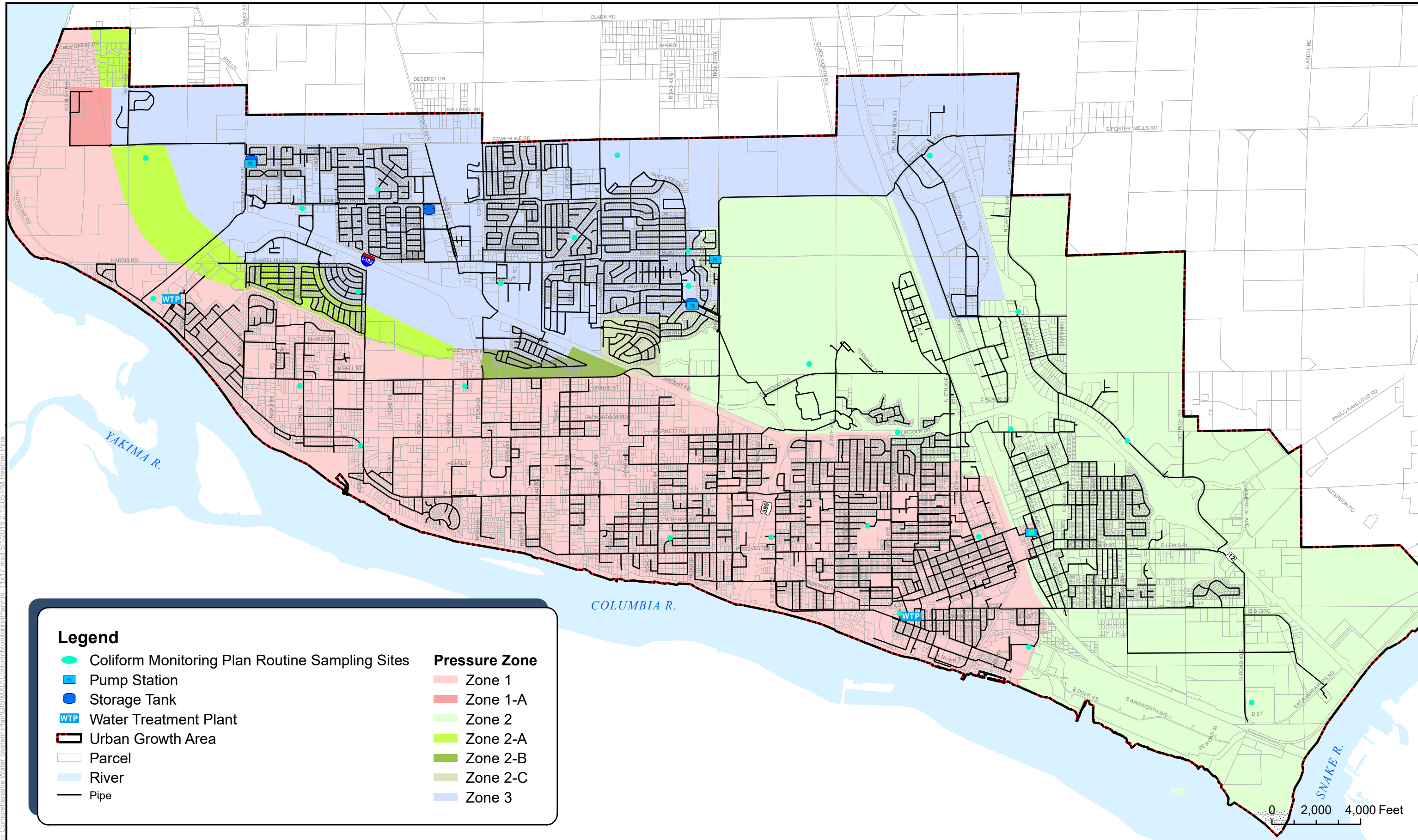
Downstream: Outlet Mall RR – 5200 Outlet Dr.

### **PLAN PREPARATION INFORMATION**

Updated information provided by Bill Maxwell, Water Treatment Plant Operator, City of Pasco. Latest update on 11/9/15



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### Legend

- Coliform Monitoring Plan Routine Sampling Sites
- Pump Station
- Storage Tank
- WTP Water Treatment Plant
- Urban Growth Area
- Parcel
- River
- Pipe

### Pressure Zone

- Zone 1
- Zone 1-A
- Zone 2
- Zone 2-A
- Zone 2-B
- Zone 2-C
- Zone 3

0 2,000 4,000 Feet



## Comprehensive Water System Plan Update City of Pasco



## Coliform Monitoring Plan Routine Sampling Sites



**City of Pasco  
Butterfield Water Treatment Plant**

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**STAGE II D/DBP MONITORING PLAN (IDSE)**

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**WATER SYSTEM INFORMATION**

City of Pasco 525 N. 3 <sup>rd</sup> Ave. PO Box 293 Pasco, WA 99301	ID#	664003	
	County:	Franklin	
	Group:	A	
Ahmad Qayoumi, Public Works Director (509) 545-3444	Type:	Community	
Derek Wiitala Plant Division Manager (509) 545-3468	WRIA:	36	
Fred Vanecek, Chief Operator (509) 545-3469	Owner:	City of Pasco	

**WATER SYSTEM SOURCES**

#	Name	Category	Depth	Use	Location
<b>S01 – Columbia River</b>	Surface	N/A	Perm.	SW/NE 03 09N 30E	
	Butterfield WTP = 26.0 MGD				
<b>S09 – Columbia River</b>	Surface	N/A	Perm	NE/NE 18 09N 29E	
	West Pasco WTP = 6.0 MGD				

**City of Pasco  
Butterfield Water Treatment Plant**

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**STAGE II D/DBP MONITORING PLAN (IDSE)**

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**WATER SYSTEM STORAGE**

Riverview Heights reservoir – 10 MG	Pressure Zone 1
Road 100 Tank – 1 MG	Pressure Zone 1
Road 68 Elevated Reservoir – 2.5 MG	Pressure Zone 3

**WATER SYSTEM SERVICE INFORMATION**

Total Population Served:	68,648
Total Commercial Connections:	2,600
Total Multi-Family Connections:	5,768
Total Residential Connections:	15,969
Total Service Connections	24,337

**PRESSURE ZONES**

Total Number Pressure Zones:	3
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**City of Pasco  
Butterfield Water Treatment Plant**

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**STAGE II D/DBP MONITORING PLAN (IDSE)**

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SAMPLING INFORMATION

**TTHM and HAA5**

**Qualified plant operators collect 4 quarterly samples each** at 4 sample sites on the 2nd Tuesday of the last month in the quarter. The 4 sites represent a reduced monitoring waiver for as long as results meet regulatory guidelines. Raw and Finished TOC samples are also collected at each treatment plant as part of this monitoring program. Samples collected are kept cold and are shipped overnight to the laboratory.

SAMPLE LOCATIONS

(All sampling sites are secured sampling stations. The following sites were justified for Stage 2, Reduced Monitoring as per regulatory guidelines.)

Highest TTHM LRAA:

- Lakeview Mobile Home Park  
1505 S. Rd. 40 E

Highest HAA5 LRAA, Stage 1 Sampling Site:

- Homerun Rd. @ Dust Devil Stadium

Maximum Residence Time – Zone 3:

- 3 Rivers Lift Station  
Rd. 60 & 3 Rivers Dr.

Maximum Residence Time – Zone 2:

- County Fire Station  
2108 Rd. 84

**City of Pasco  
Butterfield Water Treatment Plant**

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**STAGE II D/DBP MONITORING PLAN (IDSE)**

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Sample analysis is performed by:

EDGE ANALYTICAL  
1620 S. WALNUT ST.  
BURLINGTON, WA 98233

PHONE 800-755-9295

Compliance is based on a **“local running annual average, of each individual site sampled”**.

**City of Pasco**  
**Butterfield Water Treatment Plant**

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**STAGE II D/DBP MONITORING PLAN (IDSE)**

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MAXIMUM RESIDUAL DISINFECTANT LEVEL (MRDLs)

SAMPLING INFORMATION

Samples are taken at the same time as routine total coliform samples.

SAMPLE LOCATION

Routine Sample Sites – Pressure Zone 1

- Public Works Shop – 1025 S. Gray St.
- City Hall – 525 N. 3<sup>rd</sup>
- Emerson School – N.18<sup>th</sup> Ave. & W. Henry St.
- Pasco Animal Hospital – 3012 Road 92
- Franklin County Fire Dist. #3 Station – 2108 Road 84
- Kingdom Hall – 7020 Argent Rd.
- Heritage Park – Rd. 42 & W. Park St
- 816 N. 28<sup>th</sup> Ave

Routine Sample Sites – Pressure Zone 2

- Lake View Mobile Home Park – 1505 Road 40 East
- Eastside Booster Station – 316 N. Oregon Ave.
- City View Cemetery – 1300 N. Oregon Ave.
- 1900 Commercial Ave.
- King City Restaurant – 2100 E. Hillsboro Ave.
- Lucas Park N. 14<sup>th</sup> Ave. & Lincoln Dr.
- Airport Fire Station # 82 – 3502 Varney Ln.
- Road 84 & Moline Dr.
- Kohler Rd. & Ramsey Dr.

Routine Sample Sites – Pressure Zone 3

- Foster Wells Rd. & Industrial Way
- Riverview Booster Station – 4015 Desert Plateau Dr.
- N/W Cor. of Adobe Dr. & Burden Rd.
- Lincoln Park – Wrigley & Jackson Ln.
- Homerun Rd. @ Dust Devil Stadium
- N/E Cor. of Rd. 84 & Hudson Dr.
- 9250 Sandifur Pkwy.



**City of Pasco  
Butterfield Water Treatment Plant**

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**STAGE II D/DBP MONITORING PLAN (IDSE)**

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MRDL SAMPLE LOCATION CONTINUED

Informational Sample Sites:

- Riverview Heights Booster Station – 4015 Desert Plateau

TOC SAMPLING

TOC Sample Site – Butterfield Water Treatment Plant  
West Pasco Water Treatment Plant

- Lab Sink – Raw Water Sample
- Lab Sink – Clearwell Sample

TOC's are sampled quarterly, (due to reduced monitoring requirements), on the 2nd Tuesday of the last month of the quarter. One raw water sample is collected before any treatment and one sample from the clearwell before entrance to the distribution system at each Water Treatment Plant.

**PLAN PREPARATION INFORMATION**

Update information provided by Bill Maxwell, Water Treatment Plant Operator. 11/9/15





## U.S. Environmental Protection Agency

Risk Management Plan (RMP)

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Status	Date	Time
[X]Prepared	10/16/2014	12:39:35 PM
[X]Certified	10/21/2014	5:24:37 PM
[ ]Rejected		

**Reference number: RMP000120141016123935BATEMANHW**

Preparer: Heath Bateman (BATEMANHW)

Certifying Official: Fred Vanecek (CITYOFPASCO1)

**Facility ID: 100000145924**

Facility: Butterfield Water Treatment Plant  
1306 W. "B" Street  
Pasco, WA 99301

Transaction ID: \_2ff74829-423e-4faa-a47b-1b2f31736a1a

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## Section 1. Registration Information

1.1 Source Identification	
1.1.a. Facility Name	Butterfield Water Treatment Plant
1.1.b. Parent Company #1 Name	City of Pasco
1.1.c. Parent Company #2 Name	
1.2 EPA Facility Identifier	100000145924
1.3 Other EPA Systems Facility Identifier	
1.4 Dun and Bradstreet Numbers (DUNS)	
1.4.a. Facility DUNS	
1.4.b. Parent Company #1 DUNS	070972799
1.4.c. Parent Company #2 DUNS	
1.5 Facility Location	
1.5.a. Street - Line 1	1306 W. "B" Street
1.5.b. Street - Line 2	
1.5.c. City	Pasco
1.5.d. State	WA
1.5.e. Zip Code - Zip +4 Code	99301
1.5.f. County	FRANKLIN
1.5.g. Facility Latitude (in decimal degrees)	46.220278
1.5.h. Facility Longitude (in decimal degrees)	-119.102500
1.5.i. Method for determining Lat/Long	Interpolation - Map
1.5.j. Description of location identified by Lat/Long	Process Unit Area Centroid
1.5.k. Horizontal Accuracy Measure (meters)	1
1.5.l. Horizontal Reference Datum Code	North American Datum of 1927
1.5.m. Source Map Scale Number	24000
1.6 Owner or Operator	
1.6.a. Name	City of Pasco
1.6.b. Phone	(509) 545-3444
1.6.c. Street - Line 1	P.O. Box 293
1.6.d. Street - Line 2	525 N 3rd Ave
1.6.e. City	Pasco
1.6.f. State	WA
1.6.g. Zip Code - Zip +4 Code	99301
Foreign Country	
Foreign State/Province	
Foreign Zip/Postal Code	
1.7 Name, title and email address of person or position responsible for RMP (part 68) implementation	
1.7.a. Name of person	Reuel Klempel
1.7.b. Title of person or position	Plant Division Manager
1.7.c. Email address of person or position	klempelr@pasco-wa.gov



## Section 1. Registration Information

1.8 Emergency Contact	
1.8.a. Name	Fred Vanecek
1.8.b. Title of person or position	Chief Operator
1.8.c. Phone	(509) 545-3469
1.8.d. 24-Hour Phone	(509) 727-4101
1.8.e. 24-Hour Phone Extension/PIN #	
1.8.f. Email address for emergency contact	N/A
1.9 Other Points of Contact	
1.9.a. Facility or Parent Company E-mail Address	
1.9.b. Facility Public Contact Phone Number	
1.9.c. Facility or Parent Company WWW Homepage Address	
1.10 Local Emergency Planning Committee (LEPC)	Franklin County LEPC
1.11 Number of fulltime equivalent (FTEs) employees on site	4
1.12 Covered by	
1.12.a. OSHA PSM	Y
1.12.b. EPCRA section 302	Y
1.12.c. CAA Title V Air Operating Permit Program	
1.12.d. Air Operating Permit ID #	
1.13 OSHA Star or Merit Ranking	
1.14 Last Safety Inspection (by an External Agency) Date	07/21/2009
1.15 Last Safety Inspection Performed by an External Agency	State occupational safety agency
1.16 Will this RMP involve Predictive Filing?	
1.18 RMP Preparer Information	
1.18.a. Name	Sarah Sells
1.18.b. Phone	(509) 545-3444
1.18.c. Street - Line 1	PO Box 293
1.18.d. Street - Line 2	525 N 3rd Ave
1.18.e. City	Pasco
1.18.f. State	WA
1.18.g. Zip	99301
Foreign Country	
Foreign State/Province	
Foreign Zip Code	



## Section 1. Registration Information

### Section 1.17 Process Specific Information

#### Process 1

Process ID #	1000013657		
Process Description	Chlorine for disinfection		
1.17.a. Program Level	3		
1.17.b. NAICS Code(s)	22131 (Water Supply and Irrigation Systems)		
1.17.c. Chemical(s)			
	Chemical Name	CAS Number	Quantity
	Chlorine	7782-50-5	8000



## Section 2. Toxics: Worst Case

## Scenario 1

Process Name	Chlorine for disinfection
2.1 Chemical	
2.1.a. Name	Chlorine
2.1.b. Percent Weight of Chemical	
2.2 Physical State	Gas
2.3 Model Used	EPA's RMP*Comp(TM)
2.4 Scenario	Gas Release
2.5 Quantity Released (lbs)	8000
2.6 Release Rate (lbs/min)	800
2.7 Release Duration (mins)	10
2.8 Wind Speed (meters/sec)	1.5
2.9 Atmospheric stability class	F
2.10 Topography	Urban
2.11 Distance to endpoint (miles)	1.9
2.12 Estimated residential population within distance to endpoint (numbers)	19000
2.13 Public receptors within distance to endpoint	
2.13.a. Schools	Y
2.13.b. Residences	Y
2.13.c. Hospitals	Y
2.13.d. Prison/Correctional Facilities	
2.13.e. Recreational Areas	Y
2.13.f. Major commercial, office or industrial areas	Y
2.13.g. Other	
2.14 Environmental receptors within distance to endpoint	
2.14.a. National or State Parks, Forests or Monuments	
2.14.b. Officially Designated Wildlife Sanctuaries, Preserves or Refuges	Y
2.14.c. Federal Wilderness Area	
2.14.d. Other	
2.15 Passive mitigation considered	
2.15.a. Dikes	
2.15.b. Enclosures	
2.15.c. Berms	
2.15.d. Drains	
2.15.e. Sumps	
2.15.f. Other	
2.16 Graphic file	Graphic file exists





## Section 3. Toxics: Alternative Release

## Scenario 1

Process Name	Chlorine for disinfection
3.1 Chemical	
3.1.a. Name	Chlorine
3.1.b. Percent Weight of Chemical	
3.2 Physical State	Gas
3.3 Model Used	EPA's RMP*Comp(TM)
3.4 Scenario	Worst Case
3.5 Quantity Released (lbs)	8000
3.6 Release Rate (lbs/min)	800
3.7 Release Duration (mins)	10
3.8 Wind Speed (meters/sec)	1.5
3.9 Atmospheric stability class	F
3.10 Topography	Urban
3.11 Distance to endpoint (miles)	1.9
3.12 Estimated residential population within distance to endpoint (numbers)	19000
3.13 Public receptors within distance to endpoint	
3.13.a. Schools	Y
3.13.b. Residences	Y
3.13.c. Hospitals	Y
3.13.d. Prison/Correctional Facilities	
3.13.e. Recreational Areas	Y
3.13.f. Major commercial, office or industrial areas	Y
3.13.g. Other	
3.14 Environmental receptors within distance to endpoint	
3.14.a. National or State Parks, Forests or Monuments	
3.14.b. Officially Designated Wildlife Sanctuaries, Preserves or Refuges	Y
3.14.c. Federal Wilderness Area	
3.14.d. Other	
3.15 Passive mitigation considered	
3.15.a. Dikes	
3.15.b. Enclosures	
3.15.c. Berms	
3.15.d. Drains	
3.15.e. Sumps	
3.15.f. Other	
3.16 Active mitigation considered	
3.16.a. Sprinkler systems	
3.16.b. Deluge systems	
3.16.c. Water curtain	
3.16.d. Neutralization	
3.16.e. Excess flow valve	
3.16.f. Flares	



### Section 3. Toxics: Alternative Release

3.16.g. Scrubbers	
3.16.h. Emergency shutdown systems	Y
3.16.i. Other	
3.17 Graphic file	



## Section 3. Toxics: Alternative Release

## Scenario 2

Process Name	Chlorine for disinfection
3.1 Chemical	
3.1.a. Name	Chlorine
3.1.b. Percent Weight of Chemical	
3.2 Physical State	Gas
3.3 Model Used	EPA's RMP*Comp(TM)
3.4 Scenario	Alternative
3.5 Quantity Released (lbs)	2000
3.6 Release Rate (lbs/min)	632
3.7 Release Duration (mins)	3.16
3.8 Wind Speed (meters/sec)	3
3.9 Atmospheric stability class	D
3.10 Topography	Urban
3.11 Distance to endpoint (miles)	0.3
3.12 Estimated residential population within distance to endpoint (numbers)	690
3.13 Public receptors within distance to endpoint	
3.13.a. Schools	
3.13.b. Residences	Y
3.13.c. Hospitals	
3.13.d. Prison/Correctional Facilities	
3.13.e. Recreational Areas	
3.13.f. Major commercial, office or industrial areas	
3.13.g. Other	
3.14 Environmental receptors within distance to endpoint	
3.14.a. National or State Parks, Forests or Monuments	
3.14.b. Officially Designated Wildlife Sanctuaries, Preserves or Refuges	
3.14.c. Federal Wilderness Area	
3.14.d. Other	
3.15 Passive mitigation considered	
3.15.a. Dikes	
3.15.b. Enclosures	
3.15.c. Berms	
3.15.d. Drains	
3.15.e. Sumps	
3.15.f. Other	
3.16 Active mitigation considered	
3.16.a. Sprinkler systems	
3.16.b. Deluge systems	
3.16.c. Water curtain	
3.16.d. Neutralization	
3.16.e. Excess flow valve	
3.16.f. Flares	



### Section 3. Toxics: Alternative Release

3.16.g. Scrubbers	
3.16.h. Emergency shutdown systems	
3.16.i. Other	
3.17 Graphic file	<i>Graphic file exists</i>



## Section 7. Prevention Program: Program Level 3

## Program 1

Prevention Program Description: Chlorine for disinfection	
7.1 NAICS Code for process	
7.1.a. Process Name	1000013657 (Chlorine for disinfection)
7.1.b. NAICS	22131 (Water Supply and Irrigation Systems)
7.2 Chemicals	
Chlorine	
7.3 Date on which the safety information was last reviewed or revised	07/21/2009
7.4 Process Hazard Analysis (PHA)	
7.4.a. Date of last PHA or PHA update	08/21/2009
7.4.b. Technique used	
7.4.b.1. What if	
7.4.b.2. Checklist	
7.4.b.3. What if/Checklist Combined	
7.4.b.4. HAZOP	Y
7.4.b.5. Failure mode & effects analysis	
7.4.b.6. Fault tree analysis	
7.4.b.7. Other	
7.4.c. Expected or actual date of completion of all changes resulting from last PHA or PHA update	08/21/2009
7.4.d. Major hazards identified	
7.4.d.1. Toxic release	Y
7.4.d.2. Fire	
7.4.d.3. Explosion	
7.4.d.4. Runaway reaction	
7.4.d.5. Polymerization	
7.4.d.6. Overpressurization	
7.4.d.7. Corrosion	Y
7.4.d.8. Overfilling	
7.4.d.9. Contamination	
7.4.d.10. Equipment failure	Y
7.4.d.11. Loss of cooling, heating, electricity, instrument air	
7.4.d.12. Earthquake	
7.4.d.13. Floods	
7.4.d.14. Tornado	
7.4.d.15. Hurricanes	
7.4.d.16. Other	
7.4.e. Process controls in use	
7.4.e.1. Vents	Y
7.4.e.2. Relief valves	
7.4.e.3. Check valves	
7.4.e.4. Scrubbers	
7.4.e.5. Flares	
7.4.e.6. Manual shutoffs	Y



## Section 7. Prevention Program: Program Level 3

7.4.e.7. Automatic shutoffs	Y
7.4.e.8. Interlocks	
7.4.e.9. Alarms and procedures	Y
7.4.e.10. Keyed bypass	
7.4.e.11. Emergency air supply	
7.4.e.12. Emergency power	
7.4.e.13. Backup pump	
7.4.e.14. Grounding equipment	
7.4.e.15. Inhibitor additions	
7.4.e.16. Rupture disks	Y
7.4.e.17. Excess flow device	
7.4.e.18. Quench system	
7.4.e.19. Purge system	Y
7.4.e.20. None	
7.4.e.21. Other	
7.4.f. Mitigation systems in use	
7.4.f.1. Sprinkler system	Y
7.4.f.2. Dikes	
7.4.f.3. Fire walls	
7.4.f.4. Blast walls	
7.4.f.5. Deluge system	
7.4.f.6. Water curtain	
7.4.f.7. Enclosure	Y
7.4.f.8. Neutralization	
7.4.f.9. None	
7.4.f.10. Other	
7.4.g. Monitoring/detection systems in use	
7.4.g.1. Process area detectors	Y
7.4.g.2. Perimeter monitors	
7.4.g.3. None	
7.4.g.4. Other	
7.4.h. Changes since last PHA update	
7.4.h.1. Reduction in chemical inventory	
7.4.h.2. Increase in chemical inventory	
7.4.h.3. Change in process parameters	
7.4.h.4. Installation of process controls	
7.4.h.5. Installation of process detection systems	
7.4.h.6. Installation of perimeter monitoring systems	
7.4.h.7. Installation of mitigation systems	
7.4.h.8. None recommended	
7.4.h.9. None	Y
7.4.h.10. Other	
7.5 Date of most recent review or revision of operating procedures	07/21/2009
7.6 Training	



## Section 7. Prevention Program: Program Level 3

7.6.a. Date of most recent review or revision of training programs	07/21/2009
7.6.b. Type of training provided	
7.6.b.1. Classroom	Y
7.6.b.2. On the job	Y
7.6.b.3. Other	
7.6.c. Type of competency testing used	
7.6.c.1. Written test	Y
7.6.c.2. Oral test	
7.6.c.3. Demonstration	
7.6.c.4. Observation	Y
7.6.c.5. Other	
7.7 Maintenance	
7.7.a. Date of most recent review or revision of maintenance procedures	02/25/2009
7.7.b. Date of most recent equipment inspection or test	02/25/2009
7.7.c. Equipment most recently inspected or tested (equipment list)	chlorinator feed system & gas detection equipment
7.8 Management of change	
7.8.a. Date of most recent changes that triggered management of change procedures	
7.8.b. Date of most recent review or revision of management of change procedures	05/15/2009
7.9 Date of most recent pre-startup review	
7.10 Compliance audits	
7.10.a. Date of most recent compliance audits	07/21/2009
7.10.b. Expected or actual date of completion of all changes resulting from the most recent compliance audits	07/21/2009
7.11 Incident investigation	
7.11.a. Date of most recent incident investigation	
7.11.b. Expected or actual date of completion of all changes resulting from the incident investigation	
7.12 Date of most recent review or revision of employee participation plans	07/21/2009
7.13 Date of most recent review or revision of hot work permit procedures	05/10/2009
7.14 Date of most recent review or revision of contractor safety procedures	05/10/2009
7.15 Date of most recent evaluation of contractor safety performance	05/10/2009





## Section 9. Emergency Response

9.1 Written emergency response (ER) plan	
9.1.a. Is your facility included in the written community emergency response plan?	Y
9.1.b. Does your facility have its own written emergency response plan?	Y
9.2 Does your facility's ER plan include specific actions to be taken in response to accidental releases of regulated substances?	Y
9.3 Does your facility's ER plan include procedures for informing the public and local agencies responding to accidental releases?	Y
9.4 Does your facility's ER plan include information on emergency health care?	Y
9.5 Date of most recent review or update of your facility's ER plan	08/21/2009
9.6 Date of most recent ER training for your facility's employees	08/21/2009
9.7 Local agency with which your facility's ER plan or response activities are coordinated	
9.7.a. Name of agency	Franklin County Emergency Mgmt.
9.7.b. Phone number	(509) 545-3546
9.8 Subject to	
9.8.a. OSHA Regulations at 29 CFR 1910.38	Y
9.8.b. OSHA Regulations at 29 CFR 1910.120	Y
9.8.c. Clean Water Act Regulations at 40 CFR 112	Y
9.8.d. RCRA Regulations at 40 CFR 264, 265, 279.52	
9.8.e. OPA-90 Regulations at 40 CFR 112, 33 CFR 154, 49 CFR 194, 30 CFR 254	
9.8.f. State EPCRA Rules of Laws	
9.8.g. Other	



## Executive Summary

This Risk Management Plan is for the planning of the response to a potential chlorine leak at the City of Pasco's Butterfield Water Treatment Plant. The City uses chlorine as the primary disinfectant in the water treatment process. We have not had an accidental release of chlorine in the past five years.

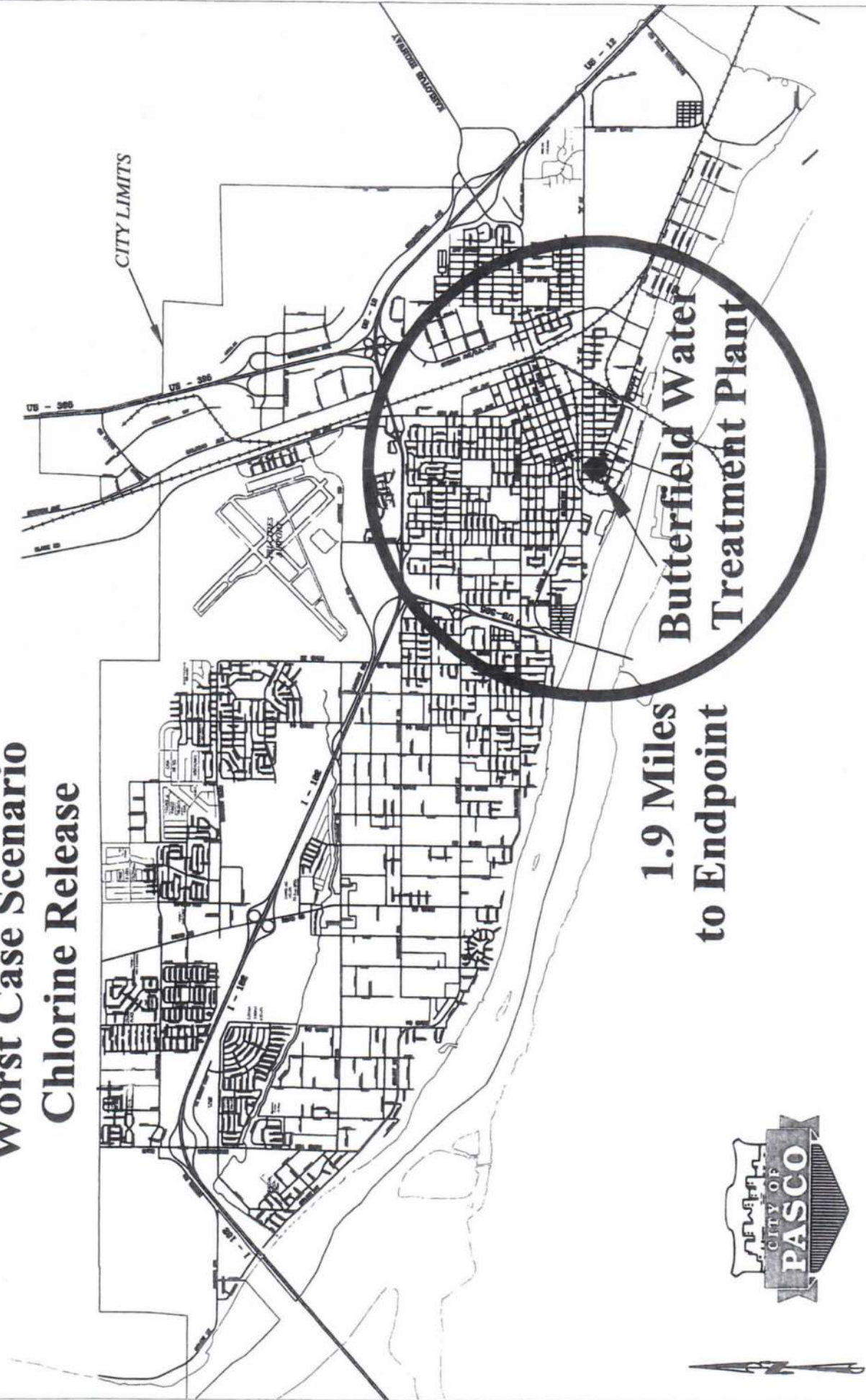
Personnel that work for the City of Pasco, continues to treat chlorine gas with the utmost care and respect. As mentioned in the original RMP, written Standard Operating Procedures for handling chlorine and an Emergency Response Procedure were established in June 1994. Since that time, the City of Pasco has written a Process Safety Management Plan for chlorine at the Water Treatment Plant that conforms to the Occupational Safety and Health Administration (OSHA) and has also completed an update of the plan which included update of training requirements, egress and respiratory protection, and chlorine tank changing procedures. The City also has a written plan that conforms with the State Department of Labor and Industries requirements for Management of Highly Hazardous Chemicals. This plan was developed to provide guidelines for response to threatened or actual chlorine release that will minimize the potential for employee and/or public exposure to these hazardous materials.

As discussed in the original RMP, the requirements of the Risk Management Guidance for offsite Consequences Analysis covers two scenarios for modeling. The first scenario being the "worst" case release-which represents the very worst that can happen. The second scenario being the "alternative release." This is to represent the most probable situation for a possible accident.

The worst case scenario includes the assumption that all four of the Water Treatment Plant one ton chlorine cylinders that are on-line would be released into the atmosphere in ten minutes time. A release of this size would effect the operation of the Water Treatment Plant and a large portion of the population of the City of Pasco. The primary response is to contact the Pasco Fire Department so that they may contact the area Hazardous Materials Response Team. They would take control of the situation at that point and time. They have a more accurate computer modeling program they would use at that time to better determine the extent of the emergency. The chances of this size of accident occurring are minimal because of the types of controls and the nature of the gas.

The alternative release scenario includes the assumption that one of the one ton cylinders was ruptured while unloading the cylinder. A release this size would effect an area around the Water Treatment Plant with a radius of 0.3 miles. That means about 690 residents may be effected. The primary response is to contact the Pasco Fire Department so that they may contact the area Hazardous Materials Response Team. They would take control of the situation at that point in time. They have more accurate computer modeling program they would use at that time to better determine the extent of the emergency. The Franklin County Emergency Management team actually conducted a simulated drill for this scenario in the summer of 1998

# Risk Management Plan Worst Case Scenario Chlorine Release



# RMP\*Comp: Results of Consequence Analysis

## Scenario Summary

Oct 16, 2014

Chemical: Chlorine  
CAS number: 7782-50-5  
Threat type: Toxic Gas  
Scenario type: Worst-case  
Physical state: Liquefied under pressure  
Quantity released: 4 tons  
Release duration: 10 min  
Release rate: 440 pounds per minute  
  
Mitigation measures: Release in enclosed space, in direct contact with outside air  
  
Surrounding terrain type: Urban surroundings (many obstacles in the immediate area)  
Toxic endpoint: 0.0087 mg/L; basis: ERPG-2

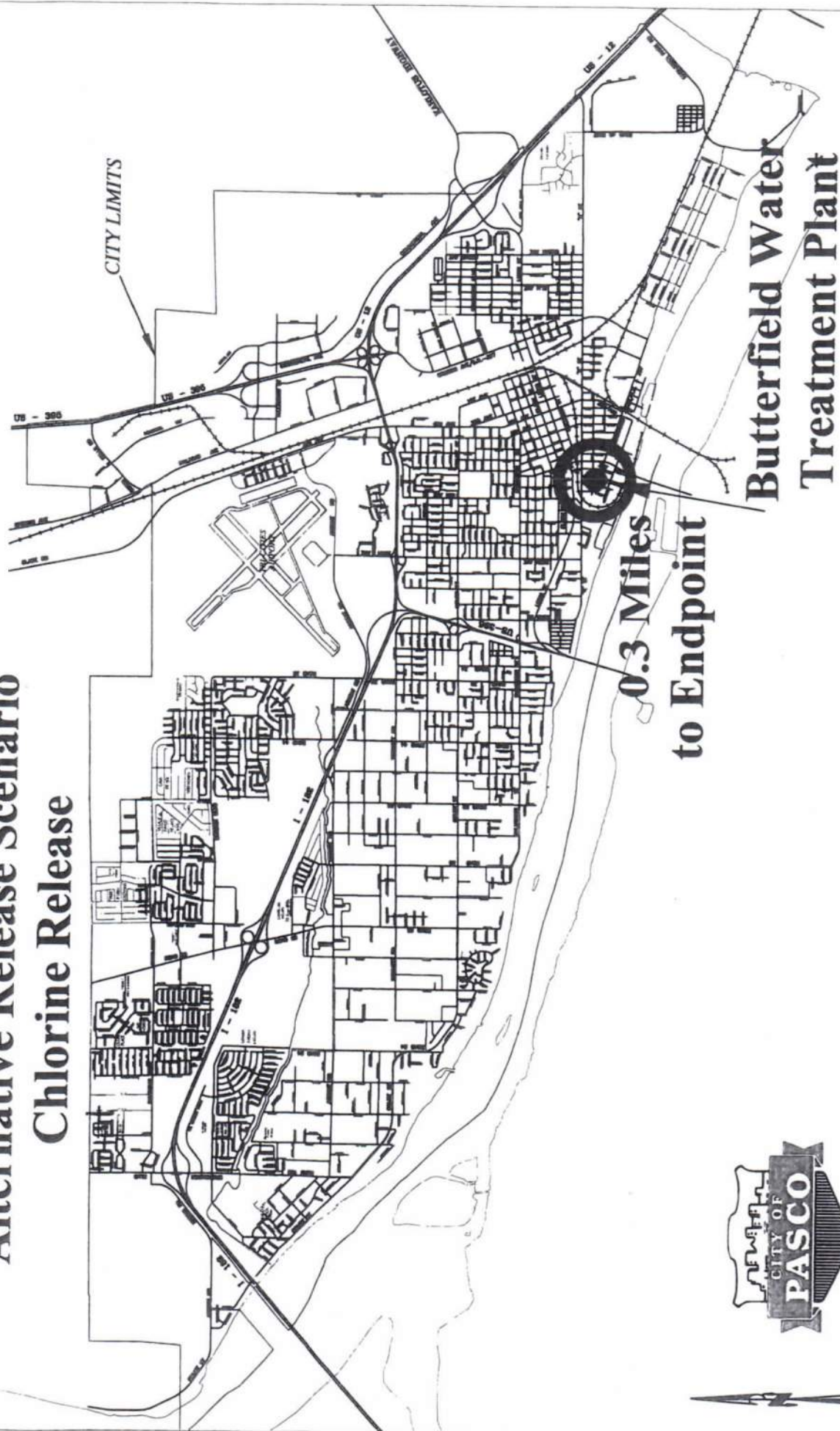
Estimated distance to toxic endpoint: 1.9 miles (3.1 kilometers)

### -----ASSUMPTIONS ABOUT THIS SCENARIO-----

Wind speed: 1.5 meters/second (3.4 miles/hour)  
Stability class: F  
Air temperature:



# Risk Management Plan Alternative Release Scenario Chlorine Release



# RMP\*Comp: Results of Consequence Analysis

## Scenario Summary

Oct 16, 2014

Chemical: Chlorine  
CAS number: 7782-50-5  
Threat type: Toxic Gas  
Scenario type: Alternative  
Physical state: Liquefied under pressure  
Release duration: 10 minutes  
Storage type: Hole in liquid space of tank  
Hole or puncture area: 0.2 square inches  
Height of liquid column above hole: 24 inches  
  
Release rate: 0.316 tons per min  
  
Mitigation measures: Release in enclosed space, in direct contact with outside air  
  
Surrounding terrain type: Urban surroundings (many obstacles in the immediate area)  
Toxic endpoint: 0.0087 mg/L; basis: ERPG-2

Estimated distance to toxic endpoint: 0.3 miles (0.5 kilometers)

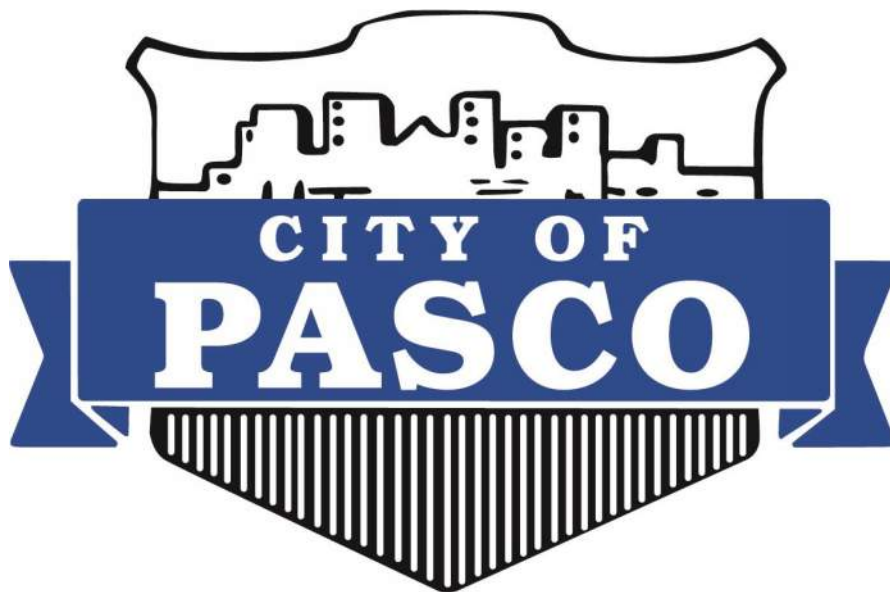
### -----ASSUMPTIONS ABOUT THIS SCENARIO-----

Wind speed: 3 meters/second (6.7 miles/hour)  
Stability class: D  
Air temperature:





# ***CROSS-CONNECTION CONTROL PROGRAM***



January 2014

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## **Appendix**

- A Washington Administrative Codes
- B Pasco Municipal Codes
- C Backflow Assembly Tester Policy, Backflow Assembly Tester Registration Form  
Pasco Backflow Assembly Test Report Form
- D Applicable Pasco Construction Standards
- E Fire Hydrant Meter Application

**References**

City of Pasco web site (Codes, Ordinances & Resolutions / Business)  
Pasco Engineering Standards and Specifications [PDF]  
USCFCCCHR list of approved backflow prevention assemblies  
Washington Administrative Codes  
Washington Certification Services  
Washington Environmental Training Center (WETRC)

# Chapter 1

## CITY OF PASCO

### Public Works Department

# CROSS-CONNECTION CONTROL POLICY

#### Sections:

- 100 Purpose.
- 110 Application.
- 120 Enforcement.
- 130 Definitions.
- 140 Cross-Connections Prohibited.
- 150 Commercial Premises Isolation
- 160 Installation of Backflow Prevention Assemblies.
- 170 Types of Backflow Prevention Assemblies Required.
- 180 Location.
- 190 Installation.
- 200 Acceptable Types.
- 210 Identification of Piping Systems.
- 220 Customers Inspection & Testing Requirements.
- 230 Termination of Services.
- 240 Penalties.

**100 PURPOSE.** The purpose of this chapter, in conjunction with the Uniform Plumbing Code, is to protect the public health in accordance to Washington State Department of Health Drinking Water Regulations, WAC 246-290-490 by the control and prevention of actual and potential cross-connections. This requires the proper installation and safeguarding of water service lines leading to premises where cross-connections exist or are likely to occur, through periodic inspections to minimize the danger of contamination to the potable water system from the premises or the City's potable water system itself.

**110 APPLICATION.** This chapter applies throughout the City of Pasco (CITY) and outside the City to every premises and the owners and occupants thereof served by the potable water system of the City. It applies to all systems installed prior to or after its enactment. Every owner and occupant of any premises covered by this chapter is responsible for compliance with its terms and shall be strictly liable for all damage incurred as a result of failure to comply with the expressed terms and provisions contained herein.

**120 ENFORCEMENT.** The Public Works Director will administer the provisions of this chapter. The Director will designate a Cross-Connection Specialists and propound all needful rules and regulations to carry these provisions into effect. Any deviation, modification or changes from approved standards must be approved by the Director or designated representative.

## 130 DEFINITIONS.

- (1) City or Purveyor means the City of Pasco, Washington.
- (2) 'Air gap separation' means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to tank, plumbing fixture, or other device and the flood level
- (3) 'Auxiliary supply' means any water source or system other than the public water system, that may be available in the building or on the premises.
- (4) 'Backflow' means the flow other than the intended direction of flow, of any foreign liquids, gases, or substances back into the distribution piping of the public water system.
- (5) 'Back Pressure' means backflow caused by a pump, elevated tank, boiler, or other means that could create pressure within the system greater than the potable water supply system.
- (6) 'Backflow prevention assembly' means an assembly to counteract backflow due to back pressure or back siphonage and has been approved for use in the State of Washington by the Department of Health.
- (7) 'Backflow prevention device' means a device to counteract back pressures or prevent back siphonage.
- (8) 'Cross-connection' means any physical arrangement whereby the City's water system is connected, directly or indirectly, with any other non-potable water system, including, but not limited to sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains, or may contain, contaminated water, sewage, or other waste liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or change-over devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross-connections.
- (9) Double check valve assembly (DCVA) means an assembly composed of two independently acting check valves, including tightly closing resilient seated shutoff valves attached at each end of the assembly and fitted with properly located resilient seated test cocks.
  - (a) Double check detector assembly (DCDA) means a specifically designed assembly composed of a line-size approved double check valve assembly with a bypass containing a specific water meter and an approved double check valve assembly. The meter shall register accurately for rates of flow up to 2 gpm (gallon per minute) and shall show a registration for all rates of flow.

- (b) Double check detector assembly type 2 (DCDA2) means a specifically designed assembly composed of a line-size approved double check valve assembly with a parallel bypass assembly. The single check valve used for this assembly shall meet all of the standards for a double check valve assembly excluding the requirement for a second check valve and a test cock between the two check valves. The bypass piping must attach to the line-size assembly between the No. 1 check valve and the No. 2 check valve and between the No. 2 check valve and the No. 2 shutoff valve. Test cock no. 4 of the line-size assembly shall not be located on the bypass piping and test cock No. 4 shall not be attached to the main-line body at the same location as the bypass piping. The bypass containing a specific water meter. The meter shall register accurately for rates of flow up to 2 gpm (gallon per minute) and shall show a registration for all rates of flow.
- (10) Reduced pressure principle backflow prevention assembly (RPBA) means an assembly containing two independently acting approved check valves with a hydraulically operating, mechanically independent pressure differential relief valve located between the two checks, and at the same time below the first check valve. The unit shall include resilient seated test cocks and tightly closing resilient seated shutoff valves at each end of the assembly-
- (a) Reduced pressure detector assembly (RPDA) means a specifically designed assembly composed of a line-size approved reduced pressure principle backflow prevention assembly with a bypass containing a specific water meter and an approved reduced pressure principle backflow prevention assembly. The meter shall register accurately for rates of flow up to 2 gpm (gallon per minute) and shall show a registration for all rates of flow.
- (b) Reduced pressure detector assembly type 2 (RPDA2) means a specifically designed assembly composed of a line-size approved reduced pressure principle backflow prevention assembly with a bypass containing a specific water meter and a check valve with a test cock for testing. The check valve must be attached to the line-size assembly between the No. 1 check valve and No. 2 check valve and between the No. 2 check valve and No. 2 shutoff valve. The No.4 test cock of the line-size assembly shall not be located on the bypass piping and test cock No. 4 shall not be attached to the main-line body at the same location as the bypass piping. The meter shall register accurately for rates of flow up to 2 gpm (gallon per minute) and shall show a registration for all rates of flow.
- (11) Pressure vacuum breaker assembly (PVBA) means an assembly containing an independently operating internally loaded check valve and an independently operated loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with a properly located resilient seated test cocks and tightly closing resilient seated shutoff valves attached at each end of the assembly.

- (12) 'Purveyor' means the Director of Public Works.
- (13) Spill resistant vacuum breaker assembly (SVBA) means an assembly containing an independently operating internally loaded check valve and an independently operated loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with a properly located resilient seated test cock, a properly located bleed/vent port, and tightly closing resilient seated shutoff valves attached at each end of the assembly.
- (14) Atmospheric vacuum breaker back siphonage prevention assembly (AVB) means an assembly containing an air inlet valve, a check seat and air inlet port(s). (Also known as the non-pressure type vacuum breaker) A shutoff valve immediately upstream may be an integral part of the assembly, but there shall be no shutoff valves or obstructions downstream. The assembly shall not be subject to operating pressure for more than twelve (12) hours in any twenty-four (24) hour period.
- (15) Premises Isolation assembly means the backflow prevention assembly installed to prevent the backflow of contaminants from the property.
- (16) In-premises Protection means the installation of a backflow prevention assembly or device to prevent backflow from a specific fixture or connection inside the property.
- (17) Potable water system means the City's water distribution system supplying drinking water.

#### **140 CROSS-CONNECTIONS PROHIBITED.**

- (1) All cross-connections, whether or not they are controlled by automatic devices such as check valves or by hand operated mechanisms including, but not limited to gate valves, stop clocks, or removable sections are prohibited.
- (2) Failure on the part of persons, firms, or corporations to discontinue the use of all cross-connections and to physically separate cross-connections is sufficient cause for the immediate discontinuance of City water service to the premises.

#### **150 COMMERCIAL PREMISES ISOLATION.** All commercial properties are required to have an RPBA for Premises Isolation of the building water supply at the time of construction or;

- (1) There is a change in the occupancy use,
- (2) The building is remodeled with the accumulative valuation meeting or exceeding 33%,
- (3) An additional internal backflow prevention assembly is installed or required.

Property owners may submit a written request for a variance. However, if future inspections identify a cross-connection hazard the variance will become void and the requirement enforced.



**160 INSTALLATION OF BACKFLOW PREVENTION ASSEMBLIES.** Backflow prevention assemblies shall be installed at the water meter for those facilities listed on Table 9 in the Department of Health Cross-Connection Control regulations or any premises where in the judgment of the City's Cross-Connection Specialist the nature and extent of activity or use on the premises would present an immediate and dangerous hazard to health should a cross-connection occur, even though such cross-connection does not exist at the time the backflow prevention assembly is required to be installed. This includes:

- (1) Premises having an auxiliary water supply including, but not limited to City Irrigation Water, Franklin County Irrigation District water or private well.
  - (a) Premise having, but not utilizing an auxiliary water supply shall install and maintain an approved backflow prevention assembly commensurate with the degree of hazard on the City water supply to any connection(s), including, but not limited to landscape irrigation systems.
- (2) Premises having internal cross-connections that are not correctable, or intricate plumbing arrangements which make it impractical to ascertain whether or not cross connections exist.
- (3) Premises where entry is restricted so that inspections for cross-connections cannot be made with sufficient frequency or at sufficient short notice to ensure that cross-connections do not exist.
- (4) Premises having a repeated history of cross-connections being established or re-established.
- (5) Premises on which any substance is handled under pressure so as to permit entry into the public water system, or where a cross-connection could reasonably be expected to occur. This includes, but is not limited to the handling of process waters and cooling waters.
- (6) Premises where materials of a toxic or hazardous nature are handled such that if back siphonage should occur, a serious health hazard may result.
- (7) The following types of facilities, including, but not limited to:
  - (a) Hospitals, mortuaries, clinics;
  - (b) Laboratories;
  - (c) Piers and docks;
  - (d) Sewage treatment plants;
  - (e) Food or beverage processing plants;
  - (f) Chemical plants using a water process;
  - (g) Metal plating industries;
  - (h) Petroleum processing or storage plants;
  - (i) Radioactive material processing plants or nuclear reactors;
  - (j) Car washes;
  - (k) Others specified by the City's Cross-Connection Specialist

**170 TYPES OF BACKFLOW PREVENTION ASSEMBLIES REQUIRED.** The type of prevention device required by the City's Cross-Connection Specialist in accordance with Section 160 depends on the degree of hazard which exists:

- (1) An air-gap separation or reduced pressure backflow assembly shall be installed where the water supply may be contaminated by sewage, industrial waste of a toxic nature or other contaminants which would cause a health or system hazard.
- (2) In the case of a substance which may be objectionable but not hazardous to health, a double check valve assembly, air-gap separation or a reduced pressure principle backflow assembly shall be installed.
- (3) Lawn sprinkler systems, which are supplied by City water only, shall be required to have one double check valve assembly, pressure vacuum breaker assembly, spill resistant vacuum breaker assembly or atmospheric vacuum breaker's may be installed on each line. The units shall be approved by the Washington State Department of Health, as manufactured. Installation shall be as follows:
  - (a) Pressure Vacuum Breaker Assembly (PVBA) and Spill Resistant Vacuum Breaker (SVB). The PVBA and SVBA must be installed at least twelve inches above the highest fixture or point of water usage and in such a manner that drainage will preclude back pressure. The PVBA and SVBA unit shall be installed vertically with test cock(s) and control valves accessibly located for connection of test equipment. This type assembly shall not be installed higher than sixty (60) inches.
  - (b) Atmospheric Vacuum Breaker (AVB). The AVB shall be installed on the discharge side of the last valve on each sprinkler zone. The AVB shall be installed at least six (6) inches above the highest sprinkler head so at no time will the AVB be subjected to back pressure or drainage. The AVB shall not be installed where it will be under continuous operating pressure for more than 12 hours in any 24 hour period. The AVB unit shall be installed vertically and no higher than sixty (60) inches.
  - (c) Double Check Valve Assembly (DCVA). The DCVA must be installed in an approved box below ground or above ground in the orientation the DCVA was approved by the State of Washington Department of Health with minimum required clearances to provide access to perform maintenance and testing. And in such a manner that drainage will preclude flooding of the unit. The DCVA unit shall be installed with test cocks and control valves accessibly located for connection of test equipment. This type assembly shall not be installed higher than sixty (60) inches.

**180 LOCATION.** Backflow prevention assemblies required by this chapter must be installed at the meter, at the property line of the premises when meters are not used. Approval for alternate locations shall be requested in writing for consideration by the City's Cross-Connection Specialist to ensure the backflow

assembly is readily accessible for maintenance and testing, and where no part of the assembly will be submerged or hidden from proper inspection.

- 190 INSTALLATION.** Backflow prevention assemblies required by this chapter must be installed to minimum State Department of Health requirements in conjunction with the City's Construction Standards published by the Pasco Engineering Department as a reference under the supervision of the City's Cross-Connection Specialist.
- 200 ACCEPTABLE TYPES.** Any protective assembly required by this chapter shall be a model approved by the City's Cross-Connection Specialist. A double check valve assembly, double check detector assembly, reduced pressure backflow assembly, reduced pressure detector assembly or a pressure vacuum breaker assembly will be approved if it has successfully passed performance tests of the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research, and has been approved by the Washington State Department of Health, and otherwise meets standards acceptable to the Director of Public Works.
- 210 IDENTIFICATION OF PIPING SYSTEMS.** Where potable water and, non-potable water including but not limited to chemical feed systems, compressed air lines, gas lines, co-exist in an industrial, commercial or residential facility, labeling in accordance with American National Standards A13.1 shall be required to ensure proper identification of each line.
- 220 CUSTOMER'S INSPECTION & TESTING REQUIREMENTS.** The reduced pressure backflow assembly, reduced pressure detector assemblies, double check valve assembly, double check detector assemblies, air gaps, spill resistant vacuum breaker assembly and pressure vacuum breaker assembly shall be inspected & tested at installation, repair, and annually thereafter or more often when successive inspections & tests indicate failure. Backflow prevention assemblies no longer on the State of Washington Department of Health "approved list" or repeatedly fail may be required to be replaced.
- 1) The customer is responsible to have their backflow prevention assembly tested or repaired on an annual basis or more often if the backflow assembly repeatedly fails by a person having met the requirements and is in good standings with Washington Certification Services as a Washington State Certified Backflow Assembly Tester and is approved by the City's Cross-Connection Specialist. The customer shall provide written evidence on a City test form to the City's Cross-Connection Specialist within seven (7) days from the actual test date documenting that the backflow assembly failed or meets all requirements including but not limited to accepted assembly condition, test results and installation.
    - (a) The Cross-Connection Specialist will give written notice (green post card) to the property owner thirty (30) days before the date the backflow test is due.
    - (b) The Cross-Connection Specialist will give written notice (red post card) to the property owner advising when the test report is fourteen (14) days past due.

- (c) Property owners failing to meet the testing or installation requirement will be referred to the Pasco Code Enforcement Board.
- 2) Any person inspecting, and/or testing, backflow prevention assemblies shall be currently certified as a Backflow Assembly Tester by the State of Washington Department of Health, Office of Drinking Water, Washington Certification Services and meet the State of Washington Department of Labor and Industries requirements for repairing backflow prevention assemblies where applicable.
  - (a) Backflow Assembly Testers testing in the City are subject to the provisions outlined in the Pasco Public Works Department Backflow Assembly Tester Policy.
- 3) Any person or company converting an existing City water supplied system to any auxiliary water supply must coordinate the removal of the City water supply and connection to the auxiliary water supply with the Cross-Connection Specialist.
  - (a) The City potable water supply valve must be removed and verified by the Cross-Connection Specialist prior to any connection to the auxiliary water supply.

**230 TERMINATION OF SERVICES.** The failure of the customer to provide water use activity information upon request or meet the requirements relative to the installation, maintenance, testing or inspection of backflow prevention assemblies required by this chapter shall be considered a violation of Pasco Municipal Code Chapter 13 and result in one of the following actions:

- (a) Referred to the Pasco Code Enforcement Board for determination and order, or
- (b) Immediate termination of water services to the premises.

**240 PENALTIES.** It is unlawful for any persons, firm, or corporation to violate any provision of the Public Works Department Cross-Connection Policy and Procedure Program identified in the Pasco Municipal Code Chapter 13 or fail to comply with any provision thereof. A violation of Chapter 13 is a misdemeanor unless otherwise provided. A violation of any provision hereof is a continuing violation.

# Chapter 2

## Backflow Assembly Installation

The City of Pasco recognizes the State of Washington Department of Health, Drinking Water Division recommendations for using the Pacific Northwest Section, American Water Works Association Accepted Practice and Procedure Manual (referred to as the “Yellow Manual”) and the University of Southern California Foundation For Hydraulic Research and Cross-Connection Control (USCFHRCCC) for the installation of backflow prevention devices and assemblies. However, these are recommendations and the City of Pasco has the authority to make more stringent requirements to meet each installation application.

The Atmospheric Vacuum Breaker (AVB) is a backflow device commonly installed on the water supply to equipment and some landscape irrigation systems. Of all of the backflow preventers, the AVB is for low hazard applications and is the most improperly installed and/or utilized.

- The AVB must be used only on potable (drinking water) applications.
- It must be installed and maintained no less than six (6) inches higher than highest point of downstream piping.
- There cannot be any valves installed after it or be subject to back pressure.
- The water supply to the AVB cannot be on for more that twelve (12) hours in a twenty-four (24) hour period.

The Pressure Vacuum Breaker Assembly (PVBA) and Spill Resistant Vacuum Breaker Assembly (SVBA) are similar in design and intended application. The PVBA and SVBA are for low hazard applications. The PVBA is commonly used on the potable water supply to a landscape irrigation system where the SVBA designed for indoor use when the spillage of water in unacceptable.

- The PVBA and SVBA must be used only on potable water applications.
- They both must be installed a minimum of twelve (12) inches above the highest point of downstream piping. However, cannot be more than sixty (60) inches above ground.
- Unlike the AVB, the PVBA and SVBA can have valve(s) installed after it.
- The PVBA and SVBA are designed to be under continuous pressure.
- The PVBA and SVBA cannot be subject to back pressure.

The Double Check Valve Assembly (DCVA) is widely used by landscape contractors due to the DCVA having the ability to be installed below ground. Because the DCVA can be subjected to back pressure, it can be used where the landscape terrain is sloped or hilly.

- The DCVA must have the appropriate clearances for testing and maintenance when installed below ground or enclosure (Appendix E)
- DCVA can be under continuous pressure.
- The DCVA cannot be installed more than sixty (60) inches above the ground or floor unless an *\*approved platform* is provided.
- The DCVA can be used for low hazard applications.

Double Check Detector Assembly (DCDA) and DCDA type 2 are designed for use where it is necessary to record unauthorized use of water. It has a main body assembly with a metered by-pass assembly. It is typically found on the water supply to a fire sprinkler system.

- The DCDA must have the appropriate clearances for testing and maintenance when installed below ground or enclosure (Appendix E)
- DCDA can be under continuous pressure, as required for fire protection.
- The DCDA cannot be installed more than sixty (60) inches above the ground or floor unless an approved platform is provided.
- The DCDA can be used for low hazard applications where there is no chemical injection or anti-freeze solution used.

Reduced Pressure Backflow Assembly (RPBA) in some regions refer to it as a Reduced Pressure Zone Assembly or RPZ. Both the RPBA and RPZ are commonly referred to as an RP. The RP is for use where the water or downstream uses of the water are or may be contaminated with chemicals or bacteria. It is for this reason that the RPBA is for use on high hazard applications.

- The RPBA must have the appropriate clearances for testing and maintenance.
- The RPBA **cannot** be installed below ground.
- RPBA can be under continuous pressure.
- The RPBA cannot be installed more than sixty (60) inches above the ground or floor unless an approved platform is provided.
- The RPBA can be used for both low and high hazard applications.
- The RPBA requires freeze protection (Appendix E) if not winterized.

Reduced Pressure Detector Assembly (RPDA) and RPDA type 2, like the DCDA are designed for use where it is necessary to record unauthorized use of water. It has a main body assembly with a metered by-pass assembly. It is typically found on the water supply to a fire sprinkler system when chemical injection or anti-freeze is used.

- The RPDA must have the appropriate clearances for testing and maintenance when installed below ground or enclosure (Appendix E)
- The RPDA **cannot** be installed below ground.
- RPDA can be under continuous pressure, as required for fire protection.
- The RPDA cannot be installed more than sixty (60) inches above the ground or floor unless an approved platform is provided.
- The RPDA requires freeze protection (Appendix E) if not winterized.

Dual or parallel backflow assemblies (RPBA, RPDA, DCVA, AND DCDA) should be hydraulically sized by the manufacturer to assure proper operation and wear.

Enclosures for assemblies installed above ground must provide adequate clearances for annual testing and maintenance.

The Air Gap (AG) separation is the most common and effective mean of backflow protection and least costly to maintain when it is utilized. The most common AG is found in the home. That is the sink and bath tub.

- The AG is used when there is a potential or there is a likelihood of sewage contamination could occur.
- The Air Gap separation is the unobstructed distance between the free flowing fill pipe (faucet) and the flood rim of the receiving vessel (sink or tub).
- The separation is measured two (2) times the inside diameter of the fill line above the flood rim (Appendix E), unless there is a wall next to it or it is inside an artificial atmosphere (pressurized dome stadium). In that case the AG must be increased.

All backflow prevention assemblies are to be tested.

- At the time of installation.
- When the assembly has been moved or reinstalled.
- After it has been repaired.
- After a backflow incident involving the assembly or air gap.
- Annually, unless the purveyor requires more frequent testing for high hazard premises or for assemblies that repeatedly fail.

*\*approved platform* is platform that has been manufactured or constructed to Occupational Safety and Health Administration (OSHA) and/or Washington Industrial Safety and Health Act (WISHA) standards.



# Chapter 3

## Landscape Irrigation Water Supply

The City of Pasco Municipal Code, Chapter 25 Section 75 specifies the requirements for landscape vegetation and the maintaining of live vegetation by installing an automatic watering system. There are four (4) potential sources of water that can be utilized to operate an underground sprinkler system. They are:

1. The City's potable water (fed through a water meter)
2. Pasco Irrigation Water.
3. Franklin County Irrigation District (FCID)
4. Private well

At this time the City does not have a reclaimed water system available for residential use.

### Using potable water

Residents with properties east of 20<sup>th</sup> Ave. utilize water through the water meter to irrigate their yards. This requires the installation of backflow protection to prevent backflow contamination to the City's water system. (Appendix E)

### Irrigation Water

Residents west of 20<sup>th</sup> Ave. (except for isolated areas) have access to either FCID or City Irrigation water. When irrigation water is "Available" and the supply is adjacent to the property, Pasco Municipal Code strongly urges customers to connect to the irrigation water supply. The use of irrigation water does not require the installation of a backflow preventer, **unless** the irrigation water and the potable water are inter-connected so that there is an option to switch between the two water supplies.

There are few private wells currently being used for irrigation purposes. These wells are used when old farm houses had access to the City's potable water system and opted to maintain the well for irrigation after connecting the house to the City's system.

Private wells and irrigation water are considered an *\*auxiliary water supply* and is untreated. Not being treated water, to Health Department standards, it has the potential of containing hazardous bacteria, chemicals etc. requiring it to be kept separate from the potable water, unless protection by a Reduced Pressure Backflow Assembly that is properly installed and maintained. (Appendix E)

### Connecting to the supply

When connecting to the potable water supply, it is necessary to make sure that it is done properly, with the correct fittings to minimize contamination to the system as well as the house. New regulations require plumbing fittings that come in contact with water used for drinking (service lines, fittings, meters and valves) be *\*lead free*.

### **Disconnecting/converting to irrigation water**

When an existing water connection that is being used for irrigation purposes is disconnected so that the irrigation system can be converted to an auxiliary water supply, the proper procedure must be followed to minimize the potential of leaking fittings and contamination to the drinking water.

1. The potable water supply valve (typically adjacent to the water meter box) is dug up. The hole should be big enough to adequately put a wrench on the supply valve to remove it. It's a good idea to go 6 inches deeper than the water line going to the house for run back. (Some are very tight and you will need leverage)
2. You need to have the proper tools on hand (16" pipe wrench, 12" Crescent wrench, hack saw or PVC cutter, Teflon tape or thread sealant and a pipe plug).
3. Call the City to have the meter turned off (48 hour notice for scheduling is requested).
4. When the meter is turned off, cut line between the supply valve and the line going to the solenoid valves.
5. Unscrew the supply valve and connecting nipple from the tee.
6. Install the pipe plug in the tee.
7. The City will turn the water back on to verify there are no leaks before the hole is backfilled.
8. Connect the Irrigation water supply to the piping going to the solenoid valves.

*\*auxiliary water* is an untreated water of unacceptable or unknown quality water supplied to or is adjacent to the property that is not water supplied through the City of Pasco water distribution system network.

# Chapter 4

## Miscellaneous Water Use From Fire Hydrants

The City of Pasco allows the use of fire hydrants for filling water trucks, water towers for construction dust control, sewer line flushing, loading and flushing water mains and to supply hydro-seeding equipment, portable cleaning and spray equipment.

**Fire Hydrant Meters** are used to track the amount of water used from the fire hydrant. Application is made at the Engineering Division desk and contains information on connecting the meter, backflow prevention and Air Gap separation requirements.

### **Portable Spray and Cleaning Equipment**

Portable spray and cleaning equipment are “portable” and can be connected to unknown quality water sources (which may be contaminated). This equipment can/usually have the potential of mixing chemicals such as detergents or sanitizers to mix with the spray under high pressure. Equipment utilizing a direct connection to the water source (fire hydrant) requires a Reduced Pressure Backflow Assembly (RPBA) as well as the fire hydrant meter. Trailer or truck mounted equipment can have a reservoir tank in various gallon capacities. A tank should be fitted with an approved Air Gap or permanently mounted RPBA. (Appendix E)

### **Sewer Line Flushing**

When a fire hydrant is used to flush a sewer line, a hose is connected from the fire hydrant meter to an Air Gap separation. The Air Gap is required due to the hazardous nature of the sewer. Typically, the hose is connected to the fire hydrant meter which is connected to the fill line on a water truck equipped with an approved Air Gap. The water truck then supplies water to the sewer line through a hose. When a water truck is not used, a RPBA is installed at the fire hydrant with the meter and a hose is run from the RPBA to the sewer line. (Appendix E)

### **Filling Water Towers, Water Trucks, Portable Tank Trailers and Hydro-seeding Equipment**

Water Towers, Water Trucks, Portable Tank Trailers and Hydro-seeding Equipment are constantly moved from one site to another. The site can be another water source such as rivers, lakes, canals or wells. These water sources are not treated and in many cases are contaminated. The towers and trucks have open tops where birds and other wildlife can get in, die and decompose. For these reasons, an Air Gap separation or (Appendix E)

**New Water Main Construction**

Before a new water main can be connected to the distribution system, it has to pass a pressure test and a bacteriological (bac-T sanitation) test. After the pipe is installed it is chlorinated, fill with water from a fire hydrant that is connected to a water truck through a fire hydrant meter or a direct connection to the pipe from a fire hydrant meter with an approved backflow preventer. (Appendix E) After setting for a specified amount of time with the high concentration of chlorine, the line is flushed and a bac-T water sample is collected. Once cleared by the local Health Department laboratory, the new water main can be connected to the system and put into service.



## **Appendix 4-H**

### **City of Pasco**

### **Watershed Control Program**

#### **Introduction**

Existing drinking water system planning requirements (WAC 246-290-135) require all Group A systems using surface water as a source of supply to develop a watershed control program (WCP). This document summarizes the WCP for the City of Pasco, Washington, and integrates and incorporates by reference related plans and programs upon which this WCP relies. The City of Pasco derives its drinking water supply from two surface water intakes on the Columbia River: (1) the McNary Pool Columbia River Butterfield Intake (Butterfield Intake), and (2) West Pasco McNary Pool Columbia River Intake (West Pasco Intake). Water diverted through these intakes is treated at the Butterfield and West Pasco water treatment plants (WTP), respectively, and then distributed to customers. The locations of the two surface intakes are shown in Figure 4-H-1.

The major components of the City's WCP are listed below:

- Watershed description;
- Potential sources of surface water contamination;
- Watershed management and control measures;
- System operation and emergency provisions;
- Raw water quality trends; and
- Recommendations for long-term watershed control planning.

#### **Watershed Description**

##### General

The City is located at the southern margin of Franklin County, Washington, near the confluence of the Columbia, Yakima, and Snake Rivers. The Yakima and Snake Rivers are major tributaries contributing flow to the Columbia River. The conflux of the Yakima River is located upstream of the Butterfield intake structure and downstream of the West Pasco intake. The conflux of the Snake River is located downstream of both intake structures.

The Columbia and Yakima Rivers drain extensive watersheds upstream of the City's intakes with numerous land uses and potential contaminant sources that are outside of the City's control or jurisdiction. This WCP focuses on land uses within and near the City that could affect the quality of source water diverted by the City's intakes, including the following watersheds that flow to the Yakima and Columbia River systems immediately upstream of the City intakes:

- Esquatzel Coulee (WRIA 36);
- Lower Yakima (WRIA 37); and

- Alkali-Squilchuck (WRIA 40).

The City's shoreline area is located within Lake Wallula, a reservoir on the Columbia River created in 1954 after the construction of McNary Dam. River stage and floodplain levels are closely regulated and confined to the river. Artificial storages and releases by McNary Dam operations result in higher than natural flows during the late summer and fall and lower than natural flows in the spring and early summer when Columbia and Yakima river flows would be higher from melting snowpack. Seasonal changes in the hydraulic regime affect sediment, nutrient, and organic matter transport within the river.

Based on land use regionally and within and along the shoreline of the City, activities that could adversely impact source water quality include those associated with upstream agricultural and commercial/industrial operations, including upland operations away from the shoreline that can result either in impacts to surface water or groundwater discharging to the Columbia River.

### Climate

The Pasco area has a climate characterized by hot, dry summers and cold, damp winters, with snow being the main form of winter precipitation (WRCC 2017). Average annual rainfall totals 7.48 inches, nearly 70 percent of which falls during the months of October through March. Total rainfall is generally greatest during the month of December (1.1 inches) and lowest during July (0.18 inches). Maximum air temperatures average 42.9 °F during the three coldest months of the year (December through February) and 87.9 °F during the three warmest months (June through August). Average annual snowfall totals 9.5 inches, and is generally greatest during the month of January (3.7 inches).

Precipitation provides the mainstem Columbia River and nearby contributing watersheds with most of their seasonal flow. Irrigation return flow and groundwater discharge from infiltration of precipitation and irrigation seepage does provide seasonal flow contribution to surface water bodies within the watersheds. Surface water features within the watersheds include tributary streams, irrigation canals and drains, wetlands, lakes, and reservoirs.

### Land Use

Land use and land cover within the upstream watersheds mainly consists of cropland, pasture, mixed rangeland (grasslands/shrublands), and cultivated lands (irrigated and non-irrigated). Land cover within the City limits is dominated by developed areas, shrub/scrubland, and agricultural land. Land use within the City ranges from residential and commercial/industrial to open space areas. Existing land use designations and acreages are identified in Table 2-2 of the City's 2016 Comprehensive Water System Plan.

The City's shoreline area along the Columbia River is dominated by open space land use (> 60 percent). Open space includes development-restricted areas such as park lands, trails, and critical areas. Most of the open space land is owned by the U.S. Army Corp of Engineers and Washington State Parks and Recreation Department. Other owners include the Port of Pasco



and Washington State Department of Transportation. Industrial land use constitutes over 25 percent of the shoreline and is mostly owned by the Port of Pasco downstream of both of the City's intake facilities. Industrial land use is designated for manufacturing, food processing, storage, and wholesale distribution of equipment and products, hazardous material storage, and transportation-related facilities. Water-dependent and water-related uses include boat launches, docks, piers, and recreational uses such as boating and fishing. Ownership, land covers, and land use types within the City's shoreline jurisdiction are identified in the City's Shoreline Inventory, Analysis, and Characterization Report (Anchor QEA 2015).

## **Potential Sources of Surface Water Contamination**

A contaminant source inventory was completed to identify possible sources having the potential to adversely impact source water quality in the vicinity of each of the City's river intake structures by searching environmental databases of potential contaminant source sites, and identifying and evaluating typical land use practices.

### **Contaminant Source Inventory**

A total of 156 potential contaminant source sites were identified within a one-mile search radius encompassing the intakes (see Figures 4-H-2 and 4-H-3). The name, address, source type, and a brief description of each site are provided in Tables 4-H-1 and 4-H-2, and identified on the figures by a map identification number. Descriptions of the source type codes listed in the tables are defined in Table 4-H-3.

Of the 156 sites identified, 14 were identified in proximity to the West Pasco intake structure (Figure 4-H-2 and Table 4-H-1). Only one site is listed as a confirmed and suspected contaminated site (Map ID No. 5 on Figure 4-H-2). All sites are located downstream of or on the opposite side of the river from the West Pasco intake, with the exception of a concrete facility and automotive services center (Map ID No.'s 7, 8, and 9). According to the Washington State Department of Ecology (Ecology), these facilities are identified as generators of more than 2,640 pounds of hazardous waste per year (Table 4-H-1) and are located upstream or upgradient of the intake.

The remaining 142 potential contaminant sites were identified in proximity of the Butterfield intake (see Figure 4-H-3 and Table 4-H-2). Approximately 80 percent of these are mapped at locations downstream of or on the opposite side of the river from the intake. The upstream site closest to the river is a dairy products retailer (Map ID No. 28 on Figure 4-H-3), described as storing 10,000 pounds or less of hazardous chemicals and identified as having an underground storage tank. The downstream site closest to the intake (Map ID. No. 1 on Figure 4-H-3) is listed as having two underground storage tanks. Five of the 142 sites are listed as state cleanup sites (Map ID No.'s 13, 30, 87, 112, and 123) and 11 are listed as having a leaky underground storage tank (LUST; Map ID No.'s 29, 46, 58, 67, 72, 79, 97, 103, 106, 119, and 138). The LUST sites are considered as known soil or groundwater contamination sites. All of the LUST sites are located downstream of or across the river from the intake, at distances of one-half mile or more.

## Land Use Evaluation

Current land use within a one-mile radius of the intake structures include residential, commercial, and parks/open space. Industrial land use is identified downstream of the Butterfield intake. Shoreline areas surrounding the intakes are largely composed of low-density residential, and parks/open space. Potential contaminant issues related to these land uses include:

- **Residential** – Potential contaminants commonly associated with residential land use include sediment, nutrients, pathogens, hydrocarbons and metals. These are typically associated with paints, solvents, lawn and garden care products, automotive products such as antifreeze and motor oil, and nutrient loading and disposal of household detergents and cleansers through septic systems;
- **Commercial/Industrial** – Potential contaminants commonly associated with commercial/industrial land use include petroleum hydrocarbons from gasoline stations, industrial and commercial operations that fuel and maintain equipment and vehicles, metals, and solvents. Contamination from metals is a potential threat at commercial and industrial sites that handle or use materials with significant metallic constituents (paints, waste oil, etc.), historical pesticides (historical pesticides were typically metal-based compounds), and metal plating shops (cyanides and heavy metals). Solvents can be a major threat to water supplies, because they have high solubilities relative to drinking water standards, and thus a small quantity can affect a large portion of an aquifer or surface water body; and
- **Parks/Open Space** – Expected to have the lowest potential for contamination because of the nature and low impact of activities occurring there. Pesticide use and nutrients from fertilizers, however may affect runoff from parks and illicit dumping in open spaces also may present a threat to nearby surface water.

Other potential upstream contaminant sources in the watershed include:

- **Agriculture** – Agricultural activities can cause several types of water quality problems, including suspended sediment from soil erosion, nutrient loading and microbiological contamination from manure and other biological wastes, and chemical fertilizers and pesticides. Farming activities that have the potential to degrade water quality include poor pasture management and chemical use, poor management of animal wastes, unlimited animal access to surface waters, and overgrazing and erosion;
- **Industrial** – Central Pre-Mix Concrete Company operates an aggregate mining operation north of the West Pasco intake facility. Potential contaminants associated with typical sand and gravel mining operations include petroleum hydrocarbons, such as lubricants and fuels. Leaks and spills resulting from vehicle/equipment operation, fueling, maintenance, and washing, or from improper handling and storage of lubricants and fuels, may enter groundwater or surface water systems by direct runoff or through-flow. Process water used at concrete batch plants also can pose a contaminant risk if discharged without pre-treatment. Concrete batch plants store, handle, and mix a variety of chemicals used as concrete additives and discharged process water can

contain high levels of pH, chlorides, and sulfates.

- **Erosion** – Increased sediment loading from the movement of soil by water and wind, primarily in areas that have high erosion potential (e.g., areas with moderate to steep slopes and exposed soils having little or no vegetative cover);
- **Roadways** – Accidental spills, construction and maintenance activities, and general vehicular traffic can introduce suspended solids, nutrients, petroleum hydrocarbons and metals into surface water bodies;
- **Stormwater Outfalls** – Precipitation that collects on impervious surfaces becomes stormwater runoff that may entrain contaminants that have the potential to impact surface water quality. Heavy metals, lawn and garden chemicals, animal waste, sediment, and petroleum products are common pollutants found in stormwater. The City has identified five outfall locations (see Figure 4-I-1): two are direct discharges to the Columbia River and the remaining three are indirect discharges to the river. The two direct discharge outfalls are located downstream of the Butterfield intake. The three indirect outfalls are located upstream of the Butterfield intake and discharge to a pond or drainage ditches before discharging to the river. All outfalls are downstream of the West Pasco intake; and
- **Radiological Hazards** – Accidental release of radioactive material from the Columbia Generating Station (CGS) or contaminated groundwater discharging to the Columbia River. The CGS facility is located upstream of the City's intake facilities, approximately 10 miles north of Richland on land leased from the U.S. Department of Energy-Richland at the Hanford Nuclear Reservation. The CGS facility is a Boiling Water Reactor designed to produce 1,180 megawatts of electrical power. Fuel for the reactor consists of slightly enriched uranium dioxide pellets sealed in zirc-alloy-2 fuel rods. The Hanford Nuclear Reservation, a mostly decommissioned nuclear production complex north of CGS, also poses a potential threat to surface water quality. Potential contaminants from these sites include chemicals, metals, and radionuclides such as carbon tetrachloride, chromium-6, nitrate, tritium, uranium, strontium, and iodine-129. Though some of Hanford's groundwater is contaminated, Ecology currently reports that the amount reaching the Columbia River is very small and immediately diluted once the groundwater enters the River.

## **Watershed Management and Control Measures**

This section describes how the City of Pasco monitors and manages activities and land use to minimize or eliminate potential impacts to source water quality. The City does not own all the land within the watersheds and must rely on other local entities with land use authority, including Franklin and Benton Conservation Districts, Franklin County, Benton County, Benton-Franklin Health Department, Washington State Department of Ecology, and the Cities of Kennewick, Richland, and West Richland.

### Land Use Policies and Municipal Ordinances

The mission of the City's Planning Department is to promote the general welfare of the community by ensuring that all development activity within the City's jurisdiction follows the

City's Comprehensive Plan and the Subdivision and Zoning Ordinances of the Municipal Code. The City's land use policies and municipal ordinances are intended to protect critical areas; provide efficient and safe transportation networks; maintain and improve the quality of air, water, and land resources; and better provide for the maintenance of health and sanitation within the City.

Comprehensive Plans developed by Benton and Franklin Counties identify similar water resource and environmental protection goals and policies, intended to preserve and protect ground and surface water resources.

### Stormwater Management

The City is required to develop and implement a Stormwater Management Program (SWMP) as set forth in the Eastern Washington Phase II Municipal Stormwater General Permit. The SWMP is a set of actions and activities comprising the components listed in S5.B of the General Permit, and is designed to (1) reduce the discharge of pollutants from the regulated small Municipal Separate Storm Sewer Systems (MS4) to the Maximum Extent Practicable (MEP), (2) satisfy the state requirement under Chapter 90.48 RCW to apply All Known, Available, and Reasonable methods of prevention, control and Treatment (AKART) prior to discharge, and (3) protect water quality. The City's 2016 Comprehensive Stormwater Management Plan describes the actions and activities completed and scheduled future activities in each of the six NPDES Permit program components listed below:

- Public Education and Outreach;
- Public Involvement and Participation;
- Illicit Discharge Detection and Elimination;
- Construction Site Stormwater Runoff Control;
- Post-Construction Stormwater Management for New Development and Redevelopment; and
- Pollution Prevention and Good Housekeeping for Municipal Operations.

The City requires that all stormwater and drainage improvements be planned, designed, permitted, constructed, and maintained in accordance with the requirements of the latest version of Ecology's Stormwater Management Manual for Eastern Washington (SWMMEW).

The Cities of Pasco, Kennewick, Richland, and West Richland, along with the Department of Ecology are collectively committed to maintaining an effective erosion and sediment control program at all construction sites to prevent or minimize potential impacts to the environment. Untreated runoff from such sites affects water quality; human, animal and environmental health; and can cause flooding when storm drains are clogged with sediment and debris. Developers and contractors working on projects within the Cities are responsible for onsite containment and are required to implement erosion and sediment control measures and best management practices to prevent runoff from entering the stormwater system and surface water bodies.

Shoreline Master Programs developed by Benton and Franklin Counties identify similar stormwater policies, general regulations, required measures, and performance standards to protect and maintain surface and groundwater quantity and quality.

### Agriculture Management

Ecology assumes the primary enforcement role to ensure that agriculture operations do not degrade water quality. Ecology's enforcement is triggered by documented water quality degradation, and is usually initiated by a complaint. Farm owners are encouraged to work with the Natural Resources Conservation Service and the local Franklin Conservation District to develop and implement management plans and best management practices to protect water quality. Programs available through the Franklin Conservation District to help agribusiness and the environment to minimize water quality degradation include:

- **Irrigation Water Management (IWM)** – Provides information to achieve a higher level of IWM to help minimize water quality problems, reduce energy costs and improve crop quality and yield;
- **Nutrient Management Plan** – Designed to prevent contaminated waste water discharge to surface waters; prevent migration of contaminants from the dairy facility to the underlying aquifer; agronomically recycle the livestock nutrients produced through the soil and crops to the fullest extent; meet the requirements of the Clean Water Act; and comply with federal, state and local laws regarding water quality standards; and
- **Habitat Enhancement Projects** – Establishes native grasses on irrigation circle corners to minimize wind erosion of soils and reduce pesticide applications for weed control.

The Washington State Department of Agriculture Pesticide Management Division prepared a Pesticide Management Strategy for Water Quality Protection. The strategy emphasizes prevention of water quality risks by managing pesticide use in a manner that reduces or eliminates the leaching of pesticides to groundwater and surface water. Core aspects of the management strategy include (1) pesticide evaluation, (2) water quality assessment, (3) water quality monitoring and pesticide detection activities, (4) surface and groundwater vulnerability assessment, (5) timely and measured response to confirmed water quality impacts from pesticide use, (6) cooperative development of label modifications to address environmental and human health pesticide concerns, and (7) information and education to maximize proper use of pesticides according to label requirements.

### Inspection and Monitoring

The City and other local entities institute routine inspection and monitoring activities as proactive measures to protect natural resources of the watersheds. Examples include:

- **Radiological Monitoring** – Washington State and federal agencies actively monitor soil, groundwater, river water, seeps, sediments, and vegetation for impacts from radiological contaminants at regular survey intervals each year. The Hanford Site and Columbia River are also periodically surveyed for radioactivity using various geophysical tools. Results of the monitoring activities are published in the Hanford Site Annual Groundwater Monitoring Reports. In partnerships with the Oregon Department of Energy and the Washington State Department of Health, sediment samples in the river behind the McNary Dam are collected and analyzed to monitor for potential health threats from river sediments. In addition, an interlocal cooperation agreement has been established by and between the Cities of Pasco, Kennewick, Richland, and West Richland and the Counties of Benton and Franklin to review, evaluate, and monitor conditions and operations at the Hanford Nuclear Reservation. This includes interactions with the U.S. Department of Energy, Ecology, U.S. Environmental Protection Agency, and others regarding Hanford environmental contamination, remediation, waste management, response to emergencies, and work force and site transition issues;
- **Stormwater** – The City’s 2016 MS4 Annual Report identified the following stormwater inspection and monitoring activities:
  - Publicized a hotline telephone number for public reporting of spills and other illicit discharges;
  - Informed public employees, businesses, and the general public of hazards associated with illicit discharges and improper disposal of waste;
  - Inspected stormwater treatment and flow control facilities (except catch basins) owned or operated by the City; and
  - Implemented procedures for conducting illicit discharge investigations.
- **Water Quality Monitoring** – The City conducts routine water quality monitoring at the raw water intakes. Analytes and field parameters monitored include total organic carbon, turbidity, pH, total alkalinity, and hardness.

### Public Education

The Cities of Pasco, Kennewick, Richland, and West Richland entered into an agreement with the Franklin Conservation District and Benton Conservation District for water conservation and stormwater public education services. Under the agreement, the districts provide classroom teaching to grades K-8 to educate students on water, soil, and energy conservation and stormwater pollution prevention. The services also include education outreach at public events such as the Regional Home and Garden Show and Benton/Franklin County Fair and distribution of conservation and stormwater education materials to share with friends and family.

The City also provides public education information and materials through various publications and social media sources, such as The Pulse Newsletter, brochures, and social media outlets such as Facebook, Twitter, and Instagram. These sources are designed to provide the latest public information on City programs and events and special announcements, including stormwater management, erosion and sediment control, and water quality reports.

## **System Operation and Emergency Provisions**

The City is responsible for treatment and conveyance of the community's potable water supply. Specifically, the major water system components that are operated by the City include the McNary Pool Columbia River Butterfield Intake, West Pasco McNary Pool Columbia River Intake, Butterfield WTP, West Pasco WTP, five storage facilities, four booster stations, and approximately 326 miles of transmission and distribution piping. The treatment plants and associated facilities are operated and maintained in accordance with detailed operations and maintenance documents, which are referenced in Section 9 of the City's 2016 Comprehensive Water System Plan.

It is important that the system remains uninterrupted to prevent a public health hazard and considerable inconvenience to the customers. In the event of an interruption, the City employs the following management strategies:

- If an emergency caused production to cease at one treatment plant, the system could continue to be supplied by the other facility,<sup>1</sup> although the West Pasco WTP has insufficient capacity to meet full system demands without some curtailment in the event of loss of Butterfield WTP for an extended period of time;
- In the event of a mechanical failure, pumping and booster stations are all equipped with multiple pumps capable of sustaining operations if one pump were to fail;
- A backup power generator is available for use at the Broadmoor Pump Station; and
- During sustained power failures, the Water Division maintains a portable generator for use.<sup>2</sup>

For a more detailed outline on the emergency provisions, including where to obtain a copy of the Risk Management Plan, Vulnerability Assessment, Contingency Procedures, and Emergency Response Plan, please refer to Section 9 of the Comprehensive Water System Plan.

## **Water Quality**

The City conducts routine water quality monitoring at the raw water intakes. Analytes and field parameters monitored include total organic carbon, turbidity, pH, total alkalinity, and hardness. Results of these monitoring activities since year 2002 (where available) are presented in Figures 4-H-4 and 4-H-5. No adverse water quality trends are apparent.

The City also conducts routine Washington State Department of Health compliance monitoring in post-treatment/finished water for inorganic compounds, synthetic organic compounds (SOCs), volatile organic compounds (VOCs), metals, and radiologicals. All monitored VOCs, SOCs, metals, and radiologicals at both intake locations have been

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<sup>1</sup> Butterfield WTP is currently capable of meeting current system maximum daily demand of 26.8 mgd without supplement from West Pasco. Any failure in Butterfield WTP however, may result in limited supply since maximum production from West Pasco WTP is 6 mgd. More details can be found in Section 9 of the City's 2016 Comprehensive Water System Plan.

<sup>2</sup> Currently, only the West Pasco Pump Station and Eastside Pump Station can utilize this generator.



consistently near or below their associated state reporting limits. Monitored metals include As, Ba, Be, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, Si, Th, and Zn. Monitored radiologicals include gross alpha and beta, radium-226 and -228, radon, and tritium. The City's water quality complies with all state and federal drinking water regulations and no adverse trends in post-treatment/finished water are apparent.

## **Recommendations**

Existing drinking water system planning requirements (WAC 246-290-135) require water purveyors using surface water as a source of supply to update their watershed control program at least every six years, or more frequently if required by the Washington State Department of Health. Updates to the program should also be considered in response to changes in contaminant sources, new data or information, program performance needs, or other changes. This section provides recommendations regarding improvements to consider as part of the next watershed control program update.

### Program Evaluation

Source water protection is an ongoing process and plans should be periodically reviewed and updated. The following should be considered as part of the updating process:

- Identify and assess emerging issues, current conditions within source water protection areas, and changed conditions within the watershed (e.g. land use or land cover);
- Reevaluate water quality data, inspection and monitoring information, watershed control measures, community and stakeholder involvement, and emergency response provisions and identify areas of the program that need revision; and
- Modify the program's characterization, goals and implementation elements in response to changed conditions or program performance needs, as needed.

### Increase Public Awareness

Public education and voluntary action are critical to protecting drinking water supply sources. Public participation in source water protection planning and management strategies increases awareness and ownership of the program. The Quad Cities have an agreement with the Franklin Conservation District and Benton Conservation District for water conservation and stormwater public education services. We recommend expanding the public outreach program to include source water protection and consider brochures, mailers, utility bill inserts, press releases, and meetings and workshops to emphasize the following:

- **Proper Use of Chemicals** – Proper use of household chemicals, especially lawn chemicals such as fertilizers and pesticides. Many homeowners fail to use lawn chemicals in accordance with the label – and chemical over-use, especially when combined with over-watering – can lead to impacts to drinking water supply sources. Educate homeowners about the importance of following the manufacturer's instructions when using lawn and household chemicals;

- **Correct Disposal of Waste** – Correct disposal of household hazardous wastes including waste oils, paint, lawn chemicals, and other household hazardous materials. Inappropriate disposal of these substances, including pouring chemicals on the ground or down the drain (e.g., stormwater or septic system), can create a threat to groundwater and surface water quality. The implementation of periodic no-cost hazardous waste collection days can be an effective tool for encouraging proper disposal, especially when paired with public education efforts;
- **Increase Awareness** – Increase awareness of residents and business owners/operators located near the City’s intake facilities. Hands-on learning and technical assistance opportunities for households, business owners, teachers, and students can help develop knowledge, teach new skills, and ultimately change the attitudes, practices, and behaviors of those living or working near drinking water supply sources.

Notifications to the identified potential contaminant sources listed in Tables 4-H-1 and 4-H-2 and to regulatory agencies, local governments, and emergency responders can also increase public awareness and enhance source water protection:

- **Notification to Owners of Potential Sources of Contamination** – Provide letters of notification to those owners/operators located within a one-mile radius of the City’s intake facilities and identified as potential sources of contamination. These letters should include a map identifying the locations of the intake facilities and potential and known sources of contamination. The purpose is to inform businesses/facilities of their presence near a drinking water supply source and that activities in the area have the potential to affect the community’s drinking water quality;
- **Notification to Regulatory Agencies and Local Governments** – Provide separate letters of notification to regulatory agencies and local governments that include information on the water-supply system and locations of potential and known sources of contamination near the intake facilities;
- **Notification to Local Emergency Responders** – Provide separate letters of notification to the appropriate emergency responders. These letters should include findings of the contaminant source inventory so that local emergency responders can evaluate whether changes in emergency response procedures (e.g., incident/spill response) are needed to better protect source water quality.

### Contingency Planning

Development of a contingency plan is recommended in the event that a natural disaster or contamination event results in the temporary or permanent loss of the City’s surface water supply sources. Alternative sources of supply could include interconnects with other neighboring water systems or distribution of purchased water. The most effective contingency effort may be to implement use of some of the City’s irrigation supply wells.

### Develop a Regional Watershed Control Program

The Quad Cities all utilize the Columbia River as a source of drinking water supply, all have

shoreline development along and access to the river, and all are responsible for developing a watershed control program. Consequently, it is recommended that the City coordinate with the other Quad Cities for the development of a regional watershed control program to (1) prevent program duplication and overlap and (2) establish consistent and holistic watershed management and control measures to address potential threats to the Cities surface water supply source.

The regional watershed control plan could be developed through an interlocal cooperation agreement and using and building upon the watershed control programs that have been previously developed by other Quad City municipalities. The regional plan should be developed using guidance information and materials provided by the American Water Works Association's (AWWA) Management Standard for Source Water Protection (ANSI/AWWA G300-14) and AWWA's Operational Guide to AWWA Standard G300, and include the following information:

- **Source Water Delineation** – Update source water delineations and watershed description, as needed based on any emerging issues or changed conditions;
- **Water Quality Assessment** – Review annual water quality reports and available raw and finished water quality data to identify potential concerns or adverse trends, and make recommendations for monitoring in other portions of the watershed, as needed;
- **Potential Contaminant Sources and Land Use** – Develop a comprehensive database of potential contaminant source sites and land use activities around each City's Columbia River intake structure(s);
- **Compliance with Regulatory Requirements** – Identify and document relevant regulations that apply to each source water protection area;
- **Security Planning and Implementation** – Develop a plan that (1) identifies key security threats, (2) establishes security measures to protect personnel and the water supply, and (3) describes the expected response of personnel in the event of a security incident. Documentation addressing any security issues or incidents should be maintained as part of the program;
- **Emergency Management Notification Plan** – Establish a consortium of local emergency management agencies and upstream industries, water purveyors and other regional water suppliers and develop an emergency management notification plan. The purpose of the plan would be to establish an early-warning system to ensure an effective and comprehensive response in the event of a significant spill. Specific plan objectives would include (1) defining alert and notification procedures to be followed when a spill occurs, (2) outlining response procedures and techniques to be used during a spill incident, and (3) documenting resources available to assist with a spill incident. The plan should include estimates of the time it would take utilities and/or emergency responders to respond to a spill. The response time should be used to define the extent and update the inventory of potential contaminant source sites upstream of the surface water intake locations;
- **Emergency Preparedness and Response** – Update or develop emergency preparedness and response plans and procedures to implement in the event that a natural

disaster or contamination event results in the temporary or permanent loss of water supply source;

- **Health and Safety Management** – Develop and document a health and safety plan to protect personnel and visitors engaged in operational activities pertaining to watershed management and control measures; and
- **Stakeholder and Community Involvement** – Identify and actively pursue source water area stakeholders to improve coordination of partnership activities, volunteer efforts, and potential funding opportunities.

A regional watershed control program would be eligible for funding support from the Washington State Department of Health's Source Water Protection Local Assistance Grant Program. The grant funding program provides financial assistance to water systems and local governments for Group A source water protection. These funds are available to support drinking water protection projects that reduce the risk of contamination within a source water protection area. More information can be found at the following website:

<http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/SourceWater/LocalAssistanceGrantProgram>.

## References

AWWA, 2010, Operational Guide to G300, Source Water Protection.

AWWA, 2014, Source Water Protection, AWWA Management Standard ANSI/AWWA G300-14, June 1, 2014.

Anchor QEA, LLC, 2015, Shoreline Inventory, Analysis and Characterization Report, prepared for the City of Pasco, October 2014 (revised June 2015).

Western Regional Climate Center (WRCC), 2017, Historical Climate Information. <http://www.wrcc.dri.edu/>. Accessed March 2017.

**Table 4-H-1: Contaminant Source inventory - West Pasco Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
1	PASCO CITY MAINTENANCE	4300 RD 108 Pasco, WA 99301	ALLSITES, FINDS	Stores 10,000 lbs or les of hazardous chemicals
2	PASCO DECANT FACILITY - ROAD 108	4310 CRESCENT RD Pasco, WA 99301	SWF/LF	Handles solid waste
3	PASCO DECANT FACILITY - ROAD 108	4310 CRESCENT RD Pasco, WA 99301	FINDS, ALLSITES	Handles solid waste
4	DALE C ADAMS	No address provided	ALLSITES	Unknown; a non-enforcement action (i.e. permit, notice of construction, etc.) was finalized, issued to the respective party, indicating the non-enforcement action was taken
5	580 COLUMBIA POINT DR	580 COLUMBIA POINT DR Richland, WA 99352	ALLSITES, CSCSL NFA	Independent clean up
6	Franklin County Irrigation District No.1	4320 RD 111 Pasco, WA 99301-6514	UST	Underground storage tank
7	Central Pre Mix Concrete Pasco	11919 Harris Road Pasco, WA 99301-8950	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
8	Central Pre Mix Concrete Pasco	11919B Harris Road Pasco, WA 99301-8950	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
9	Super Lube Pasco	1816 W Court Pasco, WA 99301-3446	HAZWASTE, UST	Generates more than 2,640 pounds of hazardous waste per year; underground storage tank
10	Richland Yacht Club	350 Columbia Point Drive Richland, WA 99352	UST	Underground storage tank

**Table 4-H-1: Contaminant Source inventory - West Pasco Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
11	Connel Oil Inc Columbia Point Drive	350 Columbia Point Drive Richland, WA 99352	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
13	Columbia Point Apartments	575 Columbia Point Dr. Richland, WA 99352	CONSTSWGP	General permit issued to owner/operators of construction projects that disturb one or more acres of land through clearing, grading, excavating, or stockpiling of fill material that discharge stormwater to State waters.
14	Skyland American Road Fuel 45	25 Columbia Point Dr Richland, WA 99352	UST	Underground storage tank
15	Richland Water Treatment Plant	110 Saint street Richland, WA 99352-2064	WATQUAL, HAZWASTE	Biosolids; discharge of treated domestic wastewater to State waters; facilities that treat, store, or dispose hazardous waste
16	Richland Waste Water Treatment Facility	555 Lacy Road Richland, WA 99352	BIOSOLIDS	Biosolids

(1) See Table 4-H-3 for Source Type Code description

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
1	LOT 1 SHORT PLAT 79-31	1130 WASHINGTON ST Pasco, WA 99301	ALLSITES, UST	2 underground storage tanks
2	US WEST COMMUNICATIONS INC PASCO	1300 BLOCK S 9TH ST Pasco, WA 99301	ALLSITES, RCRA NonGen / NLR, ECHO, FINDS	Non hazardous waste generator; no violations reported
3	TRUGREEN CHEMLAWN PASCO	1220 S 10TH Pasco, WA 99301-5110	ALLSITES, FINDS	Stores 10,000 lbs or less of hazardous chemicals
4	SIGNS BY SUE	1215A S 10TH AVE Pasco, WA 99301	ALLSITES	Unknown
5	CARGILL INC PASCO	720 W RIVER ST Pasco, WA 99301-5778	ALLSITES, FINDS	Stores 10,000 lbs or less of hazardous chemicals
6	BLEYHL FARM SERVICE INC PASCO	1126 W AINSWORTH ST Pasco, WA 99301-5129	ALLSITES, FINDS	Stores 10,000 lbs or less of hazardous chemicals
7	TIDEWATER TERMINAL CO INC	1320 S 8TH ST Pasco, WA 99301	ALLSITES, RCRA NonGen / NLR	Hazardous waste generator, Stores 10,000 lbs or less of hazardous chemicals
8	HARBOR OIL INC PASCO	RIVER ST & 7TH LOT 10 Pasco, WA 99301	ALLSITES, RCRA NonGen / NLR	Generates unknown quantity of dangerous waste
9	PASCO CITY WASHINGTON LIFT STATION	911 W WASHINGTON Pasco, WA 99301	ALLSITES, FINDS	Stores 10,000 lbs or less of hazardous chemicals
10	US CG ANT KENNEWICK	434 CLOVER ISLAND Kennewick, WA 99336	ALLSITES, MANIFEST, RCRA NonGen / NLR, ECHO, FINDS	Underground storage tank, stores 10,000 lbs or less of hazardous chemicals
11	FRANK & SONS AUTOBODY INC	1319 W AINSWORTH ST Pasco, WA 99301	ALLSITES, MANIFEST, RCRA NonGen / NLR, ECHO, FINDS	Generates unknown quantity of dangerous waste
12	PASCO WATER TREATMENT PLANT	1307 W B ST Pasco, WA 99301-0293	ALLSITES, NPDES	Stores 10,000 lbs or less of hazardous chemicals



**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
13	PASCO BULK FUEL TERMINAL SITE	AINSWORTH & W 9TH Pasco, WA 99301	ALL SITES, INST CONTROL, CSCL, HSL, SCS	State cleanup site
14	LEHIGH PORTLAND CEMENT CO PASCO	610 W RIVER ST Pasco, WA 99301-5777	ALLSITES, FINDS	Stores 10,000 lbs or less of hazardous chemicals
15	DOYLE BROTHERS INC	619 W RIVER ST Pasco, WA 99301-6327	ALLSITES, FINDS, UST	Underground storage tank
16	MCGREGOR CO PASCO	550 W RIVER Pasco, WA 99301	ALLSITES, RCRA NonGen / NLR, ECHO, FINDS	Generates unknown quantity of dangerous waste
17	CENEX HARVEST STATES PASCO	1203 W A ST Pasco, WA 99302	ALLSITES, RCRA NonGen / NLR, ECHO, FINDS, UST	Generates unknown quantity of dangerous waste, stores 10,000 lbs or less of hazardous chemicals; underground storage tank
18	METZ MARINA INC	206 CLOVER ISLAND Kennewick, WA 99336	ALLSITES, UST	Underground storage tank
19	SEARS 8179	1111 W A ST Pasco, WA 99302	ALLSITES, MANIFEST, RCRA NonGen / NLR, ECHO, FINDS	Handles and generates hazardous waste
20	ACME WELDING WORKS AKA GIBSON	W 1603 A ST Pasco, WA 99301	ALLSITES, RCRA NONGen / NLR	Generates unknown quantity of hazardous waste
21	STOP AND GO MARKET #2	221 S 10TH AVE Pasco, WA 99301	ALLSITES, Financial Assurance, UST	2 Underground storage tanks
22	PACIFICORP PASCO SUBSTATION	S 6TH AND WASHINGTON ST Pasco, WA 99301	ALLSITES, FINDS	Manufactures or processes more than the threshold amount of one or more toxic chemicals
23	MONSON & MONSON LLC MONSON RANCHES CA PA	5020 N COMMERCIAL AVE Pasco, WA 99301	ALLSITES, NPDES	Discharges process wastewater and stormwater

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
24	CLOVER ISLAND YACHT CLUB	104 CLOVER ISLAND Kennewick, WA 99336	ALLSITES, Financial Assurance, UST	Stores 10,000 lbs or less of hazardous chemicals, Underground storage tank
25	PERFECTION TIRE	1403 W LEWIS Pasco, WA 99301	ALLSITES, UST	Underground storage tank, hazardous waste generator
26	MR CAR	1431 W LEWIS Pasco, WA 99301	ALLSITES, FINDS	Unknown
27	CHARLOTTE STROMME	1530 W LEWIS Pasco, WA 99301	ALLSITES, UST	Underground storage tank
28	DARIGOLD PASCO BRANCH	1720 W WASHINGTON ST Pasco, WA 99301-5147	ALLSITES, FINDS, UST	Stores 10,000 lbs or less of hazardous chemicals, underground storage tank
29	ESTES EXPRESS LINES INC	900 E BRUNEAU AVE Kennewick, WA 99336	ALLSITES, MANIFEST, ICR, RCRA NonGen / NLR, CSCSL, LUST,HSL	Underground storage tank; hazardous waste generator
30	TWIN CITY METALS	455 E BRUNEAU AVE Kennewick, WA 99336	ALLSITES, CSCSL, HSL, SCS	State cleanup site
31	SAFETY KLEEN SYSTEMS INC	814 E AINSWORTH Pasco, WA 99301	CORRACTS, ALLSITES, MANIFEST, SEMS-ARCHIVE, RCRA NonGen / NLR, FINDS, SPILLS	Manufactures or processes more than the threshold amount of one or more toxic chemicals, discharges contaminated stormwater to state waters
32	Connell Oil Inc. Port of Kennewick	206 Clover Island Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
33	Twin City Foods Kennewick	1000 E 1st Ave Kennewick, WA 99336	HAZWASTE, FRUITGP	Generates more than 2,640 pounds of hazardous waste per year; discharges wastewater to State waters.
34	Bridge Pumps Station Kennewick	621 N. Gum St Kennewick, WA 99336	UST	Underground storage tank
35	Ash Grove Cement West Inc.	416 N Ivy Street Kennewick, WA 99336-3796	UST, HAZWASTE	Underground storage tank; generates more than 2,640 pounds of hazardous waste per year
36	Kennewick River Lift Station	Kinwood & Columbia Dr. Kennewick, WA 99336	UST	Underground storage tank
37	Central Pre-Mix Concrete	1011 E Bruneau Ave Kennewick, WA 99336	UST	Underground storage tank
38	Kennewick POTW	416 N Kingwood Ave Kennewick, WA 99336-0108	IND2POTWPRIVSWDP	Discharge permit for facility that discharges pretreated wastewater to a public or privately owned treatment works (POTW).
39	Kennewick Sewage Lagoon System	415 N Kingwood Kennewick, WA 99336	UST, WATRES	Underground storage tank; dam
40	Kennewick No 1 Aerated Wastewater Lagoon	Kennewick, WA	WATRES	Dam
41	Kennewick No 2 Aerated Wastewater Lagoon	Kennewick, WA	WATRES	Dam
42	Welch Warehouse CCF	350 Juniper Street Kennewick, 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
43	North Pacific Grain Growers Inc	900 E Columbia Drive Kennewick, WA 99336-0267	HAZWASTE, UST, AQLA	Generates more than 2,640 pounds of hazardous waste per year; underground storage tank; small sources governed only by local air authorities
44	Kennewick Fabrication Yard	208 Gum Street Kennewick, WA 99336	UST	Underground storage tank
45	Wondrack Distributing Cardlock	206 N Gum Street Kennewick, WA 99336-3770	HAZWASTE, UST	Generates more than 2,640 pounds of hazardous waste per year; underground storage tank
46	Metro Mart 3	520 E Columbia Drive Kennewick, WA 99336	LUST	Leaking underground storage tank
47	Columbia Pacific Transport	2250 E Crane Street Kennewick, WA 99336-0502	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
48	High Desert Maintenance	525 E Bruneau Ave Kennewick, WA 99336	UIC	Underground injection control
49	Kennewick WA Line Seg 48	MP 2 3rd Sub Portland Division Portland, OR 99336	UST	Underground storage tank
50	Dan's Garage	508 E Bruneau Ave Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
51	Roy Scharnhorst	561 E Columbia Drive Kennewick, WA 99336-37630	UST	Underground storage tank
52	Motorcycles Inc	422 E Columbia Drive Kennewick, WA 99336	UST	Underground storage tank

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
53	Bob's Autobody	210 N Date Street Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
54	Columbia Gardens Wine Business Park	Columbia Drive Kennewick, WA 99336	IND2POTWPRIVSWDP	Discharges pretreated wastewater to a public or privately owned treatment works (POTW).
55	Charlies Automotive	421 E Columbia Drive Kennewick, WA 99336-3712	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
56	Don's Autobody	421 E Columbia Drive Kennewick, WA 99336-3712	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
57	Columbia Gardens Erosivity Waiver	421 E Columbia Drive Kennewick, WA 99336	CONSTSWGP	General permit issued to owner/operators of construction projects that disturb one or more acres of land through clearing, grading, excavating, or stockpiling of fill material that discharge stormwater to State waters.
58	Tricity Beverage	201 N Cedar Street Kennewick, WA 99336	UST, LUST	Underground storage tank; leaking underground storage tank
59	Columbia River Body works	222 E Bruneau Avenue Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
60	Norco Kennewick	102 E Columbia Drive Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
61	J. Lieb Foods Inc	10 E Bruneau Avenue Kennewick, WA 99336	IND2POTWPRIVSWDP	Discharges pretreated wastewater to a public or privately owned treatment works (POTW).
62	S & B Machine	208 N Washington Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
63	Two guys stripping	109 N Washington Street Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
64	SECO Construction Equipment Inc.	110 N Washington Street Kennewick, WA 99336-3735	HAZWASTE, UST	Generates more than 2,640 pounds of hazardous waste per year; underground storage tank
65	Copeland Lumber Yards Kennewick	209 N Washington Street Kennewick, WA 99336	UST	Underground storage tank
66	Pump Pak & Eatery	3 W Columbia Drive Kennewick, WA 99336	UST	Underground storage tank
67	Petroleum Pump Company Kennewick	23 W Columbia Drive Kennewick, WA 99336	UST, LUST	Underground storage tank; leaking underground storage tank
68	JC Penny Co	100 Columbia Center Kennewick, WA 99336-1150	UST	Underground storage tank
69	Baker Produce Kennewick	212 W Railroad Ave Kennewick, WA 99336-3675	IND2POTWPRIVSWDP	Discharges pretreated wastewater to a public or privately owned treatment works (POTW).

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
70	Riverside Autobody	325 W Deschutes Kennewick, WA 99336	HAZWASTE	Generates more than 2,640 pounds of hazardous waste per year
71	Clayton Ward Cycling	119 E Albany Ave Kennewick, WA 99336	RECYCLING	Recycling facilities are those that transform or remanufacture waste materials into usable or marketable materials for use other than landfill disposal or incineration. Requirements do not include the collection, compacting, repackaging and sorting for the purpose of transport.
72	Ludwig Oil Company	108 E Kennewick Ave Kennewick, WA 99336-3755	UST, LUST	Underground storage tank; leaking underground storage tank
73	AT&T Wireless East Kennewick	410 E Kennewick Avenue Kennewick, WA 99336	HAZWASTE	Facilities that treat, store, or dispose hazardous waste.
74	Wondrack Distributing Chevron	529 E Kennewick Avenue Kennewick, WA 99336-4070	HAZWASTE, Industrial SW GP	Facilities that treat, store, or dispose hazardous waste; discharge of contaminated stormwater to State waters.
75	Haydons Transmission Inc. Kennewick	516 E 1st Ave Suite D Kennewick, WA 99336	HAZWASTE, UST	Facilities that treat, store, or dispose hazardous waste; underground storage tanks
76	Sharpe & Preszler Construction Company	605 E Kennewick Kennewick, WA 99336-4071	UST	Underground storage tank
77	Tesoro 2GO 62177	22 S Gum Street Kennewick, WA 99336	UST	Underground storage tank
78	Columbia Specialty Products LLC	900 W River Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste



**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
79	Water World Marina Inc	1315 S 4th Avenue Pasco, WA 99301-5762	UST, LUST	Underground storage tank; leaking underground storage tank
80	Ray Poland & Sons Concrete & Asphalt Rec	215 E Ainsworth Pasco, WA	W2R	temporary handling of solid waste
81	Eds Disposal	1210 S Grey Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
82	Pasco Port	904 E Ainsworth Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
83	SAFETY KLEEN SYSTEMS INC	904 E Ainsworth Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
84	Big Pasco Industrial Center	904 E Ainsworth Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
85	Port of Pasco Industrial Center	904 E Ainsworth Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
86	WA DA Franklin 1 Waste Pesticide	1011 E Ainsworth Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
87	US ARMY Reservce Facility	NE Corner of E Ainsworth & S Maitland Pasco, WA	SCS	State cleanup site
88	Pasco WWTP	1015 S Grey Ave Pasco, WA 99301-0293	BIOSOLIDS, WATQUAL	Biosolids; discharge of treated domestic wastewater to State waters.
89	Pasco City	1025 S Grey Street Pasco, WA 99301	UST, HAZWASTE	Underground storage tank; facilities that treat, store, or dispose hazardous waste

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
90	Azteca Auto Body	820 S 3rd Ave Pasco, WA	UST, HAZWASTE, ENFORFNL	Underground storage tank; facilities that treat, store, or dispose hazardous waste; enforcement action was finalized
91	Ireland Don & Lars Nelson	832 S 3rd Pasco, WA 99301-5704	UST	Underground storage tank
92	Tru Door Inc	836 S 3rd Ave Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
93	Total Service	313 S 4th Avenue Pasco, WA 99301-5510	UST	Underground storage tank
94	Simmonson Automotive	627 W Columbia Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
95	Legacy Body Shop	700 W Columbia Street Pasco, WA 99301	HAZWASTE, ENFORFNL	Facilities that treat, store, or dispose hazardous waste; enforcement action was issued
96	Russ Dean Ford Body Shop	700 W Columbia Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
97	Goodwill Industries Pasco	307 W Columbia Street Pasco, WA 99301-5634	UST, LUST	Underground storage tank, leaking underground storage tank
98	IRM Investments LLC	310 W Columbia Street Pasco, WA 99302-2645	UST	Underground storage tank
99	US GSA Federal Building USPO	403 W Lewis Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
100	Rite Aid #5315	215 N 4th Ave Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
101	Salvation Army Pasco	310 N 4th Ave Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
102	Chevron 90988	531 W Clark Pasco, WA 99301-5521	UST	Underground storage tank
103	Moon Security Services Inc	124th N 5th Pasco, WA 99301-5512	UST, LUST	Underground storage tank; leaking underground storage tank
104	Franklin County PUD 1	619 W Clark Street Connell, WA 99326	UST	Underground storage tank
105	AT&T PASCO	Pasco, WA 99302	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
106	Charles L Burks Conoco	1132 Sylvester Pasco, WA 99301-4809	UST, LUST	Underground storage tank; leaking underground storage tank
107	Andelin Family Dentistry	1121 W Sylvester Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
108	Columbia Restaurant supply	117 S 5th Pasco, WA 99301	UST, HAZWASTE	Facilities that treat, store, or dispose hazardous waste; underground storage tank
109	Hallers Repair Inc	609 W Lewis Street Pasco, WA 99301-5537	UST, HAZWASTE	Facilities that treat, store, or dispose hazardous waste; underground storage tank
110	Simmonson Automotive Inc.	626 W Lewis Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
111	Mendoza Auto Repair	626 W Lewis Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
112	Shell Bulk Plant Pasco	215 S 6th Pasco, WA 99301	SCS	State cleanup site

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
113	Pasco Machine Co Inc	W 518 Columbia Pasco, WA 99301-5579	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
114	Millenium Autobody	616 W Columbia Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
115	USWCOM Pasco Co	707 W Lewis Street Pasco, WA 99301	UST, HAZWASTE	Facilities that treat, store, or dispose hazardous waste; underground storage tank
116	Shell Oil Co Bernards	807 W Lewis Pasco, WA 99301-5541	UST, HAZWASTE	Facilities that treat, store, or dispose hazardous waste; underground storage tank
117	Llanter Median LLC	807 W Lewis Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
118	Pacifex Inc Pasco	1 N California Street Pasco, WA 99302	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
119	US Bank	215 N 10th Ave Pasco, WA 99301-5429	UST, LUST	Underground storage tank; leaking underground storage tank
120	John M Keltch Inc	719 S28 Ave Pasco, WA 99302-2038	UST	Underground storage tank
121	Metro Mart	1015 W Lewis Pasco, WA 99301	UST	Underground storage tank
122	Gary's Auto Care	901 W Lewis Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
123	Glens Metals	1104 E Lewis Pasco, WA 99301	SCS, HAZWASTE	Facilities that treat, store, or dispose hazardous waste
124	Ben Franklin Transit Pasco	1202 W Lewis Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
125	Pasco School District 1	1215 W Lewis Street Pasco, WA 99301-5472	UST	Underground storage tank

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
126	Tri City Paints	1303 W Clark Pasco, WA 99301-5453	UST	Underground storage tank
127	Monson Ranch CA Warehouse	5020 N COMMERCIAL AVE Pasco, WA 99301	FruitGP	Discharges wastewater to State waters.
128	Pasco Service Station	1515 W Lewis Street Pasco, WA 99301	UST	Underground storage tank
129	Rutt Enterprises	1531 W Lewis Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste, underground storage tanks
130	Bulldog Motors	1603 W Lewsi Street Pasco, WA 99301	HAZWASTE, UST	Facilities that treat, store, or dispose hazardous waste, underground storage tanks
131	Integrity RV Services	1724 W Lewis Street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
132	Seven Up Bottle Bottling Company of Walla Walla	2106 W Frontage Pasco, WA 99301-4703	UST	Underground storage tank
133	Ainsworth Collision Center Inc	23331 W A street Pasco, WA 99301	ENFORFNL	Enforcment action was issued
134	Star Rentals & Sales Pasco	1912 W A Street Pasco, WA	HAZWASTE, UST	Facilities that treat, store, or dispose hazardous waste; underground storage tank
135	Lampson RR	1928 W A street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
136	Northside Auto Service	1900 W A street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
137	Desert RV Repair	1719 W A street Pasco, WA 99301	HAZWASTE	Facilities that treat, store, or dispose hazardous waste

**Table 4-H-2: Contaminant Source Inventory - Butterfield Intake**

Map ID No.	Facility Name	Address	Source Type Code <sup>(1)</sup>	Description
138	Stop & Go Mini Mart	830 W A Street Pasco, WA 99301	UST, LUST	Underground storage tank; leaking underground storage tank
139	Tosco Bulk Plant	817 W A Street Pasco, WA 99301-6312	HAZWASTE, UST	Facilities that treat, store, or dispose hazardous waste; underground storage tank
140	Connel Oil	817 W A Street Pasco, WA 99301-6312	HAZWASTE	Facilities that treat, store, or dispose hazardous waste
141	A Complete Janitorial	730 W A street Pasco, WA 99301	AIRQUAL	Enforcement action was issued
142	Kennewick Waste Water Treatment Plant	210 W 6th Avenue Kennewick, WA 99336-5649	AIRQUAL, WATQUAL	Discharge of treated domestic wastewater to State waters; small emission source

(1) See Table 4-H-3 for Source Type Code description

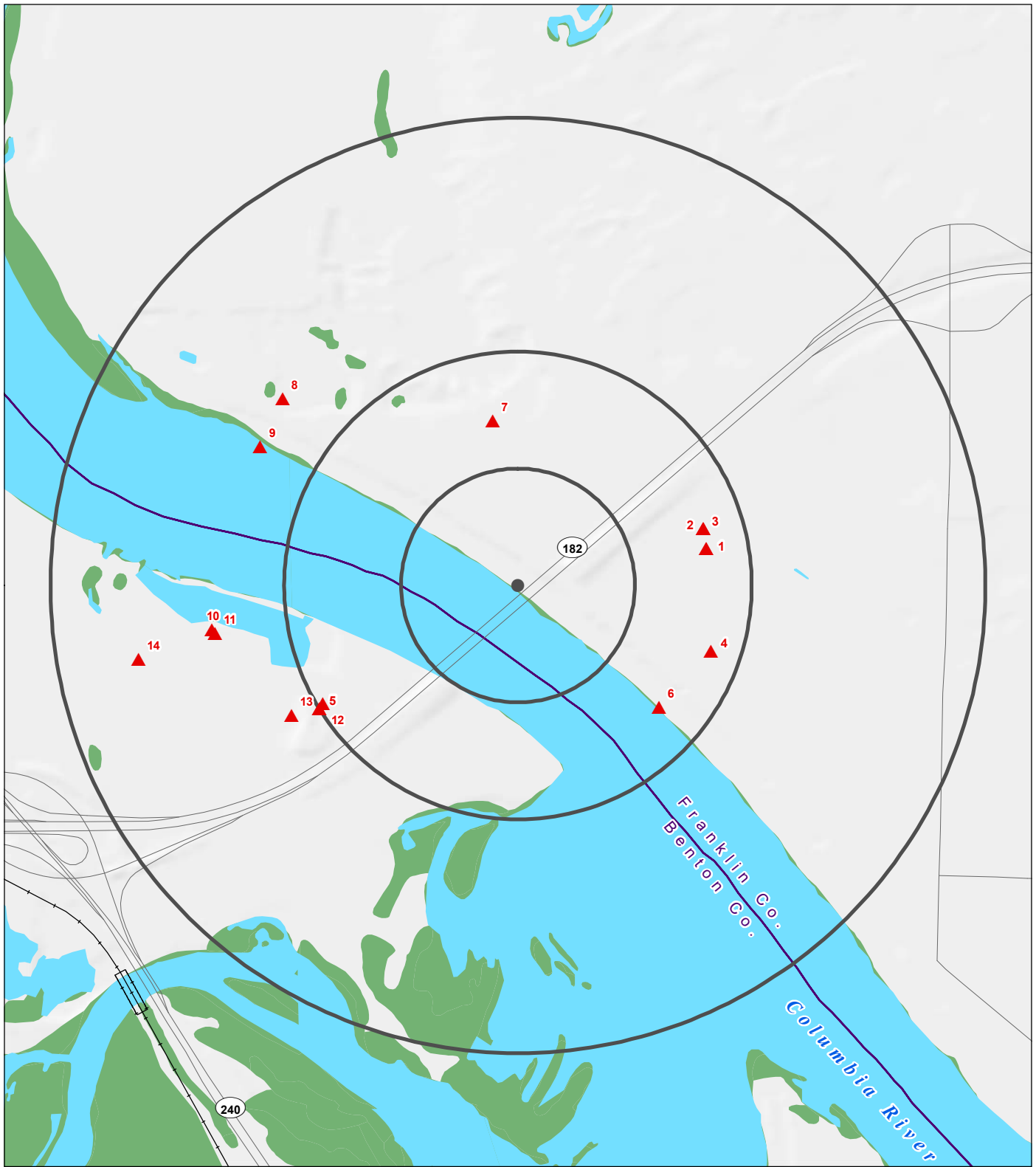
**Table 4-H-3: Source Type Code Descriptions**

Source Type Code	Source Type Code Description	Known or Suspected Contamination
CSCSL NFA	Confirmed and Suspected Contaminated Sites - No Further Action	Known
CSCSL	Confirmed and Suspected Contaminated Sites	
ENF F	DOE Enforcement Action Final	
ERNS	Emergency Response Notification System	
HMRIS	Hazardous Materials Incident Report System	
ICR	Washington Independent Clean-up Report	
Industrial SW GP	General Permit issued to industries to regulate the discharge of contaminated stormwater to State waters	
LUST	Leaking Underground Storage Tank	
SCS	State Clean-up Sites	
VCP	Voluntary Clean-up Site	
AIRQUAL	Small sources governed only by local air authorities	
All SITES	Facilities and Sites of Interest to WA DOE	Potential
AQLA	Small sources governed only by local air authorities.	
BIOSOLIDS	Biosolids	
CDL	Clandestine Drug Labs	
CONSTSWGP	Discharge of stormwater to State waters	
CORRACTS	Corrective Action Report	
ECHO	Enforcement & Compliance History Information	
EHCR2	Emergency/Hazard Chemical RPT Tier 2	
ENFORFNL	An Enforcement action (i.e. Penalty, Order, Notice) was finalized and issued to the respective party, indicating the enforcement action was taken	
FA	Financial Assurance for a UST	
Financial Assurance	Financial Assurance Information Listing	
FINDS	Facility Index System	
FRUITGP	Discharges of process wastewater and stormwater to State waters from fruit packers	
FTTS	FIDRA/TSCAL Tracking System (Pesticide Use)	
HAZWASTE	Hazardous Waste Generators, Managers, or Planners	
HSL	Hazardous Site List	
IND2POTWPRIVSWDP	Discharges pretreated wastewater to a public or privately owned treatment works (POTW)	
INST CONTROL	Institutional Control Site List	
MANIFEST	Hazardous Waste Manifest Information	
NPDES	National Pollution Discharge Permit	
RCRA	Resource Conservation Recovery Act Sites	
RCRA NonGen/NLR	RCRA - Non Generators / No Longer Regulated	
RECYCLING	Recycling Facility	
SEMS-ARCHIVE	Superfund Enterprise Management System Archive	
SPILLS	Active or Inactive Facilities that fail to meet RCRA	



**Table 4-H-3: Source Type Code Descriptions**

Source Type Code	Source Type Code Description	Known or Suspected Contamination
SWF/LF	Solid Waste Facility or Landfill site	
TRIS	Toxic Chemical Release System	
UIC	Underground Injection Wells	
UST	Operational Underground Storage Tanks	
WATQUAL	Discharge of treated domestic wastewater to State waters	
WATRES	Dams that capture and store at least 10 acre-feet of water or watery materials such as mine tailings, sewage and manure waste	
W2R	Various types of facilities that handle solid waste on an interim basis	

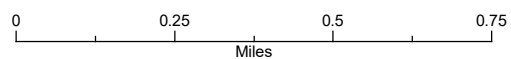


# LEGEND

- West Pasco Intake
- ▲ Potential Contaminant Source Location
- Railway
- County line
- Waterbody
- National Wetland Inventory

Date: September 14, 2017  
Data Sources: ESRI, USGS

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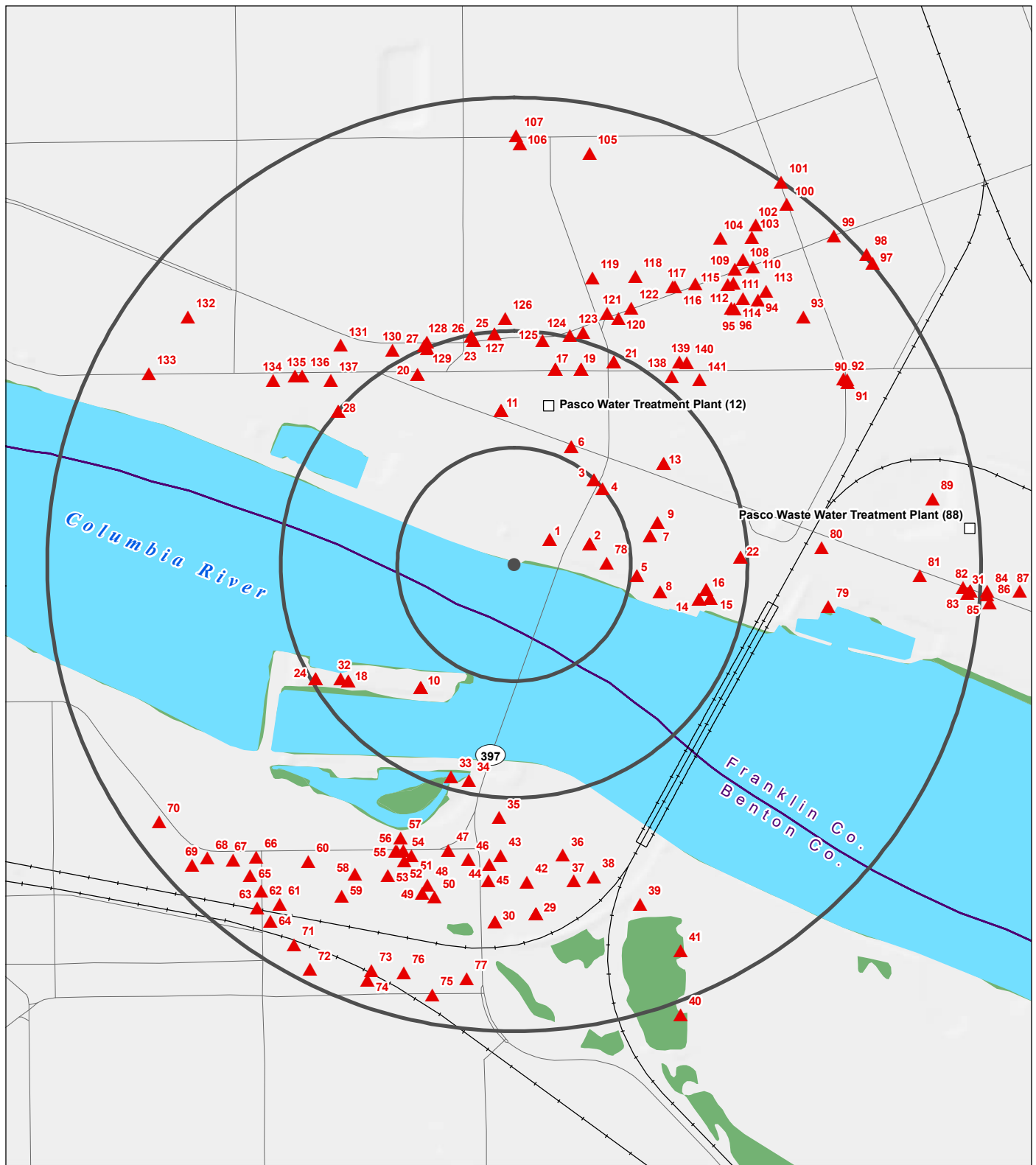


## Figure 4-H-2

### Potential Contaminant Source Locations near West Pasco Intake

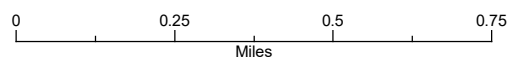
City of Pasco Watershed Control Program





# LEGEND

- Butterfield Intake
- ▲ Potential Contaminant Source Location
- Water Treatment Plant/Facility
- Railway
- ▭ County Line
- Waterbody
- National Wetland Inventory



Date: September 14, 2017  
Data Sources: ESRI, USGS

Document Path: P:\Portland\116 - MSA\016-Pasco 2016 WSP Update\Project GISMXDs\Figure4H-3\_Butterfield\_WTP\_Overview.mxd

## Figure 4-H-3

### Potential Contaminant Source Locations near Butterfield Intake

City of Pasco Watershed Control Program





STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PERMIT  
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

- ☒ Surface Water
- (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- ☐ Ground Water
- (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
September 23, 1991 *	S4-30976	S4-30976P	

\* The first ten cubic feet per second of this water right has a priority date of June 24, 1980, pursuant to WAC 173-531A-050(3).

NAME
Cities of Richland, Kennewick, Pasco and West Richland (c/o Richland)

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 190	Richland	WA	99352-0190

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE		
Columbia River		
TRIBUTARY OF (IF SURFACE WATERS)		
Pacific Ocean		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE -FEET PER YEAR
178 <sub>1</sub>		96,619 <sub>1</sub>
QUANTITY, TYPE OF USE, PERIOD OF USE		

QUANTITY, TYPE OF USE, PERIOD OF USE  
Municipal, industrial, commercial. Year-round Period of Use.

The projected maximum instantaneous and annual diversions from 2002-2008 are 10 cubic feet per second and 7227 acre-feet per year; additional quantities to meet projected demands beyond 2008 are to be determined by a six year review process as described in the Provisions of this permit. The maximum cubic feet per second and acre-feet per year quantities shown above are the maximums that can be used by 2051.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL  
Approximate location: Multiple points within the Cities of Kennewick, Pasco, and Richland service areas, including all the existing municipal diversions and treatment facilities in Kennewick, Pasco and Richland (see table below).

Location of Points of Withdrawal/Diversion on the Columbia River

CITY	MAP ID NO.	WATER RIGHT/OTHER ID NO.	LOCATION
Richland	R-1	Energy NW	NENW Section 2, T. 11 N., R. 28 E.W.M.
	R-2	Battelle	SWNE Section 14, T. 10 N., R. 28 E.W.M.
	R-3	S4-29941P	SWNE Section 14, T. 10 N., R. 28 E.W.M.
	R-4	W.S.U.	SWSW Section 24, T. 10 N., R. 28 E.W.M.
	R-5	SWC 9004	SWSW Section 24, T. 10 N., R. 28 E.W.M.
	R-6	S4-26404C Water Treatment Plant	NWNW Section 36, T. 10 N., R. 28 E.W.M.
		S4-27121C	
		SWC 9005	
	R-7	14030C Columbia Point	SWNE Section 13, T. 9 N., R. 28 E.W.M.
		G4-29214P	
		G4-29799P	
	R-8	Badger Mountain Irrigation District	SWSE Section 23, T. 9 N., R. 28 E.W.M.
Pasco	P-1	Water Treatment Plant	SWNE Section 31, T. 9 N., R. 30 E.W.M.
	P-2	S3-28791P (Kidwell)	W½ Section 18, T. 9 N., R. 29 E.W.M.
Kennewick	K-1	S4-25479C (SW Filter Plant)	SWSW Section 31, T. 9 N., R. 30 E.W.M.
	K-2	3897-A (Ranney Wells)	Govt. Lots 1 and 2, Section 35, T 9 N, R 29 EWM
	K-3	Corps of Engineers-Columbia Park (Multiple Points)	Sections. 27, 28, 29, 34, 35, T. 9 N., R. 29 EWM

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
Refer to table above				37, 40, 31	Benton, Franklin

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The water will be used within the area provided with urban water service by Kennewick, Pasco, Richland and West Richland, as identified in the six-year updates of the Quad Cities' Water System Plans, and as currently shown on Figure 1 (attached).

FILE COPY

## DESCRIPTION OF PROPOSED WORKS

The cities of Kennewick, Pasco and Richland will initially use their existing Columbia River water diversion and treatment facilities. Additional diversion/withdrawal facilities, including the potential construction of facilities capable of delivering water for storage and later withdrawal as part of an Aquifer Storage and Recovery (ASR) project and other pumps and pipes, will be added to the system incrementally as needed to respond to demand. Use of any new point of diversion will require the applicant to apply for and receive approval of a change of water right.

## DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: October 1, 2003	COMPLETE PROJECT BY THIS DATE: October 1, 2050	WATER PUT TO FULL USE BY THIS DATE: October 1, 2051
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## PROVISIONS

Over the duration of this permit, diversion of water will not be permitted at any time the applicable flow objectives are not met **UNLESS** the consumptive portion of the diverted water is properly mitigated through such means as water transfers, replacements, habitat enhancements, or trust water right arrangements. The first ten cubic feet per second (cfs) of this water right are allocated from the John Day/McNary Pools reservation for municipal water use pursuant to WAC 173-531A-050.

The following conditions apply to this approval:

- A. The Quad Cities shall provide municipal water to all municipal, industrial, and commercial users and uses within their urban service areas based on the Quad Cities' six-year updates of their Regional Water Forecast and Conservation Plan (RWFCP) described in Provision H.5.
- B. This authorization is subject to Washington Department of Fish and Wildlife juvenile salmon and gamefish screening criteria (pursuant to RCW 75.20.040). Permit holders should contact the Department of Fish and Wildlife, 600 Capitol Way N., Olympia, WA 98501-1091, Attention: Habitat Management Division, Phone: (360) 753-3318 or call (509) 575-2734 for the Yakima Screen Shop to obtain specific gamefish (trout, bass, etc.) requirements for their projects.

- C. An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded daily. The maximum monthly rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of each calendar year. Ecology is requiring submittal of monthly meter readings to collect seasonal information for water resource planning, management and compliance.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate, source name, annual quantity used including units, maximum rate of diversion including units, monthly meter readings including units, peak monthly flow including units, Department of Health WFI water system number and source number(s), purpose of use, fish screen status, open channel flow or pressurized diversion and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

(Continued on page 3)

*This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.*

Given under my hand the seal of this office at Yakima, Washington,

this 15<sup>th</sup> day of SEPTEMBER 2003.

DATA REVIEW

OK RD

Department of Ecology

by

Robert F. Barwin, Section Manager

Provisions Continued

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

- D. Following each six-year period, Ecology will issue a certificate for the amount of water put to beneficial use during that period after an investigation has been conducted. Compliance with any Ecology Order issued as part of the water use associated with the six-year period is a requirement of the certificate for that six-year increment.
- E. Unless a new instream flow rule for the mainstem Columbia River is promulgated and Ecology approves an application by the Quad Cities to substitute these flows as conditions to this water right, the following flow objectives will apply:

Water may be appropriated under this permit ONLY when the following minimum instream flow requirements are EQUALLED OR EXCEEDED, or when the consumptive water use associated with appropriations under this permit are fully mitigated:

1. Between April 10 and June 30, the minimum flow measured at McNary Dam will depend on the April-September runoff forecast at The Dalles Dam, such that:
  - a. if the forecast is 80 million acre-feet (MAF) or less, the minimum flow is 220,000 cfs;
  - b. if the forecast is greater than 80 MAF and less than 92 MAF, the minimum flow is  $220,000 + ((40(\text{forecast} - 80) / 12) \times 1000)$  cfs;
  - c. if the forecast is greater than 92 MAF, the minimum flow is 260,000 cfs.
2. Between July 1 and August 31, the minimum flow measured at McNary Dam is 200,000 cfs.
3. From September 1 through October 31, the minimum flow measured at McNary Dam is 80,000 cfs.
4. Between November 1 and April 9, the minimum flow measured at Bonneville Dam will range from 125,000 to 160,000 cfs, with the specific flow objective to be set by the FCRPS Technical Management Team every two weeks during that period.

Any future proposed mitigation plans submitted by the Quad-Cities for review by Ecology shall be governed by the following terms:

- Mitigation for appropriations beyond the first ten cfs will be according to the following "fifty percent or more/fifty percent or less" formula: fifty percent or more of water consumptively used by the Quad Cities during times when flows established in Provision E are not met will be mitigated by flow replacement using water upstream of the McNary Dam in the Columbia River system; the balance of the mitigation will be accounted for by fish habitat improvements that benefit Columbia River system fish at least to the same extent as would replacement water.
- For any habitat project mitigation proposed by the Quad-Cities under this provision, the Quad-Cities will demonstrate based upon best available science and other applicable legal requirements that the proposed mitigation will benefit Columbia River system fish at least to the same extent as would replacement water.
- In determining whether any habitat project mitigation proposed under this provision is acceptable, Ecology will consult with and give a high degree of deference to the Washington State Department of Fish and Wildlife, the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.
- Any time Ecology approves the use of mitigation to offset diversion increments after the first increment (the first increment is defined as the first 10 cfs of diverted water), Ecology shall issue an order that is subject to appeal to the Pollution Control Hearings Board or any successor body with jurisdiction to hear appeals from Ecology water right decisions.
- To determine the amount of perpetual mitigation for the first increment of water use, Ecology has used an 80 percent consumptive use estimate; i.e., Ecology has assumed that for the first 10 cfs of diverted water, there will be a consumptive use of 8 cfs. Concurrent with the times that the Quad Cities submit each successive Regional Water Forecast and Conservation Plan (RWFCP) Ecology will reevaluate this 80 percent consumptive use estimate based on then-current metering and other data showing actual water returned to the system, and will assure that the appropriate amount of water-for-water mitigation is in place. If consumptive use increases above 80%, in order to keep the diversion for the first 10 cfs not subject to interruption, Ecology will transfer into trust additional water rights from the McNary Pool to offset the additional consumptive use.



- F. If a new instream flow rule for the mainstem Columbia River is promulgated, the Quad Cities may apply to Ecology to have these new flows substituted as permit conditions for the above flows. The application must be in a form and manner that sufficiently explains the basis for the request and the effect of the request on public interest, existing rights and water availability. Upon approval by Ecology, the new flow objectives will replace the conditions described above. Until different instream flow objectives are established through formal rulemaking and Ecology approval of an application by Quad Cities to have these flows applied as new conditions to this water right, the flows set forth above shall remain in effect for the duration of this permit.
- G. Based on the flow replacement mitigation agreed to be supplied by Ecology for the first six-year increment, the maximum water diversion allowed under this permit shall be 10 cfs. If additional water is required prior to 2008, the process to obtain it is the same as that described in Provisions E and H.
- H. To access water beyond the initial 10 cfs, the Quad Cities shall submit an updated RWFCP to the Department of Health and the Department of Ecology on a six-year schedule consistent with the schedule for review of water right quantities. The Quad Cities shall coordinate the preparation and completion of their individual water system plans and related supply, demand, and conservation programs. Prior to completion of the plans, the RWFCP will be completed jointly by the Quad Cities to compare demand to available supply and to evaluate the conservation achieved and the conservation projected resulting from implementation of the program described in section 6. The Quad Cities may submit the RWFCP for access to additional water, under the same process described in this condition, prior to any six-year interval if demand forecasts or other circumstances warrant earlier review. The full quantities of water recommended for a permit in this report may be appropriated in six-year increments associated with submittal of the RWFCP, and only when the applicable minimum instream flow is equaled or exceeded, or when the consumptive water use associated with appropriations under this permit is mitigated. Ecology will review the demand estimates, the water conservation elements of the plan, return flows estimates, and other relevant information contained in the plan that comprises the mitigation or flow replacement proposal. Following public comment, Ecology would approve, conditionally approve, or deny the proposed mitigation plan through an Order. If the Order denies the proposed mitigation or flow replacement proposal, then the appropriation for that 6-year increment would be subject to interruption when the flow objectives in this permit are not met, as described in Provision E.
1. The non-interruptibility of water use beyond the first 10 cfs requires that the Quad Cities submit a mitigation plan to Ecology for approval. Unless extraordinary circumstances exist, when the Quad Cities propose a mitigation plan for future diversion increments under their water right, the Quad Cities will submit their plan at least one year before the Quad Cities need a final decision from Ecology. Ecology will use this one year period for public notice, consultation, and to accomplish any necessary water right trust transfers. For purposes of this section "extraordinary circumstances" is defined only as factual circumstances that establish the need for an Ecology response time of less than one year. In no case will Ecology shorten its review and decision time so as to preclude Ecology from fulfilling its public notice and consultation obligations. The mitigation required for withdrawals of water in the succeeding six-year periods shall be proposed by the Quad Cities in their six-year RWFCPs for approval by the Department of Ecology.
  2. Upon issuance of an Order by Ecology approving, in conformance with Provision E of this permit, one or more trust water rights or approving another replacement water program or a mitigation program proposed by the permittee to offset the full projected consumptive use during periods when flow objectives are not met, the six-year appropriation will not be conditioned as interruptible.
  3. The maximum quantity of withdrawals of water requiring mitigation during the succeeding six-year periods will be presented in the RWFCPs and determined by subtracting estimated return flow from the maximum diversion amount. Return flow calculations shall be based on best available science and shall reflect seasonal conditions. During the course of that six-year period, actual quantities to be mitigated will depend on daily recording and monthly reporting of actual water use under this permit, return flow estimates corresponding to the season of water use, and whether or not the then current flow objectives are achieved during that period.
  4. Each RWFCP shall include a Conservation Program demonstrating how the best available and reasonable conservation technology will be implemented in the subsequent six-year period. The Conservation Program shall meet, as a minimum for the entire life of this permit, current (as of date prepared) Department of Health requirements as well as the conservation conditions described below. In addition, the RWFCP with its Conservation Program shall be submitted to the Department of Ecology for review and approval consistent with the six-year schedule for reviewing water rights. The RWFCP shall propose and implement water conservation activities in the following areas: reducing leakage and unaccounted for water from the municipal water supply system; and monitoring, accounting for (separately) and reducing commercial, industrial, residential (indoor) and landscape water use. The Conservation Program shall include a detailed profile of current water use characteristics for each conservation category defined above including their total annual demand, average demand, unit demand and peak demand. Compliance with the Conservation Program for each six year period shall be a condition of the permit.
  5. The Quad Cities RWFCP shall comply with Department of Health rules (*Conservation Planning Requirements, Washington State Department of Health PUB 331-008, March 1994*) which currently require that these plans contain, as a minimum:
    - *Water Use Data Collection Requirements.* Systems must report the best currently available data on water use for the categories of use, which are identified by the department.

- *Water Demand Forecast.* A complete forecast, including an estimate of reduction of water use from implementation of water conservation measures, must be developed.
- *Conservation Program.* A Conservation Program must be developed and implemented. The Conservation Program elements must include: Conservation Objectives; Evaluation of Conservation Measures; and Identification of Selected Conservation Activities.

If the Department of Health adopts more stringent rules relating to water conservation, the Quad Cities will plan and implement their plans to meet or exceed the more stringent rules.

6. In addition to the general water conservation requirements described above, the following Conservation Program activities are required as conditions of this permit. The Quad Cities will initiate development of the following programs within one year after issuance of the permit and will adopt them for implementation within two years of the date of permit issuance.

For the purposes of the following conservation program elements, the term "implement" means obtaining and expending funding for capital facilities and operational staff, program assessment, and monitoring and reporting associated with each program element in a manner and on a schedule to achieve, and once achieved to maintain, the stated goal or target.

**i. Leak Detection Program**

The Quad Cities shall implement a program to reduce leakage and unaccounted for water for each water supply system within the Quad Cities area. Leakage and unaccounted for water includes water loss due to leaking water mains and smaller distribution lines and inefficient fixtures, including inaccurate metering. Unaccounted for or unmetered water consumption also includes uses such as street sweeping, contractors, flushing hydrants, dust control, and erosion control by the Cities, County and private parties. The goal of the program is to reduce unaccounted for water to no more than 10% of the total diversion by 12/31/2010. The improvements to achieve the goal that are not concluded by 2010 must be identified and incorporated in the State approved Water System Plan for the city's capital improvement program with a completion date of no more than 2016.

**ii. Large Meter Testing Program**

The Quad Cities shall implement a program by December 31, 2005 to test all large meters (greater than 2-inches diameter, primarily used in commercial/industrial connections) and repair or replace all meters found to be defective. The testing and maintenance program will continue after the December 31, 2005 date on a schedule consistent with the manufacturer's recommendations.

**iii. Residential Meter Repair/Replacement Program**

The Quad Cities shall implement a program by December 31, 2005 to test and repair or replace all residential water meters on a schedule consistent with manufacturers' recommendations. The testing and replacement program will continue after the December 31, 2005 date on an appropriate schedule to ensure that the users meters are reasonably accurate.

**iv. Residential Retrofit Program**

The Quad Cities shall implement a residential retrofit program by December 31, 2004 to provide the public with low-flow shower heads, toilet tank displacement bags, leak detection tablets and other residential water conservation measures. The initial program will be completed by December 31, 2008.

**v. Source Metering Replacement and Improvement**

The Quad Cities shall implement a source metering replacement and improvement program by December 31, 2005 to ensure that all water sources are accurately monitored.

**vi. Develop a Water Audit Program for Large Water Users**

The Quad Cities shall develop and implement a water audit program for large (commercial, industrial and institutional) water users. At least 50% of the large water users will be audited by December 31, 2007 and the remainder of the audits completed by 2010. The water audit program shall continue on an ongoing repeat schedule for those large customers where the audit suggests that reasonable additional water use reduction is possible.

**vii. Develop a Joint Plan with Irrigation Districts to address Urban Area Irrigation Needs**

The Quad Cities shall pursue development of a Joint Plan with Irrigation Districts whose service areas overlap with the Quad Cities service area. The Plan shall address irrigation water supplies for landscape use (e.g., which entity supplies landscape water and Quad Cities policies on serving those areas) and landscape water demands during water-short periods when Irrigation Districts may prorate their water users. This plan will be completed by December 31, 2009.

**viii. Develop an Integrated Water Shortage and Drought Response Plan**

The Quad Cities shall develop an integrated Water Shortage and Drought Response Plan for periods when water demands exceed allowed diversions. This plan will be completed by December 31, 2007.

**ix. Develop a recommended School Education Program**

The Quad Cities will work with the school districts within the UGA for the Quad Cities to define appropriate classroom materials and assist the school districts with implementation of the program. The plan will be outlined and a recommended program be adopted for initial implementation by the cities within two years from the issuance of the permit. The implementation in the schools will be on the schedule approved by the school districts.

**x. Develop a General Public Education Program.**

The Quad Cities will develop a public education program as committed to in the Regional Water Supply Plan that will include outreach to all customers emphasizing the efficient use of both indoor and outdoor watering, consumptive use records on water bills, the promotion of water efficient devices such as low flow shower heads, and regional publications explaining conservation programs. This program shall be developed by December 31, 2005 and implemented on an on-going basis.

I. This permit herein recommended is specifically subordinate to any future permits that may be issued under applications No. S4-29956, S4-30052, R4-30102, S4-30185, S4-30465, and S4-30584.



**CITY OF PASCO**  
**AMENDMENTS TO THE STANDARD SPECIFICATIONS**  
**July 1, 2015**

**Pasco Municipal Code 14.08.010**

The Standard Specifications for Road, Bridge, and Municipal Construction published by Washington State Department of Transportation shall govern all construction, modification, extension or improvement affecting directly or indirectly any City utility or street infrastructure elements. Said improvements include, but are not limited to, streets, sidewalks, structures, sewer lines, water lines, storm drainage lines, irrigation lines, or appurtenances thereto, either by public contract or by private development, within the City.

The Standard Specifications are adopted as modified by the City of Pasco Amendments to the Standard Specifications and the City of Pasco Standard Drawings, approved and signed by the city Engineer, except as may be directed by the City Engineer.

The City Clerk shall keep three copies of the Standard Specifications and Amendments on file at all times as required by state law. (Ord. 3969, 2010; Ord. 1367 Sec. 1, 1969.)

The Standard Specifications for Municipal Public Works Construction, as prepared by the Washington State Department of Transportation 2014 Standard Specifications for Road, Bridge, and Municipal Construction hereinafter referred to as "Standard Specifications," hereby references are made a part of said specifications as amended before January 1, 2014, by the Washington State Department of Transportation , the City of Pasco Standard Amendments, and the APWA general special provisions as indicated and supplemented by the "Special Provisions." Copies of the Standard Specifications are available for review and inspection at the office of the Engineer. Copies of the Standard Specifications may be purchased from:

Washington State Department of Transportation (WSDOT)  
Engineering Publications  
Post Office Box 47408  
Olympia, WA. 98504-7408

Copies of the City of Pasco Standard Amendments may be acquired at:  
<http://pasco-wa.gov/index.aspx?NID=409>

**AMENDMENTS:**

**Introduction:**

The following Amendments to the Standard Specifications supersede any conflicting provisions of the Standard Specification. For informational purposes, the date following each Amendment title indicates the implementation date of the Amendment or the latest date of revision.

Each Amendment contains all current revisions to the applicable section of the Standard Specifications and may include references which do not apply to any particular project.

**Modifications and Clarifications to the General Requirements of the Standard Specification:**

**1-01 DEFINITIONS AND TERMS**

**1-01.3 Definitions**

*(October 3, 2014 COP GSP)*

Supplement Section 1-01.3 with the following:

**City**

City shall mean City of Pasco, Washington

**Contracting Agency**

Contracting agency shall mean City of Pasco, Washington

**Engineer/ Project Engineer**

The City Engineer, acting directly or through his authorized representative.

*(March 8, 2013 APWA GSP)*

Delete the heading **Completion Dates** and the three paragraphs that follow it, and replace them with the following:

**Dates**

***Bid Opening Date***

The date on which the Contracting Agency publicly opens and reads the Bids.

***Award Date***

The date of the formal decision of the Contracting Agency to accept the lowest responsible and responsive Bidder for the Work.

***Contract Execution Date***

The date the Contracting Agency officially binds the Agency to the Contract.

***Notice to Proceed Date***

The date stated in the Notice to Proceed on which the Contract time begins.

***Substantial Completion Date***

The day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the operational and safety standpoint, any remaining traffic disruptions will be rare and brief, and only minor incidental work, replacement of temporary substitute facilities, plant establishment periods, or correction or repair remains for the Physical Completion of the total Contract.

***Physical Completion Date***

The day all of the Work is physically completed on the project. All documentation required by the Contract and required by law does not necessarily need to be furnished by the Contractor by this date.

***Completion Date***

The day all the Work specified in the Contract is completed and all the obligations of the Contractor under the contract are fulfilled by the Contractor. All documentation required by the Contract and required by law must be furnished by the Contractor before establishment of this date.

***Final Acceptance Date***

The date on which the Contracting Agency accepts the Work as complete.

Supplement this Section with the following:

All references in the Standard Specifications, Amendments, or WSDOT General Special Provisions, to the terms “State”, “Department of Transportation”, “Washington State Transportation Commission”, “Commission”, “Secretary of Transportation”, “Secretary”, “Headquarters”, and “State Treasurer” shall be revised to read “Contracting Agency”.

All references to “State Materials Laboratory” shall be revised to read “Contracting Agency designated location”.

All references to “final contract voucher certification” shall be interpreted to mean the final payment form established by the Contracting Agency.

The venue of all causes of action arising from the advertisement, award, execution, and performance of the contract shall be in the Superior Court of the County where the Contracting Agency’s headquarters are located.

**Additive**

A supplemental unit of work or group of bid items, identified separately in the Bid Proposal, which may, at the discretion of the Contracting Agency, be awarded in addition to the base bid.

**Alternate**

One of two or more units of work or groups of bid items, identified separately in the Bid Proposal, from which the Contracting Agency may make a choice between different methods or material of construction for performing the same work.

**Business Day**

A business day is any day from Monday through Friday except holidays as listed in Section 1-08.5.



**Contract Bond**

The definition in the Standard Specifications for “Contract Bond” applies to whatever bond form(s) are required by the Contract Documents, which may be a combination of a Payment Bond and a Performance Bond.

**Contract Documents**

See definition for “Contract”.

**Contract Time**

The period of time established by the terms and conditions of the Contract within which the Work must be physically completed.

**Notice of Award**

The written notice from the Contracting Agency to the successful Bidder signifying the Contracting Agency’s acceptance of the Bid Proposal.

**Notice to Proceed**

The written notice from the Contracting Agency or Engineer to the Contractor authorizing and directing the Contractor to proceed with the Work and establishing the date on which the Contract time begins.

**Traffic**

Both vehicular and non-vehicular traffic, such as pedestrians, bicyclists, wheelchairs, and equestrian traffic.

**1-02 BID PROCEDURES AND CONDITIONS****1-02.1 Prequalification of Bidders**

*(August 1, 2002 COP GSP)*

Supplement Section 1-02.1 with the following:

Bidders and Sub-contractors shall be pre-qualified in accordance with Pasco Municipal Code 14.10 ‘Qualification for Public Works Construction’

**1-02.2 Plans and Specifications**

*(November 4, 1997 COP GSP)*

Delete Section 1-02.2 and replace it with the following:

For projects issued by the City of Pasco, copies of plans and specifications (bidding documents) will be on file in the office of the Engineer and may be obtained, at the City, at the cost defined in the Invitation for Bid. After award of the contract, five (5) sets of plans and specifications will be issued without charge.

### **1-02.5 Proposal Forms**

*(June 27, 2011 APWA GSP)*

Delete this section and replace it with the following:

The Proposal Form will identify the project and its location and describe the work. It will also list estimated quantities, units of measurement, the items of work, and the materials to be furnished at the unit bid prices. The bidder shall complete spaces on the proposal form that call for, but are not limited to, unit prices; extensions; summations; the total bid amount; signatures; date; and, where applicable, retail sales taxes and acknowledgment of addenda; the bidder's name, address, telephone number, and signature; the bidder's D/M/WBE commitment, if applicable; a State of Washington Contractor's Registration Number; and a Business License Number, if applicable. Bids shall be completed by typing or shall be printed in ink by hand, preferably in black ink. The required certifications are included as part of the Proposal Form.

The Contracting Agency reserves the right to arrange the proposal forms with alternates and additives, if such be to the advantage of the Contracting Agency. The bidder shall bid on all alternates and additives set forth in the Proposal Form unless otherwise specified.

### **1-02.6 Preparation of the Bid Proposal**

*(June 27, 2011 APWA GSP)*

Supplement the second paragraph with the following:

4. If a minimum bid amount has been established for any item, the unit or lump sum price must equal or exceed the minimum amount stated.
5. Any correction to a bid made by interlineation, alteration, or erasure, shall be initialed by the signer of the bid.

Delete the last paragraph, and replace it with the following:

The Bidder shall make no stipulation on the Bid Form, nor qualify the bid in any manner.

A bid by a corporation shall be executed in the corporate name, by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign).

A bid by a partnership shall be executed in the partnership name, and signed by a partner. A copy of the partnership agreement shall be submitted with the Bid Form if any D/M/WBE requirements are to be satisfied through such an agreement.

A bid by a joint venture shall be executed in the joint venture name and signed by a member of the joint venture. A copy of the joint venture agreement shall be submitted with the Bid Form if any D/W/MBE requirements are to be satisfied through such an agreement.

*(May 1, 2012 COP GSP)*

Revise the fifth paragraph, numbered item 1. to read:

The Bidder shall list all Subcontractors who will perform work on the Subcontract Disclosure Form.

**1-02.8 Noncollusion Declaration**

*(November 4, 1997 COP GSP)*

Supplement Section 1-02.8 with the following:

A Non-collusion Declaration (Certificate) is required.

**1-02.9 Delivery of Proposal**

*(October 1, 2005 APWA GSP)*

Supplement Section 1-02.9 with the following:

Bid bonds shall be submitted on the form supplied by the Contracting Agency.

**1-02.14 Disqualifications of Bidders**

*(November 4, 1997 COP GSP)*

Supplement Section 1-02.14 with the following:

11. The Bidder's Statement of Qualifications is found to be in error, questionable, or not in the best interest of the City.

**1-02.15 Pre Award Information**

*(October 1, 2005 APWA GSP)*

Revise Section 1-02.15 to read:

Before awarding any contract, the Contracting Agency may require one or more of these:

1. A complete statement of the origin, composition, and manufacture of any or all materials to be used,
2. Samples of these materials for quality and fitness tests,
3. A progress schedule (in a form the Contracting Agency requires) showing the order of and time required for the various phases of the work,
4. A breakdown of costs assigned to any bid item,
5. Attendance at a conference with the Engineer or representatives of the Engineer,

6. Obtain, and furnish a copy of, a business license to do business in the city or county where the work is located.
7. A copy of State of Washington Contractor's Registration, or
8. Any other information or action taken that is deemed necessary to ensure that the bidder is the lowest responsible bidder.

## **1-03 AWARD AND EXECUTION OF CONTRACT**

### **1-03.1 Consideration of Bid**

*(January 23, 2006 APWA GSP)*

Revise the first paragraph of Section 1-03.1 to read:

After opening and reading proposals, the Contracting Agency will check them for correctness of extensions of the prices per unit and the total price. If a discrepancy exists between the price per unit and the extended amount of any bid item, the price per unit will control. If a minimum bid amount has been established for any item and the bidder's unit or lump sum price is less than the minimum specified amount, the Contracting Agency will unilaterally revise the unit or lump sum price, to the minimum specified amount and recalculate the extension. The total of extensions, corrected where necessary, including sales taxes where applicable and such additives and/or alternates as selected by the Contracting Agency, will be used by the Contracting Agency for award purposes and to fix the Awarded Contract Price amount and the amount of the contract bond.

### **1-03.2 Award of Contract**

*(January 1, 2010 COP GSP)*

Revise Section 1-03.2 to read:

Normally, Contract Award or Bid rejection will occur within 60 calendar days after Bid opening. If the lowest responsible Bidder and the Contracting Agency agree, this deadline may be extended. If they cannot agree on an extension by the 60-calendar day deadline, the Contracting Agency reserves the right to Award the Contract to the next lowest responsible Bidder or reject all Bids. The Contracting Agency will notify the successful Bidder of the Contract Award in writing.

### **1-03.3 Execution of Contract**

*(January 1, 2010 COP GSP)*

Revise Section 1-03.3 to read:

Within 10-calendar days after the Award date, the successful Bidder shall return the signed Contracting Agency-prepared Contract, an insurance certification as required by Section 1-07.18, and a satisfactory bond as required by law and Section 1-03.4. Before

execution of the Contract by the Contracting Agency, the successful Bidder shall provide any pre-Award information the Contracting Agency may require under Section 1-02.15.

Until the Contracting Agency executes a Contract, no Proposal shall bind the Contracting Agency nor shall any Work begin within the project limits or within Contracting Agency-furnished sites. The Contractor shall bear all risks for any Work begun outside such areas and for any materials ordered before the Contract is executed by the Contracting Agency.

If the Bidder experiences circumstances beyond their control that prevents return of the Contract documents within 10-calendar days after the Award date, the Contracting Agency may grant up to a maximum of 10 additional calendar days for return of the documents, provided the Contracting Agency deems the circumstances warrant it.

#### **1-03.4 Contract Bond**

*(October 1, 2005 APWA GSP)*

Revise the first paragraph of Section 1-03.4 to read:

The successful bidder shall provide an executed contract bond for the full contract amount. This contract bond shall:

1. Be on a Contracting Agency-furnished form;
2. Be signed by an approved surety (or sureties) that:
  - a. Is registered with the Washington State Insurance Commissioner, and
  - b. Appears on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner,
3. Be conditioned upon the faithful performance of the contract by the Contractor within the prescribed time;
4. Guarantee that the surety shall indemnify, defend, and protect the Contracting Agency against any claim of direct or indirect loss resulting from the failure:
  - a. Of the Contractor (or any of the employees, subcontractors, or lower tier subcontractors of the Contractor) to faithfully perform the contract, or
  - b. Of the Contractor (or the subcontractors or lower tier subcontractors of the Contractor) to pay all laborers, mechanics, subcontractors, lower tier subcontractors, material person, or any other person who provides supplies or provisions for carrying out the work;
5. Be accompanied by a power of attorney for the Surety's officer empowered to sign the bond; and
6. Be signed by an officer of the Contractor empowered to sign official statements (sole proprietor or partner). If the Contractor is a corporation, the bond must be signed by the president or vice-president, unless accompanied by written proof of the authority of the individual signing the bond to bind the corporation (i.e., corporate resolution, power of attorney or a letter to such effect by the president or vice-president).

## **1-04 SCOPE OF WORK**

### **1-04.2 Coordination of Contract Documents, Plans, Special Provisions, Specifications, and Addenda**

*(October 3, 2014 COP GSP)*

Revise the second paragraph of Section 1-04.2 to read:

Any inconsistency in the parts of the contract shall be resolved by following this order of precedence (e.g., 1 presiding over 2, 2 over 3, 3 over 4, and so forth):

1. Addenda,
2. Proposal Form,
3. Special Provisions,
4. Approved Construction Plans,
5. City of Pasco Amendments to the Standard Specifications,
6. Amendments to the Standard Specifications,
7. Standard Specifications,
8. Contracting Agency's Standard Plans or Details (if any), and
9. WSDOT Standard Plans for Road, Bridge, and Municipal Construction.

### **1-04.7 Differing Site Conditions (Changed Conditions)**

*(January 1, 2010 COP GSP)*

Supplement Section 1-04.7 with the following:

The Contractor may perform test pits to investigate subsurface conditions during the bidding phase with approval from the Engineer.

## **1-05 CONTROL OF WORK**

### **1-05.4 Conformity with Plans, Stakes, Deviation**

*(January 1, 2012 COP GSP)*

Supplement Section 1-05.4 with the following:

The Contractor shall provide a surveyor, licensed to practice in the State of Washington, for all project surveying. The Engineer will provide any survey control and benchmarks used in the creation of the construction drawings. Unless otherwise provided for in the bid proposal, all costs for project surveying shall be included in the cost of other bid items.

The stationing marked in the field for construction staking shall match the stationing on the construction drawings.

“Blue Top” stakes shall be provided for subgrade and top course, on the roadway center line, at a minimum of 50-foot stations on tangent sections and 25-foot stations on horizontal curves, vertical curves, and through intersections. “Blue Top” stakes shall also be provided at the quarter crowns, matching the centerline spacing, for all cross sections 40 feet and wider. When concrete curb and gutter exists or is installed with the project, “Blue Top” stake elevations shall be referenced to the curb elevations and may vary slightly from the construction drawings to achieve the required crushed surfacing thicknesses and roadway cross slopes.

The Engineer reserves the right to check or have checked all project surveying. If the surveying is determined to be incorrect, the Contractor shall bear all costs associated with checking the surveying. If the grades are found to be correct, the Contractor will be compensated for costs and lost time in accordance with Section 1-04.4.

#### **1-05.6 Inspections of Work and Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 1-05.6 with the following:

The Engineer or his representative may not be on the job site full-time. The Contractor shall follow the approved construction plans and specifications, schedule, and request inspections and testing at the appropriate times as required herein. The Engineer will make an effort to provide inspections on short notice, but if unable to, the requirements for proper notice shall apply. The project schedule prepared by the Contractor and approved by the Engineer shall also be used as a guide for the Contractor to schedule inspections. The Contractor shall provide 48 hours of response time to a request for inspections and 48 hours for testing, but in no case shall there be more than 72 hours notice. The request shall state the date and approximate time the inspection or test is requested. If the Contractor has requested two (2) inspections or tests and is not prepared for said inspection or test, the Contractor shall pay the costs for any additional improperly scheduled requests.

At the beginning of the project, or each applicable construction activity, the Contractor shall meet with the Engineer and establish a minimum 100 feet of product, in the field, which meets the specifications. This work includes: survey staking and control, pavement cuts, utility trenches, trench bedding, pipe installation, backfill, patches, curb and gutter alignment, grade and finish, sidewalk finish, paving finish, and any other activities determined by the Engineer to be important to the project. No major amount of work shall proceed until this is established. This does not waive the Contractor's requirements in the specifications for quality control or materials used.

Inspections and testing are mandatory for acceptance of backfilling any utility trenches; placing base course and top course for streets; paving: placing sidewalks, curbs and gutters, sewer and water line installation.



### **1-05.7 Removal of Defective and Unauthorized Work**

*(October 1, 2005 APWA GSP)*

Supplement Section 1-05.7 with the following:

If the Contractor fails to remedy defective or unauthorized work within the time specified in a written notice from the Engineer, or fails to perform any part of the work required by the Contract Documents, the Engineer may correct and remedy such work as may be identified in the written notice, with Contracting Agency forces or by such other means as the Contracting Agency may deem necessary.

If the Contractor fails to comply with a written order to remedy what the Engineer determines to be an emergency situation, the Engineer may have the defective and unauthorized work corrected immediately, the rejected work removed and replaced, or have work the Contractor refuses to perform completed by using Contracting Agency or other forces. An emergency situation is any situation when, in the opinion of the Engineer, a delay in its remedy could be potentially unsafe, or might cause serious risk of loss or damage to the public.

Direct or indirect costs incurred by the Contracting Agency attributable to correcting and remedying defective or unauthorized work, or work the Contractor failed or refused to perform, shall be paid by the Contractor. Payment will be deducted by the Engineer from monies due, or to become due, the Contractor. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required, and costs for repair and replacement of work of others destroyed or damaged by correction, removal, or replacement of the Contractor's unauthorized work.

No adjustment in contract time or compensation will be allowed because of the delay in the performance of the work attributable to the exercise of the Contracting Agency's rights provided by this Section.

The rights exercised under the provisions of this section shall not diminish the Contracting Agency's right to pursue any other avenue for additional remedy or damages with respect to the Contractor's failure to perform the work as required.

*(January 1, 2012 COP GSP)*

Supplement Section 1-05.7 with the following:

For new roadway/street construction and overlay projects, HMA work rejected shall require the replacement of the entire road or street width from block to block or as approved in writing from the Engineer. For trench patching, HMA work rejected shall require the replacement of the entire patch width from block to block or as approved in writing from the Engineer.

### **1-05.11 Final Inspection**

Delete Section 1-05.11 and replace it with the following:

### **1-05.11 Final Inspections and Operational Testing**

#### **1-05.11(1) Substantial Completion Date**

*(January 1, 2012 COP GSP)*

The Contracting Agency has the right to use any and/or all work prior to Substantial Completion.

Utility castings shall be raised to final grade and final patching shall be completed prior to issuance of Substantial Completion.

When the Contractor considers the work substantially complete, the Contractor shall notify the Engineer in writing, requesting the Engineer establish the Substantial Completion Date. The Contractor's request shall list the specific items of work to be completed in order to reach physical completion. Upon receipt of the Contractor's request, the Engineer will schedule an inspection of the work. The Engineer may also establish the Substantial Completion Date unilaterally.

After this inspection, the Engineer will notify the Contractor in writing concurring in or denying Substantial Completion. Upon receipt, the Contractor shall provide the Engineer with a revised schedule and pursue without unauthorized delay the work necessary to reach substantial completion.

The process shall be repeated until the Engineer establishes the Substantial Completion Date. Once the substantial completion date has been established, the Contractor shall work without delay to reach physical completion.

Any defective work found after Substantial Completion and prior to Final Acceptance shall be considered contract work.

#### **1-05.11(2) Final Inspection and Physical Completion Date**

*(October 1, 2005 APWA GSP)*

When the Contractor considers the work physically complete and ready for final inspection, the Contractor by written notice shall request the Engineer to schedule a final inspection. The Engineer will set a date for final inspection. The Engineer and the Contractor will then make a final inspection and the Engineer will notify the Contractor in writing of all particulars in which the final inspection reveals the work incomplete or unacceptable. The Contractor shall immediately take such corrective measures as are necessary to remedy the listed deficiencies. Corrective work shall be pursued vigorously, diligently, and without interruption until physical completion of the listed deficiencies.

This process will continue until the Engineer is satisfied the listed deficiencies have been corrected.

If action to correct the listed deficiencies is not initiated within 7 days after receipt of the written notice listing the deficiencies, the Engineer may, upon written notice to the Contractor, take whatever steps are necessary to correct those deficiencies pursuant to WSDOT Section 1-05.7. The Contractor will not be allowed an extension of contract time because of a delay in the performance of the work attributable to the exercise of the Engineer's right hereunder.

Upon correction of all deficiencies, the Engineer will notify the Contractor, in writing, of the date upon which the work was considered physically complete. That date shall constitute the Physical Completion Date of the contract, but shall not imply acceptance of the work or that all the obligations of the Contractor under the contract have been fulfilled.

### **1-05.11(3) Operational Testing**

*(October 1, 2005 APWA GSP)*

It is the intent of the Contracting Agency to have at the Physical Completion Date a complete and operable system. Therefore when the work involves the installation of machinery or other mechanical equipment; street lighting, electrical distribution or signal systems; irrigation systems; buildings; or other similar work it may be desirable for the Engineer to have the Contractor operate and test the work for a period of time after final inspection but prior to the physical completion date. Whenever items of work are listed in the Contract Provisions for operational testing they shall be fully tested under operating conditions for the time period specified to ensure their acceptability prior to the Physical Completion Date. During and following the test period, the Contractor shall correct any items of workmanship, materials, or equipment which prove faulty, or that are not in first class operating condition. Equipment, electrical controls, meters, or other devices and equipment to be tested during this period shall be tested under the observation of the Engineer, so that the Engineer may determine their suitability for the purpose for which they were installed. The Physical Completion Date cannot be established until testing and corrections have been completed to the satisfaction of the Engineer.

The costs for power, gas, labor, material, supplies, and everything else needed to successfully complete operational testing, shall be included in the unit contract prices related to the system being tested, unless specifically set forth otherwise in the proposal.

Operational and test periods, when required by the Engineer, shall not affect a manufacturer's guaranties or warranties furnished under the terms of the contract.

### **1-05.12 Final Acceptance**

*(January 1, 2010 COP GSP)*

Revise the third sentence of the first paragraph of Section 1-05.12 to read:

The City Council accepts the completed Contract and the items of Work shown in the final estimate by signature of the Final Contract Voucher Certification.

*(January 1, 2012 COP GSP)*

Supplement Section 1-05.12 with:

The City shall issue a statement of Final Acceptance at project completion. Work performed by City forces, when a contractor fails to conform to the requirements of 1-05.11, in which reimbursement to the City has not been made, will be withheld from the final payment. A 60-day appeal period will begin the day after final acceptance. The retainage shall be released after the appeal period and in accordance with Washington State R.C.W.'s. (See 1-09.9(1) Retainage)

Add the following new section:

**1-05.12(1) One-Year Guarantee Period**

*(March 8, 2013 APWA GSP)*

The Contractor shall return to the project and repair or replace all defects in workmanship and material discovered within one year after Final Acceptance of the Work. The Contractor shall start work to remedy any such defects within 7 calendar days of receiving Contracting Agency's written notice of a defect, and shall complete such work within the time stated in the Contracting Agency's notice. In case of an emergency, where damage may result from delay or where loss of services may result, such corrections may be made by the Contracting Agency's own forces or another contractor, in which case the cost of corrections shall be paid by the Contractor. In the event the Contractor does not accomplish corrections within the time specified, the work will be otherwise accomplished and the cost of same shall be paid by the Contractor.

When corrections of defects are made, the Contractor shall then be responsible for correcting all defects in workmanship and materials in the corrected work for one year after acceptance of the corrections by Contracting Agency.

This guarantee is supplemental to and does not limit or affect the requirements that the Contractor's work comply with the requirements of the Contract or any other legal rights or remedies of the Contracting Agency.

**1-05.13 Superintendents, Labor and Equipment of Contractor**

*(August 14, 2013 APWA GSP)*

Delete the sixth and seventh paragraphs of this section.

Add the following new section:

**1-05.16 Water and Power**

*(October 1, 2005 APWA GSP)*

The Contractor shall make necessary arrangements, and shall bear the costs for power and water necessary for the performance of the work, unless the contract includes power and water as a pay item.

*(October 3, 2014 COP GSP)*

Supplement with the following:

If City water is used for any work related to this project, a Fire Hydrant Meter and Gate Valve will need to be obtained from the City of Pasco to be used specifically for this project. The Contractor shall be charged an \$800 return deposit plus a \$50 non-refundable handling and processing fee for the meter and valve. The City will charge the Contractor for any water used in the construction of the project. Any water used for this project shall be considered incidental to construction and will be paid per Standard Specification 2-07.5. The Contractor shall not operate the hydrant as a gate valve, nor shall the Contractor be allowed to operate any other City owned valve. The Contractor shall provide the necessary back flow prevention device when connecting to the water service. The Fire Hydrant Meter requirements and the Fire Hydrant Meter Application are available at the Customer Service Window and the Engineering Department.

Add the following new section:

**1-05.17 Oral Agreements**

*(October 1, 2005 AWWA GSP)*

No oral agreement or conversation with any officer, agent, or employee of the Contracting Agency, either before or after execution of the contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the contract. Such oral agreement or conversation shall be considered as unofficial information and in no way binding upon the Contracting Agency, unless subsequently put in writing and signed by the Contracting Agency.

**1-06 CONTROL OF MATERIAL**

**1-06.2(1) Samples and Tests for Acceptance**

*(January 1, 2012 COP GSP)*

Supplement Section 1-06.2(1) with the following:

The Engineer may designate a third party testing agency to perform sampling and testing. The Engineer shall be notified 48-hours in advance of all testing.

If work is rejected due to test failure, the Contractor shall remove and replace the rejected work. If the work fails testing again, all costs for further testing shall be borne by the Contractor.

The costs for samples and testing shall be borne by the owner for all projects that are not City-constructed projects.

#### **1-06.2(2) Statistical Evaluations of Materials for Acceptance**

*(November 4, 1997 COP GSP)*

Delete Section 1-06.2(2)

### **1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC**

#### **1-07.1 Laws to be Observed**

*(October 1, 2005 APWA GSP)*

Supplement Section 1-07.1 with the following:

In cases of conflict between different safety regulations, the more stringent regulation shall apply.

The Washington State Department of Labor and Industries shall be the sole and paramount administrative agency responsible for the administration of the provisions of the Washington Industrial Safety and Health Act of 1973 (WISHA).

The Contractor shall maintain at the project site office, or other well known place at the project site, all articles necessary for providing first aid to the injured. The Contractor shall establish, publish, and make known to all employees, procedures for ensuring immediate removal to a hospital, or doctor's care, persons, including employees, who may have been injured on the project site. Employees should not be permitted to work on the project site before the Contractor has established and made known procedures for removal of injured persons to a hospital or a doctor's care.

The Contractor shall have sole responsibility for the safety, efficiency, and adequacy of the Contractor's plant, appliances, and methods, and for any damage or injury resulting from their failure, or improper maintenance, use, or operation. The Contractor shall be solely and completely responsible for the conditions of the project site, including safety for all persons and property in the performance of the work. This requirement shall apply continuously, and not be limited to normal working hours. The required or implied duty of the Engineer to conduct construction review of the Contractor's performance does not, and shall not, be intended to include review and adequacy of the Contractor's safety measures in, on, or near the project site.

## **1-07.2 State Taxes**

Delete this section, including its sub-sections, in its entirety and replace it with the following:

### **1-07.2 State Sales Tax**

*(June 27, 2011 APWA GSP)*

The Washington State Department of Revenue has issued special rules on the State sales tax. Sections 1-07.2(1) through 1-07.2(3) are meant to clarify those rules. The Contractor should contact the Washington State Department of Revenue for answers to questions in this area. The Contracting Agency will not adjust its payment if the Contractor bases a bid on a misunderstood tax liability.

The Contractor shall include all Contractor-paid taxes in the unit bid prices or other contract amounts. In some cases, however, state retail sales tax will not be included. Section 1-07.2(2) describes this exception.

The Contracting Agency will pay the retained percentage (or release the Contract Bond if a FHWA-funded Project) only if the Contractor has obtained from the Washington State Department of Revenue a certificate showing that all contract-related taxes have been paid (RCW 60.28.051). The Contracting Agency may deduct from its payments to the Contractor any amount the Contractor may owe the Washington State Department of Revenue, whether the amount owed relates to this contract or not. Any amount so deducted will be paid into the proper State fund.

#### **1-07.2(1) State Sales Tax — Rule 171**

WAC 458-20-171, and its related rules, apply to building, repairing, or improving streets, roads, etc., which are owned by a municipal corporation, or political subdivision of the state, or by the United States, and which are used primarily for foot or vehicular traffic. This includes storm or combined sewer systems within and included as a part of the street or road drainage system and power lines when such are part of the roadway lighting system. For work performed in such cases, the Contractor shall include Washington State Retail Sales Taxes in the various unit bid item prices, or other contract amounts, including those that the Contractor pays on the purchase of the materials, equipment, or supplies used or consumed in doing the work.

#### **1-07.2(2) State Sales Tax — Rule 170**

WAC 458-20-170, and its related rules, apply to the constructing and repairing of new or existing buildings, or other structures, upon real property. This includes, but is not limited to, the construction of streets, roads, highways, etc., owned by the state of Washington; water mains and their appurtenances; sanitary sewers and sewage disposal systems unless such sewers and disposal systems are within, and a part of, a street or road drainage system; telephone, telegraph, electrical power distribution lines, or other

conduits or lines in or above streets or roads, unless such power lines become a part of a street or road lighting system; and installing or attaching of any article of tangible personal property in or to real property, whether or not such personal property becomes a part of the realty by virtue of installation.

For work performed in such cases, the Contractor shall collect from the Contracting Agency, retail sales tax on the full contract price. The Contracting Agency will automatically add this sales tax to each payment to the Contractor. For this reason, the Contractor shall not include the retail sales tax in the unit bid item prices, or in any other contract amount subject to Rule 170, with the following exception.

Exception: The Contracting Agency will not add in sales tax for a payment the Contractor or a subcontractor makes on the purchase or rental of tools, machinery, equipment, or consumable supplies not integrated into the project. Such sales taxes shall be included in the unit bid item prices or in any other contract amount.

### **1-07.2(3) Services**

The Contractor shall not collect retail sales tax from the Contracting Agency on any contract wholly for professional or other services (as defined in Washington State Department of Revenue Rules 138 and 244).

### **1-07.5 Environmental Regulations**

#### **1-07.5(1) General**

*(January 1, 2012 COP GSP)*

Supplement Section 1-07.5(1) with the following:

4. Dumping of material removed from catch basins and other storm drain structures into the right of way, sanitary sewer or storm drain system is prohibited. Contractor's caught disposing of materials in this manner will be assessed damages and may have their prequalification status revoked.

### **1-07.9 Wages**

#### **1-07.9(1) General**

*(November 11, 1997 COP GSP)*

Supplement the eighth paragraph of Section 1-07.9(1) with the following:

The Contractor shall pay all required fees established in WAC 296-127-045 and consider said fees incidental to the project.



### **1-07.17 Utilities and Similar Facilities**

*(January 1, 2012 COP GSP)*

Supplement Section 1-07.17 with the following:

Only City personnel shall operate water system valves.

Where the location of the work is in proximity to overhead wires and power lines, the Contractor shall coordinate all work with the utility and shall provide for such measures as may be necessary for the protection of workmen.

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification. In addition to the requirements of RCW 19.122, the Contractor shall use surface features and other evidence in determining the approximate utility location prior to excavation. The Contractor shall hand dig to expose known utilities.

### **1-07.18 Public Liability and Property Damage Insurance**

Delete this section in its entirety, and replace it with the following:

#### **1-07.18 Insurance**

*(January 24, 2011 APWA GSP)*

##### **1-07.18(1) General Requirements**

- A. The Contractor shall obtain the insurance described in this section from insurers approved by the State Insurance Commissioner pursuant to RCW Title 48. The insurance must be provided by an insurer with a rating of A-: VII or higher in the A.M. Best's Key Rating Guide, which is licensed to do business in the state of Washington (or issued as a surplus line by a Washington Surplus lines broker). The Contracting Agency reserves the right to approve or reject the insurance provided, based on the insurer (including financial condition), terms and coverage, the Certificate of Insurance, and/or endorsements.
- B. The Contractor shall keep this insurance in force during the term of the contract and for thirty (30) days after the Physical Completion date, unless otherwise indicated (see C. below).
- C. If any insurance policy is written on a claims made form, its retroactive date, and that of all subsequent renewals, shall be no later than the effective date of this Contract. The policy shall state that coverage is claims made, and state the retroactive date. Claims-made form coverage shall be maintained by the Contractor for a minimum of 36 months following the Final Completion or earlier termination of this contract, and the Contractor shall annually provide the Contracting Agency with proof of renewal. If renewal of the claims made form of coverage becomes unavailable, or economically prohibitive, the Contractor shall purchase an extended reporting period

(“tail”) or execute another form of guarantee acceptable to the Contracting Agency to assure financial responsibility for liability for services performed.

- D. The insurance policies shall contain a “cross liability” provision.
- E. The Contractor’s and all subcontractors’ insurance coverage shall be primary and non-contributory insurance as respects the Contracting Agency’s insurance, self-insurance, or insurance pool coverage.
- F. All insurance policies and Certificates of Insurance shall include a requirement providing for a minimum of 30 days prior written notice to the Contracting Agency of any cancellation in any insurance policy.
- G. Upon request, the Contractor shall forward to the Contracting Agency a full and certified copy of the insurance policy(s).
- H. The Contractor shall not begin work under the contract until the required insurance has been obtained and approved by the Contracting Agency.
- I. Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of contract, upon which the Contracting Agency may, after giving five business days notice to the Contractor to correct the breach, immediately terminate the contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Contracting Agency on demand, or at the sole discretion of the Contracting Agency, offset against funds due the Contractor from the Contracting Agency.
- J. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the contract and no additional payment will be made.

**1-07.18(2) Additional Insured**

All insurance policies, with the exception of Professional Liability and Workers Compensation, shall name the following listed entities as additional insured(s):

- the Contracting Agency and its officers, elected officials, employees, agents, and volunteers

The above-listed entities shall be additional insured(s) for the full available limits of liability maintained by the Contractor, whether primary, excess, contingent or otherwise, irrespective of whether such limits maintained by the Contractor are greater than those required by this Contract, and irrespective of whether the Certificate of Insurance provided by the Contractor pursuant to 1-07.18(3) describes limits lower than those maintained by the Contractor.

### **1-07.18(3) Subcontractors**

Contractor shall ensure that each subcontractor of every tier obtains and maintains at a minimum the insurance coverages listed in 1-07.18(5)A and 1-07.18(5)B. Upon request of the Contracting Agency, the Contractor shall provide evidence of such insurance.

### **1-07.18(4) Evidence of Insurance**

The Contractor shall deliver to the Contracting Agency a Certificate(s) of Insurance and endorsements for each policy of insurance meeting the requirements set forth herein when the Contractor delivers the signed Contract for the work. The certificate and endorsements must conform to the following requirements:

1. An ACORD certificate or a form determined by the Contracting Agency to be equivalent.
2. Copies of all endorsements naming Contracting Agency and all other entities listed in 1-07.18(2) as Additional Insured(s), showing the policy number. The Contractor may submit a copy of any blanket additional insured clause from its policies instead of a separate endorsement. A statement of additional insured status on an ACORD Certificate of Insurance shall not satisfy this requirement.
3. Any other amendatory endorsements to show the coverage required herein.

### **1-07.18(5) Coverages and Limits**

The insurance shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve the Contractor from liability in excess of such limits. All deductibles and self-insured retentions must be disclosed and are subject to approval by the Contracting Agency. The cost of any claim payments falling within the deductible shall be the responsibility of the Contractor.

#### **1-07.18(5)A Commercial General Liability**

A policy of Commercial General Liability Insurance, including:

Per project aggregate  
Premises/Operations Liability  
Products/Completed Operations – for a period of one year following final acceptance of the work.  
Personal/Advertising Injury  
Contractual Liability  
Independent Contractors Liability  
Stop Gap / Employers' Liability  
Explosion, Collapse, or Underground Property Damage (XCU)  
Blasting (only required when the Contractor's work under this Contract includes exposures to which this specified coverage responds)

Such policy must provide the following minimum limits:

\$1,000,000	Each Occurrence
\$2,000,000	General Aggregate
\$1,000,000	Products & Completed Operations Aggregate
\$1,000,000	Personal & Advertising Injury, each offence

**Stop Gap / Employers' Liability**

\$1,000,000	Each Accident
\$1,000,000	Disease - Policy Limit
\$1,000,000	Disease - Each Employee

**1-07.18(5)B Automobile Liability**

Automobile Liability for owned, non-owned, hired, and leased vehicles, with an MCS 90 endorsement and a CA 9948 endorsement attached if "pollutants" are to be transported. Such policy(ies) must provide the following minimum limit:

\$1,000,000	combined single limit
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**1-07.18(5)C Workers' Compensation**

The Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the state of Washington.

**1-07.23 (1) Construction Under Traffic**

*(January 1, 2010 COP GSP)*

Delete the second paragraph of Section 1-07.23(1) in its entirety, and replace it with the following:

To disrupt traffic as little as possible, the Contractor shall permit traffic to pass through the Work with the least possible inconvenience or delay. The Contractor shall maintain existing roads, streets, sidewalks, and paths within the project limits, keeping them open and in good, clean, safe condition at all times. Deficiencies caused by the Contractor's operations shall be repaired at the Contractor's expense. The Contractor shall also maintain roads, streets, sidewalks, and paths adjacent to the project limits when affected by the Contractor's operations. The Contractor shall perform the following:

**1-07.24 Rights of Way**

*(October 1, 2005 APWA GSP)*

Delete Section 1-07.24 in its entirety, and replace it with the following:

Street right of way lines, limits of easements, and limits of construction permits are indicated in the Plans. The Contractor's construction activities shall be confined within these limits, unless arrangements for use of private property are made.

Generally, the Contracting Agency will have obtained, prior to bid opening, all rights of way and easements, both permanent and temporary, necessary for carrying out the work. Exceptions to this are noted in the Bid Documents or will be brought to the Contractor's attention by a duly issued Addendum.

Whenever any of the work is accomplished on or through property other than public right of way, the Contractor shall meet and fulfill all covenants and stipulations of any easement agreement obtained by the Contracting Agency from the owner of the private property. Copies of the easement agreements may be included in the Contract Provisions or made available to the Contractor as soon as practical after they have been obtained by the Engineer.

Whenever easements or rights of entry have not been acquired prior to advertising, these areas are so noted in the Plans. The Contractor shall not proceed with any portion of the work in areas where right of way, easements or rights of entry have not been acquired until the Engineer certifies to the Contractor that the right of way or easement is available or that the right of entry has been received. If the Contractor is delayed due to acts of omission on the part of the Contracting Agency in obtaining easements, rights of entry or right of way, the Contractor will be entitled to an extension of time. The Contractor agrees that such delay shall not be a breach of contract.

Each property owner shall be given 48 hours notice prior to entry by the Contractor. This includes entry onto easements and private property where private improvements must be adjusted.

The Contractor shall be responsible for providing, without expense or liability to the Contracting Agency, any additional land and access thereto that the Contractor may desire for temporary construction facilities, storage of materials, or other Contractor needs. However, before using any private property, whether adjoining the work or not, the Contractor shall file with the Engineer a written permission of the private property owner, and, upon vacating the premises, a written release from the property owner of each property disturbed or otherwise interfered with by reasons of construction pursued under this contract. The statement shall be signed by the private property owner, or proper authority acting for the owner of the private property affected, stating that permission has been granted to use the property and all necessary permits have been obtained or, in the case of a release, that the restoration of the property has been satisfactorily accomplished. The statement shall include the parcel number, address, and date of signature. Written releases must be filed with the Engineer before the Completion Date will be established.

## **1-08 PROSECUTION AND PROGRESS**

Add the following new section:

### **1-08.0 Preliminary Matters**

*(May 25, 2006 APWA GSP)*

Add the following new section:

#### **1-08.0(1) Preconstruction Conference**

*(October 10, 2008 APWA GSP)*

Prior to the Contractor beginning the work, a preconstruction conference will be held between the Contractor, the Engineer and such other interested parties as may be invited. The purpose of the preconstruction conference will be:

1. To review the initial progress schedule;
2. To establish a working understanding among the various parties associated or affected by the work;
3. To establish and review procedures for progress payment, notifications, approvals, submittals, etc.;
4. To establish normal working hours for the work;
5. To review safety standards and traffic control; and
6. To discuss such other related items as may be pertinent to the work.

The Contractor shall prepare and submit at the preconstruction conference the following:

1. A breakdown of all lump sum items;
2. A preliminary schedule of working drawing submittals; and
3. A list of material sources for approval if applicable.

Add the following new section:

#### **1-08.0(2) Hours of Work**

*(December 8, 2014 APWA GSP)*

Except in the case of emergency or unless otherwise approved by the Engineer, the normal working hours for the Contract shall be any consecutive 8-hour period between 7:00 a.m. and 6:00 p.m. Monday through Friday, exclusive of a lunch break. If the Contractor desires different than the normal working hours stated above, the request must be submitted in writing prior to the preconstruction conference, subject to the provisions below. The working hours for the Contract shall be established at or prior to the preconstruction conference.

All working hours and days are also subject to local permit and ordinance conditions (such as noise ordinances).

If the Contractor wishes to deviate from the established working hours, the Contractor shall submit a written request to the Engineer for consideration. This request shall state what hours are being requested, and why. Requests shall be submitted for review no later than 48 hours prior to the day(s) the Contractor is requesting to change the hours.

If the Contracting Agency approves such a deviation, such approval may be subject to certain other conditions, which will be detailed in writing. For example:

1. On non-Federal aid projects, requiring the Contractor to reimburse the Contracting Agency for the costs in excess of straight-time costs for Contracting Agency representatives who worked during such times. (The Engineer may require designated representatives to be present during the work. Representatives who may be deemed necessary by the Engineer include, but are not limited to: survey crews; personnel from the Contracting Agency's material testing lab; inspectors; and other Contracting Agency employees or third party consultants when, in the opinion of the Engineer, such work necessitates their presence.)
2. Considering the work performed on Saturdays, Sundays, and holidays as working days with regard to the contract time.
3. Considering multiple work shifts as multiple working days with respect to contract time even though the multiple shifts occur in a single 24-hour period.
4. If a 4-10 work schedule is requested and approved the non-working day for the week will be charged as a working day.
5. If Davis Bacon wage rates apply to this Contract, all requirements must be met and recorded properly on certified payroll.

Add the following new section:

**1-08.0(3) Reimbursement for Overtime Work of Contracting Agency Employees**  
(May 25, 2006 APWA GSP)

Where the Contractor elects to work on a Saturday, Sunday, or holiday, or longer than an 8-hour work shift on a regular working day, as defined in the Standard Specifications, such work shall be considered as overtime work. On all such overtime work an inspector will be present, and a survey crew may be required at the discretion of the Engineer. In such case, the Contracting Agency may deduct from amounts due or to become due to the Contractor for the costs in excess of the straight-time costs for employees of the Contracting Agency required to work overtime hours.

The Contractor by these specifications does hereby authorize the Engineer to deduct such costs from the amount due or to become due to the Contractor.

**1-08.4 Prosecution of Work**

Delete this section in its entirety, and replace it with the following:

#### **1-08.4 Notice to Proceed and Prosecution of Work**

*(June 27, 2011 APWA GSP)*

Notice to Proceed will be given after the Contract has been executed and the contract bond and evidence of insurance have been approved and filed by the Contracting Agency. The Contractor shall not commence with the work until the Notice to Proceed has been given by the Engineer. The Contractor shall commence construction activities on the project site within ten days of the Notice to Proceed Date, unless otherwise approved in writing. The Contractor shall diligently pursue the work to the physical completion date within the time specified in the Contract. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified in the Contract.

When shown in the Plans, the first order of work shall be the installation of high visibility fencing to delineate all areas for protection or restoration, as described in the Contract. Installation of high visibility fencing adjacent to the roadway shall occur after the placement of all necessary signs and traffic control devices in accordance with 1-10.1(2). Upon construction of the fencing, the Contractor shall request the Engineer to inspect the fence. No other work shall be performed on the site until the Contracting Agency has accepted the installation of high visibility fencing, as described in the Contract.

*(January 1, 2010 COP GSP)*

Supplement Section 1-08.4 with the following:

The Notice to Proceed shall specify the first day of the contract.

#### **1-08.5 Time for Completion**

*(January 1, 2012 COP GSP)*

Revise the third paragraph of Section 1-08.5 to read:

Contract time shall begin on the day indicated in the written notice to proceed. The contractor must obtain written authorization from the engineer to start work on the project at an earlier date. If permission is granted, then Contract time shall begin on the first working day when onsite Work begins. The Contract Provisions may specify another starting date for Contract time, in which case, time will begin on the starting date specified.

*(January 1, 2012 COP GSP)*

Revise the fifth paragraph of Section 1-08.5 to read:

The Engineer will give the Contractor written notice of the Physical Completion Date for all Work the Contract requires. That date shall constitute the Physical Completion Date of



the Contract, but shall not imply the City Council's acceptance of the Work or the Contract.

**1-09.6 Force Account**

*(October 10, 2008 APWA GSP)*

Supplement Section 1-09.6 with the following:

The Contracting Agency has estimated and included in the Proposal, dollar amounts for all items to be paid per force account, only to provide a common proposal for Bidders. All such dollar amounts are to become a part of Contractor's total bid. However, the Contracting Agency does not warrant expressly or by implication that the actual amount of work will correspond with those estimates. Payment will be made on the basis of the amount of work actually authorized by Engineer.

**1-09.9 Payments**

*(March 13, 2012 APWA GSP)*

Delete the first four paragraphs and replace them with the following:

The basis of payment will be the actual quantities of Work performed according to the Contract and as specified for payment.

The Contractor shall submit a breakdown of the cost of lump sum bid items at the Preconstruction Conference, to enable the Project Engineer to determine the Work performed on a monthly basis. A breakdown is not required for lump sum items that include a basis for incremental payments as part of the respective Specification. Absent a lump sum breakdown, the Project Engineer will make a determination based on information available. The Project Engineer's determination of the cost of work shall be final.

Progress payments for completed work and material on hand will be based upon progress estimates prepared by the Engineer. A progress estimate cutoff date will be established at the preconstruction conference.

The initial progress estimate will be made not later than 30 days after the Contractor commences the work, and successive progress estimates will be made every month thereafter until the Completion Date. Progress estimates made during progress of the work are tentative, and made only for the purpose of determining progress payments. The progress estimates are subject to change at any time prior to the calculation of the final payment.

The value of the progress estimate will be the sum of the following:

1. Unit Price Items in the Bid Form — the approximate quantity of acceptable units of work completed multiplied by the unit price.
2. Lump Sum Items in the Bid Form — based on the approved Contractor's lump sum breakdown for that item, or absent such a breakdown, based on the Engineer's determination.
3. Materials on Hand — 100 percent of invoiced cost of material delivered to Job site or other storage area approved by the Engineer.
4. Change Orders — entitlement for approved extra cost or completed extra work as determined by the Engineer.

Progress payments will be made in accordance with the progress estimate less:

1. Retainage per Section 1-09.9(1), on non FHWA-funded projects;
2. The amount of progress payments previously made; and
3. Funds withheld by the Contracting Agency for disbursement in accordance with the Contract Documents.

Progress payments for work performed shall not be evidence of acceptable performance or an admission by the Contracting Agency that any work has been satisfactorily completed. The determination of payments under the contract will be final in accordance with Section 1-05.1.

*(March 13, 2012 APWA GSP)*

Supplement this section with the following:

Lump sum item breakdowns are not required when the bid price for the lump sum item is less than \$20,000.

*(April 10, 2006 COP GSP)*

Supplement this section with the following:

If mutually agreed upon, the City may prepare the Progress Payment Estimate. The Contractor shall submit Request for payments on forms approved by the Engineer, monthly for payment. The Engineer shall, upon receipt of progress payment request, review for accuracy. The Engineer shall correct any inaccurate entries and return progress payment request to the Contractor for concurrence and re-submittal. If mutually agreed upon, by the Engineer and Contractor, the City may prepare the Progress Payment. The Contractor, Engineer, and Director of Public Works or Designee, shall sign the progress payment in order for the payment to be valid. The City will make payment within thirty calendar days from the date of the valid progress payment. The cut off period for work covered in a progress period will be within the last ten days of the month, usually by the 25th.

### **1-09.11(3) Time Limitations and Jurisdictions**

*(January 1, 2010 COP GSP)*

Revise Section 1-09.11(3) to read:

For the convenience of the parties to the Contract it is mutually agreed by the parties that any claims or causes of action which the Contractor has against the City arising from the Contract shall be brought within 180-calendar days from the date of final acceptance (Section 1-05.12) of the Contract by the City Council; and it is further agreed that any such claims or causes of action shall be brought only in the Superior Court of Franklin County. The parties understand and agree that the Contractor's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action. It is further mutually agreed by the parties that when any claims or causes of action which the Contractor asserts against the City arising from the Contract are filed with the City or initiated in court, the Contractor shall permit the City to have timely access to any records deemed necessary by the City to assist in evaluating the claims or action.

### **1-09.13 Claims Resolution**

*(April 4, 2006 COP GSP)*

Revise Section 1-09.13 as follows:

#### **1-09.13(2) Nonbinding Alternative Disputes Resolution (ADR)**

Delete Section 1-09.13(2) in its entirety.

#### **1-09.13(3) Claims \$250,000 or Less**

Delete Section 1-09.13(3) in its entirety.

#### **1-09.13(3)A Administration of Arbitration**

Delete Section 1-09.13(3)A in its entirety.

#### **1-09.13(3)B Procedures to Pursue Arbitration**

Delete Section 1-09.13(3)B in its entirety.

#### **1-09.13(4) Claims in Excess of \$250,000**

Delete Section 1-09.13(4) in its entirety.

### **2-03 ROADWAY EXCAVATION AND EMBANKMENT**

#### **2-03.3(14)D Compaction and Moisture Control Tests**

*(January 1, 2012 COP GSP)*

Supplement Section 2-03.3(14)D with the following:

Compaction testing shall be performed at the following interval, as a minimum:

Subgrade: Two (2) tests for the first ten thousand (10,000) square feet and one (1) test for each additional ten thousand (10,000) square feet).

Ballast and Crushed Surfacing: Two (2) tests for the first ten thousand (10,000) square feet and one (1) test for each additional ten thousand (10,000) square feet.

Hot Mix Asphalt: Two (2) tests for the first three thousand, five hundred (3,500) square feet and one (1) test for each additional three thousand, five hundred (3,500) square feet. Hot Mix Asphalt shall be tested on the same working day that it was placed.

Embankments: Two (2) tests for the first one thousand (1,000) square feet and one (1) test for each additional one thousand (1,000) square feet. Tests will be taken at varying depths within the embankment.

Trenches: Three (3) tests, at varying depths, shall be performed within the first one hundred (100) feet of pipeline installed to establish compaction method. Once a satisfactory method has been established, one test shall be performed for each one hundred (100) linear feet of pipeline installed. Tests shall be taken at varying depths along the trench. Compaction method shall be reestablished each time backfill material, compaction equipment, or method of operation changes.

If the product fails any test, the Engineer will require additional testing to determine the extent of the failure and more frequent tests may be required on additional work. Testing shall be in accordance with Section 1-06.2(1).

## **2-11 TRIMMING AND CLEANUP**

### **2-11.3 Construction Requirements**

*(January 1, 2012 COP GSP)*

Supplement “the Contractor shall” of Section 2-11.3 with the following:

7. Restore all grass area affected by construction with sod and in accordance with the City of Pasco Construction Standards.
8. Restore all landscaping rock, mulch, and bark with the same materials as existed prior to construction.
9. Restore all shoulders, from edge of pavement to right of way line, with the same material as existed prior to construction, except that earth shoulders shall be restored with 2 inches of compacted crushed surface top course.
10. Restore the site and offsite areas damaged by the Work to their original condition or better and to the satisfaction of the Engineer and the adjoining homeowners.

## **5-04 HOT MIX ASPHALT**

### **5-04.2 Materials**

*(January 1, 2010 COP GSP)*

Revise the first sentence of the third paragraph of Section 5-04.2 to read:

If provided for in the special provisions or with approval in writing from the engineer, the contractor may utilize recycled asphalt pavement (RAP) in the production of HMA.

Revise the first sentence of the fifth paragraph to read:

If provided for in the special provisions or with approval in writing from the engineer, the contractor may use warm mix asphalt (WMA) processes in the production of HMA.

### **5-04.3(3)A Material Transfer Device/Vehicle**

*(August 3, 2009 WSDOT GSP)*

Section 5-04.3(3)A is deleted in its entirety.

### **5-04.3(5)A Preparation of Existing Surfaces**

*(January 1, 2010 COP GSP)*

Supplement Section 5-04.3(5)A with the following:

#### **Overlays and Utility Patches**

Edges of asphalt and curb edge shall be tack coated.

Prior to paving utility trenches, the edges of the trenches shall be saw-cut parallel to the center of the street leaving long straight edges. Should any undermining occur on existing adjacent pavement, the contractor shall neatly cut the pavement 6 inches beyond the undermined area. The Engineer may waive all or a portion of the saw cutting requirement if the original street cut is straight and not damaged.

### **5-04.3(5)D Soil Residual Herbicide**

*(January 1, 2012 COP GSP)*

Revise the first paragraph of Section 5-04.3(5)D to read:

Contractor shall apply one application of an approved soil residual herbicide on areas where hot mix asphalt is applied. The requirements of Section 8-02.3(2)A shall apply to this application. The application of herbicide shall precede paving by no more than 24 hours.

**5-04.3(7)A Mix Design**  
(January 1, 2010 COP GSP)

Supplement Section 5-04.3(7)A with the following:

Unless stated otherwise or with written approval from the engineer, the contractor shall use HMA CI ½" PG 64-28 in accordance with section 9-03.8(7).

**5-04.3(7)A2 Statistical or Nonstatistical Evaluation**  
(January 16, 2014 APWA GSP)

Delete this section and replace it with the following:

Mix designs for HMA accepted by Nonstatistical or Commercial evaluation shall;

- Be submitted to the Project Engineer on WSDOT Form 350-042
- Have the aggregate structure and asphalt binder content determined in accordance with WSDOT Standard Operating Procedure 732 and meet the requirements of Sections 9-03.8(2) and 9-03.8(6).
- Have anti-strip requirements, if any, for the proposed mix design determined in accordance with WSDOT Test Method T 718 or based on historic anti-strip and aggregate source compatibility from WSDOT lab testing. Anti-strip evaluation of HMA mix designs utilized that include RAP will be completed without the inclusion of the RAP.

At or prior to the preconstruction meeting, the contractor shall provide one of the following mix design verification certifications for Contracting Agency review;

- The proposed mix design indicated on a WSDOT mix design/anti-strip report that is within one year of the approval date
- The proposed HMA mix design submittal (Form 350-042) with the seal and certification (stamp & signature) of a valid licensed Washington State Professional Engineer.
- The proposed mix design by a qualified City or County laboratory mix design report that is within one year of the approval date.

The mix design will be performed by a lab accredited by a national authority such as Laboratory Accreditation Bureau, L-A-B for Construction Materials Testing, The Construction Materials Engineering Council (CMEC's) ISO 17025 or AASHTO Accreditation Program (AAP) and shall supply evidence of participation in the AASHTO Material Reference Laboratory (AMRL) program.

At the discretion of the Engineer, agencies may accept mix designs verified beyond the one year verification period with a certification from the Contractor that the materials and sources are the same as those shown on the original mix design.

**5-04.3(8)A1 General**

*(January 16, 2014 APWA GSP)*

Delete this section and replace it with the following:

Acceptance of HMA shall be as defined under nonstatistical or commercial evaluation.

Nonstatistical evaluation will be used for all HMA not designated as Commercial HMA in the contract documents.

The mix design will be the initial JMF for the class of HMA. The Contractor may request a change in the JMF. Any adjustments to the JMF will require the approval of the Project Engineer and must be made in accordance with Section 9-03.8(7).

Commercial evaluation may be used for Commercial HMA and for other classes of HMA in the following applications: sidewalks, road approaches, ditches, slopes, paths, trails, gores, prelevel, and pavement repair. Other nonstructural applications of HMA accepted by commercial evaluation shall be as approved by the Project Engineer. Sampling and testing of HMA accepted by commercial evaluation will be at the option of the Project Engineer. Commercial HMA can be accepted by a contractor certificate of compliance letter stating the material meets the HMA requirements defined in the contract.

**5-04.3(8)A3 Sampling**

*(January 1, 2012 COP GSP)*

Supplement Section 5-04.3(8)A3 with the following:

One (1) sample shall be taken within the first one hundred (100) tons of asphalt delivered to the site and every 400 tons thereafter with a minimum of one (1) sample per working day. If the asphalt fails any test, the Engineer will require additional testing to determine the extent of the failure and more frequent tests may be required on additional asphalt being delivered. Testing and samples shall be in accordance with Section 1-06.2(1).

**5-04.3(8)A5 Test Results**

*(January 16, 2014 APWA GSP)*

The first paragraph of this section is deleted.

*(April 10, 2006 COP GSP)*

Supplement Section 5-04.3(8)A5 with the following:

HMA testing shall be pre-arranged and oil content results reported within two (2) hours of sampling. Initial reports may be by phone, subsequent written documents shall be submitted to the City prior to the next day's paving shift.

#### **5-04.3(8)A6 Test Methods**

*(January 16, 2014 APWA GSP)*

Delete this section and replace it with the following:

Testing of HMA for compliance of Va will be at the option of the Contracting Agency. If tested, compliance of Va will be use WSDOT Standard Operating Procedure SOP 731. Testing for compliance of asphalt binder content will be by WSDOT FOP for AASHTO T 308. Testing for compliance of gradation will be by WAQTC FOP for AASHTO T 27/T 11.

#### **5-04.3(9) Spreading and Finishing**

*(January 1, 2010 COP GSP)*

Revise the first paragraph of Section 5-04.3(9) to read:

The mixture shall be laid upon an approved surface, spread, and struck off to the grade and elevation established. HMA pavers complying with Section 5-04.3(3) shall be used to distribute the mixture. Unless otherwise directed by the Engineer, HMA of 3 inches or less in depth shall be placed in one lift. HMA over 3 inches in depth shall be placed in multiple lifts of equal thickness.

#### **5-04.3(12) Joints**

*(January 1, 2011 COP GSP)*

Supplement Section 5-04.3(12) with the following:

All joints shall be hand raked prior to rolling. The final joint shall be straight, level with the abutting edge, free of coarse material at the surface, and neat in appearance. The Contractor shall use panel widths that minimize longitudinal pavement joints.

#### **5-04.3(16) Weather Limitations**

*(January 1, 2012 COP GSP)*

Revise Section 5-04.3(16) to read:

HMA shall not be placed on any Traveled Way beginning October 1st through March 31st of the following year without written approval from the Engineer.

Asphalt for prime coat shall not be applied when the ground temperature is lower than 50°F without written approval of the Engineer.

HMA shall not be placed on any wet surface, or when the average surface temperatures are less than those specified in the following table, or when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures. Any exceptions to



the above and following limitations will not be allowed without the written approval of the Engineer.

Wind (mph)	Ambient °F (Minimum)	Surface °F (Minimum)	Precipitation
0-5	45°	40°	Not Measurable
5-10	50°	40°	Not Measurable
10-15	55°	40°	Not Measurable
15+	No Paving	No Paving	Not Measurable

1. If the weather criteria are met, the paving contractor shall complete the entire panel or lane with no transverse joints.
2. If meteorological conditions changes after starting, construction shall be monitored by the Engineer and require their approval.
3. HMA shall not be placed on ground that is frozen.

The weather guide shall be the “National Weather Service” zone forecast for the Lower Columbia Basin, Washington at [www.wrh.noaa.gov/](http://www.wrh.noaa.gov/)

#### **5-04.4 Measurement**

*(January 1, 2012 COP GSP)*

Revise the third paragraph of Section 5-04.4 to read:

Soil residual herbicide will be included in the cost of HMA.

#### **5-04.5 Payment**

*(January 1, 2010 COP GSP)*

Delete the following in Section 5-04.5:

“Soil Residual Herbicide \_\_\_\_ ft. Wide”, per mile, or

“Soil Residual Herbicide”, per square yard.

The unit Contract price per mile or per square yard for “Soil Residual Herbicide” shall be full payment for all costs incurred to obtain, provide and install herbicide in accordance with Section 5-04.3(5)D.

#### **5-04.5(1) Quality Assurance Price Adjustments**

*(November 11, 1997 COP GSP)*

Delete Section 5-04.5(1) in its entirety.

**5-04.5(1)A Price Adjustment for Quality of HMA Mixture**  
(November 20, 2006 COP GSP)

Delete Section 5-04.5(1)A in its entirety.

**5-04.5(1)B Price Adjustments for Quality of HMA Compaction**  
(November 20, 2006 COP GSP)

Delete Section 5-04.5(1)B in its entirety.

**6-02 CONCRETE STRUCTURES**

**6-02.3(14) Finishing Concrete Surfaces**  
(January 1, 2010 COP GSP)

Supplement Section 6-02.3(14) with the following:

The completed surface shall be of uniform texture, smooth, uniform as to grade, and free from defects of all kinds. The completed surface shall not vary more than 1/8-inch from the lower edge of a 10-foot straightedge placed on the surface parallel to the centerline.

The finish shall be a light broom finish, or as noted in the City of Pasco Standard Plans, or as approved by the Engineer. A non-uniform finish, an overworked finish, a finish where a cement layer has formed, discolored, is spalling, or a finish damaged by the weather, will not be accepted.

**7-01 DRAINS**

**7-01.2 Materials**  
(November 20, 2006 COP GSP)

Supplement Section 7-01.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

**7-04 STORM SEWERS**

**7-04.2 Materials**  
(November 20, 2006 COP GSP)

Supplement Section 7-04.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

**7-04.3(1) Cleaning and Testing**

**7-04.3(1)A General**

*(October 3, 2014 COP GSP)*

Supplement Section 7-04.3(1)A with the following:

All storm piping, with the exception of infiltration trench perforated pipe, shall have television inspection. Cost of television inspection shall be included in the pipe installation cost.

All recordings shall be in color and in DVD format, playable on standard DVD players. Television inspection shall begin at the downstream structure and end at the next upstream structure. The camera speed shall not exceed one-half (1/2) foot per second. A pivot head camera shall be used with detailed inspection of all laterals showing the entire lateral with a 360 degree pan around the opening. Panning of each lateral shall be a minimum of 15 seconds.

The Contractor shall add colored dye that contrasts with the pipe color and clean water to the cleaned storm line before television inspection. The recording shall be free from static and a minimum distance of 10 feet shall be clearly visible in front of the camera.

All recordings shall show on the screen the correct time and date of the inspection, the name of the camera operator, the manhole numbers being inspected, an accurate footage count, and all lateral locations using a 12 hour clock position.

All inspections shall be performed by Pipeline Assessment and Certification Program (PACP) trained personnel. The Contractor shall provide a copy of the inspection, with all appurtenant written logs, within 24 hours of the inspection.

## **7-05 MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS**

### **7-05.2 Materials**

*(November 20, 2006 COP GSP)*

Supplement Section 7-05.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

### **7-05.3 Construction Requirements**

*(January 1, 2010 COP GSP)*

Delete the tenth paragraph of Section 7-05.3.

### **7-05.3(3) Connection to Existing Manhole, (Line, Catch Basin or Curb Inlet)**

*(January 1, 2010 COP GSP)*

Delete the last sentence of the second paragraph of Section 7-05.3(3).

Supplement Section 7-05.3(3) with the following:

The Contractor shall be required to core drill into the structure, shape the channel to accommodate the new pipe, and grout the opening.

**7-05.4 Measurement**

*(November 11, 1997 COP GSP)*

Revise the fourth paragraph of Section 7-05.4 to read:

Structure excavation Class B and structure excavation Class B including haul, shall be included as part of the applicable unit or lump sum bid item.

**7-08 GENERAL PIPE INSTALLATION REQUIREMENTS**

**7-08.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-08.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

**7-08.3(1)A Trenches**

*(January 1, 2012 COP GSP)*

Supplement Section 7-08.3(1)A with the following:

Existing pavement shall be neatly saw-cut on both sides of the trench parallel to and a minimum of 6 inches back from the top of the trench width.

**7-08.3(2)B Pipe Laying – General**

*(January 1, 2012 COP GSP)*

Supplement Section 7-08.3(2)B with the following:

Sewers and side sewers crossing water mains shall be laid below the water mains to provide a vertical separation of at least 18 inches between the invert of the water main and the crown of the sewer. Sewers and side sewers shall not cross above water mains without approval of the Engineer.

When conditions prevent a vertical separation as described above, the sewer shall be:

- Constructed of water main standard material, or;
- Constructed of standard gravity-sewer material encased in CDF as described in Section 2-09.3(1)E. CDF encasement shall extend for the length of the crossing segment and shall encase the pipe such that the CDF is a minimum of two feet in thickness from all sides of the sewer pipe, or;

- Constructed of standard gravity-sewer material and encased in a one-quarter inch minimum thickness continuous steel, ductile iron, or pressure-rated PVC pipe with a dimension ratio (DR) (the ratio of the outside diameter to the pipe wall thickness) of 18 or less. All voids between the sewer and the host pipe shall be pressure-grouted with sand cement grout or bentonite. Commercially available pipe skids and end seals are acceptable.

The length of the sewer segment shall be the maximum standard length available from the manufacturer (but not less than 18 feet) and shall be installed with the segment centered at the point of crossing so that the joints will be equidistant and as far as possible from the water main.

*(January 1, 2012 COP GSP)*

Revise the third paragraph of Section 7-08.3(2)B to read:

Pipe shall be laid to a true line and grade at the invert of the pipe and the Contractor shall exercise care in matching pipe joints for concentricity and compatibility. In no case shall two pipes be joined together with ends having the maximum manufacturer's tolerance. The invert line may vary from the true line and grade within the limits stated to develop uniformity, concentricity, and uniform compression of jointing material provided such variance does not result in a reverse sloping invert. The limit of variance at the invert elevation of the pipe shall be plus or minus  $\frac{3}{4}$ -inch for a completed, backfilled pipe. Checking of the invert elevation of the pipe shall be done by remote operated CCTV camera utilizing a  $\frac{3}{4}$ -inch measuring device (lead ball).

### **7-08.3(3) Backfilling**

*(January 1, 2012 COP GSP)*

Revise the second paragraph of Section 7-08.3(3) to read:

Pipe zone backfill material shall be 5/8 minus crushed rock, pea gravel, or granular sand, free from clay, frozen lumps, roots, or moisture in excess of that permitting required compaction in accordance with 9-03.12(3).

*(January 1, 2012 COP GSP)*

Supplement Section 7-08.3(3) with the following:

Backfill above the pipe zone may be placed in horizontal lifts up to 18 inches thick with written approval of the Engineer.

## **7-09 WATER MAINS**

### **7-09.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-09.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

*(January 1, 2012 COP GSP)*

Supplement Section 7-09.2 with the following:

PVC pipelines under streets or roadways shall be Class 150 AWWA C-900/905 pipe with ductile iron fittings. All other pipelines shall be either class 200 PVC or galvanized where shown on the irrigation details.

Fittings for pipelines 4-inch and larger, shall be cast or ductile iron.

### **7-09.3(5) Grade and Alignment**

*(January 1, 2012 COP GSP)*

Supplement Section 7-09.3(5) with the following:

Water mains shall be laid above sanitary sewers and side sewers to provide a vertical separation of at least 18 inches between the invert of the water main and the crown of the sewer. Water mains shall not be laid in a manner that violates the minimum separation or below sanitary sewers and side sewers without the approval of the Engineer.

*(January 1, 2012 COP GSP)*

Revise the first sentence of the third paragraph of Section 7-09.3(5) to read:

The depth of trenching for water mains shall be such as to give a minimum cover of 42 inches over the top of the pipe unless otherwise specified in the Special Provisions.

### **7-09.3(9) Bedding the Pipe**

*(January 1, 2012 COP GSP)*

Revise Section 7-09.3(9) to read:

Gravel backfill for pipe zone bedding and pipe zone backfill shall be select granular material free from wood waste, organic material, and other extraneous or objectionable material in accordance with 9-03.12(3). Gravel backfill for pipe zone bedding shall be placed to the depths shown in the Standard Plans. Gravel backfill for pipe zone bedding shall be rammed and tamped around the pipe to 95-percent of maximum density by

approved hand-held tools, so as to provide firm and uniform support for the full length of the pipe, valves, and fittings. Care shall be taken to prevent any damage to the pipe or its protective coating.

**7-09.3(11) Compaction of Backfill**

*(January 1, 2010 COP GSP)*

Revise Section 7-09.3(11) to read:

At locations where paved streets, Roadway Shoulders, driveways, or sidewalks will be constructed or reconstructed over the trench, the backfill shall be spread in layers and be compacted by mechanical tampers. In such cases, the backfill material shall be placed in successive layers not exceeding 6-inches in loose thickness unless with written approval from the Engineer, and each layer shall be compacted with mechanical tampers to the density specified herein. Mechanical tampers shall be of the impact type as approved by the Engineer.

**7-09.3(15)A Ductile Iron Pipe**

*(January 1, 2012 COP GSP)*

Revise the first paragraph of Section 7-09.3(15)A to read:

Long radius curves, either horizontal or vertical, may be laid with standard pipe lengths by deflecting the joints. If the pipe is shown curved on the Plans and no special fittings are shown, the Contractor can assume that the curves can be made by deflecting the joints with standard lengths of pipe. If shorter lengths are required, the Plans will indicate maximum lengths that can be used. The amount of deflection at each pipe joint when pipe is laid on a horizontal or vertical curve shall not exceed one-half (1/2) of the manufacturer's printed recommended deflections.

**7-09.3(19)A Connections to Existing Mains**

*(January 1, 2012 COP GSP)*

Delete the third paragraph of Section 7-09.3(19)A in its entirety.

*(January 1, 2012 COP GSP)*

Supplement Section 7-09.3(19)A with the following:

Requests for water line shut downs and water taps shall utilize the City of Pasco Procedure for Scheduling Water Crews, Performing Taps, and Placing New Water Lines in Service. Connection to existing water mains will not be permitted until all required bacteriological and pressure testing has been successfully completed.

*(January 1, 2010 COP GSP)*

Revise the title of Section 7-09.3(20) to read:

**7-09.3(20) Detectable Marking Tape And Tracer Wire**

*(January 1, 2012 COP GSP)*

Revise Section 7-09.3(20) to read:

Detectable marking tape and tracer wire shall be installed over all water lines, including service lines. The tape shall be placed approximately 2-feet above the top of the line and shall extend its full length. The tracer wire shall be fastened to the top of the pipe with duct tape at 6-foot intervals and shall be routed up into valve boxes with adequate length for connection to location equipment. Wire splice kits shall be per the City of Pasco materials list.

**7-09.3(21) Concrete Thrust Blocking**

*(November 20, 2006 COP GSP)*

Supplement Section 7-09.3(21) with the following:

Thrust blocks shall be formed and placed in conformance to the City of Pasco Construction Standards for the appropriate pipe size and fitting type.

**7-09.3(22) Blowoff Assemblies**

*(December 23, 2014 COP GSP)*

Supplement Section 7-09.3(22) with the following:

All dead end lines must end with a blowoff, regardless if there is a hydrant.

**7-09.3(23) Hydrostatic Pressure Test**

*(January 1, 2010 COP GSP)*

Revise Section 7-09.3(23) to read:

Water main appurtenances and service connections to the meter setter shall be tested in sections of convenient length under a hydrostatic pressure equal to 150-psi. Pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor.

Sections to be tested shall normally be limited to 1,500-feet. The Engineer may require that the first section of pipe, not less than 1,000-feet in length, installed by each of the Contractor's crews, be tested in order to qualify the crew and the materials. Pipe laying shall not be continued more than an additional 1,000-feet until the first section has been tested successfully.



The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. Thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

The mains shall be filled with water and allowed to stand under pressure a sufficient length of time to allow the escape of air and allow the lining of the pipe to absorb water. The Contracting Agency will furnish the water necessary to fill the pipelines for testing purposes at a time of day when sufficient quantities of water are available for normal system operation.

The test shall be accomplished by pumping the main up to the required pressure and stopping the pump and holding pressure for 1 hour. During the test, the section being tested shall be observed to detect any visible leakage.

There shall not be an appreciable or abrupt loss in pressure during the one hour test period.

Pressure gauges used in the test shall be accompanied with certifications of accuracy from a testing Laboratory approved by the Engineer.

Any visible leakage detected shall be corrected by the Contractor. Should the tested section fail to meet the pressure test successfully as specified, the Contractor shall, at no additional expense to the Contracting Agency, locate and repair the defects and then retest the pipeline.

Tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Each valve shall be tested by closing each in turn and relieving the pressure beyond. This test of the valve will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The Contractor shall verify that the pressure differential across the valve does not exceed the rated working pressure of the valve.

Prior to calling out the Engineer to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to ensure that the pipe is in satisfactory condition.

Defective materials or workmanship, discovered as a result of hydrostatic field test, shall be replaced by the Contractor at no additional expense to the Contracting Agency. Whenever it is necessary to replace defective material or correct the workmanship, the hydrostatic test shall be re-run at the Contractor's expense until a satisfactory test is obtained.

**7-09.3(24)J Preventing Reverse Flow**  
(December 23, 2014 COP GSP)

Supplement Section 7-09.3(24)J with the following:

All water lines shall be pressure tested and sanitized with a satisfactory report received from the State Health Department prior to the backflow assembly installation. Backflow preventers shall NOT be pressure tested against.

**7-09.3(24)K Retention Period**  
(January 1, 2012 COP GSP)

Revise Section 7-09.3(24)K to read:

Treated water shall be retained in the pipe at least 24 hours but not more than 28 hours. After the 24-hour period, the chlorine residual at pipe extremities and at other representative points shall be at least 25 mg/l.

**7-09.4 Measurement**  
(January 1, 2012 COP GSP)

Supplement Section 7-09.4 with the following:

All pipe fittings shall be measured by size and type.

**7-09.5 Payment**  
(January 1, 2010 COP GSP)

Supplement the third paragraph of Section 7-09.5 with the following:

Payment shall also include detectable marking tape, locator wire, and restrained joints, and connection to existing pipelines.

**7-12 VALVES FOR WATER MAINS**

**7-12.2 Materials**  
(January 1, 2010 COP GSP)

Supplement Section 7-12.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

### **7-12.3 Construction Requirements**

*(April 10, 2006 COP GSP)*

Supplement Section 7-12.3 with the following:

Valves shall not be installed in Sidewalks, Pedestrian Curb Ramps, Driveway Approaches or any other exposed concrete surface.

## **7-14 HYDRANTS**

### **7-14.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-14.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

## **7-15 SERVICE CONNECTIONS**

### **7-15.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-15.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

### **7-15.3 Construction Requirements**

*(January 1, 2012 COP GSP)*

Supplement Section 7-15.3 with the following:

No joints are allowed between the corporation stop and the angle meter stop.

## **7-17 SANITARY SEWERS**

### **7-17.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-17.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

### **7-17.3 Construction Requirements**

*(December 23, 2014 COP GSP)*

Supplement Section 7-17.3 with the following:

Sanitary sewer main shall be at least 8" in diameter. All runs shall terminate in a sanitary sewer manhole (no cleanouts allowed).

**7-17.3(1) Protection of Existing Sewerage Facilities**

*(January 1, 2012 COP GSP)*

Supplement Section 7-17.3(1) with the following:

When connecting to an existing sewer, the downstream system shall be protected from construction debris by placing a 90 degree, SRECO, UEMSI or equal "stove pipe" sand trap, the same size as the sewer main line, in the first existing manhole downstream of the connection. It shall be the Contractor's responsibility to maintain this trap until the new system is placed in service and then to remove it. Any construction debris, excavation or backfill material which enters the existing downstream system shall be removed. When the first manhole is set, the outlet shall be plugged until the entire system is accepted by the Engineer.

**7-17.3(2) Cleaning and Testing**

Supplement Section 7-17.3(2) with the following:

**7-17.3(2)A General**

*(January 1, 2010 COP GSP)*

Revise the first sentence of the first paragraph of Section 7-17.3(2)A to read:

Sewers and appurtenances shall be cleaned and tested after backfilling by the low pressure air method, except where the ground water table is such that the Engineer may require the infiltration test.

Supplement Section 7-17.3(2)A with the following:

Contractor shall keep the pipeline clean and free of debris. The pipeline shall be cleaned prior to the contractor requesting inspections.

**7-17.3(2)H Television Inspection**

*(January 1, 2010 COP GSP)*

Revise the second sentence of the first paragraph of Section 7-17.3(2)H to read:

The costs incurred in making the initial inspection shall be borne by the contractor.

Supplement Section 7-17.3(2)H with the following:

All recordings shall be in color and in DVD format, playable on standard DVD players. Television inspection shall begin at the downstream manhole and end at the next upstream manhole. The camera speed shall not exceed one-half (1/2) foot per second. A pivot head camera shall be used with detailed inspection of all laterals showing the entire lateral with a 360 degree pan around the opening. Panning of each lateral shall be a minimum of 15 seconds.

The Contractor shall add colored dye that contrasts with the pipe color and clean water to the cleaned sewer line before Television inspection. The recording shall be free from static and a minimum distance of 10 feet shall be clearly visible in front of the camera.

All recordings shall show on the screen the correct time and date of the inspection, the name of the camera operator, the manhole numbers being inspected, an accurate footage count, and all lateral locations using a 12 hour clock position.

All inspections shall be performed by Pipeline Assessment and Certification Program (PACP) trained personnel. The Contractor shall provide a copy of the inspection, with all appurtenant written logs, within 24 hours of the inspection.

#### **7-17.5 Payment**

*(January 1, 2010 COP GSP)*

Revise the seventh paragraph of Section 7-17.5 to read:

The unit Contract price per linear foot for sewer pipe of the kind and size specified shall be full pay for furnishing, hauling, and assembling in place the completed installation including all wyes, tees, special fittings, joint materials, structure excavation class B, testing sewer pipe, bedding and backfill material, and adjustment of inverts to manholes for the completion of the installation to the required lines and grades..

### **7-18 SIDE SEWERS**

#### **7-18.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-18.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

#### **7-18.3(5) End Pipe Marker**

*(January 1, 2010 COP GSP)*

Revise Section 7-18.3(5) to read:

The location of side sewers at the property line shall be marked per the Standard Drawing.

## **8-01 EROSION CONTROL AND WATER POLLUTION CONTROL**

### **8-01.3(1) Construction Requirements**

*(March 1, 2015 COP GSP)*

Supplement Section 8-01.3(1) with the following:

Exposed and unworked soils shall be temporarily or permanently stabilized as soon as practicable, unless otherwise approved by the City of Pasco. Contractor shall follow the requirements in the most current publication of the Stormwater Management Manual for Eastern Washington.

## **8-03 IRRIGATION SYSTEMS**

*(January 1, 2010 COP GSP)*

Supplement Section 8-03 with the City of Pasco Landscape Irrigation Standards.

### **8-03.2 Materials**

*(January 1, 2012 COP GSP)*

Supplement Section 8-03.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List and the City of Pasco Landscape Irrigation Standards.

## **8-04 CURBS, GUTTERS, AND SPILLWAYS**

### **8-04.3 Construction Requirements**

*(January 1, 2012 COP GSP)*

Supplement Section 8-04.3 with the following:

Testing requirements shall be as follows:

<b>Project Quantity</b>	<b>Test Requirement</b>
Less than 5 CY	None
5 CY – 10 CY	1 Slump, 4 Cylinders
10+ CY	2 Slump, 4 Cylinders per 25 CY

For project quantities above five (5) cubic yards, test requirements shall be based on concrete placed during one (1) working day. If the concrete fails any test, the Engineer will require additional testing to determine the extent of the failure and more frequent tests may be required on additional concrete being placed. Testing and samples shall be in accordance with Section 1-06.2(1).

Regardless of quantity, a Certification of Compliance shall be provided for all concrete delivered to the site in accordance with Section 6-02.3(5)B.

**8-04.3(1) Cement Concrete Curbs, Gutters, and Spillways**

*(January 1, 2010 COP GSP)*

Revise the fourth paragraph of Section 8-04.3(1) to read:

Expansion joints in the curb or curb and gutter shall be spaced at 50-foot intervals, the beginning and ends of curb returns, drainage Structures, bridges, and cold joints with existing curbs and gutters. The expansion joint shall be filled to full cross-section with ½-inch premolded joint filler. When curb or curb and gutter is placed adjacent to Portland Cement Concrete Pavement, a 3/8-inch thick, 6-inch deep premolded joint filler shall be installed between the 2 vertical surfaces to prevent cracking. Joint material shall be set flush or trimmed flush with the finished concrete surface. Construction joints shall be at accurate ten (10) foot spacing and shall consist of a two (2) inch cut or slice into the concrete pour, and an additional two (2) inch cut into the heel of the pour. Joints shall be formed neatly and perpendicular to the line of the curb.

**8-04.3(1)A Extruded Cement Concrete Curb**

*(January 1, 2010 COP GSP)*

Supplement Section 8-04.3(1)A with the following:

Joints shall be formed neatly and perpendicular to the line of the curb.

**8-13 MONUMENT CASES**

Supplement Section 8-13 with the following:

**8-13.1 Description**

*(March 13, 1995 WSDOT GSP)*

Section 8-13.1 is deleted and replaced by the following:

This work shall consist of furnishing and placing monument cases, covers, and pipes in accordance with the Standard Plans and these Specifications, in conformity with the lines shown in the Plans.

**8-13.2 Materials**

*(March 13, 1995 WSDOT GSP)*

Section 8-13.2 is supplemented with the following:

The pipe shall be Schedule 40 galvanized pipe.

### **8-13.3 Construction Requirements**

*(March 13, 1995 COP GSP)*

The last paragraph of Section 8-13.3 is revised to read:

The Contractor will be responsible for placing the concrete core and tack or wire inside the pipe.

### **8-13.4 Measurement**

*(March 13, 1995 WSDOT GSP)*

Section 8-13.4 is deleted and replaced by the following:

Measurement of monument case, cover, and pipe will be by the unit for each monument case, cover, and pipe furnished and set.

### **8-13.5 Payment**

*(April 28, 1997 WSDOT GSP)*

Section 8-13.5 is supplemented with the following:

“Monument Case, Cover, and Pipe,” per each.

## **8-14 CEMENT CONCRETE SIDEWALK**

### **8-14.3 Construction Requirements**

*(January 1, 2012 COP GSP)*

Supplement Section 8-14.3 with the following:

Testing requirements shall be as follows:

<b>Project Quantity</b>	<b>Test Requirement</b>
less than 5 CY	None
5CY - 10CY	1 Slump, 4 Cylinders
10+CY	2 Slump, 4 Cylinders per each 25CY

For project quantities above five (5) cubic yards, test requirements shall be based on concrete placed during one (1) working day. If the concrete fails any test, the Engineer will require additional testing to determine the extent of the failure and more frequent tests may be required on additional concrete being placed. Testing and samples shall be in accordance with Section 1-06.2(1).

Regardless of quantity, a Certification of Compliance shall be provided for all concrete delivered to the site in accordance with Section 6-02.3(5)B.



### **8-14.3(3) Placing and Finishing Concrete**

*(January 1, 2010 COP GSP)*

Supplement Section 8-14.3(3) with the following:

Expansion joints, using 1/2" thick pre-molded material (AASHTO M213) at full depth, shall be perpendicular and provided at a maximum spacing of thirty (30) feet, at cold joints and at each side of driveway. See City of Pasco Standard Detail Plans 3-6 for joints at pedestrian ramps. Sidewalk construction joints shall be provided at five (5) foot intervals, or as required to match existing improvements. All work shall be perpendicular to the curb and straight. Joint material shall be set flush or trimmed flush with the finished concrete surface.

Concrete finish shall be in accordance with section 6-02.3(14).

## **8-20 ILLUMINATION, TRAFFIC SIGNAL SYSTEMS, INTELLIGENT TRANSPORTATION SYSTEMS, AND ELECTRICAL**

### **8-20.3(6) Junction Boxes, Cable Vaults, and Pull Boxes**

*(January 1, 2010 COP GSP)*

Supplement Section 8-20.3(6) with the following:

Junction boxes shall be installed at each pole and at each end of all crossings. Junction boxes shall be QUAZITE PG-1324

## **8-21 PERMANENT SIGNING**

### **8-21.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 8-21.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

## **8-22 PAVEMENT MARKING**

### **8-22.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 8-22.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

## **9-03 AGGREGATES**

### **9-03.12(3) Gravel Backfill for Pipe Zone Bedding**

*(January 1, 2010 COP GSP)*

Revise Section 9-03.12(3) to read:

Gravel backfill for pipe zone bedding shall be used for pipe zone backfill.

Gravel backfill for pipe zone bedding shall consist of 5/8 minus crushed gravel, pea gravel, or granular sand. It shall be free from various types of wood waste or other extraneous or objectionable materials.

Native material may be used with written approval from the Engineer.

## **9-15 IRRIGATION SYSTEM**

*(January 1, 2010 COP GSP)*

Supplement Section 9-15 with the City of Pasco Landscape Irrigation Standards.

*(January 1, 2010 COP GSP)*

Revise the title of Section 9-15.18 to read:

### **9-15.18 Detectable Marking Tape and Tracer Wire**

*(January 1, 2012 COP GSP)*

Revise Section 9-15.18 to read:

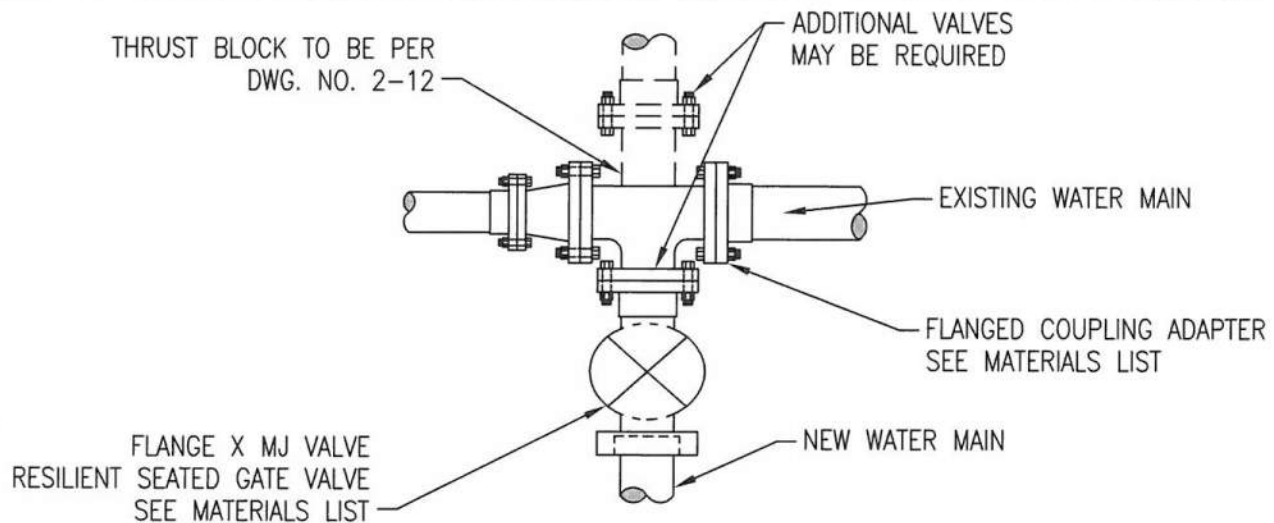
Detectable marking tape shall consist of inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents, and solvents likely to be encountered in the soil, with a metallic foil core to provide the most positive detection and pipeline locators.

The tape shall be color coded and shall be imprinted continuously over its entire length in permanent black ink. The message shall convey the type of line buried below and shall also have the word "Caution" prominently shown. Color coding of the tape shall be as follows:

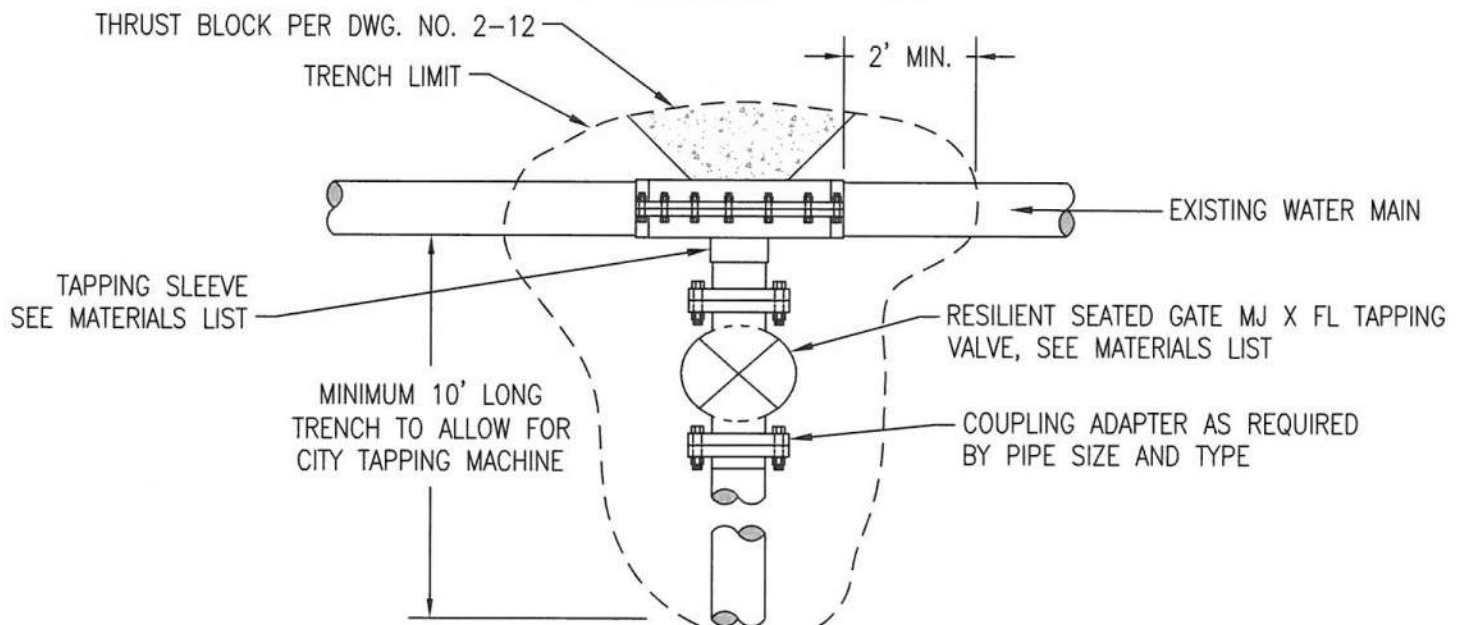
<b>Utility</b>	<b>Tape Color</b>
Water	Blue
Sewer	Green
Electrical	Red
Gas/Oil	Yellow
Telephone/CATV	Orange
<u>Irrigation</u>	<u>Purple</u>

The width of the tape shall be as recommended by the manufacture for the depth of installation.

Tracer wire shall be 12-gauge heavy insulated (60 mil) copper wire with UF insulation colored per the chart above for the utility being installed.



**CUT-IN TEE/CROSS**



**TAPPING SLEEVE AND VALVE**

**NOTES:**

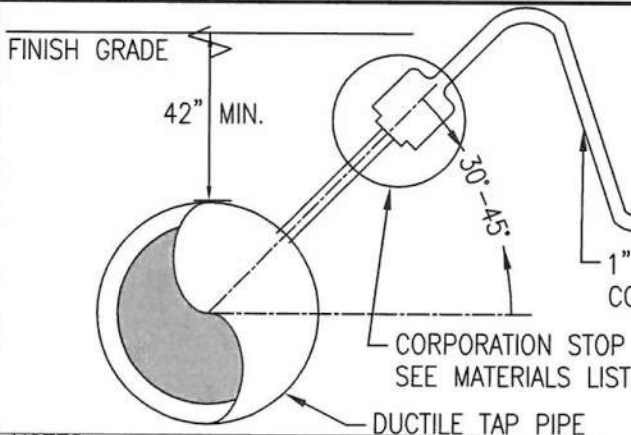
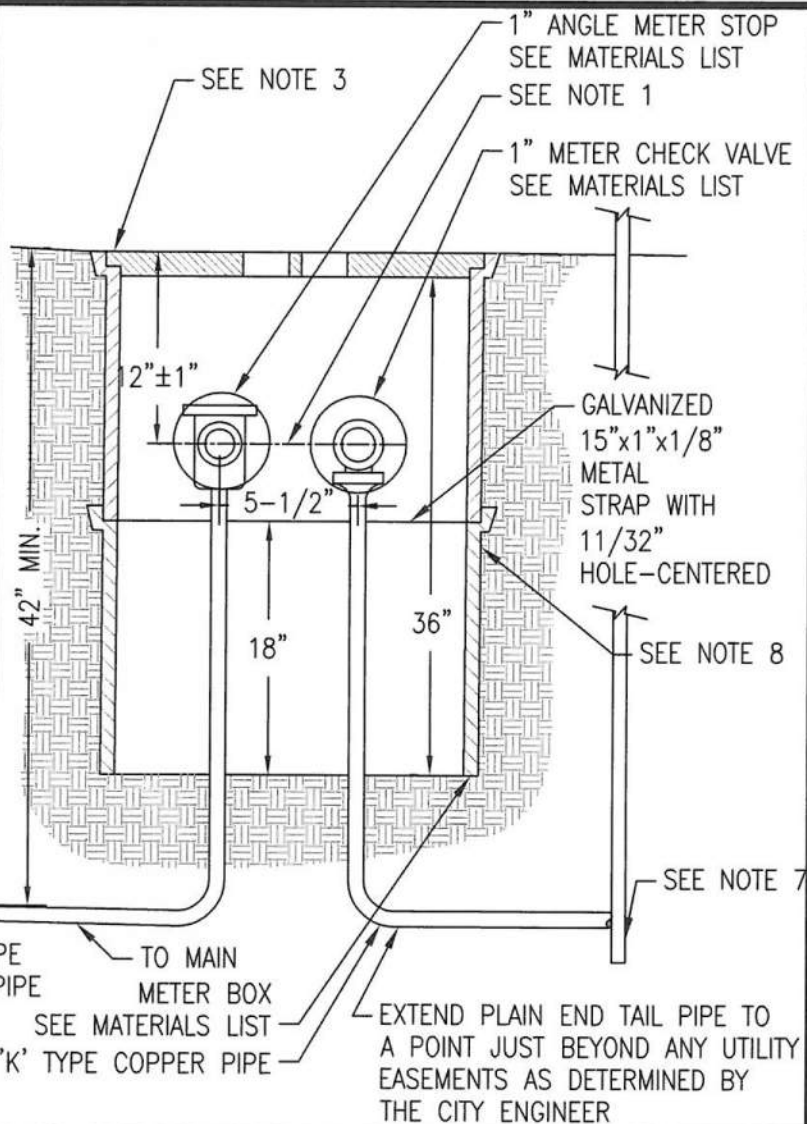
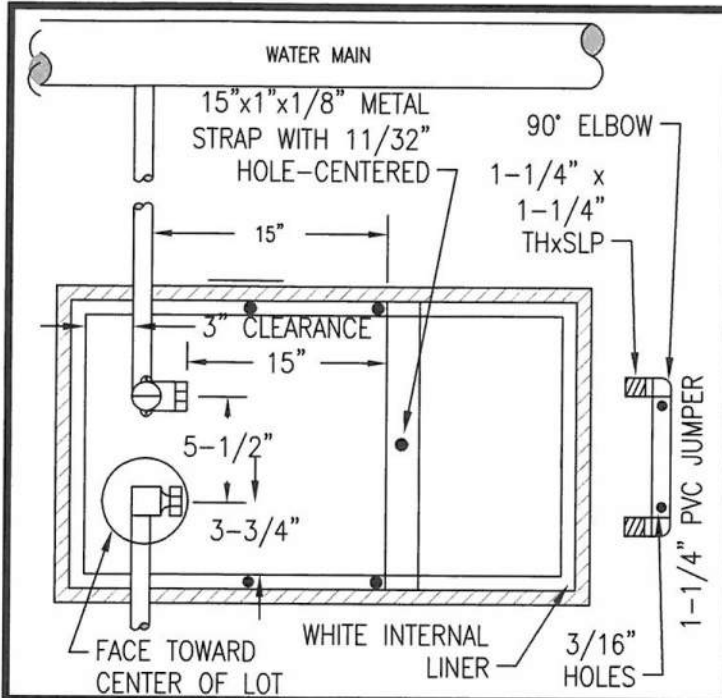
1. CONTRACTOR TO DIG & VERIFY PIPE SIZE AND MATERIAL PRIOR TO ORDERING MATERIALS.
2. MATERIALS TO BE ON THE THE JOB PRIOR TO SCHEDULING SHUTDOWNS OR TAPS. UP TO 48 HOURS NOTICE SHALL BE REQUIRED TO SCHEDULE CITY CREWS FOR TAP.
3. MAXIMUM TAP TO EXISTING LINE NOT TO EXCEED 50% OF MAIN DIAMETER ON A.C. OR P.V.C. PIPE, EXCEPT C900/905; (MAX. TAP FOR CROSS NOT TO EXCEED 50% OF MAIN).
4. FOR D.I., C.I. STEEL AND C-900/905 SIZE ON SIZE TAPPING TEES AND SADDLES ON MAINS SHALL BE TAPPED 1/2" UNDERSIZED.
5. CONTRACTOR TO EXCAVATE, INSTALL TAPPING SLEEVE AND VALVE PRIOR TO CITY CREW ARRIVAL, CITY CREW WILL COMPLETE TAP, TAP FEE MAY BE REQUIRED. CONTRACTOR SHALL SUPPLY PROPER SLOPING/SHORING, ALONG WITH TABULATED DATA, PRIOR TO CITY CREW ARRIVAL.
6. ONCE IN SERVICE WATER SHALL NOT BE TURNED OFF WITHOUT APPROVAL FROM CITY ENGINEER OR CITY FIELD DIVISION MANAGER.

REV. 5  
2/23/15 7. IF PIPE IS LESS THAN 6" DIA. A CUT-IN TEE SHALL BE USED.

**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**TAPPING WATER MAINS**

APPROVED:		STD. SPEC. 7-09.3	DWG. NO. 2-1
DATE: 5/15/15		DATE: 3-16-15	



# NOTES:

1. IF METER NOT INSTALLED, A PVC JUMPER CUT TO THE SIZE AND THREAD OF THE APPROPRIATE SERVICE SHALL BE PLACED BETWEEN KEY METER VALVE AND ANGLE CHECK VALVE. DRILL TWO  $3/16$ " HOLES IN JUMPER.
2. SEE DWG. NO. 2-30 FOR BEDDING.
3. BOXES TO BE SET WITH LONG EDGE PARALLEL TO THE STREET, TOP OF BOX LEVEL WITH TOP BACK OF SIDEWALK.
4. ATTACH THE TWO BOX SECTIONS TOGETHER WITH 4 #14x2.5" HEX WASHER HEAD ZINC COATED SELF TAPPING BOLT, SCREWED IN AT APPROX. 45 DEGREES SO THAT THE BOLT PENETRATES INTO THE REINFORCED SECTION OF THE BOTTOM BOX. SPREADER BAR TO BE BETWEEN THE TWO BOXES.
5. ALL SERVICE CONNECTIONS TO NEW WATER MAIN, EXCEPT TO DUCTILE IRON PIPE CLASS 52 OR STRONGER, SHALL BE MADE USING SADDLES AS SPECIFIED AND BE OF THE SIZE AND TYPE SUITABLE FOR USE WITH THE PIPE BEING INSTALLED (SEE MATERIALS LIST). ALL HOT TAPS ARE PERFORMED BY THE CITY CREW.
6. NEW WATER SYSTEM SHALL BE PLACED IN SERVICE PRIOR TO PLACEMENT OF ASPHALT.
7. WATER SERVICE TAIL PIECE SHALL BE EXTENDED TO RIGHT-OF-WAY LINE AND MARKED WITH 8'-2x4 STUD, PAINTED BLUE, EXTENDING 36" MIN ABOVE SURFACE.
8. WATER METER BOX TO HAVE 18" CLEARANCE FROM ANY CONCRETE OR ASPHALT DRIVEWAY, SIDEWALK, ETC.
9. DO NOT BURY ANGLE METER STOP BEFORE INSTALLING METER BOX.
10. NO COUPLINGS FROM MAIN TO ANGLE METER STOP.
11. COPPER AND BOXES ARE TO BE SET TO GRADE BEFORE WATER IS TURNED ON.
12. ANY CONNECTION MADE TO SUPPLY THE LANDSCAPE IRRIGATION SYSTEM SHALL BE MADE AT THE RIGHT-OF-WAY LINE AND NO LESS THAN 36" FROM THE METER BOX.

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

## RESIDENTIAL WATER SERVICE

APPROVED:

*[Signature]*

STD. SPEC. 7-15

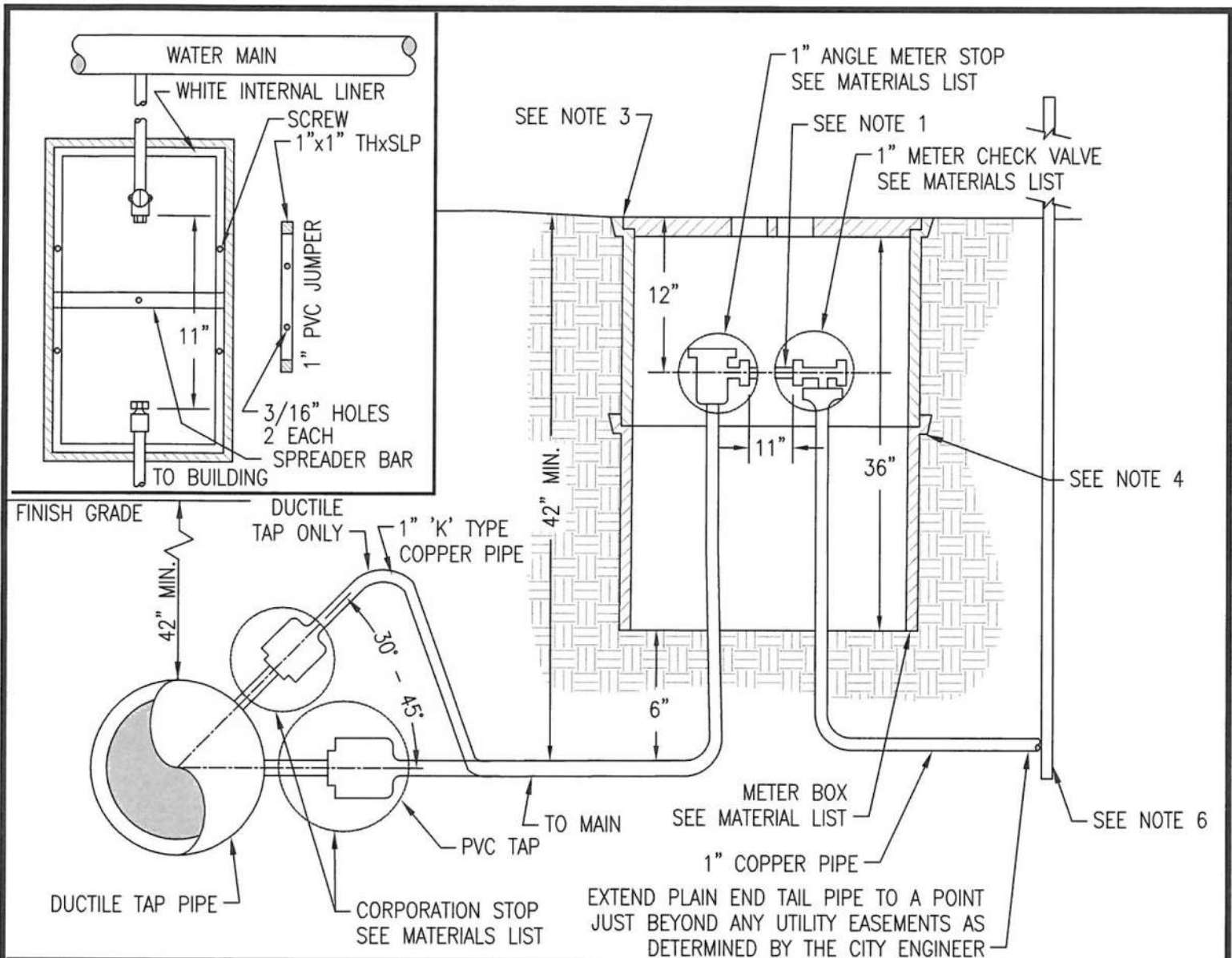
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5/15/16  
3-6-15

DWG. NO. 2-2

REV. 9  
2/23/15

9



#### NOTES:

- IF METER NOT INSTALLED, A PVC JUMPER CUT TO THE SIZE AND THREAD OF THE APPROPRIATE SERVICE SHALL BE PLACED BETWEEN ANGLE METER STOP AND METER CHECK VALVE. DRILL TWO 3/16" HOLES IN JUMPER.
- SEE DWG. 2-30 FOR BEDDING.
- BOXES TO BE SET PERPENDICULAR TO THE STREET, TOP OF BOX LEVEL WITH TOP BACK OF SIDEWALK.
- ATTACH THE TWO BOX SECTIONS TOGETHER WITH #14 x 2-1/2" HEX WASHER HEAD ZINC COATED SELF TAPPING SCREW AT 2 EQUALLY SPACED LOCATIONS ON THE LONG SIDE. SPREADER BAR TO BE BETWEEN THE TWO BOXES.
- ALL SERVICE CONNECTIONS TO WATER MAIN, EXCEPT TO DUCTILE IRON PIPE CLASS 52 OR STRONGER SHALL BE MADE USING SADDLES AS SPECIFIED AND BE OF THE SIZE AND TYPE SUITABLE FOR USE WITH THE PIPE BEING INSTALLED.
- NEW WATER SYSTEM SHALL BE PLACED IN SERVICE A MINIMUM OF 48 HOURS PRIOR TO PLACEMENT OF ASPHALT. 4
- WATER SERVICE TAIL PIPE SHALL BE EXTENDED TO RIGHT-OF-WAY LINE AND MARKED WITH 8'-2x4 METAL STUD, PAINTED BLUE, EXTENDING 36" MIN. ABOVE SURFACE. RPBA AND ISOLATION VALVE WILL BE REQUIRED AT PROPERTY LINE.
- WATER METER BOX TO HAVE 18" CLEARANCE FROM ANY CONCRETE OR ASPHALT DRIVEWAY, SIDEWALK, ETC. THE ISOLATION VALVE SHALL BE NO LESS THAN 36" FROM THE METER BOX. 4
- DO NOT BURY ANGLE METER STOP BEFORE INSTALLING METER BOX.
- NO COUPLINGS FROM MAIN TO ANGLE METER STOP OR FROM ANGLE METER CHECK TO TERMINATION AT R/W. 4
- COPPER SERVICE TO BE SET TO GRADE BEFORE WATER IS TURNED ON.

REV. 4  
2/23/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

COMMERCIAL WATER SERVICE

APPROVED:

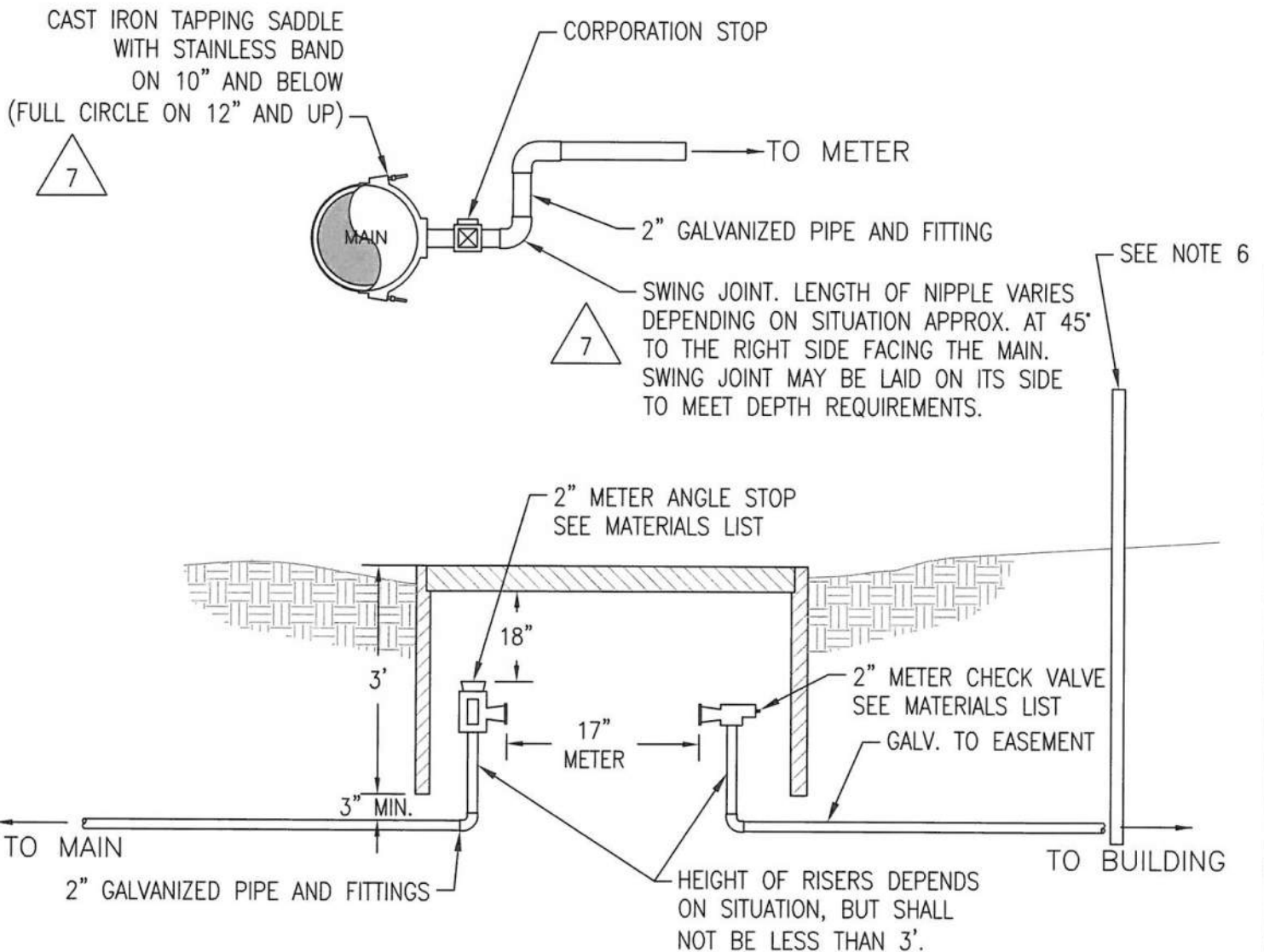
*John M. McQuinn*  
*Robert M. McQuinn*

STD. SPEC. 7-15

DATE:

5/15/15  
3-6-15

DWG.  
NO.  
2-2A



**NOTES:**

1. METER TO BE APPROXIMATELY 18" FROM THE METER BOX LID.
2. IF METER NOT INSTALLED, A PVC JUMPER CUT TO THE SIZE AND THREAD OF THE APPROPRIATE SERVICE SHALL BE PLACED BETWEEN THE ANGLE METER STOP AND METER CHECK VALVE. DRILL TWO  $\frac{3}{16}$ " HOLES IN JUMPER.
3. SMALLER METER SIZES REDUCED IN BETWEEN ANGLE METER STOP AND METER.
4. DO NOT BURY METER ANGLE STOP BEFORE INSTALLING METER BOX.
5. WATER SERVICE TAIL PIECE SHALL BE EXTENDED TO THE RIGHT-OF-WAY LINE AND MARKED WITH AN 8'- TREATED 2x4 INSIDE AN 8' STEEL STUD, PAINTED BLUE, EXTENDING 36" MIN. ABOVE SURFACE. MARKER BOARD TO BE CUT OFF FLUSH WITH THE GROUND IN ALREADY ESTABLISHED AREAS.
6. WATER METER BOX TO HAVE 18" CLEARANCE FROM ANY CONCRETE OR ASPHALT DRIVEWAY, SIDEWALK, ETC. THE ISOLATION VALVE SHALL BE NO LESS THAN 36" FROM THE METER BOX.
7. WATER METER BOX SHALL HAVE A WHITE RESIN INTERNAL LINER.
8. BOXES ARE TO BE SET PERPENDICULAR TO THE STREET.



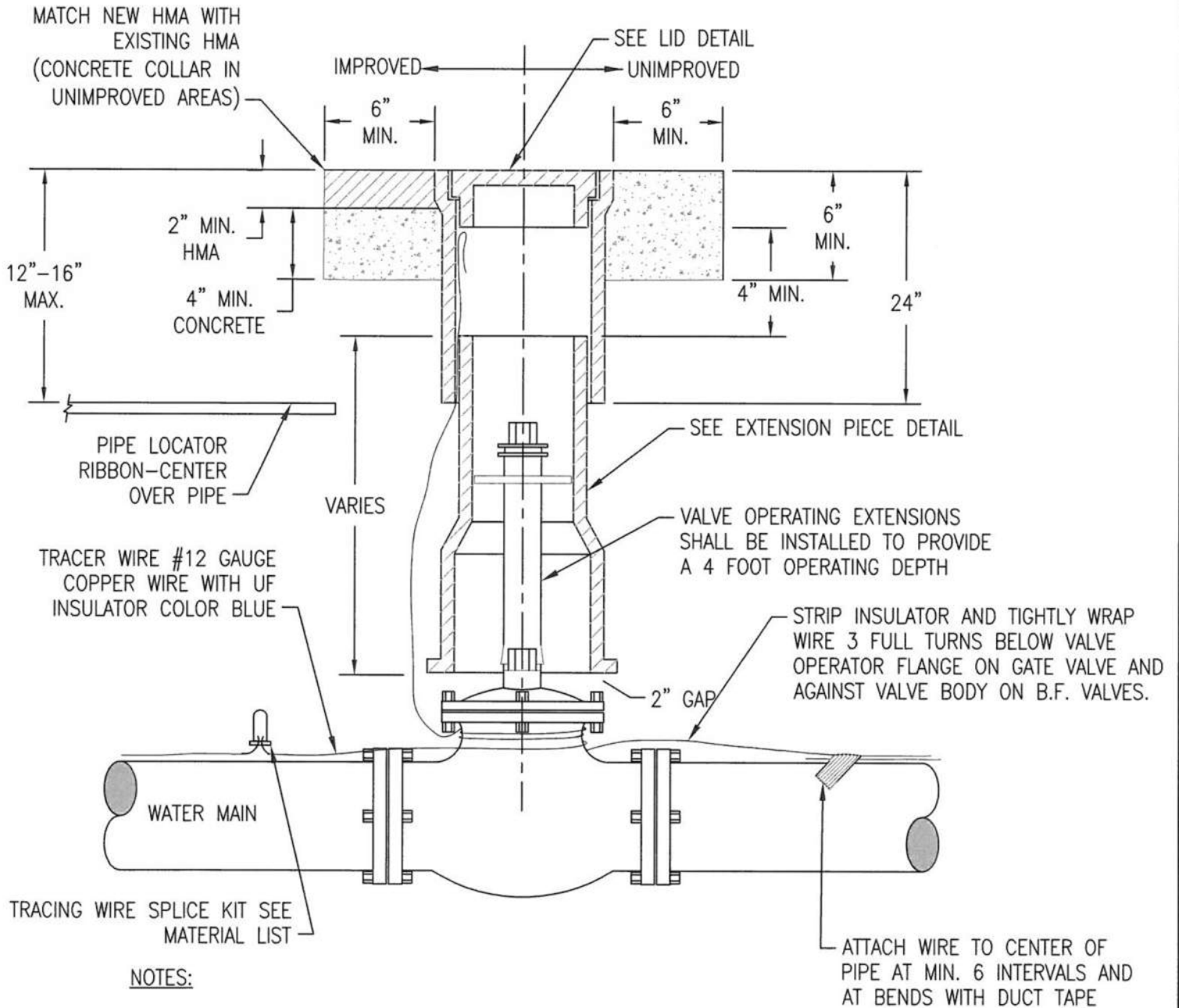
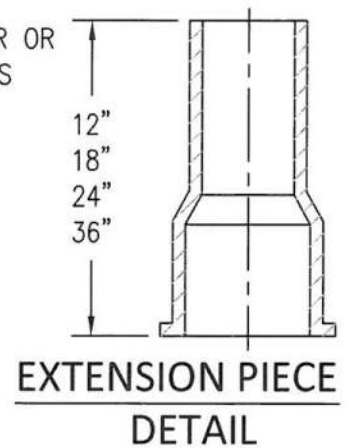
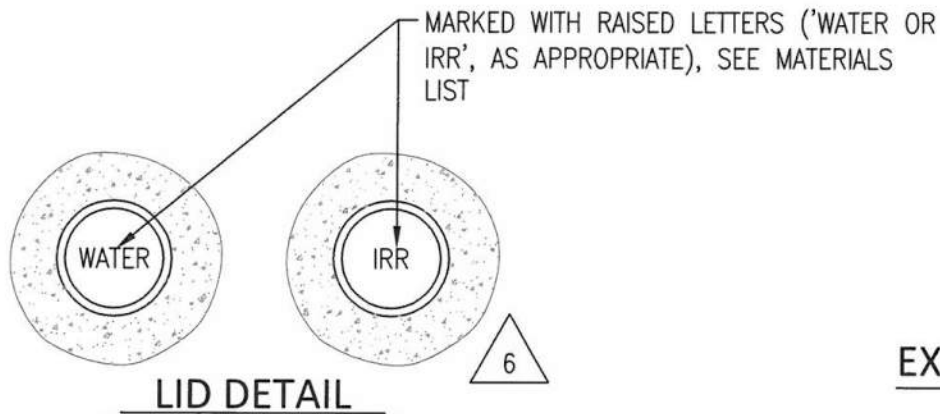
REV. 7  
2/23/15

**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**2" SERVICE INSTALLATION**

APPROVED: <i>[Signature]</i>		STD. SPEC.	7-15
DATE: <i>5/15/15</i>		DWG. NO.	2-3





1. BUTTERFLY VALVES SHALL BE ORIENTED SUCH THAT THE OPERATING NUT AND VALVE BOX SHALL BE NEAR THE CENTERLINE.

REV. 6  
12/13/10



**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**CAST IRON VALVE BOX**

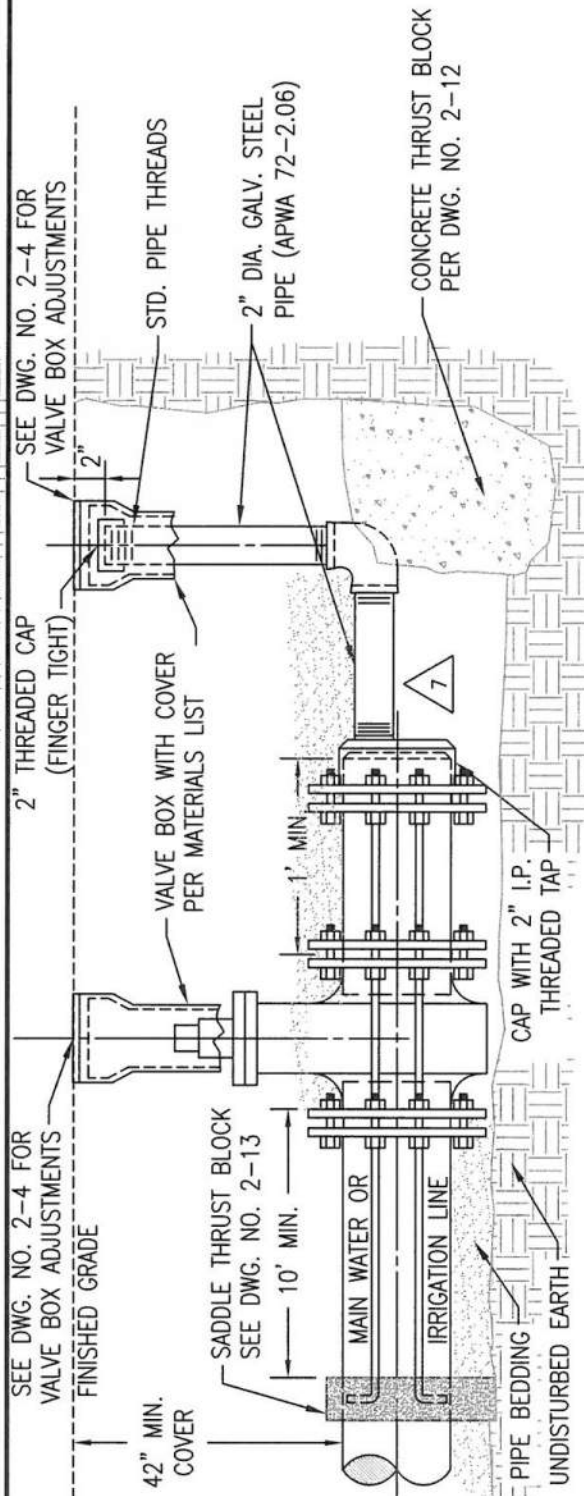
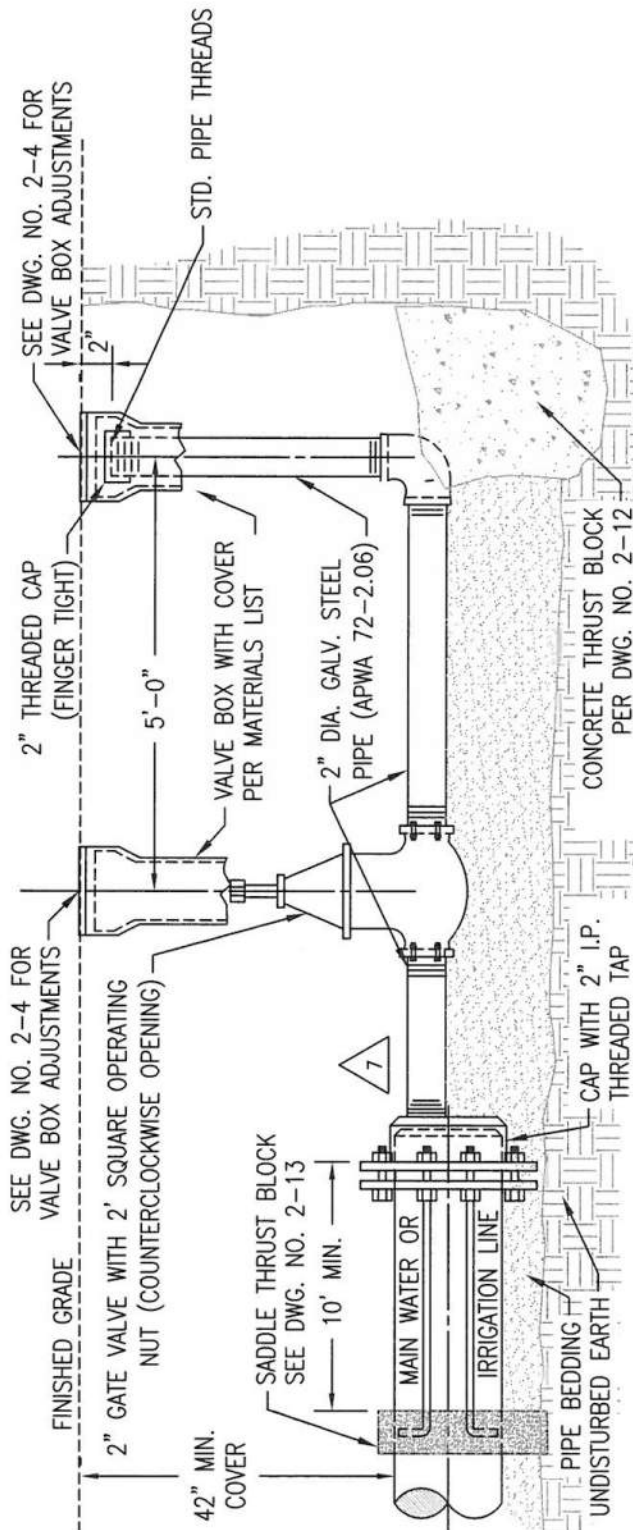
APPROVED:

STD. SPEC. 7-09.3

DATE:

DWG. NO. 2-4





NOTES:

1. ON WATER MAINS WHICH WILL BE EXTENDED IN THE FUTURE, THE VALVE WHICH OPERATES THE BLOW-OFF ASSEMBLY SHALL BE THE SAME SIZE AS THE MAIN UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. THE THRUST BLOCK SHALL BE SIZED TO PROVIDE THRUST FOR THE MAIN WATER LINE.
3. JOINT RESTRAINTS AND FIELD LOK GASKETS MAY BE REQUIRED IN PLACE OF A SADDLE THRUST BLOCK OR MAY BE USED WITH PERMISSION OF THE CITY ENGINEER

REV. 7  
2/23/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

BLOW-OFF ASSEMBLY

APPROVED:

*[Signature]*

STD. SPEC. 7-09.3(22)

DATE:

5/15/15  
3-6-15

DWG. NO. 2-5

REV. 6  
4/28/14

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

# AIR/VACUUM RELIEF AND VAULT

APPROVED:

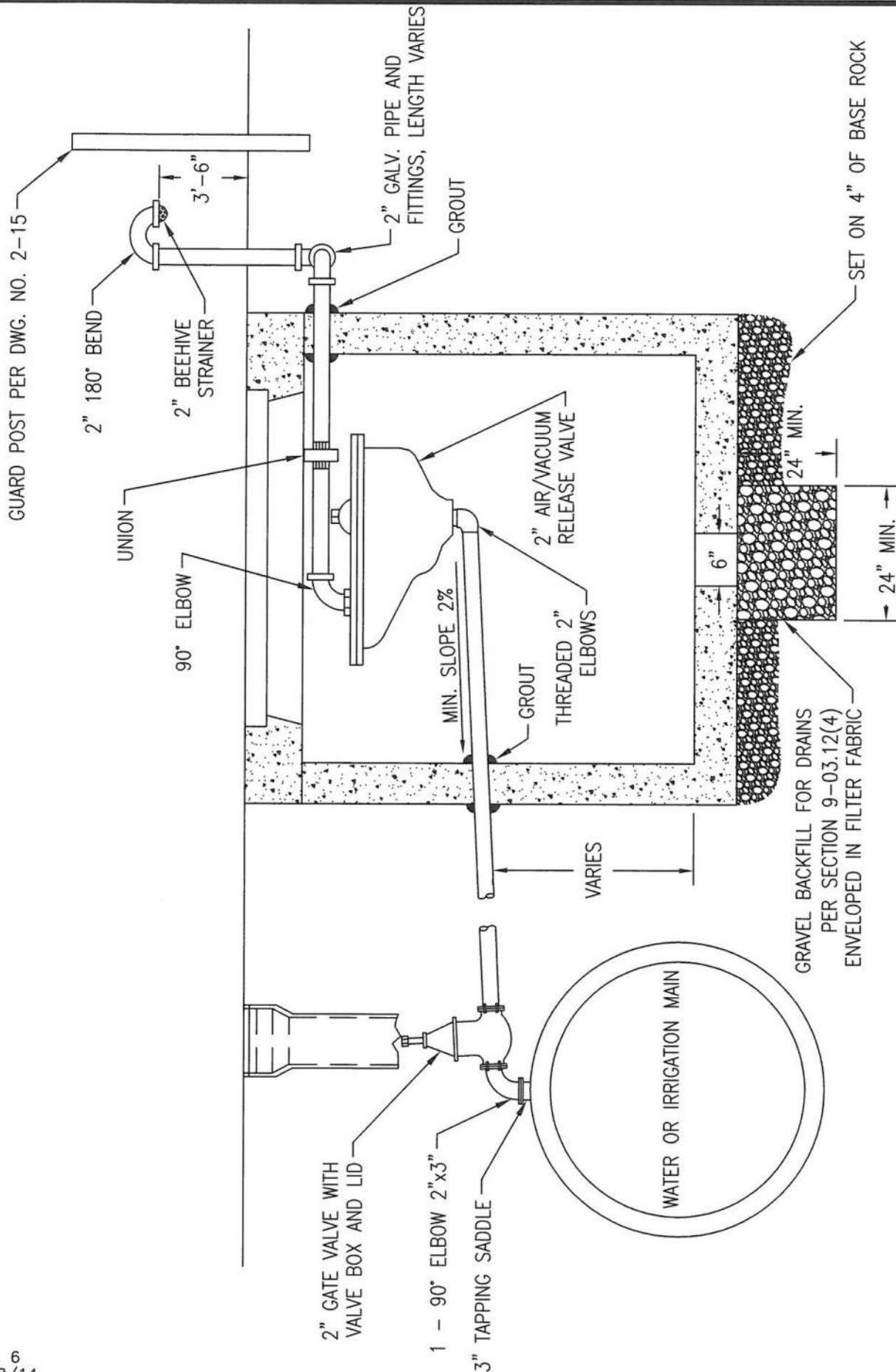
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*[Signature]*

STD. SPEC. 7-12.3

DATE:

5/15/15  
3-6-15

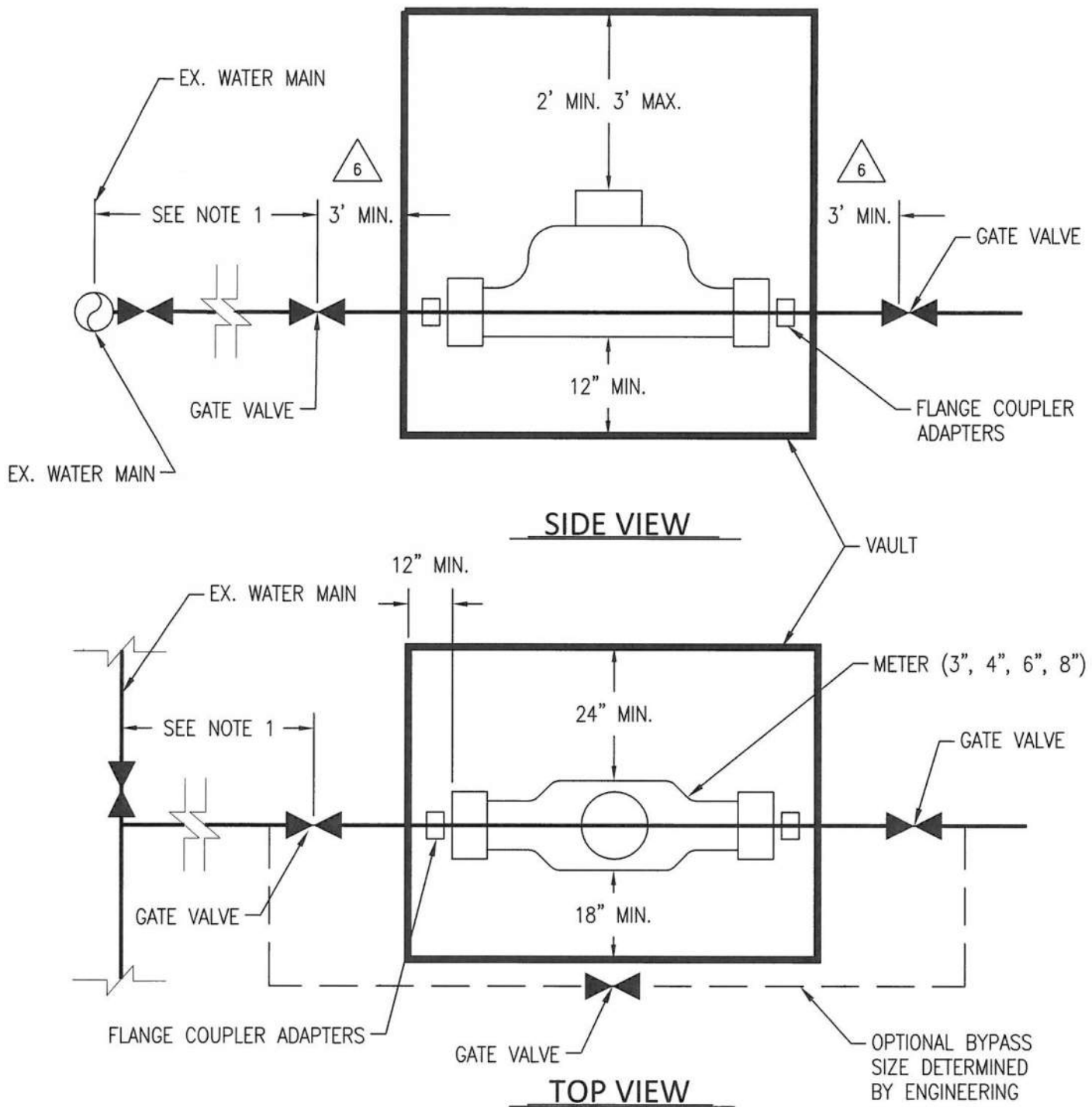
DWG.  
NO.  
2-6



## NOTES:

1. VAULTS TO BE UTILITY VAULT 444-LA (3.5'x3.5'x3.25') AND 332P LID (DIAMOND PLATE SPRING ASSISTED COVER WITH LOCKING LATCH), OR APPROVED EQUAL. DEPTH TO BE DETERMINED BY APPLICATION.
2. SEE MATERIALS LIST FOR APPROVED AIR/VACUUM RELIEF

6



**NOTES:**

1. IF MAINLINE BRANCH VALVE IS MORE THAN 10' FROM THE VAULT, A SECOND GATE VALVE WILL BE REQUIRED.
2. VAULT REQUIREMENTS SHALL BE PER MATERIALS LIST.
3. METERS ARE TO BE SUPPLIED AND INSTALLED BY C.O.P. WATER DEPARTMENT CREWS AFTER ALL FEES ARE PAID.

REV. 6  
4/28/14

**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**3" TO 8" SERVICES**

APPROVED:

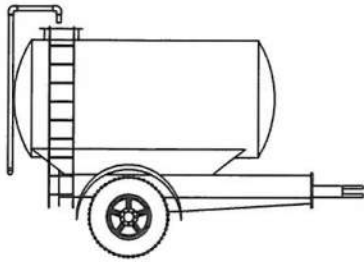
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STD. SPEC. 7-15.3

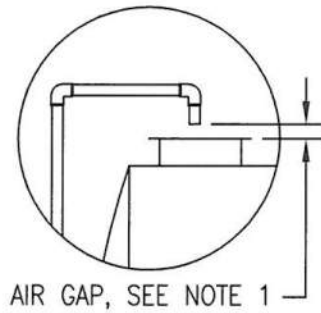
DATE:

5/15/15  
3-6-15

DWG.  
NO.  
2-7

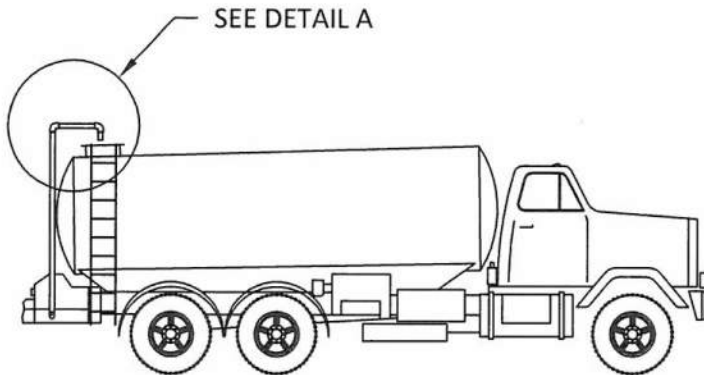


TRAILER AND HYDRO-SEEDER

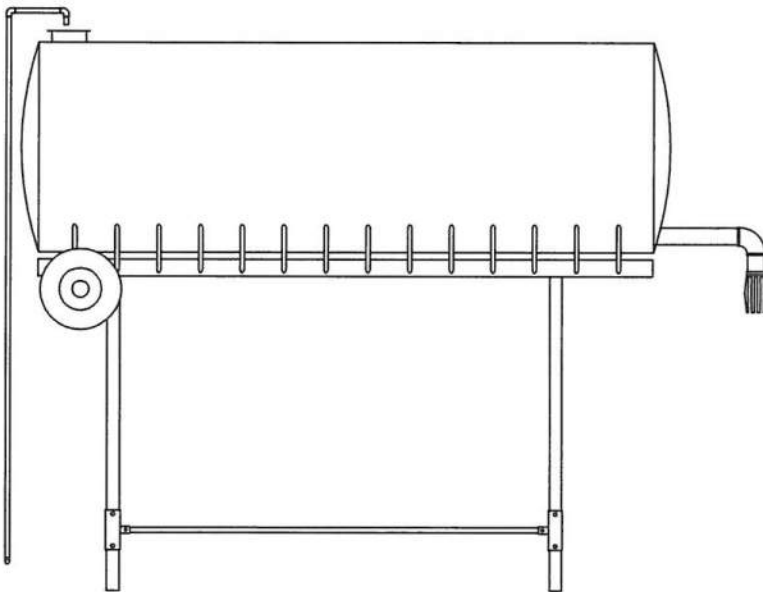


AIR GAP, SEE NOTE 1

DETAIL A



TRUCK



TOWER

NOTES:

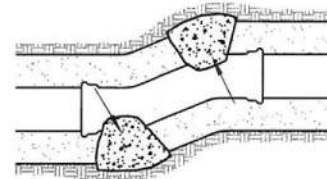
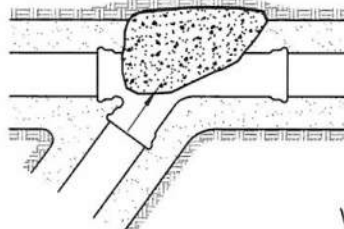
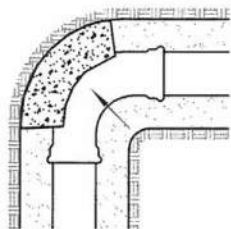
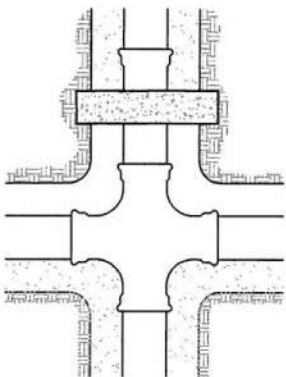
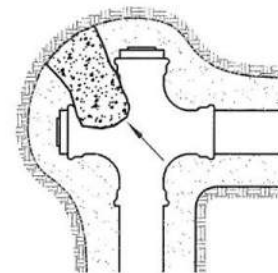
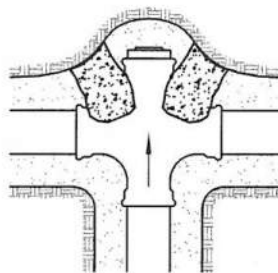
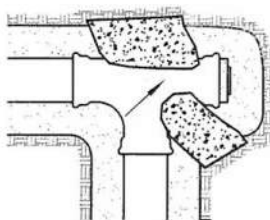
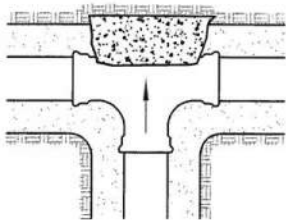
1. AIR GAPS SHALL BE A MINIMUM OF 2X I.D. OF THE FILL PIPE ABOVE THE FLOOD RIM. IF AIR GAPS DO NOT MEET THIS MINIMUM OR ARE NOT PRESENT, A BACKFLOW PREVENTION ASSEMBLY SHALL BE REQUIRED AND MUST BE ON THE LATEST USCFCCCHR LIST OF APPROVED ASSEMBLIES.
2. BACKFLOW PREVENTION ASSEMBLY MUST BE TESTED EACH TIME IT IS INSTALLED AND/OR REINSTALLED.
3. DCVA IS REQUIRED ON ALL POTABLE WATER SUPPLY TO THE AIR GAP WHEN THE POTABLE WATER SOURCE IS MORE THAN 200 FEET OR 4 HOSE LENGTHS. DCVA IS REQUIRED WHEN ANY HOSE COUPLINGS LEAK.

REV. 3  
2/23/15

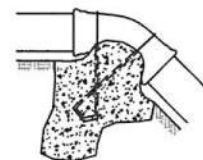
PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

REQUIRED AIR GAP

APPROVED:		STD. SPEC.	DWG. NO. 2-8
 		DATE: 5/15/15 3-6-15	



VERTICAL THRUST BLOCKS



SADDLE THRUST BLOCK  
SEE DWG. NO. 2-13

REBAR SIZE	EMBEDMENT DEPTH	HOOK SIZE
# 4	11"	6"
# 5	14"	7.5"
# 6	17"	9"
# 8	22"	12"

Pipe Size in Inches	HORIZONTAL THRUST BLOCKS MIN. BEARING AREA IN SQUARE FEET					VERTICAL THRUST BLOCKS MIN. VOLUME IN CUBIC YARDS			
	Tees, Wyes & Dead Ends	90° Bend	45° Bend	11 1/4° & 22 1/2° Bend		45° Vertical Bend		11 1/4° & 22 1/2° Vertical Bend	
						Min Vol	Size	Min Vol	Size
4 & Under	1	1.5	1	0.4		0.5	# 4	0.2	# 4
6	2	3	1.5	0.8		1	# 4	0.5	# 4
8	4	6	3	1.5		1.5	# 4	1	# 4
10	6	9	5	2.3		2.5	# 4	1.5	# 4
12	9	12	7	4		3.5	# 4	2	# 4
14	12	16	9	5		4.5	# 4	2.5	# 4
16	15	21	12	6		6	# 4	3	# 4
18	19	27	15	8		7.5	# 5	4	# 4
20	24	33	18	9		9	# 5	5	# 4
24	34	48	26	13		13	# 6	7	# 4

NOTES:

- THRUST BLOCKING TO BE CONCRETE PER MATERIALS LIST. MAX. SLUMP OF 4".
- THE FOLLOWING TABULATIONS IS BASED UPON A MAXIMUM WATER PRESSURE OF 150 PSI AND A SAFE BEARING CAPACITY OF 2,000 LBS. PER SQ. FOOT ADJUST FOR OTHER VALUES OF PRESSURE.
- KEEP CONCRETE CLEAR OF JOINTS AND ACCESSORIES.
- ALL THRUST BLOCKS MUST BE FORMED WITH PLYWOOD OR OSB AND INSPECTED. PLEASE CALL 545-3444.
- JOINTS TO BE WRAPPED POLYETHYLENE 3 MIL.

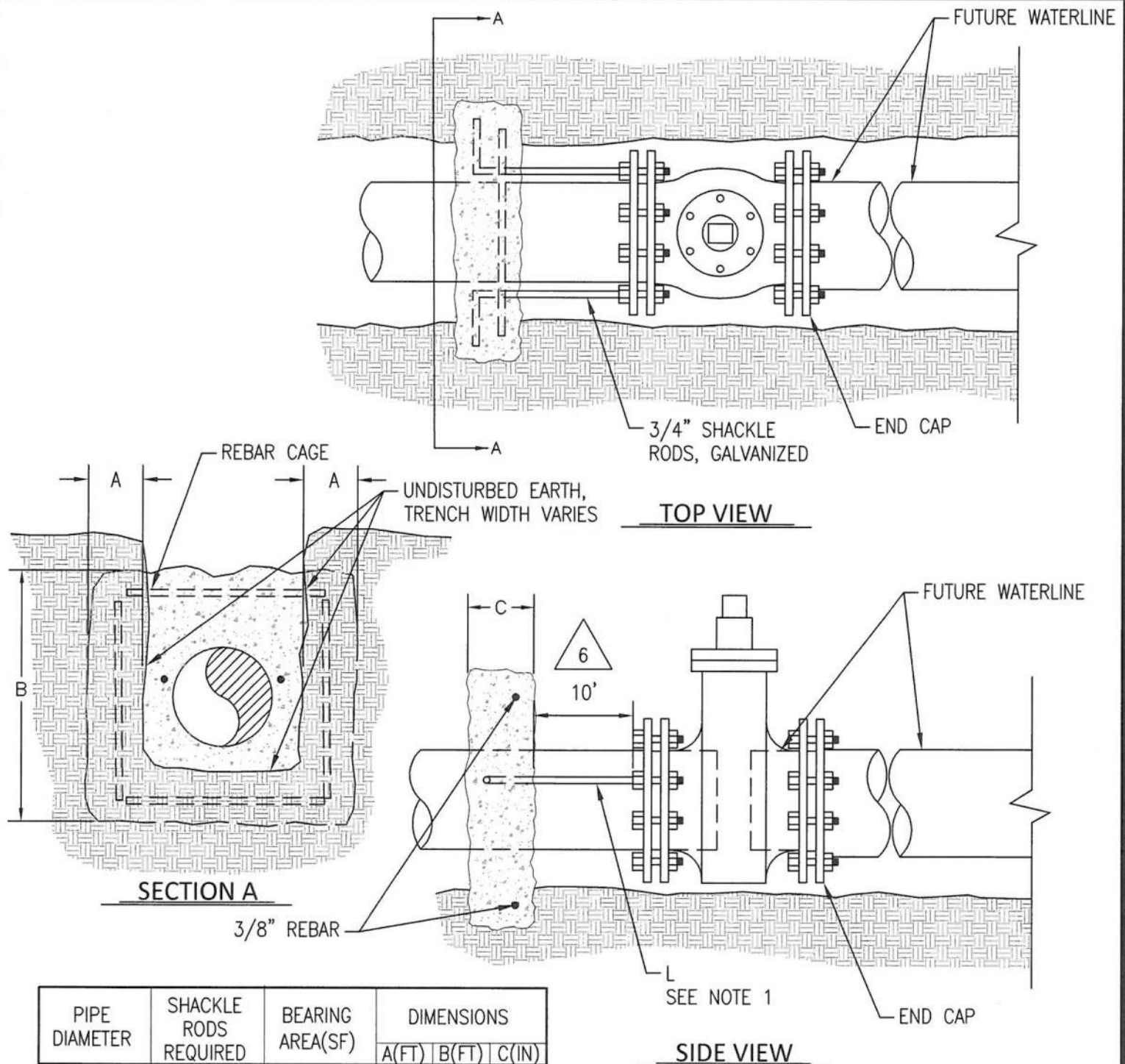
REV. 6  
12/29/09

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

CONCRETE THRUST BLOCKING

APPROVED:		STD. SPEC. 7-09.3(21)	
		DATE: 5/15/10	
		3-6-15	
		DWG. NO. 2-12	





PIPE DIAMETER	SHACKLE RODS REQUIRED	BEARING AREA(SF)	DIMENSIONS		
			A(FT)	B(FT)	C(IN)
6"	2	2	1	2	8
8"	2	4	1	2	8
10"	2	6	1.5	2	12
12"	4	9	1.5	3	12
16"	4	15	2	4	16
18"	4	19	2.5	4	20
20"	6	24	3	4	24
24"	8	34	3.5	5	24

MINIMUM BEARING AREA OF THRUST BLOCK IN SQ.  
FEET (BASED ON 2,000 P.S.F. SOIL BEARING CAP)

**NOTES:**

1. THE LENGTH OF RODS "L" SHALL BE 10 FEET MINIMUM OR AS DIRECTED BY THE ENGINEER.
2. CONCRETE SHALL BE PER THE MATERIALS LIST.
3. RESTRAINED JOINTS (MEGA-LUG AND/OR FIELD LOC GASKETS) MAY BE USED OR SHALL BE REQUESTED TO BE USED AT THE DIRECTION AND PERMISSION OF THE CITY ENGINEER.

REV. 6  
2/24/15

**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**SADDLE THRUST BLOCK**

APPROVED: <i>[Signature]</i>		STD. SPEC. 7-09.3(21)	DWG. NO. 2-13
DATE: 5/15/15			

REV. 8  
2/23/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

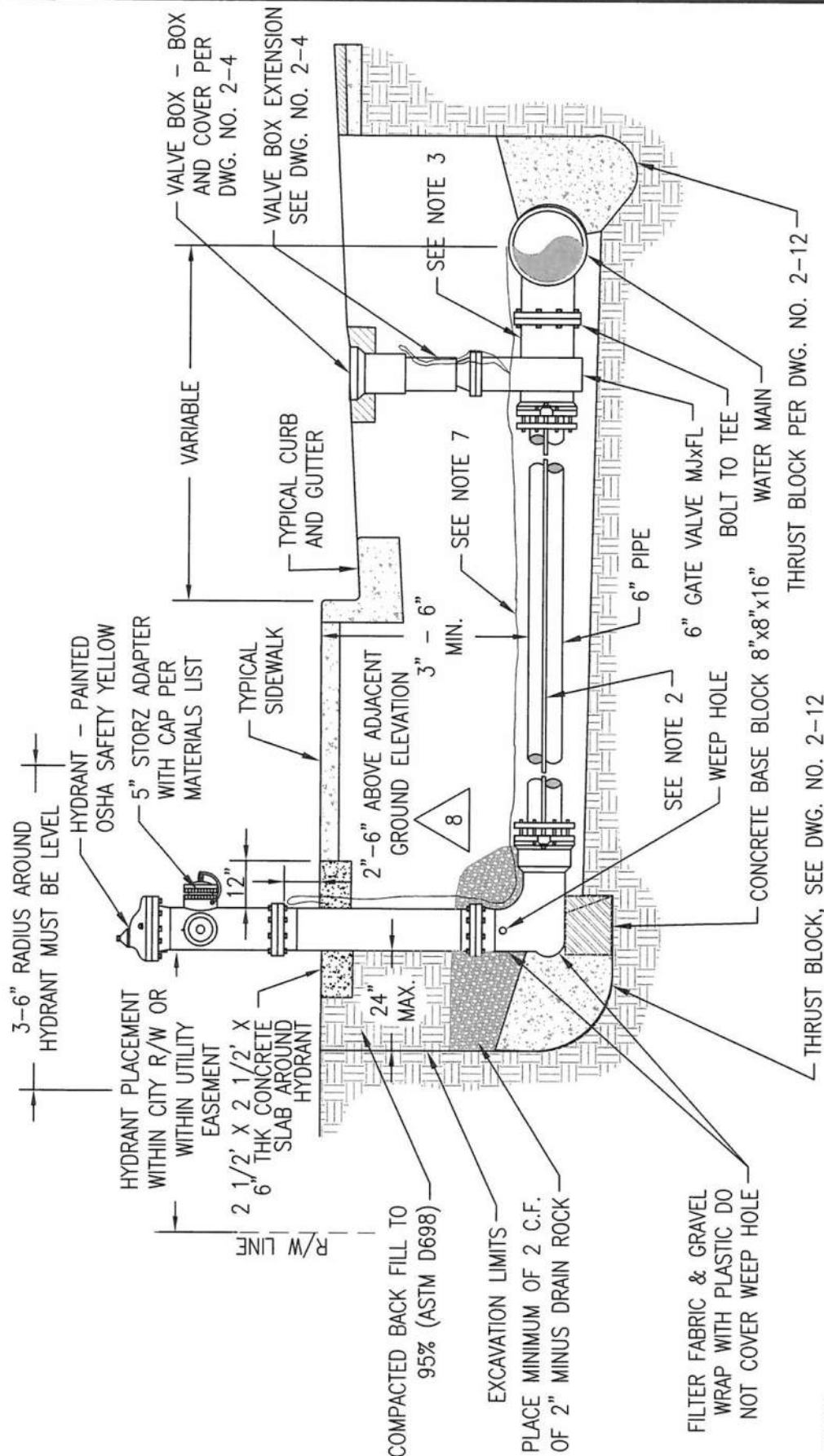
FIRE HYDRANT INSTALLATION

APPROVED:

STD. SPEC. 7-14.3

DATE: 5/15/15

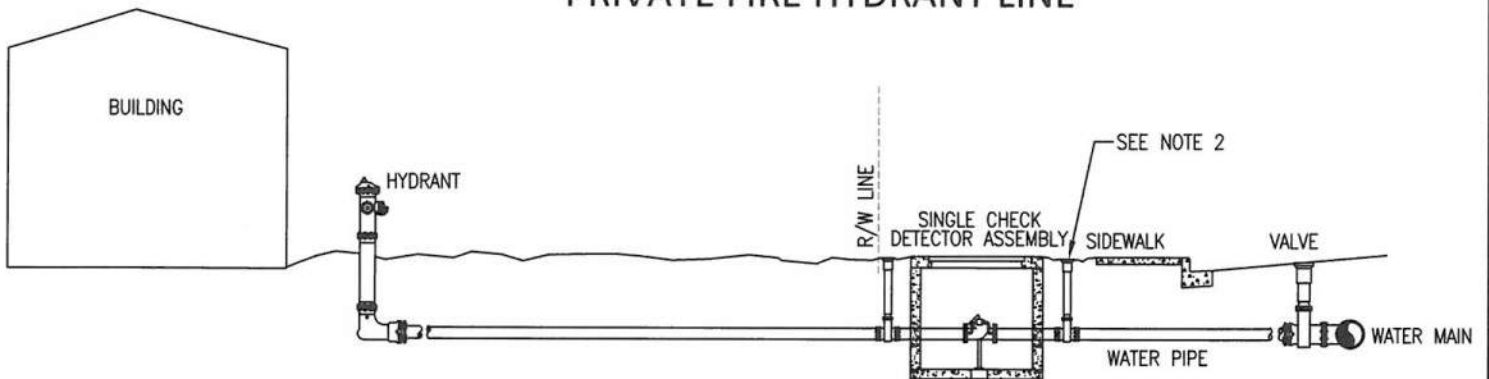
DWG. NO. 2-14



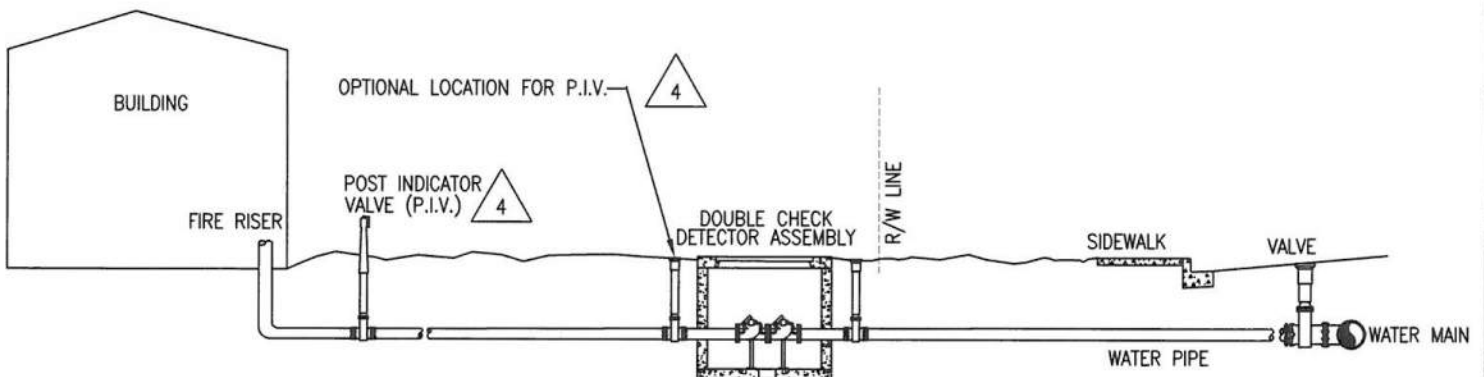
NOTES:

1. HYDRANTS SHALL BE PER THE MATERIALS LIST.
2. (2) EA. 3/4" SHACKLE RODS MAY BE REQUIRED IN SPECIAL CIRCUMSTANCES AS DIRECTED BY THE ENGINEER.
3. HUB & FLANGE CASTING. (SEE MATERIALS LIST).
4. HYDRANTS SHALL BE HOODED UNTIL OPERATIONAL.
5. HYDRANTS SHALL FACE THE STREET UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
6. PRIVATE FIRE HYDRANTS SHALL HAVE A SINGLE CHECK DETECTOR ASSEMBLY INSTALLED INSIDE THE R/W LINE. (SEE MATERIALS LIST)
7. TRACER WIRE FROM MAIN TO FIRE HYDRANT. (BLUE INSULATION)
8. USE OF HYDRANT EXTENSIONS MUST BE APPROVED IN WRITING BY THE CITY ENGINEER. NOT TO BE USED IN NEW INSTALLS.
9. HYDRANTS SHALL BE INSTALLED ON ALTERNATING SIDES OF THE STREET ON 300 FOOT SPACING IN INDUSTRIAL AND COMMERCIAL AREAS AND 500 FOOT SPACING IN RESIDENTIAL AREAS.
10. SEE GUARD POST REQUIREMENTS.
11. REMOVE CHAINS FROM CAPS.

## PRIVATE FIRE HYDRANT LINE



## FIRE SPRINKLER SYSTEM LINE



### NOTE:

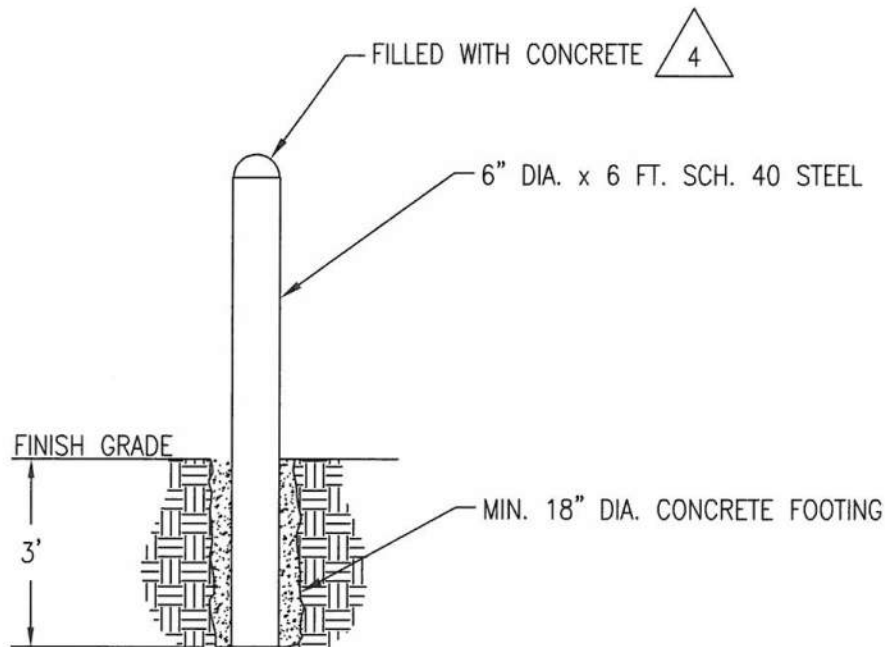
1. PASCO MUNICIPAL CODE 13.28.010 REQUIRES ALL FIRE LINES TO BE METERED.
2. THIS VALVE IS NOT REQUIRED IF VAULT IS WITHIN 10' OF VALVE AT MAIN.
3. FOR REFERENCE ONLY. SEE WASHINGTON STATE HEALTH DEPARTMENT REQUIREMENTS FOR FURTHER CLARIFICATION.
4. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.
5. DETECTOR METER TO READ IN CUBIC FEET.
6. IF A REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) IS REQUIRED, IT SHALL BE INSTALLED PER DWG. NO. 2-27.



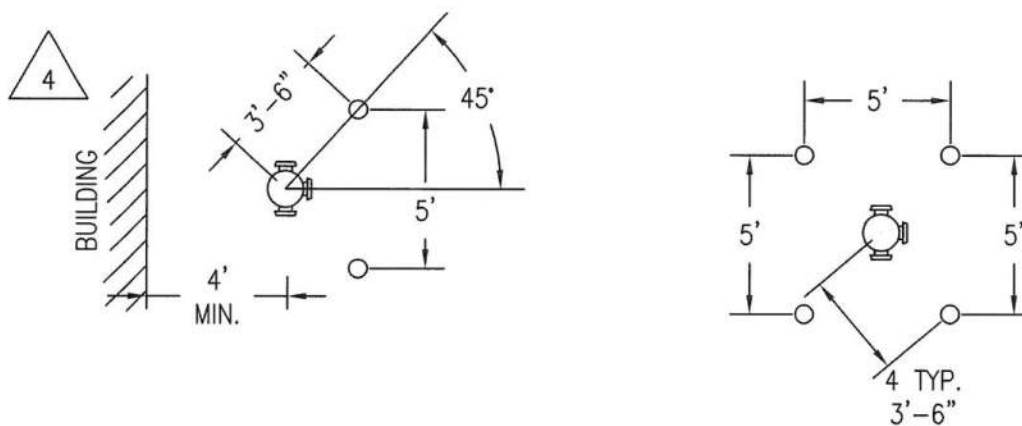
REV. 4  
2/23/15

PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION CITY OF PASCO, WASHINGTON		FIRE LINES / BACKFLOW	
APPROVED: <i>[Signature]</i>		STD. SPEC.	7-14.3
		DATE:	5/15/16 3-6-15
		DWG. NO.	2-14A





TYPICAL GUARD POST REQUIREMENTS. OTHER CONFIGURATIONS MAY BE REQUIRED BY THE ENGINEER, SUBJECT TO FIELD CONDITIONS.



#### NOTES:

1. CENTER OF GUARD POST TO BE SET 3' - 6' FROM HYDRANT CENTER NUT.
2. GUARD POSTS OUTSIDE OF THE RIGHT-OF-WAY ARE NOT REQUIRED IF THE FACE OF A MINIMUM SIX-INCH HIGH CURB IS LOCATED A MINIMUM OF 3' - 0" HORIZONTALLY FROM THE HYDRANT CENTER NUT.
3. DO NOT INSTALL GUARD POST IN LINE WITH HYDRANT PORTS.
4. CONCRETE SHALL BE PER CITY OF PASCO STANDARD SPECIFICATION.
5. GUARD POSTS SHALL BE PLUMB.
6. GUARD POSTS SHALL BE PAINTED OSHA YELLOW.

REV. 4  
10/8/12

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

#### GUARD POST

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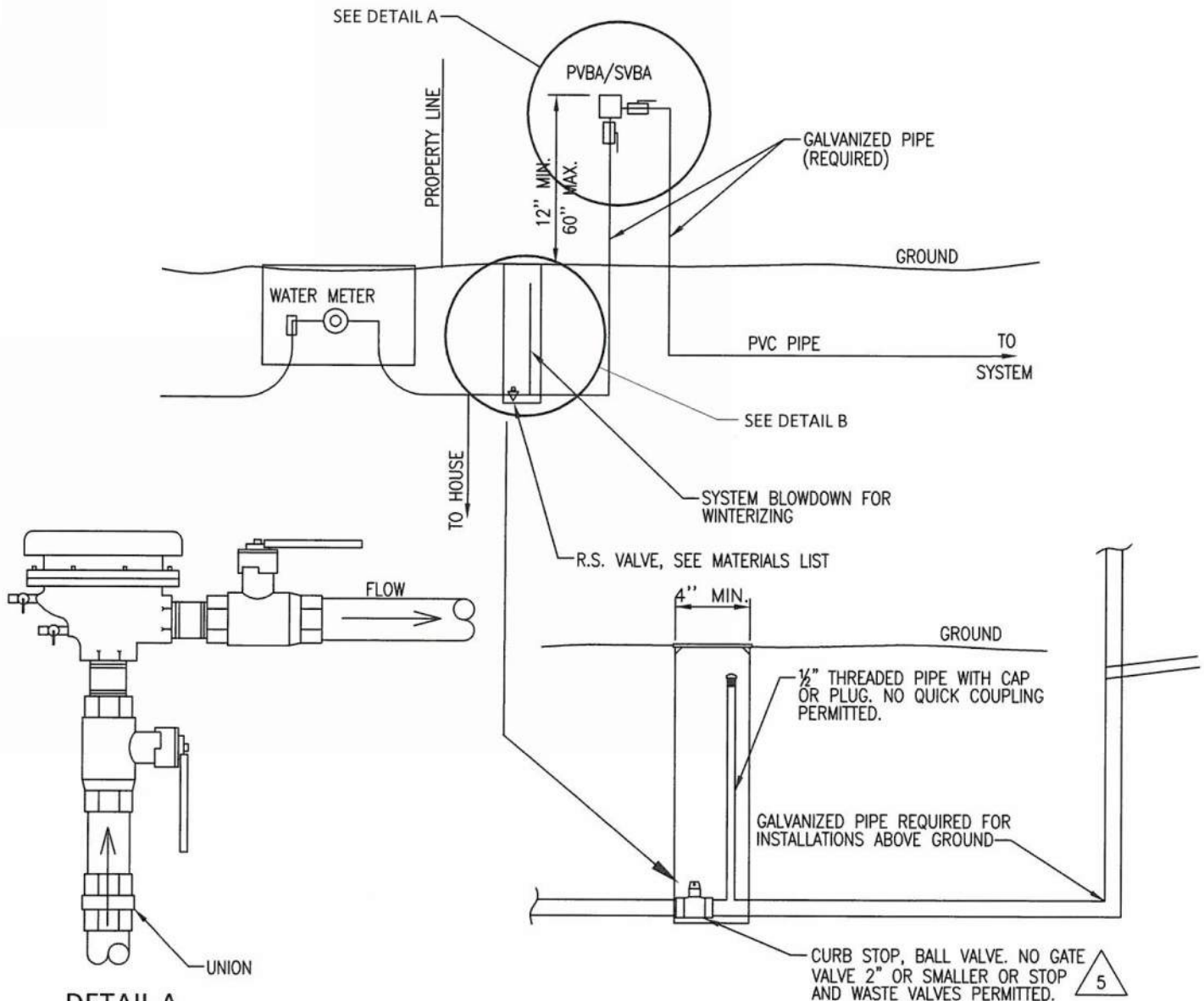
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STD. SPEC. 7-14.3(2)C

DATE:

5/15/15

DWG.  
NO.  
2-15



**DETAIL A**

SCALE: NTS

**NOTES:**

1. PRESSURE VACUUM BREAKER ASSEMBLY (PVBA) MAY BE INSTALLED ON LOW HAZARD POTABLE WATER SUPPLY SYSTEMS AS DETERMINED BY THE CITY OF PASCO CROSS CONNECTION SPECIALIST. CROSS CONNECTION SPECIALIST MUST BE CONSULTED PRIOR TO INSTALLATION. PLEASE CALL 545-3463.
2. PVBA/SVBA MUST BE INSTALLED NOT LESS THAN 12" ABOVE THE HIGHEST POINT OF USE & NOT MORE THAN 60" HIGH.
3. OWNER IS RESPONSIBLE FOR FREEZE PROTECTION.
4. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.
5. THE IRRIGATION SUPPLY TEE AND VALVE IS TO BE NO LESS THAN 36" OUTSIDE OF THE METER BOX ON 3/4" AND 1" SERVICES.
6. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.
7. TEE IS TO BE LEAD FREE.

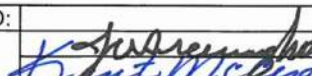
**DETAIL B**

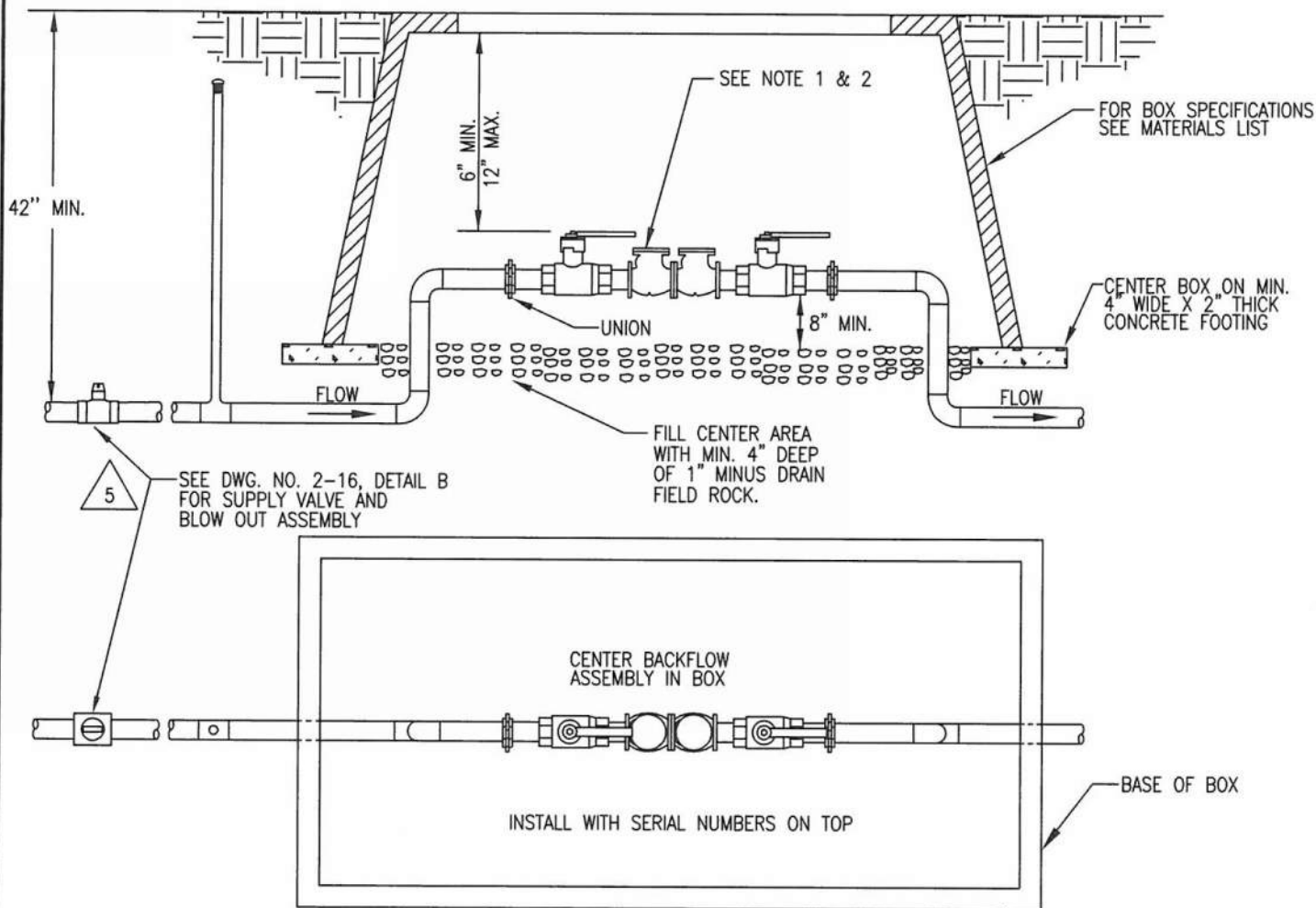
SCALE: NTS

REV. 5  
2/23/15

**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**PVBA/SVBA INSTALLATION 1/2" TO 2"**

APPROVED: 		STD. SPEC. 7-15.3	DWG. NO. 2-16
DATE: 5/15/15		3-6-15	



### DCVA INSTALLATION

DOUBLE CHECK VALVE ASSEMBLY FOR ASSEMBLIES 1/2" TO 2"

#### NOTES:

1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED IN THE ORIENTATION AS APPROVED BY THE USC TESTING LAB & ACCEPTED BY THE DEPARTMENT OF HEALTH.
3. CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE CONSULTED PRIOR TO INSTALLATION. PLEASE CALL 545-3463.
4. ASSEMBLY INSTALLATIONS ABOVE GROUND REQUIRE COPPER OR GALVANIZED PIPE WITH AT LEAST ONE UNION. INSTALLATIONS BELOW GROUND MUST HAVE TWO UNIONS.
5. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER. (SEE DWG. NO. 2-16, DETAIL "B").
6. ASSEMBLIES APPROVED FOR BELOW GROUND INSTALLATION CAN NOT BE SUBJECT TO FLOODING.
7. A LADDER IS REQUIRED IF ACCESS OPENING TO FLOOR EXCEEDS 36 INCHES.
8. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.
9. THE IRRIGATION SUPPLY VALVE IS TO BE NO LESS THAN 36" OUTSIDE OF THE METER BOX ON 3/4" AND 1" SERVICES, SEE STANDARD 2-16 DETAIL "B".
10. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

REV. 5  
2/23/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

### DCVA INSTALLATION 1/2" TO 2"

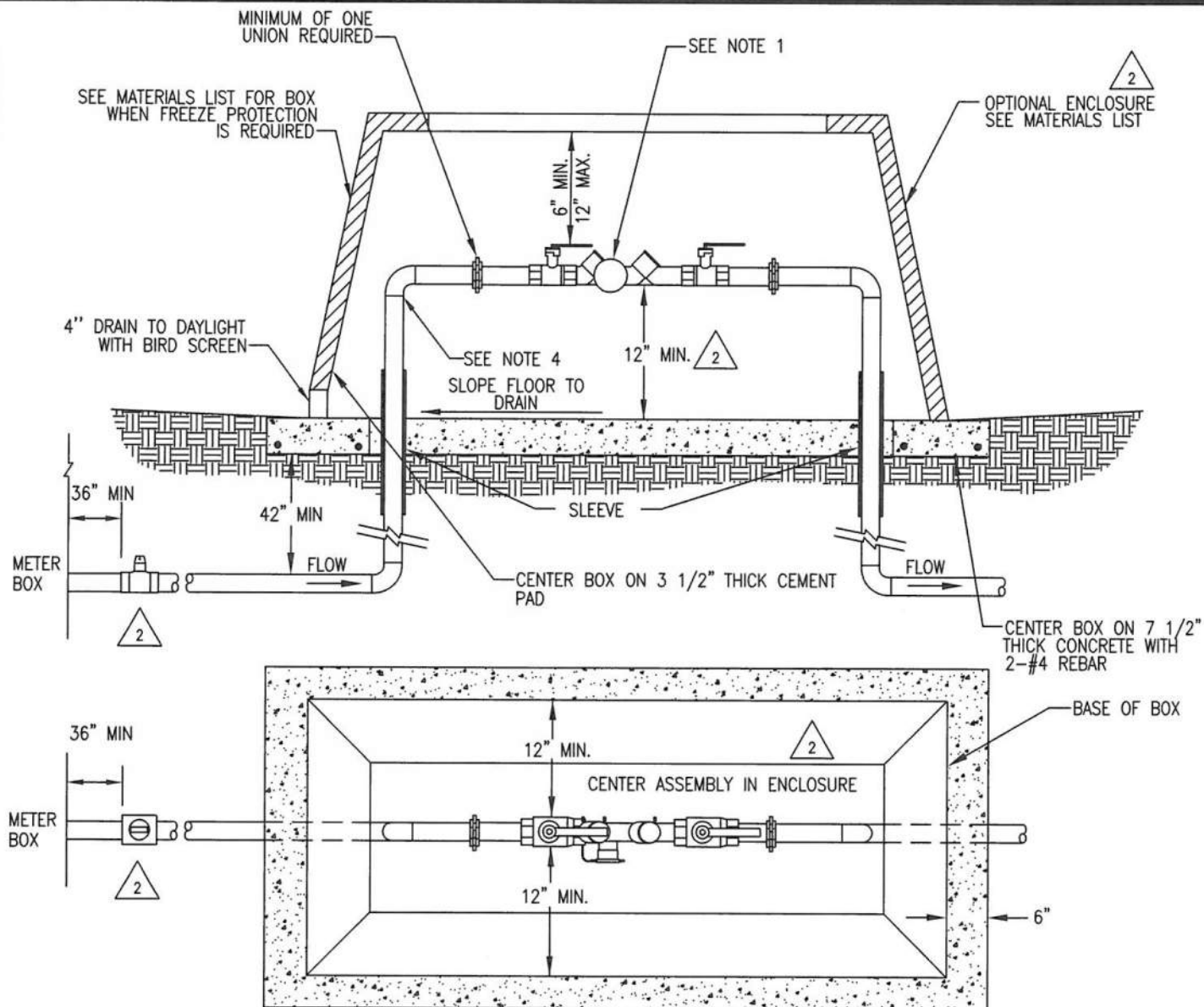
STD. SPEC. 7-09(24)5

APPROVED:

DATE:

DWG. NO. 2-17





### RPDA INSTALLATION

FOR REDUCED PRESSURE DETECTOR ASSEMBLY  
3/4" TO 2"

#### NOTES:

1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED ABOVE GROUND, MINIMUM 12" CLEARANCE ABOVE THE FLOOD PLAIN (CURB) AND IN THE ORIENTATION AS APPROVED BY USC TESTING LAB AND ACCEPTED BY DEPT. OF HEALTH. THE ENCLOSURE MUST ALLOW FOR ROUTINE MAINTENANCE AND TESTING (REMOVABLE ENCLOSURE OR OPENS ON THE SIDE FOR ACCESS TO THE TEST COCKS).
3. CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE CONSULTED PRIOR TO INSTALLATION. PLEASE CALL 545-3463.
4. ASSEMBLY INSTALLATIONS ABOVE GROUND REQUIRE COPPER OR GALVANIZED PIPE WITH AT LEAST ONE UNION (NO PVC). PVC SLEEVE TO EXTEND 6" ABOVE AND 12" BELOW CEMENT PAD TO ALLOW FOR SETTLEMENT OF PAD.
5. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER.
6. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.

REV. 2  
2/23/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

RPDA INSTALLATION OF 3/4" TO 2"

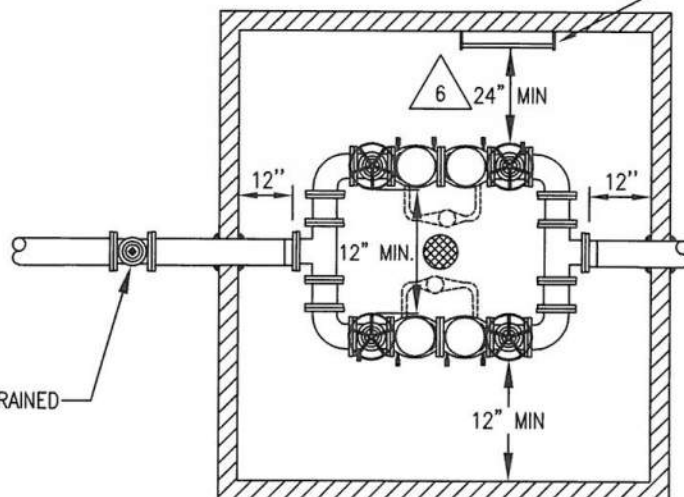
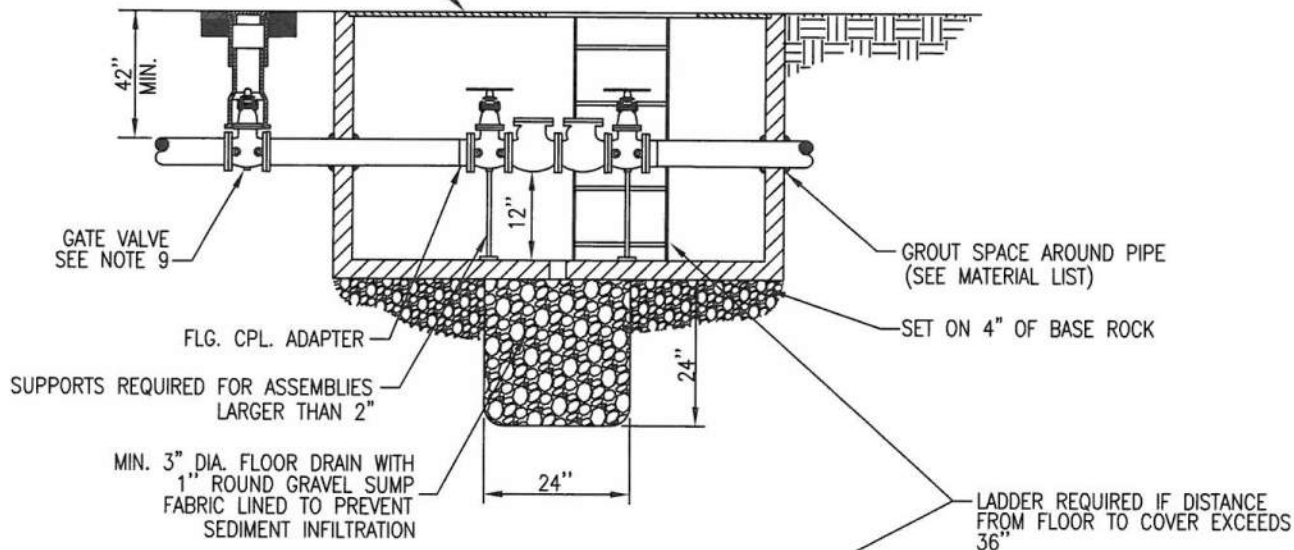
APPROVED:

STD. SPEC. 7-09.3(24)J

DATE:

DWG.  
NO.  
2-20

SEE MATERIALS LIST FOR VAULT  
AND VAULT LID REQUIREMENTS



## DCVA & DCDA DUAL INSTALLATION LARGER THAN 2"

FOR DOUBLE CHECK VALVE ASSEMBLY & DOUBLE CHECK DETECTOR  
ASSEMBLY LARGER THAN 2"

### NOTES:

1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED IN THE ORIENTATION AS APPROVED BY USC TESTING LAB AND ACCEPTED BY DEPT OF HEALTH.
3. CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE CONSULTED PRIOR TO INSTALLATION. PLEASE CALL 545-3463.
4. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER.
5. ASSEMBLIES APPROVED FOR BELOW GROUND INSTALLATION CAN NOT BE SUBJECT TO FLOODING.
6. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.
7. ALL VAULT WALL PENETRATIONS ARE TO BE GROUTED INSIDE AND OUT.
8. IF MAIN VALVE IS LOCATED WITHIN 10' OF THE VAULT, THIS VALVE IS NOT REQUIRED.
9. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

REV. 6  
2/24/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

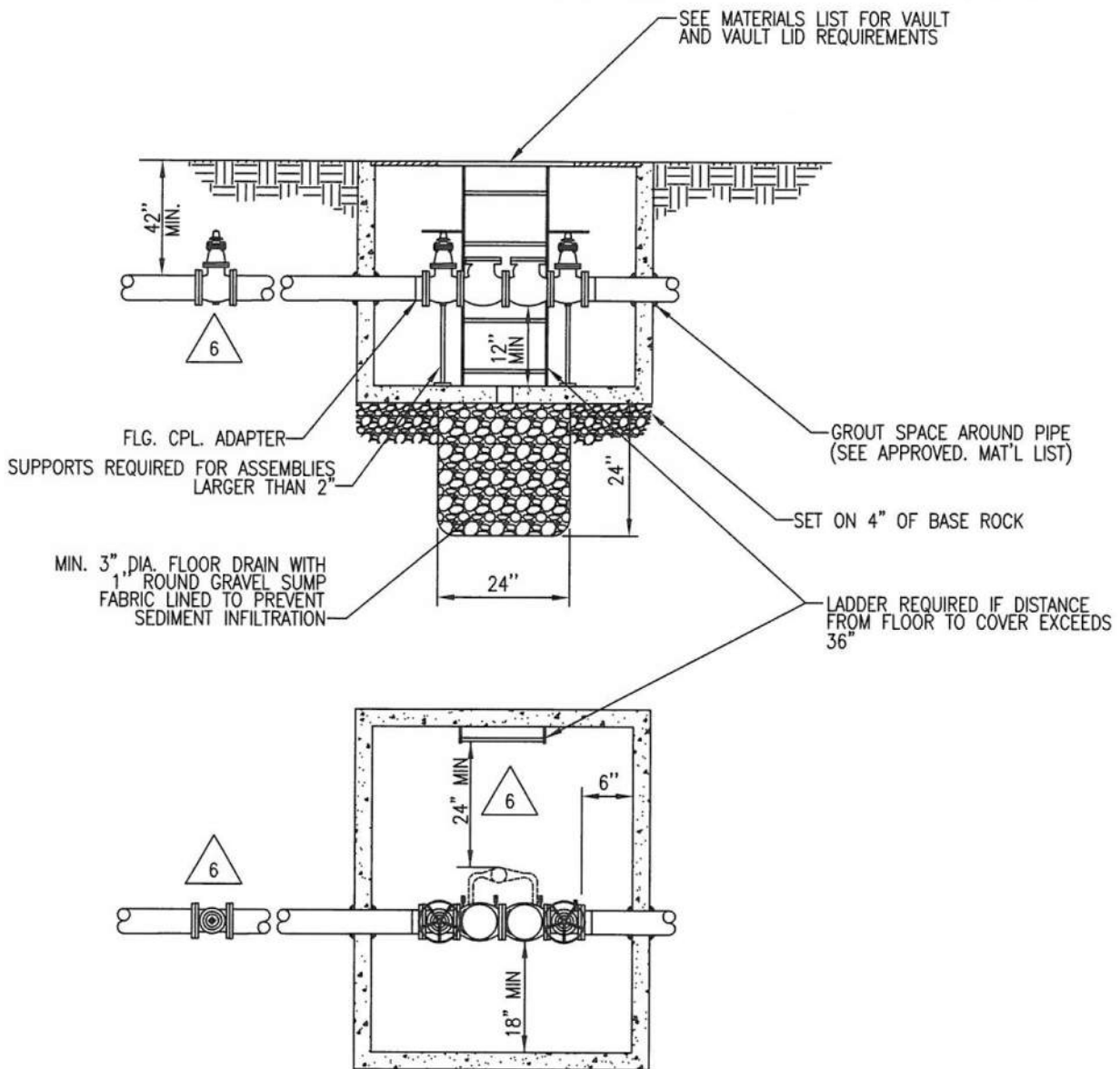
## DCVA & DCDA DUAL INSTALLATION LARGER THAN 2"

APPROVED:

STD. SPEC. 7-09.3(24)J

DATE:

DWG.  
NO.  
2-22



### DCDA & DCVA INSTALLATION 2" AND LARGER

FOR DOUBLE CHECK DETECTOR ASSEMBLY & DOUBLE CHECK VALVE ASSEMBLY  
2" AND LARGER

#### NOTES:

1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED IN THE ORIENTATION AS APPROVED BY USC TESTING LAB AND ACCEPTED BY DEPT OF HEALTH. DETECTOR MUST READ IN CUBIC FEET
3. CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE CONSULTED PRIOR TO INSTALLATION.
4. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER.
5. ASSEMBLIES APPROVED FOR BELOW GROUND INSTALLATION CAN NOT BE SUBJECT TO FLOODING.
6. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.
7. ALL VAULT WALL PENETRATIONS ARE TO BE GROUTED INSIDE AND OUT.
8. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

REV. 6  
2/24/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

#### DCDA & DCVA INSTALLATION 2" & LARGER

APPROVED:

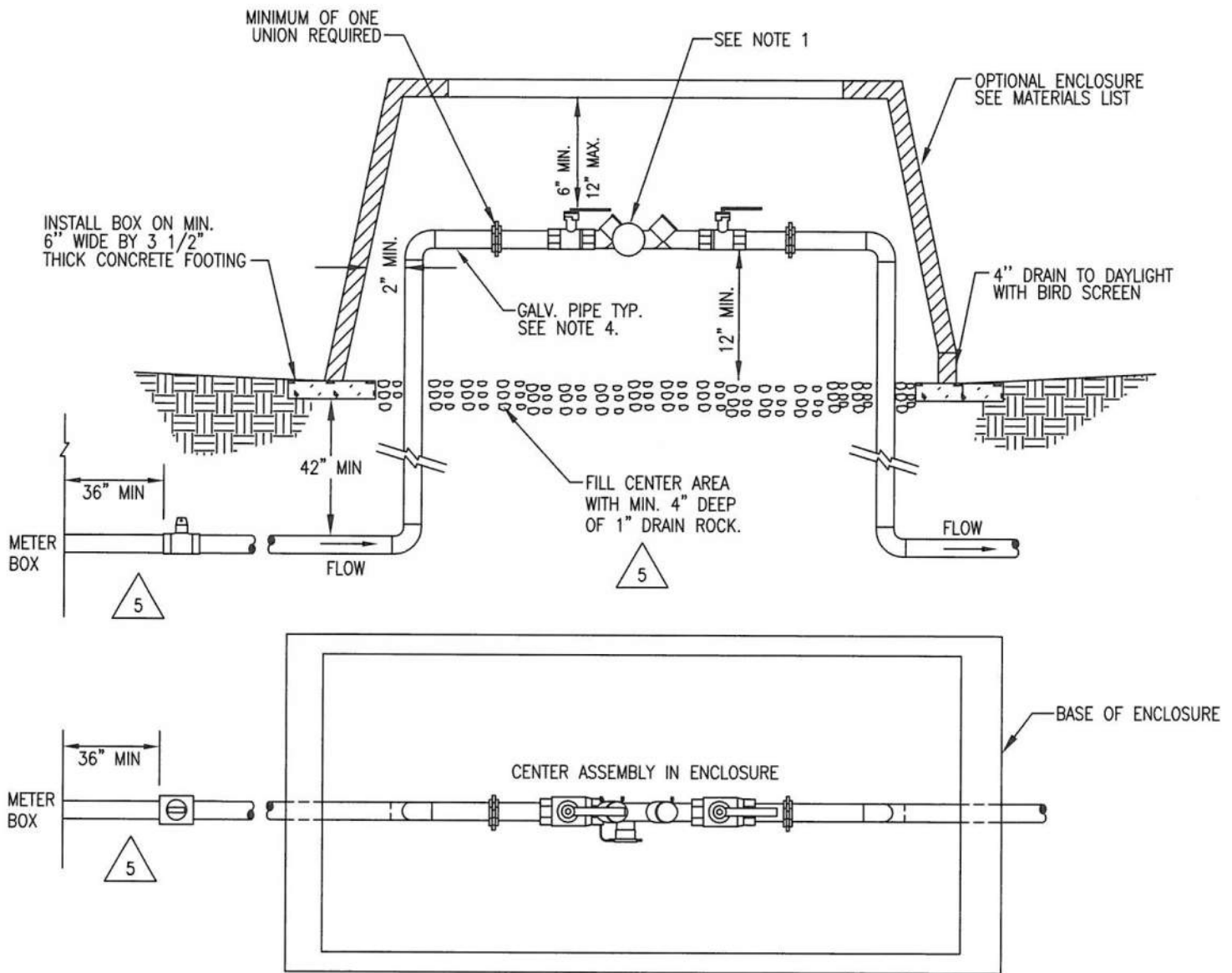
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STD. SPEC. 7-09.3(24)J

DATE:

5/15/15  
3-6-16

DWG.  
NO.  
2-23



**RPBA INSTALLATION**  
REDUCED PRESSURE BACKFLOW ASSEMBLY  
FOR ASSEMBLIES 3/4" TO 1" 5

**NOTES:**

5

1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED ABOVE GROUND, MINIMUM 12" CLEARANCE ABOVE THE FLOOD PLAIN (CURB) AND IN THE ORIENTATION AS APPROVED BY USC TESTING LAB AND ACCEPTED BY DEPT OF HEALTH. THE ENCLOSURE MUST ALLOW FOR ROUTINE MAINTENANCE AND TESTING (REMOVABLE ENCLOSURE OR OPENS ON THE SIDE FOR ACCESS TO THE TEST COCKS).
3. CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE CONSULTED PRIOR TO INSTALLATION. PLEASE CALL 545-3463.
4. ASSEMBLY INSTALLATIONS ABOVE GROUND REQUIRE COPPER OR GALVANIZED PIPE WITH AT LEAST ONE UNION.
5. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER (SEE STD PLAN 2-16, DETAIL "B" FOR IRRIGATION).
6. WHEN INSTALLED INSIDE A BUILDING, A FLOOR DRAIN SIZED TO ACCEPT MAXIMUM DISCHARGE FROM THE RELIEF ASSEMBLY IS REQUIRED.
7. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

REV. 5  
2/24/15

**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**RPBA INSTALLATION OF 3/4" TO 1"**

APPROVED:

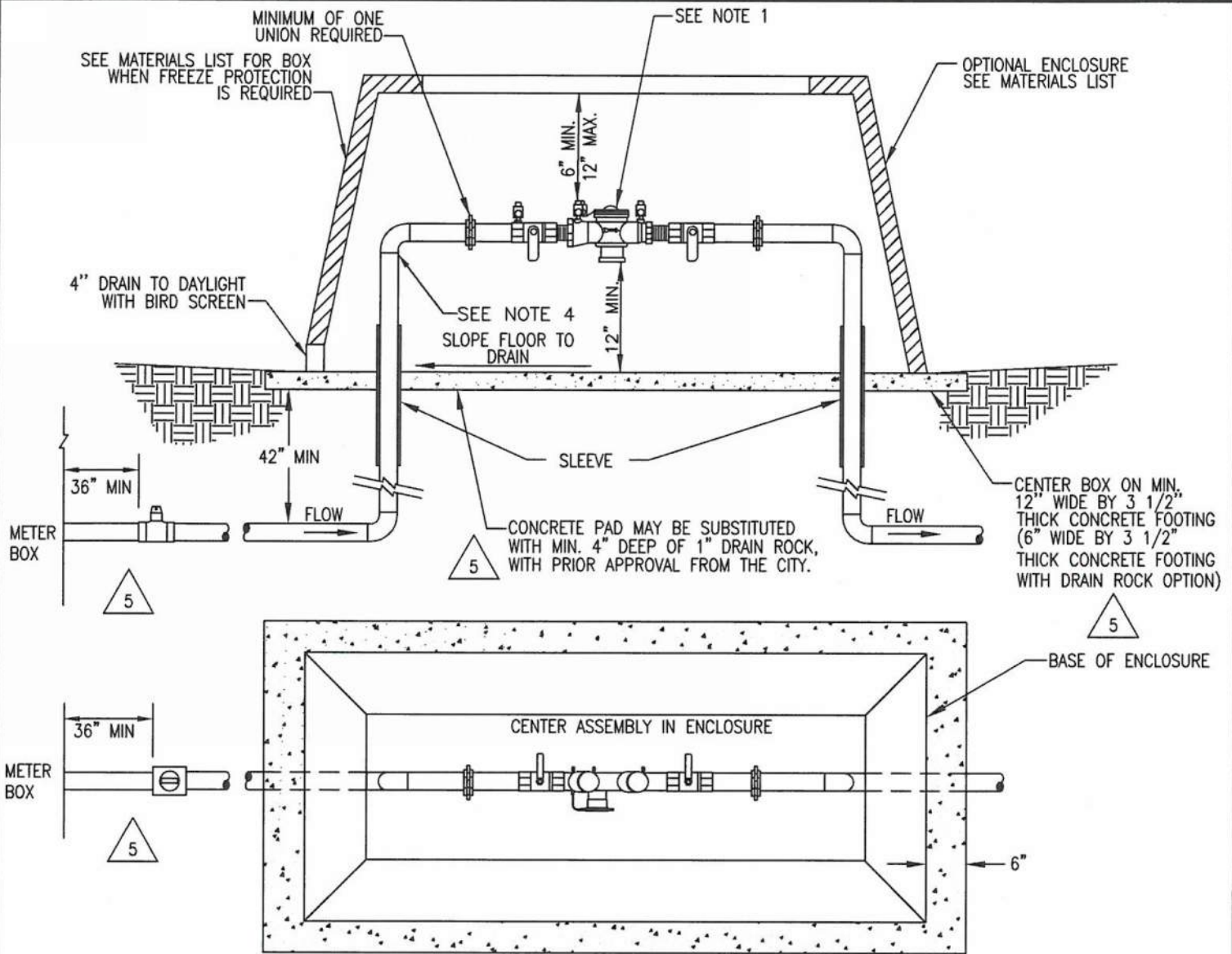
STD. SPEC. 7-09.3(24)J

DATE:

5/15/15  
3/6-15

DWG.  
NO.  
2-24





### RPBA INSTALLATION

FOR REDUCED PRESSURE BACKFLOW ASSEMBLY  
FOR ASSEMBLIES 1 1/4" TO 2"

#### NOTES:

1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED ABOVE GROUND, MINIMUM 12" CLEARANCE ABOVE THE FLOOD PLAIN (CURB) AND IN THE ORIENTATION AS APPROVED BY USC TESTING LAB AND ACCEPTED BY DEPT OF HEALTH. THE ENCLOSURE MUST ALLOW FOR ROUTINE MAINTENANCE AND TESTING (REMOVABLE ENCLOSURE OR OPENS ON THE SIDE FOR ACCESS TO TEST COCKS).
3. CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE CONSULTED PRIOR TO INSTALLATION. PLEASE CALL 545-3463.
4. ASSEMBLY INSTALLATIONS ABOVE GROUND REQUIRE COPPER OR GALVANIZED PIPE WITH AT LEAST ONE UNION. PVC SLEEVE TO EXTEND 6" ABOVE AND 12" BELOW CONCRETE PAD TO ALLOW FOR SETTLEMENT OF PAD.
5. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER (SEE STD PLAN 2-16, DETAIL B FOR IRRIGATION).
6. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.
7. FOR PREMISES ISOLATION, THE ENCLOSURE MUST HAVE A MINIMUM 3 1/2" CONCRETE PAD AND MUST BE NO LESS THAN 24" AWAY FROM THE ISOLATION VALVE.
8. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

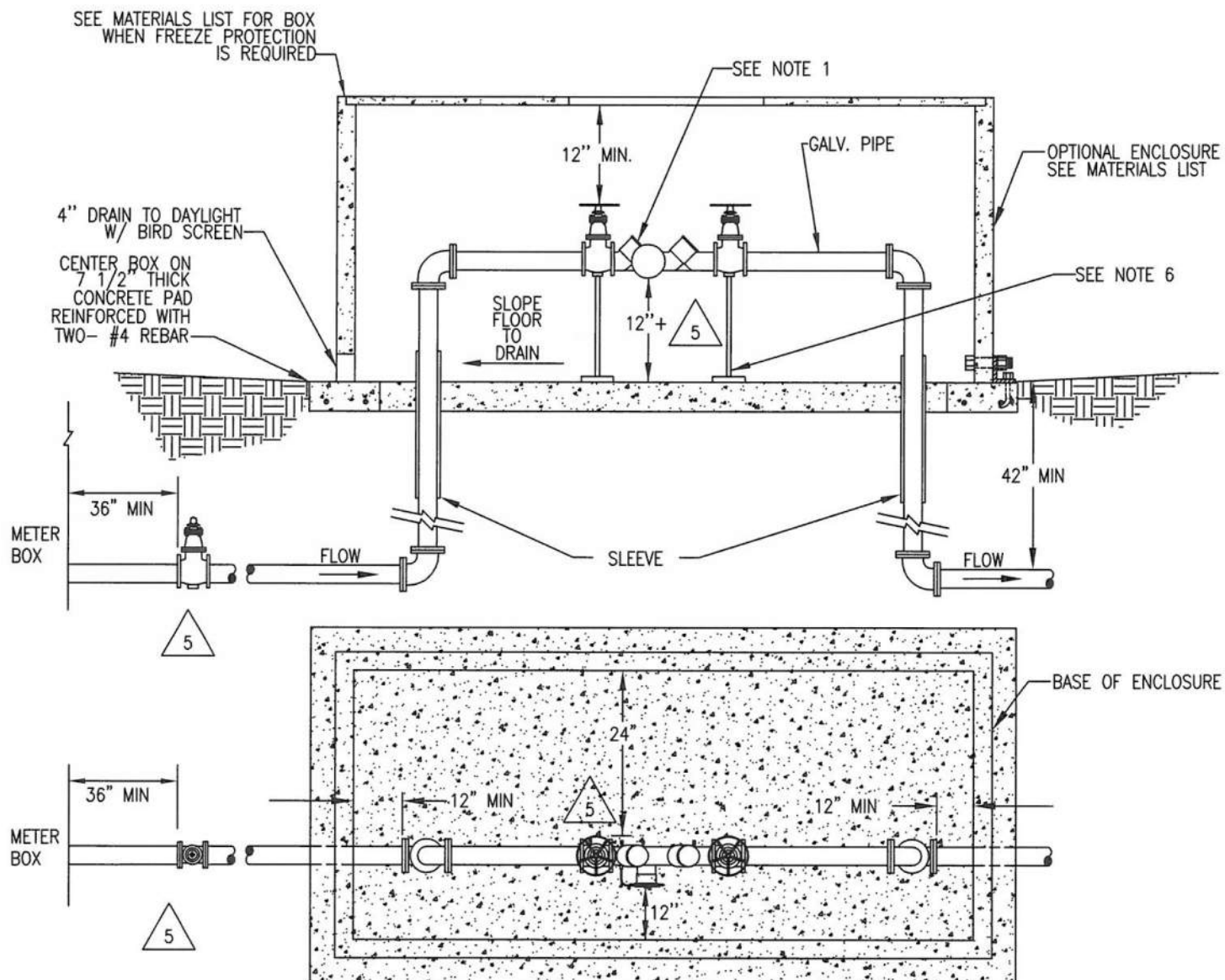
REV. 5  
2/24/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

### RPBA INSTALLATION 1-1/4" TO 2"

APPROVED:	<i>Kent McInnis</i>	STD. SPEC.	7-09.3(24)J
	<i>John...</i>	DATE:	4-9-15 5/15/15
		DWG. NO.	2-25





### RPDA & RPBA INSTALLATION

FOR REDUCED PRESSURE DETECTOR ASSEMBLY & REDUCE PRESSURE BACKFLOW ASSEMBLY LARGER THAN 2"

#### NOTES:

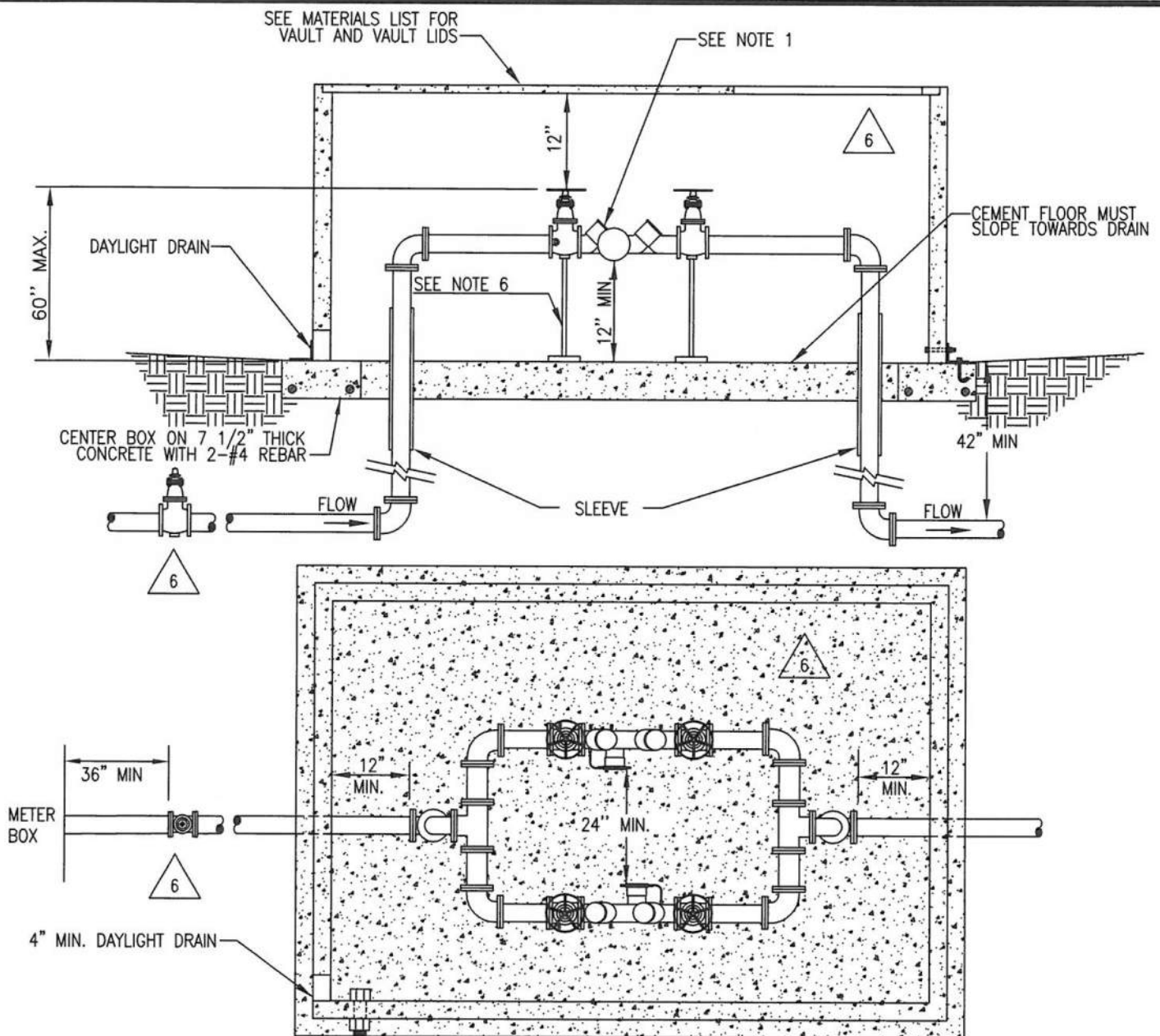
1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED ABOVE GROUND, MINIMUM 12" CLEARANCE ABOVE THE FLOOD PLAIN (CURB) AND IN THE ORIENTATION AS APPROVED BY USC TESTING LAB AND ACCEPTED BY DEPT. OF HEALTH. THE ENCLOSURE MUST ALLOW FOR ROUTINE MAINTENANCE AND TESTING (REMOVABLE ENCLOSURE OR OPENS ON THE SIDE FOR ACCESS TO THE TEST COCKS).
3. A CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE PRESENT DURING INSTALLATION, PLEASE CALL 545-3463.
4. PVC SLEEVE TO EXTEND 6" ABOVE AND 12" BELOW CONCRETE PAD TO ALLOW FOR SETTLEMENT OF PAD.
5. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER.
6. PIPE SUPPORTS ARE REQUIRED ON ASSEMBLIES OVER 2".
7. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.
8. FOR PREMISES ISOLATION, ANY CONCRETE IS TO BE NO LESS THAN 36" FROM THE METER BOX.
9. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

REV. 5  
2/25/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

### RPDA & RPBA INSTALLATION LARGER THAN 2"

APPROVED:	STD. SPEC. 7-09.3(24)J	DWG. NO. 2-27
DATE: 5/15/15		



### RPDA & RPBA DUAL INSTALLATION

FOR REDUCE PRESSURE DETECTOR ASSEMBLY & REDUCED PRESSURE  
BACKFLOW ASSEMBLY LARGER THAN 2"

#### NOTES:

1. MUST BE ON THE LATEST USCFCCHR LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.
2. MUST BE INSTALLED ABOVE GROUND, MINIMUM 12" CLEARANCE ABOVE THE FLOOD PLAIN (CURB) AND IN THE ORIENTATION AS APPROVED BY USC TESTING LAB AND ACCEPTED BY DEPT. OF HEALTH. THE ENCLOSURE MUST ALLOW FOR ROUTINE MAINTENANCE AND TESTING (REMOVABLE ENCLOSURE OR OPENS ON THE SIDE FOR ACCESS TO THE TEST COCKS).
3. A CITY OF PASCO CROSS CONNECTION SPECIALIST MUST BE PRESENT DURING INSTALLATION, PLEASE CALL 545-3463.
4. PVC SLEEVE TO EXTEND 6" ABOVE AND 12" BELOW CEMENT PAD TO ALLOW FOR SETTLEMENT.
5. FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER.
6. PIPE SUPPORTS ARE REQUIRED ON ASSEMBLIES OVER 2".
7. THE BACKFLOW ASSEMBLY IS TO BE TESTED AT THE TIME OF INSTALLATION BY A CERTIFIED TESTER APPROVED BY THE CITY UNLESS PRE-APPROVED BY THE CROSS CONNECTION SPECIALIST.
8. FOR PREMISES ISOLATION, ANY CONCRETE IS TO BE NO LESS THAN 36" FROM THE METER BOX.
9. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

REV. 6  
1/14/14

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

RPDA & RPBA DUAL INSTALLATION LARGER THAN 2"

APPROVED:

STD. SPEC. 7-09.3(24)J

DATE:

DWG.  
NO.  
2-28

REV. 7  
12/14/10

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

# WATERLINE BEDDING

APPROVED:

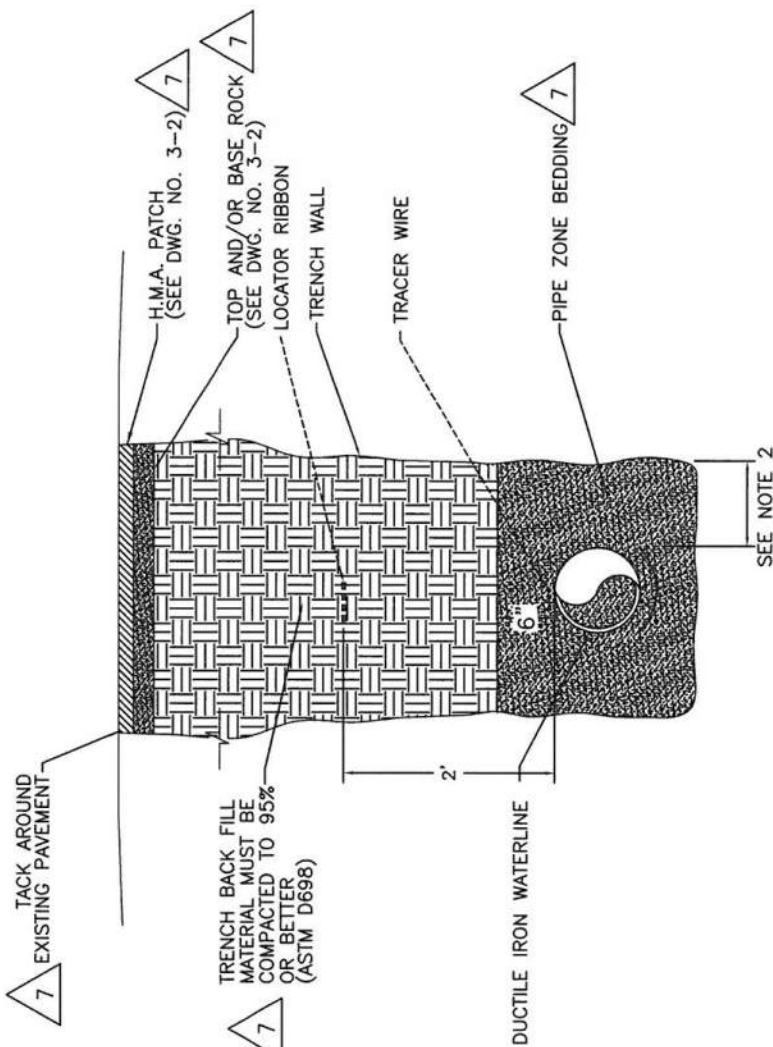
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STD. SPEC. 7-09.3(9)

DATE:

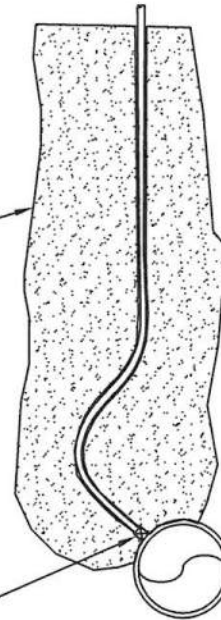
5/15/15  
3/6/15

DWG.  
NO.  
2-30



CORPORATION STOP

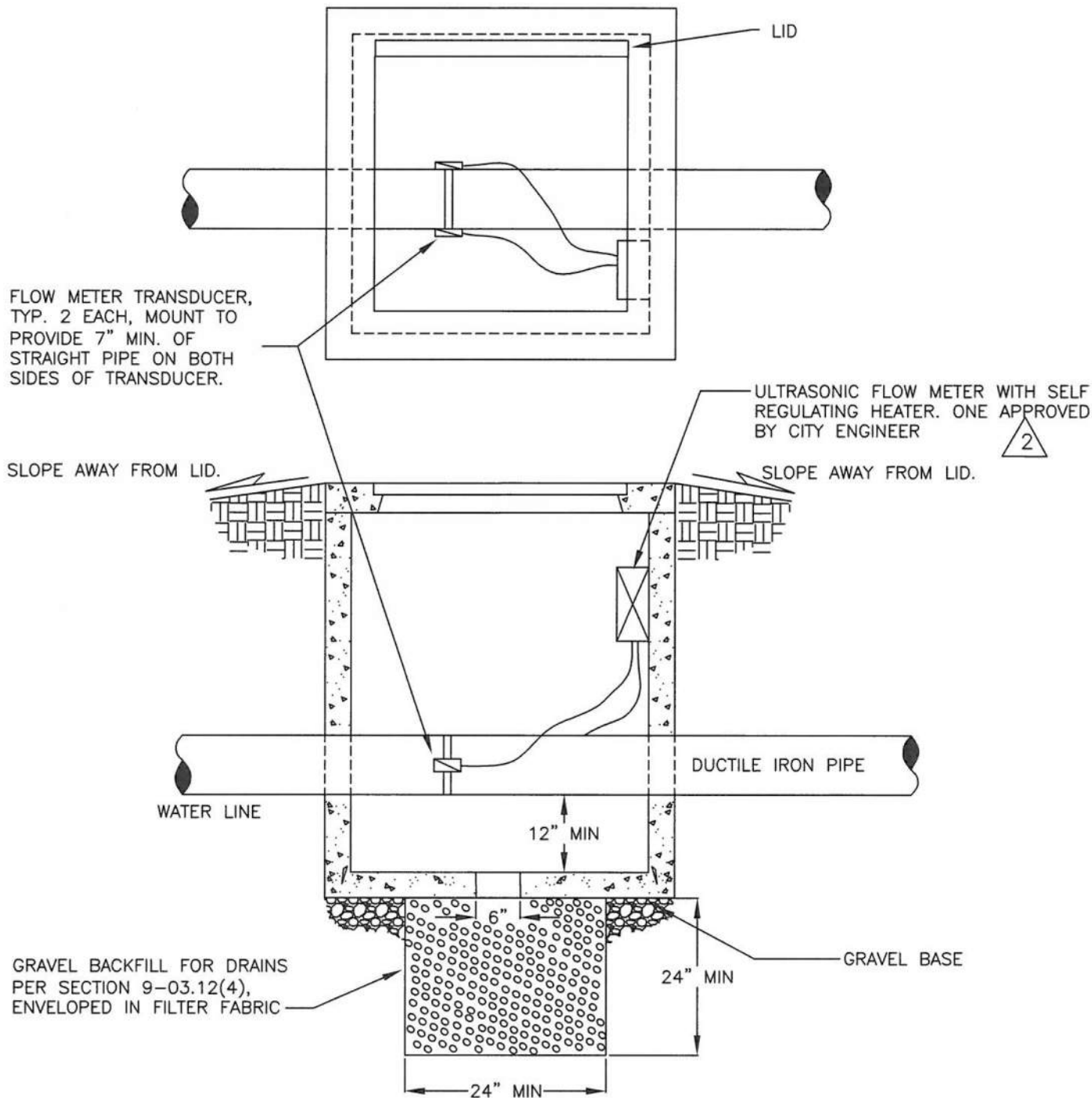
PIPE BEDDING MUST BE COMPACTED TO 95% MIN. (ASTM 698)



## DUCTILE IRON WATERLINE AND SERVICE

### NOTES:

1. TAPS TO EXISTING WATER MAINS ARE TO BE MADE BY CITY CREWS AFTER FEES ARE PAID.
2. ALL PIPE, WHEN APPROVED SHALL REQUIRE 6" BEDDING UNDER PIPE.
3. THIS STANDARD GOOD FOR DEPTHS UP TO 14 FEET. PIPES THAT EXCEED 14 FEET SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS FOR BEDDING.
4. TRENCH SHALL BE EXCAVATED TO ACCOMMODATE PIPE BELL.
5. PIPE BEDDING TO BE PER WSDOT STD. SPEC. 7.08.3(1) AND 7.08.3(3).



NOTES:

1. VAULTS TO BE FROM UTILITY VAULT CO. WITH 42"x42" INSIDE DIMENSION, AND 332P GALV. LID (DIAMOND PLATE SPRING ASSISTED COVER WITH LOCKING LATCH), DEPTH TO BE DETERMINED BY APPLICATION, OR APPROVED EQUAL.
2. PIPE IS TO BE CONTINUOUS THROUGH THE VAULT (NO JOINTS).

REV. 2  
4/20/06

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

FIRELINE METER - ULTRASONIC

APPROVED:

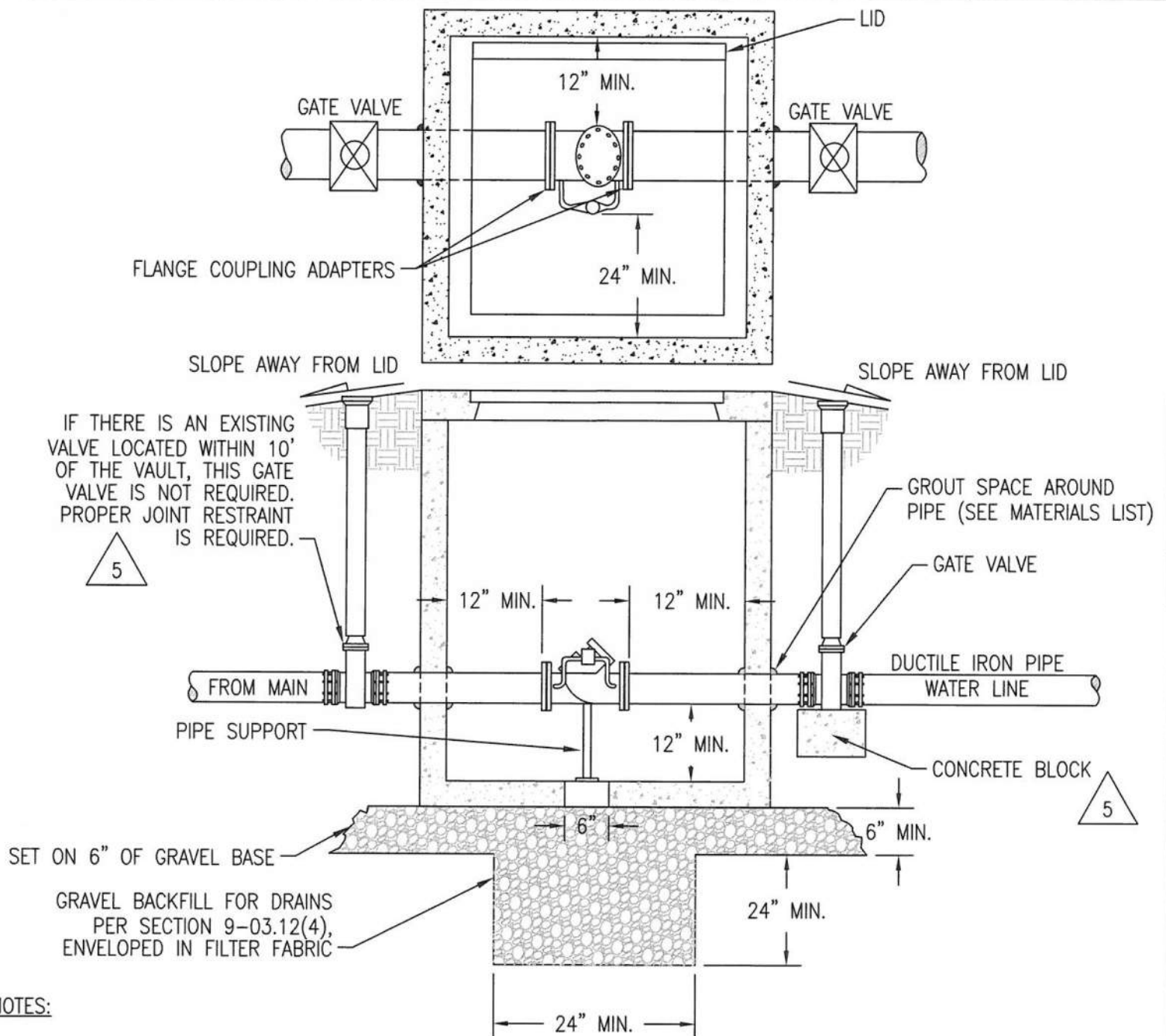
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STD. SPEC. 7-15.3

DATE:

5/15/05  
3-6-15

DWG.  
NO.  
2-31



# NOTES:

1. VAULTS ARE TO HAVE DIMENSIONS TO MEET CLEARANCES (SEE MATERIALS LIST). DEPTH TO BE DETERMINED BY APPLICATION. IF VAULT IS DEEPER THAN 4', AN ACCESS LADDER IS REQUIRED.
2. SINGLE DETECTOR CHECK VALVE ASSEMBLY WITH BYPASS METER ASSEMBLY IS WATTS SS07F AND WILL BE PURCHASED AND INSTALLED BY CITY OF PASCO CREWS AFTER ALL FEES ARE PAID.
3. SEE DWG. NO. 2-33 FOR VAULT PLACEMENT.
4. THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.
5. CONCRETE BLOCK IS REQUIRED UNDER VALVES PAST THE BACKFLOW ASSEMBLY ON ALL FIRE LINES.

REV. 5  
2/25/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

## SINGLE DETECTOR CHECK ASSEMBLY

APPROVED:

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STD. SPEC. 7-14.3

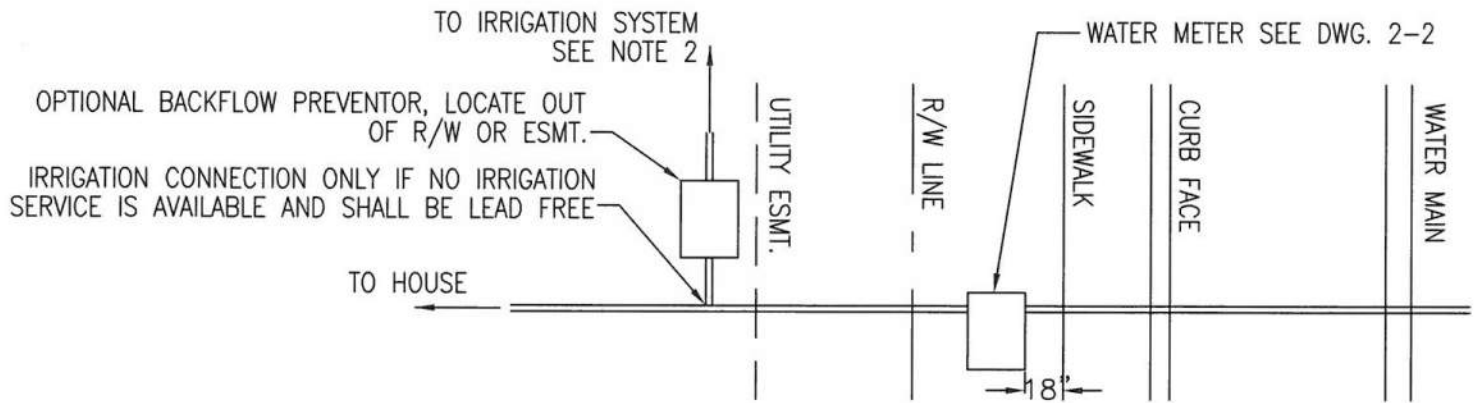
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5/15/15  
3-6-15

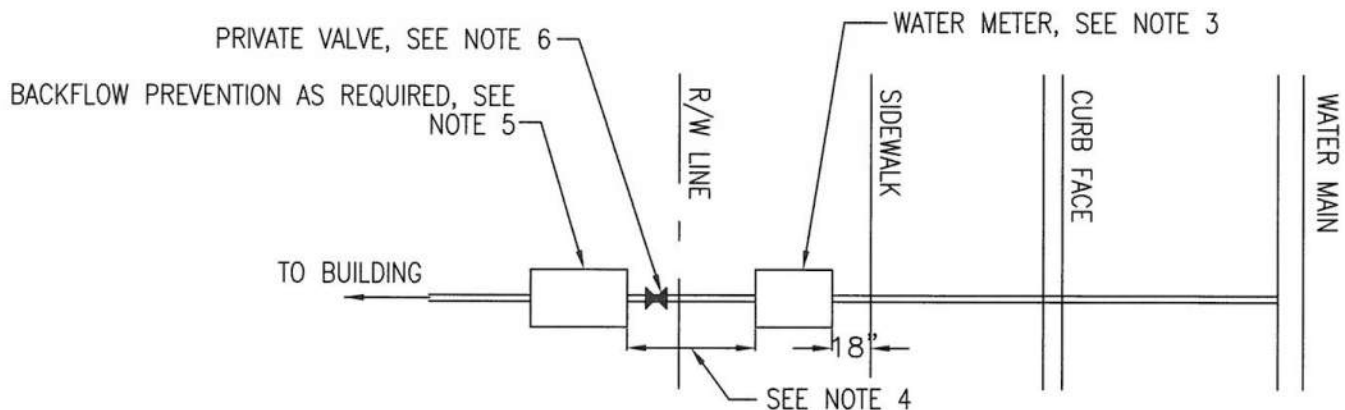
DWG.  
NO.  
2-32



# RESIDENTIAL



# COMMERCIAL

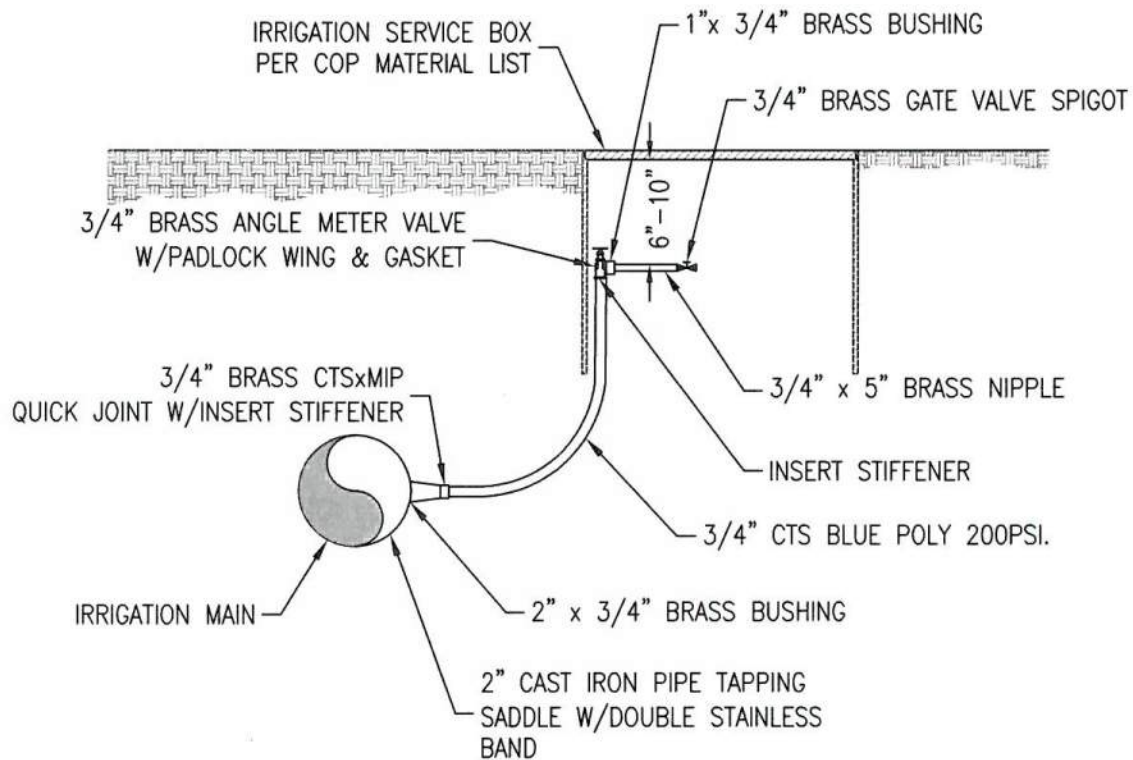


## NOTES:

- IF NO SIDEWALK EXISTS OR THERE IS INSUFFICIENT SPACE BETWEEN SIDEWALK AND RIGHT OF WAY LINE, CONTACT THE ENGINEERING DEPARTMENT FOR PLACEMENT OF WATER METERS.
- SEE DWG. NO. 5-5 IF IRRIGATION SERVICE BOX EXISTS BUT NO IRRIGATION WATER IS AVAILABLE.
- SEE DWG. NO. 2-2A, 2-3 OR 2-7 FOR WATER METER AND SERVICE DETAILS.
- BACKFLOW PREVENTION DEVICE (EDGE OF CONCRETE OR VAULT) SHALL BE LOCATED A MINIMUM OF 36" FROM THE EDGE OF THE WATER METER BOX FOR ALL SERVICES. THE ISOLATION VALVE MUST BE NO LESS THAN 24" FROM THE METER BOX.
- BACKFLOW PREVENTION SHALL BE A REDUCED PRESSURE BACKFLOW ASSEMBLY. THIS REQUIREMENT MAY BE REDUCED OR WAIVED UPON WRITTEN REQUEST TO THE CITY ENGINEER. BACKFLOW ASSEMBLY AND FITTINGS ARE TO BE LEAD FREE.
- PROPERTY OWNER RESPONSIBLE FOR ACCESS TO VALVE (VALVE BOX/CAN) AND FREEZE PROTECTION. SEE MATERIALS LIST
- THESE BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS REFLECT MINIMUM REQUIREMENTS TO COMPLY WITH WASHINGTON DEPARTMENT OF HEALTH REGULATIONS (WAC 246-290-490) AND UNIFORM PLUMBING CODE. UNAPPROVED DEVIATION MAY RESULT IN THE CITY REJECTING THE INSTALLATION AND THE CERTIFICATE OF OCCUPANCY AS WELL. ALL REQUESTS FOR DEVIATION TO THESE STANDARDS MUST BE SUBMITTED IN WRITING AND APPROVED BY THE CITY'S CROSS-CONNECTION SPECIALIST.

REV. 2  
2/25/15

PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION CITY OF PASCO, WASHINGTON	WATER SERVICE & BACK FLOW LOCATIONS		
	APPROVED:	DATE:	DWG. NO.
	<i>[Signature]</i>	5/15/15	2-34



**IRRIGATION SERVICE  
FROM IRRIGATION MAIN ONLY  
STREET SIDE**

**IRRIGATION SERVICE FROM POTABLE WATER MAIN  
MUST BE CONNECTED PER COP STD DWG NO. 2-2**

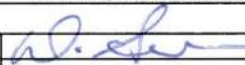
**NOTES:**

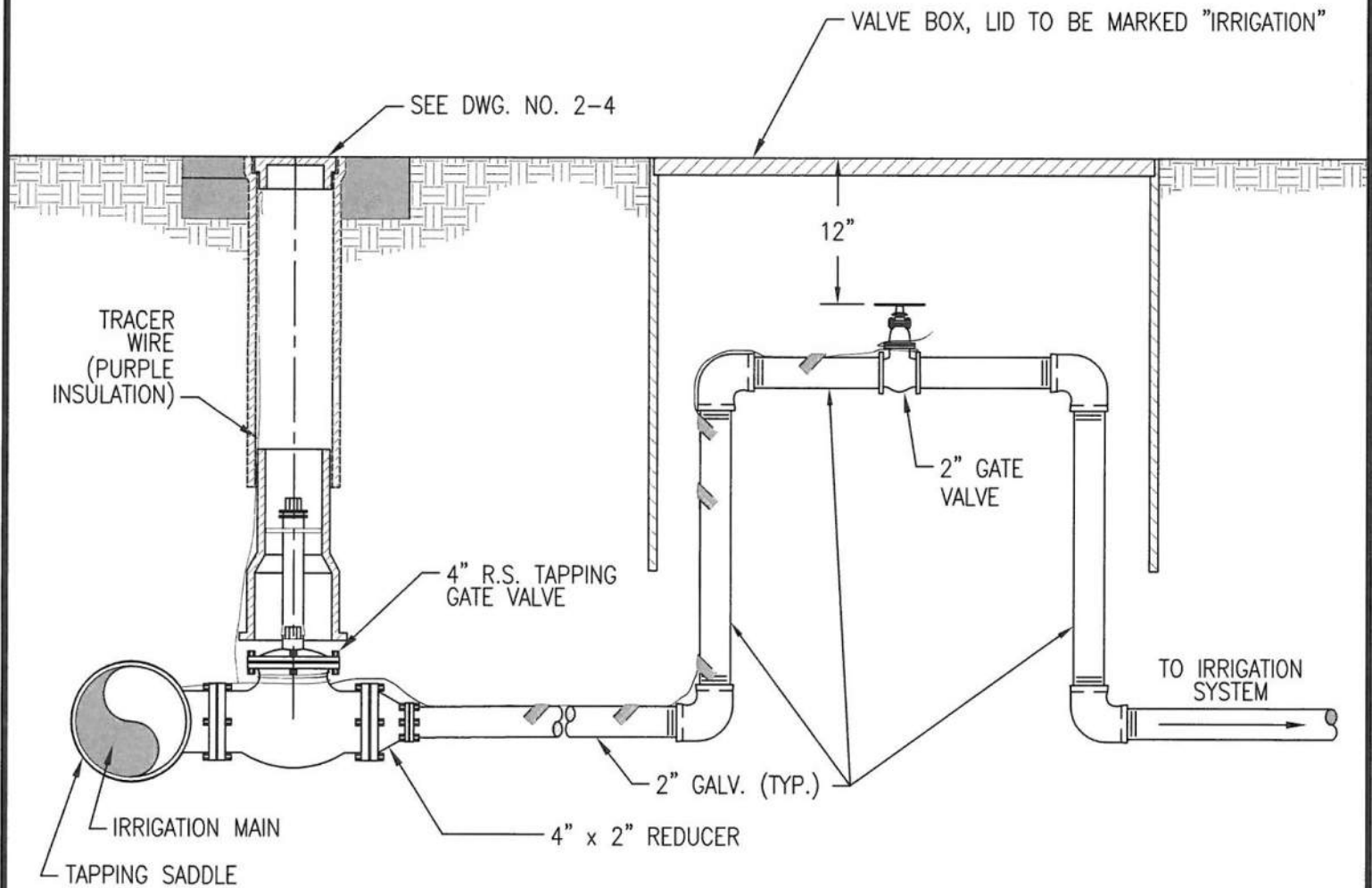
1. NO CONNECTION BETWEEN THE DRINKING SUPPLY WATER AND IRRIGATION SUPPLY IS ALLOWED.
2. FOR RESIDENTIAL CONSTRUCTION ONLY.
3. ALL THREADED CONNECTIONS MUST USE THREAD SEALANT PER COP MATERIAL LIST.
4. ALL FITTINGS PER COP MATERIAL LIST.

REV. 3  
8/19/16

**PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON**

**IRRIGATION SERVICE (FRONT YARD)**

APPROVED: 	STD. SPEC. 8-03.3(5)	DATE: 9/7/2016
		DWG. NO. 2-35



REV. 0  
10/25/12

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

CITY OWNED OR ACQUIRED IRRIGATION SERVICES

APPROVED:

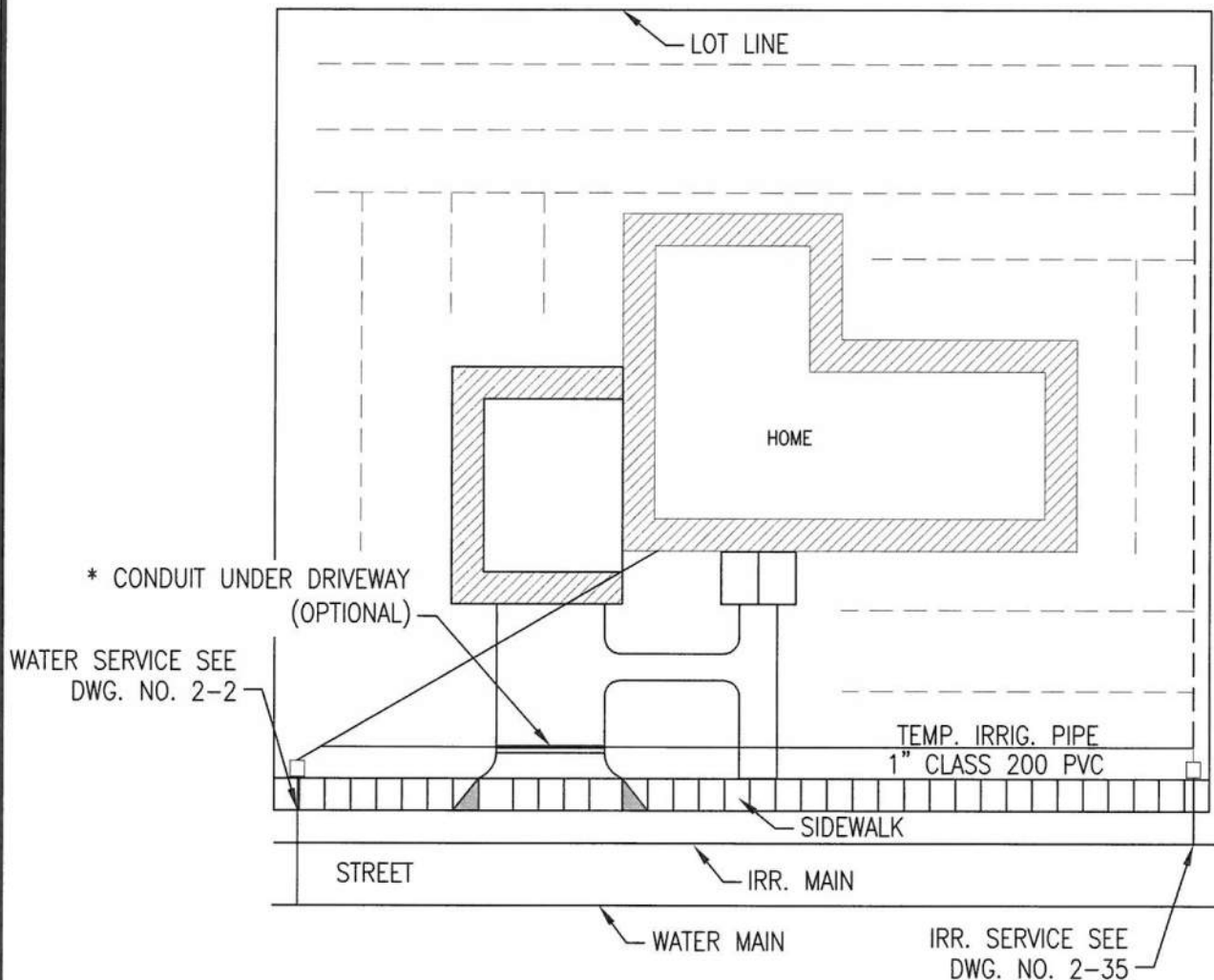
STD. SPEC. 8-03.3(5)

DATE:

5/15/15

DWG.  
NO.  
2-36





**NOTES:**

1. TEMPORARY CONNECTION REQUIRED IN ALL AREAS WHERE IRRIGATION WATER IS NOT CURRENTLY AVAILABLE. TEMPORARY CONNECTION SHALL BE DISCONNECTED WHEN IRRIGATION WATER BECOMES AVAILABLE. INSPECTION OF THE DISCONNECT MUST BE APPROVED BY THE CROSS CONNECTION SPECIALIST BEFORE CONNECTING TO THE IRRIGATION WATER.
2. INSTALLATION OF A LANDSCAPE IRRIGATION SYSTEM SUPPLIED BY CITY DRINKING WATER REQUIRES BACKFLOW PREVENTION. PLEASE CONTACT CROSS CONNECTION SPECIALIST AT 509-545-3463.



- \* CONDUIT TO BE MAX 18" DEEP AND EXTEND 6" PAST EDGE OF DRIVEWAY.

REV. 3  
2/25/15

PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
CITY OF PASCO, WASHINGTON

**TEMPORARY IRRIGATION SERVICE WITH BACKFLOW**

APPROVED:

*[Signature]*  
*[Signature]*

STD. SPEC. 8-03

DATE:

5/15/15  
3-6-15

DWG.  
NO.  
2-37

## **7-09 WATER MAINS**

### **7-09.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-09.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

*(January 1, 2012 COP GSP)*

Supplement Section 7-09.2 with the following:

PVC pipelines under streets or roadways shall be Class 150 AWWA C-900/905 pipe with ductile iron fittings. All other pipelines shall be either class 200 PVC or galvanized where shown on the irrigation details.

Fittings for pipelines 4-inch and larger, shall be cast or ductile iron.

### **7-09.3(5) Grade and Alignment**

*(January 1, 2012 COP GSP)*

Supplement Section 7-09.3(5) with the following:

Water mains shall be laid above sanitary sewers and side sewers to provide a vertical separation of at least 18 inches between the invert of the water main and the crown of the sewer. Water mains shall not be laid in a manner that violates the minimum separation or below sanitary sewers and side sewers without the approval of the Engineer.

*(January 1, 2012 COP GSP)*

Revise the first sentence of the third paragraph of Section 7-09.3(5) to read:

The depth of trenching for water mains shall be such as to give a minimum cover of 42 inches over the top of the pipe unless otherwise specified in the Special Provisions.

### **7-09.3(9) Bedding the Pipe**

*(January 1, 2012 COP GSP)*

Revise Section 7-09.3(9) to read:

Gravel backfill for pipe zone bedding and pipe zone backfill shall be select granular material free from wood waste, organic material, and other extraneous or objectionable material in accordance with 9-03.12(3). Gravel backfill for pipe zone bedding shall be placed to the depths shown in the Standard Plans. Gravel backfill for pipe zone bedding shall be rammed and tamped around the pipe to 95-percent of maximum density by

approved hand-held tools, so as to provide firm and uniform support for the full length of the pipe, valves, and fittings. Care shall be taken to prevent any damage to the pipe or its protective coating.

**7-09.3(11) Compaction of Backfill**

*(January 1, 2010 COP GSP)*

Revise Section 7-09.3(11) to read:

At locations where paved streets, Roadway Shoulders, driveways, or sidewalks will be constructed or reconstructed over the trench, the backfill shall be spread in layers and be compacted by mechanical tampers. In such cases, the backfill material shall be placed in successive layers not exceeding 6-inches in loose thickness unless with written approval from the Engineer, and each layer shall be compacted with mechanical tampers to the density specified herein. Mechanical tampers shall be of the impact type as approved by the Engineer.

**7-09.3(15)A Ductile Iron Pipe**

*(January 1, 2012 COP GSP)*

Revise the first paragraph of Section 7-09.3(15)A to read:

Long radius curves, either horizontal or vertical, may be laid with standard pipe lengths by deflecting the joints. If the pipe is shown curved on the Plans and no special fittings are shown, the Contractor can assume that the curves can be made by deflecting the joints with standard lengths of pipe. If shorter lengths are required, the Plans will indicate maximum lengths that can be used. The amount of deflection at each pipe joint when pipe is laid on a horizontal or vertical curve shall not exceed one-half (1/2) of the manufacturer's printed recommended deflections.

**7-09.3(19)A Connections to Existing Mains**

*(January 1, 2012 COP GSP)*

Delete the third paragraph of Section 7-09.3(19)A in its entirety.

*(January 1, 2012 COP GSP)*

Supplement Section 7-09.3(19)A with the following:

Requests for water line shut downs and water taps shall utilize the City of Pasco Procedure for Scheduling Water Crews, Performing Taps, and Placing New Water Lines in Service. Connection to existing water mains will not be permitted until all required bacteriological and pressure testing has been successfully completed.

*(January 1, 2010 COP GSP)*

Revise the title of Section 7-09.3(20) to read:

**7-09.3(20) Detectable Marking Tape And Tracer Wire**

*(January 1, 2012 COP GSP)*

Revise Section 7-09.3(20) to read:

Detectable marking tape and tracer wire shall be installed over all water lines, including service lines. The tape shall be placed approximately 2-feet above the top of the line and shall extend its full length. The tracer wire shall be fastened to the top of the pipe with duct tape at 6-foot intervals and shall be routed up into valve boxes with adequate length for connection to location equipment. Wire splice kits shall be per the City of Pasco materials list.

**7-09.3(21) Concrete Thrust Blocking**

*(November 20, 2006 COP GSP)*

Supplement Section 7-09.3(21) with the following:

Thrust blocks shall be formed and placed in conformance to the City of Pasco Construction Standards for the appropriate pipe size and fitting type.

**7-09.3(22) Blowoff Assemblies**

*(December 23, 2014 COP GSP)*

Supplement Section 7-09.3(22) with the following:

All dead end lines must end with a blowoff, regardless if there is a hydrant.

**7-09.3(23) Hydrostatic Pressure Test**

*(January 1, 2010 COP GSP)*

Revise Section 7-09.3(23) to read:

Water main appurtenances and service connections to the meter setter shall be tested in sections of convenient length under a hydrostatic pressure equal to 150-psi. Pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor.

Sections to be tested shall normally be limited to 1,500-feet. The Engineer may require that the first section of pipe, not less than 1,000-feet in length, installed by each of the Contractor's crews, be tested in order to qualify the crew and the materials. Pipe laying shall not be continued more than an additional 1,000-feet until the first section has been tested successfully.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. Thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

The mains shall be filled with water and allowed to stand under pressure a sufficient length of time to allow the escape of air and allow the lining of the pipe to absorb water. The Contracting Agency will furnish the water necessary to fill the pipelines for testing purposes at a time of day when sufficient quantities of water are available for normal system operation.

The test shall be accomplished by pumping the main up to the required pressure and stopping the pump and holding pressure for 1 hour. During the test, the section being tested shall be observed to detect any visible leakage.

There shall not be an appreciable or abrupt loss in pressure during the one hour test period.

Pressure gauges used in the test shall be accompanied with certifications of accuracy from a testing Laboratory approved by the Engineer.

Any visible leakage detected shall be corrected by the Contractor. Should the tested section fail to meet the pressure test successfully as specified, the Contractor shall, at no additional expense to the Contracting Agency, locate and repair the defects and then retest the pipeline.

Tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Each valve shall be tested by closing each in turn and relieving the pressure beyond. This test of the valve will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The Contractor shall verify that the pressure differential across the valve does not exceed the rated working pressure of the valve.

Prior to calling out the Engineer to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to ensure that the pipe is in satisfactory condition.

Defective materials or workmanship, discovered as a result of hydrostatic field test, shall be replaced by the Contractor at no additional expense to the Contracting Agency. Whenever it is necessary to replace defective material or correct the workmanship, the hydrostatic test shall be re-run at the Contractor's expense until a satisfactory test is obtained.

**7-09.3(24)J Preventing Reverse Flow**  
(December 23, 2014 COP GSP)

Supplement Section 7-09.3(24)J with the following:

All water lines shall be pressure tested and sanitized with a satisfactory report received from the State Health Department prior to the backflow assembly installation. Backflow preventers shall NOT be pressure tested against.

**7-09.3(24)K Retention Period**  
(January 1, 2012 COP GSP)

Revise Section 7-09.3(24)K to read:

Treated water shall be retained in the pipe at least 24 hours but not more than 28 hours. After the 24-hour period, the chlorine residual at pipe extremities and at other representative points shall be at least 25 mg/l.

**7-09.4 Measurement**  
(January 1, 2012 COP GSP)

Supplement Section 7-09.4 with the following:

All pipe fittings shall be measured by size and type.

**7-09.5 Payment**  
(January 1, 2010 COP GSP)

Supplement the third paragraph of Section 7-09.5 with the following:

Payment shall also include detectable marking tape, locator wire, and restrained joints, and connection to existing pipelines.

**7-12 VALVES FOR WATER MAINS**

**7-12.2 Materials**  
(January 1, 2010 COP GSP)

Supplement Section 7-12.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

### **7-12.3 Construction Requirements**

*(April 10, 2006 COP GSP)*

Supplement Section 7-12.3 with the following:

Valves shall not be installed in Sidewalks, Pedestrian Curb Ramps, Driveway Approaches or any other exposed concrete surface.

## **7-14 HYDRANTS**

### **7-14.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-14.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

## **7-15 SERVICE CONNECTIONS**

### **7-15.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-15.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

### **7-15.3 Construction Requirements**

*(January 1, 2012 COP GSP)*

Supplement Section 7-15.3 with the following:

No joints are allowed between the corporation stop and the angle meter stop.

## **7-17 SANITARY SEWERS**

### **7-17.2 Materials**

*(January 1, 2010 COP GSP)*

Supplement Section 7-17.2 with the following:

Materials shall meet the requirements of the City of Pasco Materials List.

### **7-17.3 Construction Requirements**

*(December 23, 2014 COP GSP)*

Supplement Section 7-17.3 with the following:





## Appendix 6-A

### City of Pasco's Comprehensive Master Plan Update

#### Hydraulic Model Update and Calibration

The City's hydraulic model is a comprehensive representation of the water system piping and associated infrastructure. The model was developed in WaterCAD V8i (Bentley). The updating process included a validation of the system infrastructure: storage, PRV, and pump station information. System information was updated using the City's inventory and computer-aided design (CAD) drawings. The pipe network was updated to include new developments and recent improvements.

The updated model includes 326 miles of pipe, 3 storage tanks, 4 pump stations, 18 PRVs, and two water treatment plants (WTP). It allows the user the flexibility of representing different steady state operating conditions.

Existing system demands were updated based on production records while keeping the distribution from the 2007 model update effort, as explained in **Section 3 – Population and Water Demand**.

#### Calibration Results

Once the model was updated, simulation results were compared with actual data from field measurements to see how well the model reproduced real world conditions. Static pressure was measured at thirteen hydrant locations, with fire flow tests performed at seven of those locations. The testing locations were selected in order to measure strategic points in each zone. **Figure 6-A-1** shows the location of the field tests.

SCADA records were used to determine tank elevations and pump status during the field tests. In order to calibrate the model, pressure control settings and friction factors were modified when possible in an iterative process. The calibrated model predicted static pressures throughout the system with an average error of 5 percent (less than 4 psi). The residual pressure (pressure reading while simulating a fire flow) was predicted with an average error of 10 percent (less than 6 psi).

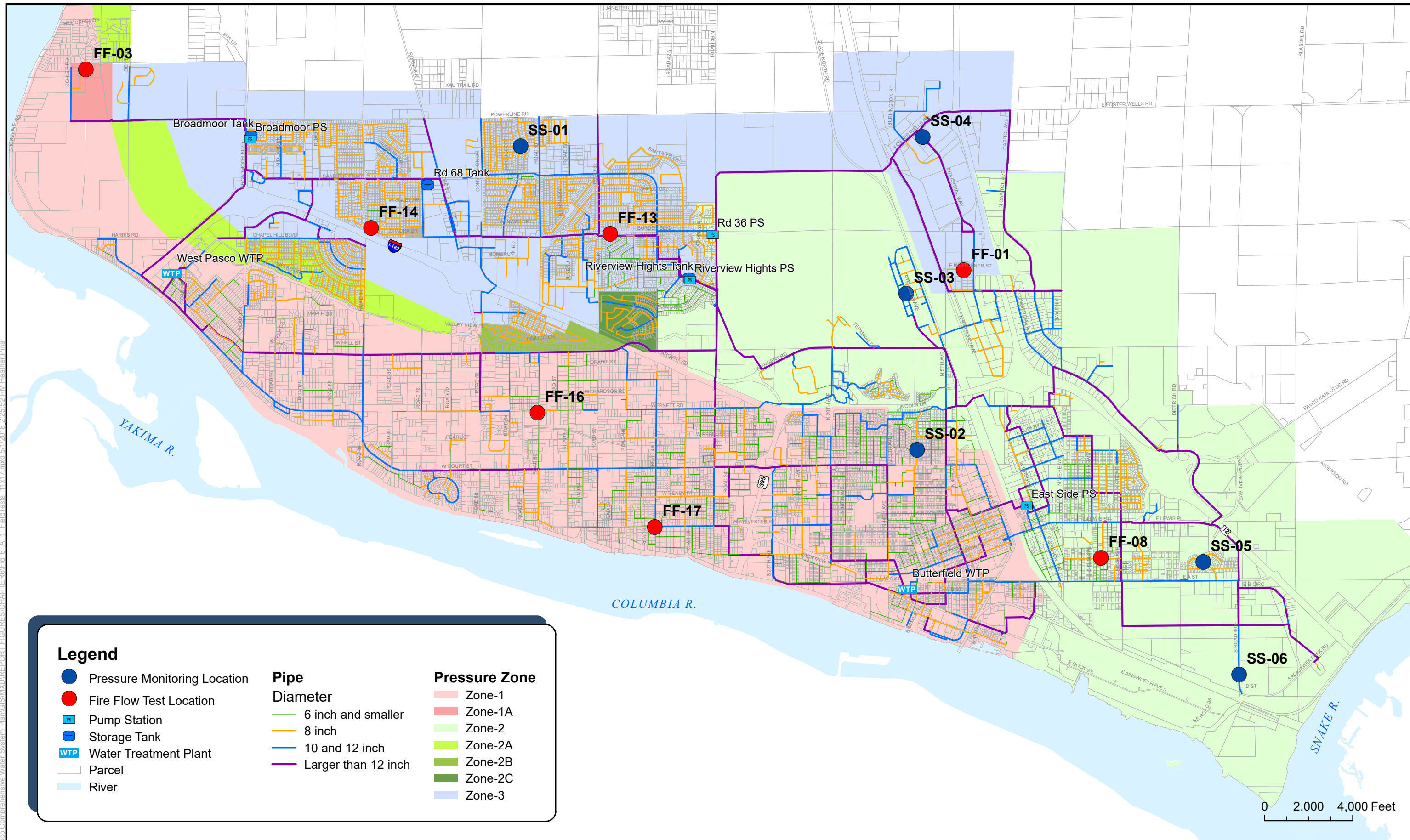
**Table 6-A-1** shows a summary of calibration results. Overall the model predicted static pressures within an acceptable level of accuracy for all pressure zones. In general, the results were consistent for Zones 1 and 3. The model results at the fire flow test performed in Zone 2 show the lowest level of accuracy with an absolute error of 13psi. Based on this, it is recommended that the City conduct additional hydrant testing in the future to help improve the overall accuracy of the model.

A challenge for obtaining a high degree of agreement between the model and field data during fire flow tests FF-03, FF-08, FF-16, and FF-17 involved the level of confidence on pipe diameter information. There are discrepancies between the City's CAD drawing

inventory and the 2007 hydraulic model.

Even though the City investigated the pipe size around field testing locations, the lack of overall confidence in the diameter information throughout the system, makes it difficult to have a high level of confidence in the calibration. It is recommended that the City invest in developing a comprehensive geographic information system (GIS) water layer. Through the data building effort a comprehensive validation of pipe diameters is recommended. The model and GIS could then be maintained in a coordinated manner to ensure the future installation of piping is inventoried consistently.

J:\BOL Projects\151710\_Pasco Comprehensive Water System Plan\GIS\MXD\REPORT FIGURES\CHAPTER6\Fig 6-A-1\_FieldTests\_11x17.mxd 5/1/2018 2:25:52 PM Heather Ping



Comprehensive Water System Plan Update  
City of Pasco



Figure 6-A-1  
Field Test Locations  
and Pressure Zones

**Table 6-A-1**  
**Model Calibration Results – Static and Residual Pressure**

Field Data					Model Results		Error				Comments
Test <sup>1</sup>	Pressure Zone	Static Pressure (psi)	Fire Flow (gpm)	Residual Pressure (psi)	Static Pressure (psi)	Residual Pressure (psi)	Static pressure		Residual Pressure		
							%	Absolute Error (psi)	%	Absolute Error (psi)	
FF-01	Zone 3	95	1,050	70	92	73	3%	3.3	-4%	3	Assumed one unit working at Road 36 PS
FF-03	Zone 3 <sup>2</sup>	60	700	45	53	45	12%	7	0%	0	Assumed main PRV opens during a fire flow event (8-in @ 45psi)
FF-08	Zone 2	78	920	50	72	63	8%	6.2	-26%	13	
FF-13	Zone 3	66	750	60	63	59	4%	2.7	2%	1.2	
FF-14	Zone 3	78	1050	75	72	70	8%	6	7%	5.1	
FF-16	Zone 1	66	700	50	63	58	5%	3.5	-16%	8	Pipe diameter uncertainties around this location
FF-17	Zone 1	65	1000	60	70	68	-8%	5.1	-14%	8.1	
SS-01	Zone 3	61			62.7		-3%	1.7			
SS-02	Zone 1	54			54.5		-1%	0.5			Assumed one unit on at Butterfield WTP
SS-03	Zone 2	78			76.1		2%	1.9			
SS-04	Zone 3	98			96.7		1%	1.3			Assume two units on at Road 36 PS
SS-05	Zone 2	71			65.2		8%	5.8			
SS-06	Zone 2	74			70.7		4%	3.3			
System-side Average Error <sup>3</sup>							5%	3.7	10%	5.5	

Notes:

<sup>1</sup> Test Id starting with FF indicates fire flow test location. SS denotes locations with a static pressure reading only.

<sup>2</sup> This portion of the system outside of City Limits, supplied from Zone 3 via PRVs.

<sup>3</sup> Average error calculated using absolute values.



**Appendix 6-B**  
**City of Pasco's Comprehensive Water Master Plan**  
**Storage and Pumping Capacity Analysis Results**

**Table 6-B-1**  
**2015 Storage Capacity Evaluation Results**

Reservoir Storage Area	Pressure Zone	Average Day Demand	Maximum Day Demand	Peak Hour Demand	Fire Flow Requirement		Source of Supply	Total Supply Capacity	Zone Firm Supply Capacity <sup>1</sup>	ERUs <sup>2</sup>	200gal*ERU	2days(ADD- Firm Supply Capacity)	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage	Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus (+)/ Deficiency (-)
		(gpm)	(gpm)	(gpm)	(gpm)	(hr)		(gpm)	(gpm)	gpdpd	MG	MG	(MG)	(MG)	(MG)	(MG)	(MG)	(MG)	(MG)
Broadmoor Tank	Zone-1	2,520	5,946	7,755	5,750	4	Butterfield WTP	23,500										1.0	
Riverview Heights Tank							West Pasco WTP	4,200										10.0	
<b>Zone 1</b>		<b>2,520</b>	<b>5,946</b>	<b>7,755</b>	<b>5,750</b>	<b>4</b>		27,700	21,200	8,560	1.71	0	2.03	0	1.38	1.71	5.12	11.00	5.88
	Zone-2	2,651	4,843	5,981	6,000	4	Eastside PS	7,555										-	
							PRVs (3 stations)	6,861											
<b>Zone 2</b>		<b>2,651</b>	<b>4,843</b>	<b>5,981</b>	<b>6,000</b>	<b>4</b>		14,416	12,416	9,002	1.80	0	0.49	0	1.44	1.80	3.73	-	-3.73
Road 68 Tank	Zone-3	3,664	7,788	9,904	6,000	4	Broadmoor PS	5,040										2.5	
	Zone-1- A	72	153	195			Riverview Heights PS	8,150											
	Zone-2- A	133	335	438			Road 36 PS	6,000											
	Zone-2- B	35	87	115															
	Zone-2- C	241	607	795															
<b>Zone 3</b>		<b>3,766</b>	<b>7,793</b>	<b>9,937</b>	<b>6,000</b>	<b>4</b>		19,190	11,040	12,789	2.56	0	0.60	0	1.44	2.56	4.60	2.50	-2.10
<b>Total Storage Deficiency</b>																			<b>-5.82</b>

Notes:  
<sup>1</sup> Firm capacity: total capacity assuming the largest pumping unit out-of-service.  
<sup>2</sup> ERU=Equivalent Residential Unit, 424gallons per dwelling per day.

Table 6-B-2  
2022 Storage Capacity Evaluation Results – Alternative A: New Industrial User in Zone 3

Reservoir Storage Area	Pressure Zone	ADD	MDD	PHD	Fire Flow Required	Source of Supply	Total Supply Capacity	Zone Firm Supply Capacity <sup>1</sup>	ERUs <sup>2</sup>	200gal *ERU	2days ADD-Firm Supply Capacity)	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage	Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus (+)/ Deficiency (-)
		gpm	gpm	gpm	gpm		gpm	gpm	gdpdp	MG	MG	MG	MG	MG	MG	MG	MG	MG
Broadmoor Tank	Zone-1	2,663	6,587	8,601	5,750	Butterfield WTP	23,500										1.0	
Riverview Heights Tank					4hrs	West Pasco WTP	4,200										10.0	
Zone 1		2,663	6,587	8,601	5,750		27,700	21,200	9,046	1.81	0	2.03	0	1.38	1.81	5.22	11.00	5.78
No existing tank	Zone-2	2,698	5,232	6,532	6,000	Eastside PS	3,555										-	
					4hrs	PRVs (3 stations)	6,861											
Zone 2		2,698	5,232	6,532	6,000		10,416	6,861	9,163	1.83	0	0.49	0	1.44	1.83	3.76	-	-3.76
Road 68 Tank	Zone-3	4,344	8,468	10,585	6,000	Broadmoor PS	5,040										2.5	
	Zone-1-A	85	167	208	4hrs	Riverview Heights PS	8,150											
	Zone-2-A	133	335	438		Road 36 PS	6,000											
	Zone-2-B	35	87	115														
	Zone-2-C	241	607	795														
Zone 3		4,838	9,664	12,141	6,000		19,190	11,040	16,431	3.29	0	0.71	0	1.44	3.29	5.44	2.50	-2.94
Total Storage Deficiency																		-6.70

Notes:  
<sup>1</sup> Firm capacity: total capacity assuming the largest pumping unit out-of-service.  
<sup>2</sup> ERU=Equivalent Residential Unit, 424gallons per dwelling per day.

Table 6-B-3  
2022 Storage Capacity Evaluation Results – Alternative B: New Industrial Users in Zone 2

Reservoir Storage Area	Pressure Zone	ADD	MDD	PHD	Fire Flow Requirement	Source of Supply	Total Supply Capacity	Zone Firm Supply Capacity <sup>1</sup>	ERUs <sup>2</sup>	200gal *ERU	2days (ADD-Firm Supply Capacity)	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage	Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus (+)/ Deficiency (-)
		gpm	gpm	gpm	gpm		gpm	gpm	gpdpd	MG	MG	MG	MG	MG	MG	MG	MG	MG
Broadmoor Tank	Zone-1	2,663	6,587	8,601	5,750	Butterfield WTP	23,500										1.0	
Riverview Heights Tank					4hrs	West Pasco WTP	4,200										10.0	
Zone 1		2,663	6,587	8,601	5,750		27,700	21,200	9,046	1.81	0	2.03	0	1.38	1.81	5.22	11.00	5.78
	Zone-2	3,392	5,926	7,226	6,000	Eastside PS	3,555										-	
					4hrs	PRVs (3 stations)	6,861											
Zone 2		3,392	5,926	7,226	6,000		10,416	6,861	11,520	2.30	0	0.56	0	1.44	2.30	4.31	-	-4.31
Road 68 Tank	Zone-3	3,664	7,788	9,904	6,000	Broadmoor PS	5,040										2.5	
	Zone-1-A	72	153	195		Riverview Heights PS	8,150											
	Zone-2-A	133	335	438	4hrs	Road 36 PS	6,000											
	Zone-2-B	35	87	115														
	Zone-2-C	241	607	795														
Zone 3		4,144	8,970	11,447	6,000		19,190	11,040	14,074	2.81	0	0.64	0	1.44	2.81	4.89	2.50	-2.39
Total Storage Deficiency																		-6.70

Notes:  
<sup>1</sup> Firm capacity: total capacity assuming the largest pumping unit out-of-service.  
<sup>2</sup> ERU=Equivalent Residential Unit, 424gallons per dwelling per day.



Table 6-B-2B  
2027 Storage Capacity Evaluation Results – Alternative A: New Industrial User in Zone 3

Reservoir Storage Area	Pressure Zone	ADD	MDD	PHD	Fire Flow Required	Source of Supply	Total Supply Capacity	Zone Firm Supply Capacity <sup>1</sup>	ERUs <sup>2</sup>	200gal *ERU	2days ADD-Firm Supply Capacity)	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage	Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus (+)/ Deficiency (-)
		gpm	gpm	gpm	gpm		gpm	gpm	gpdpd	MG	MG	MG	MG	MG	MG	MG	MG	MG
Broadmoor Tank	Zone-1	3,027	7,487	9,776	5,750	Butterfield WTP	23,500										1.0	
Riverview Heights Tank					4hrs	West Pasco WTP	4,200										10.0	
Zone 1		3,027	7,487	9,776	5,750		27,700	21,200	10,282	2.06	0	2.03	0	1.38	2.06	5.46	11.00	5.54
No existing tank	Zone-2	3,067	5,947	7,425	6,000	Eastside PS	3,555										-	
					4hrs	PRVs (3 stations)	6,861											
Zone 2		3,067	5,947	7,425	6,000		10,416	6,861	10,416	2.08	0	0.53	0	1.44	2.08	4.05	-	-4.05
Road 68 Tank	Zone-3	5,525	10,213	12,619	6,000	Broadmoor PS	5,040										2.5	
	Zone-1-A	109	201	248	4hrs	Riverview Heights PS	8,150											
	Zone-2-A	151	381	498		Road 36 PS	6,000											
	Zone-2-B	39	99	130														
	Zone-2-C	274	690	904														
Zone 3		6,098	11,584	14,399	6,000		19,190	11,040	20,712	4.14	0	0.84	0	1.44	4.14	6.42	2.50	-3.92
Total Storage Deficiency																		-7.97

Notes:  
<sup>1</sup> Firm capacity: total capacity assuming the largest pumping unit out-of-service.  
<sup>2</sup> ERU=Equivalent Residential Unit, 424gallons per dwelling per day.

Table 6-B-3B  
2027 Storage Capacity Evaluation Results – Alternative B: New Industrial Users in Zone 2

Reservoir Storage Area	Pressure Zone	ADD	MDD	PHD	Fire Flow Requirement	Source of Supply	Total Supply Capacity	Zone Firm Supply Capacity <sup>1</sup>	ERUs <sup>2</sup>	200gal *ERU	2days (ADD-Firm Supply Capacity)	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage	Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus (+)/ Deficiency (-)
		gpm	gpm	gpm	gpm		gpm	gpm	gpdpd	MG	MG	MG	MG	MG	MG	MG	MG	MG
Broadmoor Tank	Zone-1	3,027	7,487	9,776	5,750	Butterfield WTP	23,500										1.0	
Riverview Heights Tank					4hrs	West Pasco WTP	4,200										10.0	
Zone 1		3,027	7,487	9,776	5,750		27,700	21,200	10,282	2.06	0	2.03	0	1.38	2.06	5.46	11.00	5.54
	Zone-2	4,455	7,335	8,813	6,000	Eastside PS	3,555										-	
					4hrs	PRVs (3 stations)	6,861											
Zone 2		4,455	7,335	8,813	6,000		10,416	6,861	15,129	3.03	0	0.67	0	1.44	3.03	5.14	-	-5.14
Road 68 Tank	Zone-3	4,165	8,852	11,257	6,000	Broadmoor PS	5,040										2.5	
	Zone-1-A	82	174	221		Riverview Heights PS	8,150											
	Zone-2-A	151	381	498	4hrs	Road 36 PS	6,000											
	Zone-2-B	39	99	130														
	Zone-2-C	274	690	904														
Zone 3		4,710	10,196	13,011	6,000		19,190	11,040	15,998	3.20	0	0.70	0	1.44	3.20	5.34	2.50	-2.84
Total Storage Deficiency																		-7.97

Notes:  
<sup>1</sup> Firm capacity: total capacity assuming the largest pumping unit out-of-service.  
<sup>2</sup> ERU=Equivalent Residential Unit, 424gallons per dwelling per day.

Table 6-B-4  
2036 Storage Capacity Evaluation Results – Alternative A: New Industrial User in Zone 3

Reservoir Storage Area	Pressure Zone	ADD	MDD	PHD	Fire Flow Requirement	Source of Supply	Total Supply Capacity	Zone Firm Supply Capacity <sup>1</sup>	ERUs <sup>2</sup>	200gal* ERU	2 days (ADD-Firm Supply Capacity)	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage	Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus (+)/ Deficiency (-)
		gpm	gpm	gpm	gpm		gpm	gpm	gpdpd	MG	MG	MG	MG	MG	MG	MG	MG	MG
Broadmoor Tank	Zone-1	3,089	8,020	10,576	5,750	Butterfield WTP	23,500										1.0	
Riverview Heights Tank					4hrs	West Pasco WTP	4,200										10.0	
Zone 1		3,089	8,020	10,576	5,750		27,700	21,200	10,491	2.10	0	2.03	0	1.38	2.10	6.91	11.00	4.09
No existing tank	Zone-2	2,980	6,175	7,832	6,000	Eastside PS	3,555										-	
					4hrs	PRVs (3 stations)	6,861											
Zone 2		2,980	6,175	7,832	6,000		10,416	6,861	10,120	2.02	0	0.52	0	1.44	2.02	3.98	-	(3.98)
Road 68 Tank	Zone 3	6,969	13,381	16,704	6,000	Broadmoor PS	5,040										2.5	
	Zone 1-A	137	263	329														
	Zone 2-A	166	439	581	4hrs	Riverview Heights PS	8,150											
	Zone 2-B	42	110	145		Road 36 PS	6,000											
	Zone 2-C	253	667	882														
Zone 3		7,567	14,860	18,641	6,000		19,190	11,040	25,698	5.14	0	0.99	0	1.44	5.14	7.57	2.50	(5.07)
Total Storage Deficiency																		(9.05)

Notes  
<sup>1</sup> Firm capacity: total capacity assuming the largest pumping unit out-of-service.  
<sup>2</sup> ERU=Equivalent Residential Unit, 424gallons per dwelling per day.

Table 6-B-5  
2036 Storage Capacity Evaluation Results – Alternative B: New Industrial Users in Zone 2

Reservoir Storage Area	Pressure Zone	ADD	MDD	PHD	Fire Flow Requirement	Source of Supply	Total Supply Capacity	Zone Firm Supply Capacity <sup>1</sup>	ERUs <sup>2</sup>	200gal* ERU	2days (ADD-Firm Supply Capacity)	Operational Storage	Equalizing Storage	Fire Flow Storage	Standby Storage	Total Minimum Recommended Storage	Existing Reservoir Capacity	Storage Surplus (+)/ Deficiency (-)
		gpm	gpm	gpm	gpm		gpm	gpm	gpdpd	MG	MG	MG	MG	MG	MG	MG	MG	MG
Broadmoor Tank	Zone-1	3,089	8,020	10,576	5,750	Butterfield WTP	23,500										1.0	
Riverview Heights Tank						West Pasco WTP	4,200										10.0	
Zone 1		3,089	8,020	10,576	5,750		27,700	21,200	10,491	2.10	0	2.03	0	1.38	2.10	6.91	11.00	4.09
	Zone-2	5,131	8,327	9,983	6,000	Eastside PS	3,555										-	
						PRVs (3 stations)	6,861											
Zone 2		5,131	8,327	9,983	6,000		10,416	6,861	17,426	3.49	0	0.74	0	1.44	3.49	5.66	-	(5.66)
Road 68 Tank	Zone-3	4,860	11,273	14,596	6,000	Broadmoor PS	5,040										2.5	
	Zone-1-A	96	222	287														
	Zone-2-A	166	439	581		Riverview Heights PS	8,150											
	Zone-2-B	42	110	145		Road 36 PS	6,000											
	Zone-2-C	253	667	882														
Zone 3		5,417	12,710	16,491	6,000		19,190	11,040	18,396	3.68	0	0.77	0	1.44	3.68	5.89	2.50	(3.39)
Total Storage Deficiency																		(9.05)

Notes:  
<sup>1</sup> Firm capacity: total capacity assuming the largest pumping unit out-of-service.  
<sup>2</sup> ERU=Equivalent Residential Unit, 424gallons per dwelling per day.

**Table 6-B-6**  
**2015 Pump Station Capacity Evaluation Results – Zone 3 (Open System)**

<b>Supply to Zone 3 (Reservoirs Broadmoor and Riverview Heights)</b>						<b>Criterion 1</b>		<b>Criterion 2</b>	
						Pump station total capacity must be equal or larger than MDD for the pressure zone or system		Pump station firm capacity must be equal or larger than ADD for the pressure zone or system	
<b>Source of Supply</b>	<b>Total Supply Capacity</b>	<b>Firm Capacity</b>	<b>Pressure Zone</b>	<b>ADD</b>	<b>MDD</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>
	<b>gpm</b>	<b>gpm</b>		<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>
Broadmoor PS	5,040		Zone 3 <sup>2</sup>	3,664	7,788				
Riverview Heights PS	8,150		Zone 1-A	72	153				
Road 36 PS	6,000		Zone 2-A	133	335				
			Zone 2-B	35	87				
			Zone 2-C	241	607				
	<b>19,190</b>	<b>16,190</b>		<b>3,766</b>	<b>7,793</b>	<b>7,793</b>	<b>11,397<sup>2</sup></b>	<b>3,766</b>	<b>12,424</b>

Notes:

<sup>1</sup> Total capacity assuming the largest unit is out-of-service.

<sup>2</sup> Includes the demand to pressure zones 1-A .

<sup>3</sup> Surplus available to supply Zone 2 through PRVs.

**Table 6-B-7**  
**2015 Pump Station Capacity Evaluation Results – Zone 2 (Closed System)**

Supply to Zone 2 (closed system)						Criterion 1		Criterion 2	
						Pump station must be able to provide PHD with the largest pump out-of-service		Pump station must be able to provide MDD plus fire flow with the largest “domestic” pump out-of-service	
Source of Supply	Total Supply Capacity	Firm Capacity <sup>1</sup>	Total Capacity without Largest Domestic Pump	MDD	PHD	Required Capacity	Surplus(+) or Deficiency (-)	Required Capacity	Surplus (+) or Deficiency (-)
	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm
Eastside PS	7,555	5,725	5,725	4,843	5,981				
PRVs <sup>2</sup>	11,397	11,397	11,397						
	18,952	17,122	17,122	4,843	5,981	5,981	11,142	10,843	6,280

Notes:

<sup>1</sup> Total capacity assuming the largest unit is out-of-service.

<sup>2</sup> Surplus from Zone 3, available to supply Zone 2 through PRVs.

**Table 6-B-8**  
**2022 Pump Station Capacity Evaluation Results –Alternative A: New Industrial User in Zone 3**

						<b>Criterion 1</b>		<b>Criterion 2</b>	
						Pump station total capacity must be equal or larger than MDD for the pressure zone or system		Pump station firm capacity must be equal or larger than ADD for the pressure zone or system	
<b>Source of Supply</b>	<b>Total Supply Capacity</b>	<b>Firm Capacity<sup>1</sup></b>	<b>Pressure Zone</b>	<b>ADD</b>	<b>MDD</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>
	<b>gpm</b>	<b>gpm</b>		<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>
Broadmoor PS	5,040		Zone-3	4,344	8,468				
Riverview Heights PS	8,150		Zone-1-A	85	167				
Road 36 PS	6,000		Zone-2-A	133	335				
			Zone-2-B	35	87				
			Zone-2-C	241	607				
<b>Zone 3 Supply System</b>	<b>19,190</b>	<b>16,190</b>		<b>4,838</b>	<b>9,664</b>	<b>9,664</b>	<b>9,526</b>	<b>4,838</b>	<b>11,352</b>
Eastside PS	7,555	5,725	Zone-2	2,698	5,232				
Additional Flow Available PRVs	9,526	9,526							
<b>Zone 2 Supply System</b>	<b>17,081</b>	<b>15,251</b>		<b>2,698</b>	<b>5,232</b>	<b>5,232</b>	<b>11,849</b>	<b>2,698</b>	<b>12,553</b>

Note:

<sup>1</sup> Total capacity assuming the largest unit is out-of-service.

**Table 6-B-9**  
**2022 Pump Station Capacity Evaluation Results – Alternative B: New Industrial Users in Zone 2**

						<b>Criterion 1</b>		<b>Criterion 2</b>	
						Pump station total capacity must be equal or larger than MDD for the pressure zone or system		Pump station firm capacity must be equal or larger than ADD for the pressure zone or system	
<b>Source of Supply</b>	<b>Total Supply Capacity</b>	<b>Firm Capacity<sup>1</sup></b>	<b>Pressure Zone</b>	<b>ADD</b>	<b>MDD</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>
	<b>gpm</b>	<b>gpm</b>		<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>
Broadmoor PS	5,040		Zone-3	3,664	7,788				
Riverview Heights PS	8,150		Zone 1-A	72	153				
Road 36 PS	6,000		Zone 2-A	133	335				
			Zone 2-B	35	87				
			Zone 2-C	241	607				
<b>Zone 3 Supply System</b>	<b>19,190</b>	<b>16,190</b>		<b>4,144</b>	<b>8,970</b>	<b>8,970</b>	<b>10,220</b>	<b>4,144</b>	<b>12,046</b>
Eastside PS	7,555	5,725	Zone-2	3,392	5,926				
Additional Flow Available PRVs	10,220	10,220							
<b>Zone 2 Supply System</b>	<b>17,775</b>	<b>15,945</b>		<b>3,392</b>	<b>5,926</b>	<b>5,926</b>	<b>11,849</b>	<b>3,392</b>	<b>12,553</b>

Note:

<sup>1</sup> Total capacity assuming the largest unit is out-of-service.



**Table 6-B-10**  
**2027 Pump Station Capacity Evaluation Results –Alternative A: New Industrial User in Zone 3**

						<b>Criterion 1</b>		<b>Criterion 2</b>	
						Pump station total capacity must be equal or larger than MDD for the pressure zone or system		Pump station firm capacity must be equal or larger than ADD for the pressure zone or system	
<b>Source of Supply</b>	<b>Total Supply Capacity</b>	<b>Firm Capacity<sup>1</sup></b>	<b>Pressure Zone</b>	<b>ADD</b>	<b>MDD</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>
	<b>gpm</b>	<b>gpm</b>		<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>
Broadmoor PS	5,040		Zone-3	5,634	10,414				
Riverview Heights PS	8,150		Zone-2-A	151	381				
Road 36 PS	6,000		Zone-2-B	39	99				
			Zone-2-C	274	690				
<b>Zone 3 Supply System</b>	<b>19,190</b>	<b>16,190</b>		<b>6,098</b>	<b>11,584</b>	<b>11,584</b>	<b>7,606</b>	<b>6,098</b>	<b>10,091</b>
Eastside PS	7,555	5,725	Zone-2	3,067	5,947				
Additional Flow Available PRVs	7,606	7,606							
<b>Zone 2 Supply System</b>	<b>15,161</b>	<b>13,331</b>		<b>3,067</b>	<b>5,947</b>	<b>5,947</b>	<b>9,214</b>	<b>3,067</b>	<b>10,264</b>

**Table 6-B-10**  
**2027 Pump Station Capacity Evaluation Results –Alternative B: New Industrial User in Zone 2**

						<b>Criterion 1</b>		<b>Criterion 2</b>	
						Pump station total capacity must be equal or larger than MDD for the pressure zone or system		Pump station firm capacity must be equal or larger than ADD for the pressure zone or system	
<b>Source of Supply</b>	<b>Total Supply Capacity</b>	<b>Firm Capacity<sup>1</sup></b>	<b>Pressure Zone</b>	<b>ADD</b>	<b>MDD</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>
	<b>gpm</b>	<b>gpm</b>		<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>
Broadmoor PS	5,040		Zone-3	4,246	9,026				
Riverview Heights PS	8,150		Zone-2-A	151	381				
Road 36 PS	6,000		Zone-2-B	39	99				
			Zone-2-C	274	690				
<b>Zone 3 Supply System</b>	<b>19,190</b>	<b>16,190</b>		<b>4,710</b>	<b>10,196</b>	<b>10,196</b>	<b>8,994</b>	<b>4,710</b>	<b>11,480</b>
Eastside PS	7,555	5,725	Zone-2	4,455	7,335				
Additional Flow Available PRVs	8,994	8,994							
<b>Zone 2 Supply System</b>	<b>16,549</b>	<b>14,719</b>		<b>4,455</b>	<b>7,335</b>	<b>7,335</b>	<b>9,214</b>	<b>4,455</b>	<b>10,264</b>

**Table 6-B-10**  
**2036 Pump Station Capacity Evaluation Results –Alternative A: New Industrial User in Zone 3**

						<b>Criterion 1</b>		<b>Criterion 2</b>	
						Pump station total capacity must be equal or larger than MDD for the pressure zone or system		Pump station firm capacity must be equal or larger than ADD for the pressure zone or system	
<b>Source of Supply</b>	<b>Total Supply Capacity</b>	<b>Firm Capacity<sup>1</sup></b>	<b>Pressure Zone</b>	<b>ADD</b>	<b>MDD</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>
	<b>gpm</b>	<b>gpm</b>		<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>
Broadmoor PS	5,040		Zone-3	7,106	13,644				
Riverview Heights PS	8,150		Zone-2-A	166	439				
Road 36 PS	6,000		Zone-2-B	42	110				
			Zone-2-C	253	667				
<b>Zone 3 Supply System</b>	<b>19,190</b>	<b>16,190</b>		<b>7,567</b>	<b>14,860</b>	<b>14,860</b>	<b>4,330</b>	<b>7,567</b>	<b>8,623</b>
Eastside PS	7,555	5,725	Zone-2	2,980	6,175				
Additional Flow Available PRVs	4,330	4,330							
<b>Zone 2 Supply System</b>	<b>11,885</b>	<b>10,055</b>		<b>2,980</b>	<b>6,175</b>	<b>6,175</b>	<b>5,709</b>	<b>2,980</b>	<b>7,075</b>

Note:

<sup>1</sup> Total capacity assuming the largest unit is out-of-service.

**Table 6-B-12**  
**2036 Pump Station Capacity Evaluation Results – Alternative B: New Industrial Users in Zone 2**

						<b>Criterion 1</b>		<b>Criterion 2</b>	
						Pump station total capacity must be equal or larger than MDD for the pressure zone or system		Pump station firm capacity must be equal or larger than ADD for the pressure zone or system	
<b>Source of Supply</b>	<b>Total Supply Capacity</b>	<b>Firm Capacity<sup>1</sup></b>	<b>Pressure Zone</b>	<b>ADD</b>	<b>MDD</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>	<b>Required Capacity</b>	<b>Surplus (+) or Deficiency (-)</b>
	<b>gpm</b>	<b>gpm</b>		<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>	<b>gpm</b>
Broadmoor PS	5,040		Zone-3	4,956	11,494				
Riverview Heights PS	8,150		Zone-2-A	166	439				
Road 36 PS	6,000		Zone-2-B	42	110				
			Zone-2-C	253	667				
<b>Zone 3 Supply System</b>	<b>19,190</b>	<b>16,190</b>		<b>5,417</b>	<b>12,710</b>	<b>12,710</b>	<b>6,480</b>	<b>5,417</b>	<b>10,773</b>
Eastside PS	7,555	5,725	Zone-2	5,131	8,327				
Additional Flow Available PRVs	6,480	6,480							
<b>Zone 2 Supply System</b>	<b>14,035</b>	<b>12,205</b>		<b>5,131</b>	<b>8,327</b>	<b>8,327</b>	<b>5,708</b>	<b>5,131</b>	<b>7,074</b>

Note:

<sup>1</sup> Total capacity assuming the largest unit is out-of-service.



## **APPENDIX 7-A**

### **CIP COST ESTIMATING METHODOLOGY**

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#### **Introduction**

This appendix summarizes the approach used to develop unit costs and project costs used in the Capital Improvement Program (CIP) for the City of Paso's (City's) Comprehensive Water System Plan (CWSP).

#### **Cost Estimating**

The probable costs estimated for each improvement are based on average costs from the *2015 RS Means Heavy Construction Cost Data* (RSMeans), City input, construction costs for similar projects in the City and across the Northwest, and information provided by local suppliers. All costs identified in this section reference 2015 U.S. dollars. The *Engineering News Record Construction Cost Index (ENR CCI)* basis is 10,315 (20-city average, May 2016).

Project cost estimates were prepared in accordance with the guidelines of AACE International, formerly the Association for the Advancement of Cost Engineering International. (*AACE International Recommended Practice No. 56R-08 Cost Estimate Classification System - As Applied for the Building and General Construction Industries - TCM Framework: 7.3 - Cost Estimating and Budgeting* Rev. December 31, 2011). The project cost estimates in this CWSP are categorized Class 5, as defined by AACE International:

Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systemic manner.

Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.

Typical accuracy ranges for Class 5 estimates are -20% to -30% on the low side, and +30% to +50% on the high side, depending on the construction complexity of the project, appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks.

All project descriptions and cost estimates in this CWSP represent planning-level accuracy and opinions of costs (+50%, -30%). During the design phase of each improvement project, project definition, scope, and specific information (e.g., pipe diameter and length) should be verified. The final cost of individual projects will depend on actual labor and material costs, site conditions, competitive market conditions, regulatory requirements, project schedule, and other factors. Because of these factors, project feasibility and risks must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

The project costs presented in this CWSP include estimated construction costs, and allowances for permitting, legal, administrative, and engineering fees. A contingency factor is also added in anticipation of any unforeseen project costs. Construction costs are based on the preliminary concepts and layouts of the system components developed during the system analysis.

Total estimated project costs were determined through a progression of steps and multiple methodologies, which included development of:

- component unit costs (includes the sum of materials, labor, and equipment of a project's basic features);
- construction costs (the sum of component costs and markups such as the contractor's bid price to determine the probable cost of construction); and
- project costs (the sum of construction costs plus additional cost allowances for engineering, legal, and administrative fees to determine the total project cost to the City).

The following costs are not included:

- Land or right-of-way acquisition, unless directed by the City.
- Water system studies, planning, or modeling.
- Borrowing or finance charges during the planning, design, or construction of assets.
- Improvements to distribution or treatment facilities in response to changes in regulatory standards or rules.
- Remediation or fines associated with system violations.
- Water right acquisition or transfers.

## **Project Unit Costs**

### ***Pipelines***

The estimates for water system piping include the costs for pipe, fittings, valves, water service connections and surface restoration typical to City projects. The pipe material

assumed for new waterlines was CL 50 ductile iron for 8- to 24-inch pipes. The component costs were developed after a review of recent City bid tabs.

As the diameter of pipe and the trench width increase, the costs also increase. Therefore, a specific cost has been identified for each pipe diameter. Table 7A-1 presents pipeline project unit costs.

**Table 7A-1**  
**Water Pipeline Costs per Linear Foot**

<b>Pipe Diameter (inch)</b>	<b>Project (\$/lf)</b>
8	\$218
10	\$262
12	\$306
14	\$350
16	\$394
18	\$424
20	\$467
24	\$548
30	\$674
36	\$793

### ***Ground Level Storage Facilities***

Proposed storage facility project costs were prepared for AWWA D110 – Type 1 pre-stressed concrete tanks based on recent City construction experience. It was assumed that proposed reservoirs will be circular, at-grade structures with an exterior wall height between 25 and 35 feet. Project cost estimates for pre-stressed concrete construction were based on a base cost of \$2,134,000 per million gallons of storage volume.

### ***Elevated Storage Facilities***

Proposed elevated storage facility project costs were prepared for AWWA D107 – Composite Elevated Tanks based on vendor provided information. It was assumed that proposed reservoirs will be circular, 145 ft to high water level with an head range of 45 feet. Project cost estimates for elevated storage were based on a base cost of \$3,400,000 per million gallons of storage volume.



### ***Increases in Pump Station Capacity***

Increasing pump station capacity will require increasing the number of pumps at a facility. A cost curve for total project costs has been developed based on horsepower for a new pump. The construction cost accounts for addition of new pump, motor, and VFD, and modifications to pipes and valves. The following equation summarizes the total cost of increasing pump station capacity:

$$\text{Increases in Booster Pump Station Capacity Total Project Cost} = 170,836 + 340.8 * \text{HP}$$

### **Construction Cost Allowances**

The construction cost is the sum of materials, labor, equipment, mobilization, contractor's overhead and profit, and contingency for each project. Tables 7A-3 and 7A-4 present the additional allowances associated with the construction costs and project costs, respectively.

#### ***Traffic Control***

Traffic control will be required for all projects that occur on roadways. Its cost should be evaluated based on the scope and size of each project, and as local conditions at the time of construction dictate. For planning purposes, the cost of traffic control is estimated at 0.5% for residential roads and 2% for commercial roads. Traffic control markup includes the cost of signage, flagging, temporary barriers, street widening, pavement markings, lane delineators, and lighting at flagging locations.

#### ***Erosion Control***

Erosion control will be required for all projects, and is estimated at 1% of the construction costs. Erosion control markup includes materials and practices to protect adjacent property, storm water systems, and surface water in accordance with regulatory requirements. The level of effort and cost for erosion control depends on the size and scope of a project, and the local conditions at the time of construction.

#### ***Construction Contractor Overhead and Profit***

A 10% markup accounts for the contractor's indirect project costs and anticipated profit.

#### ***Construction Mobilization***

Mobilization markup covers the contractor's administrative and direct expenses to mobilize equipment, materials, and labor to the worksite. The cost allowance of mobilization is 10% for pipeline projects and new facilities, and 15% for specialized construction and equipment needed for repair and rehabilitation projects.

### ***Construction Contingency***

A 30% increase was added to each project's construction contingency cost in anticipation of uncertainties inherent in planning-level development. Contingency costs include:

- Unanticipated utilities.
- Relocation and connection to existing infrastructure.
- Minor elements of work not addressed in component unit cost development.
- Details of construction.
- Changes in site conditions.
- Variability in construction bid climate.

The contingency excludes:

- Major scope changes such as end-product specification, capacities, and location of project.
- Extraordinary events such as strikes or natural disasters.
- Management reserves.
- Escalation and currency effects.

A summary of construction markups is provided in Table 7A-3.

**Table 7A-3**  
**Additional Construction Costs**

<b>Additional Cost Factor</b>	<b>Percent</b>
Low Traffic Control	0.5%
High Traffic Control	2%
Erosion Control	1%
Dewatering	1%
Contractor Overhead and Profit	10%
Mobilization – Pipeline Project	10%
Mobilization – Repair and Rehabilitation Projects	15%
Contingency	30%

### **Total Project Cost**

The total project cost is the sum of construction costs with additional cost allowances for engineering, legal, and administrative fees, as presented in Table 7A-4. Engineering costs

include design and surveying; construction administration is the cost associated with managing the construction of the project; and the administrative and legal costs are those associated with the City's financial and legal oversight of the contract.

**Table 7A-4**  
**Summary of Additional Costs**

<b>Additional Cost Factor</b>	<b>Percent</b>
Construction Administration	5%
Engineering	15%
Legal and Administrative	10%



## Appendix 7-B – City of Pasco ASR Pre-Feasibility Assessment

### Capital Improvement Project No. S-004

### Introduction

As municipalities face increasing water demands, decreasing available surface water rights and supplies, and limited land area for conventional storage, it is becoming imperative to develop innovative water supply solutions. Aquifer storage and recovery (ASR) is a water management strategy that provides a way to reallocate a surface water source with seasonal availability through groundwater storage and can be a low-cost alternative for increasing water system storage and production capacity in areas where groundwater supplies are limited. For these reasons, ASR has become a key innovative water management approach for municipalities in Washington and throughout the Pacific Northwest.

This Appendix 7-B summarizes the concept and preliminary feasibility process for developing an aquifer storage and recovery (ASR) program for the City of Pasco (City). The City is interested in investigating the feasibility of using ASR to address storage needs in certain portions of their system, reduce Quad City Water Right mitigation requirements and costs, and lessen impacts on flows in the Columbia River from increasing summer surface water diversions. This appendix also describes the regulatory framework authorizing ASR in the State of Washington.

### Regulatory Framework

During year 2000, the Washington State Legislature passed a bill expanding the definition of reservoir in Revised Code of Washington (RCW) 90.03.370. Since that time, reservoir permits that were traditionally used for surface water impoundments may now include aquifers as the storage reservoir. Washington Administrative Code (WAC) Chapter 173-157 establishes standards for review of ASR reservoir permit applications, and outlines the process the Department of Ecology (Ecology) uses to evaluate applications and issue permits for ASR.

### ASR Concept

The general ASR concept for the City would recharge (i.e., inject) treated drinking water sourced from the Columbia River into targeted water-bearing zones of basalt rock of the Columbia River Basalt Group (CRBG) via an existing or new well. The drinking water would be delivered to the ASR well from the City's supply system, recharged via the pump column in the well, and stored in the basalt aquifer beneath the site for later recovery and beneficial use. Aquifer recharge would take place when surplus treated water is available, typically from November to May, and would be appropriated under the City's portion of the Quad Cities Water Right (S4-30976P) using existing infrastructure and treatment facilities. The length of the storage period and the volume of the recharge water recovered will vary depending on the aquifer hydraulic properties, physical and chemical changes to the water that may take place during the storage period, and length of the demand period. The recovered water would be required to meet state and federal drinking water standards and have a composition, taste, and odor comparable to the recharge water for customer acceptance. Based on pilot test results from the City of Kennewick's ASR system and from other municipalities using ASR to store treated drinking water in Columbia River Basalt aquifers, we do not anticipate adverse impacts to recovered water quality.

## Phase I: Pre-Feasibility Assessment

An initial evaluation focused to assess whether an ASR project will meet certain key feasibility benchmarks is a recommended first phase. It is intended to provide the basis for determining whether ASR could provide a meaningful portion of the storage needs identified by the City, while also providing water rights and instream flow benefits. Some of the key unknowns that should be explored further as part of this initial evaluation phase and that will determine the feasible capacity of an ASR system at a given location include the following:

- **Infrastructure Needs** – Identify what infrastructure needs or engineer upgrades may be necessary for ASR recharge (e.g., storage and peak flow needs, modify an existing well, drill and construct a new well) and what treatment and conveyance requirements may be needed for source water.
- **Source Water Availability** – Identify the water rights structure needed to be in place to access source water for ASR and evaluate the timing of source water availability.
- **Storage Aquifer** – Evaluate the basalt aquifer system and assess whether its hydrogeologic characteristics are suitable for supporting ASR operations at rates, volumes, and cost-ratios that are favorable compared to other storage alternatives.
- **Water Quality Pre-Assessment** – Characterize water quality conditions of recharge source water and native groundwater. Compare the water quality conditions against drinking water quality standards and groundwater quality criteria and assess the potential for source water to degrade background groundwater quality.
- **Environmental Assessment** – Conduct an environmental assessment of the proposed project. The assessment would include such elements as proximity to contaminated areas, identification of present and prior land use(s), locations of floodplains and surface water bodies, and potential slope/ground stability issues.
- **Regulatory Requirements** – List the regulatory requirements and what permitting obstacles or challenges that may be anticipated. Identify whether there are any apparent water quality or chemical compatibility concerns with regard to regulatory requirements that may impact ASR feasibility.

## Phase II: Reservoir Permit Application Process

Assuming positive Phase I feasibility, the next step toward permitting and developing an ASR facility would be to prepare and submit a reservoir permit application to Ecology. The reservoir permit application elements and process is summarized below and further described in WAC 173-157:

- **Pre-Application Meeting** – Schedule and attend a pre-application meeting with Ecology to discuss the project.
- **Reservoir Permit Application** – Prepare and submit a reservoir permit application for the project. Results from work conducted under Phase I (above) could be used in preparing elements of the application. The required elements are summarized below, and further described in WAC 173-157-120 through -170:
  - Conceptual model of hydrogeologic system (e.g., extent, nature, and hydraulic properties of the target storage aquifer);

- Project operation plan (e.g., anticipated quantities and times source water is available for recharge, and proposed rates of injection/recovery, and target storage volume);
- Legal framework description (e.g., source water rights, other water rights in ASR project area, instream flows in the vicinity of the point of diversion/withdrawal, ownership and control of ASR facilities); and
- Project mitigation and monitoring plans (e.g., quality assurance project plan, system monitoring plan, and sampling methods, procedures and timelines).

## Planning-Level Cost Estimates

Preliminary cost estimates to complete the work items listed in Phase I and II are provided below. These cost estimates are for planning-level purposes only, and were developed from experience supporting other ASR projects and feasibility assessments in the State of Washington.

### Phase I

• Task I.1 – Infrastructure Needs:	\$5,000
• Task I.2 – Source Water Availability:	\$10,000
• Task I.3 – Storage Aquifer Assessment:	\$10,000
• Task I.4 – Water Quality Pre-Assessment:	\$10,000
• Task I.5 – Environmental Assessment:	\$10,000
• <u>Task I.6 – Regulatory Requirements:</u>	<u>\$5,000</u>
<b>TOTAL PHASE I:</b>	<b>\$50,000</b>

### Phase II

• Task II.1 – Pre-Application Meeting:	\$5,000
• <u>Task II.2 – Reservoir Permit Application:</u>	<u>\$20,000</u>
<b>TOTAL PHASE II:</b>	<b>\$25,000</b>

### Total Estimated Planning-Level Cost

The planning-level cost for Phase I and II total an estimated \$75,000. We recommend discussing potential funding opportunities with Ecology (including the Office of the Columbia River) to help offset these costs and give the City a better understanding of ASR cost/benefit.





Appendix 7-C: Project Descriptions

CIP ID	Type of Improvement	CIP Title	Location	Description	Time Frame	Cost
S-001	Supply	West Pasco Water Treatement Plant Filter Expansion Phase 1	West Pasco WTP	This project consists of adding two banks of micro filters to the West Pasco Water Treatment Plant to increase capacity from 6 million per day to 12 million gallons per day. This project is part of the overall West Pasco Water Treatment Plant expansion which includes the new raw water intake, and additional sludge drying beds. This added capacity is needed to continue to meet the growing demands for water in the City of Pasco.	2024-2027	\$ 1,350,000.00
S-002	Supply	West Pasco WTP Expansion - Phase 2	West Pasco WTP	This project is the second phase (final phase) that will expand the West Pasco WTP. The WTP will be expanded to 18 million gallons per day.	2035	\$ 1,350,000.00
S-002-PS	Supply	West Pasco WTP Expansion – Phase 2 – Pump Station Upgrade	West Pasco WTP	This project will upgrade the high service pump station and expand pumping capacityto zone 3.	2035	\$ 910,000.00
S-003	Supply	Butterfield WTP Facility Plan	Butterfield WTP	In order to evaluate the overal Butterfeld WTP it is recommended that a facilty plan be completed. The completion of the Water Treatment Facility Plan and associated preliminary design for the Butterfield WTP is recommended to evaluate an overall plant and determine improvements to increase the "reliable" capacity to 30 mgd. The WTP capcity is currently limited by contact time, reducing the "reliable" capacity to 26.8 mgd.	2020	\$ 300,000.00
S-004	Supply	ASR Feasibility Study	System Wide	Recommended to evaluate opportunities to store treated surface water from the Columbia River in the basalt aquifer system below the City. ASR has the ability to self-mitigate use of water under the Quad City Water Right (QCWR) permit by transferring surface water supply availability from the winter to the summer. ASR could also provide economical storage benefits compared to traditional above ground storage. Additionally, it will address instantaneous flow limitations and reduce associated environmental effects of summer surface water diversion	2019	\$ 75,000.00
S-005	Supply	Riverview Heights PS Backup Power	Riverview PS	The City is interested in adding backup power to the Riverview Heights Pump Station, as it is the main source of supply to Pressure Zone 3. The upgrades will include an onsite generator and transfer switch to allow for a fully functional pump station during a power failure.	2018	\$ 380,000.00
AP-03	Supply	Butterfield Water Treatment Plant PLC and Control Upgrades Project #00039	Zone 1	This project consists of replacing all the aging and out-of-date programmable logic controllers (PLC) in support of the supervisory control and data acquisition (SCADA) system with new equipment throughout the entire Butterfield Water Treatment Plant. The existing technology is from 1989 and was installed in the mid 1990’s. The PLC code no longer offers drivers for any computer operating system that is currently on the market. Upgrading the controls will allow us to take advantage of Ethernet communication and utilize readily available and supported drivers for the software packages staff regularly uses. Additionally, replacement hardware for the existing system is almost non-existent and our last major repair required bringing in a retired technician who knew how to troubleshoot and fix this old equipment. This project will upgrade the Butterfield Plant to the same level of control technology as the West Pasco Water Treatment Plant and outlying facilities.	2017-2018	\$ 600,000.00
AP-04	Supply	Columbia Water Supply Project #11001	Zone 1	This project will construct a raw water intake facility and pump station to divert water from the Columbia River to the West Pasco Water Treatment Plant (WPWTP) for treatment and distribution to the City rate payers by the end of 2018. The project will also replace an existing 24-inch raw water pipeline with a 30-inch pipeline and add an electrical duct bank between the intake facility and the WPWTP. Design and permitting for the project took 5 years and construction will take an additional 2 years. Partial construction funding is provided by a low interest Drinking Water State Revolving Fund (DWSRF) loan. Completion of this project will provide the City with a reliable source of water capable of supplying 18 million gallons per day to meet the demands of the City’s potable water needs.	2017-2018	\$ 8,705,000.00
AP-05	Supply	Butterfield Water Treatment Plant Chlorine Safety Improvements City Project #17004	Zone 1	This project consists of the installation of emergency air cleaning equipment at the Butterfield Water Treatment Plant. The system is designed to remove contaminants from the atmosphere in the event of an accidental chlorine release. This safety improvement will bring the facility into compliance with the provisions of the 2015 International Fire Code. The proposed improvements bring the facility into current fire code compliance. The existing ventilation and abatement system was installed in 1987 and is no longer adequate to meet current standards. Without these improvements, a sheared valve or punctured cylinder could not be repaired before the contents of the one-ton chlorine cylinder had been discharged, thereby endangering both employees and the public. This safety improvement provides greater protection to the public and first responders should such an event occur. This equipment is used to contain the toxic atmosphere thereby eliminating the active risk to the public and emergency services personnel	2019-2020	\$ 325,000.00
AP-06	Supply	West Pasco Water Treatment Plant Backwash Ponds Project #16008	West Pasco WTP	In addition to the treatment capacity upgrades included in phase 1, the West Pasco WTP will require additional pumping capacity for the high service pump station and additional filter backwash capability. Increasing water output from 6 million to 12 million gallons per day (MGD). This work will coincide with the planned PALL micro-filter expansion project. The additional pump/piping for the high service system will include 460 feet of 24” piping required to connect into the Zone 1 transmission main. The proposed backwash system expansion will recover and neutralize the additional backwash waste generated from the increased filtration required by the additional 6 MPG of capacity. Although the West Pasco WTP Phase 1 expansions will increase potable water output from 6 million gallons per day to 12 million gallons per day, this project will be designed and constructed to process the backwash flows from the ultimate production capacity of 18 million gallons per day at one time, due to the need of obtaining EPA approval to discharge the waste stream to the Columbia River.	2017-2020	\$ 2,226,000.00
T-001	Storage	New Storage Reservoir: 5.75 MG Project #00041	Zone 2	This project will construct a 5.75 million gallon Zone 2 reservoir east of Highway 397. It was identified in the Water Master Plan as being needed to provide additional reliability, improve available fire flows, improve level of service to customers and meet the future required storage volumes and capacity needs for this area. The new East Side Reservoir will also provide the option of pumping to Zone 3, thereby providing an alternate source of supply for the Road 68 reservoir in the event of an emergency or planned maintenance. If this water tank is not constructed and the City continues growing at the current pace, there will not be enough required water storage to meet the Maximum Day Demand and eventually fire flow demands and emergency reserves.	2020-2023	\$ 11,700,000.00
T-002	Storage	New Storage Reservoir: 3.5 MG	Zone 3	This project will construct a 3.5 million gallon Zone 3 reservoir. This is needed to provide additional reliability, improve available fire flows, improve level of service to customers and meet the future required storage volumes and capacity needs for this area.	2035	\$ 7,469,000.00
PROPOSED PIPING PROJECTS:						
IP-001	Pipe	Waterline Extension -Irving Street (West to Road 49) Project #00047	Zone 1	This project will install approximately 325 linear feet of 8” ductile iron water main along Irving St. connecting the water main coming from Road 52 to the main on Road 49. This connection will help loop the water system in this area. This area has many undersized mains and dead ends which cause water quality issues that require more frequent flushing than other areas. It will also help improve the fire flow availability to the hydrants in the area. If this water main is not extended, there will continue to be a deficiency in fire hydrant flow and as well as continued need for flushing maintenance at the dead end	2022	\$ 87,200.00
IP-002	Pipe	Waterline Extension - Riverhaven Street (Road 36 to Road 40) Project #00048	Zone 1	This project will install approximately 1,400 linear feet of 8” ductile iron water main along Riverhaven St. from Road 36 to Road 40. The dead end water mains at the southern end of these streets will be connected to the new water main. This connection will help loop the water system which will improve flow characteristics of the system and eliminate dead ends in the area. Looping the system with a properly sized water main will provide better flow for the fire hydrants in the vicinity. Having the proper distribution of fire hydrants can help elevate our rating with the Washington Surveying and Rating Bureau and may help improve the fire insurance rates that property owners pay. Making this connection will also provide better flows in the distribution system and improve water quality for the customers in this area. This will also reduce the amount of flushing maintenance required to keep the water quality high. If this water main is not extended, there will continue to be a deficiency in fire flow to the fire hydrants and the continued need for additional flushing of the dead ends.	2023	\$ 305,200.00
IP-003	Pipe	Waterline Extension - W Court St to N 3rd St.	Zone 1	New 8-inch pipe connection, possibly from W Court St up N 3rd Ave 60 feet. Final location to be determined by City. This project will install approximately 60 linear feet of 8" ductile iron water main.	2022	\$ 30,000.00
IP-004	Pipe	Waterline Replacement - Along Empire Dr (West of N 5th Ave)	Zone 2	This project will replace approximately 1,500 linear feet of existing 6" with an 8" pipe along Empire Dr. west of N 5th Ave.	2026	\$ 327,000.00

Appendix 7-C: Project Descriptions

CIP ID	Type of Improvement	CIP Title	Location	Description	Time Frame	Cost
IP-005	Transmission Pipe	Water Main Installation - Crescent - Chapel Hill Transmission Main	Zone 1-3	This project will install approximately 5,350 linear feet of 20” transmission main leaving the West Pasco Water Treatment Plant and connecting to the 20” existing main at Ione St and Road 108, then north along Crescent Road up to Chapel Hill Blvd, then east up to Broadmoor Blvd, then north up to St. Thomas Dr, connecting to existing 24-inch transmission main. Further development of the design and confirmation of the exact route and needs of the project need to be verified to build a cost estimate and better description. This transmission main will be needed to efficiently deliver water from the West Pasco Water Treatment Plant to Pressure Zones 2 & 3 after the second West Pasco Water Treatment Plant expansion. Having another line leaving the plant will also allow for part of the plant to be shut down for maintenance while still delivering water to the distribution system. If this line is not installed, the velocity of the water in the existing main leaving the plant will approach or exceed the limits of safe delivery of water. If the transmission main were to break there will be a significant amount of damage cause before the plant could be	2018-2019	\$ 2,507,080.00
PREVIOUSLY DEFINED PIPING PROJECTS:						
DP-002	Pipe	Waterline Replacement - Richardson Road (Road 92 to Road 96) Project #00043	Zone 1	This project will replace approximately 1,400 linear feet of existing 4” and 6” thin wall irrigation class PVC water line and replace it with 8” ductile iron pipe in Richardson Road between Road 60 and Road 64. The project will include the installation of 3 fire hydrants to provide fire protection. Having the proper distribution of fire hydrants can help elevate our rating with the Washington Surveying and Rating Bureau and may help improve the fire insurance rates that property owners pay.	2019	\$ 460,000.00
DP-003	Pipe	Waterline Replacement - Star Lane (West of Road 97)	Zone 1	In this location, approximately 1,000 lineal feet of 6" thin wall irrigation class PVC water line will be replaced with 8" ductile iron pipe. The existing water services and appurtenances will be reconnected to the new main. This will greatly improve service and allow for fire flow to the customers in this area and reduce maintenance and repair costs for	2024	\$ 113,000.00
DP-004	Pipe	Waterline Replacement - Road 84 (Court Street to Argent Road)	Zone 2	In this location, approximately 3,000 lineal feet of 12" asbestos cement water line will be replaced with 8" ductile iron pipe. The existing water services and appurtenances will be reconnected to the new main. Replacement of this line will allow for improved customer service, fire flow, compliance with regulations, and safer working conditions for employees and contractors.	2025-2026	\$ 450,000.00
DP-005	Pipe	Waterline Replacement - Road 60 (Pearl Street, Court Street, Agate Street, and 62nd Place) Project #00044	Zone 1	This project will replace approximately 3,000 linear feet of existing 6” thin wall PVC water line with approximately 1,400 linear feet of 16” ductile iron pipe along Road 60 and approximately 1,600 linear feet of 8” ductile iron pipe along W Pearl St, W Agate St and 62nd Pl. This project will not install any new fire hydrants. Not completing this project puts the City at higher risk of having a property damage claim from a future leak. When there is a water main break the ground tends to wash out and settle in the area of the leak which can put more strain on the pipe remaining in the ground and lead to more leaks. The undersized pipe also does not provide optimum water flow to the hydrants in this area.	2020	\$ 900,000.00
DP-006	Pipe	Waterline Replacement - Road 80 (North along Agate Street)	Zone 1	In this location, approximately 1,000 lineal feet of 6" thin wall irrigation class PVC water line and 6" ductile iron water line will be replaced with 8" ductile iron pipe. The existing water services and appurtenances will be reconnected to the new main. This will greatly improve service and allow for fire flow to the customers in this area and reduce maintenance costs for the City.	2025	\$ 125,000.00
DP-007	Pipe	Waterline Replacement - Road 76 (Wernett Road to Court Street) Project #00045	Zone 1	This project will replace approximately 1,700 linear feet of existing 4” and 6” thin wall irrigation class PVC water line and replace it with 12” ductile iron pipe. The project will also install 4 new fire hydrants. Road 76 is intended to be one of the larger water mains that supplies some of the residential areas that are now beginning to see substantial development. The project will also help loop the 12” main that extends down from Argent Road to the main in Court Street. Having the proper distribution of fire hydrants can help elevate our rating with the Washington Surveying and Rating Bureau and may help improve the fire insurance rates that property owners pay. Water mains made of thin wall PVC pipe cannot be worked on in the same manner as ductile iron pipe and thicker C900 class PVC pipe due to the fragile nature of the pipe. Not completing this project could hinder the ability of any new properties from being able to connect to the City Water and stops the fire department from having an uninterrupted supply of water for firefighting purposes on this street. This line is currently a pinch point in the water distribution system due to the smaller size.	2020	\$ 826,000.00
DP-008	Pipe	Waterline Replacement - Maple Road (Road 100 to Road 104) CP7.WT.2R.15.20	Zone 1	This project was started in 2015 and consits of replacing asbestos cement water lines with ductile iron pipe and reconnecting existing water services and appurtenances. 1,550 linearfeet from 6" to 8" ductile iron pipe.	2024	\$ 300,000.00
DP-009	Pipe	Waterline Replacement - Road 88 (Franklin Road to Court Street)	Zone 1	In this location, approximately 1,000 lineal feet of 6" asbestos cement water line will be replaced with 8" ductile iron pipe. The existing water services and appurtenances will be reconnected to the new main. Replacement of this line will allow for improved customer service, fire flow, compliance with regulations, and safer working conditions for employees and contractors.	2024	\$ 200,000.00
DP-010	Pipe	Waterline Extension - Alton Street (Wehe Avenue to the alley west of Owen Street) Project #00046	Zone 2	This project will install approximately 700 linear feet of 8” ductile iron water main along Alton St. from Wehe Ave. to the alley west of Owen Ave. One fire hydrant will be installed at the intersection of Wehe Ave and Alton St. The hydrant on Alton between Owen St and Beech St will be relocated to the new line. This connection will help loop the water system and eliminate dead ends in the area. Looping the system with a properly sized water main will provide opportunity to relocate a fire hydrant installed on an undersized main and install an additional fire hydrant. Having the proper distribution of fire hydrants can help elevate our rating with the Washington Surveying and Rating Bureau and may help improve the fire insurance rates that property owners pay. Making this connection will also provide better flows in the distribution system and improve water quality for the customers in this area. If this water main is not extended, there will continue to be a deficiency in fire hydrants and uninterrupted water for firefighting purposes in this area as well as continued need for additional flushing of the dead ends.	2021	\$ 153,000.00
DP-012	Pipe	Waterline Extension - Schuman Lane (West from Road 96) Project #00040	Zone 1	This project will install approximately 550 linear feet of 8” ductile iron pipe on Schuman Lane to carry potable water. One fire hydrant will be installed to provide fire protection. This street currently does not have water service provided down the length of it. Installing the waterline will allow for development of currently vacant lots, provide existing homes an option to connect to the City drinking water system and allow for the installation of needed fire hydrants in this area as well. There have been several requests made to Engineering to have a water main installed in this roadway for the above-mentioned reasons. Getting water service from Court St to Schuman Ln depends on the neighbors being agreeable to allowing the service lines to cross their property. The existing homes that have City water service have the water services and meters on Court St and the service lines to the homes run across the neighboring properties to the north. Not completing this project hinders the development of existing vacant lots along this street and stops the fire department from having an uninterrupted supply of water for firefighting purposes on this street.	2018	\$ 80,000.00
DP-013	Pipe	Waterline Extension - Road 103 (Maple Street to Willow Way) Project #00049	Zone 1	This project will install approximately 825 linear feet of 8” ductile iron water main along Road 103 connecting the water mains on Maple Drive and Willow Way. This connection will help loop the water system, and improve fire flow availability. Making this connection will also provide better flows in the distribution system and improve water quality for the customers in this area. If this water main is not extended, there will continue to be a deficiency in flow characteristics of	2023	\$ 113,000.00
DP-015	Pipe	Wernett Road Waterline CP7.WT.2A.14.01	Zone 1	This project will install approximately 10,700 linear feet of 12" ductile iron water line from Road 48 to Road 80. After installatin of the water line, existing water services and appurtenances will be reconnected. This installation is needed because the existing water lines along Wernett Road range in size from 4" to 12" and are not interconnected to create a looped system. Thi sproject will allow for improved service, fire protection/fire flow, and proper looping of the water system in this area.	2025-2026	\$ 873,000.00
DP-016	Pipe	East Airport Waterline (Port of Pasco)	Zone 2	This project will install approximately 4,200 linear feet of 16" ductile iron water line along N. 4th Avenue and connect to the existing 24" water line running east-west along the north airport property line to improve service to the industries in the North Pasco area. The installation of this line will complete the loop of the water sytem within the airport commercial property areas.	2026-2027	\$ 895,000.00
AP-08	Pipe	Automated Meter Reading Project #00050	System Wide	This project will replace approximately 19,000 mechanical water meters and/or meter registers with new electronic encoder type meters and registers to allow for automated meter reading which is faster, more accurate and provides more information regarding leaks and high consumption.	2019-2023	\$ 4,750,000.00

Appendix 7-C: Project Descriptions

Project ID	Type of Improvement	PROJECT TITLE	Location	Description	Time Frame	Cost
SERVICE AREA PIPING PROJECTS:						
PROJECT ID	Type of Improvement	PROJECT TITLE	Location	Description	Time Frame	Cost
FP-001	Pipe	Chapel Hill Boulevard Waterline	Zone 3	This Project is the City's participation with the devloper(s) to install 6400 LF of 16" Domestic Water along Chapel Hill Boulevard (Road 84 to Road 68). Developers are normally required to install 8" Diameter mains, but it is the City's desire to upsize this main to better serve existing and future customers.	2018	\$ 920,000.00
FP-017	Pipe	16" Waterline Loop - Broadmoor Blvd.	Zone 3	This project will install approximately 3,600 linear feet of 16" ductile iron water line along Broadmoor BLVD.	2026	\$ 1,420,764.00
FP-018	Pipe	Road 100 Corridor North	Zone 1-3	This project will install approximately 2,800 linear feet of 24" ductile iron water line along road 68 from Powerline RD. to the proposed Tank (T-002), from the tank 2,800 linear feet of 16" ductile iron pipe will be installed to Clark Rd. 12,000 linear feet of 16" ductile iron pipe will be installed along Clark Rd to the West. of Rd. 68. Another 5,300 LF of 16" ductile iron pipe will be installed along Easy Street to create a looped system. Finally 5,300 linear feet of 12" ductile iron pipe will be installed along Dent Rd and connect to the existing system to the West.	2031-2034	\$ 11,105,488.00
FP-019	Pipe	Broadmoor to Road 52 - 16" Waterline Ext.	Zone 3	This project will install approximately 28,000 linear feet of 16" ductile iron pipe along powerline road from Broadmoor to Road 52.	2026-2027	\$ 6,300,060.00
FP-020	Pipe	West Pasco Loop	Zone 1	This project will install approxmately 9,200 linear feet of 16" ductile iron pipe and 13,000 linear feet of 12" ductile iron pipe to create a West Pasco Loop.	2028-2031	\$ 7,645,178.00
FP-021	Pipe	Riverview Area Service Concept Piping Improvements - Road 92	Zone 1	This project installs approximately 1,450 linear feet of 12" ductile iron water line along Road 92 in the Riverview Area.	2027	\$ 440,946.00
FP-022	Pipe	Riveview Area Service Concept Piping Improvements - Road 68	Zone 1	This project installs approximately 2,700 linear feet of 16" ductile iron water line along Road 68 in the Riverview Area.	2029	\$ 1,054,000.00
FP-023	Pipe	Riverview Area Service Concept Piping Improvements - Road 52	Zone 1	This project installs approximately 5,300 linear feet of 12" ductile iron water line along Road 52 in the Riverview Area.	2031	\$ 1,640,160.00
FP-024	Pipe	DNR Area Service Concept Piping Improvements - Road 76	Zone3	This project installs approximately 3,000 linear feet of 12" ductile iron water line to provide water service for future growth in the DNR Area. This line will run along Road 76.	2024	\$ 918,000.00
FP-025	Pipe	DNR Property - I-182 Crossing	Zone 3	This project instals approximately 1,400 linear feet of 12" ductile iron water line to proivde a looped system in the DNR area. This water will connect to the existing water system north of I-182. An existing 16" casing under I-182 will be utilized.	2025	\$ 428,400.00
FP-026	Pipe	WAST Property Loop Improvements	Zone 2	This project installs approximately 13,300 linear feet of 12" to 16" ductile iron pipe to create a looped backbone system for the eastern portion of the City .	2030	\$ 3,132,300.00
FP-027	Pipe	Pasco Kahlotus Rd. Pipe Improvements	Zone 2	This project installs approximately 6,200 linear feet 16" ductile iron pipe to create a looped backbone system for the eastern portion of the City . The water line will run along Pasco Kahlotus Rd. and conect to the existing system at two separate locations.	2029	\$ 2,266,800.00
FP-028	Pipe	Tank Farm Transmission Loop Improvements	Zone 2	This project installs approximately 13,500 linear feet of 16" ductile iron pipe to create a looped backbone system for the eastern portion of the City .	2034	\$ 5,319,000.00
FP-029	Pipe	Road 52 to Glade North Road Transmission Improvements	Zone 3	This project installs approximately 12,500 linear feet of 16" ductile iron pipe to create a looped backbone system for the eastern portion of the City .	2028	\$ 4,925,000.00







**CITY OF PASCO, WASHINGTON  
ENVIRONMENTAL CHECKLIST (SEPA) FORM**

**(Official Use Only)**

Project Title CITY COMPREHENSIVE WATER PLAN  
Environmental Checklist No. 16-038 Date Received 9/14/2016  
Reference File No. N/A Date of Action 9/20/2016

For detailed instructions log on to the following site: <http://www.ecy.wa.gov/pubs/98114.pdf>

**PURPOSE OF THE CHECKLIST.** The State Environmental Policy Act (SEPA), Chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of the checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

**INSTRUCTIONS FOR APPLICANTS:** This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observation or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply". Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

**USE OF CHECKLIST FOR NONPROJECT PROPOSALS:** Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectfully.

The review and all subsequent actions on your proposal are all carried out under the guidelines of the State Environmental Policy Act, (WAC 197-11), Title 23 of the Pasco Municipal Code, the Community Development Policy Plan, and local environmental policies. Permits or other actions subject to this review may be conditioned or denied as deemed necessary in accordance with the foregoing regulations.

**NOTE:** This is a standard form being used by all state and local agencies in the State of Washington for various types of proposal; it has been modified to meet the particular environmental needs and policies of the City of Pasco and its surrounding area.

**A. BACKGROUND:**

1. Name of proposed project, if applicable: City of Pasco Comprehensive Water System Plan
2. Name of applicant: City of Pasco
- a. Address 525 N. 3rd Avenue, Pasco, WA, 99301
- b. Phone number 509-545-3444
3. Contact person: Daniel S. Ford, PE- City Engineer
- a. Address 525 N. 3rd Avenue, P.O. Box 293, Pasco, WA, 99301
- b. Phone number 509-545-3444
4. Date checklist prepared: August 19, 2016
5. Agency requesting checklist: City of Pasco
6. Proposed timing or schedule (including phasing, if applicable): 2016-2036 Planning Horizon
- 7) Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? ☒ Y ☐ N.

If Yes, explain:

The Comprehensive Water Plan (Plan) proposes improvements to the water source treatment, system storage, and system distribution components of the City of Pasco water system over the next six years and also projects the needs of the system over a 20-year period. The Plan is required to be updated every 6-years.

- 8) List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal:

Regional Water Forecast and Conservation Plan, City of Kennewick, City of Pasco, City of Richland, and City of West Richland, January 2016, RH2 Engineering, Inc. This document serves as the basis for the Quad City Water Right for area municipal, industrial, and commercial users.

- 9) Do you know whether applications are pending for governmental approvals or other proposal directly affecting the property covered by your proposal? ☐ Y ☒ N.

If Yes, explain.

This SEPA Checklist has been completed for general impacts associated with the Plan. Specific projects identified in the Plan may require a specific environmental review as required under the State Environmental Policy Act.

- 10) List any government approvals or permits that will be needed for your proposal, if known.

The Plan will be submitted to the Washington State Department of Health for approval.

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- 11) Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The Plan includes a review of record drawings, water records, water quality records, laws and regulations, population projections, Urban Growth Boundaries, Water Service Area Boundaries, ordinances, construction standards, operations, and other characteristics of the existing and future water supply system. A hydraulic analysis of the water distribution system and an evaluation of the water quality are included in the plan. The Plan develops recommendations for system and operational improvements for the 6-year and 20-year planning period.

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- 12) Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site, plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or details plans submitted with any permit applications related to this checklist.

The Plan encompasses the City of Pasco incorporated area (within City Limits) and unincorporated areas surrounding the City Limits. The Plan includes all area within the City of Pasco Urban Growth Area as adopted by the City of Pasco and Franklin County.

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## B. ENVIRONMENTAL ELEMENTS:

### 1) Earth

- a) General description of the site (Check one): ☒ Flat, ☒ rolling, ☐ hilly, ☐ steep slopes, ☐ mountainous, ☐ other (describe):

- 
- b) What is the steepest slope on the site (approximate percent slope)? <sup>N/A</sup> \_\_\_\_\_

- c) What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)?

Sand, loamy sand

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If you know the classification of agricultural soils, specify them and note any prime farmland.

Farmland of Statewide Importance

~~LANDS OR FARM LANDS OF LONG TERM COMMERCIAL SIGNIFICANCE IN THE PASCO UGA OR NEARBY BASED ON SOILS ETC~~  
PER THE FRANKLIN COUNTY COMP PLAN & PASCO COMP PLAN THERE ARE NO PRIME FARM

d) Are there surface indications or history of unstable soils in the immediate vicinity? ☐ Y ☒ N

If Yes, describe:

DN  
9/20/16

e) Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill:

Some grading and filling would occur during construction of water system projects. Imported structural fill needed during construction will come from an approved pit source.

f) Could erosion occur as a result of clearing, construction, or use? ☒ Y ☐ N.

If Yes, describe:

Given the native sandy soil in the area, it is possible for windborn and stormwater runoff erosion to occur during construction. Proper preventative steps shall be taken to prevent such erosion.

g) About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or building)? N/A

h) Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Erosion shall be controlled through the use of Best Management Practices at construction sites to avoid runoff to water ways and storm drains.



**2. Air**

a) What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known:

Dust and exhaust from construction equipment will exist through construction. The projects will not have a net effect on the air quality for the total area after the completion of this project.

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b) Are there any off-site sources of emissions or odor that may affect your proposal?

☐ Y ☒ N

If Yes, describe:

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c) Proposed measures to reduce or control emissions or other impacts to air, if any:

During construction, fugitive dust would be controlled through the application of water and sweeping of impervious surfaces. These emissions are expected to be temporary. No long-term impacts are anticipated.

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**3. Water****A) Surface:**

a) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? ☒ Y ☐ N.

If yes, describe type and provide names. If appropriate, state what stream or river it flows into. The McNary Reservoir of the Columbia River, is approximately ¼ mile south of the West Pasco Water Treatment Plant and approximately ½ mile south of the Butterfield Water Treatment Plant. The McNary Reservoir is the source of water for the City of Pasco and is the location of the raw water pumping stations for both the water treatment plants.

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b) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? ☒ Y ☐ N.

If Yes, describe and attach available plans.

The raw water pumping stations are located at the edge of, and within, the McNary Reservoir and are also within the 200 feet protected shoreline. All work at the intake structures will be required to comply with the City of Pasco Shorelines, DNR, and USACE permitting policies.

---

c) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

There is no fill and dredge material that would be placed in or removed from surface water or wetlands for this project.

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d) Will the proposal require surface water withdrawals or diversions? ☒ Y ☐ N.

Give general description, purpose, and approximate quantities if known.

Yes, the proposal requires water withdrawals or diversions. At full build-out of the West Pasco WTP will have a capacity of approximately 18 MGD and the Butterfield WTP will have a capacity of approximately 30 MGD, resulting in water withdrawal of approximately 48 MGD for city drinking water supply purposes. This water withdrawal is authorized in the existing water rights and in the Quad-City water right.

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e) Does the proposal lie within a 100-year floodplain? ☒ Y ☐ N.

If Yes, note location on the site plan. (Site Plan attached ☐ Y ☒ N).

f) Does the proposal involve any discharges of waste materials to surface water? ☒ Y ☐ N.

If Yes, describe the type of waste and anticipated volume of discharge:

The proposal involves discharge of return flows from the filtration process at the Butterfield WTP to the Columbia River (McNary Pool) via a NPDES General Permit for Water Treatment Plant.

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### **B) Ground:**

a) Will ground water be withdrawn, or will water be discharged to ground water? ☐ Y ☒ N

Give general description, purpose and approximate quantities if known:

The City of Pasco no longer uses ground water wells to supply the potable water system.

---

b) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: industrial, containing the following chemicals..., agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve:

None

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## c) Water Runoff (including storm water):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known):

The Plan does not specifically create storm water runoff.

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Where will this water flow?

N/A

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Will this water flow into other waters? ☐ Y ☒ N.

If Yes, explain:

- 
- 2) Could waste materials enter ground or surface waters? ☒ Y ☐ N.

If Yes, describe:

Gas/Oil spills from construction equipment and vehicle traffic.

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d) Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Preventative measures shall be placed to mitigate sediment runoff during construction.

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**4. Plants**

a) Check or circle types of vegetation found on the site:

☒ Deciduous tree; ☐ alder, ☐ maple, ☐ aspen, ☐ other:

☒ Evergreen tree; ☐ fir, ☐ cedar, ☐ pine, ☐ other:

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☒ Shrubs

☒ Pasture

☒ Crop or grain

☒ Wet soil plants; ☐ cattail, ☐ buttercup, ☐ bulrush, ☐ skunk cabbage, ☐ other:

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☒ Water plants: ☐ water lily, ☐ eelgrass, ☐ milfoil, ☐ other:

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☐ Other types of vegetation (Describe):

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b) What kind and amount of vegetation will be removed or altered?

Small amounts of vegetation may be disturbed during construction of projects identified in the Plan.  
Construction will generally be within urbanized areas so vegetation alteration and removal will be minimal.

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c) List threatened or endangered species known to be on or near the site:

No known endangered or threatened species.

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d) Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

This project will not change the existing condition of landscapes surrounding the project site. For projects identified in the Plan, where landscaping or native plants are disturbed during construction outside of public rights-of-way, the area will be returned to its existing or better condition.

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## 5. Animals

a) Circle any birds and animals, which have been observed on or near the site or are known to be near the site:

☒ Birds: ☐ hawk, ☐ heron, ☐ eagle, ☐ songbirds, ☐ other (describe):

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☒ Mammals: ☐ deer, ☐ bear, ☐ elk, ☐ beaver, ☐ other (describe):

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☒ Fish: ☐ bass, ☐ salmon, ☐ trout, ☐ herring, ☐ shellfish, ☐ other (describe):

---

b) List any threatened or endangered species known to be on or near the site.

Bull trout, Gray wolf, Pygmy rabbit are known to be threatened or endangered species found in Franklin County.

---

c) Is the site part of a migration route? ☒ Y ☐ N.

If Yes, explain:

Pacific Flyway

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d) Proposed measures to preserve or enhance wildlife, if any:

None proposed

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## **6. Energy and Natural Resources**

a) What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electrical power is currently used at the treatment plants and booster pumping stations. Electric power is supplied by the Franklin Public Utility District and Big Bend Electric Cooperative. Natural gas is provided for heating of structures at the treatment plants and booster pumping stations and is supplied by Cascade Natural Gas.

---

b) Would your project affect the potential use of solar energy by adjacent properties?

☐ Y ☒ N.

If Yes, describe:

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c) What kinds of energy conservation features are included in the plans of this proposal?

One of the purposes of the Plan is to promote water conservation and energy efficiency. Water conservation measures and improvements to pump efficiency will reduce the amount of energy needed to treat and pump the water to the domestic water system.

---

List other proposed measures to reduce or control energy impacts, if any:

None.

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## **7. Environmental Health**

a) Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, which could occur as a result of this proposal?

☒ Y ☐ N

If Yes, describe:

The primary and secondary chemicals used at the treatment plants, storage reservoirs, and booster pump stations all have the potential to create environmental health hazards.

---

1) Describe special emergency services that might be required.

No additional demands to public emergency services and no special safety requirements are necessary other than for potential accident issues associated with chemical handling. An emergency response program has been established and includes Public Works and the City of Pasco Fire Department.

---

2) Proposed measures to reduce or control environmental health hazards, if any:

Specific methods of hauling, handling, and disposing of these chemicals are included as part of the operations program of the water system.

---

b) Noise

1) What types of noise exist in the area, which may affect your project (for example: traffic, equipment, operation, other)?

The water system is located within an Urban area with typical urban noises present.

---

- 2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example: traffic, construction, operation, other)?

There will be temporary noise generated during construction, including noise from heavy machinery and vehicles. Construction activities are generally limited to normal work hours.

The plant operations (24-hours) will generate noise from pumps, air compressors, blowers, and other equipment. Mitigation includes site set backs and other forms of sound attenuation where necessary.

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- 3) Indicate what hours noise would come from the site. 7am - 6pm during Construction  
24/7 during Plant Operations

- 4) Proposed measures to reduce or control noise impacts, if any:

Construction equipment and vehicles will have proper mufflers and will generally be limited to normal work hours. The water system facilities will be operated to prevent or minimize operational noises from being heard outside of buildings. This will be accomplished through building design, noise screening, and sound attenuation of exhaust from the buildings.

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## 8. Land and Shoreline Use

- a) What is the current use of the site and adjacent properties? Residential, commercial, industrial, and agricultural land use districts.

- b) Has the site been used for agriculture? ☒ Y ☐ N.

If Yes, describe.

Lands within the Urban Growth Boundary and the Water Service Boundary have been used for agriculture in the past. Some lands will continue to be used for agricultural purposes until such time as they are converted to urban development projects.

---

- c) Describe any structures on the site.

The existing water system structures include: buildings, intake screens, flocculation and sedimentation basins, filters, clearwells, reservoirs, high service and booster pumping stations, chemical addition facilities, and offices. Structures throughout the Urban Growth Boundary include commercial, industrial, single family and multi-family residential structures, typical of an urban area.

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- d) Will any structures be demolished? ☐ Y ☒ N.

If Yes, what?

---

- e) What is the current zoning classification of the site? Citywide improvements will occur.

- f) What is the current comprehensive plan designation of the site? Citywide improvements will occur.
-



SHORELINE  
RESIDENTIAL &  
PUBLIC FLOOD  
PROTECTION  
~~TBD~~ CLEVEE ARM

- g) If applicable, what is the current shoreline master program designation of the site? TBD
- h) Has any part of the site been classified as an "environmentally sensitive" area? ☒ Y ☐ N.  
If so, specify.

Due  
9/20/16

The City of Pasco Planning Department maintains a Shoreline Management Plan and zoning and land use measures within the Urban Growth Boundary to protect any environmentally sensitive areas.

- i) Approximately how many people would reside or work in the completed project? TBD
- j) Approximately how many people would the completed project displace? None
- k) Proposed measures to avoid or reduce displacement impacts, if any:

WATER UTILITY  
9/20/16

N/A

- l) Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Individual projects set forth in the Comprehensive Plan would be subject to City of Pasco Planning Department review for compliance with land use regulations.

## 9. Housing

- a) Approximately how many units would be provided, if any? None
- Indicate whether high, middle, or low-income housing. N/A

- b) Approximately how many units, if any, would be eliminated? None
- Indicate whether high, middle, or low-income housing. N/A

- c) Proposed measures to reduce or control housing impacts, if any:

None proposed

## 10. Aesthetics

- a) What is the tallest height of any proposed structure(s), not including antennas? TBD



What is the principal exterior building material(s) proposed? TBD

- b) Proposed measures to reduce or control aesthetic impacts, if any:

Individual projects set forth in the Plan would be subject to City of Pasco Planning and Building Department reviews for compliance with City regulations.

---

### **11. Light and Glare**

- a) What type of light or glare will the proposal produce?

Individual projects set forth in the Plan may require outside lighting components.

---

What time of day would it mainly occur? Night

- b) Could light or glare from the finished project be a safety hazard or interfere with views?

☐ Y ☒ N.

- c) What existing off-site sources of light or glare may affect your proposal?

None

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- d) Proposed measures to reduce or control light and glare impacts, if any:

Outside lighting components will be required to be in compliance with City regulations.

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### **12. Recreation**

- a) What designated and informal recreational opportunities are in the immediate vicinity?

The Columbia River is used extensively by the public for water sports. Extensive park lands and recreation facilities are available along the Columbia River (McNary Reservoir) and throughout the entire Urban Growth Boundary of the City of Pasco. No negative impacts to recreational facilities are anticipated to result from the adoption of the Plan.

---

b) Would the proposed project displace any existing recreational uses? ☐ Y ☒ N.

If Yes, describe.

---

c) Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

None proposed

---

### **13. Historic and Cultural Preservation**

a) Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? ☒ Y ☐ N.

If Yes, describe.

There are a number of historical buildings and possible cultural sites located within the City of Pasco Urban Growth Boundary. Individual projects may be required to conduct historical and/or cultural surveys of the impacted area of the project.

---

b) Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

Individual projects may be required to conduct historic, archaeological, and/or cultural surveys of the impacted area of the project.

---

c) Proposed measures to reduce or control impacts, of any:

Individual projects may be required to conduct historic, archaeological, and/or cultural surveys of the impacted area of the project. Areas of historic, archaeological, or cultural importance would be avoided or impacts mitigated if unavoidable.

---

**14. Transportation**

a) Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any (Site Plan Attached? ☐ Y ☒ N).

Water distribution facilities are generally constructed within existing improved public rights-of-way or within rights-of-way which are being improved for public access.

---

b) Is site currently served by public transit? ☒ Y ☐ N.

City/UGA is served by the Ben-Franklin Transit Authority.

If not, what is the approximate distance to the nearest transit stop? \_\_\_\_\_

c) How many parking spaces would the completed project have? TBD

How many would the project eliminate? None

d) Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? ☒ Y ☐ N.

If Yes, generally describe (indicate whether public or private).

The Plan does not specifically increase or decrease new roads or streets. Pipelines, both new and existing, are usually constructed in public rights-of-way. When pipelines are constructed in existing roads, the surface of the road or street is restored. Other Plan projects such as, those that create new above ground facilities, may be required to construct improvements to existing roads or streets.

---

e) Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? ☒ Y ☐ N.

If Yes, describe.

Water, rail, and air transportation all exist within the Urban Growth Boundary and Plan improvement projects are likely to occur in the immediate vicinity of some or all of these systems.

---

f) How many vehicular trips per day would be generated by the completed project? TBD

If known, indicate when peak volumes would occur. TBD

g) Proposed measures to reduce or control transportation impacts, if any:

During construction of proposed improvements identified in the Plan, the construction contractor may be required to provide flag persons and signage to direct traffic until completion and site restoration.

---

**15. Public Services**

a) Would the project result in an increased need for public services (for example: fire protection, police protection, health care, school, other)? ☒ Y ☐ N.

If Yes, describe.

Plan improvements that propose construction of additional building facilities may require additional fire and police protection.

---

b) Proposed measures to reduce or control direct impacts on public services, if any.

The Plan includes many recommendations that will improve water related public services with the City of Pasco Urban Growth Boundary. Emergency water supply features and pipeline replacements will help ensure adequate and responsive service of domestic water and fire protection in accordance with the City of Pasco Comprehensive Land Use Plan.

---

**16. Utilities**

a) Check utilities currently available at the site:

☒ electricity, ☒ natural gas, ☒ water, ☒ refuse service, ☒ telephone, ☒ sanitary sewer, ☒ septic system, ☐ other (specify):

All areas within the City of Pasco Urban Growth Boundary currently or will have utility services available.

---

b) Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity, which might be needed.

Individual projects identified in the Plan may require extension of electrical services, natural gas services, water services, refuse service, telephone service, sanitary sewer service, or other public services.

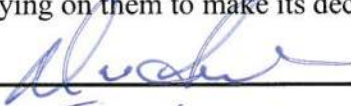
---

**C. SIGNATURE:**

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

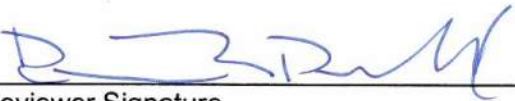
Signature: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

  
September 13, 2016

## Community & Economic Development Department

This application was reviewed by the Planning Division of the Community & Economic Development Department. Any comments or changes made by the Department are entered in the body of the checklist and contain initials of the reviewer.

  
Reviewer Signature Date 9/20/16  
DAVID I McDONALD

## D. Supplemental sheet for nonproject actions

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

WILL HAVE LITTLE TO NO IMPACT ON THESE ITEMS.

Proposed measures to avoid or reduce such increases are:

THE CITY CURRENTLY OPERATES UNDER A NPDES PERMIT FOR THE WATER TREATMENT PLANT

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

WILL HAVE LITTLE TO NO IMPACT

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

ALL RAW WATER INTAKE FACILITIES ARE DESIGNED TO PROTECT & CONSERVE FISH IN THE COLUMBIA RIVER.



3. How would the proposal be likely to deplete energy or natural resources?

MAINLY HYDRO-ELECTRIC POWER IS USED TO OPERATE PASCO'S WATER SYSTEM

Proposed measures to protect or conserve energy and natural resources are:

ADDRESSED BY CONSTRUCTION STANDARDS & OPERATIONAL GUIDES.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

THE PASCO WATER SYSTEM IS LOCATED WITHIN THE PASCO "UGA" WHICH IS MOSTLY URBAN IN NATURE.

Proposed measures to protect such resources or to avoid or reduce impacts are:

THE PROVISIONS OF THE CITY'S COMP PLAN & IMPLEMENTATION REGULATIONS APPLY.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

WILL NOT ENCOURAGE LAND OR SHORELINE USES INCOMPATIBLE WITH EXISTING PLANS.

Proposed measures to avoid or reduce shoreline and land use impacts are:

PASCO RECENTLY ADOPTED A "DOE" REVIEWED SHORELINE MASTER PROGRAM.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

WILL HAVE LITTLE TO NO IMPACT ON THESE ITEMS.

Proposed measures to reduce or respond to such demand(s) are:

ADDRESS BY CONSTRUCTION STANDARDS & OPERATIONAL GUIDES.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

PREPARATION OF A WATER COMP PLAN IS A STATE REQUIREMENT & DOES NOT CONFLICT WITH OTHER LAWS.



COMMUNITY DEVELOPMENT DEPARTMENT (509) 545-3441 / Fax (509) 545-3499  
P.O. Box 293, 525 North Third Avenue, Pasco, Washington 99301

## **DETERMINATION OF NON-SIGNIFICANCE**

**Description of Proposal:** Comprehensive Water Plan for City of Pasco.

**Proponent:** CITY OF PASCO  
PO BOX 293  
PASCO, WA 99301

**Location of Proposal:** 1306 W B Street (main Water Treatment Plant) (Comp Plan applies City-wide)

**Lead Agency:** City of Pasco

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2) (c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

- ☐ There is no comment period for this DNS.
- ☒ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by: October 4, 2016

**Responsible Official:** David I. McDonald

**Position/Title:** CITY PLANNER

**Address:** P. O. BOX 293, PASCO, WA 99301-0293

**Phone:** (509) 545-3441

**Date:** 9/20/2016

**Signature:** 

**ED Number:** SEPA2016-038

**Master File Number:** [None Assigned]



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