CITY OF SELAH
WATER SYSTEM PLAN

HLA
Engineering and Land Surveying, Inc.

February 2021

PROJECT NO. 19061E

CITY OF SELAH

WATER SYSTEM PLAN

Prepared by:

HLA
Engineering and Land Surveying, Inc.

PROJECT NO. 19061E

FEBRUARY 2021

TABLE OF CONTENTS

INTRODUCTION AND EXECUTIVE SUMMARY i
INTRODUCTION ii
PLANNING REQUIREMENTS ii
OBJECTIVE ii
PROJECTED WATER DEMANDS iii
SUMMARY OF SYSTEM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS iv
SUPPLY iv
STORAGE iv
DISTRIBUTION v
TELEMETRY v
PROPOSED WATER SYSTEM FINANCIAL PROGRAM v

CHAPTER 1 - DESCRIPTION OF THE WATER SYSTEM 1-1
1.1 OWNERSHIP AND MANAGEMENT 1-2
1.1.1 Water System Ownership 1-2
1.2 SYSTEM BACKGROUND 1-4
1.2.1 History of Water System Development and Growth 1-4
1.2.2 Geography 1-5
1.2.3 Neighboring/Adjacent Purveyors 1-6
1.2.4 Ordinances/Bylaws 1-8
1.3 INVENTORY OF EXISTING FACILITIES 1-8
1.3.1 General Description of Existing System Facilities and Major Components 1-8
1.4 RELATED PLANS 1-9
1.4.1 Previous Comprehensive Water Plans 1-9
1.4.2 Water System Plans for Adjacent Water Systems 1-9
1.4.3 Urban Growth Area Comprehensive Plan 1-9
1.4.4 2019 Selah Sub-Area Plan 1-9
1.4.5 Wellhead Protection Program 1-10
1.4.6 General Sewer Plans 1-10
1.4.7 Watershed Plan 1-11
1.5 EXISTING SERVICE AREA 1-12
1.6 FUTURE SERVICE AREA 1-13
1.7 SERVICE AREA AGREEMENTS 1-16
1.8 SERVICE AREA POLICIES 1-16
1.9 SATELLITE MANAGEMENT AGENCIES 1-18
1.10 CONDITIONS OF SERVICE 1-18
1.11 COMPLAINTS 1-18
1.12 DUTY TO SERVE 1-18
1.13 LOCAL GOVERNMENT CONSISTENCY 1-19

CHAPTER 2 - BASIC PLANNING DATA 2-1
2.1 POPULATION 2-2
2.2 CURRENT AND FUTURE WATER SERVICES 2-3
2.2.1 Current Water Services 2-3
2.2.2 Future Water Services 2-4
2.3 CURRENT WATER PRODUCTION AND CONSUMPTION 2-6
2.3.1 Water Production 2-6
2.3.2 Current Water Consumption 2-7
2.3.3 Seasonal Water Consumption 2-9
2.3.4 Maximum and Peak Consumption 2-11
2.3.5 Distribution System Leakage (DSL) 2-12
2.3.6 Water Supply Characteristics and Trends 2-13
2.3.7 Equivalent Residential Units 2-15

2.4 FORECAST OF FUTURE WATER DEMAND 2-16
2.4.1 Future ERUs and ADD 2-17
2.4.2 Future MDD and PHD 2-19
2.4.3 Current and Future Water Demand by Pressure Zone 2-21

CHAPTER 3 - SYSTEM INVENTORY AND ANALYSIS 3-1
3.1 SYSTEM DESIGN STANDARDS 3-2
3.2 WATER QUALITY 3-3
3.2.1 Water Source Sampling and Testing 3-3
3.2.2 Distribution System Sampling and Testing 3-12
3.2.3 Future Source Water and Distribution System Sampling and Testing 3-15
3.3 SYSTEM DESCRIPTION AND INVENTORY 3-16
3.3.1 Water Sources 3-20
3.3.2 Water Treatment 3-23
3.3.3 Booster Pump Stations 3-23
3.3.4 Pressure Reducing Valves 3-25
3.3.5 Storage Facilities 3-26
3.3.6 Telemetry Control System 3-27
3.3.7 Transmission and Distribution Systems 3-31
3.3.8 Asset Condition Assessment 3-31
3.4 SYSTEM CAPACITY ANALYSIS 3-33
3.4.1 Source of Supply and Reliability Analysis 3-33
3.4.2 Water Right Self-Assessment 3-35
3.4.3 Storage Analysis 3-39
3.4.4 Fire Flow 3-47
3.4.5 Pressure Reducing Valve Capacity Analysis 3-50
3.4.6 Hydraulic Analysis 3-51
3.4.7 Assumptions 3-51
3.4.8 Analysis Scenarios 3-53
3.4.9 Model Calibration 3-53
3.5 SYSTEM CAPACITY ANALYSIS SUMMARY 3-55
3.6 SUMMARY OF SYSTEM DEFICIENCIES 3-57
3.6.1 Supply 3-57
3.6.2 Storage 3-58
3.6.3 Distribution 3-58
3.6.4 Telemetry 3-58
3.7 SELECTION AND JUSTIFICATION OF PROPOSED IMPROVEMENT PROJECTS 3-59
3.7.1 Supply 3-59
3.7.2 Storage 3-59
3.7.3 Distribution 3-60

CHAPTER 4 – WATER USE EFFICIENCY PROGRAM 4-1
4.1 WATER USE EFFICIENCY PROGRAM 4-2
4.1.1 Planning Requirements 4-2
4.1.2 Current Water Conservation Program 4-3
4.1.3 Water Use Efficiency Goals 4-4
4.1.4 Evaluation and Implementation of Water Use Efficiency Measures 4-4
4.1.5 WUE Measure Implementation 4-8
4.1.6 Customer Education 4-9
4.1.7 Water Use Efficiency Program Effectiveness 4-9
4.1.8 Water Use Efficiency Savings 4-10

CHAPTER 5 - SOURCE WATER PROTECTION 5-1
5.1 WELLHEAD PROTECTION PROGRAM 5-2
5.2 UPDATES AND MODIFICATIONS TO THE WELLHEAD PROTECTION PLAN 5-3

CHAPTER 6 - OPERATION AND MAINTENANCE PROGRAM....6-1
6.1 WATER SYSTEM MANAGEMENT AND PERSONNEL....6-2
6.2 OPERATOR CERTIFICATION....6-3
6.3 SYSTEM OPERATION AND CONTROL....6-5
6.4 SAFETY PROCEDURES....6-8
6.5 SERVICE AND SUPPLY REPRESENTATIVES....6-9
6.6 COMPREHENSIVE MONITORING PLAN....6-11
6.6.1 Monitoring Requirements, Location, and Frequency....6-12
6.6.2 Testing Laboratories....6-13
6.6.3 Violation Procedures....6-13
6.6.4 Follow-up Action....6-17
6.7 EMERGENCY RESPONSE PROGRAM....6-25
6.7.1 System Information....6-26
6.7.2 Chain of Command....6-26
6.8 EMERGENCY EVENTS....6-27
6.9 SEVERITY OF EMERGENCIES....6-27
6.10 EMERGENCY NOTIFICATION....6-29
6.11 WATER QUALITY SAMPLING....6-33
6.12 RESPONSE ACTIONS FOR SPECIFIC EVENTS....6-34
6.13 ALTERNATIVE WATER SOURCES....6-37
6.14 RETURNING TO NORMAL OPERATIONS....6-37
6.15 CROSS-CONNECTION CONTROL PROGRAM....6-38
6.16 CUSTOMER COMPLAINT RESPONSE PROGRAM....6-39
6.17 RECORD KEEPING AND REPORTING....6-39
6.18 O&M IMPROVEMENTS....6-40

CHAPTER 7 - DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS....7-1
7.1 PROJECT REVIEW PROCEDURES....7-2
7.2 POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES....7-2
7.3 DESIGN STANDARDS AND CONSTRUCTION STANDARDS....7-3
7.4 CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES....7-3

CHAPTER 8 – CAPITAL IMPROVEMENT PROGRAM....8-1
8.1 IMPROVEMENT PROGRAM OBJECTIVE....8-2
8.2 OPERATIONAL AND MAINTENANCE (O&M) IMPROVEMENTS....8-2
8.2.1 Year 2021 Through Year 2030 Prioritized Improvements....8-2
8.2.2 Schedule of Recommended O&M Improvements....8-9
8.3 MAJOR CAPITAL IMPROVEMENTS....8-11
8.3.1 Year 2021 through Year 2030 Prioritized Improvements....8-11
8.3.2 Year 2031 through Year 2041 Prioritized Improvements....8-20
8.3.3 Schedule of Recommended Major Capital Improvements....8-28
8.4 FUTURE MAJOR CAPITAL IMPROVEMENTS (PLANNING)....8-30

CHAPTER 9 - FINANCIAL PROGRAM....9-1
9.1 PAST AND PRESENT FINANCIAL STATUS....9-2
9.2 AVAILABLE REVENUE SOURCE....9-4
9.3 RECOMMENDED FINANCING STRATEGY....9-7
9.4 WATER RATES....9-9

CHAPTER 10 - MISCELLANEOUS DOCUMENTS....10-1
10.1 MISCELLANEOUS DOCUMENTS INDEX....10-2

LIST OF TABLES

TABLE 1-1 MAJOR WATER SYSTEM IMPROVEMENTS....1-4
TABLE 1-2 WATER SYSTEM GROWTH SUMMARY....1-5
TABLE 1-3 EXISTING ZONING WITHIN CITY LIMITS....1-12
TABLE 1-4 GMA PLANNING AREA OUTSIDE OF CITY LIMITS BUT WITHIN SELAH UGA....1-13
TABLE 2-1 CENSUS POPULATION TRENDS....2-2
TABLE 2-2 OFM POPULATION ESTIMATES....2-3
TABLE 2-3 CITY POPULATION PROJECTIONS....2-3
TABLE 2-4 YEAR 2021 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE....2-4
TABLE 2-5 YEAR 2031 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE....2-5
TABLE 2-6 YEAR 2041 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE....2-6
TABLE 2-7 SELAH ANNUAL WATER PRODUCTION 2013 - 2018....2-6
TABLE 2-8 SELAH MONTHLY WATER PRODUCTION 2017....2-7
TABLE 2-9 METERED WATER SERVICES BY USER CATEGORY 2013-2018....2-7
TABLE 2-10 ANNUAL WATER CONSUMPTION BY USER CATEGORY 2013-2018....2-8
TABLE 2-11 AVERAGE DAY WATER CONSUMPTION BY USER CATEGORY 2013-2018....2-8
TABLE 2-12 MAXIMUM MONTH WATER CONSUMPTION, JULY 2017....2-11
TABLE 2-13 MAXIMUM DAY AND PEAK HOUR WATER DEMAND, JULY 7, 2017....2-12
TABLE 2-14 SELAH WATER PRODUCTION AND CONSUMPTION 2013-2018....2-12
TABLE 2-15 SELAH GROUNDWATER LEVEL CONDITIONS 2015 – 2020[A]....2-14
TABLE 2-16 EQUIVALENT RESIDENTIAL UNIT FACTORS (ERUS)....2-16
TABLE 2-17 YEAR 2021 ERU AND ADD....2-18
TABLE 2-18 YEAR 2031 ERU AND ADD....2-18
TABLE 2-19 YEAR 2041 ERU AND ADD....2-19
TABLE 2-20 YEAR 2021 MDD AND PHD....2-19
TABLE 2-21 YEAR 2031 MDD AND PHD....2-20
TABLE 2-22 YEAR 2041 MDD AND PHD....2-20
TABLE 2-23 YEAR 2021 WATER DEMAND BY PRESSURE ZONE....2-22
TABLE 2-24 YEAR 2031 WATER DEMAND BY PRESSURE ZONE....2-23
TABLE 2-25 YEAR 2041 WATER DEMAND BY PRESSURE ZONE....2-24
TABLE 3-1 SYSTEM DESIGN STANDARDS....3-2
TABLE 3-2 INORGANIC (PRIMARY SUBSTANCES) CHEMICAL ANALYSIS SUMMARY....3-4
TABLE 3-3 INORGANIC (SECONDARY SUBSTANCES) CHEMICAL ANALYSIS SUMMARY....3-4
TABLE 3-4 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NOS. 3 & 4 (S05)....3-5
TABLE 3-5 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 5 (S03)....3-6
TABLE 3-6 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 6 (S04)....3-7
TABLE 3-7 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 7 (S06)....3-8
TABLE 3-8 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 8 (S07)....3-9
TABLE 3-9 NITRATE/NITRITE CHEMICAL ANALYSIS RESULTS....3-10
TABLE 3-10 SOURCE WELL VOC TESTING....3-11
TABLE 3-11 SOURCE WELL SOC TESTING....3-11
TABLE 3-12 SOURCE WELL RADIONUCLIDE TESTING....3-12
TABLE 3-13 TTHM AND HAA5 PROGRAM SUMMARY OF RESULTS....3-13
TABLE 3-14 LEAD AND COPPER MONITORING PROGRAM SUMMARY OF RESULTS....3-14
TABLE 3-15 FUTURE SOURCE WATER SAMPLING REQUIREMENTS....3-15
TABLE 3-16 FUTURE DISTRIBUTION SYSTEM SAMPLING REQUIREMENTS....3-16
TABLE 3-17 SELAH WATER SYSTEM PRESSURE ZONE INFORMATION....3-16
TABLE 3-18 SELAH SOURCE WELL INFORMATION SUMMARY....3-22
TABLE 3-19 BOOSTER PUMP STATION INFORMATION....3-24
TABLE 3-20 PRESSURE REDUCING VALVE SETTINGS....3-25
TABLE 3-21 WATER RESERVOIR INFORMATION....3-26
TABLE 3-22 EXISTING TELEMETRY CONTROL SETTINGS BASED ON RESERVOIR LEVELS....3-28
TABLE 3-23 WATER DISTRIBUTION SYSTEM PIPE SIZE SUMMARY....3-31
TABLE 3-24 ASSET CONDITION ASSESSMENT SUMMARY....3-32
TABLE 3-25 WATER SUPPLY RELIABILITY SUMMARY....3-34
TABLE 3-26 WATER RIGHT SELF-ASSESSMENT....3-38

TABLE 3-27 CURRENT AND FUTURE SYSTEM-WIDE STANDBY STORAGE REQUIREMENTS 3-40
TABLE 3-28 CURRENT AND FUTURE SYSTEM-WIDE EQUALIZING STORAGE REQUIREMENTS3-40
TABLE 3-29 CURRENT AND FUTURE SYSTEM-WIDE STORAGE REQUIREMENTS 3-41
TABLE 3-30 CURRENT AND FUTURE ZONE 2 AND ABOVE STANDBY STORAGE REQUIREMENTS 3-42
TABLE 3-31 EXISTING AND FUTURE ZONE 2 AND ABOVE EQUALIZING STORAGE REQUIREMENTS.....3-43
TABLE 3-32 CURRENT AND FUTURE ZONE 2 AND ABOVE TOTAL STORAGE REQUIREMENTS 3-43
TABLE 3-33 CURRENT AND FUTURE NORTH HILL ZONE 4, 5, AND 6 STANDBY STORAGE REQUIREMENTS.....3-44
TABLE 3-34 EXISTING AND FUTURE NORTH HILL ZONE 4, 5, AND 6 EQUALIZING STORAGE REQUIREMENTS.....3-45
TABLE 3-35 CURRENT AND FUTURE NORTH HILL ZONE 4, 5, AND 6 TOTAL STORAGE REQUIREMENTS.....3-45
TABLE 3-36 CURRENT AND FUTURE SOUTH HILL ZONE 4, 5, 6, AND 7 STANDBY STORAGE REQUIREMENTS.....3-46
TABLE 3-37 EXISTING AND FUTURE SOUTH HILL ZONE 4, 5, 6, AND 7 EQUALIZING STORAGE REQUIREMENTS.....3-47
TABLE 3-38 CURRENT AND FUTURE SOUTH HILL ZONE 4, 5, 6, AND 7 TOTAL STORAGE REQUIREMENTS.....3-47
TABLE 3-39 DOH MINIMUM FIRE FLOW REQUIREMENTS 3-48
TABLE 3-40 PRESSURE REDUCING VALVE CAPACITY SUMMARY 3-50
TABLE 3-41 HYDRAULIC ANALYSIS PARAMETERS 3-52
TABLE 3-42 FIRE FLOW FIELD TEST AND HYDRAULIC MODEL RESULTS 3-54
TABLE 3-43 CURRENT AND FUTURE DEMAND, SOURCE CAPACITY AND WATER RIGHTS SUMMARY 3-55
TABLE 3-44 ERU CAPACITY SUMMARY (DOH WORKSHEET 4-1) 3-56
TABLE 4-1 WATER USE EFFICIENCY RULE REQUIREMENTS.....4-2
TABLE 4-2 WATER CONSUMPTION INFORMATION 2013-2018.....4-3
TABLE 4-3 WATER USE EFFICIENCY MEASURES 4-4
TABLE 4-4 SUMMARY OF DEMAND SIDE WUE MEASURES 4-7
TABLE 4-5 SUMMARY OF SUPPLY SIDE WUE MEASURES.....4-8
TABLE 4-6 SUMMARY AND PROJECTED SAVINGS OF WATER USE EFFICIENCY MEASURES 4-8
TABLE 4-7 DEMAND FORECAST WITH AND WITHOUT PROJECTED WUE SAVINGS 4-10
TABLE 5-1 2019 POTENTIAL CONTAMINANT SOURCE GROUP 5-3
TABLE 6-1 MINIMUM MONTHLY COLIFORM SAMPLING REQUIREMENTS.....6-12
TABLE 6-2 DISINFECTION BYPRODUCTS AND RESIDUALS.....6-13
TABLE 6-3 INORGANIC CHEMICAL MCLS 6-14
TABLE 6-4 RADIONUCLIDE MCLS 6-15
TABLE 6-5 VOLATILE ORGANIC CHEMICAL MCLS.....6-15
TABLE 6-6 SYNTHETIC ORGANIC CHEMICAL MCLS 6-16
TABLE 6-7 EMERGENCY CHAIN-OF-COMMAND AND RESPONSIBILITIES.....6-27
TABLE 6-8 LOCAL NOTIFICATION LIST.....6-30
TABLE 6-9 STATE NOTIFICATION LIST.....6-30
TABLE 6-10 SERVICE / REPAIR NOTIFICATION LIST 6-31
TABLE 6-11 SENSITIVE USERS NOTIFICATION LIST 6-31
TABLE 6-12 CUSTOMER NOTIFICATION PROCEDURES.....6-32
TABLE 6-13 LAW ENFORCEMENT, EMERGENCY MANAGEMENT, COUNTY HEALTH, DOH, AND WDOE NOTIFICATION PROCEDURES.....6-32
TABLE 6-14 SERVICE AND REPAIR CONTRACTOR NOTIFICATION PROCEDURES 6-33
TABLE 6-15 NEIGHBORING WATER SYSTEM NOTIFICATION PROCEDURES.....6-33
TABLE 6-16 HEALTH ADVISORY ISSUANCE NOTIFICATION PROCEDURES 6-33
TABLE 6-17 RESPONSE ACTIONS FOR POWER OUTAGES 6-34
TABLE 6-18 RESPONSE ACTIONS FOR WATER MAIN BREAK 6-35
TABLE 6-19 RESPONSE ACTIONS FOR MICROBIAL CONTAMINATION 6-35
TABLE 6-20 RESPONSE ACTIONS FOR CHEMICAL CONTAMINATION.....6-35
TABLE 6-21 RESPONSE ACTIONS FOR EARTHQUAKE.....6-35
TABLE 6-22 RESPONSE ACTIONS FOR HAZARDOUS MATERIAL SPILL 6-36
TABLE 6-23 RESPONSE ACTIONS FOR ELECTRONIC EQUIPMENT FAILURE.....6-36
TABLE 6-24 RESPONSE ACTIONS FOR VANDALISM OR TERRORIST ATTACK 6-36

TABLE 6-25 ALTERNATIVE WATER SOURCES 6-37
TABLE 6-26 ACTIONS FOR RETURNING THE SYSTEM TO NORMAL OPERATION 6-38
TABLE 6-27 SELAH WATER SYSTEM COMPLAINTS 2007-2012 6-39
TABLE 6-28 SELAH WATER SYSTEM RECORDS 6-39
TABLE 8-1 SCHEDULE OF RECOMMENDED O&M IMPROVEMENTS 8-10
TABLE 8-2 SCHEDULE OF RECOMMENDED MAJOR CAPITOL IMPROVEMENTS 8-29
TABLE 9-1 WATER OPERATING FUND (FUND 411) BALANCES 9-2
TABLE 9-2 WATER RESERVE FUND (FUND 461) BALANCES 9-2
TABLE 9-3 WATER OPERATING FUND (FUND 411) REVENUES AND EXPENDITURES 9-3
TABLE 9-4 FUNDING SOURCE SUMMARY 9-7
TABLE 9-5 PROPOSED WATER OPERATING FUND (411) AND RESERVE FUND (461) FINANCIAL PROGRAM 9-8
TABLE 9-6 EXAMPLE RATE STRUCTURE COMPARISON 9-11

LIST OF FIGURES

FIGURE 1-1 STATE VICINITY MAP 1-3
FIGURE 1-2 EXISTING AND FUTURE SERVICE AREAS 1-7
FIGURE 1-3 EXISTING ZONING MAP 1-14
FIGURE 1-4 FUTURE LAND USE MAP 1-15
FIGURE 2-1 SEASONAL SINGLE-FAMILY RESIDENTIAL CONSUMPTION 2-9
FIGURE 2-2 SEASONAL CONSUMPTION BY USER CATEGORY 2017 2-10
FIGURE 3-1 STATIC PRESSURE ZONE MAP 3-17
FIGURE 3-2 WATER SYSTEM SCHEMATIC 3-19
FIGURE 3-3 YEAR 2021 RESERVOIR STORAGE LEVELS 3-29
FIGURE 3-4 YEAR 2041 RESERVOIR STORAGE LEVELS 3-30
FIGURE 3-5 YEAR 2021 MAX DAY DEMAND FIRE FLOW CAPACITIES MAP 3-49
FIGURE 6-1 WATER SYSTEM ORGANIZATIONAL CHART 6-4
FIGURE 8-1 RECOMMENDED WATER SYSTEM IMPROVEMENTS 8-12
FIGURE 8-2 FUTURE MAJOR WATER SYSTEM IMPROVEMENTS MAP 8-31

INTRODUCTION

AND

EXECUTIVE SUMMARY

HLA
Engineering and Land Surveying, Inc.

INTRODUCTION

The City of Selah is located in the upper Yakima Valley, within the northern part of Yakima County. The City lies along Interstate 82, approximately 3 miles north of the City of Yakima, and 36 miles south of the City of Ellensburg, in a dry, sunny area consisting of cultivated lands and sage-covered foothills. Incorporated in 1919, Selah lies against the west foothills of the valley, with over two-thirds of the City varying from 1,100 to 1,200 feet in elevation above mean sea level. Selah's economy depends largely on the agricultural industry; two fruit warehouses and two fruit juice companies provide most of the employment within the City.

Selah recognizes the need to improve and expand its water system to meet the demands of its system users and keep pace with other growth-oriented improvements in this vital Yakima County community. HLA Engineering and Land Surveying, Inc. (HLA), was authorized by the City of Selah to prepare this Water System Plan, which represents the culmination of planning and data collection efforts.

PLANNING REQUIREMENTS

Water systems with 1,000 or more services are required to have a water system plan approved by the Washington State Department of Health (DOH) pursuant to the Washington Administrative Code, WAC 246-290-100 and WAC 246-291-140.

To assist water utilities in preparing their plans, DOH has published a *Water System Planning Handbook,* Document No. 331-068, revised August 10, 2020. This handbook identifies information needed in a water system plan to "identify current demands and future needs and apply available resources most efficiently in order to provide high quality service at the lowest cost while protecting the community's health." The handbook is organized into 10 major chapters, with each chapter representing a basic water system plan component. The 10 chapters are:

1. Description of the Water System
2. Basic Planning Data
3. System Analysis and Asset Management
4. Water Use Efficiency Program
5. Source Water Protection
6. Operation and Maintenance Program
7. Distribution Facilities Design and Construction Standards
8. Capital Improvement Program
9. Financial Program
10. Miscellaneous Documents

Each chapter is divided into several sections to address specific topics in detail. The City of Selah *2021 Water System Plan* update has been prepared in the format of the Department of Health's *Water System Planning Handbook*.

OBJECTIVE

The principal goal of water system planning is to make efficient use of available resources. This is accomplished by making decisions about water system capital improvements and operations which are in accordance with overall system policies and directions expressed in a utility's water system plan.

An equally important reason for developing a water system plan is to assure orderly growth of the system while maintaining reliable delivery of high-quality water. The plan is intended to guide water utility actions in a manner consistent with other activities taking place in the community.

The water system plan is intended to look ahead at least 20 years into the future. Development of a definite improvement schedule and financial program is required for the plan approval period, while the planning approach for remaining years may be more conceptual. DOH plan approval is effective for ten years from the date of written approval, unless otherwise requested by DOH. To continually provide adequate guidance to decision makers, the plan must be updated prior to expiration of the current plan approval.

Once adopted by the City of Selah and approved by DOH, the Water System Plan is considered "to be a commitment to implement the actions identified in the improvement schedule." Future water system decisions shall be in accordance with the Water System Plan.

PROJECTED WATER DEMANDS

To plan for Selah's future water needs, the following items were examined:

Basic Planning Data (CHAPTER 2): Land use, future service area boundary, and population growth are used to evaluate demands on the Selah water system. The City's 2019 population was estimated by the Office of Financial Management in Washington as 7,965, and the future populations projected for the 10-year (2031) and 20-year (2041) planning periods by Yakima County are 9,023 and 9,997 respectively. Selah's 2016-2018 three-year average number of residential water services was 2,314, and the future number of residential services is projected to be 2,746 by the year 2031.

Current Water Demands (CHAPTER 2): Selah's greatest year of water consumption in the last six years was in 2015 when 860.39 million gallons was consumed. This is equal to an average daily consumption of 2,357,241 million gallons. The maximum month of water consumption was experienced in July 2017, when the average daily consumption for the month was 3,649,251 gallons. Maximum day consumption (based upon the maximum day of water production in the month) was 4,642,302 gallons on July 7, 2017, and peak hour consumption was calculated to be 5,319 gpm.

Projected Water Demands (CHAPTER 2): Selah's water demand forecast for the year 2031, and the City's current source capacity and water rights are below:

	PROJECTED YEAR	CURRENT SOURCE	CURRENT
	2031 Demand	Capacity	Water Rights
ERUs	6,715	- - - - - - -	- - - - - - -
Annual	1,020.989 MG	2,890.800 MG	1,550.945 MG
Maximum Day	5.728 MGD	7.920 MGD	7.920 MGD
Peak Hour	6,564 gpm	5,500 gpm	- - - - - - -

SUMMARY OF SYSTEM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

The following is a listing of the major water system deficiencies and recommended improvements which have been identified in the existing water system. A more detailed description of these deficiencies and related improvements can be found in CHAPTER 8.

SUPPLY

Water Rights – A City's water right status is crucial in determining the amount of possible future growth. Currently, Selah has annual rights (Q_a) of 4,760 acre-feet per year and instantaneous rights (Q_i) of 5,500 gpm. As discussed in CHAPTER 2, current water rights are adequate in providing for existing and projected year 2041 demands, but will become the limiting factor in the City's future physical system capacity beyond the 20-year planning horizon. Should population trends and demand projections change, the water rights may be exceeded by year 2041.

As discussed in CHAPTER 1, the City currently requires any proposed new development, projected to exceed the City's current water right capacity, to transfer any water rights the developer may hold to the City, prior to approval of the new development.

Industrial customer water usage accounts for nearly 40 percent of the City's annual water demand, as discussed in CHAPTER 2. As a result, future industrial usage needs to be closely monitored by the City to ensure demand projections are not exceeded. Consideration should be given to explore the potential of transferring existing water rights owned by industries to the City, especially if potable water demands are requested to be increased.

Source Well Capacity – Selah's source wells are limited by the City's water rights of 5,500 gpm and may be capable of producing 6,400 gpm should additional instantaneous water rights be acquired and when well production is optimized to meet the larger capacity. The existing source capacity is adequate to meet current and anticipated 2041 demands. However, if population trends change unexpectedly, demand projections increase above the present trendlines, or unanticipated drought occurs, the source well capacities may need to be reevaluated prior to year 2041.

In 2019, Selah analyzed their system and recognized that the City was not using their allowed 5,500 gpm water rights due to corrective maintenance required in Well No. 7. Department of Ecology made grants available to twenty-four (24) drought affected areas in Washington State at the same time. Selah's analysis prior to the declaration of drought resulted in Selah receiving funding to repair Well No. 7 and optimize water production even during time of drought.

Booster Pump Stations – Any future development within Zone 7 south will require a new booster pump station to serve this pressure zone. These improvements are shown in Figure 8-1. No other booster station improvements are needed at this time.

STORAGE

Storage Capacity – As discussed previously in CHAPTER 3, the City's total reservoir storage capacity is adequate to meet the 20-year projected demand, by nesting fire suppression and standby storage. Therefore, no improvement project is recommended at this time except for the Valhalla reservoirs. Additional reservoir storage capacity will be needed in the Valhalla (North Hill) area to serve anticipated full build out demand. If future water demands change, the City may need to reevaluate the need for additional storage.

Reservoir Cleaning and Maintenance – The North Reservoirs were constructed in 1938 and have some minor cracking and signs of age. The smaller North Reservoir has been offline for some time due to leakage. It is recommended this reservoir be replaced with a new reinforced concrete reservoir.

DISTRIBUTION

Service Meters – The City's existing water service meters are primarily hand-read. It is recommended the City implement radio-read service meters in the future, requiring less labor and more accurate, readily available consumption data. Replacement of older service meters is necessary to improve accuracy and potentially reduce the distribution system leakage (DSL) percentage.

Fire Flow Capacity – Figure 3-5 identifies existing system fire flow capacities along with the minimum fire flow requirements for regions within the City. As shown on the figure, some locations are deficient based on the computer hydraulic model. Refer to Figure 8-1 for suggested improvements to address deficiencies.

Water Main Upsizing and Replacement – Most of the deficiencies identified in Figure 3-5 can be addressed by upsizing water mains. Suggested Improvements for water main upsizing are shown in Figure 8-1.

Pressure – Water services currently range in elevation from 1,080 to 1,500 feet, with static pressures ranging from 37 to 97 psi. Higher pressures are experienced at lower portions of the distribution system, at locations furthest away from reservoirs in respective pressure zones. Typically, distribution system pressures should not exceed 100 psi, unless the design engineer can justify the need for the excessive pressure and verify the pipe material is appropriate. High pressures are beneficial at these locations for fire flow reliability. Few locations experience pressure greater than 100 psi. In those locations, the City will install and maintain individual service pressure reducing valves (PRVs) if determined necessary by the Public Works Supervisor.

TELEMETRY

Selah's telemetry control system was installed in 2001 and is controlled by a master Programmable Logic Controller (PLC), which is located at the City's public works office. The Human Machine Interface (HMI) computer is the City's connection to the master PLC for making operational adjustments to the water system. A new HMI computer was purchased in 2019.

PROPOSED WATER SYSTEM FINANCIAL PROGRAM

Recommended system improvements are scheduled for completion in annual increments for the next ten (10) years, as shown in Table 8-1 and Table 8-2 in CHAPTER 8. Scheduling of the remaining improvements beyond this ten-year planning period needs to be reviewed yearly as priorities and City growth patterns change and progress. Major recommended improvements for future years (2031 through 2041) have been estimated but have not been scheduled at this time. The estimated improvement costs are provided in Table 8-1 and Table 8-2, as well as the total projected yearly cost.

To fund the recommended water system improvements discussed in this Plan, a proposed financial program has been developed and is provided in Table 9-5 and CHAPTER 9. The proposed financial program incorporates projected operations, improvements, and loan costs for the next six-year period. Projected revenues and expenditures of the water system include growth factors and inflation rates, in addition to the recommended rate increases, to account for estimated growth within the City, as discussed in CHAPTER 9.

The City of Selah will continue annual reviews of the water system's financial program during their budget preparation process. The financial program will also be reviewed and revised as needed during the next update of the *Water System Plan*. This continued review will allow for modifications to the proposed rate and revenue increases, should financial conditions change.

CHAPTER 1 -

DESCRIPTION OF THE WATER SYSTEM

HLA
Engineering and Land Surveying, Inc.

1.1 OWNERSHIP AND MANAGEMENT

1.1.1 Water System Ownership

The City of Selah, a municipal corporation located within the northern part of Yakima County as shown in Figure 1-1 State Vicinity Map, owns and operates its own water system. Decisions regarding daily water system operations are made by the City Administrator and the Public Works Director. Financial decisions regarding major water system improvements and establishment of water rates are made by the Selah City Council. The following parties are involved in the operation, maintenance, and planning for the Selah water production, storage, and distribution facilities:

WATER SYSTEM NAME, OWNER, OPERATOR, AND IDENTIFICATION NUMBER:

City of Selah Water System

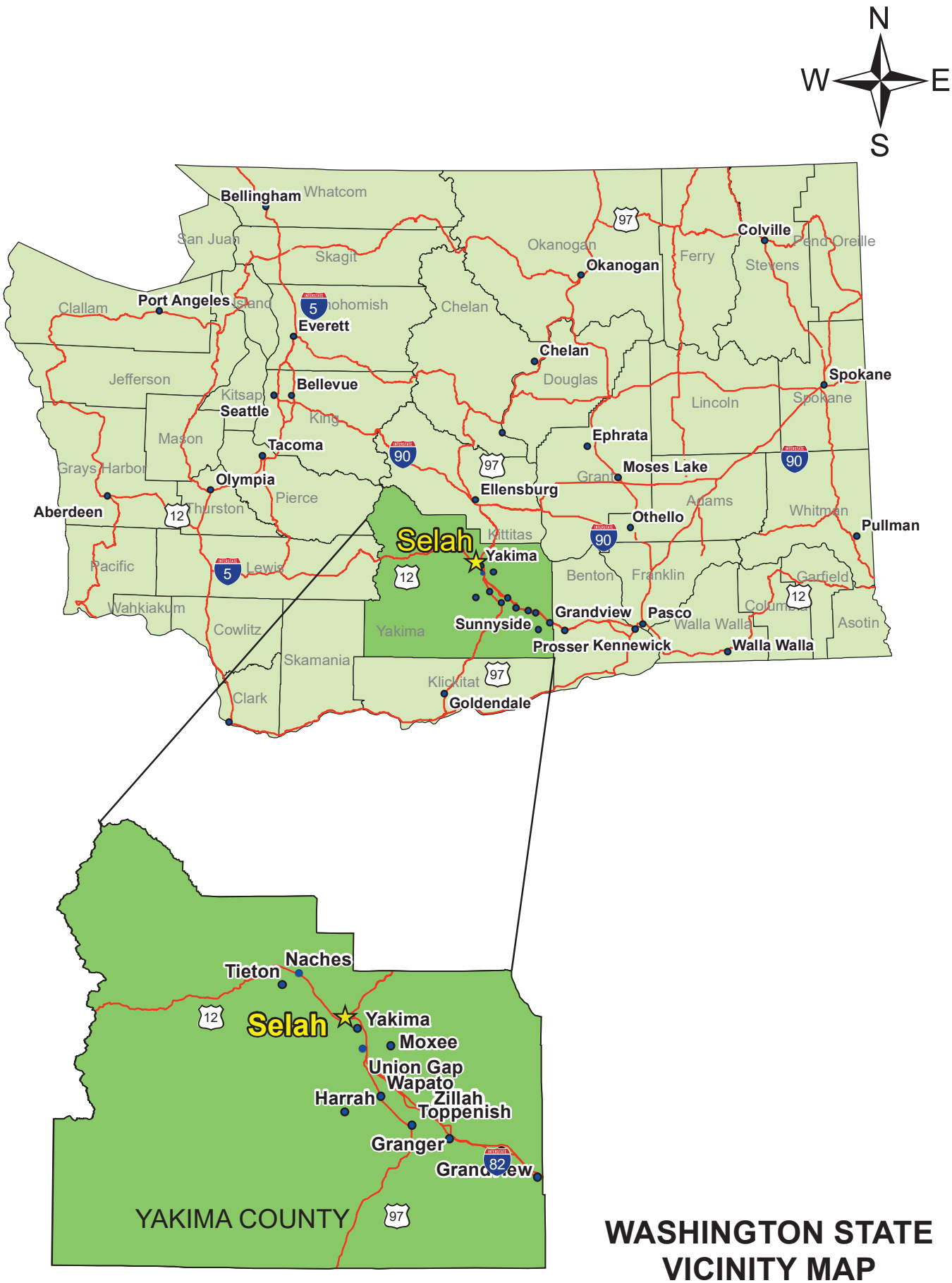
City of Selah
220 South Rushmore Road
Selah, WA 98942
Phone: (509) 698-7365

Mayor: Sherry Raymond
City Administrator: Donald Wayman
Public Works Director: Joe Henne
Public Works Supervisor, Water System Manager: Ty Jones
Water System Identification Number: 774006

WATER SYSTEM CONSULTING ENGINEER:

HLA Engineering and Land Surveying, Inc. (HLA)
2803 River Road
Yakima, WA 98902
Phone: (509) 966-7000
Project Engineer: Justin L. Bellamy, PE

A description of the City's water system management structure is presented in CHAPTER 6. A copy of the City's Water Facility Inventory (WFI) form is included in CHAPTER 10.



WASHINGTON STATE VICINITY MAP FIGURE 1-1

7-9-2019
P:/Arcview/2019/19061/State Vicinity Map.mxd

1.2 SYSTEM BACKGROUND

1.2.1 History of Water System Development and Growth

Provided in Table 1-1 is some information on the development of Selah's water system.

TABLE 1-1 MAJOR WATER SYSTEM IMPROVEMENTS

Year	Improvement Description
1938	North Reservoir constructed
1944	Well No. 3 constructed
1947	Well No. 4 constructed
1951	Well No. 5 constructed
1951-2	Wells No. 1 and No. 2 abandoned, and Palm Park Reservoir constructed
1960	Well No. 6 constructed
1967	Brader Hill Reservoir, transmission main, and booster station constructed
1978	Goodlander Reservoir, transmission main, and booster station constructed
1985	Goodlander and Pleasant Hills Reservoir transmission main intertie constructed
1987	Telemetry system installed
1993	Wells No. 3 and No. 4 rehabilitated
1994	Well No. 7 and Pumphouse constructed
1998	Pressure Reducing Valve improvements constructed
2001	New telemetry system installed to automatically control pump and reservoir operation
2003	2,200 feet of 12-inch water main installed from Crestview Drive to McGonagle Road
2005	500 gpm Zone 6 Booster Station constructed at Brader Hill Reservoir. 18,000 12-inch and 16-inch water transmission main and 1.2 Million Gallon Zone 6 Steel Reservoir constructed
2009	2,900 feet of 12-inch water transmission main installed from Well No. 6 to N. 12th Street
2009	Valhalla Reservoirs constructed, two 158,500-gallon reinforced concrete
2009	Goodlander Booster Pump Station and Zone 4 PRV constructed
2009	Well No. 6 modifications and Well No. 6 Booster Station constructed
2009	Well No. 8 constructed
2010	Well No. 3, 4, and 8 electrical building improvements constructed
2011	Rehabilitation of North Reservoirs
2012	Well No. 5 redevelopment and new pump installation
2014	Goodlander Heights Booster Pump removed, 350 feet of 12-inch water main installed from Zone 4 PRV to Goodlander Heights
2014	Hillview area, Home and Pear Avenues, and Wenas water main improvements, and Goodlander Reservoir rehabilitation
2017	Valhalla Zone 6 Booster Pump Station constructed
2017	Palm Park Booster Pump Station reconstructed
2018	Goodlander Zone 5 Booster Pump Station rebuilt
2020	Well No. 7 Redevelopment and well pump installed

Selah's first *Comprehensive Water System Plan (*CWP*)*, completed in 1971, provided the City with an in-depth look at its water system, deficiencies, and potential growth. In 1987, an update of the CWP was initiated but not finalized until 1994. Since 1994, the City added a major new source of supply (Well No. 7), completed updates to the CWP in 2000, and in 2014 changed the document title to Water System Plan (WSP). A summary of the growth of Selah's water system is provided in Table 1-2.

TABLE 1-2 WATER SYSTEM GROWTH SUMMARY

	Year							% Increase 1970-2018
	1970	1986	1997	2007	2010	2012	2018	
Population*	3,311	4,769	5,730*	6,740*	7,147*	7,290*	7,820*	136.2%
Total Water Services	1,125	1,537	1,886	2,289	2,413	2,447	2,878	155.8%
Total Annual Metered Consumption (MG)	394	658	806	751	744	756	794	101.5%
Total Source Capacity (MGD)	4.18	4.98	7.13	7.13	7.13	7.13	7.13	70.6%
Total Storage Capacity (MG)	1.22	2.22	2.22	3.414	3.731	3.731	3.731	205.8%

* Based on Washington State Office of Financial Management (OFM) census data and estimates.

1.2.2 Geography

The City of Selah and its Urban Growth Area are located in the Upper Yakima Valley, the northern part of Yakima County, in the south-central portion of Washington State, as shown in Figure 1-1. The City lies in a basin which is surrounded to the north, west, and south by sage-covered foothills, and to the east by the Yakima River and Yakima Ridge. During the Ice Age, the Yakima River cut its way through Yakima Ridge, creating an area now called the Selah Gap. The Yakima River, Interstate 82 (I-82), State Route 823 (SR 823), and the Burlington Northern-Santa Fe Railroad Selah Gap all lie in the one-quarter mile gap in the Yakima Ridge. The cities of Ellensburg and Yakima can be accessed via I-82. The City of Ellensburg is thirty-six miles to the north and the City of Yakima is three miles to the south of Selah.

The City of Selah lies against the west foothills of the valley, with over two-thirds of the City varying from 1,100 to 1,300 feet in elevation above mean sea level. Portions of the western and northern areas of Selah reach 1,450 feet above mean sea level, and portions of the southern area rise in elevation to 1,760 feet above mean sea level.

Similar to the rest of the Yakima Valley, Selah and its Urban Growth Area have a warm and dry climate. The Cascade Mountain Range acts as a barrier between Yakima County and the Pacific Ocean, keeping precipitation low and temperatures warm. The annual temperature range is from an average low of 26.9° F to an average high of 63.2° F. The average temperature is 49.7° F and the average annual precipitation is 8.35 inches. With a warm climate and rich volcanic soils, Yakima County sustains significant agricultural and recreational functions.

The economy of Selah, and of the Yakima Valley, depends largely upon the agricultural industry. Fruit grown locally is packed and shipped or used in various processing plants throughout the Yakima Valley. Much of Selah's employment is sustained by two such warehouses and two major fruit juicing companies. As the largest of the bedroom communities to the City of Yakima, Selah's economy is closely tied to that of the City of Yakima.

1.2.3 Neighboring/Adjacent Purveyors

Figure 1-2 displays Selah's Existing and Future Service Areas. Selah's Service area generally corresponds to the current City Limits and the future service area expands to Selah's Urban Growth Area (UGA) boundary. The UGA is identified after each Census and prior to population allocations to each of the cities and towns in Yakima County. Selah's UGA describes the projected future area within which the City will provide and maintain services in the next 20 years. The City's Future Service Area/Service Area/UGA boundary also represents their water rights place of use.

Six community water systems exist within Selah's Urban Growth Area as shown in Figure 1-2. These systems include Friday Point Water System, New Horizons Water System, Selandia Water System, Pleasant Hill Water System, Hillview Water System, and High Valley Water System. Other residences currently within Selah's Urban Growth Area are served by individual wells. The City of Yakima, located three miles to the south, owns and operates its own municipal water system.

CITY OF SELAH

Water System Plan Update

EXISTING AND FUTURE SERVICE AREAS

SELANDIA WATER SYSTEM DOH ID #77410

HILLVIEW WATER ASSOCIATION DOH ID #33365

HIGH VALLEY WATER SYSTEM DOH ID #33515

PLEASANT HILL WATER SYSTEM DOH ID #01831

NEW HORIZONS WATER SYSTEM DOH ID #51151

FRIDAY POINT WATER SYSTEM DOH ID #07612

Well No. 6

Well No. 7

Well No. 3, 4, & 8

Well No. 5

LEGEND

- SELAH RETAIL SERVICE AREA (SELAH CITY LIMITS)
- SELAH FUTURE RETAIL SERVICE AREA (SELAH UGA)
- YAKIMA RETAIL SERVICE AREA (YAKIMA CITY LIMITS)
- YAKIMA FUTURE RETAIL SERVICE AREA (YAKIMA UGA)
- EXISTING SELAH SERVICE AREA
- NEIGHBORING PRIVATE COMMUNITY WATER SYSTEM SERVICES AREA
- Well Location

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-9-20
P:\Arcview\2019\19061\Fig_1-2.mxd

FIGURE 1-2

1.2.4 Ordinances/Bylaws

The City of Selah operates its water system in accordance with the following municipal code chapters:

Chapter 9.02	Municipal Water Supply
Chapter 9.06	Water Fund
Chapter 9.15	Service Outside City Limits
Chapter 9.16	Water and Sewer Facilities Act
Chapter 9.17	Plant Investment Fee
Chapter 9.19	Utility Latecomer Agreements, Ordinance 940 (Latecomer's Agreement; June 1989)
Chapter 20.80	Plant Investment Fees
Chapter 20.90	Fee for Municipal Water System Reservoir Capacity Capital Cost Recovery Program No. 1
Chapter 20.91	Fee for Water Connections in Lookout Point Reservoir Water Pressure Capital Cost Recovery Area (Capital Recovery Area)
Chapter 21.11	Appeals

Copies of these Selah Municipal Code chapters are included in CHAPTER 10 and are maintained online at: https://selah.municipal.codes/.

1.3 INVENTORY OF EXISTING FACILITIES

1.3.1 General Description of Existing System Facilities and Major Components

The existing City of Selah domestic water system consists of seven distribution pressure zones as described in CHAPTER 3. The static pressure level ranges from 37 to 97 psi.

The City is supplied water from six primary source wells. The maximum pumping capacity of the six wells is 6,400 gpm or 9.21 million gallons per day, although normal production is reduced to 5,500 gpm or 7.92 million gallons per day due to water right limitations. The City's total existing water right is 5,500 gpm and 4,760 Acre-Feet per Year (1,551 Million Gallons).

Water storage is provided by six reservoirs within Selah's water system. The lowest pressure level (Zone 1) is served by three reinforced concrete reservoirs with the combined capacity of 1,022,000 gallons. Water from Zone 1 is boosted into the Zone 3 pressure level through three booster pump stations with a combined capacity of 3,750 gpm. Two reinforced concrete reservoirs serve Zones 2 and 3 with the combined capacity of 1,200,000 gallons. Water from Zone 3 is boosted into the south Zone 6 pressure level through one duplex booster pump station with a capacity of 1,000 gpm. One steel reservoir serves south Zones 4 and 5 with a capacity of 1,192,000 gallons. This reservoir will also serve future Zones 6 and 7 with the addition of a booster pump station. Water from Zone 3 is also boosted into the north Zone 5 pressure level through one duplex booster pump station with a capacity of 1,000 gpm. Two reinforced concrete reservoirs serve north Zones 4 and 5 with a total capacity of 317,000 gallons. Selah's total reservoir capacity is 3,731,000 gallons.

Water is provided to Zone 2 and Zone 4 (south and north) through multiple pressure reducing valves (PRVs) served by reservoirs located in higher pressure zones.

The entire water system is controlled by a comprehensive PLC (Programmable Logic Controller) based telemetry system. PLC telemetry units are located at all system wells, booster stations, and reservoirs, and are linked via radio communication. The telemetry system's master control station is located at the City's Public Works Shop.

The existing transmission and distribution system is looped where possible and consists of mainly 6-inch or larger ductile or cast-iron pipes. Currently, Selah has no interties with neighboring water purveyors. In 2019, there were 2,795 total services in the Selah water system. A more detailed description of Selah's water system is presented in CHAPTER 3. Selah's existing water system is shown in detail on Map A, enclosed as a large, folded map.

1.4 RELATED PLANS

1.4.1 Previous Comprehensive Water Plans

The City's first Comprehensive Water Plan was completed in 1997, which provided Selah with an in-depth look at its water system, deficiencies, and potential growth. Updates were completed in September 2008 and October 2014.

1.4.2 Water System Plans for Adjacent Water Systems

Four small water systems exist within Selah's Urban Growth Area, which include Friday Point Water System, New Horizons Water System, Selandia Water System, and High Valley Water System. None of these four water systems have developed comprehensive water planning documents. The City of Yakima, Selah's nearest municipal neighbor (located approximately three miles south of Selah), updated its Water System Plan in 2017. Although they are neighboring communities, there are currently no water service area agreements between the two cities.

1.4.3 Urban Growth Area Comprehensive Plan

The City of Selah's current adopted Growth Management Act (GMA) Comprehensive Plan (Comprehensive Plan) was updated in June 2017. The next Comprehensive Plan update is scheduled to be completed in 2025. The Comprehensive Plan identifies Selah's physical environment, economic characteristics, population demographics, land uses, and various infrastructure systems within the City and its Urban Growth Area. The typical Comprehensive Plan format is to describe current conditions, develop forecasts for a 20-year planning period, evaluate observed or predicted deficiencies, strategize for addressing current and future challenges, and budget for necessary improvements. Understanding and predicting future changes within the City and its Urban Growth Area are critical in forecasting future demands on the City's water system. As a result, Selah's Urban Growth Area Comprehensive Plan was an important tool in development of this Water System Plan update.

1.4.4 2019 Selah Sub-Area Plan

In 2017, Selah initiated a Sub-Area Plan to evaluate a portion of the City's urban area and determine necessary efforts to enhance and encourage development within the area. Staff and City Council reviewed the existing conditions of various infrastructure systems, planned capital and O&M projects in short-, mid-, and long-range plans, researched the potential land available in the UGA, and have decided to further investigate a UGA boundary expansion as a result of the Sub-Area Plan. The Sub-Area Plan was approved and adopted by City Council on July 23, 2019.

The expansion would be necessary to accommodate the extension of Naches Avenue (Road) between its current terminus at South Rushmore Road and Interstate 82 (I-82) Exit 29. Preliminary planning in the Sub-Area Plan includes anticipating the preferred land uses in the expanded area and potential zoning. The City will likely use the Regional Travel Demand Model to analyze a few alternatives before beginning UGA negotiations with Yakima County. Since UGA expansion negotiations have not begun with Yakima County, potential impacts on the City's water supply system have not been included in the WSP update.

1.4.5 Wellhead Protection Program

The City of Selah was one of eight water purveyors who collectively developed a regional wellhead protection plan. Other participants in this planning effort included:

City of Yakima	Yakima County
City of Moxee	Town of Naches
City of Tieton	City of Union Gap
City of Selah	Nob Hill Water Association

Completed in 1999, the effort resulted in individual wellhead protection planning documents for each of the eight participants. Selah's plan identified potential sources of contamination near its ground water supplies, proposed management strategies to prevent contamination of those supplies, and developed a contingency plan for mitigation in the event of ground water contamination. The document contains the following elements:

1. A water system summary;
2. A wellhead protection area for each well;
3. An inventory of potential ground water contaminant sources;
4. A contingency plan which includes an analysis of source capacity, reliability, and water rights; short- and long-term alternate water sources; emergency and spill response procedures; and
5. A local wellhead protection management plan.

Selah signed the Interlocal Agreement for the Regional Wellhead Protection Program in November 2000. The most recent update of the Upper Yakima Valley Regional Wellhead Protection Plan was completed in 2015. A copy of the Wellhead Protection Plan Interlocal Agreement is included in CHAPTER 10. Selah's identified potential sources of contamination map was last updated in December 2015 and can be found in CHAPTER 10 as well.

1.4.6 General Sewer Plans

In 1997, the City of Selah completed a General Sewer Plan for the City and its Urban Growth Area. The General Sewer Plan was updated in November 2011 and October 2018. This document includes the following:

1. Description of existing and future sewer service areas (Urban Growth Area);
2. Description of existing conditions, including the condition and location of existing trunk and interceptor sewers, pumping stations, the collection system, current system operation and maintenance, and problem areas;
3. Forecasts future wastewater loadings based upon growth projections;
4. Recommends a wastewater system improvement plan and a financial plan; and
5. Design standards for recommended wastewater collection system improvements.

The General Sewer Plan provides Selah with one of its Capital Improvement Plans for various infrastructure systems, predicts future sanitary sewer services within City Limits and Urban Growth Boundaries, and is the wastewater counterpart to the Water System Plan.

1.4.7 Watershed Plan

In 1998, the Washington State Legislature passed the Watershed Planning Act (RCW 90.82), providing a framework for developing local solutions to water issues on a watershed basis. Framed around watersheds, this voluntary comprehensive planning process was designed to allow local citizens, governments, and tribes to form watershed management planning units to develop watershed management plans.

The watershed planning process consists of three phases. In Phase 1 (Organization), initiating governments (the counties, largest city, and largest water utility in the watershed) identify and appoint Watershed Planning Unit members who represent water resource interests within the watershed. Phase 1 activities also include the development of operating and decision-making structures and goals, and development of a scope of work for Phase 2.

Phase 2 (Technical Assessment), directed by the watershed planning unit, focuses on developing strategies for improving water quality, protecting or enhancing fish habitat, setting instream flow recommendations, and applies for funding for the collection, management, and distribution of data. Phase 2 is at least a one-year process.

Phase 3 (Plan Development and Approval) requires actual development of the watershed plan. The plan must include water supply strategies to meet minimum flows for fish and to provide for future out-of-stream uses. Phase 3 is at least a one-year process.

The City of Selah is in the Upper Yakima River Basin Watershed Planning Area (WRIA 39). In 1998, the Yakima River Basin Watershed Planning Unit was formed to develop a comprehensive watershed management plan for the entire Yakima River Basin and the Naches River Basin watersheds. In December 2002, the Watershed Planning Unit completed and approved the *Yakima River Basin Watershed Management Plan* (Phase 3 of the planning process) and forwarded the Plan to the county commissioners of Yakima, Benton, Klickitat, and Kittitas Counties. In late 2005, Yakima, Benton, and Klickitat Counties approved and adopted the Plan, while Kittitas County opted to withdraw from the process. The watershed plan contains no obligations for county or state agencies. There is not an operating lead agency for the purposes of adopted watershed plan implementation needs. Instead, water quantity-related plan implementation needs are being addressed by the Yakima River Basin Water Enhancement Project working group.

In 2009, Ecology and Reclamation formed the Yakima River Basin Water Enhancement Project Working Group to help develop a solution to the basin's water problems. The group includes the Yakama Nation, irrigation districts, federal, state, county, and city governments, and environmental organizations. The group developed the *Yakima River Basin Integrated Water Resource Management Plan* (Plan). Elements of the Plan include construction of fish passages at dams, habitat restoration, watershed protection, development of new surface water retention and groundwater storage, enhanced agricultural and municipal water conservation programs, and more effective water banking processes. In total, approximately $3.8 billion is needed to complete the priority projects identified in the Plan.

The *Final Programmatic Environmental Impact Statement* (FPEIS) was issued in March 2012 for the Plan. The FPEIS evaluates two alternatives to meet the water supply and environmental needs in the Yakima River Basin; "No Action Alternative" and "Yakima River Basin Integrated Water Resource Management Plan Alternative," the latter is the preferred alternative.

In July 2013, the Legislature approved more than $130 million in state funding to advance the *Yakima River Basin Integrated Water Plan*. The funding will purchase 50,000 acres of privately owned timber land in the Teanaway River basin, east of Cle Elum, helping to preserve the area's watershed.

In June 2017, A study titled *Water Security for the Yakima River Basin's Economy, Communities, and Watersheds* was released. In 2018, the Department of Ecology and Treasurer's Debt Management Division released cost estimates of implementing the Yakima Basin Integrated Plan (YBIP) in a publication titled *2018 Cost Estimate and Financing Plan Yakima River Basin Integrated Water Resource Management Plan.*

The City of Selah's *Water System Plan* is consistent with the *Yakima River Basin Integrated Water Plan*.

1.5 EXISTING SERVICE AREA

The existing water system serves a combination of residential, commercial, industrial, and public users. The boundary of the Existing Service Area is shown on Figure 1-2. The Existing Service Area is approximately 1,460 acres, a majority of which is within the Selah City Limits. This figure also shows the areas served by the adjacent water systems of Friday Point, New Horizons, Selandia, Pleasant Hill, Hillview, and High Valley. Map A, provided in CHAPTER 10, shows the existing Selah water system, including the general location of water mains, valves, fire hydrants, wells, booster stations, and reservoirs.

The Selah City Limits includes an area of approximately 2,965 acres. Existing zoning within the City is presented in Table 1-3 and is shown in Figure 1-3.

TABLE 1-3 EXISTING ZONING WITHIN CITY LIMITS

Grouped Land Use Category	Total Acreage*	Percent of Total
One-Family Residential (R-1)	1,742	58.8%
Two-Family Residential (R-2)	129	4.4%
Multi-Family Residential (R-3)	48	1.6%
Low Density Single-Family (LDSF)	442	14.9%
Professional Business (B-1)	8	0.3%
General Business (B-2)	130	4.4%
Industrial (M-1)	182	6.1%
Planned Development (PD)	24	0.8%
Un-zoned**	260	8.8%
TOTAL	2,965	100.0%

* Source: Yakima County GIS, December 2020.
** Un-zoned areas include streets, alleys, right-of-way, and other un-zoned areas within the City Limits boundary.

As shown in Table 1-3 Residential is the largest land use within the City Limits, comprising approximately 2,361 acres or 79.6% of the land. Most Business uses are along South 1st Street, Naches Avenue, Jim Clements Way, and Wenas Road, and total 138 acres (approximately 4.7% of the land within the City). Industrial development within Selah comprises approximately 182 acres (6.1% of the land within the City) and is generally adjacent to Railroad Avenue.

1.6 FUTURE SERVICE AREA

The Future Service Area for the City of Selah water generally corresponds to the City's Urban Growth Area (UGA), as adopted in the City's *GMA Comprehensive Plan*. Often, future planning distinguishes the area within the City Limits, the area inside the UGA but outside of the City Limits, and the total 20-year anticipated area of growth when the UGA and City Limits areas are combined. The Future Service Area/UGA boundary is shown in Figure 1-2. Future land uses within the City's Urban Growth Area (UGA) boundary, including those within in the City Limits are shown in Figure 1-4. The total UGA area is about 4,906 acres and the area outside of the City Limits, but inside the UGA boundary is approximately 1,941 acres. The breakdown of future land uses inside and outside the City Limits, is presented in Table 1-4.

TABLE 1-4 GMA PLANNING AREA OUTSIDE OF CITY LIMITS BUT WITHIN SELAH UGA

Land Use Category	Total Acreage*	Percent of Total
Low Density Residential	2,421	49.3%
Moderate Density Residential	180	3.7%
High Density Residential	39	0.8%
Commercial	229	4.7%
Industrial	373	7.6%
Industrial Sprayfield	131	2.7%
Quasi-Public Open Spaces	415	8.5%
Floodway	139	2.8%
Steep Slopes	428	8.7%
Parks	29	0.6%
Un-zoned**	522	10.6%
TOTAL	4,906	100.0%

* Source: Yakima County GIS, December 2020.
** Un-zoned areas include streets, alleys, right-of-way, and other un-zoned areas within the City Limits boundary.

CITY OF SELAH

Water System Plan Update

EXISTING ZONING MAP

N
W E
S
0 1,100 2,200
Feet

LEGEND

- SELAH CITY LIMITS
- YAKIMA CITY LIMITS
- SELAH FUTURE RETAIL SERVICE AREA BOUNDARY (UGA)
- YAKIMA FUTURE RETAIL SERVICE AREA BOUNDARY (UGA)

ZONING WITHIN CITY LIMITS

- (R-1) ONE-FAMILY RESIDENTIAL
- (R-2) TWO-FAMILY RESIDENTIAL
- (R-3) MULTI-FAMILY RESIDENTIAL
- (LDSF) LOW DENSITY SINGLE FAMILY
- (B-1) PROFESSIONAL BUSINESS
- (B-2) GENERAL BUSINESS
- (M-1) INDUSTRIAL
- (PD) PLANNED DEVELOPMENT

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-9-20
P:\Arcview\2019\190611\Fig_1-3.mxd

FIGURE 1-3

CITY OF SELAH

Water System Plan Update

FUTURE LAND USE MAP

N W E S

0 1,100 2,200 Feet

LEGEND

- SELAH CITY LIMITS
- YAKIMA CITY LIMITS
- SELAH FUTURE RETAIL SERVICE AREA BOUNDARY (UGA)
- YAKIMA FUTURE RETAIL SERVICE AREA BOUNDARY (UGA)

FUTURE LAND USE

- LOW DENSITY RESIDENTIAL
- MODERATE DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- INDUSTRIAL SPRAYFIELD
- QUASI-PUBLIC OPEN SPACES
- FLOODWAY
- STEEP SLOPES
- PARKS

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-9-20
P:\Arcview\2019\19061\Fig_1-3.mxd

FIGURE 1-4

1.7 SERVICE AREA AGREEMENTS

There are currently four small water purveyors within Selah's UGA. No agreements are currently in place between any of these water purveyors and the City of Selah regarding future water service. In addition, Selah currently has no water service area agreement with its nearest municipal neighbor, the City of Yakima.

1.8 SERVICE AREA POLICIES

Many policies are established by a utility which affect its growth and development. Some policies deal specifically with drinking water and have a direct impact upon utility development within its future service area. The City of Selah has identified the following policies which directly or indirectly affect the water system:

1. The City will provide domestic water service to new customers within Selah's future service area (Urban Growth Area) under the following conditions:

    - All costs associated with providing water service, e.g., extending water mains to the site, shall be the responsibility of the proponent/developer. Requirements to be met by proponents/developers when extending the City's water system are identified in "Extension by Developers" which is provided in Miscellaneous Documents CHAPTER 10.
    - The City maintains adequate water rights capacity per DOH's required "water rights self-assessment" to serve the proposed property/properties.
    - The City maintains adequate physical source and/or storage capacity to serve the projected 20-year demand.
    - The proponent/developer shall transfer all potable water rights associated with the property/properties to the City.
    - The proponent/developer shall "decommission" all groundwater wells on the property in accordance with the applicable Washington Administrative Code (WAC) requirements unless a well is to become part of the City's water system.
    - The proponent/developer shall allow the City the opportunity to purchase any irrigation water rights/shares associated with the property/properties prior to offering said irrigation rights/shares to any other interested party.

2. The City may choose to require a water main extension to be oversized for future demand. The difference in material and construction costs between the two sizes may be paid for by the City, or it may enter into an agreement requiring those costs to be repaid by the future users.

3. Service will not be provided to proposed structures which have fire flow requirements greater than the capacity of the system. The cost of upgrading the existing water system which is required by a development to meet fire flow requirements shall be the responsibility of the developer including, but not limited to:

    - Upsizing existing water mains.
    - Looping the distribution system by installing new water mains.
    - Increasing storage and/or pumping capacities.

4. The City will administratively assist property owners who wish to establish a Local Improvement District for the purposes of constructing water system improvements.

5. The City has created by Ordinance No. 1450, Title 9, Chapter 9.19 Utility Latecomer Agreements, of their municipal code. This Chapter provides a format for the City to establish latecomer charges for water and sewer facility improvements. A copy of this ordinance is provided in CHAPTER 10.

6. The City has adopted Ordinance Nos. 1674 and 1675, which establish a capital cost recovery area for the 2005 water system improvements, including the Lookout Point Reservoir, booster pump station, and transmission mains. A copy of these ordinances is provided in CHAPTER 10.

7. The City will not wholesale water to other utilities.

8. The City will not allow its mains to be used to transmit another water purveyor's water through the City's system to other non-City water users (wheeling of water).

9. The City will provide water service to properties outside the City Limits in accordance with Chapter 9.15 of the City Municipal Code, a copy of which is provided in CHAPTER 10. The "outside customers" must execute an outside utility agreement and will be assessed water rates which are higher than those charged to customers within the City Limits.

10. As a prerequisite to obtaining domestic water service, the City requires property owners of existing lots of record to connect to sanitary sewers which are within 200 feet or less of the nearest property corner. Should sanitary sewer not be available within 200 feet, the property owner shall be required to sign a waiver prohibiting the property owner from opposing a future Local Improvement District (LID) for sewer service.

11. The City may choose to manage and operate or provide specific contract services for a satellite water system outside the City Limits but within the City's service area. In making its decision, the City will take into consideration such factors as:

    - Construction materials, standards, and specifications of the satellite system;
    - Condition of the various components of the satellite system including, but not limited to, pipes, valves, pumps, reservoir, and sources of supply;
    - Easements and access of the satellite system;
    - Fire protection capability of the satellite system;
    - Cross-connection control of the satellite system;
    - Specific operation, management, or contract service responsibilities to be provided; and
    - Conditions for assuming management and operation of the satellite system.

    City operation of satellite systems will be made on a case-by-case basis. In those cases where agreements for City operation are reached between the City and the satellite system, contracts for ownership, operation, and maintenance will be developed and included within CHAPTER 10.

12. The City shall not accept ownership or operation of existing private water systems annexed into the City unless said systems meet the City of Selah standards. Substandard systems shall be upgraded or replaced prior to integration into the City's water system.

13. Newly annexed properties will transfer the balance of unused domestic and/or irrigation water rights to the City.

1.9 SATELLITE MANAGEMENT AGENCIES

As discussed previously in Section 1.6, the City of Selah may, in the future, choose to manage and operate a satellite water system outside the City Limits, but within the City's Urban Growth Area. However, the City has no specific plans at this time to become a satellite management agency. If Selah makes plans to manage and/or operate a satellite water system, the City will develop a Satellite Management Program.

1.10 CONDITIONS OF SERVICE

The City of Selah has a water service application form, available at City Hall, which includes water service charges and billing information. Other information regarding conditions of service such as developer extension requirements, meter and material specifications, connection fee schedule, cross-connection control requirements, and latecomer payback provisions (if applicable) are presented to builders and developers when they apply to the City for building permits.

1.11 COMPLAINTS

In 1998, Selah developed a water system complaint response system. Prior to 1998, the City Public Works Department responded to and resolved water system complaints but kept no records as to the number of or nature of water system complaints. Selah's computerized complaint response program is discussed in more detail in CHAPTER 6.

1.12 DUTY TO SERVE

The City of Selah recognizes municipal water suppliers have a duty to provide service to all new connections within their retail service area when sufficient water rights and capacity exists, when the service request is consistent with the City code, and when service can be provided in a timely and reasonable manner. Each of these factors is discussed in this WSP.

The City of Selah is committed to providing water service to those persons and commercial and industrial establishments in accordance with City Municipal Code Chapters 9.02 and 9.15. Copies of these City codes and ordinances are included in CHAPTER 10.

The following is a summary of the City's procedures for addressing requests for water service:

Service Requests – Applications for water service are addressed (either by an approval or through a request for additional information) within thirty (30) days and in accordance with City Code Chapter 9.02.020. A copy of this City code is included in the CHAPTER 10.

Water Rights Adequacy – Each application for water service is reviewed by the City to determine the amount of water requested and evaluate the City's water rights and capacity to provide service.

Conditions of a Non-Technical Nature – Conditions for connection to the City's water system are addressed in accordance with City Code Chapter 9.02 and City Code Chapter 9.15. Copies of these City code chapters are included in CHAPTER 10.

Procedures for Handling Time Extensions, Disputes, and Appeals – Requests for time extensions, disputes, and appeals of service denials are addressed in accordance with City Code Chapter 21.11. A copy of this City code chapter is included in CHAPTER 10.

1.13 LOCAL GOVERNMENT CONSISTENCY

Local government consistency review was completed by City planning staff and Yakima County in accordance with WAC 246-290-100(7) to ensure consistency between the water system plan and local comprehensive plans, development regulations, and other local codes. Consistency review is also necessary to support orderly planning and development, minimizing conflicts and legal entanglements. A copy of the completed and signed Local Government Consistency Determination forms (DOH 331-568) are provided in CHAPTER 10.

CHAPTER 2 -

BASIC PLANNING DATA

HLA
Engineering and Land Surveying, Inc.

2.1 POPULATION

According to the U.S. Census Bureau, the 2010 population of the City of Selah was 7,147, an increase of 13.3%, or 837 people since 2000. The resulting annual growth rate for the period 2000-2010 was approximately 13.3%. This ten-year growth rate was slightly lower than previous decades. Population trends based on Census information for the City of Selah, Yakima County, and the State of Washington between 1910 and 2010 are presented in Table 2-1.

TABLE 2-1 CENSUS POPULATION TRENDS

Year	City of Selah		Yakima County		State of Washington	
	Population*	Percent Change	Population	Percent Change	Population	Percent Change
1910	-	-	41,709		1,141,990	
1920	-	-	63,710	52.7%	1,356,621	18.8%
1930	767	-	77,402	21.5%	1,563,396	15.2%
1940	1,130	47.3%	99,019	27.9%	1,736,191	11.1%
1950	2,489	120.3%	135,723	37.1%	2,378,963	37.0%
1960	2,824	13.5%	145,112	6.9%	2,853,214	19.9%
1970	3,311	17.2%	145,212	0.1%	3,413,244	19.6%
1980	4,500	35.9%	172,508	18.8%	4,132,353	21.1%
1990	5,113	13.6%	188,823	9.5%	4,866,692	17.8%
2000	6,310	23.4%	222,581	17.9%	5,894,121	21.1%
2010	7,147	13.3%	243,231	9.3%	6,724,540	14.1%

Source: U.S. Census Bureau

Every year, the Washington State Office of Financial Management (OFM) develops population estimates for the state, each county, and all cities. Refer to Table 2-2 for a summary of population estimates between 2011 and 2019. Before initiation of Yakima County's Comprehensive Plan update, County staff begins with the OFM estimate for each jurisdiction in Yakima County and then allocates future population in an iterative negotiation with each city. Population allocation was most recently completed for the City of Selah in 2017. Based on land use and employment calculations, Yakima County population estimates for Selah and for Yakima County between 2020 and 2040 are added to Table 2-3. An additional year was extrapolated to align with this WSP. Selah's growth rate is anticipated to increase as shown in Table 2-3.

TABLE 2-2 OFM POPULATION ESTIMATES						
Year	City of Selah		Yakima County		State of Washington	
	Population	Percent Change	Population	Percent Change	Population	Percent Change
2011	7,205	0.8%	244,700	0.6%	6,767,900	0.6%
2012	7,290	1.2%	246,000	1.1%	6,817,770	1.4%
2013	7,340	0.7%	247,250	0.5%	6,882,400	0.9%
2014	7,395	0.7%	248,800	0.6%	6,968,170	1.2%
2015	7,495	1.4%	249,970	0.5%	7,061,410	1.3%
2016	7,530	0.5%	250,900	0.4%	7,183,700	1.7%
2017	7,630	1.3%	253,000	0.8%	7,310,300	1.8%
2018	7,820	2.5%	254,500	0.6%	7,427,570	1.6%
2019	7,965	1.9%	255,950	0.6%	7,546,410	1.6%
Source: Washington State Office of Financial Management (OFM)						

TABLE 2-3 CITY POPULATION PROJECTIONS					
Year	Future Population	% Increase from Previous Year	Year	Future Population	% Increase from Previous Year
2020	7,965	1.22	2031	9,023	1.09
2021	8,061	1.22	2032	9,120	1.09
2022	8,157	1.22	2033	9,217	1.09
2023	8,253	1.22	2034	9,314	1.09
2024	8,349	1.22	2035	9,412	1.05
2025	8,445	1.15	2036	9,510	1.05
2026	8,541	1.15	2037	9,607	1.05
2027	8,637	1.15	2038	9,705	1.05
2028	8,734	1.15	2039	9,802	1.05
2029	8,830	1.15	2040	9,899	0.99
2030	8,926	1.09	2041[b]	9,997	0.99
Sources: [a] Yakima County's 2017 Review of its UGAs and Permitted Densities for City of Selah May 25, 2016, Staff Report [b] Extrapolation of Yakima County estimates for one additional year					

2.2 CURRENT AND FUTURE WATER SERVICES

2.2.1 Current Water Services

The location of the population of a purveyor whose water system includes multiple distribution pressure zones is critical in assessing demands on the various water system components. The City generally determines the population location by identifying user categories and number of water services within each pressure zone. In addition to determining population locations and related residential water services, it is important to understand the location of all other water service users. Water services are divided into user

categories and distributed throughout water system pressure zones as shown in Table 2-4. Throughout this plan, the term "service" and "connection" are synonymous with each other.

TABLE 2-4 YEAR 2021 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE

				North Hill			South Hill				
User Category	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 4	Zone 5	Zone 6	Zone 7	Total
Single-Family Residential	1,043	660	415	91	25	57	166	0	0	0	2,457
Commercial	156	2	0	0	0	0	0	0	0	0	158
Industrial	25	0	0	0	0	0	0	0	0	0	25
Political Subdivision	9	2	0	0	0	0	0	0	0	0	11
Outside Single-Family Residential	0	6	2	0	0	0	0	0	0	0	8
Apartment	48	6	0	1	0	0	0	0	0	0	55
Irrigation Only	51	8	6	0	0	0	1	0	0	0	66
Federal State Government	1	8	0	0	0	0	0	0	0	0	9
Outside Commercial	0	0	2	0	0	0	0	0	0	0	2
City	30	2	2	0	0	0	0	0	0	0	34
TOTAL	1,363	694	427	92	25	57	167	0	0	0	2,825

2.2.2 Future Water Services

The number of residential water services within the City Limits is anticipated to increase consistent with the population growth rate projection shown in Table 2-3. However, increases in population per pressure zone will vary depending on the availability of undeveloped land, and potential for new home construction. Based on discussions with the City, residential construction will most likely occur within upper pressure zones. Locations of anticipated future residential water services for the years 2031 and 2041 were determined based on these discussions.

Because of the impacts that providing water service to undeveloped properties outside of the City's existing services area have on existing water rights, source capacity, and reservoir storage capacity, the City will only provide water service to new customers within the UGA under the following conditions:

1. All costs associated with providing water service, e.g., extending water mains to the site, shall be the responsibility of the proponent/developer.

2. The City maintains adequate water rights capacity per DOH's required "water rights self-assessment," to serve the projected 20-year demand.

3. The City maintains adequate physical source and/or storage capacity to serve the proposed property/properties.

4. The proponent/developer shall transfer all potable water rights and irrigation water rights/shares associated with the property/properties to the City.

5. The proponent/developer shall "decommission" all groundwater wells on the property in accordance with the applicable Washington Administrative Code (WAC) requirements, unless a well is to become part of the City's water system; and

6. Service will not be provided to proposed structures which have fire flow requirements greater than the capacity of the system. The cost of upgrading the existing water system to meet fire flow requirements, required by a development shall be the responsibility of the developer, including, but not limited to:

   a. Upsizing existing water mains;
   b. Looping of the distribution system by installing new water mains; and
   c. Increasing storage and/or pumping capacities.

The population and number of residential services located outside the City Limits, but served by the City's water system, are expected to remain the same as experienced in the past. It is difficult to predict how population increases within the City and the UGA will affect increases in other user categories. The water service totals in remaining user categories were projected to increase at a rate like the population growth rate, and as determined by the City. The locations of these future services were determined based on the existing zoning and future land uses within the City. Future water services by user category per distribution pressure zone for the years 2031 and 2041 are shown respectively in the following tables.

TABLE 2-5 YEAR 2031 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE

				North Hill			South Hill				
User Category	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 4	Zone 5	Zone 6	Zone 7	Total
Single-Family Residential	1,043	700	500	110	50	97	181	35	30	0	2,746
Commercial	174	2	0	0	0	0	0	0	0	0	176
Industrial	28	0	0	0	0	0	0	0	0	0	28
Political Subdivision	11	2	0	0	0	0	0	0	0	0	13
Outside Single-Family Residential	0	7	2	0	0	0	0	0	0	0	9
Apartment	52	8	0	1	0	0	0	0	0	0	61
Irrigation Only	59	8	6	0	0	0	1	0	0	0	74
Federal State Government	1	9	0	0	0	0	0	0	0	0	10
Outside Commercial	0	0	3	0	0	0	0	0	0	0	3
City	32	3	3	0	0	0	0	0	0	0	38
TOTAL	1,400	739	514	111	50	97	182	35	30	0	3,158

TABLE 2-6 YEAR 2041 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE											
				North Hill			South Hill				
User Category	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 4	Zone 5	Zone 6	Zone 7	Total
Single-Family Residential	1,043	745	532	140	100	130	240	55	50	5	3,040
Commercial	193	2	0	0	0	0	0	0	0	0	195
Industrial	31	0	0	0	0	0	0	0	0	0	31
Political Subdivision	12	2	0	0	0	0	0	0	0	0	14
Outside Single-Family Residential	0	8	2	0	0	0	0	0	0	0	10
Apartment	57	10	0	1	0	0	0	0	0	0	68
Irrigation Only	63	10	8	0	0	0	1	0	0	0	82
Federal State Government	1	11	0	0	0	0	0	0	0	0	12
Outside Commercial	0	0	3	0	0	0	0	0	0	0	3
City	34	4	4	0	0	0	0	0	0	0	42
TOTAL	1,435	792	549	141	100	130	241	55	50	5	3,497

2.3 CURRENT WATER PRODUCTION AND CONSUMPTION

Current and historical metered water production and consumption data records are the preferred method for determining demand trends and establishing a basis for forecasting future demand. All water system sources and services in the City of Selah are metered. Production meters are typically read daily, and consumption meters are read monthly, except for the months of November, December, January, and February, when consumption is estimated based on average day demand in the winter months.

2.3.1 Water Production

Annual water production by source well for the period 2013 through 2018 is presented in Table 2-7. Total production has generally been stable.

TABLE 2-7 SELAH ANNUAL WATER PRODUCTION 2013 - 2018 (values are in million gallons)						
Source	2013	2014	2015	2016	2017	2018
Well Nos. 3 & 4	0.010	0.248	0.217	0.086	0.162	13.463
Well No. 5	355.372	68.276	158.987	210.786	133.738	13.270
Well No. 6	183.389	280.228	337.328	443.907	259.275	206.445
Well No. 7	83.373	284.810	200.263	107.919	221.747	521.467
Well No. 8	243.389	219.601	176.966	97.817	265.165	109.876
TOTAL	865.533	853.163	873.761	860.515	880.087	864.521

Monthly water production for each source for the year 2017 (year of highest annual production in the last six years) is provided in Table 2-8.

TABLE 2-8 SELAH MONTHLY WATER PRODUCTION 2017 (values are in million gallons)						
Month	Well Nos. 3 & 4	Well No. 5	Well No. 6	Well No. 7	Well No. 8	All Wells
January	0.000	0.000	19.171	0.001	33.107	52.279
February	0.000	0.000	19.981	0.480	32.733	53.194
March	0.000	5.308	17.578	1.416	23.484	47.786
April	0.000	12.235	38.211	7.399	10.450	68.295
May	0.000	25.608	24.491	5.255	25.576	80.930
June	0.011	27.234	25.823	21.503	34.331	108.902
July	0.097	24.093	25.475	42.788	11.754	104.207
August	0.000	3.103	38.127	61.201	9.758	112.189
September	0.000	0.361	21.470	50.644	7.571	80.046
October	0.054	10.141	14.568	18.352	24.044	67.159
November	0.000	16.494	6.936	0.007	29.539	52.976
December	0.000	9.161	7.444	12.701	22.818	52.124
TOTAL	0.162	133.738	259.275	221.747	265.165	880.087

2.3.2 Current Water Consumption

Currently, water consumption data is maintained by a computer database at City Hall. Services are billed based on meter size and user category. User categories and the number of metered services for each category for the period of 2013 through 2018, including six-year and three-year averages are presented in Table 2-9.

TABLE 2-9 METERED WATER SERVICES BY USER CATEGORY 2013-2018								
User Category	2013	2014	2015	2016	2017	2018	2013-2018 Avg.	2016-2018 Avg.
Single-Family Residential	2,195	2,214	2,240	2,260	2,311	2,370	2,265	2,314
Commercial	139	144	150	150	152	152	148	151
Industrial	28	31	30	30	29	24	29	28
Political Subdivision	10	10	11	11	11	11	11	11
Outside Single-Family Residential	7	7	7	7	7	8	7	7
Apartment	50	51	52	53	53	53	52	53
Irrigation Only	51	53	62	62	64	64	59	63
Federal State Govt.	9	9	9	9	9	9	9	9
Outside Commercial	2	2	2	2	2	2	2	2
City	32	31	31	31	32	33	32	32
TOTAL	2,523	2,552	2,594	2,615	2,670	2,726	2,614	2,670

The annual volume of water consumed (in million gallons per year) by user category for the period 2013 through 2018 is presented in Table 2-10, including six-year and three-year averages.

TABLE 2-10 ANNUAL WATER CONSUMPTION BY USER CATEGORY 2013-2018 (values are in million gallons per year)								
User Category	2013	2014	2015	2016	2017	2018	2013-2018 Avg.	2016-2018 Avg.
Single-Family Residential	300.724	330.986	331.343	317.720	310.751	334.449	320.996	320.974
Commercial	33.762	32.201	34.831	37.305	34.466	36.846	34.902	36.206
Industrial	322.856	312.461	348.348	323.915	349.237	310.614	327.905	327.922
Political Subdivision	10.417	12.029	7.096	6.885	5.861	7.930	8.370	6.892
Outside Single-Family Residential	0.904	1.078	0.958	0.939	0.865	1.077	0.970	0.960
Apartment	26.332	26.897	28.936	27.600	23.964	24.136	26.311	25.234
Irrigation Only	27.022	26.722	28.399	27.452	26.698	26.867	27.193	27.006
Federal State Govt.	4.712	4.485	4.729	4.763	5.261	5.691	4.940	5.238
Outside Commercial	0.265	0.417	0.919	1.096	0.430	0.479	0.601	0.668
City	61.605	72.525	74.834	68.763	81.578	88.800	74.684	79.713
TOTAL	788.599	819.801	860.393	816.438	839.111	836.889	826.872	830.813

The average day water consumption per service by user category (in gallons per service per day) for the period 2013 through 2018 including averages is presented in Table 2-11.

TABLE 2-11 AVERAGE DAY WATER CONSUMPTION BY USER CATEGORY 2013-2018 (values are in gallons per service per day)								
User Category	2013	2014	2015	2016	2017	2018	2013-2018 Avg.	2016-2018 Avg.
Single-Family Residential	375	410	405	385	368	387	388	380
Commercial	665	613	636	681	621	664	647	656
Industrial	31,591	27,615	31,813	29,581	32,994	35,458	31,508	32,678
Political Subdivision	2,854	3,242	1,767	1,715	1,460	1,975	2,169	1,717
Outside Single-Family Residential	354	403	375	359	338	385	369	361
Apartment	1,448	1,436	1,525	1,427	1,239	1,252	1,387	1,306
Irrigation Only	1,452	1,381	1,255	1,213	1,143	1,150	1,266	1,169
Federal State Govt.	1,434	1,365	1,440	1,450	1,602	1,732	1,504	1,595
Outside Commercial	396	597	1,118	1,334	589	583	770	835
City	5,274	6,410	6,614	6,077	6,984	7,372	6,455	6,811

2.3.3 Seasonal Water Consumption

Water consumption in the City of Selah varies throughout the year with the seasons, primarily due to irrigation use in the summer months. Services within the City of Selah do not have separate irrigation systems, so domestic water is used for irrigation. As shown in Figure 2-1, peak consumption months are June through September. Figure 2-1 shows the seasonal change in residential consumption per service from 2013 through 2018. Figure 2-2 shows the seasonal change for all service categories for the year 2017 (year of highest annual consumption).

FIGURE 2-1
SEASONAL SINGLE-FAMILY RESIDENTIAL CONSUMPTION

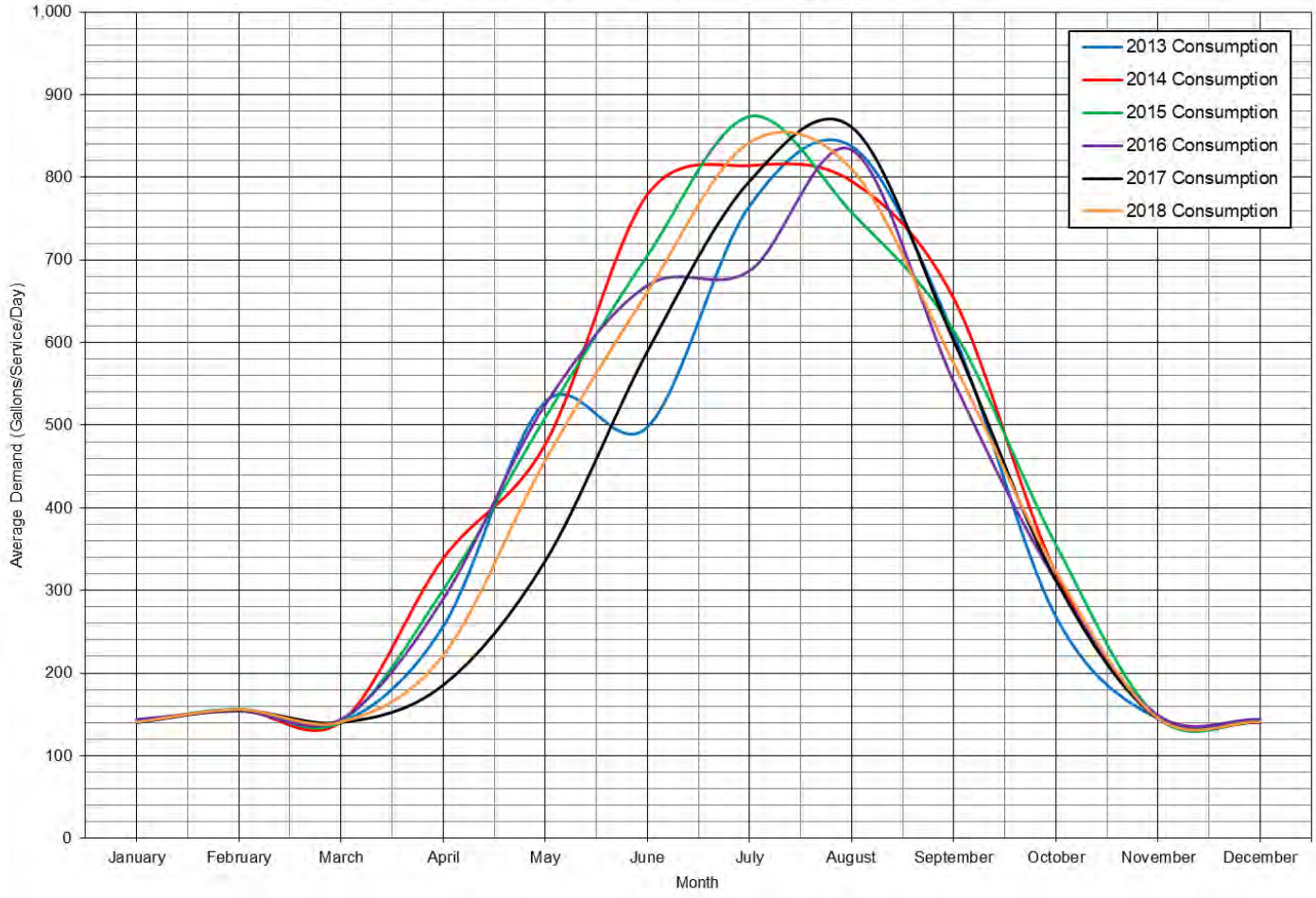
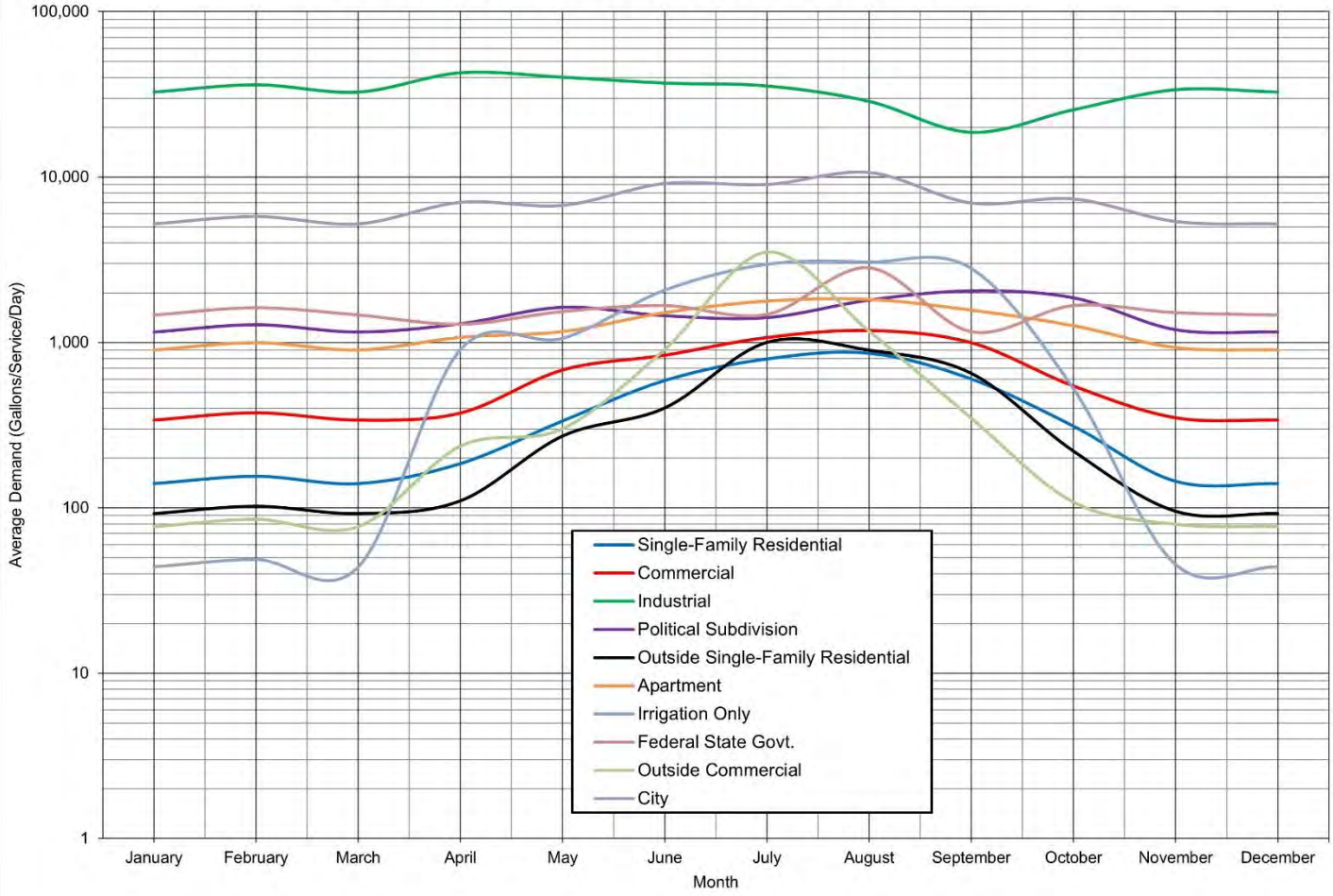


FIGURE 2-2
SEASONAL CONSUMPTION BY USER CATEGORY 2017



2.3.4 Maximum and Peak Consumption

Between the years 2013 and 2018, the largest annual consumption took place in 2017, with a total metered consumption of 839.1 million gallons (MG). The maximum month of water consumption between 2013 and 2018 was experienced in July 2017 when 113.1 MG of water was consumed. This maximum month consumption is approximately 1.6 times greater than the average monthly consumption in 2017. July 2017 provides a realistic representation of maximum and peak consumption for the six-year period, as the maximum month to average month ratio is consistent with most other years. A breakdown of water consumption by user category for July 2017 is shown in Table 2-12.

TABLE 2-12 MAXIMUM MONTH WATER CONSUMPTION, JULY 2017

User Category	No. of Services	Maximum Month Consumption (gallons)	Average Day Consumption (gallons)	Maximum Month Consumption per Service (gallons)	Average Day Consumption per Service (gallons)
Single-Family Residential	2,311	56,983,388	1,838,174	24,657	795
Commercial	152	5,055,732	163,088	33,261	1,073
Industrial	29	31,983,732	1,031,733	1,102,887	35,577
Political Subdivision	11	483,208	15,587	43,928	1,417
Outside Single-Family Residential	7	217,668	7,022	31,095	1,003
Apartment	53	2,928,420	94,465	55,253	1,782
Irrigation Only	64	5,902,468	190,402	92,226	2,975
Federal State Govt.	9	412,896	13,319	45,877	1,480
Outside Commercial	2	218,416	7,046	109,208	3,523
City	32	8,940,844	288,414	279,401	9,013
TOTAL	2,670	113,126,772	3,649,251	42,370	1,367

The maximum day of recorded water production in July 2017 occurred on July 7, 2017, when 4,869,000 gallons were pumped into the water system. Utilizing the percentage breakdown of demand per user category from the July 2017 consumption data, maximum day demand (MDD) was calculated as shown in Table 2-13.

Peak hour demand (PHD), also shown in Table 2-13, was calculated by the following equation:

$$PHD = (ERU_{MDD}/1440)\,[(C)(N) + F] + 18$$ *(2019 Water System Design Manual*, Equation 3-1)

Where:
PHD = Peak Hourly Demand, (gpm).
C = Coefficient associated with ranges of ERUs, 1.6 *(2019 Water System Design Manual Table 3-1)*
N = Number of ERUs based on the ERU_{MDD} value (gpd).
F = Factor associated with ranges of ERUs, 225 *(2019 Water System Design Manual Table 3-1).*
ERU_{MDD} = Maximum Day Demand per ERU (gpd).

The calculated PHD is 1.65 times the MDD.

TABLE 2-13 MAXIMUM DAY AND PEAK HOUR WATER DEMAND, JULY 7, 2017					
User Category	No. of Services	Maximum Day Demand (gallons)	Maximum Day Demand per Service (gallons)	Peak Hour Demand (gpm)	Peak Hour Demand per Service (gpm)
Single-Family Residential	2,311	2,338,387	1,012	2,679	1.2
Commercial	152	207,468	1,365	238	1.6
Industrial	29	1,312,494	45,258	1,504	51.9
Political Subdivision	11	19,829	1,803	23	2.1
Outside Single-Family Residential	7	8,932	1,276	10	1.5
Apartment	53	120,171	2,267	138	2.6
Irrigation Only	64	242,215	3,785	278	4.3
Federal State Govt.	9	16,944	1,883	19	2.2
Outside Commercial	2	8,963	4,481	10	5.1
City	32	366,899	11,466	420	13.1
TOTAL	2,670	4,642,302		5,319	
* 4,869,000 gallons production less 4.66% DSL (2017 average DSL) to arrive at a maximum daily consumption of 4,642,302 gallons.					

2.3.5 Distribution System Leakage (DSL)

Table 2-14 shows annual water production, annual metered water consumption, and the difference between production and total consumption (DSL), including the DSL percentage. Water production from Selah's source wells for the period 2013 through 2018 totaled 5,197 million gallons. Metered consumption during that same time totaled 4,961 million gallons. Estimated unmetered consumption includes water usage for firefighting, waterline breaks, construction use, and other related activities. The difference between production and metered consumption for that period was 236 million gallons, or 4.55% of total water production for the period. The average DSL for the past three years (2013-2018) is slightly lower at 4.33%. To be conservative, the 2017 DSL of 4.66% is used in this Plan.

TABLE 2-14 SELAH WATER PRODUCTION AND CONSUMPTION 2013-2018				
Year	Production	Consumption	DSL	% DSL
2013	865,533,150	788,598,448	76,934,702	8.89%
2014	853,163,000	819,800,520	33,362,480	3.91%
2015	873,761,230	860,392,984	13,368,246	1.53%
2016	860,515,000	816,437,512	44,077,488	5.12%
2017	880,087,000	839,110,888	40,976,112	4.66%
2018	864,521,000	836,888,580	27,632,420	3.20%
TOTAL	5,197,580,380	4,961,228,932	236,351,448	4.55%
3-Year Average (2016-2018)	868,374,333	830,812,327	37,562,007	4.33%

The City will continue to track the difference between production and total authorized consumption and will work towards further reducing the volume of DSL through the implementation of supply-related water use efficiency measures. Water use efficiency measures are discussed in further detail in CHAPTER 4.

2.3.6 Water Supply Characteristics and Trends

The most important aspect of a water utility is its domestic water supply source. The City of Selah's water supply is dependent on ground water sources. The City utilizes six source wells. The locations of these wells within the water system are shown in Map A, provided in CHAPTER 10. All six City wells are located on property owned by the City and have protective covenants (except Well No. 6) establishing a 100-foot sanitary radius. Copies of the property deeds and protective covenants for each well are provided in CHAPTER 10.

As discussed in CHAPTER 3, there has been no significant change in source well water quality from any of Selah's wells as demonstrated by inorganic chemical and volatile organic chemical monitoring over time.

Selah has taken steps to protect its aquifers through implementation of its *Wellhead Protection Plan* and participation in a regional wellhead protection plan. Completed in October 2000, the *Upper Yakima Valley Regional Wellhead Protection Plan*, which includes Selah's *Wellhead Protection Plan*, is intended to protect Selah's aquifers through a combination of regulatory measures, best management practices, and public education and awareness. Details of Selah's *Wellhead Protection Program* are provided in CHAPTER 5, and a copy of the Plan is provided in CHAPTER 10.

The City of Selah's wells are all housed within secure and lockable structures and visited by City personnel daily. Should a water quality problem occur, the City's routine monitoring program, in accordance with the Washington State Department of Health requirements, will provide a timely warning mechanism and will assist in identifying the source contamination.

The existing City wells all withdraw water from the Columbia River Basalt Group. This geologic formation consists of four distinct hydrogeologic units. Starting with the oldest, these four units are known as the Grande Ronde, Wanapum, and Saddle Mountains Units (made up primarily of basalts of the same name, but also include sedimentary interbeds), and the Ellensburg Unit.

The Grande Ronde, Wanapum, and Saddle Mountains Units vary in thickness in South-Central Washington. Each unit is composed of numerous to several hundred individual basalt flows, which can range in thickness from a few inches to more than 300 feet, with sedimentary interbeds. Distinct, thick sedimentary interbeds separate the Grande Ronde, Wanapum, and Saddle Mountains Units.

Five of Selah's existing City wells (Well Nos. 3, 4, 5, 6, and 8) penetrate and withdraw water from the Ellensburg Formation. The local Ellensburg Formation is a distinct aquifer which is utilized by many municipalities for domestic supply. The Ellensburg Formation consists of alluvial, unconsolidated, and consolidated sedimentary deposits. Review of the well logs of each source provided in CHAPTER 10 show layers of sand, gravel, clay, shale, and sandstone. Well No. 7 withdraws water from the Wanapum Basalt Formation aquifer. The Wanapum Basalt Formation is composed mostly of basalt and sedimentary interbeds, lying beneath the Ellensburg Formation.

Irrigation wells for agricultural use also penetrate and withdraw from the above described Formations. Consequently, many of the Yakima area communities have experienced diminishing capacities and/or lowering drawdown levels in their source wells over years. Trends in groundwater levels are one of several factors important in determining source reliability. The United States Geological Survey (USGS) recently completed reports determining and analyzing such trends. The *Groundwater Status and Trends for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho* (Scientific Investigations Report 2012-5261), published in 2012 by USGS, concluded that groundwater levels in the aquifer have risen since the 1950s in areas heavily irrigated with surface water and have declined since the 1970s in

areas irrigated with groundwater. For wells examined in the Report, typical rises in water level under surface-water irrigation areas were 50 feet. Declines of 200 feet or greater were common in areas where pumping groundwater is the dominant source of irrigation water. The USGS Report concluded that 72% of the wells within the aquifer experienced declines over the study period, 1968-2009. Furthermore, the trends for all wells within the aquifer declined at a mean rate of 1.9 ft/year.

Source wells within Selah were not directly involved with the USGS studies and reports, however, the City recognizes the importance of monitoring groundwater level trends as it has a direct impact on the long-term reliability of the City's groundwater sources. In 2015 the City began tracking water level conditions in their primary production wells, Well Nos. 6, 7, and 8. Provided in Table 2-15 is monthly static water levels from January 2015 through January 2020.

TABLE 2-15 SELAH GROUNDWATER LEVEL CONDITIONS 2015 – 2020[a]

Month-Year	Source		
	Well No. 6 (ft. BGS)	Well No. 7 (ft. AGS)	Well No. 8 (ft. BGS)
Jan-2015	49	–	37
April-2015	52	–	33
July-2015	55	–	27
Oct-2015	51	–	30
Jan-2016	47	24	21
April-2016	49	28	20
July-2016	59	23	26
Oct-2016	50	28	38
Jan-2017	50	27	33
April-2017	49	30	25
July-2017	53	26	28
Oct-2017	48	21	23
Jan-2018	44	23	19
April-2018	43	23	19
July-2018	54	17	25
Oct-2018	46	15	22
Jan-2019	44	18	19
April-2019	48	–	28
July-2019	58	21	41
Oct-2019	46	18	20
Jan-2020	45	21	19

[a] Table values are feet below ground surface (BGS), except Well No. 7. Well No. 7 is under artesian pressure, so its values are feet above ground surface (AGS).

As shown in Table 2-15, static water levels (aquifer levels) in Well No. 6 have remained consistent the last five years. Well No. 8 water levels fluctuated considerably from January 2015 to January 2017 but have been consistent the last three years. Most recently, Well No. 7 had a significant drop in artesian pressure from 2017 to 2019. This change resulted in a noticeable reduction in booster pump performance beginning in 2018. As a result, the City began to review and evaluate the cause of the change. In 2019 a hydrogeologic assessment of the existing aquifer condition was conducted, followed by well redevelopment and pumping tests to confirm current drawdown conditions. Through this study it was found that the well is

still in good condition and can meet short-term demands with the installation of a turbine pump, but it is anticipated the City will continue to see long-term decline in the static water level in the well that will limit its ability to meet future demands. The City will need to begin evaluating options for a replacement source or mitigation of the declines in regional groundwater levels. Recommended improvements for Well No. 7 are discussed further in CHAPTER 3. A copy of the hydrogeologic report and findings for Well No. 7 is included in CHAPTER 10.

Static water levels appear to be directly impacted by well use. When compared to the water production values provided in Table 2-7, there were drops in annual water production from Well No. 8 in 2016 and 2018 which correlates with the higher static water levels recorded those years. Similarly, annual production from Well No. 7 increased significantly in 2018, which may have contributed to the substantial declines in artesian pressure. Conversely annual production from Well No. 6 has remained consistent and there are no apparent changes to seasonal static groundwater levels each year. It is important for the City to manage source well production to avoid over pumping individual wells and negatively impacting aquifer levels and well performance. The City recognizes the importance of continuing to monitor water levels to identify and evaluate trends that may have an adverse impact on the water supply capability of the City's system.

2.3.7 Equivalent Residential Units

An Equivalent Residential Unit (ERU) is defined as the amount of water consumed by a typical full-time single-family residence. The actual quantity of water represented by an ERU is related to the type of demand (average day or peak) being considered. As discussed previously, maximum day and peak hour demands were calculated from the maximum day of production in the second highest maximum month of consumption for the period between 2013 and 2018. As a result, the peaking factor from an average day demand (ADD) to a maximum day demand (MDD) is not the same for all service categories. Therefore, ERU values for ADD and MDD have been calculated as shown in Table 2-16. This ERU information is useful for forecasting and analyzing future water system demand.

Residential ADD per service values from the 2013 to 2018 period vary from a high of 410 gallons per service per day in 2014 to a low of 368 gallons per service per day in 2017 as shown in Table 2-11. Similar variation in consumption per service occurs in the other user categories. The City has generally seen consistent demands over the past three years, providing a suitable representation of existing conditions. The average ADD from each user category for the period 2016 through 2018 from Table 2-11 was used in producing the ERU values in Table 2-16.

The maximum day demand per service and peak hour demand per service provided in Table 2-13 are based upon the calculated demand for July 7, 2017, which was the maximum day of production for the highest month of consumption in the last six years.

TABLE 2-16 EQUIVALENT RESIDENTIAL UNIT FACTORS (ERUS)				
User Category	ADD (2016-2018)		MDD (July 2017)	
	gpd/ Service[a]	ERUs	gpd/ Service[b]	ERUs
Single-Family Residential	380	1.0	1,012	1.0
Commercial	656	1.7	1,365	1.3
Industrial	32,678	86.0	45,258	44.7
Political Subdivision	1,717	4.5	1,803	1.8
Outside Single-Family Residential	361	0.9	1,276	1.3
Apartment	1,306	3.4	2,267	2.2
Irrigation Only	1,169	3.1	3,785	3.7
Federal State Govt.	1,595	4.2	1,883	1.9
Outside Commercial	835	2.2	4,481	4.4
City	6,811	17.9	11,466	11.3
[a] ADD values based upon 2016 through 2018 average. [b] Peak Day Demand is based upon calculated demand for July 7, 2017 as provided in Table 2-13.				

2.4 FORECAST OF FUTURE WATER DEMAND

Water use is contingent upon several varying and uncertain factors, which makes forecasting future demand difficult. Of primary importance are the following factors:

1. Population;
2. Type of residential development (i.e., R-1, R-2, R-3, LDSF);
3. Types of commercial businesses (i.e., B-1, B-2);
4. Changes in industrial customer usage;
5. Per capita income;
6. Climate;
7. Irrigation use of water; and
8. Price charged for water and type of rate structure (i.e. the base water quantity and cost for individual service meters).

Forecasting future system demands is based upon the projected number of single-family residential, outside single-family residential, apartment, commercial, outside commercial, industrial, political subdivision, federal state government, City, and irrigation-only water services, and the annual average day, maximum day, and peak hour water demand.

As discussed previously in Section 2.1, the population projections for the City of Selah are based on Yakima County estimates for the City, which result in annual growth rates as shown in Table 2-3. Future water services are based upon the projected City population growth. However, based upon impacts to Selah's existing water rights, source capacity, and reservoir storage capacity, the City will only provide water service to new customers outside of their existing service area under specific conditions (previously specified within this Plan).

Because Selah is in many ways a bedroom community to the City of Yakima, increases in population do not always correlate to increases in commercial businesses. Therefore, it is difficult to predict how population increases within the City and the UGA will affect increases in other user categories. However, the water service totals in remaining user categories were projected to increase at a rate like the population growth rate, and as determined by the City Planner and City Administration.

As can be seen in Section 2.3.2, industrial customer usage accounts for almost 40 percent of the City's annual water demand. Though there has been little change in industrial customer demand in the last six years, a change in usage or planned expansion can have a significant impact on future water system demand. The City recently approved a development agreement with one of its industrial customers, Matson Fruit Company, who plans to expand their operations and increase their current water demand by about 60 percent over the next 20 years. Current demand from Matson Fruit Company only accounts for about 2.6 percent of the total industrial demand for the City. Their projected 20-year demand will only account for about 3.5 percent of the total projected future industrial demand, so their proposed expansion will be handled within the projected future industrial demand for the system. No other existing industrial customers are planning a significant expansion or increase in water usage in the near future, but it is important for the City to bear in mind the significant impacts increasing industrial demand or adding a new industrial customer has on the City's water supply system. Future expansion and development proposals need to be carefully evaluated to ensure the water system has sufficient capacity to serve them. Water rights may need to be transferred to the City or other system improvements constructed to serve future expansion and development proposals.

Other factors such as income, climate and water cost will be assumed to remain consistent with current trends. Climate does have a major influence on Selah's water consumption during summer months due to use of domestic water supply for irrigation purposes. However, the area's climate has generally remained consistent with historical averages.

2.4.1 Future ERUs and ADD

The number of water system services, ERUs, and ADD, are calculated from the current water services by user category per pressure zone as shown in Table 2-4, Table 2-5, and Table 2-6, and the average 2016 through 2018 demand per service for each user category, provided in Table 2-11.

The calculated future number of services, ERUs, and projected ADD for years 2021, 2031, and 2041 are presented in Table 2-17, Table 2-18, and Table 2-19, respectively. To accommodate the uncertainties in projecting future water demand and to account for system losses, a 10% contingency factor has been applied to the ADD projections, as shown.

TABLE 2-17 YEAR 2021 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	2,457	1.0	380	2,457.0	933,660
Commercial	158	2.0	656	316.0	103,648
Industrial	25	86.0	32,678	2,150.0	816,950
Political Subdivision	11	5.0	1,717	55.0	18,887
Outside Single-Family Residential	8	1.0	361	8.0	2,888
Apartment	55	3.0	1,306	165.0	71,830
Irrigation Only	66	3.0	1,169	198.0	77,154
Federal State Govt.	9	4.0	1,595	36.0	14,355
Outside Commercial	2	2.0	835	4.0	1,670
City	34	18.0	6,811	612.0	231,574
Subtotal	2,825			6,001.0	2,272,616
10% Contingency					227,262
TOTAL	2,825			6,001.0	2,499,878

TABLE 2-18 YEAR 2031 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	2,746	1.0	380	2,746.0	1,043,480
Commercial	176	2.0	656	352.0	115,456
Industrial	28	86.0	32,678	2,408.0	914,984
Political Subdivision	13	5.0	1,717	65.0	22,321
Outside Single-Family Residential	9	1.0	361	9.0	3,249
Apartment	61	3.0	1,306	183.0	79,666
Irrigation Only	74	3.0	1,169	222.0	86,506
Federal State Govt.	10	4.0	1,595	40.0	15,950
Outside Commercial	3	2.0	835	6.0	2,505
City	38	18.0	6,811	684.0	258,818
Subtotal	3,158			6,715.0	2,542,935
10% Contingency					254,294
TOTAL	3,158			6,715.0	2,797,229

TABLE 2-19 YEAR 2041 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	3,040	1.0	380	3,040.0	1,155,200
Commercial	195	2.0	656	390.0	127,920
Industrial	31	86.0	32,678	2,666.0	1,013,018
Political Subdivision	14	5.0	1,717	70.0	24,038
Outside Single-Family Residential	10	1.0	361	10.0	3,610
Apartment	68	3.0	1,306	204.0	88,808
Irrigation Only	82	3.0	1,169	246.0	95,858
Federal State Govt.	12	4.0	1,595	48.0	19,140
Outside Commercial	3	2.0	835	6.0	2,505
City	42	18.0	6,811	756.0	286,062
Subtotal	3,497			7,436.0	2,816,159
10% Contingency					281,616
TOTAL	3,497			7,436.0	3,097,775

2.4.2 Future MDD and PHD

Future Maximum Day Demand (MDD) and Peak Hour Demand (PHD) for the water system were calculated for the years 2021, 2031, and 2041 using the projected number of services for each user category and the MDD per service for July 7, 2017, as discussed in Section 2.3.4. Calculated future MDD and PHD values for 2021, 2031, and 2041 are presented in Table 2-20, Table 2-21, and Table 2-22, respectively. To accommodate the uncertainties in projecting future water demand and to account for system losses, a 10% contingency factor has been applied to the MDD and PHD projections, as shown.

TABLE 2-20 YEAR 2021 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	PHD/ Service (gpm)	Total PHD (gpm)
Single-Family Residential	2,457	1.0	2,457.0	1,012	2,486,484	1.2	2,849.1
Commercial	158	1.3	213.1	1,365	215,670	1.6	247.1
Industrial	25	44.7	1,118.2	45,258	1,131,450	51.9	1,296.5
Political Subdivision	11	1.8	19.6	1,803	19,833	2.1	22.7
Outside Single-Family Residential	8	1.3	10.1	1,276	10,208	1.5	11.7
Apartment	55	2.2	123.2	2,267	124,685	2.6	142.9
Irrigation Only	66	3.7	246.9	3,785	249,810	4.3	286.2
Federal State Govt.	9	1.9	16.7	1,883	16,947	2.2	19.4
Outside Commercial	2	4.4	8.9	4,481	8,962	5.1	10.3
City	34	11.3	385.3	11,466	389,844	13.1	446.7
Subtotal	2,825		4,599.0		4,653,893		5,332.6
10% Contingency					465,389		533.3
TOTAL	2,825		4,599.0		5,119,282		5,865.9

TABLE 2-21 YEAR 2031 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	PHD/ Service (gpm)	Total PHD (gpm)
Single-Family Residential	2,746	1.0	2,746.0	1,012	2,778,952	1.2	3,184.2
Commercial	176	1.3	237.4	1,365	240,240	1.6	275.3
Industrial	28	44.7	1,252.4	45,258	1,267,224	51.9	1,452.0
Political Subdivision	13	1.8	23.2	1,803	23,439	2.1	26.9
Outside Single-Family Residential	9	1.3	11.3	1,276	11,484	1.5	13.2
Apartment	61	2.2	136.7	2,267	138,287	2.6	158.5
Irrigation Only	74	3.7	276.8	3,785	280,090	4.3	320.9
Federal State Govt.	10	1.9	18.6	1,883	18,830	2.2	21.6
Outside Commercial	3	4.4	13.3	4,481	13,443	5.1	15.4
City	38	11.3	430.6	11,466	435,708	13.1	499.2
Subtotal	3,158		5,146.3		5,207,697		5,967.2
10% Contingency					520,770		596.7
TOTAL	3,158		5,146.3		5,728,467		6,563.9

TABLE 2-22 YEAR 2041 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	PHD/ Service (gpm)	Total PHD (gpm)
Single-Family Residential	3,040	1.0	3,040.0	1,012	3,076,480	1.2	3,525.1
Commercial	195	1.3	263.0	1,365	266,175	1.6	305.0
Industrial	31	44.7	1,386.6	45,258	1,402,998	51.9	1,607.6
Political Subdivision	14	1.8	24.9	1,803	25,242	2.1	28.9
Outside Single-Family Residential	10	1.3	12.6	1,276	12,760	1.5	14.6
Apartment	68	2.2	152.4	2,267	154,156	2.6	176.6
Irrigation Only	82	3.7	306.7	3,785	310,370	4.3	355.6
Federal State Govt.	12	1.9	22.3	1,883	22,596	2.2	25.9
Outside Commercial	3	4.4	13.3	4,481	13,443	5.1	15.4
City	42	11.3	475.9	11,466	481,572	13.1	551.8
Subtotal	3,497		5,697.7		5,765,792		6,606.5
10% Contingency					576,579		660.7
TOTAL	3,497		5,697.7		6,342,371		7,267.2

2.4.3 Current and Future Water Demand by Pressure Zone

In addition to forecasting future total water demand, it is important to forecast where in the system that demand will occur. Water services and corresponding water demands by pressure zone for the year 2021 are presented in Table 2-23. The future number of water services and water demands by pressure zone for the years 2031 and 2041 are presented in Table 2-24, and Table 2-25, respectively. The future demand projections include a 10% contingency factor to account for system losses, as shown in the respective tables.

TABLE 2-23 YEAR 2021 WATER DEMAND BY PRESSURE ZONE

				North Hill			South Hill				
Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone5	Zone 6	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,043	660	415	91	25	57	166				2,457
Number of ERUs (ERU_{MDD})	1,043	660	415	91	25	57	166				2,457
Annual Demand (MG/year)	144.66	91.54	57.56	12.62	3.47	7.91	23.02	0.00	0.00	0.00	340.79
Maximum Day Demand (MGD)	1.06	0.67	0.42	0.09	0.03	0.06	0.17	0.00	0.00	0.00	2.49
Peak Hour Demand (gpm)	1,209	765	481	106	29	66	192	0	0	0	2,849
Commercial											
Number of Services	156	2									158
Number of ERUs (ERU_{MDD})	210	3									213
Annual Demand (MG/year)	37.35	0.48									37.83
Maximum Day Demand (MGD)	0.21	0.00									0.22
Peak Hour Demand (gpm)	244	3									247
Industrial											
Number of Services	25										25
Number of ERUs (ERU_{MDD})	1,118										1,118
Annual Demand (MG/year)	298.19										298.19
Maximum Day Demand (MGD)	1.13										1.13
Peak Hour Demand (gpm)	1,296										1,296
Political Subdivision											
Number of Services	9	2									11
Number of ERUs (ERU_{MDD})	16	4									20
Annual Demand (MG/year)	5.64	1.25									6.89
Maximum Day Demand (MGD)	0.02	0.00									0.02
Peak Hour Demand (gpm)	19	4									23
Outside Single-Family Residential											
Number of Services		6	2								8
Number of ERUs (ERU_{MDD})		8	2								10
Annual Demand (MG/year)		0.79	0.26								1.05
Maximum Day Demand (MGD)		0.01	0.00								0.01
Peak Hour Demand (gpm)		9	3								12
Apartment											
Number of Services	48	6	0	1							55
Number of ERUs (ERU_{MDD})	108	13	0	2							123
Annual Demand (MG/year)	22.88	2.86	0.00	0.48							26.22
Maximum Day Demand (MGD)	0.11	0.01	0.00	0.00							0.12
Peak Hour Demand (gpm)	125	16	0	3							143
Irrigation Only											
Number of Services	51	8	6				1				66
Number of ERUs (ERU_{MDD})	191	30	22				4				247
Annual Demand (MG/year)	21.76	3.41	2.56				0.43				28.16
Maximum Day Demand (MGD)	0.19	0.03	0.02				0.00				0.25
Peak Hour Demand (gpm)	221	35	26				4				286
Federal State Govt.											
Number of Services	1	8									9
Number of ERUs (ERU_{MDD})	2	15									17
Annual Demand (MG/year)	0.58	4.66									5.24
Maximum Day Demand (MGD)	0.00	0.02									0.02
Peak Hour Demand (gpm)	2	17									19
Outside Commercial											
Number of Services			2								2
Number of ERUs (ERU_{MDD})			9								9
Annual Demand (MG/year)			0.61								0.61
Maximum Day Demand (MGD)			0.01								0.01
Peak Hour Demand (gpm)			10								10
City											
Number of Services	30	2	2								34
Number of ERUs (ERU_{MDD})	340	23	23								385
Annual Demand (MG/year)	74.58	4.97	4.97								84.52
Maximum Day Demand (MGD)	0.34	0.02	0.02								0.39
Peak Hour Demand (gpm)	394	26	26								447
TOTAL SERVICES BY ZONE											
Number of Services	1,363	694	427	92	25	57	167	0	0	0	2,825
Number of ERUs (ERU_{MDD})	3,028	755	471	93	25	57	170	0	0	0	4,599
Annual Demand (MG/year)	605.65	109.97	65.97	13.10	3.47	7.91	23.45	0.00	0.00	0.00	829.50
Maximum Day Demand (MGD)	3.06	0.76	0.48	0.09	0.03	0.06	0.17	0.00	0.00	0.00	4.65
Peak Hour Demand (gpm)	3,511	875	547	108	29	66	197	0	0	0	5,333

TABLE 2-24 YEAR 2031 WATER DEMAND BY PRESSURE ZONE

				North Hill			South Hill				
Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone5	Zone 6	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,043	700	500	110	50	97	181	35	30	0	2,746
Number of ERUs (ERU_{MDD})	1,043	700	500	110	50	97	181	35	30	0	2,746
Annual Demand (MG/year)	144.66	97.09	69.35	15.26	6.94	13.45	25.10	4.85	4.16	0.00	380.87
Maximum Day Demand (MGD)	1.06	0.71	0.51	0.11	0.05	0.10	0.18	0.04	0.03	0.00	2.78
Peak Hour Demand (gpm)	1,209	812	580	128	58	112	210	41	35	0	3,184
Commercial											
Number of Services	174	2									176
Number of ERUs (ERU_{MDD})	235	3									237
Annual Demand (MG/year)	41.66	0.48									42.14
Maximum Day Demand (MGD)	0.24	0.00									0.24
Peak Hour Demand (gpm)	272	3									275
Industrial											
Number of Services	28										28
Number of ERUs (ERU_{MDD})	1,252										1,252
Annual Demand (MG/year)	333.97										333.97
Maximum Day Demand (MGD)	1.27										1.27
Peak Hour Demand (gpm)	1,452										1,452
Political Subdivision											
Number of Services	11	2									13
Number of ERUs (ERU_{MDD})	20	4									23
Annual Demand (MG/year)	6.89	1.25									8.15
Maximum Day Demand (MGD)	0.02	0.00									0.02
Peak Hour Demand (gpm)	23	4									27
Outside Single-Family Residential											
Number of Services		7	2								9
Number of ERUs (ERU_{MDD})		9	2								11
Annual Demand (MG/year)		0.92	0.26								1.19
Maximum Day Demand (MGD)		0.01	0.00								0.01
Peak Hour Demand (gpm)		10	3								13
Apartment											
Number of Services	52	8	0	1							61
Number of ERUs (ERU_{MDD})	117	18	0	2							137
Annual Demand (MG/year)	24.79	3.81	0.00	0.48							29.08
Maximum Day Demand (MGD)	0.12	0.02	0.00	0.00							0.14
Peak Hour Demand (gpm)	135	21	0	3							158
Irrigation Only											
Number of Services	59	8	6				1				74
Number of ERUs (ERU_{MDD})	221	30	22				4				277
Annual Demand (MG/year)	25.17	3.41	2.56				0.43				31.57
Maximum Day Demand (MGD)	0.22	0.03	0.02				0.00				0.28
Peak Hour Demand (gpm)	256	35	26				4				321
Federal State Govt.											
Number of Services	1	9									10
Number of ERUs (ERU_{MDD})	2	17									19
Annual Demand (MG/year)	0.58	5.24									5.82
Maximum Day Demand (MGD)	0.00	0.02									0.02
Peak Hour Demand (gpm)	2	19									22
Outside Commercial											
Number of Services			3								3
Number of ERUs (ERU_{MDD})			13								13
Annual Demand (MG/year)			0.91								0.91
Maximum Day Demand (MGD)			0.01								0.01
Peak Hour Demand (gpm)			15								15
City											
Number of Services	32	3	3								38
Number of ERUs (ERU_{MDD})	363	34	34								431
Annual Demand (MG/year)	79.55	7.46	7.46								94.47
Maximum Day Demand (MGD)	0.37	0.03	0.03								0.44
Peak Hour Demand (gpm)	420	39	39								499
TOTAL SERVICES BY ZONE											
Number of Services	1,400	739	514	111	50	97	182	35	30	0	3,158
Number of ERUs (ERU_{MDD})	3,251	814	572	112	50	97	185	35	30	0	5,146
Annual Demand (MG/year)	657.29	119.67	80.55	15.73	6.94	13.45	25.53	4.85	4.16	0.00	928.17
Maximum Day Demand (MGD)	3.29	0.82	0.58	0.11	0.05	0.10	0.19	0.04	0.03	0.00	5.21
Peak Hour Demand (gpm)	3,770	944	664	130	58	112	214	41	35	0	5,967

TABLE 2-25 YEAR 2041 WATER DEMAND BY PRESSURE ZONE

				North Hill			South Hill				
Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone5	Zone 6	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,043	745	532	140	100	130	240	55	50	5	3,040
Number of ERUs (ERU_{MDD})	1,043	745	532	140	100	130	240	55	50	5	3,040
Annual Demand (MG/year)	144.66	103.33	73.79	19.42	13.87	18.03	33.29	7.63	6.94	0.69	421.65
Maximum Day Demand (MGD)	1.06	0.75	0.54	0.14	0.10	0.13	0.24	0.06	0.05	0.01	3.08
Peak Hour Demand (gpm)	1,209	864	617	162	116	151	278	64	58	6	3,525
Commercial											
Number of Services	193	2									195
Number of ERUs (ERU_{MDD})	260	3									263
Annual Demand (MG/year)	46.21	0.48									46.69
Maximum Day Demand (MGD)	0.26	0.00									0.27
Peak Hour Demand (gpm)	302	3									305
Industrial											
Number of Services	31										31
Number of ERUs (ERU_{MDD})	1,387										1,387
Annual Demand (MG/year)	369.75										369.75
Maximum Day Demand (MGD)	1.40										1.40
Peak Hour Demand (gpm)	1,608										1,608
Political Subdivision											
Number of Services	12	2									14
Number of ERUs (ERU_{MDD})	21	4									25
Annual Demand (MG/year)	7.52	1.25									8.77
Maximum Day Demand (MGD)	0.02	0.00									0.03
Peak Hour Demand (gpm)	25	4									29
Outside Single-Family Residential											
Number of Services		8	2								10
Number of ERUs (ERU_{MDD})		10	2								12
Annual Demand (MG/year)		1.05	0.26								1.32
Maximum Day Demand (MGD)		0.01	0.00								0.01
Peak Hour Demand (gpm)		12	3								15
Apartment											
Number of Services	57	10	0	1							68
Number of ERUs (ERU_{MDD})	128	22	0	2							152
Annual Demand (MG/year)	27.17	4.77	0.00	0.48							32.41
Maximum Day Demand (MGD)	0.13	0.02	0.00	0.00							0.15
Peak Hour Demand (gpm)	148	26	0	3							177
Irrigation Only											
Number of Services	63	10	8				1				82
Number of ERUs (ERU_{MDD})	236	37	30				4				307
Annual Demand (MG/year)	26.88	4.27	3.41				0.43				34.99
Maximum Day Demand (MGD)	0.24	0.04	0.03				0.00				0.31
Peak Hour Demand (gpm)	273	43	35				4				356
Federal State Govt.											
Number of Services	1	11									12
Number of ERUs (ERU_{MDD})	2	20									22
Annual Demand (MG/year)	0.58	6.40									6.99
Maximum Day Demand (MGD)	0.00	0.02									0.02
Peak Hour Demand (gpm)	2	24									26
Outside Commercial											
Number of Services			3								3
Number of ERUs (ERU_{MDD})			13								13
Annual Demand (MG/year)			0.91								0.91
Maximum Day Demand (MGD)			0.01								0.01
Peak Hour Demand (gpm)			15								15
City											
Number of Services	34	4	4								42
Number of ERUs (ERU_{MDD})	385	45	45								476
Annual Demand (MG/year)	84.52	9.94	9.94								104.41
Maximum Day Demand (MGD)	0.39	0.05	0.05								0.48
Peak Hour Demand (gpm)	447	53	53								552
TOTAL SERVICES BY ZONE											
Number of Services	1,434	792	549	141	100	130	241	55	50	5	3,497
Number of ERUs (ERU_{MDD})	3,462	887	623	142	100	130	244	55	50	5	5,698
Annual Demand (MG/year)	707.31	131.50	88.32	19.89	13.87	18.03	33.71	7.63	6.94	0.69	1,027.90
Maximum Day Demand (MGD)	3.50	0.90	0.63	0.14	0.10	0.13	0.25	0.06	0.05	0.01	5.77
Peak Hour Demand (gpm)	4,014	1,028	722	165	116	151	283	64	58	6	6,607

CHAPTER 3 -

SYSTEM INVENTORY AND ANALYSIS

HLA
Engineering and Land Surveying, Inc.

3.1 SYSTEM DESIGN STANDARDS

Standardized performance and design criteria are essential for the efficient evaluation, construction, and operation of a water utility. Establishing minimum criteria assures a base level of system reliability and enhances the utility's ability to assess system deficiencies and to plan for future improvements. The City of Selah has established the following performance and design criteria for their water system:

TABLE 3-1 SYSTEM DESIGN STANDARDS

Parameter	Design Standard	Regulatory Reference
Water Quality	Provide water quality consistent applicable state (DOH) and federal (EPA) requirements	Chapter 246-290 WAC, Part 3
Average Daily Demand (ADD)	Equivalent to the daily consumption per service in a user category averaged for the period 2016-2018, except as otherwise adjusted to account for recent changes in demand trends as discussed in CHAPTER 2. ADD/ERU = 380 gallons/day	WAC 246-290-221
Maximum Daily Demand (MDD)	Equivalent to the maximum day of consumption per service in a user category, as calculated using the volume of water from the maximum day of production as described in CHAPTER 2. MDD/ERU = 1,012 gallons/day	WAC 246-290-221
Peak Hourly Demand (PHD)	Equivalent to the peak hour consumption per service in a user category, as calculated using a factor of 1.65 times the MDD, as described in CHAPTER 2. PHD/ERU = 1.2 gpm.	WAC 246-290-221
Storage Requirements	Based on providing minimum operational (OS), equalizing (ES), standby (SB), and fire suppression (FSS) storage for the entire water system as calculated using the *DOH Water System Design Manual* equations. Minimum storage volumes for Selah are as calculated in Section 3.4.4.	WAC 246-290-235
Fire Suppression Storage (FSS) and Fire Flow	The minimum water demand and duration required for fire flow and/or fire suppression storage shall be determined by the local fire control authority. Minimum FSS for Selah is 1.44 MG, which is based on providing 6,000 gpm for 4 hours.	WAC 246-290-221(5)
Flow Rates and Velocities	Pipelines shall be sized for a maximum allowable water flow velocity of 8 ft/s under PHD conditions. Maximum pipe velocities may exceed 8 ft/s under fire flow conditions. The basis for pipe size design shall be per computer model analysis.	2019 DOH Water System Design Manual
System Pressures	Minimum service pressure under PHD conditions with ES storage depleted shall be 30 psi, measured at the service meter. Under MDD plus required fire flow conditions, the minimum distribution system pressure shall be 20 psi. Additional information regarding system pressure requirements under specific hydraulic analysis scenarios is presented later in Section 3.4.6.	WAC 246-290-230(5) and WAC 246-290-230(6)
Minimum Pipe Sizes	The minimum pipe size allowed within the system shall be 8-inch diameter. Where fire flow requirements exceed 1,000 gpm, the minimum pipeline size shall be determined by hydraulic analysis.	City of Selah Design and Construction Standards

Additional design standards and requirements for water main construction in the City of Selah are included in the City's Design and Construction Standards provided in CHAPTER 10.

3.2 WATER QUALITY

A public water utility must supply safe and aesthetically pleasing water to its customers. However, source waters of most water utilities vary in the types and amounts of impurities which have been acquired during their passage through atmosphere, ground surfaces, or underground strata. To assure that all drinking water maintains a standard level of quality, acceptable limits of contaminants have been established in Part 4 of WAC Chapter 246-290, *Group A Public Water Supplies*, latest edition.

These standards of acceptability establish "maximum contaminant levels" (MCLs) and "Maximum Residual Disinfectant Levels" (MRDLs) for bacteriological, inorganic chemical and physical, and other elements. The Regulations also set forth procedures to be followed if the MCL limits are exceeded.

The City of Selah monitors its system's water quality in accordance with the requirements of WAC 246-290-300, and 246-290-310. Follow-up action, if required, is completed in accordance with the requirements of WAC 246-290-320 and the Groundwater Rule (GWR). Bacteriological monitoring is performed at ten (10) locations within the water system in accordance with the City's *Coliform Monitoring Plan*. Included in the City's *Coliform Monitoring Plan* is a follow-up procedure when a sample is coliform positive, meeting the Triggered Source Water Monitoring requirements. Lead and copper distribution system monitoring is completed in accordance with the City's lead and copper monitoring program. Inorganic chemical (IOC), volatile organic chemical (VOC), synthetic organic chemical (SOC), and radionuclide testing are performed on the City's source wells.

3.2.1 Water Source Sampling and Testing

Inorganic Chemical (IOC) Monitoring: Water quality monitoring for primary IOCs, secondary IOCs and physical parameters is required from each source generally once every compliance cycle. Compliance cycles are nine years, per 40 CFR 141.23. Selah collects water samples for IOCs and physical parameters at each well, after treatment (chlorine disinfection) and prior to entry into the distribution system.

Certain chemical characteristics must be monitored more frequently than the general monitoring requirements, such as nitrates which must be monitored annually. Other chemical characteristics monitoring requirements may be waived by the DOH. For example, asbestos monitoring requirements have been waived for the City of Selah through December 2028.

Results of Selah's latest source well IOC and physical analysis test results are summarized in Table 3-2 and Table 3-3. These results show the City remains in compliance with State standards. Copies of the test results for each source well are provided in CHAPTER 10. Historical inorganic testing results for each source is provided in Table 3-4, Table 3-5, Table 3-6, Table 3-7, and Table 3-8. These results indicate that water quality in each of the wells has not significantly changed over time.

TABLE 3-2 INORGANIC (PRIMARY SUBSTANCES) CHEMICAL ANALYSIS SUMMARY						
Chemical Characteristics	MCL (mg/l)	Well Nos. 3 & 4 (S05) 09/28/2015	Well No. 5 (S03) 08/29/2016	Well No. 6 (S04) 09/24/2015	Well No. 7 (S06) 08/29/2016	Well No. 8 (S07) 09/27/2016
Antimony (Sb)	0.006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic (As)	0.010	0.0010	0.0046	0.0015	0.0001	0.0036
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.0511	0.0265	0.1020	0.0142	0.0345
Beryllium (Be)	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium (Cd)	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (Cr)	0.1	0.0027	0.0001	0.0004	0.0006	0.0004
Copper (Cu)*	1.3	0.0054	0.0014	0.0010	0.0005	0.0020
Cyanide (HCN)	0.2	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Fluoride (F)	4.0	0.20	0.16	0.26	0.86	0.10
Lead (Pb)*	0.015	0.0014	0.0003	0.0003	0.0002	0.0003
Mercury (Hg)	0.0020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel (Ni)	0.10	0.0015	0.0003	0.0006	0.0001	0.0001
Nitrate (as N)	10.0	1.32	0.05	1.76	0.05	0.75
Nitrite (as N)	1.0	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Selenium (Se)	0.05	0.0007	0.0005	0.0008	0.0005	0.0006
Sodium (Na)*	20	11.40	20.5	23.5	33.8	22.0
Thallium (Tl)	0.002	0.0011	0.0002	0.0003	0.0002	0.0001
* No DOH established MCL. Represents EPA established “action levels” for lead and copper, and recommended level for sodium.						

TABLE 3-3 INORGANIC (SECONDARY SUBSTANCES) CHEMICAL ANALYSIS SUMMARY						
Chemical Characteristics	MCL (mg/l)	Well Nos. 3 & 4 (S05) 09/28/2015	Well No. 5 (S03) 08/29/2016	Well No. 6 (S04) 09/24/2015	Well No. 7 (S06) 08/29/2016	Well No. 8 (S07) 09/27/2016
Chloride (Cl)	250.0	8.700	4.8500	10.10	5.81	7.17
Fluoride (F)	2.0	0.2000	0.1600	0.2600	0.86	0.1000
Iron (Fe)	0.3	0.0536	0.1300	0.0097	0.0161	0.0097
Manganese (Mn)	0.05	0.0024	0.0172	0.0005	0.0132	0.0289
Silver (Ag)	0.1	0.0001	0.0001	0.0001	0.0001	0.0001
Sulfate (SO_4)	250.0	19.70	18.4000	25.4	0.10	18.10
Zinc (Zn)	5.0	0.0060	0.0040	0.0039	0.0005	0.0022
Color	15 Color Units	4.0	4.0	4.0	4.0	4.0
Specific Conductivity	700 umhos/cm	359	223	491	225	307
Total Dissolved Solids (TDS)	500	232	150	294	142	202

TABLE 3-4 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NOS. 3 & 4 (S05)					
Chemical or Physical Characteristics	MCL (mg/l)	09/03/1997	08/02/2004	08/02/2007	09/28/2015
Primary Substances					
Antimony (Sb)	0.006	0.0050	0.0050	0.0050	0.0001
Arsenic (As)	0.010	0.0100	0.0020	0.0020	0.0010
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1000	0.0500	0.5700	0.0511
Beryllium (Be)	0.004	0.0020	0.0002	0.0002	0.0001
Cadmium (Cd)	0.005	0.0020	0.0003	0.0003	0.0001
Chromium (Cr)	0.1	0.0100	0.0047	0.0047	0.0027
Copper (Cu)*	1.3	0.0200	0.0020	0.0020	0.0054
Cyanide (HCN)	0.2	0.1000	0.0100	0.0100	0.0100
Fluoride (F)	4.0	0.5000	0.1700	0.2000	0.2000
Lead (Pb)*	0.015	0.0020	0.0005	0.0005	0.0014
Mercury (Hg)	0.0020	0.0005	0.0003	0.0003	0.0002
Nickel (Ni)	0.10	0.0400	0.0100	0.0100	0.0015
Nitrate (as N)	10.0	1.4000	1.5200	1.4700	1.3200
Nitrite (as N)	1.0	0.5000	0.0500	0.0500	0.0500
Selenium (Se)	0.05	0.0050	0.0050	0.0050	0.0007
Sodium (Na)*	20	15.00	14.60	14.50	11.40
Thallium (Tl)	0.002	0.0010	0.0010	0.0010	0.0011
Secondary Substances					
Chloride (Cl)	250.0	20.000	8.940	8.800	8.700
Fluoride (F)	2.0	0.5000	0.1700	0.2000	0.2000
Iron (Fe)	0.3	0.0500	0.0097	0.0198	0.0536
Manganese (Mn)	0.05	0.0100	0.0020	0.0020	0.0024
Silver (Ag)	0.1	0.0100	0.0047	0.0047	0.0001
Sulfate (SO_4)	250.0	20.00	19.90	19.30	19.70
Zinc (Zn)	5.0	0.0500	0.0206	0.0298	0.0060
Color	15 Color Units	5.0	4.0	4.0	4.0
Specific Conductivity	700 umhos/cm	340	404	404	359
Total Dissolved Solids (TDS)	500	---	260	276	232
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.					

TABLE 3-5 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 5 (S03)					
Chemical or Physical Characteristics	MCL (mg/l)	09/03/1997	09/27/2000	08/02/2007	8/29/2016
Primary Substances					
Antimony (Sb)	0.006	0.0050	0.0050	0.0050	0.0001
Arsenic (As)	0.010	0.0100	0.0100	0.0037	0.0046
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1000	0.1000	0.0580	0.0265
Beryllium (Be)	0.004	0.0020	0.0030	0.0002	0.0001
Cadmium (Cd)	0.005	0.0020	0.0020	0.0003	0.0001
Chromium (Cr)	0.1	0.0100	0.0100	0.0047	0.0001
Copper (Cu)*	1.3	0.0200	0.2000	0.0059	0.0014
Cyanide (HCN)	0.2	0.1000	0.0500	0.0100	0.0100
Fluoride (F)	4.0	0.5000	0.3000	0.3000	0.1600
Lead (Pb)*	0.015	0.0020	0.0020	0.0006	0.0003
Mercury (Hg)	0.0020	0.0005	0.0005	0.0003	0.0002
Nickel (Ni)	0.10	0.0400	0.0400	0.0100	0.0003
Nitrate (as N)	10.0	0.5000	1.2000	1.6300	0.0500
Nitrite (as N)	1.0	0.5000	0.5000	0.0500	0.0500
Selenium (Se)	0.05	0.0050	0.0050	0.0050	0.0005
Sodium (Na)*	20	21.0	20.0	24.4	20.5
Thallium (Tl)	0.002	0.0010	0.0020	0.0010	0.0002
Secondary Substances					
Chloride (Cl)	250.0	20.0000	20.0000	9.6900	4.8500
Fluoride (F)	2.0	0.5000	0.3000	0.3000	0.1600
Iron (Fe)	0.3	0.0500	0.1000	0.0158	0.1300
Manganese (Mn)	0.05	0.0120	0.0100	0.0054	0.0172
Silver (Ag)	0.1	0.0100	0.0100	0.0047	0.0001
Sulfate (SO_4)	250.0	15.0000	20.0000	18.4000	18.4000
Zinc (Zn)	5.0	0.0500	0.2000	0.0200	0.0040
Color	15 Color Units	5.0	5.0	4.0	4.0
Specific Conductivity	700 umhos/cm	210	360	390	223
Total Dissolved Solids (TDS)	500	---	---	284	150
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.					

TABLE 3-6 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 6 (S04)				
Chemical or Physical Characteristics	MCL (mg/l)	09/03/1997	09/06/2006	09/24/2015
Primary Substances				
Antimony (Sb)	0.006	0.0050	0.0060	0.0001
Arsenic (As)	0.010	0.0100	0.0030	0.0015
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1000	0.1120	0.1020
Beryllium (Be)	0.004	0.0020	0.0008	0.0001
Cadmium (Cd)	0.005	0.0020	0.0020	0.0001
Chromium (Cr)	0.1	0.0100	<0.0047	0.0004
Copper (Cu)*	1.3	0.0200	0.0200	0.0010
Cyanide (HCN)	0.2	0.1000	0.0100	0.0100
Fluoride (F)	4.0	0.5000	0.1800	0.2600
Lead (Pb)*	0.015	0.0020	0.0010	0.0003
Mercury (Hg)	0.0020	0.0005	0.0004	0.0002
Nickel (Ni)	0.10	0.0400	0.1000	0.0006
Nitrate (as N)	10.0	1.30	1.48	1.76
Nitrite (as N)	1.0	0.5000	0.2000	0.0500
Selenium (Se)	0.05	0.0050	0.0100	0.0008
Sodium (Na)*	20	29.0	25.4	23.5
Thallium (Tl)	0.002	0.0010	0.0020	0.0003
Secondary Substances				
Chloride (Cl)	250.0	20.0	10.70	10.10
Fluoride (F)	2.0	0.5000	0.1800	0.2600
Iron (Fe)	0.3	0.0500	0.1000	0.0097
Manganese (Mn)	0.05	0.0100	0.0100	0.0005
Silver (Ag)	0.1	0.0100	0.1000	0.0001
Sulfate (SO_4)	250.0	22.0	24.5	25.4
Zinc (Zn)	5.0	0.0500	0.2000	0.0039
Color	15 Color Units	5.0	15.00	4.0
Specific Conductivity	700 umhos/cm	390	493	491
Total Dissolved Solids (TDS)	500	---	308	294
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.				

TABLE 3-7 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 7 (S06)					
Chemical or Physical Characteristics	MCL (mg/l)	09/03/1997	08/03/2004	08/02/2007	08/29/2016
Primary Substances					
Antimony (Sb)	0.006	0.0050	0.005	0.0050	0.0001
Arsenic (As)	0.010	0.0100	0.0020	0.0020	0.0001
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1000	0.0160	0.0160	0.0142
Beryllium (Be)	0.004	0.0020	0.0002	0.0002	0.0001
Cadmium (Cd)	0.005	0.0020	0.0003	0.0003	0.0001
Chromium (Cr)	0.1	0.0100	0.0047	0.0047	0.0006
Copper (Cu)*	1.3	0.0200	0.0020	0.0020	0.0005
Cyanide (HCN)	0.2	0.1000	0.0100	0.0100	0.0100
Fluoride (F)	4.0	0.90	0.97	0.95	0.86
Lead (Pb)*	0.015	0.0020	0.0005	0.0005	0.0002
Mercury (Hg)	0.0020	0.0005	0.0003	0.0003	0.0002
Nickel (Ni)	0.10	0.0400	0.0100	0.0100	0.0001
Nitrate (as N)	10.0	0.50	0.05	0.05	0.05
Nitrite (as N)	1.0	0.50	0.05	0.05	0.05
Selenium (Se)	0.05	0.0050	0.0050	0.0050	0.0005
Sodium (Na)*	20	32.0	30.1	29.40	33.8
Thallium (Tl)	0.002	0.0010	0.0010	0.0010	0.0002
Secondary Substances					
Chloride (Cl)	250.0	20.0	5.03	5.02	5.81
Fluoride (F)	2.0	0.9	0.97	0.95	0.86
Iron (Fe)	0.3	0.0500	0.0200	0.0321	0.0161
Manganese (Mn)	0.05	0.0160	0.0169	0.0178	0.0132
Silver (Ag)	0.1	0.0100	0.0047	0.0047	0.0001
Sulfate (SO_4)	250.0	10.0	0.10	0.10	0.10
Zinc (Zn)	5.0	0.0500	0.0200	0.0200	0.0005
Color	15 Color Units	5.0	4.0	4.0	4.0
Specific Conductivity	700 umhos/cm	200	224	235	225
Total Dissolved Solids (TDS)	500	---	164	150	142
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.					

TABLE 3-8 INORGANIC CHEMICAL ANALYSIS RESULTS FOR WELL NO. 8 (S07)				
Chemical or Physical Characteristics	MCL (mg/l)	11/30/2009	09/25/2012	9/27/2016
Primary Substances				
Antimony (Sb)	0.006	0.0052	0.0030	0.0001
Arsenic (As)	0.010	0.0072	0.0040	0.0036
Asbestos	7 million fibers/liter	Waiver	Waiver	Waiver
Barium (Ba)	2.0	0.1000	0.0430	0.0345
Beryllium (Be)	0.004	0.0008	0.0002	0.0001
Cadmium (Cd)	0.005	0.0020	0.0003	0.0001
Chromium (Cr)	0.1	0.0200	0.0047	0.0004
Copper (Cu)*	1.3	0.0200	0.0020	0.0020
Cyanide (HCN)	0.2	0.0100	0.0100	0.0100
Fluoride (F)	4.0	0.50	0.33	0.10
Lead (Pb)*	0.015	0.0010	0.0008	0.0003
Mercury (Hg)	0.0020	0.0004	0.0002	0.0002
Nickel (Ni)	0.10	0.1000	0.0050	0.0001
Nitrate (as N)	10.0	0.2000	0.46	0.75
Nitrite (as N)	1.0	0.20	0.05	0.05
Selenium (Se)	0.05	0.0100	0.0020	0.0006
Sodium (Na)*	20	19.5	19.8	22.0
Thallium (Tl)	0.002	0.0020	0.0010	0.0001
Secondary Substances				
Chloride (Cl)	250.0	20.0	7.23	7.17
Fluoride (F)	2.0	0.50	0.33	0.1000
Iron (Fe)	0.3	1.63	0.1000	0.0097
Manganese (Mn)	0.05	0.0454	0.0112	0.0289
Silver (Ag)	0.1	0.1000	0.0047	0.0001
Sulfate (SO_4)	250.0	21.0	13.80	18.10
Zinc (Zn)	5.0	0.2000	0.0050	0.0022
Color	15 Color Units	171	4.0	4.0
Specific Conductivity	700 umhos/cm	210	273	307
Total Dissolved Solids (TDS)	500	100	192	202
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.				

Nitrate/Nitrite Monitoring: The City of Selah conducts annual monitoring for Nitrate and Nitrite on all well sources. The maximum contaminant levels (MCL) for Nitrate and Nitrite are 10.0 mg/l and 1.0 mg/l, respectively. Nitrates exceeding this concentration in drinking water can be a health hazard, especially to infants below six months of age.

Test results for the period 2014 through 2019, summarized in Table 3-9, show the City remains in compliance with State standards. A copy of the Nitrate/Nitrite analysis test results are provided in CHAPTER 10.

TABLE 3-9 NITRATE/NITRITE CHEMICAL ANALYSIS RESULTS

	2014	2015	2016	2017	2018	2019
Well Nos. 3 & 4 (S05)						
Nitrate (NO_3-N)	1.02	1.32	1.22	---	---	1.34
Nitrite (NO_2-N)	0.05	0.05	0.05	---	---	0.05
Total Nitrate/Nitrite	1.02	1.32	1.22	---	---	1.34
Well No. 5 (S03)						
Nitrate (NO_3-N)	1.74	2.08	0.05	1.43	1.87	0.06
Nitrite (NO_2-N)	0.05	0.05	0.05	0.05	0.05	0.05
Total Nitrate/Nitrite	1.74	2.08	0.50	1.43	1.87	0.06
Well No. 6 (S04)						
Nitrate (NO_3-N)	0.070	1.84	1.76	2.04	1.92	1.94
Nitrite (NO_2-N)	0.050	0.05	0.05	0.05	0.05	0.05
Total Nitrate/Nitrite	0.070	1.84	1.76	2.04	1.92	1.94
Well No. 7 (S06)						
Nitrate (NO_3-N)	0.05	0.05	0.05	0.05	0.05	0.05
Nitrite (NO_2-N)	0.05	0.05	0.05	0.05	0.05	0.05
Total Nitrate/Nitrite	0.50	0.50	0.50	0.50	0.50	0.50
Well No. 8 (S07)						
Nitrate (NO_3-N)	1.01	1.06	0.75	---	0.07	0.94
Nitrite (NO_2-N)	0.05	0.05	0.05	---	0.07	0.05
Total Nitrate/Nitrite	1.01	1.06	0.75	---	0.50	0.94

Volatile Organic Chemical Monitoring: Volatile Organic Chemical (VOC) monitoring is required once every year for the first three years of sampling, per 40 CFR 141.24. Samples are to be taken following water treatment. If no VOCs are detected during the first three years of testing, future monitoring shall be at least once every compliance period. The DOH may grant waivers for monitoring requirements. Selah conducted VOC testing on its source wells as shown in Table 3-10.

TABLE 3-10 SOURCE WELL VOC TESTING				
Well No. 3 & 4 (S05)	Well No. 5 (S03)	Well No. 6 (S04)	Well No. 7 (S06)	Well No. 8 (S07)
07/2016	07/2016	07/2016	06/2016	09/2017
07/2010	07/2010	07/2010	05/2009	09/2011
07/2006	07/2006	07/2006	04/2006	06/2011
03/1999	03/2003	03/2003	02/2003	03/2011
06/1996	03/1999	03/1999	03/2002	11/2009
	06/1996	06/1996	10/2001	
	08/1995	09/1993	07/2001	
	09/1993	04/1990	04/2001	
	04/1991		01/2000	
	01/1991		03/1999	
	06/1990		09/1998	
	04/1990		11/1997	
	09/1989		11/1996	
			08/1996	
			06/1996	
			02/1996	
			12/1994	

Test results show the City remains in compliance with State standards. The City tests for trihalomethanes (TTHM) along with VOC testing, and test results showed no presence of any of these substances in the water from the City's wells. Copies of the VOC and trihalomethanes test results are provided in CHAPTER 10.

Synthetic Organic Chemical (SOC) Monitoring: SOC monitoring is required once every year for the first three years of sampling, per 40 CFR 141.24. Samples are to be taken following water treatment. If no SOCs are detected during the first three years of testing, future monitoring shall be at least once every compliance period. DOH may grant waivers for monitoring requirements. Selah conducted SOC testing on its source wells as shown in Table 3-11.

TABLE 3-11 SOURCE WELL SOC TESTING				
Well No. 3 & 4 (S05)	Well No. 5 (S03)	Well No. 6 (S04)	Well No. 7 (S06)	Well No. 8 (S07)
05/2018	05/2018	08/2018	05/2018	09/2016
05/2009	05/2009	08/2009	05/2009	11/2009
	06/2001			
	10/1998			

Test results show the City in compliance with State standards and showed no presence of any of these substances in the water from the City's wells. A copy of the SOC analysis test results is provided in CHAPTER 10.

Radionuclide Monitoring: Radionuclide sampling from each source is typically required once every three years. DOH may reduce monitoring requirements to once every six or nine years based on criteria set forth in 40 CFR 141.26. Selah is currently required to sample Well No. 7 (S07) once every three years and all other source wells once every six years. Source well radionuclide testing for Selah has been completed as shown in Table 3-12.

TABLE 3-12 SOURCE WELL RADIONUCLIDE TESTING

Well No. 3 & 4 (S05)	Well No. 5 (S03)	Well No. 6 (S04)	Well No. 7 (S06)	Well No. 8 (S07)
07/2014	05/2017	04/2015	11/2016	11/2016
06/2014	05/2011	03/2015	05/2009	06/2011
05/2014	11/2010	08/2009	11/2004	11/2009
05/2009	10/2010	11/2004	08/2004	
08/2007	08/2007	08/2004	07/2003	
03/2007	03/2007	07/2001	07/1995	
11/2004	11/2004			
08/2004	08/2004			
07/2001	07/2001			

Test results show the City remains in compliance with State standards. A copy of the radionuclide analysis test results is provided in CHAPTER 10.

3.2.2 Distribution System Sampling and Testing

Bacteriological: Drinking water samples are required to be collected monthly at various locations throughout the water distribution system for bacteriological analysis in accordance with the City's *Coliform Monitoring Plan*. The minimum number of samples required for collection by a water utility is based on the population served. DOH regulations require water systems serving a population of 8,501 to 12,900 to take a minimum of ten (10) samples per month when no samples with a coliform presence are collected previous month. The City of Selah is required to sample a minimum of ten (10) locations within the distribution system. The *Coliform Monitoring Plan* and representative copies of bacteriological analysis results are provided in CHAPTER 10.

Disinfection Byproducts (DBPs): Selah adds chlorine to its drinking water to kill or inactivate harmful organisms that may cause various diseases, and this process is known as disinfection. However, chlorine is a very active substance, and it reacts with naturally occurring substances to form compounds known as disinfection byproducts. The most common disinfection byproducts formed when chlorine is used are trihalomethanes (TTHMs) and haloacetic acids (HAA5).

In 2006, EPA enacted new rules for disinfection byproducts monitoring, known as the Stage 2 Rule. Under the Stage 2 Rule, water systems must monitor at locations with the highest averages of total trihalomethanes (TTHMs) and haloacetic acids (HAA5). To determine these locations, the Stage 2 Rule required many systems to complete an Initial Distribution System Evaluation (IDSE). However, the City of Selah was exempt from the IDSE requirement as its 40/30 certification was approved by EPA, demonstrating low historical TTHM and HAA5 distribution system concentrations. The City was required to begin routine Stage 2 monitoring starting with the year following October 1, 2013. Two dual sample sets of TTHM and HAA5 samples are required at each of two locations annually. The City has identified the sampling locations and schedules in the *Stage 2 DBP Monitoring Plan* provided in CHAPTER 10. The compliance determination for the Stage 2 Rule is based on a locational running annual average (LRAA),

meaning compliance must be met at each monitoring location instead of the system-wide running annual average (RAA) used under the Stage 1 Rule.

Results of the TTHM and HAA5 monitoring from 2014 through 2019 are summarized in Table 3-13. A copy of the test results is also provided in CHAPTER 10. Stage 2 monitoring results show that none of the samples exceeded the federal action levels of 0.080 mg/l for TTHMs and 0.060 mg/l for HAA5.

TABLE 3-13 TTHM AND HAA5 PROGRAM SUMMARY OF RESULTS
(all values are in milligrams per liter)

Year	Sample Locations	TTHM	HAA5
2019 (2)	701 Jamie Dr.	0.0023	ND
	815 S. 4th St. Loop	0.0032	ND
2019 (1)	703 Jamie Dr.	0.0047	ND
	815 S. 4th St. Loop	0.0013	ND
2018	701/703 Jamie Dr.	0.0004	0.0060
	815 S. 4th St. Loop	ND	0.0060
2017	701/703 Jamie Dr.	0.0004	0.0060
	815 S. 4th St. Loop	0.0027	0.0060
2016	701/703 Jamie Dr.	ND	0.0150
	815 S. 4th St. Loop	0.0011	0.0150
2015	701/703 Jamie Dr.	0.0018	0.0150
	815 S. 4th St. Loop	0.0037	0.0150
2014	701/703 Jamie Dr.	0.0004	0.0150
	815 S. 4th St. Loop	0.0005	0.0150
2013	1111 Crestview Dr.	0.0015	0.0150
	701/703 Jamie Dr.	ND	0.0150
	815 S. 4th St. Loop	0.0008	0.0150
	1705 W. Orchard Ave.	ND	0.0150
2012	1111 Crestview Dr.	0.0022	0.0150
	701/703 Jamie Dr.	0.0033	0.0150
	815 S. 4th St. Loop	0.0052	0.0150
	1705 W. Orchard Ave.	0.0024	0.0150
2011	1111 Crestview Dr.	0.0038	0.0150
	701/703 Jamie Dr.	ND	0.0150
	815 S. 4th St. Loop	0.0028	0.0150
	1705 W. Orchard Ave.	0.0040	0.0150

* ND means not detected

Lead and Copper: Lead and copper sampling is required once every three years as approved by DOH, per 40 CFR 141.86. In 1997, Selah began a tap water lead and copper monitoring program to determine the lead and copper concentrations in drinking water to which its customers may be exposed. In 2017, thirty (30) samples were collected from various locations throughout the water system and tested for concentrations of lead and copper. Results from the latest monitoring indicated that none of the samples exceeded the federal action levels of 0.015 mg/l for lead and 1.3 mg/l for copper. Table 3-14 provides a

summary of the 2017 lead and copper monitoring results, which are also provided in CHAPTER 10. Test results from the 1997, 1998, 2002, 2005, 2008, 2011, 2014, and 2017 are also provided in CHAPTER 10.

TABLE 3-14 LEAD AND COPPER MONITORING PROGRAM SUMMARY OF RESULTS
(all values are in milligrams per liter)

Sample Number	Sample Location	Year 2017	
		Copper (Federal Action Level 1.3 mg/l)	Lead (Federal Action Level 0.015 mg/l)
1	302 W. Selah Ave.	0.0168	0.00011
2	201 S. 1st St	0.00952	<0.0001
3	1406 W. Fremont Ave.	0.485	0.00316
4	805 W. Cherry Ave.	0.0667	0.00055
5	203 Southern Ave.	0.00091	0.00125
6	423 N. 4th St.	0.00279	0.00028
7	206 W. Fremont Ave.	0.0224	0.00027
8	801 W. Pear Ave.	0.0043	0.00105
9	113 W. Naches Ave.	0.0514	0.00063
10	807 W. Naches Ave.	0.170	0.00959
11	216 S. 1st St.	0.0464	0.0005
12	1409 Cedar Ln.	0.225	0.00023
13	609 N. 14th St.	0.0221	0.00027
14	410 N. 10th St.	0.0183	0.00339
15	207 S. 3rd St.	0.00113	0.00012
16	222 S. Rushmore Rd.	0.0193	0.00078
17	905 W. Goodlander Circle	0.054	0.0005
18	707 Daugherty Pl.	0.0269	0.00017
19	111 N. 13th St.	0.0626	0.00019
20	222 S. Railroad Ave.	0.0613	0.00485
21	131 E. Fremont Ave.	0.00179	0.00015
22	1108 W. Pear Ave.	0.128	<0.0001
23	1105 W. Goodlander Rd.	0.0431	0.00042
24	141 E. Naches Ave.	0.00552	0.00437
25	206 Anchor Loop	0.136	0.00053
26	1110 Crestview Dr.	0.0224	0.0017
27	513 Harris Ave.	0.00818	0.00023
28	205 W. Fremont Ave.	0.00353	0.00015
29	201 Selah Ave.	0.00929	0.00034
30	401 Lacey Ave.	0.0474	0.00013

3.2.3 Future Source Water and Distribution System Sampling and Testing

A summary of future source and distribution system monitoring requirement frequencies, dates, and sample status, as provided in the City's *Water Quality Monitoring Schedule* (WQMS) *for the Year 2020*, is provided below in Table 3-15 and Table 3-16, respectively. A copy of the City's 2020 WQMS is provided in CHAPTER 10.

TABLE 3-15 FUTURE SOURCE WATER SAMPLING REQUIREMENTS

Sample Type	Frequency	Last Sample	Next Sample	Status
Well No. 5 (S03)				
Inorganic Chemicals (IOCs)*	Once/9 years	08/29/2016	2025	Within MCLs
Nitrate/Nitrite	Once/Year	10/08/2019	2020	Within MCLs
Volatile Organic Chemicals (VOCs)*	Once/6 Years	07/26/2016	2022	Within MCLs
Synthetic Organic Chemicals (SOCs)*	Once/9 Years	05/24/2018	2027	Within MCLs
Gross Alpha	Once/3 Years	05/10/2017	2020	Within MCLs
Radium 228	Once/6 Years	05/17/2017	2020	Within MCLs
Well No. 6 (S04)				
Inorganic Chemicals (IOCs)*	Once/9 years	09/24/2015	2024	Within MCLs
Nitrate/Nitrite	Once/Year	10/24/2019	2020	Within MCLs
Volatile Organic Chemicals (VOCs)*	Once/6 Years	07/26/2016	2022	Within MCLs
Synthetic Organic Chemicals (SOCs)*	Once/9 Years	08/08/2018	2027	Within MCLs
Gross Alpha	Once/6 Years	03/11/2015	2021	Within MCLs
Radium 226 and 228	Once/6 Years	04/27/2015	2024	Within MCLs
Well Nos. 3 and 4 (S05)				
Inorganic Chemicals (IOCs)*	Once/9 years	09/28/2015	2024	Within MCLs
Nitrate/Nitrite	Once/Year	03/18/2020	2021	Within MCLs
Volatile Organic Chemicals (VOCs)*	Once/6 Years	07/26/2016	2022	Within MCLs
Synthetic Organic Chemicals (SOCs)*	Once/9 Years	05/24/2018	2027	Within MCLs
Gross Alpha	Once/3 Years	07/16/2014	2020	Within MCLs
Radium 228	Once/3 Years	06/18/2014	2020	Within MCLs
Well No. 7 (S06)				
Inorganic Chemicals (IOCs)*	Once/9 years	08/29/2016	2025	Within MCLs
Nitrate/Nitrite	Once/Year	08/07/2019	2020	Within MCLs
Volatile Organic Chemicals (VOCs)*	Once/6 Years	06/01/2016	2022	Within MCLs
Synthetic Organic Chemicals (SOCs)*	Once/3 Years	05/24/2018	2027	Within MCLs
Gross Alpha	Once/6 Years	11/10/2016	2020	Within MCLs
Radium 228	Once/6 Years	11/10/2016	2020	Within MCLs
Well No. 8 (S07)				
Inorganic Chemicals (IOCs)*	Once/9 years	09/27/2016	2025	Within MCLs
Nitrate/Nitrite	Once/Year	03/26/2019	2020	Within MCLs
Volatile Organic Chemicals (VOCs)*	Once/6 Years	09/28/2017	2023	Within MCLs
Synthetic Organic Chemicals (SOCs)*	Once/9 Years	09/27/2016	2025	Within MCLs
Gross Alpha	Once/6 Years	11/10/2016	2022	Within MCLs
Radium 228	Once/6 Years	11/10/2016	2022	Within MCLs
* Waiver through next sample date.				

TABLE 3-16 FUTURE DISTRIBUTION SYSTEM SAMPLING REQUIREMENTS				
Sample Type	Frequency	Last Sample	Next Sample	Status
Coliform Bacteria	Monthly	04/07/2020	05/2020	Within MCLs
Disinfection Byproducts[a]	Annually	07/25/2019	2020	Within MCLs
Lead & Copper	3 years	09/19/2017	2020	No Exceedance
Asbestos	Waived	N/A	N/A	N/A

[a] Two dual sample sets of TTHM and HAA5 samples are required at each of two locations annually, Stage 2 Rule.
[b] Waived through December 2019.

Future sampling requirements are discussed further in CHAPTER 6. The City's future WQMS's should be consulted regarding the dates for future testing.

3.3 SYSTEM DESCRIPTION AND INVENTORY

The existing City of Selah domestic water system consists of seven distribution pressure zones, as shown in Figure 3-1, all of which provide a minimum of 30 psi static service elevation, as required by DOH. Information on those seven pressure zones, including their service elevations, pressure ranges, and how each zone is served is provided in Table 3-17.

TABLE 3-17 SELAH WATER SYSTEM PRESSURE ZONE INFORMATION				
Service Pressure Zone	Supply Source	Storage Reservoirs	Highest Service Elevation (Static Pressure)	Lowest Service Elevation (Static Pressure)
Zone 1	Six (6) Groundwater Wells (Nos. 3, 4, 5, 6, 7 & 8)	North and Palm Park Reservoirs (OF Elev. 1,305.7 ft.)	1,200 ft. (45 psi)	<1,100 ft. (89 psi)
Zone 2	From Zone 3 via Multiple Pressure Reducing Valves	Brader Hill and Goodlander Reservoirs (OF Elev. 1,489.1 ft.)	1,300 ft. (40 psi)	1,200 ft. (97 psi)
Zone 3	Three (3) Booster Pump Stations (Well No. 6, Hospital Hill, and Palm Park)	Brader Hill and Goodlander Reservoirs (OF Elev. 1,491.8 ft.)	1,390 ft. (43 psi)	1,300 ft. (82 psi)
Zone 4 North Hill Area	From Zone 5 via Pressure Reducing Valves	Valhalla Reservoirs (OF Elev. 1,666.0 ft.)	1,450 ft. (45 psi)	1,365 ft. (71 psi)
Zone 4 South Hill Area	From Zone 6 via Pressure Reducing Valve	Lookout Point Reservoir (OF Elev. 1,749.5 ft.)	1,480 ft. (44 psi)	1,390 ft. (94 psi)
Zone 5 North Hill Area	Goodlander Booster Pump Station	Valhalla Reservoirs (OF Elev. 1,666.0 ft.)	1,560 ft. (37 psi)	1,480 ft. (82 psi)
Zone 5 South Hill Area	From Zone 6 via Future Pressure Reducing Valves	Lookout Point Reservoir (OF Elev. 1,749.5 ft.)	1,560 ft. (47 psi)	1,480 ft. (82 psi)
Zone 6 North Hill Area	Valhalla Zone 6 Constant Pressure Booster Pump Station	Valhalla Reservoirs (OF Elev. 1,666.0 ft.)	1,650 ft. (47 psi)	1,560 ft. (86 psi)
Zone 6 South Hill Area	Brader Hill Booster Pump Station	Lookout Point Reservoir (OF Elev. 1,749.5 ft.)	1,650 ft. (47 psi)	1,560 ft. (86 psi)
Zone 7	Future Zone 7 Constant Pressure Booster Pump Station	Lookout Point Reservoir (OF Elev. 1,749.5 ft.)	1,730 ft. (51 psi*)	1,650 ft. (86 psi*)

* Estimated future pressure range.

CITY OF SELAH

Water System Plan Update

STATIC PRESSURE ZONE MAP

LEGEND

- SELAH CITY LIMITS
- SELAH UGA BOUNDARY
- ZONE 1 (1,100-1,200 FT)
- ZONE 2 (1,200-1,300 FT)
- ZONE 3 (1,300-1,390 FT)
- ZONE 4 (1,390-1,480 FT)
- ZONE 5 (1,480-1,560 FT)
- ZONE 6 (1,560-1,650 FT)
- ZONE 7 (1,650-1,750 FT)
- ZONE 1 PIPE
- ZONE 2 PIPE
- ZONE 3 PIPE
- ZONE 4 PIPE
- ZONE 5 PIPE
- ZONE 6 PIPE

N W E S

0 375 750 1500

NOTE: ZONE 4 NORTH ELEVATION RANGE 1,390 FT TO 1,460 FT, ZONE 5 NORTH ELEVATION RANGE 1,460 FT TO 1,560 FT AND ZONE 6 NORTH ELEVATION RANGE 1,560 FT TO 1,660 FT.

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 3-1

The City is supplied water from six primary source wells. The maximum pumping capacity of the six primary wells is 6,400 gpm or 9.21 million gallons per day, although normal production is limited to 5,500 gpm or 7.92 million gallons per day due to the City's total existing certificated water rights equaling 5,500 gpm and 4,760 acre-feet per year (1,551 million gallons). Further discussion on the City's existing water rights is provided in Section 3.4.2.

Water storage is provided by eight reservoirs within Selah's water system. The lowest pressure level (Zone 1) is served by three reinforced concrete reservoirs with the combined capacity of 1,022,000 gallons. Water from Zone 1 is boosted into the Zone 3 pressure level through three booster pump stations with a combined capacity of 3,750 gpm. Two reinforced concrete reservoirs serve Zones 2 and 3 with the combined capacity of 1,200,000 gallons. Zone 2 is supplied from Zone 3 through pressure reducing valves. Water from Zone 3 is boosted into the Zone 6 South pressure level through one duplex booster pump station with a capacity of 1,000 gpm. One steel reservoir serves Zones 4 and 6 with a capacity of 1,192,000 gallons. Water from Zone 3 is also boosted into the Zone 5 North pressure level through one duplex booster pump station with a capacity of 1,000 gpm. Zone 4 North is supplied from Zone 5 North through pressure reducing valves. Two reinforced concrete reservoirs serve Zone 5 North with a total capacity of 317,000 gallons. Selah's total reservoir capacity is 3,731,000 gallons.

During normal operation, static pressures throughout the existing water distribution system range from a low of 37 psi to a high of 97 psi, based upon the reservoir overflow elevations, booster pump stations, and pressure reducing valves.

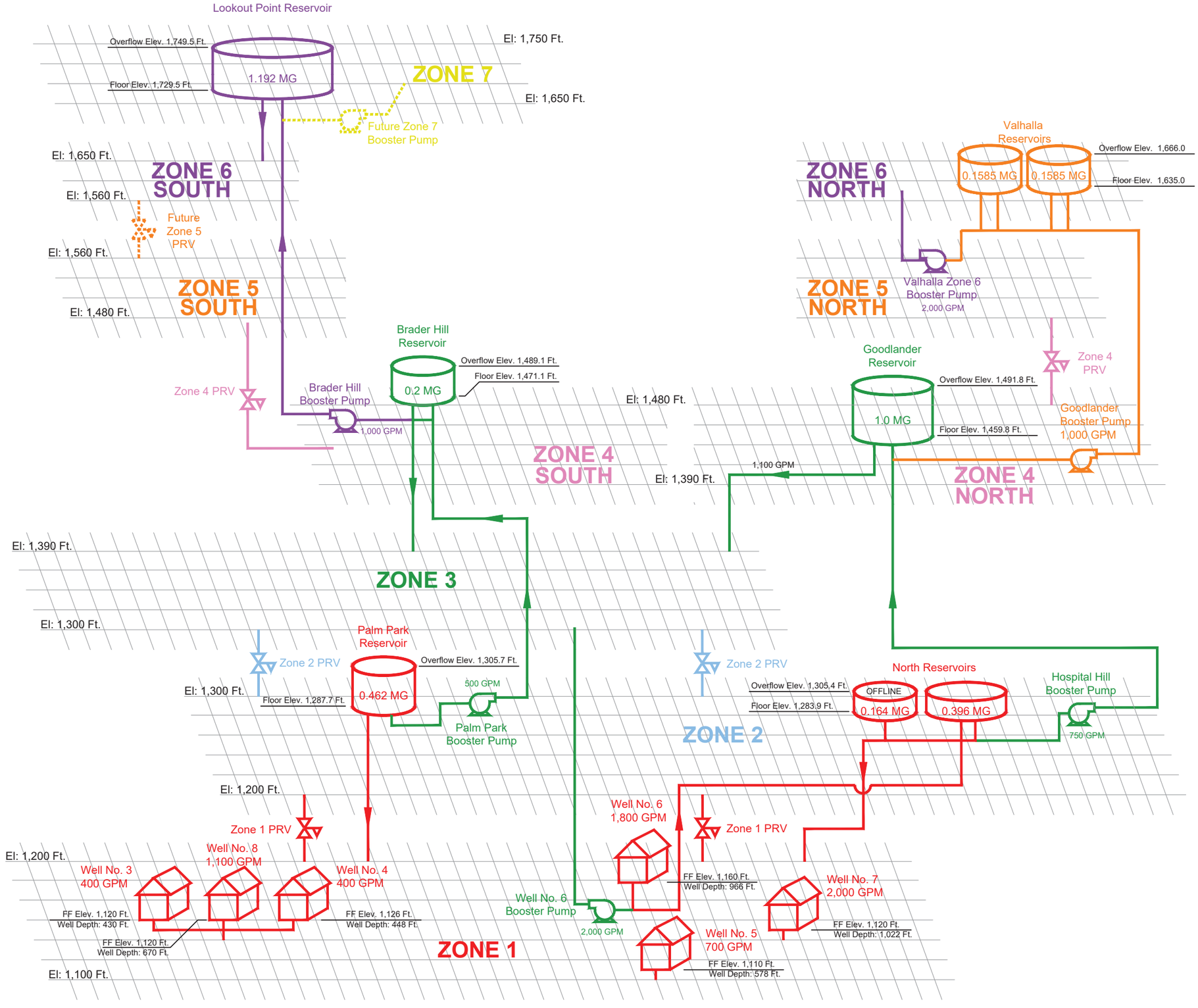
The entire water system is controlled by a comprehensive PLC (Programmable Logic Controller) based telemetry system. PLC telemetry units are located at all system wells, booster stations, and reservoirs, and are linked via radio communication. The telemetry system's master control station is located at the City's Public Works Shop.

Selah's water transmission and distribution system is comprised of over 230,000 lineal feet of pipe, ranging in diameter from 1-inch to 16-inch. The system is looped where possible, and most of the material is 6-inch or larger ductile iron or cast-iron pipe. The layout of Selah's water distribution system, including pipe sizes and valve, hydrant, reservoir, and well locations is shown in Figure 3-1. The maximum water service elevation of the existing system is also indicated in Figure 3-1. An enlarged map (Map A) of the water system is included in CHAPTER 10. Figure 3-2, Water System Schematic, provides a schematic depicting the interrelationship between the water system components

CITY OF SELAH

Water System Plan Update

WATER SYSTEM SCHEMATIC



HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 3-2

3.3.1 Water Sources

The City of Selah has six primary source wells, all located on City-owned properties within Service Pressure Zone 1, as shown in Figure 3-1 and Map A, provided in CHAPTER 10. The following are descriptions of the City's wells and pump installations.

Well No. 3 (S01): Well No. 3 is in the southwest corner of Wixson Park at the west end of Selah Avenue as shown in Figure 3-1 and Map A. Drilled in 1944, the well is 430 feet deep, and had a static water level of 40 feet deep in 1976. As a result of reduced capacity, the old well pump was replaced in 1993 with a 10-stage Peerless deep well vertical turbine pump. The existing Worthington pump discharge head was reused. The current pump is powered by a 100 horsepower, 460-volt, 3 phase, 1,760 RPM U.S. Motor, and has a capacity of 700 gpm at a total dynamic head of 390 feet, although production is kept to 400 gpm to reduce the production of sand. Operation of Well No. 3 also must be coordinated with Well No. 4 and Well No. 8 to minimize drawdown effects on the other wells. Well No. 3 can be run by itself or with Well No. 4 but cannot be run at the same time as Well No. 8 because of the immediate and significant drawdown effects.

The pump is housed in an in-ground concrete vault which is ventilated but not heated. The discharge piping runs to a concrete block building where the pump controls, valving, and chlorination equipment are housed. A check valve and an air release valve are installed in the discharge piping in this building, along with a Wallace Tiernan automatic gas chlorinator located in an adjacent room. An inline electromagnetic flowmeter is installed on the common discharge line with Well No. 4.

Well No. 4 (S02): Well No. 4 is located at the west edge of Wixson Park immediately north of Well No. 3, as shown in Figure 3-1 and Map A. Drilled in 1947, the well is 292 feet deep, and had a static water level of 60 feet deep in 1976. As a result of reduced capacity, the old 5-stage Fairbanks Morris well pump was replaced in 1993 with a 10-stage Peerless deepwell vertical turbine pump powered by a 100 horsepower, 460-volt, 3-phase, 1,760 RPM U.S. Motor. In 2001 the vertical turbine pump was replaced with a submersible pump that is powered by a 60 horsepower, 460-volt, 3-phase, 3,600 RPM Hitachi motor, and has a capacity of 700 gpm at a total dynamic head of 390 feet, although production is kept to 400 gpm to reduce the production of sand and to minimize drawdown effects in Well No. 3 and Well No. 8.

The pump is housed in an in-ground concrete vault which is ventilated but not heated. The discharge piping runs to a concrete block building where the pump controls, valving, and chlorination equipment are housed. A check valve and an air release valve are installed in the discharge piping in this building, along with a Wallace Tiernan automatic gas chlorinator located in an adjacent room. An inline electromagnetic flow meter is installed on the common discharge line with Well No. 3.

Well No. 5 (S03): Well No. 5 is located at the northwest corner of the intersection of First Avenue and Railroad Avenue, as shown in Figure 3-1 and Map A. Drilled in 1951, the well is 578 feet deep, and had a static water level of 15 feet deep in 1986. The well was rehabilitated in 2012, including a new pump, motor, and level transducer. The submersible turbine pump is a 6-stage Flowserve Pleuger Model QN83-6a (7.75" bowl size) pump with NORYL impellers. The pump has a 75 horsepower, 480-volt, 3-phase, 3,600 RPM submersible motor. The original capacity of the pump was about 700 gpm. The current capacity is about 600 gpm.

The pump is housed in a part concrete block, part wood frame building which is ventilated and heated. The wood framed walls and roof are removable. A Bailey "deepwell type" pump control valve is installed off the discharge piping. A by-pass line from this valve discharges into the City's storm drain system. A check valve and air release valve are installed in the discharge piping. An in-line flow meter is installed inside the pumphouse in a concrete piping pit. A Wallace Tiernan automatic gas chlorinator, which injects into the discharge piping, is in an adjacent room.

Well No. 6 (S04): Well No. 6 is located at the northwest corner of the intersection of Fifth Street and Speyers Road as shown in Figure 3-1 and Map A. Drilled in 1960, the well is 966 feet deep, and had a static water level of 30 feet deep in 1976. The deepwell turbine pump is an 8-stage Worthington 12 HH (12" bowl size) which was installed in 1981 and reinstalled in 2009 when the Well No. 6 and Zone 3 Booster Pump Station was constructed. The pump is powered by a 200 horsepower, 460-volt, 3-phase, 1,800 RPM U.S. Motor. The reported capacity of the pump is about 1,800 gpm, though it has never been pumped more than 1,650 gpm. The well is equipped with a level transducer and water levels are regularly monitored as described in Section 2.3.6.

The pump is housed in the booster pump station building (constructed in 2009) which is heated, ventilated, and air conditioned. The well is equipped with a Lakos Model IHB-0810 centrifugal-action vortex sand separator. Check valves and air release valves are installed in the discharge piping within the building. A 12-inch electromagnetic flow meter is installed in the discharge pipe. A separate room within the building houses the automatic gas chlorinator. The pump station also has an automatic transfer switch and generator plug to supply auxiliary power during an outage. The City regularly has a 125-kW portable diesel engine-driven generator connected to the station. The generator is only capable of powering either the well pump or booster pumps during outage.

Well No. 6 discharges directly into the system piping, but also has the ability to pump directly to the North Reservoirs or the Zone 3 reservoirs (via the booster pumps) through separate discharge piping, to lengthen chlorine contact time if necessary.

Well No. 7 (S06): Well No. 7 is located at the northeast corner of Carlon Park, adjacent to Goodlander Road, as shown in Figure 3-1 and Map A. Drilled in 1994, the well is a flowing artesian, with an original shut-in pressure of 15 psi. The current static wellhead pressure in the winter months is about 8 psi. The well was drilled to a depth of about 1,023 feet and cased to a depth of 746 feet. Water is pumped from Well No. 7 with a horizontally mounted, split-case, centrifugal Paco Type KP booster pump (Model No. 6015-1), powered by a 200 horsepower, 460-volt, 3 phase, 60 hertz, 1,800 RPM motor. The capacity of the pump is 2,000 gpm at a total dynamic head of 220 feet. In 2018 the City experienced a significant decline in well pump capacity due to lower artesian pressures. The pump was only capable of producing between 800 and 1,000 gpm without cavitation. In 2019 the City completed evaluation, redevelopment, and testing of the well to determine the conditions causing decline in well performance. Following this assessment, it was determined the well borehole was in good condition, but the recorded well depth was incorrect. The final depth of the well is about 22 feet less than what was recorded in the well log. It was also discovered during testing the well that most of the water is coming from the bottom of the borehole. Reductions in well pump performance were determined to be due to regional aquifer level declines. In 2020 a 200-horsepower vertical turbine well pump and motor were installed so the City can drawdown the well and pump the full 2,000 gpm.

The well and both pumps are housed in a masonry block building in Carlon Park. A transfer switch is installed for the City to switch between booster pump and turbine pump operation. The building is heated and ventilated. A 12-inch electromagnetic flow meter is installed in the discharge line. An automatic gas chlorinator, which injects into the discharge piping, is in an adjacent room. The well is equipped with a pressure transmitter and submersible level transducer to regularly monitor well head pressures and water levels as described in Section 2.3.6. The Well No. 7 pumphouse also has a permanent 250-kW diesel engine-driven generator and automatic transfer switch that provides auxiliary power during outages.

Well No. 8 (S07): Well No. 8 is located between Well Nos. 3 and 4 within Wixson Park as shown in Figure 3-1 and Map A. Drilled in 2009, the well is drilled to a depth of 670 feet and cased to a depth of 594 feet. During construction, the well temporarily had an artesian pressure of 0.5 feet above the ground surface, but the well now has a static water level of about 20 feet below the ground surface. The well is equipped with a Goulds Model 9TLC submersible turbine pump powered by a Hitachi 200 horsepower, 460-volt, 3 phase, 60 hertz, 3,600 RPM motor. The capacity of the pump is 1,100 gpm at a total dynamic head of 500 feet.

The wellhead is housed in an above-ground utility box on a concrete pad, which is ventilated but not heated. The piping runs to an adjacent in-ground meter vault where an in-line electromagnetic flow meter is installed on the discharge pipe. Chlorine solution piping is routed from the nearby control building to the meter vault where an injection assembly is attached to the discharge piping. A check valve, sample tap, and pressure transmitter assembly are installed on the discharge piping in the meter vault. The well is also equipped with a submersible level transmitter to regularly monitor water levels as described in Section 2.3.6.

The operation of Well No. 8 must be coordinated with Well No. 3 and Well No. 4 to minimize drawdown effects that reduce well pump production. Well No. 8 can run with Well No. 4 but cannot be run at the same time as Well No. 3 because of the immediate and significant drawdown effects. Water levels must be closely monitoring when any combination of Well No. 3, Well No. 4, and Well No. 8 are run together.

A summary of Selah's source wells, including well depth, current static water levels and capacity is provided in Table 3-18 below.

TABLE 3-18 SELAH SOURCE WELL INFORMATION SUMMARY

	Well No. 3 (S01)	Well No. 4 (S02)	Well No. 5 (S03)	Well No. 6 (S04)	Well No. 7 (S06)	Well No. 8 (S07)
Date Drilled	1944	1947	1951	1960	1994	2009
DOE Well Tag ID Number	AFK978	AFK968	AFK982	ABR091	AFK967	AAS171
Ground Elevation	1,118 feet	1,125 feet	1,110 feet	1,156 feet	1,116 feet	1,121 feet
Well Depth	430 feet	448 feet	578 feet	966 feet	1,001 feet[a]	670 feet
Depth to First Open Interval	321 feet	131 feet	201 feet	86 feet	274 feet	297 feet
Casing Size/Depth[b]	16-inch diam. 0-316 feet 12-inch diam. perf. casing to 376 feet 10-inch diam. perf. casing to 430 feet	20-inch diam. 0-100 feet 12-inch diam. perf. casing to 448 feet	24-inch diam. 0-70 feet 16-inch diam. perf. casing to 555 feet	20-inch diam. perf. casing 0-526 feet 16-inch diam. perf. casing to 537 feet 10-inch diam. perf. casing to 776 feet 8-inch diam. perf. casing to 918 feet	26-inch diam. 0-140 feet 20-inch diam. to 293 feet 16-inch diam. to 594 feet 12-inch diam. 580-742 feet 12-inch open borehole to 1,001 feet[a]	16-inch diam. 0-304 feet 10-inch diam. screen assembly from 264 feet to 670 feet
Static Water Level, Year (below ground surface)	40 feet, 1976	60 feet, 1976	15 feet, 1986	30 feet, 1976	-34.6 feet (artesian), 1994	-0.50 feet (artesian), 2010
Initial Flow @ Drawdown	85 gpm @ artesian pressure	1,430 gpm @ 97 feet	1,400 gpm @ 150 feet	1,500 gpm @ 110 feet	1,900 gpm @ -1.0 feet (artesian pressure)	1,100 gpm @ 183 feet
Current Capacity	400 gpm	400 gpm	600 gpm	1,800 gpm	2,000 gpm	1,100 gpm
Pump Motor Size	100 HP	60 Hp	75 HP	200 HP	200 HP	200 HP

[a] Values updated following 2019 video scan and evaluation of Well No. 7 condition.
[b] Refer to well logs provided in CHAPTER 10 for additional information on well construction details.

3.3.2 Water Treatment

Selah provides no treatment of its water supply other than disinfection. Disinfection of the City's water is accomplished through chlorination of the source water as it enters the City's distribution system. Each City well is equipped with a gas chlorinator which injects chlorine into the discharge piping of each well. Information on each chlorinator is included, along with the descriptions of each well.

3.3.3 Booster Pump Stations

Water is supplied to the upper pressure zones of the City's storage and distribution system through multiple booster pump stations. The location of each booster pump station is shown on Figure 3-1 and on Map A, provided in CHAPTER 10.

Water is supplied to the Zone 3 pressure level through three booster pump stations, the Hospital Hill Booster Pump Station, the Palm Park Booster Pump Station, and the Well No. 6 Booster Pump Station. Operation of the Zone 3 booster pumps is controlled based on water levels in the Goodlander Reservoir of Brader Hill Reservoir. The City can select which reservoir is the primary level control for each booster pump station.

The Hospital Hill Booster Pump Station, located at the North Reservoirs, has one 5-inch x 6-inch PACO Model 5015-5, 75-horsepower, 230-volt, 3-phase, 1,800 RPM split-case pump. The original 1978 pump was replaced with an identical pump in 1993 and has a capacity of 750 gpm. This booster pump is primarily used as a backup to other booster pumps.

The Palm Park Booster Pump Station, located at the Palm Park Reservoir was reconstructed in 2017, and contains two Grundfos Model CR90-3, 60-horsepower, 480-volt, 3-phase, 3,600 RPM vertical multistage centrifugal booster pumps, each with a capacity of 500 gpm at 220 feet of total dynamic head (TDH). The total station capacity is 1,000 gpm.

The Well No. 6 Booster Pump Station, located in the same building as Well No. 6 at the intersection of Fifth Street and Speyers Road, has two Peerless Model 6AE16G, 100-horsepower, 480-volt, 3-phase, 1,800 RPM horizontal split-case booster pumps, each with a maximum capacity of 1,050 gpm at 230 feet of TDH. The booster station was constructed in 2009 and has a total capacity of 2,000 gpm.

Water is supplied to the Zone 6 South pressure level through one duplex booster station located at the Brader Hill Reservoir. The Brader Hill Booster Pump Station contains two Grundfos Model CR90-3, 50-horsepower, 480-volt, 3-phase, 3,500 RPM pumps. Installed in 2005, each pump has a capacity of 500 gpm at 300 feet of TDH. The total capacity of the station is 1,000 gpm.

Water is supplied to the Zone 5 North pressure level through one duplex booster station located near the Goodlander Reservoir. The Goodlander Booster Pump Station contains two Grundfos Model CR90-3, 50-horsepower, 480-volt, 3-phase, 3,500 RPM vertical multistage centrifugal booster pumps, each with a capacity of 500 gpm at 220 feet of TDH. The booster pump station was originally constructed in 2009 and rebuilt in 2018 following a fire that destroyed the entire pump station. The total station capacity is 1,000 gpm.

Water supplied to the Zone 6 North pressure level is through a closed system constant pressure booster pump station that contains two Peerless Model 6AE14G, 100-horsepower, 480-volt, 3-phase, 1,800 rpm, horizontal split-case booster pumps for fire suppression, each with a capacity of 2,000 gpm at 135 feet of TDH; one Grundfos Model CR64-2-2, 20-horsepower, 480-volt, 3-phase, 3,500 RPM vertical multistage centrifugal booster pump with a capacity of 300 gpm at 110 feet of TDH; and one Grundfos Model CR10-4, 3-horsepower, 480-volt, 3-phase, 3,500 RPM vertical multistage centrifugal booster pump with a maximum capacity of 60 gpm at 105 feet of TDH. The booster station also has two 250-gallon hydropneumatics pressure tanks. The pump station is controlled based on pressures within the Zone 6

North distribution system. The maximum pump station capacity with one of the fire pumps out of service is 2,000 gpm. The booster station is also equipped with a 150-kW diesel engine-driven generator and automatic transfer switch that provides auxiliary power during outages.

Provided in Table 3-19 is a summary of the City's booster pump stations, including number of pumps, model numbers, and capacities.

TABLE 3-19 BOOSTER PUMP STATION INFORMATION

Pump Station Name	Year Installed	Service Pressure Zone	Pump Make/Model, Horsepower	Number of Pumps	Maximum Capacity (gpm)
Hospital Hill Booster Pump Station	1993	Zone 3	PACO 5015-5, 75 HP	1	750
Palm Park Booster Pump Station	2017	Zone 3	Grundfos CR90-3, 60 HP	2	1,000
Well No. 6 Booster Pump Station	2009	Zone 3	Peerless 6AE16G, 100 HP	2	2,000
Brader Hill Booster Pump Station	2005	Zone 5	Grundfos CR90-3, 50 HP	2	1,000
Goodlander Booster Pump Station	2018	Zone 5	Grundfos CR90-3, 50 HP	2	1,000
Valhalla Zone 6 Booster Pump Station	2017	Zone 6	Peerless 6AE14G, 100 HP Grundfos CR64-2-2, 20 HP Grundfos CR10-4, 3 HP	2 1 1	2,000

3.3.4 Pressure Reducing Valves

A number of pressure reducing valves (PRVs) are installed within the City's water system to feed water at an acceptable pressure from the Zone 3 pressure level to the Zone 2 level, and from the Zone 6 and Zone 5 levels to the Zone 4 level. PRVs are also installed between Zone 2 and Zone 1 to allow water to flow to Zone 1 under fire flow or emergency conditions. All the PRVs are manufactured by Cla-Val Co., and are housed in concrete vaults. Information on the City's pressure reducing valves is provided in Table 3-20.

TABLE 3-20 PRESSURE REDUCING VALVE SETTINGS

Valve No.	Valve Location	Zone	Valve Size	Year Installed	Elevation (feet)	Recorded Inlet Pressure[a] (psi)	Pressure Setting/ Recorded Outlet Pressure[a] (psi)
1	114 W. Goodlander Rd.	1	12”	1978[b]	1,210	80	42/43
2	N. 9th St. and W. Pear Ave.	1	4"	1998[c]	1,198	90	42/45
3	702 W. Orchard Ave.	1	6"	1998[c]	1,190	90	37/50
4	Alley Behind Lince School	1	4"	1998[c]	1,138	116	68/80
5 6	Goodlander and North 4th St.	2	8" 3”	1998	1,300	90	47/35 52/45
7 8	515 North 4th St.	2	6” 2”	1998	1,230	125	70/45 75/65
9 10	1401 W. Fremont Ave.	2	10” 3”	1998	1,290	92	39/30 46/35
11	N. 13th St. and W. Cherry Ave.	2	6"	1986[b]	1,229	102	65/70
12	N. 13th St. and W. Home Ave.	2	3"	1998	1,255	100	58/60
13 14	105 South 10th St.	2	6" 2”	1998	1,297	80	37/36 42/38
15 16	W. 5th Ave. and S. 10th St.	2	6" 2”	1998	1,250	115	66/50 71/60
17	1701 W. Naches Ave.	3	6”	2005	1,390	85	40/45
18	Vista Del Sol	3	6”	2019	1,389	60	50
19 20	Brader Hill Pump Station	4	8” 2”	2005	1,471	120	35 40
21 22	Goodlander Pump Station	4	6” 2”	2009	1,450	90	30/33 35/33

[a] Recorded pressures per City as of June 2020.
[b] Existing valves rehabilitated in place by GC Systems in 1998.
[c] Rehabilitated valves (by GC Systems) relocated to this location.

3.3.5 Storage Facilities

The City's water storage facilities consist of seven reinforced concrete reservoirs and one steel reservoir with a total capacity of 3,731,000 gallons. Water is pumped from all the City's wells directly into the lowest pressure level (Zone 1), including the three Zone 1 reservoirs (North and Palm Park Reservoirs). Water from Zone 1 is pumped through the Hospital Hill booster station, the Palm Park Reservoir Booster Station, and the Well No. 6 Booster Pump Station into the two Zone 3 reservoirs (Brader Hill and Goodlander). Water from Zone 3 is pumped through the Brader Hill Booster Pump Station into the Zone 6 reservoir (Lookout Point). Water from Zone 3 is also pumped through the Goodlander Booster Pump Station into the Zone 5 (Valhalla) reservoirs. Table 3-21 summarizes information on the City's water storage facilities, descriptions of which are provided below.

TABLE 3-21 WATER RESERVOIR INFORMATION

Reservoir Name	Pressure Zone	Capacity (gallons)	Floor Elevation (feet)	Overflow Elevation (feet)
North Reservoir (southern)*	Zone 1	164,000	1,283.9	1,305.4
North Reservoir (northern)	Zone 1	396,000	1,283.9	1,305.4
Palm Park Reservoir	Zone 1	462,000	1,287.7	1,305.7
Brader Hill Reservoir	Zone 3	200,000	1,471.1	1,489.1
Goodlander Reservoir	Zone 3	1,000,000	1,459.8	1,491.8
Valhalla Reservoir (west)	Zone 5	158,500	1,635.0	1,666.0
Valhalla Reservoir (east)	Zone 5	158,500	1,635.0	1,666.0
Lookout Point Reservoir	Zone 6	1,192,000	1,729.5	1,749.5
TOTAL		3,731,000		

* The 164,000-gallon north reservoir tank is offline due to leakage.

See Figure 3-3 for a schematic representation of the year 2021 reservoir level elevations. Figure 3-4 shows anticipated reservoir storage level elevations for the year 2041.

Zone 1 Reservoirs

North Reservoirs: The North Reservoirs are located north of the north end of Fifth Street and west of the Sunrise Addition development (Hillview Avenue), as shown in Map A. They consist of two in-ground reinforced concrete reservoirs, both circular in shape and 22.0 feet deep. The southernmost reservoir is 36 feet in diameter (inside dimension) with a capacity of 164,000 gallons. The northernmost reservoir is 56 feet in diameter (inside dimension) with a capacity of 396,000 gallons. The overflow elevation of each reservoir is 1,305.4 feet above sea level.

Palm Park Reservoir: The Palm Park Reservoir is located at the Southwest corner of the intersection of Hillcrest Drive and Sixth Avenue, as shown in Map A. Constructed in 1952, the Palm Park Reservoir is an above-ground, reinforced concrete, circular reservoir, 66 feet in diameter (inside dimension) and 18 feet tall. The capacity of the reservoir is 462,000 gallons, with an overflow elevation of 1,305.7 feet above sea level.

Zone 3 Reservoirs

Brader Hill Reservoir: The Brader Hill Reservoir is located north of Crusher Canyon Road at the west City Limits, as shown in Map A. Constructed in 1967, the Brader Hill Reservoir is an above-ground, reinforced concrete, circular reservoir, 41.5 feet in diameter (inside dimension) and 18 feet tall. The capacity of the reservoir is 200,000 gallons, with an overflow elevation of 1,489.1 feet above sea level.

Goodlander Reservoir: The Goodlander Reservoir is located at the west end of Goodlander Road, as shown in Map A. Constructed in 1978, the Goodlander Reservoir is a 1,000,000-gallon, above-ground, reinforced concrete, circular reservoir. The inside dimensions are 73 feet in diameter and 32 feet tall, with an overflow elevation of 1,491.8 feet above sea level.

Zone 5 Reservoirs

Valhalla Reservoirs: The Valhalla Reservoirs are located north of Goodlander Road at the north City Limits, as shown in Map A. Constructed in 2009, the Valhalla Reservoirs are above-ground, reinforced concrete, circular reservoir, 30 feet in diameter (inside dimension) and 35 feet tall. The reservoirs each have a capacity of 158,500 gallons, with overflow elevations of 1,666.0 feet above sea level.

Zone 6 Reservoir

Lookout Point Reservoir: The Lookout Point Reservoir is located at Lookout Point, as shown in Map A. Constructed in 2005, the Lookout Point Reservoir is an above-ground, circular steel reservoir, 102 feet in diameter (inside dimension) and 20 feet tall. The capacity of the reservoir is 1,200,000 gallons, with an overflow elevation of 1,749.5 feet above sea level.

3.3.6 Telemetry Control System

The entire water system is controlled by a comprehensive PLC (Programmable Logic Controller) based telemetry system, installed in 2001. PLC telemetry units are located at all system wells, booster stations, and reservoirs, and are linked via radio communication. The telemetry system's master control station is located at the City's Public Works Shop.

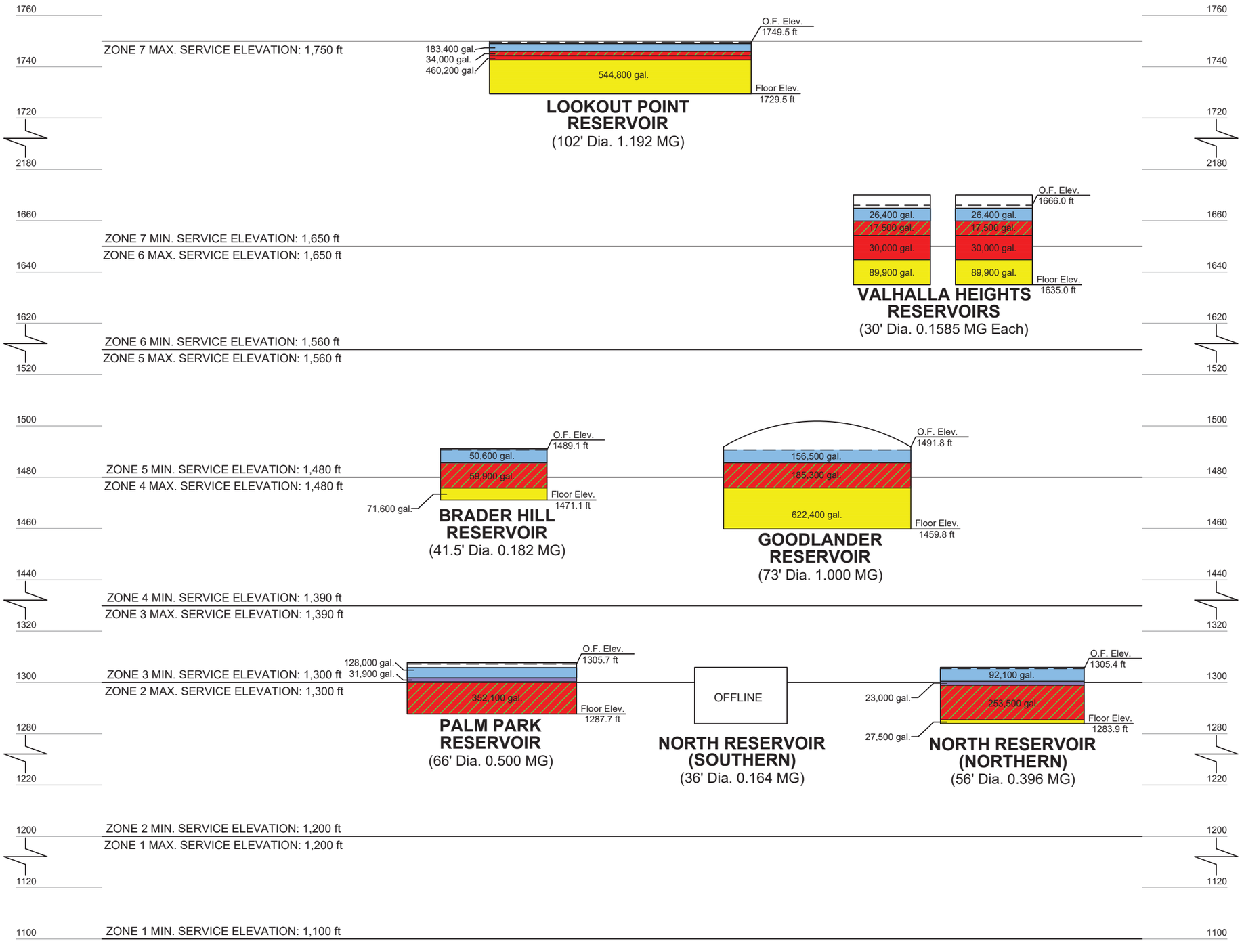
The source pumps and booster pump stations are controlled by the water level in the operator-selected reservoir for the respective pressure zone. The telemetry control settings for operating the various wells, booster station pumps, and control valves, based on water levels in the reservoirs, are shown in Table 3-22. A copy of the telemetry control system screen print outs are provided in CHAPTER 10.

Should source pumps fail to respond as ordered (on or off) by the telemetry system, or a high or low water condition exists in the reservoirs, an alarm is sounded at the City's Public Works Shop. An automatic telephone dialer is also activated which then proceeds to contact preprogrammed telephone numbers of key personnel until the alarm is properly acknowledged.

TABLE 3-22 EXISTING TELEMETRY CONTROL SETTINGS BASED ON RESERVOIR LEVELS
(All reservoir levels are in feet)

	Reservoir*									
	North		Brader Hill		Goodlander		Valhalla		Lookout Point	
Source Well / Booster Pump	Pump On	Pump Off	Pump On	Pump Off	Pump On	Pump Off	Pump On	Pump Off	Pump On	Pump Off
Well No. 3 (S01)	9.5	16.0								
Well No. 4 (S02)	9.5	16.0								
Well No. 5 (S03)	18.5	19.5								
Well No. 6 (S04)	14.0	19.0								
Well No. 7 (S06)	14.5	18.5								
Well No. 8 (S07)	15.0	18.0								
Well No. 6 Booster Pump			13.0	18.0	25.0	30.0				
Hospital Hill Booster Pump Normal Mode Refresh Mode			 3.0 5.0	 19.0 19.0	 24.0 18.0	 27.0 28.0				
Palm Park Booster Pump Normal Mode Refresh Mode			 12.0 5.0	 15.0 19.0	 18.0 17.5	 28.0 28.0				
Goodlander Booster Pump 1 Goodlander Booster Pump 2							19.0 20.0	20.0 25.0		
Brader Hill Booster Pump 1 (Lead) Brader Hill Booster Pump 2 (Lag)									14.5 14.0	17.5 17.5
Control Valves**	Open	Close	Open	Close	Open	Close	Open	Close	Open	Close
Solenoid Control Valve 1 Normal Mode Refresh Mode			 2.0 6.0	 19.0 19.0	 20.0 28.5	 26.0 29.5				
Solenoid Control Valve 2 Normal Mode Refresh Mode			 2.0 5.0	 19.0 19.0	 19.0 28.5	 22.0 29.5				

* The level set points in this table represent current normal operating conditions and can be adjusted as necessary to maximize system efficiency with changes in demand.
** The solenoid control valve allows water to be fed from the Lookout Point Reservoir (Zone 6) to the Zone 3 reservoirs during refresh mode or during high demand periods in the lower pressure zones. Zone 3 reservoirs are filled by the booster pumps during normal system conditions.



CITY OF SELAH

Water System Plan Update

YEAR 2021 RESERVOIR STORAGE LEVELS

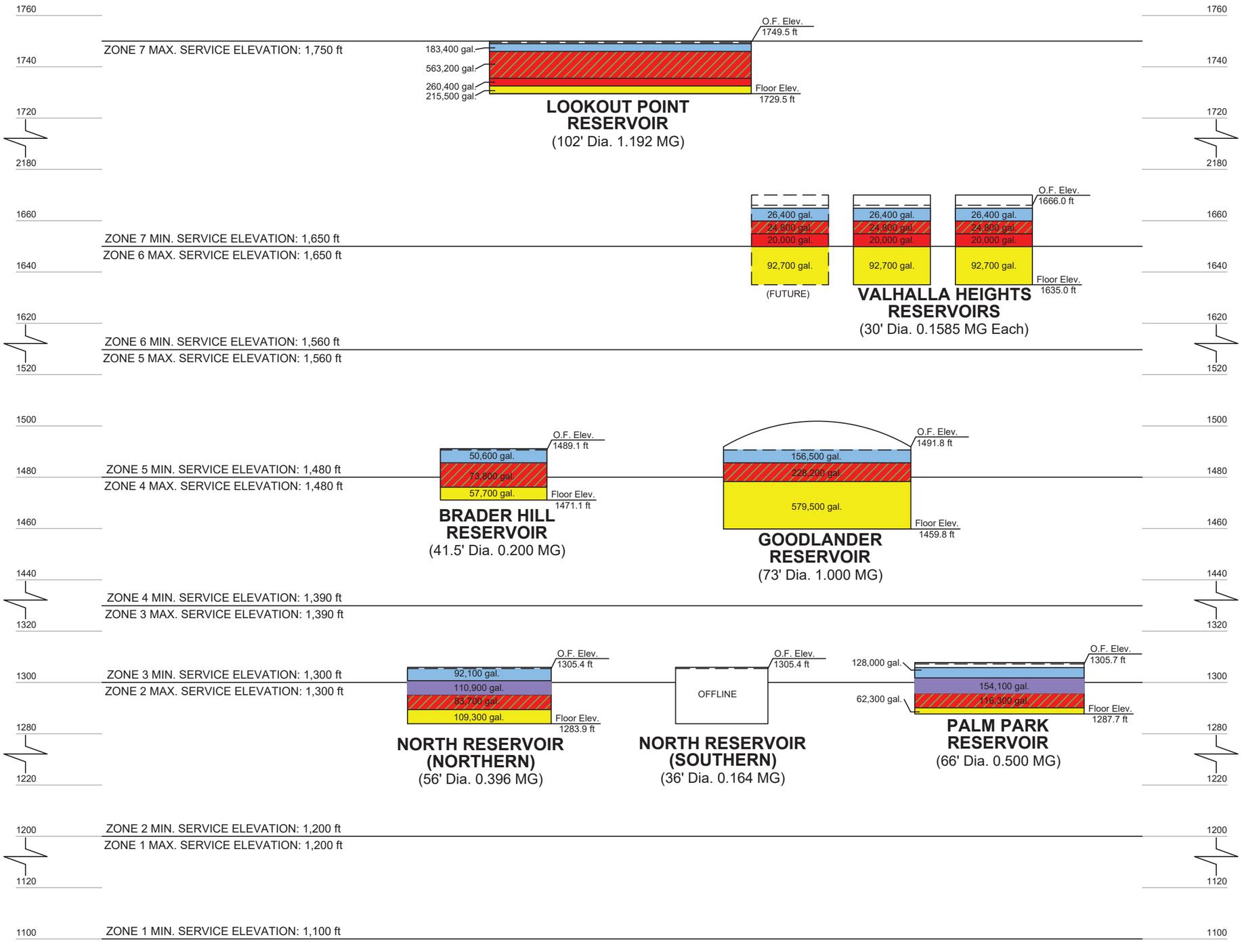
LEGEND

- OPERATIONAL STORAGE
- EQUALIZING STORAGE
- STANDBY STORAGE (NESTED WITHIN FIRE SUPPRESSION STORAGE)
- FIRE SUPPRESSION STORAGE
- AVAILABLE STORAGE

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 3-3



CITY OF SELAH

Water System Plan Update

YEAR 2041 RESERVOIR STORAGE LEVELS

LEGEND

- OPERATIONAL STORAGE
- EQUALIZING STORAGE
- STANDBY STORAGE (NESTED WITHIN FIRE SUPPRESSION STORAGE)
- FIRE SUPPRESSION STORAGE
- AVAILABLE STORAGE

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 3-4

3.3.7 Transmission and Distribution Systems

The City's existing transmission and distribution system along with water main sizes, valve, and fire hydrant locations is shown in Figure 3-1 and Map A, provided in CHAPTER 10. Most line sizes within the system are six inches in diameter or larger. Most the City's water mains are constructed of either ductile iron or cast-iron pipes, and most are looped except where topography or City limit boundaries make loops impractical. An inventory of the total length of Selah's water distribution system piping, including the length and percentage of each diameter of pipe is presented below in Table 3-23.

TABLE 3-23 WATER DISTRIBUTION SYSTEM PIPE SIZE SUMMARY

Pipe Diameter (inches)	Length (feet)	Percent of Total
1*	899	0.4%
2*	955	0.4%
4	7,304	3.1%
6	52,198	22.4%
8	87,619	37.6%
10	21,194	9.1%
12	57,112	24.5%
16	5,561	2.4%
TOTAL	232,842	100.0%

* Provides distribution to few residences, connected to 6" or larger mains on both sides.

3.3.8 Asset Condition Assessment

The age and condition of the City's major water system assets is summarized in Table 3-24. This information is valuable in evaluating and timing of future maintenance improvements necessary to maintain a high level of system reliability. Pressure reducing valve stations are not included in the list below because the City does not maintain a service records for its valves. The City stocks valve repair kits for each size and regularly checks the performance of each valve, immediately servicing the valve if needed.

TABLE 3-24 ASSET CONDITION ASSESSMENT SUMMARY

Water System Component/Name, Capacity/Size, and Type	Date Originally Const.	Expected Useful Life (Years)	Date of Last Service/ Replacement	Condition Rating (1 to 10)*	Expected Remaining Useful Life (Years)
Well No. 3 400 gpm/100 HP line shaft turbine pump	1944	10-15	1993	6	0
Well No. 4 400 gpm/60 HP submersible pump	1947	10-15	2001	5	0
Well No. 5 600 gpm/75 HP submersible pump	1951	10-15	2020	1	10
Well No. 6 1,800 gpm/200 HP line shaft turbine pump	1960	10-15	2021	2	10
Well No. 7 2,000 gpm/200 HP line shaft turbine/booster pump	1994	10-15	2020	1	15
Well No. 8 1,100 gpm/200 HP submersible pump	2009	10-15	2009	3	1
Hospital Hill Booster Station 750 gpm/75 HP, 1 split-case centrifugal pump	1993	10-15	2007	5	5
Palm Park Booster Station 1,000 gpm/60 HP, 2 vertical multistage pumps	2017	10-15	2017	1	12
Well No. 6 Booster Pump Station 2,000 gpm/100 HP, 2 split-case centrifugal pumps	2009	10-15	2009	2	4
Brader Hill Booster Pump Station 1,000 gpm/50 HP, 2 vertical multistage pumps	2005	10-15	2005	4	1
Goodlander Booster Pump Station 1,000 gpm/50 HP, 2 vertical multistage pumps	2018	10-15	2018	1	13
Valhalla Zone 6 Booster Pump Station 2,000 gpm/100 HP, 2 split-case centrifugal and 2 vertical multistage pumps	2017	10-15	2017	1	12
North Reservoir (north), 0.396 MG buried reinforced concrete	1938	30-60	2012	5	22
North Reservoir (south), 0.164 MG buried reinforced concrete	1938	30-60	2012	10	0
Palm Park Reservoir, 0.462 MG reinforced concrete	1952	30-60	2017	2	27
Brader Hill Reservoir, 0.200 MG reinforced concrete	1967	30-60	2005	4	15
Goodlander Reservoir, 1.0 MG reinforced concrete	1978	30-60	2017	2	27
Valhalla Reservoirs, two 0.159 MG reinforced concrete	2009	30-60	2009	2	19
Lookout Point Reservoir, 1.192 MG steel	2005	30-60	2005	2	15
Well No. 6 and Zone 3 Booster Pump Station, 125-kW portable diesel generator	2000	10	2009	3	2
Well No. 7 250-kW diesel generator	1999	10	2010	3	2
Valhalla Zone 6 Booster Pump Station 150 kW diesel generator	2017	10	2017	1	6
Telemetry Control System	2001	5	2020	1	5

* Condition ratings are based on recommendations in DOH Water System Planning Guidebook, with a rating of 1 equal to good/expected condition and a rating of 10 equal to unserviceable (may need replacement) condition.

3.4 SYSTEM CAPACITY ANALYSIS

Review and analysis of the capacity of all system components, including water sources, treatment systems, storage facilities, and distribution components described in Section 3.3, is important to maintain the City's level of service and ensure the current and future system satisfies the requirements of WAC 246-290-100(4)(e).

3.4.1 Source of Supply and Reliability Analysis

Existing source well production is summarized in CHAPTER 2, along with projections of future water system demand and ERUs. It is crucial to compare existing and future demand trends with the water supply capacities summarized in Section 3.3 and DOH recommended reliability criteria summarized in Section 3.10.5 of the 2019 Water System Design Manual. The following are the applicable water source reliability recommendations:

- Two or more supply sources are available.
- Permanent and seasonal sources are capable of replenishing depleted fire suppression storage within 72 hours while concurrently supplying the MDD for the water system.
- Permanent and seasonal source capacity is enough to supply MDD in a pumping period of 20 hours or less.
- With the largest source out of service, the remaining permanent and seasonal source(s) can provide a minimum of ADD for the water system.
- Source of supply pump stations have power connections to two independent primary public power sources, have in-place auxiliary power available (auto transfer capable), and/or maintain adequate gravity standby storage.
- A factor of safety is applied to well pumping test safe yield determinations.

A summary of the City's total well source capacity compared to the DOH reliability recommendations is provided in Table 3-25. A factor of safety (10% contingency) is applied to all demand projections that are used to calculate the reliability criteria demands provided in Table 3-25.

TABLE 3-25 WATER SUPPLY RELIABILITY SUMMARY			
DOH Water Supply Reliability Criteria	2021	2031	2041
MDD + FSS[a] in 72 hours (gpm)	3,888	4,311	4,737
Source Well Capacity[b] Existing (gpm) With proposed improvements (gpm)	 5,500 5,500	 5,500 5,500	 5,500 5,500
Meets Reliability Criteria?	Yes	Yes	Yes
MDD in 20 hours (gpm)	4,266	4,774	5,285
Source Well Capacity[b] Existing (gpm) With proposed improvements (gpm)	 5,500 5,500	 5,500 5,500	 5,500 5,500
Meets Reliability Criteria?	Yes	Yes	Yes
ADD (gpm)	1,736	1,943	2,151
Source Well Capacity[b] With largest source (Well No. 7) out of service (gpm)	 3,500	 3,500	 3,500
Meets Reliability Criteria?	Yes	Yes	Yes

[a] Refer to Section 3.4.4 for FSS requirements. FSS converted to 72 hours of pumping = 333 gpm (1,440,000 gallons/4,320 minutes).
[b] Existing source well capacity is water right (Q_i) limited. Additional Q_i authorization will be required to increase future source well capacity. Refer to Section 3.4.2 for addition water right information.

Power supply reliability is also an important factor in the source of supply reliability analysis. The City has in-place auxiliary diesel engine generators, with automatic transfer switch capability at its two primary sources of supply, Well No. 6, and Well No. 7, and at the Valhalla Zone 6 Booster Pump Station. However, the generator and receptacle at Well No. 6 is only sized to run the well pump or booster pumps separately, but not at the same time. A larger generator and corresponding receptacle should be installed in the future to improve reliability of this facility. Receptacles for plugging in a portable generator are provided at all other source wells and booster pump stations.

The resiliency of power supply systems (including auxiliary generators), radio communication equipment, and electronics can also have an impact on water supply reliability. Many water supply systems, including the City of Selah, rely heavily on electronically controlled power distribution equipment and motor controllers such as variable frequency drives (VFDs) to improve water supply control and efficiency. The City also uses a PLC-based telemetry control system linked via local radio communications for operation and monitoring of its water supply system. Failure of power and communication control devices can lead to temporary shutdown or manual operation of water supply equipment until repairs are made. In most cases the City maintains spare electronic controllers and control system components at each of its wellhouses and pump stations for quick changeout and repair. However, it would be difficult for the City to respond to widespread control and communication system failure due to less common threats such as electromagnetic pulse (EMP). The City may want to consider future evaluation of their water supply system to determine its vulnerability to EMP and similar threats, necessary level of protection, and steps required to further improve the system resiliency and reliability.

The condition and age of existing water system facilities and equipment such as pumps, motors, and valves can also have an impact on water supply reliability. A summary of the age and status of major water supply components is summarized in Section 3.3. Selah properly operates and maintains its water system facilities and equipment. The City will continue routine maintenance on system equipment as discussed in CHAPTER 6. Recommended O&M improvements related to well pump rehabilitation and replacement will be as described in CHAPTER 8.

Though Selah's well source capacity is adequate when compared to current and projected system demands, recent declines in groundwater levels due to declines in regional groundwater levels and increased usage may have a significant impact on long term reliability of the City's wells sources, as described in Section 2.3.6. Further evaluation of alternatives to improve water availability in the City's existing wells through artificial recharge strategies such as aquifer storage and recovery (ASR) or development of additional/alternate sources of supply is crucial.

The ASR process typically consists of diverting seasonally available surface water during periods of high flow, conveying it within a piped distribution system, and recharging a confined aquifer through a groundwater well. Recharged water is later recovered through typical well operations, either at the recharge well or other wells that tap the same groundwater system. Groundwater recharge can stabilize and/or reverse aquifer level declines and provide an opportunity to obtain new uninterruptable water rights during summer months. An ASR program may be a viable option for the City to consider for Well No. 7 given the confined aquifer condition and observed water level decline.

Pursuing and developing seasonal water sources to offset high peak demands in the summer months may also be a viable option. Seasonal irrigation demand has a significant impact on the City's water system supply capacity. Expansion of existing irrigation systems to serve more customers or treatment of irrigation water sources for direct use in the City's existing potable water distribution system are both options to consider in the future.

Alternatively, water reuse options could be considered to provide additional water supply. Sources of reclaimed or reused water within or near the City of Selah include the City's wastewater treatment plant and large industrial users such as Tree Top, SunRype, Larson Fruit, and Matson Fruit.

Reclaim and reuse of wastewater from the City's wastewater treatment plant would be very expensive and would have very limited uses (seasonal irrigation of the City parks and green strips along South First Street) and would conflict with the Department of Ecology's desire to enhance flows in Selah Ditch using wastewater treatment plant effluent. However, there may be possible reuses for some industrial water such as non-contact cooling waters. Use of such waters for irrigation of City parks and green strips, although seasonal, would reduce annual water demand, and lower demand during the critical summer period. Selah will begin investigating the technical, environmental, legal, and economic issues involved in reusing some industrial waters.

Water system interties with neighboring water purveyors can be a possible option for an emergency or supplemental source of supply. In some circumstances pursuing a water system intertie can be more cost-effective than new source development. Most water systems adjacent to or within the City service area are small residential water purveyors that will likely not have adequate capacity to make them a viable intertie option. The nearest large municipal water purveyor is the City of Yakima, approximately two miles to the south. However, pursuing an intertie with the City of Yakima may not be feasible or cost-effective because it would require extending a water main across steep slopes and the Naches River to the south.

3.4.2 Water Right Self-Assessment

The City of Selah maintains certified water rights from the State of Washington Department of Ecology (WDOE) for appropriation of ground water from all six of its active source wells. A copy of the City's water right certificates, claims, permits and applications, and any associated reports of examination (ROE) and water right correspondence documents are provided in CHAPTER 10. Selah's total combined certificated and claimed water rights is equal to 4,760 acre-feet per year and a maximum instantaneous withdrawal rate of 5,500 gpm.

Well Nos. 1 and 2

Selah's Certificate of Ground Water Right 359-D for Well No. 1 is for a maximum annual withdrawal volume of 147 acre-feet per year and a maximum instantaneous flow rate of 300 gpm. The priority date is 1920 and the certificate was confirmed on July 11, 1947. Selah's Certificate of Ground Water Right 360-D for Well No. 2 is for a maximum annual withdrawal volume of 171 acre-feet per year less any water withdrawn from the City's other sources and a maximum instantaneous flow rate of 350 gpm. The priority date is 1927 and was confirmed on July 11, 1947. The wells are in the block bounded by 5th Street, Speyers Road, and Bartlett Avenue at 46° 39' 04" N., 120° 32' 09" W. Well Nos. 1 and 2 were decommissioned when Well No. 6 was drilled as a replacement well in 1960.

Well Nos. 3, 4, and 8

Well Nos. 3 and 4 share a joint flow meter. As a result, water withdrawn from these two sources is recorded as a combined volume. Selah's Certificate of Ground Water Right 361-D for Well No. 3 is for a maximum annual withdrawal volume of 195 acre-feet per year and a maximum instantaneous flow rate of 400 gpm. The priority date is December 1944, and the certificate was confirmed on July 11, 1947. Selah's Certificate of Ground Water Right 1050-A for Well No. 4 is for a maximum annual withdrawal volume of 350 acre-feet per year and a maximum instantaneous flow rate of 750 gpm. The certificate was issued April 24, 1952, and was confirmed on January 20, 1987. Both wells are located approximately 1,400 feet west and 300 feet north of the SE corner of Section 35, at 46° 39' 04" N., 120° 32' 10" W. Well No. 8 was constructed in 2010 as an additional well under Certificate Nos. 361-D and 1050-A and is in the same location. The volume from Well Nos. 3, 4, 5, and 8 together are not to exceed a withdrawal volume of 890 acre-feet per year. The maximum instantaneous withdrawal rate and total annual volume from Well Nos. 3, 4, 5, 6, and 8 shall not exceed 3,500 gpm and 1,600 acre-feet.

Well No. 5

Selah's Certificate of Ground Water Right 1348-A for Well No. 5 is for a maximum annual withdrawal volume of 525 acre-feet per year and a maximum instantaneous flow rate of 700 gpm. The priority date is November 16, 1951, and the certificate was confirmed on January 23, 1953. The well is located on the NW corner of the intersection of South Railroad Avenue and East 1st Avenue, at 46° 39' 11" N., 120° 31' 33" W. The volume from Well Nos. 3, 4, 5, and 8 together are not to exceed 890 acre-feet. The maximum instantaneous withdrawal rate and total annual volume from Well Nos. 3, 4, 5, 6, and 8 shall not exceed 3,500 gpm and 1,600 acre-feet.

Well No. 6

Selah's Certificate of Ground Water Right 4003-A for Well No. 6 is for a maximum annual withdrawal volume of 1,600 acre-feet per year and a maximum instantaneous flow rate of 1,000 gpm. The priority date is May 11, 1959 and the certificate was confirmed on September 12, 1961. Well No. 6 replaced Well Nos. 1 and 2, and is in the block bounded by 5th Street, Speyers Road, and Bartlett Avenue, at 46° 39' 04" N., 120° 32' 09" W. When combined with the instantaneous withdrawal rate for Well Nos. 1 and 2, the total maximum instantaneous withdrawal rate authorization for Well No. 6 is 1,650 gpm. The combined maximum instantaneous withdrawal rate and total annual volume from Well Nos. 3, 4, 5, 6, and 8 shall not exceed 3,500 gpm and 1,600 acre-feet.

Well No. 7

Selah's Ground Water Right Permit G4-30642P for Well No. 7 is for a maximum annual withdrawal volume of 3,160 acre-feet per year and a maximum instantaneous flow rate of 2,000 gpm. The priority date is March 15, 1991. The well is in the NE quadrant of the NW quadrant of Section 36 of Township 14N of Range 18E, at 46° 39' 54" N., 120° 31' 22" W. An extension of time for the permit development schedule was granted by Ecology on December 9, 2019. The revised completion date of this project is December 31, 2031, to be consistent with water system planning efforts. If full use of permitted quantities is not achieved within the next 10 years, another extension of time will need to be requested from Ecology.

The status of Selah's water rights as compared to their existing and future water system demands is shown in Table 3-26. The excesses and/or deficiencies in the City's water rights are also shown in this table. Existing water rights for the City are adequate to satisfy current and future annual demands, however, well pump capacities exceed authorized instantaneous withdrawal rates. A change application will need to be submitted and approved by Ecology in the future to increase the instantaneous withdrawal rate (Q_i) of existing authorizations to match existing well pump capacities and provide additional pumping capacity as needed.

Though existing annual water right authorizations for the City satisfy the 20-year growth projection, additional water right capacity may become necessary as the City continues to expand and serve areas within their current and proposed future service areas. The City will pursue the acquisition of the water rights/permitted uses associated with each newly annexed property. In some cases, the City may need to apply for a change in type of use or point of use of the water right. These acquisitions may include:

- Permitted domestic or industrial ground or surface water rights associated with the annexed property.
- Permitted irrigation ground or surface water rights associated with the annexed property (these may include those portions supplied by an irrigation district or company).
- Ground water rights associated with individual residential property (the domestic exemption water rights).

In addition, residential areas currently served by existing small water systems within Selah's Urban Growth Area may, in the future, become annexed by the City. Selah should acquire the water rights associated with those existing water systems if they become annexed. These include:

- Selandia Water System
- High Valley Water System
- New Horizons Water System
- Friday Point Water System

TABLE 3-26 WATER RIGHT SELF-ASSESSMENT

Water Right Permit, Certificate, or Claim #	WFI Source #	Existing Water Rights				Current Source Production (2018)				10-Year Forecasted Source Production (2031)				20-Year Forecasted Source Production (2041)			
		Primary Q_i (gpm)	Non-Additive Q_i (gpm)	Primary Q_a (acre-feet)	Non-Additive Q_a (acre-feet)	Total Q_i (gpm)	Current Excess (Deficiency)	Total Q_a (acre-feet)	Current Excess (Deficiency)	Total Q_i (gpm)	10-Year Forecasted Excess (Deficiency)	Total Q_a (acre-feet)	10-Year Forecasted Excess (Deficiency)	Total Q_i (gpm)	20-Year Forecasted Excess (Deficiency)	Total Q_a (acre-feet)	20-Year Forecasted Excess (Deficiency)
1. 361-D[a,b]	S01, Well No. 3 S07, Well No. 8	400	–	195	–												
2. 1050-A[a,b]	S02, Well No. 4 S07, Well No. 8	750	–	350	–	1,150[c]	0	378[c]	167	1,150[c]	0	545	0	1,150[c]	0	545	0
3. 1348-A[a,b]	S03, Well No. 5	700	–	345	180	700	0	41	304	700	0	345	0	700	0	345	0
4. 359-D[b]	S04, Well No. 6	300	–	147	–												
5. 360-D[b]	S04, Well No. 6	350	–	171	–												
6. 4003-A[b]	S04, Well No. 6	1,000	–	392	1,208	1,650[d]	0	634	76	1,650[d]	0	710	0	1,650[d]	0	710	0
7. G4-30642P	S06, Well No.7	2,000	–	3,160	–	2,000	0	1,600	1,560	2,000	0	1,534	1,626	2,000	0	1,870	1,290
TOTAL		5,500	–	4,760	1,388	5,500	0	2,653	2,107	5,500	0	3,134	1,626	5,500	0	3,470	1,290

[a] The total annual volume (Q_a) withdrawn from Well Nos. 3, 4, 5, and 8 shall not to exceed 890 acre-feet.
[b] The maximum instantaneous withdrawal rate (Q_i) and total annual volume (Q_a) withdrawn from Well Nos. 3, 4, 5, 6, and 8 shall not exceed 3,500 gpm and 1,600 acre-feet.
[c] The Q_i for Well Nos. 3, 4, and 8 is water right limited to 1,150 gpm. The total capacity of Well Nos. 3, 4, and 8 combined is about 1,500 gpm. Well Nos. 3 and 4 share a flow meter. Well No. 8 is metered separately. The total Q_a is shown as the combined total of the two meters.
[d] The Q_i for Well No. 6 is water right limited to 1,650 gpm. The total capacity of Well No. 6 is about 1,800 gpm.

3.4.3 Storage Analysis

Reservoir facilities are necessary in a water utility's system to provide required storage in three critical areas:

1. Standby Storage: Adequate water reserves need to be maintained to meet the system's average daily demand in the event the largest water supply source is out of service. Standby storage may be "nested" within the fire suppression storage volume.

2. Fire Suppression Storage: Adequate water reserves need to be maintained to meet the system's highest fire flow requirement with no assistance from existing water supply sources and at a minimum pressure of 20 psi throughout the distribution system. Fire suppression storage may be "nested" within the standby storage volume.

3. Equalizing Storage: Adequate water reserves need to be maintained to meet that portion of the system's maximum instantaneous demand (peak hour), which exceeds the existing water supply source capacity. Equalizing storage must be available to all service connections at a minimum pressure of 30 psi.

Storage facilities also provide a volume of water for supply to the system between source pumping operations. This "operational" volume is established by each utility and is generally based on limiting, as much as practical, the number of pump cycles per hour.

The following storage analysis will first discuss the total water system and will then evaluate storage for the upper pressure zones separately.

3.4.3.1 Total System Storage Analysis

Standby Storage: The purpose of standby storage is to provide a measure of reliability should sources fail, or unusual conditions impose higher demands than anticipated. The Department of Health (DOH) defines standby storage as the volume of stored water available for use during a loss of source capacity, power, or similar short-term emergency.

For communities with multiple sources of supply such as the City of Selah, the Department of Health's (DOH) 2019 *Water System Design Manual* recommends the volume of standby storage should be calculated based upon the following equation:

$$SB = (N)(SB_i)(T_d)$$ *2019 Water System Design Manual*, Equation 7-2

Where:
SB = Total standby storage component in gallons.
N = Number of ERUs based on the ERU_{MDD} value (gpd).
$\mathbf{SB_i}$ = Locally adopted unit SB volume in gpd/ERU_{MDD} (SB_i = 200).
$\mathbf{T_d}$ = Number of days selected to meet water system-determined standard of reliability (T_d = 1).

At no time, however, shall standby storage be less than 200 gallons times the number of equivalent residential users, based on MDD. Current and future system-wide standby storage required is calculated and presented in Table 3-27.

TABLE 3-27 CURRENT AND FUTURE SYSTEM-WIDE STANDBY STORAGE REQUIREMENTS			
	2021	2031	2041
N **SB_i** x **T_d**	4,599 ERUs 200 gpd/ERU_{MDD} x 1 Day	5,146 ERUs 200 gpd/ERU_{MDD} x 1 Day	5,698 ERUs 200 gpd/ERU_{MDD} x 1 Day
Total Standby Storage Required	919,800 Gallons	1,029,200 Gallons	1,139,600 Gallons

Fire Suppression Storage: DOH defines fire suppression storage as the volume of stored water available during fire suppression activities to satisfy minimum pressure requirements per WAC 246-290-230. A volume of storage for fire suppression has been established based on fire flow ratings of various structures within Selah. The storage required is 1,440,000 gallons, which will allow a demand of 6,000 gpm for a 4-hour duration at the Tree Top facility. The fire suppression demand was established by the Selah Fire Department due to building type and size. The DOH minimum fire flow requirement for industrial areas is 1,000 gpm for 60 minutes. The volume of storage necessary to maintain a flow of 6,000 gpm for a 4-hour duration for fire protection is 1,440,000 gallons, which exceeds the DOH industrial requirement of 1,000 gpm for 60 minutes, or 60,000 total gallons (*WAC 246-293-640*) and will, therefore, be used for fire suppression storage planning purposes.

Equalizing Storage: DOH defines equalizing storage as the volume of storage needed to supplement supply to consumers when the peak hourly demand exceeds the total source pumping capacity. The DOH design method for calculating equalizing storage is 150 times the difference between the system's peak hour demand (PHD) in gpm and the total source production rate in gpm. Based on this method, the current and future equalizing storage requirements for Selah are as shown in Table 3-28.

TABLE 3-28 CURRENT AND FUTURE SYSTEM-WIDE EQUALIZING STORAGE REQUIREMENTS			
	Year 2021	Year 2031	Year 2041
Peak Hour Demand	5,866 gpm	6,564 gpm	7,267 gpm
- Total Source Capacity*	- 5,500 gpm	- 5,500 gpm	- 5,500 gpm
Subtotal	366	1,064	1,767
DOH Multiplier	x 150 gal/gpm	x 150 gal/gpm	x 150 gal/gpm
Equalizing Storage Total	54,900 Gallons	159,600 Gallons	265,050 Gallons
* Total source capacity limited by water rights. Future source capacity includes improvements to add additional Q_i authorization.			

Operational Storage: DOH defines operational storage as the volume of distribution storage associated with source or booster pump normal cycling times under normal operating conditions and is additive to the equalizing and standby storage components, and to fire flow storage if this storage component exists for any given tank. Currently, the City of Selah operates its lead source within the upper 5 feet of the water level in each reservoir, except Lookout Reservoir is set to operate at 3 feet. This corresponds to a volume of approximately 663,428 gallons, or 144.3 gallons per ERU_{MDD} (2021). The operational storage volume required to avoid excessive pump cycling only needs to be enough to limit the number of pump starts to six per hour. Under year 2021 MDD the source pumps would turn on only once every eight hours and 47 minutes [(663,428 gallons ÷ (5,500 gpm – MDD)] to fill + [663,428 gallons ÷ MDD] to empty). The same operational storage levels will be sufficient to meet 20-year MDD, while keeping source pump cycle time within an appropriate range.

Total Storage: Table 3-29 summarizes current and future storage requirements for the water system.

TABLE 3-29 CURRENT AND FUTURE SYSTEM-WIDE STORAGE REQUIREMENTS
(all storage values are in gallons)

	Year 2021 Requirements	Year 2031 Requirements	Year 2041 Requirements
Standby Storage*	919,800	1,029,200	1,139,600
Fire Suppression Storage*	1,440,000	1,440,000	1,440,000
Equalizing Storage	54,900	159,600	265,050
Operational Storage	663,428	663,428	663,428
Total Storage Required	2,158,328	2,263,028	2,368,478
Total Storage Capacity**	3,567,000	3,567,000	3,567,000
Storage Excess (Deficiency)	1,408,672	1,303,972	1,198,522

* Standby Storage will be nested with Fire Suppression Storage.
** Total storage capacity does not include the 164,000-gallon North Reservoir due to tank being offline.

It can be seen from Table 3-29 that the current available storage capacity is adequate to meet existing and future needs through the year 2041. The required future storage volumes provided in Table 3-29 are based on the demand projections provided in CHAPTER 2. Additional future storage capacity will be driven by future development.

3.4.3.2 Zone 2 and Above Supply and Storage Analysis

The supply and storage of capacity of pressure zones above Zone 1 must be analyzed separately from the total system due to their dependence on booster pump stations for water supply. All the system's source wells are located in Zone 1.

Supply to pressure Zones 2 and above is boosted from Zone 1 through three pump stations, the Hospital Hill Booster Pump Station, the Palm Park Booster Pump Station, and the Well No. 6 Booster Pump Station. The total supply capacity to Zones 2 and above is 3,750 gpm, or 5.4 MGD, which exceeds the year 2021 calculated maximum day demand of these pressure zones of 1.59 MGD. The combined pumping capacity of 3,750 gpm is also greater than the calculated year 2021 Zone 2 and above peak hour demand of about 1,822 gpm.

Currently, these pressure zones include about 1,414 single-family residential services, 2 commercial services, 2 political subdivision services, 8 outside single-family residential services, 7 apartment services, 15 irrigation only services, 8 federal state government services, 2 outside commercial services, and 4 city services. Future supply and storage requirements are based on the location of future services as discussed near the end of CHAPTER 2.

Storage requirements for Zone 2 and above consist of the same four components as described previously in the total system storage analysis. Those four components are standby, fire suppression, equalizing, and operational storage. Though standby, equalizing, and operational storage components for the Zone 2 and above storage analysis must include storage capacity for the upper pressure zones, due to their dependence on Zone 2 and Zone 3 as a source of supply, the total standby and fire suppression storage volume does not need to be stored in the Zone 3 reservoirs since these zones can be supplied by reservoirs located in Zone 5 North and Zone 6 South.

Standby Storage: Consistent with standby storage requirements for the total water system, standby storage for Zone 2 and above is based upon DOH Equation 7.2 since multiple sources of supply are available. Zone 2 and above are currently supplied by three booster pump stations, with a combined total capacity of 3,750 gpm. Current and future system-wide standby storage required is calculated and presented in Table 3-30.

TABLE 3-30 CURRENT AND FUTURE ZONE 2 AND ABOVE STANDBY STORAGE REQUIREMENTS

	2021	2031	2041
N **SB_i** x **T_d**	1,571 ERUs 200 gpd/ERU_{MDD} x 1 Day	1,895 ERUs 200 gpd/ERU_{MDD} x 1 Day	2,236 ERUs 200 gpd/ERU_{MDD} x 1 Day
Total Standby Storage Required	314,200 Gallons	379,000 Gallons	447,200 Gallons

Fire Suppression Storage: The storage requirement for fire suppression is computed for the highest fire-flow rated structure within these pressure zones of the City. The Selah Intermediate School requires 4,000 gpm for a 2-hour duration, which totals 480,000 gallons of fire suppression storage for Zone 2 and above.

Equalizing Storage: Equalizing storage must also be provided to meet the periodic demands placed on the water system which exceed the source (booster station) pumping capacity. The DOH design method for calculating equalizing storage is 150 times the difference between the system's PHD in gpm and the source production rate in gpm. Based on this method, current and future equalizing storage will not be required for Zone 2 and above, even with the Hospital Hill Booster Pump out of service (normally used as backup only). The calculated equalizing storage is shown in Table 3-31.

TABLE 3-31 EXISTING AND FUTURE ZONE 2 AND ABOVE EQUALIZING STORAGE REQUIREMENTS			
	Year 2021	Year 2031	Year 2041
Peak Hour Demand*	1,822 gpm	2,197 gpm	2,593 gpm
- Total Source Capacity	- 3,750 gpm	- 3,750 gpm	- 3,750 gpm
Subtotal	≤ 0	≤ 0	≤ 0
DOH Multiplier	x 150 gal/gpm	x 150 gal/gpm	x 150 gal/gpm
Equalizing Storage Total	0 Gallons	0 Gallons	0 Gallons
* Includes PHD for Zones 2 through 7. Note: Total source capacity with Hospital Hill BPS (backup) out of service is 3,000 gpm.			

Operational Storage: The City of Selah operates the Zone 3 reservoirs (Goodlander and Brader Hill) within a 5-foot water level range. This corresponds to a volume of approximately 207,136 gallons. For this analysis, this amount is used for operational storage in the years 2021, 2031, and 2041, respectively, as shown in Table 3-32.

Total Storage: Table 3-32 summarizes the year 2021 and future water system storage requirements of Zone 2 and above. The resulting total storage requirements for year 2021 and future years are less than the City's current storage capacity of 2.709 MG for these pressure zones.

TABLE 3-32 CURRENT AND FUTURE ZONE 2 AND ABOVE TOTAL STORAGE REQUIREMENTS (all storage values are in gallons)			
	Year 2021 Requirements	Year 2031 Requirements	Year 2041 Requirements
Standby Storage*	314,200	379,000	447,200
Fire Suppression Storage*	480,000	480,000	480,000
Equalizing Storage	0	0	0
Operational Storage	207,136	207,136	207,136
Total Storage Required	1,001,336	1,066,136	1,134,336
Total Storage Capacity**	2,079,000	2,079,000	2,079,000
Storage Excess (Deficiency)	1,077,664	1,012,864	944,664

3.4.3.3 North Hill Zone 4, 5 and 6 Supply and Storage Analysis

The supply to and storage of the upper North Hill pressure zones (Zones 4, 5, and 6) must be analyzed separately from the total system due to dependence on booster pump stations for water supply. The Goodlander Booster Pump Station provides a total supply capacity of 1,000 gpm, however since this pump station is the sole source of supply to the North Hill pressure zones, additional reliability measures should be considered to account for potential loss of the station. In 2018 the City encountered a complete loss of the existing booster pump station due to a fire, and had to utilize temporary pumping equipment to restore service to Zones 4, 5, and 6. The booster station does have a receptable for connection of a portable generator, however system redundancy is still not available in a complete loss scenario. For this reason, it is recommended that at least one day of MDD be stored in the reservoirs serving pressure Zones 4, 5, and 6.

Zones 4 and 5 of the north zones are served by two 158,500-gallon reservoirs (317,000 gallons total). The Goodlander Booster Pump Station supplies the reservoirs and the north pressure zone distribution system, including the Valhalla Zone 6 Booster Pump Station. Currently there are 173 single-family residences and one apartment complex in North Hill Zones 4, 5, and 6 that are served by the Goodlander Booster Pump Station. Most of the single-family residential housing growth in the City occurs in the North Hill area. This trend is expected to continue in future years. As a result, the number of single-family residences in North Hill Zones 4, 5, and 6 is anticipated to increase to 257 by year 2031 and 370 by year 2041.

Storage requirements for current and future north Zones 4, 5, and 6 consist of the same four components as discussed for the entire water system. Those four components are standby, fire suppression, equalizing, and operational storage. The Valhalla Reservoirs provide storage within this area.

Standby Storage: Current North Hill standby storage requirements are calculated based on there being only one source of supply for the Zones 4 and above. For only one source of supply available, the DOH *2019 Water System Design Manual* recommends that the volume of standby storage be greater than MDD if the source is vulnerable to flooding, extreme weather events, extended power outages. The Goodlander Booster Pump Station is not vulnerable to flooding and has the capability of connecting a mobile generator during extended power outages. Therefore, it is recommended that a minimum of one day of MDD be stored as standby storage. A summary of the current and future standby storage requirements is provided in Table 3-33.

TABLE 3-33 CURRENT AND FUTURE NORTH HILL ZONE 4, 5, AND 6 STANDBY STORAGE REQUIREMENTS

	2021	2031	2041
N **SB_i** x **T_d**	175 ERUs 1,012 gpd/ERU_{MDD} x 1 Day	259 ERUs 1,012 gpd/ERU_{MDD} x 1 Day	372 ERUs 1,012 gpd/ERU_{MDD} x 1 Day
Total Standby Storage Required	177,100 Gallons	262,108 Gallons	376,464 Gallons

Fire Suppression Storage: The storage requirement for fire suppression is based upon the highest fire flow rated structure within this area of the City. Currently, no structures in these zones have been rated for fire flow by the Selah Fire Department. All current and future services in Zones 4, 5, and 6 of the North Hill area of Selah are residential with the exception of one apartment service, so the minimum City required fire flow rate of 1,000 gpm for a 1-hour duration with be used. Therefore, the required fire suppression storage volume for this analysis is 60,000 gallons as shown in Table 3-35.

Equalizing Storage: Equalizing storage must also be provided to meet the periodic demands placed on the water system which exceed the source (booster station) pumping capacity. The DOH design method for calculating equalizing storage is 150 times the difference between the system's PHD in gpm and the source production rate in gpm. Based on this method, the current and future equalizing storage required for Selah's north Zones 4 and 5 will be as shown in Table 3-34

TABLE 3-34 EXISTING AND FUTURE NORTH HILL ZONE 4, 5, AND 6 EQUALIZING STORAGE REQUIREMENTS			
	Year 2021	Year 2031	Year 2041
Peak Hour Demand*	203 gpm	300 gpm	432 gpm
- Total Source Capacity	- 1,000 gpm	- 1,000 gpm	- 1,000 gpm
Subtotal	≤ 0	≤ 0	≤ 0
DOH Multiplier	x 150 gal/gpm	x 150 gal/gpm	x 150 gal/gpm
Equalizing Storage Total	0 Gallons	0 Gallons	0 Gallons
* Includes PHD for north Zones 4 through 6			

Operational Storage: The City of Selah operates the North Zone 5 (Valhalla) reservoirs within a 7.5-foot water level range. This corresponds to a volume of approximately 80,000 gallons. For this analysis, this volume is used for operational storage in the years 2021, 2031, and 2041, respectively, as shown in Table 3-35.

Total Storage: Table 3-35 summarizes the current and future storage requirements for the north zones 4, 5, and 6. The resulting total storage requirements for the current and future years are less than the City's current storage capacity of 0.317 MG for this scenario.

TABLE 3-35 CURRENT AND FUTURE NORTH HILL ZONE 4, 5, AND 6 TOTAL STORAGE REQUIREMENTS (all storage values are in gallons)			
	Year 2021 Requirements	Year 2031 Requirements	Year 2041 Requirements
Standby Storage*	177,100	262,108	376,464
Fire Suppression Storage*	60,000	60,000	60,000
Equalizing Storage	0	0	0
Operational Storage	80,000	80,000	80,000
Total Storage Required	257,100	342,108	456,464
Total Storage Capacity**	317,000	317,000	317,000
Storage Excess (Deficiency)	59,900	(25,108)	(139,464)
* Fire flow storage will be nested within standby storage volume.			

As can be seen in Table 3-35, an additional 158,500-gallon North Zone 5 storage reservoir will need to be constructed by year 2031 for further development to occur. The maximum ERU capacity of the North Hill Zone 4, 5, and 6 system is about 259, based on the ERU_{ADD} and ERU_{MDD} values for the entire system. As of May 2020, most of this capacity (about 231 ERUs) has already been allocated through approved plats and proposed residential developments.

3.4.3.4 South Hill Zone 4, 5, 6, and 7 Supply and Storage Analysis

The supply to and storage of the upper south pressure zones (Zones 4, 5, 6, and Zone 7) must be analyzed separately from the total system due to dependence on booster pump stations for water supply. Supply to the south Zones 4, 5, 6, and 7 is boosted from pressure Zone 3 through one duplex pumping station. The Brader Hill Booster Pump Station provides a total supply capacity of 1,000 gpm, however since this pump station is the sole source of supply to the South Hill pressure zones, additional reliability measures should be considered to account for potential loss of the station, similar to the Goodlander booster pump station.

For this reason, it is recommended that at least one day of MDD be stored in the reservoir serving pressure to Zones 4, 5, and 6.

Zone 4, 5, and 6 of the South Hill area is served by a 1.192-MG reservoir (Lookout Point Reservoir). The Brader Hill Booster Pump Station supplies the reservoir and the south pressure zone distribution system. There is currently no demand in south Zone 7. Future south Zone 7 demands will be supplied through a separate constant-pressure booster pump station connected to the Zone 6 distribution system. Currently there are 166 single-family residences and 1 irrigation-only service in South Hill Zones 4, 5, and 6 that are served by the Brader Hill Booster Pump Station. The number of single-family residences in South Hill Zones 4, 5, 6, and 7 is anticipated to increase to 246 by year 2031 and 350 by year 2041.

Storage requirements within south Zones 4, 5, 6, and 7 consist of the same four components as described previously in the total system storage analysis. Those four components are standby, fire suppression, equalizing, and operational storage.

Standby Storage: Current South Hill standby storage requirements are calculated based on there being only one source of supply for the Zones 4 and above. For only one source of supply available, the DOH *2019 Water System Design Manual* recommends the volume of standby storage be greater than MDD if the source is vulnerable to flooding, extreme weather events, or extended power outages. The Brader Hill Booster Pump Station is not vulnerable to flooding and has the capability of connecting a mobile generator during extended power outages. Therefore, it is recommended that a minimum of one day of MDD be stored as standby storage. A summary of the current and future standby storage requirements is provided in Table 3-36.

TABLE 3-36 CURRENT AND FUTURE SOUTH HILL ZONE 4, 5, 6, AND 7 STANDBY STORAGE REQUIREMENTS

	2021	2031	2041
N **SB_i** x **T_d**	170 ERUs 1,012 gpd/ERU_{MDD} x 1 Day	250 ERUs 1,012 gpd/ERU_{MDD} x 1 Day	354 ERUs 1,012 gpd/ERU_{MDD} x 1 Day
Total Standby Storage Required	172,040 Gallons	253,000 Gallons	358,248 Gallons

Fire Suppression Storage: The storage requirement for fire suppression is based upon the highest fire-flow rated structure within this area of the City. Currently, no structures in these zones have been rated for fire flow by the Selah Fire Department. All current and future services in the South Hill Zones 4, 5, 6, and 7 are residential, so the minimum City required fire flow rate of 1,000 gpm for a 1-hour duration with be used. Therefore, the required fire suppression storage volume for this analysis is 60,000 gallons as shown in Table 3-38.

Equalizing Storage: Equalizing storage must also be provided to meet the periodic demands placed on the water system which exceed the source (booster station) pumping capacity. The DOH design method for calculating equalizing storage is 150 times the difference between the system's PHD in gpm and the source production rate in gpm. Based on this method, the current and future equalizing storage required for Selah's north Zones 4 and 5 will be as shown in Table 3-37.

TABLE 3-37 EXISTING AND FUTURE SOUTH HILL ZONE 4, 5, 6, AND 7 EQUALIZING STORAGE REQUIREMENTS			
	Year 2021	Year 2031	Year 2041
Peak Hour Demand*	197 gpm	290 gpm	411 gpm
- Total Source Capacity	- 1,000 gpm	- 1,000 gpm	- 1,000 gpm
Subtotal	≤ 0	≤ 0	≤ 0
DOH Multiplier	x 150 gal/gpm	x 150 gal/gpm	x 150 gal/gpm
Equalizing Storage Total	0 Gallons	0 Gallons	0 Gallons
* Includes PHD for south Zones 4 through 7			

Operational Storage: The City of Selah operates the south Zone 6 reservoir (Lookout Point Reservoir) within a 3-foot water level range. This corresponds to a volume of approximately 183,377 gallons. For this analysis, this volume is used for operational storage in the years 2021, 2031, and 2041, respectively, as shown in Table 3-38.

Total Storage: Table 3-38 summarizes the current and future storage requirements for the south zones 4, 5, 6, and 7. The resulting total storage requirements for the current and future years are less than the City's current storage capacity of 1.192 MG for this scenario.

TABLE 3-38 CURRENT AND FUTURE SOUTH HILL ZONE 4, 5, 6, AND 7 TOTAL STORAGE REQUIREMENTS (all storage values are in gallons)			
	Year 2021 Requirements	Year 2031 Requirements	Year 2041 Requirements
Standby Storage*	172,040	253,000	358,248
Fire Suppression Storage*	60,000	60,000	60,000
Equalizing Storage	0	0	0
Operational Storage	183,377	183,377	183,377
Total Storage Required	415,417	496,377	601,625
Total Storage Capacity*	1,192,000	1,192,000	1,192,000
Storage Excess (Deficiency)	776,583	695,623	590,375
* Fire suppression storage will be nested within standby storage volume.			

3.4.4 Fire Flow

The demand fire flows placed upon a water system is typically the most significant element when analyzing the piping network. Every water system which is required to have a Water System Plan must address fire flow. At a minimum, a water utility must comply with fire flow standards shown in Table 3-39, established by DOH. A community may, however, develop its own standards if they exceed the DOH minimum requirements.

TABLE 3-39 DOH MINIMUM FIRE FLOW REQUIREMENTS	
Land Use Type	Flow Requirement
Residential	500 gpm for 30 minutes
Commercial and Multi-Family	750 gpm for 60 minutes
Industrial	1,000 gpm for 60 minutes
Source: *WAC 246-293-640*	

The City of Selah has developed desired fire flows for major structures within the City based on the standards of the Washington Survey and Rating Bureau. The Selah Fire Department performed a few selected building analyses using the Insurance Services Office (ISO) grading schedule. In addition, the Selah Fire Department analyzed fire flow requirements of select buildings based on the requirements of the *International Fire Code (IFC)*, latest edition. Results of the analysis have been used to generate desired fire flow capacities for areas within the City.

In Selah, the greatest fire flow requirements are within industrial and commercial areas, with isolated large demands at locations such as the Tree Top Facility and Selah schools. Fire flow requirements were used to develop Figure 3-5 which shows the locations of required minimum fire flow and the actual calculated fire flow capacity at selected locations within those areas. The Selah Fire Department has requested that all locations without a specified minimum fire flow range be required to have a minimum fire flow capacity of 1,000 gpm. This requirement is consistent with IFC requirements of 1,000 gpm for a one-hour duration for one- and two-family dwellings and townhouses without automatic sprinkler systems and 3,600 square feet or less in size. The majority of land use outside of industrial and commercial areas is single-family residential.

A computer hydraulic analysis was used to determine the existing fire flow capacities at certain locations shown in Figure 3-5. The hydraulic analysis parameters are discussed later in Section 3.4.5. As can be seen in Figure 3-5 the greatest fire flow requirements are within the industrial and commercial zoned areas and at public schools. It can be seen in Figure 3-5 that most all locations throughout the distribution system are able to provide the required minimum fire flow capacities. Recommended system improvements to correct any fire flow deficiencies are discussed further in CHAPTER 8.

CITY OF SELAH

Water System Plan Update

YEAR 2021 MAX DAY DEMAND FIRE FLOW CAPACITIES MAP

N

W E

S

0 375 750 1500

LEGEND

RETAIL SERVICE AREA (CITY LIMITS)

FUTURE SERVICE AREA BOUNDARY (URBAN GROWTH AREA)

FIRE FLOW RANGE	EXISTING CAPACITY	REQUIRED FLOW
≤ 500 GPM	⊗	
500-999 GPM	●	
1000-1999 GPM	●	MINIMUM 1000 GPM
2000-2999 GPM	●	
3000-3999 GPM	●	
4000-4999 GPM	●	
5000-5999 GPM	●	
6000-6999 GPM	●	
≥ 7000 GPM	●	

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 3-5

3.4.5 Pressure Reducing Valve Capacity Analysis

Pressure reducing valves (PRVs) feeding water from higher pressure zones to lower pressure zones must meet peak day and fire flow demands of the respective zones they serve. Water supplied to the Zone 2 and Zone 4 pressure level is only provided through PRVs. These valves must be capable of suppling all zone demands. As a result, these PRV stations generally have two separate valves, a smaller valve to satisfy MDD and a larger valve to serve PHD and provide fire flow. PRVs installed for the Zone 1 and Zone 3 pressure level are only for fire flow and emergency conditions. A summary of the City's pressure reducing valves compared to projected system demands and required fire flows is provided in Table 3-40. All PRV stations have adequate capacity to serve existing and projected future demands.

TABLE 3-40 PRESSURE REDUCING VALVE CAPACITY SUMMARY

PRV Station			Maximum Continuous Flow Capacity (gpm)[a]	Maximum Intermittent Flow Capacity (gpm)[a]	Projected Demands						Fire Flow (gpm)
					2021		2031		2041		
Valve No.	Location	Valve Size			MDD (gpm)	PHD (gpm)	MDD (gpm)	PHD (gpm)	MDD (gpm)	PHD (gpm)	
Zone 1[b]											
1	114 W. Goodlander Rd.	12”	7,000	8,720							
2	N. 9th St. & W. Pear Ave.	4"	800	990							
3	702 W. Orchard Ave.	6"	1,800	2,250							
4	Alley Behind Lince School	4"	800	990							
Zone 1 TOTAL			10,400	12,950	2,128	3,511	2,285	3,770	2,433	4,014	6,000
Zone 2											
5 6	Goodlander and North 4th St.	8" 3”	3,100 460	3,900 580	72	124	78	134	85	146	
7 8	515 North 4th St. (Hillview)	6” 2”	1,800 210	2,250 260	25	42	25	42	25	42	
9 10	1401 W. Fremont Ave.	10” 3”	4,900 460	6,150 580	157	253	170	274	186	300	
11	N. 13th St. and W. Cherry Ave.	6"	1,800	2,250							
12	N. 13th St. and W. Home Ave.	3"	460	580	157	252	170	273	186	299	
13 14	105 South 10th St.	6" 2”	1,800 210	2,250 260	70	120	76	130	83	142	
15 16	W. 5th Ave. and S. 10th St. (Hillcrest)	6" 2”	1,800 210	2,250 260	49	84	53	91	58	99	
Zone 2 TOTAL			15,200 2,010	19,050 2,520	530	875	572	944	623	1,028	4,000
Zone 3[b]											
17	1701 W. Naches Ave.	6”	1,800	2,250							
18	Vista Del Sol	6”	1,800	2,250							
Zone 3 TOTAL			3,600	4,500	331	547	402	664	438	722	1,000
Zone 4 (South Hill)											
19 20	Brader Hill Pump Station	8” 2”	3,100 210	3,900 260	119	197	130	214	171	283	1,000
Zone 4 (North Hill)											
21 22	Goodlander Pump Station	6” 2”	1,800 210	2,250 260	66	108	79	130	100	165	1,000

[a] Capacities based on suggested flow ranges in manufacturer (Cla-Val) published literature for model 90-01 PRV.
[b] Zone 1 and Zone 3 PRVs are primarily for fire flow and redundancy and are not intended to supply all Zone demand.

3.4.6 Hydraulic Analysis

A hydraulic analysis of a water utility system is a method of calculating pressures and flows throughout the distribution network under various conditions of demand at a given instant. Since the advent of personal computers, hydraulic analyses are typically performed by utilizing computer programs which model the piping, reservoir, pumps, and specialty valves of a given water system.

Numerous computer programs have been developed for performing network analyses. The program utilized for the modeling and analysis of the City of Selah water system is called WaterCAD, distributed by Bentley Systems, Inc. WaterCAD can perform instantaneous and extended period simulations of complete distribution networks, including reservoirs, source pumps, booster pumps, pressure reducing valves, and up to 1,000 pipes and 1,000 nodes (pipe junctions).

The program utilizes Genetic Algorithm calculations (Darwin modules) to solve the pressure networks. All water system components are entered into the computer, supply rates and user demands input, and reservoir water levels are established. Once this base information has been loaded, various options such as increasing system demand, lowering reservoir levels, shutting off source pumps, adding system improvements, and simulating fire flow conditions can be analyzed for their impact on the system.

3.4.7 Assumptions

To analyze the water system at a given moment in time, it is necessary to assume certain existing conditions and to program the status of key system components. The following general assumptions have been made for the hydraulic analysis of the City of Selah water system:

- Roughness coefficients (C values) for most eight-inch or larger pipes were assumed to be 120. Pipes six-inch or smaller were assumed to have a C value equal to 110. Known old or poor condition pipes were assumed at C=100.
- Nominal pipe diameters were input for inside pipe diameters.
- Node elevations are based on available contour and topographic survey elevations.

Identified in Table 3-41 are the specific parameters used in the hydraulic analysis performed for existing and future peak hour demand (PHD) and for existing and future fire flow capacities at 20 psi residual pressure during maximum day demand (MDD) conditions. The PHD hydraulic analysis assumes that all primary source wells are operating, and that the equalizing storage volume has been depleted from all tanks. The fire flow analysis, during MDD, assumes that the starting elevation in all tanks is with equalizing and fire suppression storage depleted. The fire flow analysis also assumes that all source wells are operating.

Initial elevations for the hydraulic analysis are calculated from the current and future reservoir pump-off elevations to represent current and future maximum storage conditions. The operational storage range and volume can be operator-adjusted based upon current demand, but the elevations (volumes) used represent normal operating conditions. Lower or higher initial water elevations could affect the calculated results provided in this Plan.

TABLE 3-41 HYDRAULIC ANALYSIS PARAMETERS

Water System Feature	Zone No.	Hydraulic Analysis Scenario: Year 2021 Peak Hour Demand [a] (5,866 gpm)	Year 2021 Fire Flow w/MDD [b] (3,555 gpm)	Year 2041 Peak Hour Demand [a] (7,257 gpm)
North Reservoirs Levels	1			
Maximum Elevation		1,305.4 Ft.	1,305.4 Ft	1,305.4 Ft
Initial Elevation		1,303.4 Ft.	1,290.9 Ft.	1,303.4 Ft.
Floor / Minimum Elevation		1,283.9 Ft.	1,283.9 Ft.	1,283.9 Ft.
Palm Park Reservoir Levels	1			
Maximum Elevation		1,305.7 Ft.	1,305.7 Ft.	1,305.7 Ft.
Initial Elevation		1,304.7 Ft.	1,292.2 Ft.	1,304.7 Ft.
Floor / Minimum Elevation		1,287.7 Ft.	1,287.7 Ft.	1,287.7 Ft.
Brader Hill Reservoir Levels	3			
Maximum Elevation		1,489.1 Ft.	1,489.1 Ft.	1,489.1 Ft.
Initial Elevation		1,489.1 Ft.	1,476.3 Ft.	1,489.1 Ft.
Floor / Minimum Elevation		1,471.1 Ft.	1,471.1 Ft.	1,471.1 Ft.
Goodlander Reservoir Levels	3			
Maximum Elevation		1,491.8 Ft.	1,491.8 Ft.	1,491.8 Ft.
Initial Elevation		1,489.8 Ft.	1,477.0 Ft.	1,489.8 Ft.
Floor / Minimum Elevation		1,459.8 Ft.	1,459.8 Ft.	1,459.8 Ft.
Valhalla Reservoirs Levels	5			
Maximum Elevation		1,666.0 Ft.	1,666.0 Ft.	1,666.0 Ft.
Initial Elevation		1,660.0 Ft.	1,644.9 Ft.	1,660.0 Ft.
Floor / Minimum Elevation		1,635.0 Ft.	1,635.0 Ft.	1,635.0 Ft.
Lookout Point Reservoir Levels	6			
Maximum Elevation		1,749.5 Ft.	1,749.5 Ft.	1,749.5 Ft.
Initial Elevation		1,747.0 Ft.	1,743.7 Ft.	1,742.0 Ft.
Floor / Minimum Elevation		1,729.5 Ft.	1,729.5 Ft.	1,729.5 Ft.
Source Well Status				
Well No. 3 (S01)	1	0 gpm	0 gpm	400 gpm
Well No. 4 (S02)	1	350 gpm	350 gpm	400 gpm
Well No. 5 (S03)	1	700 gpm	700 gpm	700 gpm
Well No. 6 (S04)	1	1,650 gpm	1,650 gpm	1,800 gpm
Well No. 7 (S05)	1	2,000 gpm	2,000 gpm	2,000 gpm
Well No. 8 (S07)	1	800 gpm	800 gpm	1,100 gpm
Total Supply		5,500 gpm	5,500 gpm	5,500 gpm[c]
Booster Pump Station Status				
Hospital Hill BPS	3	750 gpm (262 Ft. TDH)	750 gpm (262 Ft. TDH)	750 gpm (262 Ft. TDH)
Palm Park BPS	3	1,000 gpm (200 Ft. TDH)	1,000 gpm (200 Ft. TDH)	1,000 gpm (200 Ft. TDH)
Well No. 6 BPS	3	2,000 gpm (275 ft. TDH)	2,000 gpm (275 ft. TDH)	2,000 gpm (275 ft. TDH)
Brader Hill BPS	6	1,000 gpm (300 Ft. TDH)	1,000 gpm (300 Ft. TDH)	1,000 gpm (300 Ft. TDH)
Goodlander BPS	5	1,000 gpm (264 Ft. TDH)	1,000 gpm (264 Ft. TDH)	1,000 gpm (264 Ft. TDH)
Valhalla Zone 6 BPS	6	2,000 gpm (135 Ft. TDH)	2,000 gpm (135 Ft. TDH)	2,000 gpm (135 Ft. TDH)

[a] Equalizing Storage depleted.
[b] Equalizing and Fire Suppression Storage depleted.
[c] Currently water right limited to 5,500 gpm.

3.4.8 Analysis Scenarios

The existing water system was first analyzed considering a current peak hour demand of 5,866 gpm, based on the total calculated peak hourly flow as described in CHAPTER 2. A minimum residual pressure of 30 psi was maintained at all nodes where domestic service is provided and with all source pumps in operation. Pipe velocities remained below the eight feet per second (FPS) maximum velocity design parameter. A copy of the computer printouts of this scenario and all other hydraulic analysis results discussed in this section are provided in CHAPTER 10. Also included in CHAPTER 10 is Map B which shows the computer model layout with the pipe and node numbers for identification.

A future PHD analysis was run on the system using the PHD for the year 2041 of 7,257 gpm. This scenario was conducted with the year 2041 equalizing storage volume depleted. All service pressures were greater than 30 psi and pipe velocities were below eight (8) FPS with all source pumps in operation.

Fire flows were considered at all hydrant locations throughout the pipe network while assuming an existing system consumptive demand of 3,555 gpm, based on the total calculated MDD as described in CHAPTER 2. The computer hydraulic model was used to calculate the maximum flow attainable at designated hydrant nodes while providing a positive pressure of 20 psi. Equalizing and fire suppression storage were depleted at the start of the fire flow analysis. The resulting fire flow capacities are shown in Figure 3-5, along with the fire district requested fire flow capacities discussed in Section 3.3.4. Several locations were calculated to be deficient in meeting the specified fire flow capacities, as shown in Figure 3-5. A future fire flow analysis was performed on the system with the 2041 maximum day demands to verify adequate fire flow capacity is available. Again, the same locations were calculated to be deficient in meeting the current fire flow requirements.

3.4.9 Model Calibration

From 2010 through 2020 the City of Selah Fire Department, performed flow tests of fire hydrants at selected locations throughout the City distribution system under normal operating conditions. Field flow test results and static pressure readings were compared to the computer model under an average day demand scenario with the initial reservoir levels listed in Table 3-41. Ideally, test results would be compared to a computer model under average day demand with reservoir levels set to the actual reservoir levels at the time of testing, but reservoir levels from the time of testing were not available. Pressures from fire hydrant nodes in the model were generally within five psi of the test pressure readings, verifying that actual system pressures are comparable to the calculated pressures of the computer model. Samples of fire flow test results are shown in Table 3-42 and are compared with fire flow model results.

Available fire flow was calculated using the measured pressures and flows from the field tests. Fire flow in gpm at 20 psi of residual pressure was calculated using the following equation (simplified Hazen Williams):

$$\text{Available Fire Flow @ 20 psi Residual} = \text{Total Fire Flow} \times \sqrt{((\text{Static Pressure} - 20\ \text{psi})/(\text{Static Pressure} - \text{Residual Pressure}))}$$

The City should continue routine hydrant flow testing at representative locations throughout the distribution system and provide data updates for continued calibration of the system model. This will improve the accuracy of future system analysis. If possible, reservoir levels should be recorded at the time of testing to further improve future system model calibration accuracy.

TABLE 3-42 FIRE FLOW FIELD TEST AND HYDRAULIC MODEL RESULTS

Flow Test No.	Test Year	Location	System Pressure Zone	Flow Hydrant A			Flow Hydrant B			Static/Residual Hydrant			Calculated Available Fire Flow (gpm)[a]	Fire Flow Model Results (at residual hydrant node)		
				Node No.	Pressure (psi)	Flow (gpm)	Node No.	Pressure (psi)	Flow (gpm)	Node No.	Static Pressure (psi)	Residual Pressure (psi)		Static Pressure (psi)	Residual Pressure (psi)	Fire Flow (gpm)
1	2011	9th St. From Bartlett Ave. to Home Ave.	1	J-107	22	790	J-108	28	890	J-108	48	32	2,222	23.2	20	2,702
2	2011	Home Ave. From 13th to 11th St.	2	J-428	36	1,010	J-424	17	690	J-429	72	58	3,276	24.8	20	6,877
3	2011	W. Cherry Ave.	2	J-431	35	995	J-427	47	1,150	J-432	87	62	3,512	20	26.8	6,336
4	2011	Intermediate School	2	J-448	35	995	J-449	25	840	J-447	62	52	3,761	20	22.9	9,193
5	2011	14th St. and Pear Ave.	2	J-443	35	995	J-529	16	670	J-530	70	40	2,150	23.6	20	2,239
6	2011	Cherry Ave. and 15th St.	2	J-444	20	750	J-25	10	530	J-21	52	31	1,580	20	36.4	1,002
7	2011	Speyers Rd. and Cherry Ave.	2	J-445	20	750	J-433	37	1,025	J-249	82	47	2,362	20	26.4	3,304
8	2011	Speyers Rd. and 9th St.	2	J-435	37	1,025	J-248	32	950	J-248	80	35	2,281	24.3	20	2,304
9	2012	McGonagle Rd.	3	J-256	45	1,125	J-222	50	1,190	J-255	86	65	4,104	20	26.5	3,559
10	2012	Terry Ave and Lyle Loop	3	J-179	30	920	J-522	30	920	J-526	90	85	6,885	20.9	20	3,863
11	2012	Crestview Dr.	3	J-527	22	790	J-523	30	920	J-524	85	78	5,211	20	29.3	5,651
12	2012	Apply Way, Terry Ave., and Crestview Dr.	3	J-460	30	920	J-523	30	920	J-643	84	77	5,564	20	39.1	5,975
13	2012	Goodlander Dr. and Goodlander Circle	4	J-650	20	750	J-642	15	650	J-648	60	45	2,286	20	46.0	455
14	2012	W. Cherry Ave. and Sage Ave.	2	J-438	18	710	J-441	35	995	J-247	90	60	2,604	24.3	20.0	2,418
15	2012	W. Pear Ave. and W. Cherry Ave.	1	J-111	15	650	J-441	45	1,150	J-110	55	48	4,025	26.3	20	3,955
16	2012	Yakima Valley School	3	J-269	10	530	J-265	60	1,300	J-267	95	80	4,092	20	25.7	4,588
17	2012	W. Orchard Ave. and W. Naches Ave.	1	J-102	30	920	J-409	20	750	J-100	54	50	4,869	26.8	20	2,596
18	2012	10th St. and Hillcrest Dr.	3	J-606	45	1,125	J-603	10	530	J-604	74	50	2,483	20.0	30.6	2,223
19	2012	S. 10th St., Sherlyn Dr., and Anchor Loop	2	J-608	50	1,190	J-405	40	1,060	J-406	66	45	3,330	33.7	20	2,530
20	2012	16th St. and 17th St.	4	J-224	15	650	J-230	30	920	J-228	68	32	1,813	20.0	31.2	574
21	2012	Cedar Ln. and Orchard Ave.	3	J-624	35	995	J-633	40	1,060	J-625	60	50	4,110	20.0	23.3	3,992
22	2012	Orchard Ave. and Fremont Ave.	3	J-627	35	995	J-628	40	1,060	J-629	84	75	5,480	20.0	54.1	3,885
23	2012	Cedar Hills Dr. and Fremont Ave.	3	J-621	35	995	J-617	55	1,240	J-616	65	53	4,328	20.0	46.2	3,141
24	2012	Fremont Ave. and Orchard Ave.	2	J-421	40	1,060	J-420	40	1,060	J-418	60	50	4,240	28.3	20.0	1,435
25	2012	N. 16th St., N. 12th St., and N. 10th St.	3	J-625	30	920	J-414	25	840	J-421	88	70	3,421	20.0	64.4	3,916
26	2012	Highland Ct.	2	J-811	25	840	J-812	10	530	J-810	65	30	1,553	20.0	31.7	1,381
27	2012	W. 1st Ave. and W. Yakima Ave.	3	J-423	30	920	J-620	35	995	J-619	78	70	5,156	22.5	20.0	2,424
28	2012	S. 10th St. & Riverview Ave.	3	J-606	45	1,125	J-603	10	530	J-604	74	50	2,565	20	30.6	2,223
29	2012	S. 10th St. & Crusher Canyon Rd.	2	J-608	50	1,190	J-405	40	1,060	J-406	66	45	3,438	33.7	20	2,530
30	2012	Heritage Hills Dr. and Mayer Ct.	4	J-216	45	1,125	J-217	20	750	J-215	65	50	3,385	26	20	2,564
31	2012	Heritage Hills Ln.	4	J-386	55	1,240	J-387	35	995	J-385	80	65	4,694	20	37.5	2,340
32	2012	Heritage Hills Ct.	4	J-656	45	1,125	J-653	10	530	J-654	65	48	2,693	20	43.5	905
33	2012	Jr. High School	1	J-315	55	1,240	J-174	50	1,190	J-316	82	65	4,641	31.0	20	3,223
34	2012	High School	1	J-167	37	1,025	J-246	37	1,025	J-166	65	55	4,349	29.7	20	5,775
35	2014	Naches Ave. and Railroad Ave.	1	J-95	60	1,300	J-131	60	1,300	J-296	85	80	9,374	23.0	20	7,249
36	2014	Railroad Ave. and Jim Clements Way	1	J-261	60	1,300	J-325	60	1,300	J-59	85	80	9,374	20	64.3	7,136
37	2015	W. Goodlander Dr. btw 1282 and 1316	4	J-282	45	1,125	J-376	27	875	J-283	58	52	5,033	20	24.5	5,097
38	2016	Bower Dr.	1	J-333	23	805	J-246	37	1,025	J-338	46	38	3,299	20	25.4	3,111
39	2020	W. Goodlander Dr. btw 1540 and cul-de-sac	6	J-352	40	1,060	J-351	35	1,000	J-349	56	52	6,592	20	33.8	3,908

[a] At 20 psi residual pressure.
Note: See Map B for Junction Node Locations.

3.5 SYSTEM CAPACITY ANALYSIS SUMMARY

Table 3-43 summarizes the year 2021, 10-year, and 20-year water demands for the City of Selah, including ERUs for ADD and MDD.

TABLE 3-43 CURRENT AND FUTURE DEMAND, SOURCE CAPACITY AND WATER RIGHTS SUMMARY

Year	System Water Demand					
	ERU_{ADD}	ERU_{MDD}	Total Annual Demand	ADD	MDD	PHD
			MG/Year	MGD	MGD	gpm
2021	6,001	4,599	912.455	2.500	5.119	5,866
2031	6,715	5,146	1,020.989	2.797	5.728	6,564
2041	7,436	5,698	1,130.688	3.098	6.342	7,267

The system's current and future physical capacity (ERUs), in terms of water rights, source capacity, and storage capacity is summarized in Table 3-44.

The water rights physical capacity in Table 3-44 is based on comparing the ADD per ERU (ERU_{ADD}) to the current and/or future total annual (Q_a) water right quantity and the MDD per ERU (ERU_{MDD}) to the current and/or future total instantaneous (Q_i) water right quantity. Similarly, source physical capacity is based on comparison of ERU_{MDD} to the current and/or future well pump capacity. At a minimum, the total source capacity should be able to replenish depleted fire suppression storage in 72 hours while supplying system MDD to eliminate the need for excessive equalizing storage capacity. The water sources should also be able to supply ADD with the largest source of supply out of service.

The storage physical capacity in Table 3-44 is based on two of the primary storage components, equalizing storage (ES) and standby storage (SB). Physical capacity of the City's reservoirs is not based upon operational storage (OS) or fire suppression storage (FSS) because these normally do not change with the number of ERUs. The DOH equations for determining ERU capacity based on storage were calculated from the following equations:

Equalizing Storage

$$N = \frac{1}{C}\left[\frac{1440}{ERU_{MDD}}\left(\frac{ES}{150} + Q_S - 18\right)\right] - F$$ (*2019 Water System Design Manual*, Equation 4-5)

Where,
N = Number of ERUs based on the ERU_{MDD} value
C = Coefficient associated with ranges of ERUs (1.6)
F = Factor associated with ranges of ERUs (225)
Q_s = Total flow of all permanent sources (gpm)
ERU_{MDD} = Maximum Day Demand per ERU (gpd)

Standby Storage

$$N = \frac{SB}{200 \text{ gallons}}$$ (*2019 Water System Design Manual*, Equation 4-7)

Where,
SB = Standby Storage (gallons), minimum recommended
N = Number of ERUs

To determine the current system capacity for ES and SB, the available (excess) total system storage volume provided in Section 3.4.3.1 was split and added to the calculated required minimum storage volumes for each component.

Table 3-44 summarizes the water system capacity, in ERUs, based on current water right, source, and storage capacity. Projected system demands and calculated system capacities shown in other tables of this Plan are based on demand per service and do not directly correlate to the calculated demand per ERU for all service categories under different demand conditions (e.g. ADD, MDD, PHD). Values shown in Table 3-44 are therefore, only estimates based upon calculated demands per ERU for ADD and MDD from historical source and supply meter records.

It can be seen from Table 3-44 that of the existing system components, instantaneous water rights are currently the limiting factor in determining the physical capacity of the City of Selah water system, followed closely by well source capacity. A water rights assessment is included earlier in this chapter.

TABLE 3-44 ERU CAPACITY SUMMARY (DOH WORKSHEET 4-1)

Water System Connections Correlated to ERUs			
Service Classification	**Total MDD for the Classification (gpd)**	**Total # Connections in the Classification**	**ERU_{MDD}**
Residential			
Single-Family Residential	2,486,484	2,457	2,457
Outside Single-Family Residential	10,208	8	10
Apartment	124,685	55	123
Nonresidential			
Commercial	215,670	158	213
Industrial	1,131,450	25	1,118
Political Subdivision	19,833	11	20
Irrigation Only	249,810	66	247
Federal State Govt.	16,947	9	17
Outside Commercial	8,962	2	9
City	389,844	34	385
DSL (4.33% 3-Year Avg.)	201,514	N/A	199
Total existing ERUs (Residential + Nonresidential) =			4,798

Physical Capacity as ERUs					
Water System Component (Facility)	**Current System Capacity**	**Required Capacity**			**Calculated ERU Capacity for Each Component**
		2021	**2031**	**2041**	
Sources	9.072 MGD	5.119 MGD	5.722 MGD	6.334 MGD	8,964 ERU_{MDD}
Equalizing Storage	0.744 MG	0.055 MG	0.159 MG	0.144 MG	9,776 ERU_{MDD}
Standby Storage	1.859 MG	0.920 MG	1.028 MG	1.138 MG	9,294 ERU_{MDD}
Water Rights Q_a = 4,760 ac-ft	1,551 MG	886 MG	1,063 MG	1,176 MG	11,183 ERU_{ADD}
Q_i = 5,500 gpm	7.920 MGD	5.119 MGD	5.722 MGD	6.334 MGD	7,826 ERU_{MDD}
Water System Physical Capacity (ERU_{MDD}) = 7,826 ERUs, limited by instantaneous water rights.					

3.6 SUMMARY OF SYSTEM DEFICIENCIES

The following is a listing and brief description of deficiencies which have been identified in the present water system. The deficiencies have been grouped within three system categories (supply, storage, and distribution) and are generally placed in order of their importance. The deficiencies may be operational in nature (which have been identified by the City's Water Department personnel) or maintenance related, inadequate present or future capacities, and/or system hydraulics problems.

3.6.1 Supply

Water Rights – A City's water right status is crucial in determining the amount of possible future growth. Currently, Selah has annual rights (Q_a) of 4,760 acre-feet per year and instantaneous rights (Q_i) of 5,500 gpm. As discussed in CHAPTER 2, current water rights are adequate for existing and projected year 2041 demands, but are the limiting factor in determining the City's physical system capacity and will need to be addressed to serve demand beyond the 20-year planning horizon. The City's limiting system component is Q_i, authorization, which is about 900 gpm lower than current source well capacity. Increasing Q_i authorization will improve system reliability and reduce the amount of required equalizing storage, resulting in additional available future storage.

As discussed in CHAPTER 1, the City currently requires that any proposed new development, which will exceed the City's current water right capacity, to transfer any water right the developer may hold to the City, prior to approval of the new development.

The need for the City to control large industrial water use and explore the potential of transferring existing water rights owned by industries to the City is discussed in CHAPTER 2. Industrial water consumption is still the highest among all user categories and projected future demands will need to be closely monitored by the City.

Source Well Capacity – Selah's source wells are limited by Q_i authorization of 5,500 gpm, but can produce 6,400 gpm should additional water rights be acquired. The year 2021 source capacity is adequate to meet current and anticipated 2041 demands. However, if population trends and demand projections change, the source well capacities may need to be reevaluated prior to year 2041. Total source well capacity is also predicated on properly maintained wells and pumping equipment, groundwater levels, and aquifer yield. As described in Section 2.3.6, Section 3.3.1, and Section 3.4.1, the pumping rate from some of the City's wells has been reduced to limit sand production or interference from nearby wells or declined because of regional aquifer conditions. The City has needed to rehabilitate and replace pumping equipment in many of its wells (most recently Well No. 7) because of aquifer level declines. Increasing annual production from each well also has an impact on total well production capability. Though the City can pump the indicated maximum well capacity for a short time duration, additional wells, well pump capacity, or artificial aquifer recharge strategies may become necessary in the future to fully utilize authorized quantities.

Booster Pump Stations – Booster pump station capacity is adequate to serve current and anticipated 20-year demand. Most of the City's existing booster pump stations have been upgraded within the last ten years. The only booster pump station deficiency noted is that the generator and receptacle at the Well No. 6 and Zone 3 Booster Pump Station can only power the well or booster pumps separately. A larger generator and modification of the receptacle will be necessary to power the well and booster pumps at the same time during an outage.

3.6.2 Storage

Storage Capacity – As discussed previously in this chapter and in CHAPTER 2, the City's total system reservoir storage capacity is adequate to meet the 20-year projected demand, by nesting fire suppression and standby storage. However, the storage capacity of the North Hill Zone 4, 5, and 6 area is limited and cannot serve the projected number of full build-out ERUs, as described in Section 3.4.3.3. If projected future water demand conditions change, the City may need to reevaluate the need for additional storage.

Reservoir Cleaning and Maintenance – The North Reservoirs were constructed in 1938 and were last rehabilitated in 2012. These tanks have had some leakage due to cracking and age. The smaller North Reservoir has been offline for some time due to excessive leakage. Replacement or rehabilitation of these tanks will be necessary in the future.

3.6.3 Distribution

Service Meters – The City's existing water service meters are primarily hand-read. It is recommended the City implement radio-read service meters in the future, requiring less labor and more accurate, readily available consumption data. Replacement of older service meters is necessary to improve accuracy and potentially reduce the DSL percentage.

Fire Flow Capacity – Figure 3-5 identifies existing system fire flow capacities along with the minimum fire flow requirements for regions within the City. As shown on the figure, some locations are deficient based on the computer hydraulic model. Refer to Figure 8-1 Recommended Water System Improvements for suggested improvements to address deficiencies.

Water Main Upsizing and Replacement – Most of the deficiencies identified, as shown in Figure 3-5, can be addressed by upsizing water mains. Suggested Improvements for water main upsizing are shown in Figure 8-1 Recommended Water System Improvements.

Pressure – Water services currently range in elevation from 1,080 to 1,500 feet, with static pressures ranging from 37 to 97 psi. Higher pressures are experienced at lower portions of the distribution system, at locations furthest away from reservoirs in respective pressure zones. Typically, distribution system pressures should not exceed 100 psi, unless the design engineer can justify the need for the excessive pressure and verify the pipe material is appropriate. High pressures are beneficial at these locations for fire flow reliability. Few locations experience pressure greater than 100 psi. In those locations, the City will install and maintain individual service PRVs if determined necessary by the Public Works Supervisor.

3.6.4 Telemetry

Selah's telemetry control system was installed in 2001 and is controlled by a master Programmable Logic Controller (PLC), which is located at the City's Public Works Shop. The Human Machine Interface (HMI) computer is the City's connection to the master PLC for making operational adjustments to the water system. The HMI computer and software were last updated in 2020 and will likely need to be replaced again within the next 10 years.

3.7 SELECTION AND JUSTIFICATION OF PROPOSED IMPROVEMENT PROJECTS

The following discussion identifies recommended system improvements proposed to eliminate or reduce deficiencies described in the previous section. References to prioritized improvements specified in Section 8.2 and Section 8.3 are provided. Further description of the water system improvements is provided in CHAPTER 8.

3.7.1 Supply

Water Rights – Though the current water rights are adequate to serve existing and projected 20-year demands, additional water rights may need to be obtained in the future should demand projections change. Instantaneous water right authorization (Q_i) is currently the limiting factor in determining Selah's water system ERU capacity. Increasing Qi authorization in the future will improve system reliability and reduce the amount of required equalizing storage, resulting in additional available future storage, however source well capacity improvements may also be necessary to utilize additional Q_i for an extended period of time. There are no plans for purchase of any properties that have water rights transferable to the City of Selah for municipal use. Any future property purchases, or water right transfers will be accomplished with the City's operational budget. **[Not identified as a system improvement in Figure 8-1** Recommended Water System Improvements**]**

Source Well Capacity – Routine maintenance of the City's existing well sources is necessary to sustain their current capacity, supply efficiency, and reliability, especially as system demands increase in the future. Well No. 6, and Well No. 8, two of the City's largest producers have not been rehabilitated or the pumps rebuilt since 2009. Continued maintenance of these well sources is critical to maintain reliable source production. Well No. 5, last rehabilitated in 2012 was recently reported as having reduced pump performance from 700 gpm to about 600 gpm. This well and pump should be rehabilitated again soon to restore its maximum pumping capacity. Well Nos. 3 and 4 have not be rehabilitated in over 20 years, but usage of these sources has been minimal since construction of Well No. 8. Use of these wells is also limited because of sand production and interference with Well No. 8. The City should consider redevelopment of these source wells and replacement of the pumping equipment to maintain them as reliable backup sources of supply. Well No. 7 was recently rehabilitated but should be closely monitored because of the significant aquifer level declines observed in 2018. Evaluation of alternatives to supplement the existing aquifer will be necessary in the future as usage of the well continues to increase. **[O&M Improvement Nos. 11 through 16]**

Booster Pump Stations – Most of the City's existing booster pump stations have been upgraded within the last ten years and have adequate capacity to meet projected 20-year demands. Routine maintenance of existing pumping equipment is vital to continuing reliable station performance and supply capacity. A larger generator, including modification of the generator receptacle, is needed at the Well No. 6 and Zone 3 Booster Pump Station to power both the well and booster pumps at the same time during an outage. This upgrade will improve system reliability during an outage. If Zone demand conditions change in the future, addition booster pump station capacity or upgrades may be needed. A new Zone 7 booster pump station will be required to serve projected future services in the South Hill portion of the City's service area, however this pump station will be constructed with private developer funds. **[Capital Improvement No. 15]**

3.7.2 Storage

Reservoir Cleaning and Maintenance – Routine cleaning and inspection of the City's water storage reservoirs is necessary to maintain water quality and monitor structural integrity. The City plans to clean and inspect the reservoirs routinely every five years. **[O&M Improvement Nos. 5 through 10]**

Storage Capacity – Total system reservoir storage capacity is adequate to meet 20-year projected demand fire suppression and standby storage nested, however, the storage capacity of the North Hill Zone 4, 5, and 6 area (Valhalla Reservoirs) is limited and cannot serve the projected number of full build-out ERUs, as described in Section 3.4.3.3. It is anticipated that an additional Valhalla Reservoir will be needed by year 2031 to meet projected future demand, however this improvement will be constructed with private developer funds. If projected future water demand conditions change, the City may need to reevaluate the need for additional storage. The smaller of the North Reservoirs is not in service due to leakage. Replacement or rehabilitation of this reservoir will be necessary in the future to provide additional capacity and reliability to the entire water system. Rehabilitation of the smaller tank may have limited success and will only return about 164,000 gallons of storage capacity. Constructing a replacement storage tank will improve system storage capacity, reliability, and water quality. **[Capital Improvement Nos. 10 and 12]**

3.7.3 Distribution

Source Meter Calibration – To ensure the accuracy of well production data and potentially reduce the percentage of DSL, as described in CHAPTER 1, the City should begin routine calibration of source meters. **[O&M Improvement No. 1]**

Water Main Replacement and Upsizing – Several locations in the City's distribution system need water main replacements due to leakage and corrosion because of aging and deteriorated pipes. Many of these water mains are also undersized and will be replaced with 8-inch minimum size piping. Replacement of deteriorated and undersized water mains will reduce leakage and improve water quality, system reliability, and fire flow capacity. **[Capital Improvement Nos. 3, 4, 6, 7, 8, 9, and 11]**

Fire Flow Capacity – As shown in Figure 3-5, there are several locations where the required fire flow is not met. Looping water mains at dead ends in these locations and upsizing existing piping will improve fire flow and water quality. **[Capital Improvement Nos. 2, 13, and 14]**

Service Meter Replacement – It is recommended the City replace all hand-read meters with auto radio read meters. New meters will improve accuracy, monthly meter reading efficiency, and potentially reduce future DSL percentages. **[Capital Improvement No. 1]**

CHAPTER 4 -

WATER USE EFFICIENCY (WUE) PROGRAM

HLA
Engineering and Land Surveying, Inc.

4.1 WATER USE EFFICIENCY PROGRAM

4.1.1 Planning Requirements

In 2003, the Washington State Legislature passed the Municipal Water Supply-Efficiency Requirements Act (commonly called the Municipal Water Law) as part of a multi-year effort to reform the state's water laws. The act requires all municipal water suppliers to use water more efficiently in exchange for water right certainty and flexibility to meet future water demands. The Legislature directed DOH to adopt a rule that establishes water use efficiency requirements for all municipal suppliers. The Water Use Efficiency (WUE) Rule, which became effective on January 22, 2007, includes the following key items:

- WUE Program – This element of the rule requires the collection of water production and consumption data, forecast of future water demands, evaluation of system leakage, evaluation of water rate structures, and the implementation of WUE measures. This Program is a required element of all Water System Plans prepared after January 22, 2008.

- Distribution System Leakage (DSL) Standard – Municipal water suppliers with 1,000 or more connections are required to satisfy a DSL standard equal to 10% or less of total production by July 1, 2010.

- WUE Goal Setting and Performance Reporting – Municipal water suppliers are required to set WUE goals through a public process and report annually on their performance to customers and DOH. For water systems with 1,000 or more connections, the deadline for establishing systems goals is July 1, 2009. WUE goals must be established through a public process for a period of six or more years and should be re-evaluated each cycle. Purveyors with a Water System Plan approval period longer than six years may extend their WUE Program approval cycle to the same period.

The rule requirements and compliance deadlines are shown in Table 4-1 .

TABLE 4-1 WATER USE EFFICIENCY RULE REQUIREMENTS

Requirement	Deadlines	
	1,000 or more Connections	Under 1,000 Connections
Begin Production & Consumption Data Collection	January 1, 2007	January 1, 2008
Establish WUE Goals	July 1, 2009	July 1, 2010
Include WUE Program in Planning Documents	January 22, 2008	January 22, 2008
Submit First Annual Performance Report	July 1, 2008	July 1, 2009
Submit Service Meter Installation Schedule	July 1, 2008	July 1, 2009
Meet DSL Standard	July 1, 2010	July 1, 2011
Complete Installation of all Service Meters	January 22, 2017	January 22, 2017

A WUE Program is one requirement of the WUE Rule. All Water System Plans submitted to DOH after January 22, 2008, are required to include a WUE Program. WAC 246-290-810(4) requires municipal water suppliers to include the following items in their WUE program:

- Description of the current water conservation program, including an estimation of water saved through program implementation over the last six or more years;

- Description of the chosen WUE goals;

- Evaluation and implementation of WUE measures;
- Projected water savings;
- Customer education;
- WUE program effectiveness;
- DSL evaluation; and
- Water Loss Control Action Plan if DSL is greater than 10%.

4.1.2 Current Water Conservation Program

Selah's current Water Conservation Program, or Water Use Efficiency (WUE) Program, was prepared in April 2020 and replaced the previous Water Conservation Program provided in the *2013 Water System Plan*. As part of this *2021 Water System Plan*, the City's current WUE Program is reevaluated and expanded in accordance with WAC 246-290-810(4) and consists of the following elements:

- Water Use Efficiency Goals;
- Evaluation and Implementation of Water Use Efficiency Measures;
- WUE Measure Implementation;
- Customer Education;
- Water Use Efficiency Program Effectiveness; and
- Distribution System Leakage (DSL) Evaluation.

Provided in Table 4-2 is a summary of the population, number of water services, water consumption, and per capita water consumption from 2013 through 2019. Further information on historical water use is provided in CHAPTER 2. Since 2013, total system annual water consumption has increased by 6.2% and residential water demand has increased by 9.8%. However, annual residential demand per service per day has decreased by 1.6% since 2013.

TABLE 4-2 WATER CONSUMPTION INFORMATION 2013-2018

Year	Population*	Total Water Services	Annual Water Consumption (MG)	Annual Residential Consumption (MG)	Residential Water Services	Residential Avg. Day Consumption Per Service (gal/service/day)
2013	7,340	2,523	788.599	300.724	2,195	375
2014	7,395	2,552	819.801	330.986	2,214	410
2015	7,495	2,594	860.393	331.343	2,240	405
2016	7,530	2,615	816.438	317.720	2,260	385
2017	7,630	2,670	839.111	310.751	2,311	368
2018	7,820	2,726	836.889	334.449	2,370	387

* From Washington State OFM population estimates.

The City's 2013 *Water Use Efficiency Program* included a goal to reduce the current residential per capita use by five (5) gallons per service per day over the two years following goal adoption. The two years immediately following goal adoption in 2013 residential daily demand per service increased by about 8.7 percent, but then dropped back down to an average over the last three years of 380 gallons per service per day. The reduction goal was only achieved in 2017 when the average day consumption per service was 368 gallons per service per day.

Since 2013, the City has replaced several water service lines, meters, valves, and distribution mains that were suspected to be leaking. In addition, the City has rehabilitated several reservoirs during this period, including crack sealing. These efforts have assisted in reducing the difference between water production and consumption volumes.

4.1.3 Water Use Efficiency Goals

WUE goals are an integral component of the WUE program, setting the groundwork for more efficient use of water. The City of Selah has observed reductions in single-family residential consumption per service through past conservation measures. Therefore, the City of Selah adopted the following WUE goal for their water system in 2021:

> Reduce the current residential average day consumption per service by 2% over the next ten years.

It is anticipated that the reduction in residential use by 2% could save approximately 40 million gallons over this ten-year period.

4.1.4 Evaluation and Implementation of Water Use Efficiency Measures

Water use efficiency (WUE) measures are necessary actions taken to attain a water system's established efficiency goals. Measures are intended to support the WUE program and should address both supply and demand efficiencies. For this reason, the WUE measures that have been evaluated and/or implemented are separated into two primary categories, demand side and supply side measures.

Demand Side Measures

Municipal water systems are required to evaluate or implement a specified number of demand side water use efficiency (WUE) measures based upon the size of the water system. Table 4-3 shows the minimum number of measures required to be evaluated or implemented by the City of Selah.

TABLE 4-3 WATER USE EFFICIENCY MEASURES

Number of Service Connections	Number of Water Use Efficiency Measures to be Evaluated
Less than 500	1
500 - 999	4
1,000 – 2,499	5
2,500 – 9,999	6 (Selah's current requirement)
10,000 – 49,999	9
Greater than 50,000	12

A discussion of the demand side measures the City of Selah has evaluated to achieve its specified efficiency goal are provided below, along with the estimated costs to implement the measures and the projected water savings. Evaluation of the following measures for cost-effectiveness is primarily based on the overall implementation costs as compared to the amount of potential water savings.

New Service Charge Based on Consumption – The City of Selah charges a new hookup fee for users based on their estimated water consumption. Factors considered in estimating water use for new customers are building size, irrigated square footage, type of landscaping, and type of user. The City encourages developers and new businesses to implement low-consumption landscaping and irrigation methods first verbally, then by charging the fee associated with larger estimated consumption.

WUE Measure Cost Estimate: $0.

Estimated Water Savings: Approximately 5 million gallons per year and increases annually.

WUE Measure Action Status: Already implemented.

Water Bill Notifications – In the past, monthly water bills showed the previous and present meter readings to provide user consumption total for the month. Though consumers could see the total volume of water used, there was no direct message regarding water use efficiency. Under the last WUE Program the City of Selah began placing notices on their customer's monthly bills to encourage customers to check for leaks and be aware of excessive water use due to household leaks. This measure further educated the public on the purpose of water conservation and the benefits of reducing excessive and/or unnecessary water use. Minimal costs associated with this measure include updating the notification language and the billing software to print the selected message. The low cost of continuing this measure makes it an effective way to accomplish the specified efficiency goal.

WUE Measure Cost Estimate: $500 for updating materials.

Estimated Water Savings: Approximately 4 million gallons per year.

WUE Measure Action Status: Already implemented.

Heritage Garden Demonstration – The Yakima Basin Integrated Plan, a municipal subgroup of the Department of Ecology, promotes efficient use of municipal and domestic water throughout the Yakima Basin using voluntary, incentive-based actions that focus on landscape irrigation, and other consumptive uses. The Heritage Gardens program is funded by a grant from the Department of Ecology through the Yakima Basin Integrated Plan. The free Heritage Gardens program encourages and incentivizes homeowners, municipalities, and business to convert high water-use landscapes to low-use landscapes that feature plants and geological features native to the Yakima Valley.

The City of Selah has installed much of what is required for it to be a registered Heritage Garden at the Public Works Facility, and plans to pursue a grant from Ecology to install any further plants or features required, as well as an informational podium explaining the garden contents. The garden would include signs promoting the program and encouraging other users to install their own heritage gardens.

WUE Measure Cost Estimate: $0, grant money will be used.

Estimated Water Savings: Approximately 200,000 gallons per year.

WUE Measure Action Status: Planned for implementation in 2025.

Customer Leak Detection – The City of Selah Public Works staff will work closely with utility billing staff in identifying high water usage customers. When high usage is revealed, Public Works staff will contact the customer in a timely manner. Staff will provide leak detection services to customers and offer solutions for leak repairs. Following inspections, customers will receive DOH pamphlets promoting water conservation and tips toward consumption reduction.

WUE Measure Cost Estimate: $1,500 for time and printing materials.

Estimated Water Savings: Approximately 500,000 gallons per year.

WUE Measure Action Status: Planned for implementation in 2022.

City Webpage – The City's current webpage includes a page devoted water conservation, which provides several ways different types of users can conserve water. The resources are located at https://selahwa.gov/public-works/drought-conservation/.

WUE Measure Cost Estimate: No additional costs.

Estimated Water Savings: Approximately 750,000 gallons per year.

WUE Measure Action Status: Already implemented.

Water Rate Structure – This measure involves the evaluation of a conservation-based water rate structure to reduce consumption. The City's current rate structure is a declining-block rate, a monthly base charge plus a two-tier, volume-based consumption charge. The current rate structure is described in detail in CHAPTER 9.

Changing the current rate structure to an inclining-block rate structure, or another similar type of rate that further financially penalizes customers for excessive water use, may result in additional water savings. If approximately 30 percent of single-family residential customers (2,457 for 2021) used 10 percent less water annually (ADD of 380 gpd/service), as a result of inclining-block rates, annual water system consumption could be reduced by approximately 10.2 million gallons (1.1% of annual system demand). While being an effective method to conserve water, this type of rate structure may have negative impacts on customers, including large swings in monthly bills due to irrigation or other seasonal uses, unfairly penalizing customers that require higher usage (e.g., larger households or larger consumptive use), or placing an additional burden on low-income users. This type of rate structure may also negatively impact the City with the potential for increased variability in revenue streams.

Further evaluation of alternate rate structures will be necessary in the future prior to implementation, to determine what structure is the most suitable and effective for the system. Estimated cost for future evaluation and implementation of a conservation-based water rate structure is provided below. Additional information on current water rates is provided in CHAPTER 9 of this Plan.

WUE Measure Cost Estimate: $10,000 for further evaluation and implementation of alternative rate structures.

Estimated Water Savings: Approximately 10 million gallons per year.

WUE Measure Action Status: Alternative rate structure evaluation and/or implementation is scheduled for 2021.

It should be noted that water savings attributable to public information activities are difficult to quantify because they are not directly linked to physically saving water. Although these measures cannot be accurately quantified, they are an integral part of the WUE Program, raising awareness of the importance of water conservation and increasing community participation in other conservation activities.

A summary of the estimated costs to implement the selected measures, their estimated water savings, and overall cost-effectiveness are provided in Table 4-4 .

TABLE 4-4 SUMMARY OF DEMAND SIDE WUE MEASURES			
Measure Description	Implementation Cost	Implemented	Projected Water Savings
New Service Charge Based on Consumption	$0	Yes	5 million gallons/year
Water Bill Notifications	$500	Yes	4 million gallons/year
Heritage Garden Demonstration	$0 – Ecology Grant Assumed	2025	200,000 gallons/year
Customer Leak Detection	$1,500	2022	500,000 gallons/year
City Webpage	$0	Yes	750,000 gallons/year
Rate Structure Evaluation	$10,000	2021	40 million gallons/year

The above measure is planned to be implemented as shown in Table 4-6 . The City will reevaluate the effectiveness of the measure during each program update to determine its potential for future implementation.

Supply Side Measures

Supply side measures are essential to control distribution system leakage (DSL), improve supply efficiency, and overall system performance. The following are discussions of supply side WUE measures that have already or will be implemented within the next ten years to reduce the system's current DSL percentage and satisfy the City's Water Loss Control Action plan objective. The estimated cost of these measures and anticipated water savings are also provided.

Source Meter Calibration – To obtain more accurate water production information and potentially reduce the City's current DSL percentage, Selah began calibrating all source meters every two years. Actual water savings from meter calibration is unknown, but if the accuracy of all source meters is improved by 0.5%, the resulting water savings could be as much as 4.20 million gallons, considering that approximately 880 million gallons were pumped into the system in 2017. It should be noted that the opposite of water savings could result, therefore, it is unknown if distribution system leakage (DSL) will be reduced or how much water could be saved through meter calibration.

WUE Measure Cost Estimate: $3,000 annually for calibration of three source meters.

Estimated Water Savings: Unknown; could potentially reduce DSL by 0.5%.

WUE Measure Action Status: Already implemented.

Service Meter Replacement – In 2008 Selah began budgeting to upgrade all existing service meters to automatic radio-read meters. Meter replacement is planned to begin in 2021 and take approximately three years to complete. Radio-read meters will reduce the time Selah spends reading meters and will potentially reduce inaccuracies from older worn or malfunctioning meters. Replacing the meters will allow the City to identify sources of excessive usage and possible leakage on the customer side of the meter. With use of radio-read meters, customers can easily be alerted of their excessive use and work with the City to eliminate the leakage. Installation of new radio-read meters will potentially decrease the difference between production and consumption volumes as well as overall water consumption within the City.

WUE Measure Cost Estimate: $1.089 million.

Estimated Water Savings: Up to 300,000 gallons annually.

WUE Measure Action Status: Replacement scheduled to begin in 2021.

Reservoir Cleaning and Inspection – The City periodically cleans and inspects its reservoirs for cracking and any other deficiencies. Cracking causes unnecessary leakage directly contributing to distribution system losses (DSL). The City's reservoirs should be cleaned and inspected every five (5) years to identify any cracking and potential DSL. The approximate cost of inspecting and cleaning each reservoir is generally $6,000, assuming no significant repairs are necessary. Seven of the eight reservoirs would be cleaned regularly, but one of the North Reservoirs needs a more extensive maintenance and cleaning would be part of a larger effort.

WUE Measure Cost Estimate: Approximately $6,000 per reservoir, totaling $42,000 for seven active reservoirs.

Estimated Water Savings: None, preventative maintenance.

WUE Measure Action Status: Annual budgeting and inspection schedule.

TABLE 4-5 SUMMARY OF SUPPLY SIDE WUE MEASURES

Measure Description	Implementation Cost	Implemented	Projected Water Savings
Source Meter Calibration	$3,000	Yes	Unknown
Service Meter Replacement	$1.089 million	2021	Unknown
Reservoir Cleaning and Inspection	$15,000 per reservoir	Yes	Unknown

4.1.5 WUE Measure Implementation

A summary of the WUE program measures that are planned for implementation is provided in Table 4-6 , including measure description, implementation cost, and year of implementation. All the implemented measures support the system's WUE goals to reduce DSL and single-family residential consumption.

TABLE 4-6 SUMMARY AND PROJECTED SAVINGS OF WATER USE EFFICIENCY MEASURES

Measure Description	Implementation Cost	Implemented	Projected Water Savings
New Service Charge Based on Consumption	$0	Yes	5 million gallons/year
Water Bill Notifications	$500	Yes	4 million gallons/year
Heritage Garden Demonstration	$0 – Ecology Grant Assumed	2025	200,000 gallons/year
Customer Leak Detection	$1,500	2022	500,000 gallons/year
City Webpage	$0	Yes	750,000 gallons/year
Rate Structure Evaluation	$10,000	2021	10 million gallons/year
Source Meter Calibration	$3,000	Yes	Unknown
Service Meter Replacement	$1.089 million	2021	Unknown
Reservoir Cleaning and Inspection	$6,000 per reservoir	Yes	Unknown

The City plans to budget funds each year for the next ten-year period to fund the WUE measures listed above in Table 4-6 . These budget amounts are reflected in the proposed City of Selah financial plan in CHAPTER 9 of this Plan as part of the general operational budget and/or O&M improvement costs.

4.1.6 Customer Education

Customer education is intended to inform citizens about the need for, and the methods to achieve water conservation. Customer education involves publicizing and promoting the need for water conservation to all classes of customers. Selah currently publicizes its water conservation program in its annual *Consumer Confidence Report* to inform customers of the City's conservation efforts. In the future, the City plans to provide additional conservation information to customers in their annual *Consumer Confidence Report*, to further educate the public on the purpose of using water more efficiently.

Customer education programs that Selah has considered for further evaluation include the following:

- Program Promotion – Program promotion can include public service announcements, news articles, information provided in the City's annual *Consumer Confidence Report*, bill inserts, providing water use history as part of utility bills, and distribution of inexpensive, easily installed water-saving devices such as shower flow restrictors, toilet tank water displacement bags, and leak detection dye tablets. As previously discussed, Selah utilizes program promotion using its annual *Consumer Confidence Report* and water bill notifications.

- Speakers Bureaus – Speakers bureaus involve identifying water conservation speaking opportunities appropriate to various civic, service, community, and other groups. Such speaking opportunities focus on increasing public awareness of water resource and conservation issues and may involve the use of audio and visual aids.

- School Outreach – School outreach involves preparation of educational programs for school children targeted to increase awareness of local water resources and encourage water conservation practices. These may include school presentations, preparation of curriculum material, and tours of water system facilities.

- Theme Shows and Fairs – This activity involves preparation of a portable display of water conservation devices and selected written material and making this display available at local area theme festivals and activities.

At this time, Selah does not plan to further evaluate or implement any of the additional customer education programs listed above.

4.1.7 Water Use Efficiency Program Effectiveness

The Water Use Efficiency Rule requires the completion of annual performance reporting to system customers and to DOH. The City will use preparation of the Annual WUE Performance Report as an opportunity to review the effectiveness of the WUE measures and determine if established goals require revision. The annual effectiveness evaluation and the Annual WUE Performance Report will include the following elements:

- Calculation of DSL in terms of volume and percent of total water production;

- Identification of WUE goals;

- Evaluation of established WUE goals, including estimating water savings achieved through implemented measures and progress towards satisfying goals.

Selah will submit its Annual WUE Performance Report to DOH by July 1st of each year. Information contained in the Annual WUE Performance Report will also be included in the City's *Consumer Confidence Report*, which will be published on the City's website. WUE Program effectiveness will also be evaluated

every ten years when the Water System Plan is updated again. At this time both goals and measures will be reevaluated to determine the most cost-effective method to achieve the updated goals.

4.1.8 Water Use Efficiency Savings

To quantify the reduction in water supply requirements expected due to implementing WUE measures identified in Section 4.1.5, estimates of water use savings have been calculated. Provided in Table 4-7 is a summary of the water demand projections for years 2031 and 2041, with and without WUE measures implemented.

TABLE 4-7 DEMAND FORECAST WITH AND WITHOUT PROJECTED WUE SAVINGS

Year	Total Annual Demand (MG/Year)		ADD (MGD)		MDD (MGD)	
	Without WUE	With WUE	Without WUE	With WUE	Without WUE	With WUE
2031	1,020.989	1,000.539	2.797	2.741	5.728	5.617
2041	1,130.688	1,110.238	3.098	3.042	6.342	6.234

CHAPTER 5 -

SOURCE WATER PROTECTION

HLA
Engineering and Land Surveying, Inc.

5.1 WELLHEAD PROTECTION PROGRAM

The City of Selah was one of eight water providers within the upper portion of Yakima County which participated in the *Upper Yakima Valley Regional Wellhead Protection Plan*. The purpose of the plan is to:

- Identify potential sources of contamination near the City's ground water supplies;
- Implement management strategies to prevent contamination of those supplies; and
- Develop a contingency plan for contamination mitigation if ground water does become contaminated.

Completed in 1999, the *Upper Yakima Valley Regional Wellhead Protection Plan* resulted in individual wellhead protection plans for each of the participating water providers, including:

City of Yakima	Yakima County
City of Moxee	City of Selah
City of Tieton	City of Union Gap
City of Selah	Nob Hill Water Association

The City of Selah's Wellhead Protection Plan, prepared in accordance with DOH requirements, consists of a regional management segment detailing the regional management goals of the study and its eight participants, and a Selah-specific segment that defines the implementation of Selah's local management efforts. Selah's individual Wellhead Protection Plan is divided into the following five sections:

1. A water system summary including background, water source information, and wellhead protection area delineations. Wellhead protection area delineations were developed for 6-month, 1-year, 5-year, and 10-year travel times using an analytical model.
2. An inventory of potential contamination sources developed using Washington Department of Ecology databases and a survey of high-risk businesses in the area.
3. A contingency plan, which includes an analysis of source capacity, reliability, identification of alternate water sources, and emergency preparedness and spill response procedures.
4. A wellhead protection management strategy which details local management efforts to protect the City's ground water supplies and coordination efforts with the Regional Management Plan.
5. Appendices, containing City of Selah well log reports, well susceptibility assessments, a potential contaminant source and notification list, and resource contacts.

The City of Selah's Wellhead Protection Plan is considered a companion document to this *Water System Plan* and should be consulted for specific details and information regarding Selah's wellhead protection program.

In 2000, the City authorized the Mayor to enter an Interlocal Agreement for maintenance of the regional Wellhead Protection Plan.

As part of this *Water System Plan*, the City of Selah has updated their Potential Contaminant Source and Notification List. Updated in December 2019, the Potential Contaminant Source Notification Group is shown in Table 5-1 .

TABLE 5-1 2019 POTENTIAL CONTAMINANT SOURCE GROUP

Owner	Contact Address
Selah Aquatic Center	214 South Third Street
USPS Selah 547686002	114 E Naches Avenue
Power Clean Systems, Inc.	208 E Naches Avenue
Graham Packing Company	510 E Naches Avenue
Selah Roofing, Inc.	1104 W Cherry Avenue
WSDOT SR823 Selah Vicinity Re-Route Highway	SR823
WA DSHA Yakima Valley School	609 Speyer Road
Tree Top Storm Sewer Improvements	111 S Railroad Avenue
Road A W Goodlander Rd to Speyers Rd	
Tree Top, Inc. of Selah UST 6550	209 E 5th Avenue
Selah School District 119 High School	316 W Naches Avenue
Yakima Coop Association, Inc.	110 E 1st Avenue
207 E Goodlander Road	207 E Goodlander Road
Larson Fruit Co.	109 N Wenas Road
Tree Top, Inc. Ross Plant	101 S Railroad Avenue
Pingrey Motor Co.	102 W Naches Avenue
Pacificorp Selah Substation	NE Corner of N 11th Street and West Pear Avenue
Tree Top, Inc. Selah	1500 Harrison Road
Robert Lince Elementary School	316 W Naches Avenue
BNRR Selah MP 94 Print 401	Ls048 Sub3rd Portland Division
Naches Selah Irrigation District	143 E Naches Avenue
Selah Pole Yard	501 E Naches Avenue
Yakama Juice LLC	1 Railroad Avenue
Fremont Ave Spill	605 Fremont Avenue

5.2 UPDATES AND MODIFICATIONS TO THE WELLHEAD PROTECTION PLAN

In 2009, Selah drilled a new primary source well, Well No. 8. Information on this well is provided in CHAPTER 3 and a Well Log of Well No. 8 is included in CHAPTER 10. Also provided in CHAPTER 10 is a Ground Water Contamination Susceptibility Assessment Survey Form and Showing of Compliance for Well No. 8, and a revised Wellhead Protection Area Delineation Map. This information was also added to the City's Wellhead Protection Plan.

In 2002, the *Upper Valley Regional Wellhead Protection Plan* was updated with completion of the following tasks:

- The inventory of potential contaminant sources in the County's GIS database was updated. Included were updates from each of the Committee members. Also included were well locations from the Department of Ecology's GIS system. The well location information included mostly wells drilled since 1972.
- The City of Union Gap's two new wells and wellhead protection areas were added to the County GIS system.
- Updated copies of the map entitled "Upper Yakima County Well Head Protection Inventory" were printed.
- The DOH water quality database was downloaded from the internet.
- An overlay was developed to let County staff know when a project is proposed within a wellhead protection area. Notification letters were provided to the County's Development Services Center, and these letters will be provided to applicants proposing projects within any one of the wellhead protection areas located in the unincorporated area. The purpose of the letter is to notify applicants that their project is within a wellhead protection area and to let them know which water purveyor they can contact for additional information. Types of projects that will be issued a letter include short plats, zoning changes, etc.
- New wellhead protection signs were ordered and will be installed.
- Participated in a booth at the Central Washington State Fair in 2002 in conjunction with Yakima County's Solid Waste Division. The theme for the booth was hazardous waste reduction, which tied in closely with wellhead protection.
- Continued the coordination of emergency planning efforts with Yakima County Emergency Management Department.

In 2006, the *Upper Valley Regional Wellhead Protection Plan* was updated with completion of the following tasks:

- Updated the inventory of potential contaminant sources in the County's GIS database.
- Distributed information brochures to the public at the Central Washington State Fair.
- Downloaded the DOH water quality database from the internet.
- Reviewed information posted on Wellhead Protection website for accuracy and appropriateness for public information.
- Mailed notification letters to the owners of all contaminant sources within the wellhead protection areas.
- The Town of Naches' new well and wellhead protection area was added to the County GIS system.

In 2009, the *Upper Valley Regional Wellhead Protection Plan* was updated with completion of the following tasks:

- Updated the inventory of potential contaminant sources in the County's GIS database.
- Distributed information brochures to the public at the Central Washington State Fair.
- Downloaded the DOH water quality database from the internet.
- Reviewed information posted on Wellhead Protection website for accuracy and appropriateness for public information.
- Mailed notification letters to the owners of all contaminant sources within the wellhead protection areas.

In 2011, 2013, and 2019, the *Upper Valley Regional Wellhead Protection Plan* was updated with completion of the following tasks:

- Updated the inventory of potential contaminant sources in the County's GIS database.
- Downloaded the DOH water quality database from the internet.
- Reviewed information posted on Wellhead Protection website for accuracy and appropriateness for public information.
- Mailed notification letters to the owners of all contaminant sources within the wellhead protection areas.

An updated copy of the Yakima County GIS map entitled *Upper Yakima County Well Head Protection Inventory* is included in CHAPTER 10. Copies of the Regional Wellhead Protection Plan Updates are included in CHAPTER 10.

CHAPTER 6 -

OPERATION AND MAINTENANCE PROGRAM

HLA
Engineering and Land Surveying, Inc.

6.1 WATER SYSTEM MANAGEMENT AND PERSONNEL

The purpose of this section is to identify personnel responsible for the day-to-day operation of the water system and those positions responsible for development and/or approval of the operating budget and capital improvement program.

Water System Management Structure

Figure 6-1 is a flow chart which depicts the management hierarchy of Selah's water system. Brief descriptions of the general responsibilities of each position identified in Figure 6-1 are listed below:

Mayor and City Council: Responsible for establishing all water system policies, including service area boundaries, user rate structures, water system personnel salaries, water department budget, and capital improvements. Approves all expenditures.

City Administrator: Reviews all water system policy changes and expenditures, approves all personnel hiring, and advises Public Works Director on general water department operation.

Public Works Director: Responsible for the direct coordination of all day-to-day water system operation and maintenance tasks. Reports on the status and needs of the water system to the City Administrator, Mayor, and City Council. Prepares annual water department budget. Establishes staff job descriptions and requirements and recommends hiring of personnel. Serves as public and press contact regarding water system information.

City Clerk-Treasurer: Responsible for supervision of utility billings and budgeting preparation. Allocates funds for approved expenditures.

Utility Billing Clerk: Responsible for entering water meter reading data into the computer, generating monthly water billings, and maintaining water consumption records.

Consulting Engineer: Assists City in long-range planning; aids Public Works Director in technical aspects of water system; and provides design engineering and construction services for capital improvements.

Public Works Supervisor: Responsible for managing and assisting in the operation, maintenance, and preventive maintenance of water system facilities; providing supportive recommendations for policies, procedures, and improvements to the department, budget preparation, and future facilities; and training subordinate employees in aspects and functions of field operations. Must be capable of operating or learning to operate every tool, piece of machinery, and equipment within the Utility Department and must have a working knowledge of all types of materials, i.e., pipes, valves, and pumps. Must have a High School Diploma, and a minimum of five years' experience in the public works field with three years in a supervisory position. Must maintain a valid Class II or better Washington State Water Distribution Manger Certificate.

Utility Worker Lead: Responsible for supervising subordinate field personnel; assisting in the operation, maintenance, and preventive maintenance of water system facilities; providing supportive recommendations for policies, procedures, and improvements to the department, personnel issues, and future facilities; and training subordinate employees in aspects and functions of field operations. Must be capable of operating or learning to operate every tool, piece of machinery, and equipment within the Utility Department and must have a working knowledge of all types of materials, i.e., pipes, valves, and pumps. Must have a High School Diploma, a minimum of five years' experience in the public works field with three years in a supervisory position. Must maintain a valid Class II, or better, Washington State Water Distribution Manager Certificate.

Utility Worker III: Responsible for maintaining a complete knowledge of all aspects of the operation, maintenance, preventive maintenance, policies, procedures, and safety aspects of water system facilities. Must be capable of performing all duties required without direction or supervision and shall have the ability to supervise subordinate staff effectively. Must maintain a valid Washington State Water Distribution Specialist Class II Certificate or better. Minimum experience shall be five years in the public works field with two years in a supervisory role.

Utility Worker II: Responsible for having knowledge of all aspects of the general operations, maintenance, and preventive maintenance, policies, and procedures with safety aspects of the water system facilities. Must be capable of performing duties required with a minimum of supervision or direction. Must maintain a valid Washington State Water Distribution Specialist Class I Certificate, or better. Minimum experience shall be three years in the public works field.

Utility Worker I: Responsible for having general knowledge of water system operations and maintenance activities. Must be capable of assisting with duties under supervision or direction. Must maintain a valid Washington State Water Operator-In-Training Certificate.

6.2 OPERATOR CERTIFICATION

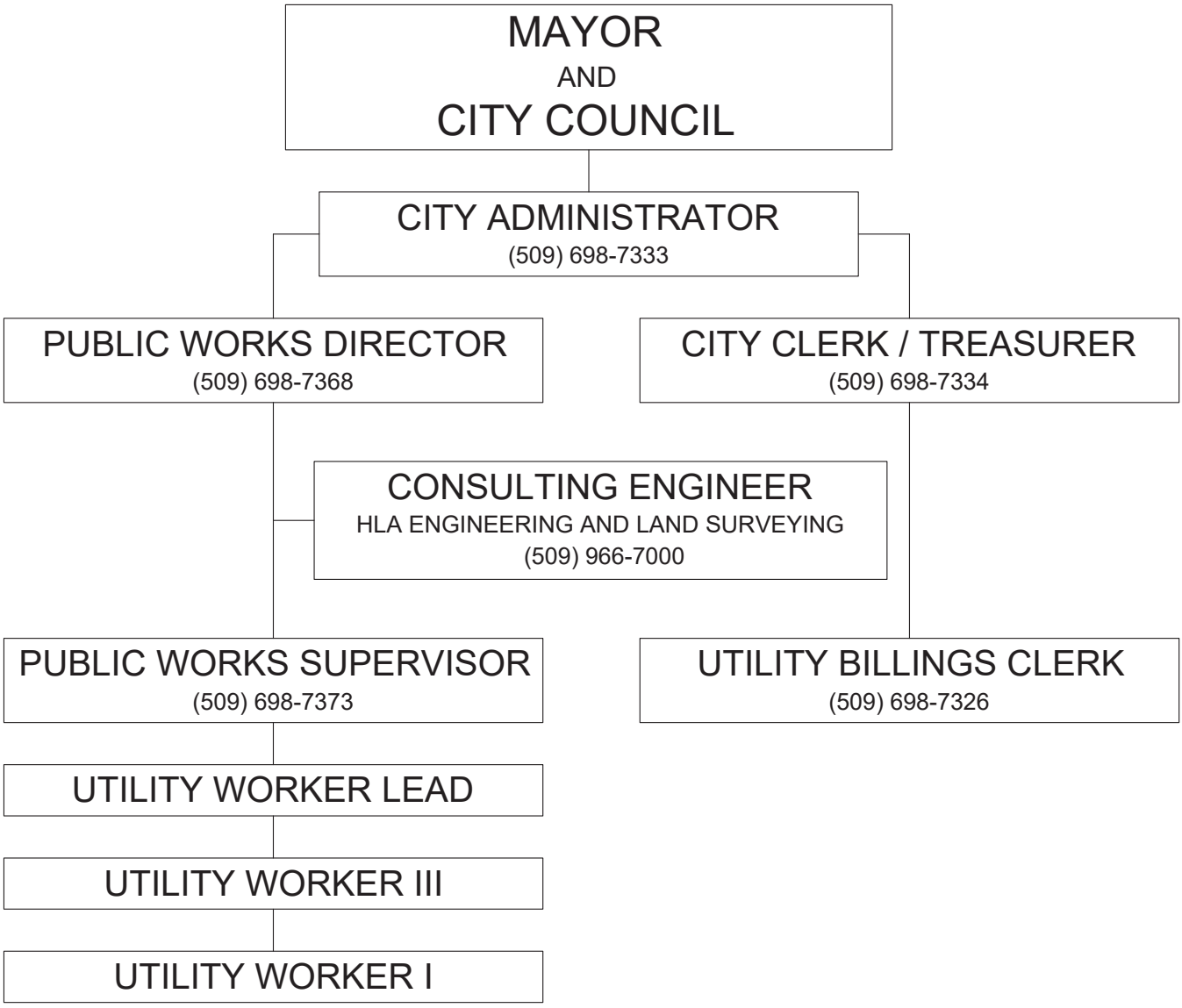
All Group A water systems within the State of Washington are classified according to the population they serve and are required by state regulation to have a certified operator in charge of system operation. Operators are required to be certified at or above the certification level of the distribution system. Selah's water distribution system, which serves 1,501 and 15,000 persons, is considered a Class 2 system and is, therefore, required to have a Class 2 (or greater) Water Distribution Manager (WDM) responsible for system operation. Selah is also required to have a Cross-connection Control Specialist (CCS) responsible for the system's cross-connection control program and is required to have a Backflow Assembly Tester (BAT) responsible for monitoring backflow prevention assemblies.

Included within Figure 6-1 are the water certifications of the various Public Works employees responsible for the operation and maintenance of Selah's water system. Selah currently has one utility employee with Water Distribution Manager certification at the Class 2 level, one utility employee with Cross-Connection Control Specialist certification, and one utility employee with Backflow Assembly Tester certification. Figure 6-1 provides the current certifications of all of Selah's water system employees who work in and have water system responsibilities.

CITY OF SELAH

Water System Plan Update

WATER SYSTEM ORGANIZATIONAL CHART



HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 6-1

6.3 SYSTEM OPERATION AND CONTROL

Section 3.3 System Description and Analysis provides a detailed description of the various water system components and their interrelationship. This interrelationship is depicted in Figure 3-2 and Map A in CHAPTER 10. It is important that water department personnel fully understand the system to evaluate its operation and maintenance requirements.

Routine System Operation and Preventative Maintenance

An outline of routine operational tasks for the various major system components is provided below:

A. Source Wells and Pumps

1. Daily Tasks

   a. Check all well facilities visually.
   b. Maintain oil levels for well pumps.
   c. Check telemetry system.
   d. Check disinfection systems.
   e. Record flow meter totalizer readings.

2. Monthly Tasks

   a. Check and grease well pump packing and pump motor seal bearings.
   b. Check oil level in pump bearing reservoir and fill, if necessary.
   c. Check floor drains and clean, if necessary.
   d. Clean pumphouse floors.

3. Seasonal Tasks

   a. Winterize or de-winterize pumphouse facilities.
   b. Check heating equipment and thermostats.
   c. Monitor and record well levels from ground level to the static water level during low (winter) demand and high (summer) demand periods.

4. Yearly Tasks

   a. Clean disinfection system equipment.
   b. Summarize flow meter totalizer records.

5. As Required Task

   a. Take sample of raw water from each well and submit to the Washington State Department of Health (DOH) Lab for Inorganic Chemical and Physical (IOC) analysis, Volatile Organic Chemical (VOC) analysis, Synthetic Organic Chemical (SOC) analysis, radionuclides, and any other test panels/analytes required by DOH.

B. Booster Pump Stations

1. Daily Tasks

   a. Visually check alarm status at Hospital Hill Booster Pump Station, at the Brader Hill Booster Pump Station, and at the Well No. 6 Booster Pump Station.

2. Weekly Tasks

   a. Check all booster pump stations operations.
   b. Grease all fittings.
   c. Check floor drains and clean, if necessary.
   d. Check oil levels.
   e. Record flow meter totalizer readings.

3. Seasonal Tasks

   a. Winterize or de-winterize pumphouse facilities.
   b. Check heating equipment and thermostats.

C. Reservoirs

1. Daily Tasks

   a. Visually check reservoir level indicator.

2. Quarterly Tasks

   a. Check all reservoir screens.

3. Yearly Tasks

   a. Visually inspect reservoir exteriors.
   b. Inspect reservoir interiors as possible without removing from service.

4. Every Five Years Task

   a. Empty reservoirs individually and inspect interiors. Clean, refill, and chlorinate reservoir before removing the next one from service.

5. As Required Tasks

   a. Inspect and video record reservoir interiors using diver, and vacuum remove accumulated debris.

D. Distribution System

1. Weekly Tasks

   a. Conduct free and total chlorine count tests at random sites within the distribution system. Report test results to Public Works and submit to the DOH at month end.

2. Monthly Tasks

   a. Take required number of water samples from various representative sites within the distribution system and submit them to a certified laboratory for bacteriological analysis in accordance with the *Coliform Monitoring Plan*.

3. Seasonal Tasks

   a. Insulate service meters.

4. Yearly Tasks

   a. Operate all valves through their full range and listen for leaks.
   b. Lubricate hydrant caps and threads. Touch-up paint as required. Operate and flush all fire hydrants near dead end mains or low points in the distribution system.
   c. Inspect all cross-connection control devices.
   d. Take required number of water samples from various representative sites within the distribution system and submit them for disinfection byproducts analysis in accordance with the *Stage 2 DBP Monitoring Plan*.

5. Every Three Years Task

   a. Take a minimum of 30 samples at target locations throughout the distribution system and submit to a state certified laboratory for required lead and copper analysis, as directed by DOH.

6. As Required Tasks

   b. Flush low velocity water mains as required to remove sedimentation.
   c. Review plans for installation of cross-connection control devices on proposed new construction.
   d. Inspect installation of required devices on new construction.
   e. Repair and/or replace service meters.

E. Telemetry System

1. Daily Tasks

   a. Observe telemetry system operation and alarms.

2. Weekly Tasks

   a. Check automatic dialer status.

3. Monthly Tasks

   a. Check total well production and compare to recorded consumption.

4. As Required Tasks

    a. Make any required changes to pump Start / Stop settings.
    b. Replace printer paper.
    c. Replace printer ink cartridge/toner.

6.4 SAFETY PROCEDURES

All City personnel are instructed to exercise the utmost care when working on any water system facility. Safety of City staff and the public is the number one priority. Selah's Public Works Department has developed the following safety programs that apply to City employees working on Selah's water system:

- *Accident Prevention and Safety Program*;
- *Hazard Communication Program*;
- *Confined Space Entry Program*; and
- *Chlorine Safety Plan.*

City employees working in and on the water system are expected to follow the policies and procedures specified within these safety programs. Specific work in and around chlorine and chlorine equipment shall be done in accordance with the procedures specified in the City's *Chlorine Safety Program*, and all work conducted in confined spaces shall be done in accordance with the procedures specified in the City's *Confined Space Entry Safety Program*. Copies of these safety programs are included within CHAPTER 10.

Provided below is an outline of safety procedures to be followed when working on water system facilities:

A. Pumping Equipment

1. Removing Pump

    a. All work conducted within confined spaces shall be done in accordance with the procedures specified in the City's *Confined Space Entry Safety Program*.
    b. Close valves.
    c. Shut off power to the pump, use lockout, tagout policy and procedures.
    d. Ensure power is disconnected and then remove electrical cables.
    e. Lift pump with proper equipment.

2. Installing Pump

    a. All work conducted within confined spaces shall be done in accordance with the procedures specified in the City's *Confined Space Entry Safety Program*.
    b. Lift pump with proper equipment.
    c. Ensure all pipe connections are properly installed and tightened.
    d. Employ an electrician to properly connect power cables.
    e. Check pump rotation.
    f. Open valves.
    g. Ensure pump control valve (if present) is operating properly.
    h. Turn on power to the pump and remove lockout, tagout tag.

B. Chlorination Equipment

1. All work conducted within confined spaces shall be done in accordance with the procedures specified in the City's *Confined Space Entry Safety Program*.
2. Verify leak alarm status before entering the room.
3. Immediately check for chlorine odors.
4. Routinely inspect for leaks.
5. Check ventilation system equipment for proper operation.
6. Properly maintain emergency breathing equipment.

C. Reservoir – Interior Inspection

1. All work conducted within confined spaces shall be done in accordance with the procedures specified in the City's *Confined Space Entry Safety Program*.
2. Inspection to be conducted in accordance with the confined space entry plan.
3. Ensure the reservoir interior is properly ventilated and illuminated.
4. Properly set and secure ladder before climbing into reservoir.

D. Distribution System – Pipeline Installation

1. All construction work requiring excavation, trenching, and shoring shall be conducted in accordance with the Department of Labor and Industries Safety Standards for Construction Work.
2. Close all valves connecting to pipe segment.
3. Properly set traffic control signing, barricades, and cones.
4. Install shoring or cribbing in all trenches over 48 inches in depth.
5. Install joint restraints or construct thrust blocking, if required, and partially backfill the trench at a minimum prior to charging the pipeline.
6. Flush, disinfect pipe, and conduct bacteriological testing prior to putting new line into service.

6.5 SERVICE AND SUPPLY REPRESENTATIVES

Provided below is a list of service and supply representatives for the various system components:

A. Pipe, Valves, and Fittings

1. H.D. Fowler Co.
   1100 River Road
   Yakima, WA 98902
   Phone: (509) 248-8400
   Phone: (509) 952-7751

2. H.D. Supply (Mueller)
   645 Lockheed Street
   Pasco, WA 99301
   Phone: (509) 547-2410

B. Water Service Materials - Romac

1. H.D. Fowler Co.
   1100 River Road
   Yakima, WA 98902
   Phone: (509) 248-8400

C. Service Meters – Badger Meter

1. General Pacific, Inc.
   P.O. Box 70
   22414 NE Townsend Way
   Fairview, OR 97024
   Phone: (503) 907-2900

D. Chlorination Equipment

1. Spokane Instruments
   Route 1, Box 149
   Chatteroy, WA 99003
   Phone: (509) 292-8560
   Contact: Gene Meridith

E. Chlorine Gas

1. Oxarc, Inc.
   1004 E. Mead Ave.
   Yakima, WA 98903
   Phone: (509) 248-0827

F. Water Main Tapping

1. Spear Taps, Inc.
   309 NE 159th Street
   Seattle, WA 98155
   Phone: (206) 363-8053

G. Electrical

1. Primary Electric and Design
   509 N. 18th Avenue
   Yakima, WA 98902
   Phone: (509) 823-4442

H. Pumps

1. PumpTech, Inc.
   209 South Hamilton Road
   Moses Lake, WA 98837
   Phone: (509) 766-6330

2. HN Electric (Electric motors and equipment)
   4224 East B Street
   Pasco, WA 99301
   Phone: 1 (800) 795-3537
   Phone: (509) 547-1691

I. Pressure Reducing Valves

1. GC Systems
   13107 NE 20th, #6
   Bellevue, WA 98005
   Phone: (206) 882-2198

2. Kent NW Sales
   555 116th Avenue NE, Suite 218
   Bellevue, WA 98004
   Phone: (206) 232-3911

J. Telemetry System

1. Conley Engineering, Inc.
   205 North 40th Avenue, Suite 201
   Yakima, WA 98902
   Phone: (509) 965-9872

K. Pump, Motor Oil, and Bearing Grease

1. Wondrack Distributing, Inc.
   North Front & East First
   Yakima, WA 98901
   Phone: (509) 453-3147

2. R.E. Powell Distributing Co.
   311 West I Street
   Yakima, WA 98902
   Phone: (509) 453-3191

L. Bearing Grease

1. AutoZone
   495 North Wenas Road
   Selah, WA 98942
   Phone: (509) 698-4600

6.6 COMPREHENSIVE MONITORING PLAN

The City of Selah monitors its system's water quality in accordance with the requirements of WAC 246-290-300, 246-290-310, and 246-290-320, which define the minimum monitoring requirements, maximum contaminant levels (MCLs) and maximum residual disinfectant levels (MRDLs), and follow-up action requirements for public water systems. The following summarizes the requirements as they pertain to the City of Selah:

6.6.1 Monitoring Requirements, Location, and Frequency

Bacteriological Analysis: Bacteriological analysis is conducted in accordance with the procedures and locations specified in Selah's Coliform Monitoring Plan, a copy of which is provided in CHAPTER 10. The minimum number of bacteriological samples required per month within the distribution system is based upon the population served and is shown in part in Table 6-1 below:

TABLE 6-1 MINIMUM MONTHLY COLIFORM SAMPLING REQUIREMENTS

Permanent Population Served	Minimum Number of Samples per Month
1 - 1,000	1
1,001 - 2,500	2
2,501 - 3,300	3
3,301 - 4,100	4
4,101 - 4,900	5
4,901 - 5,800	6
5,801 - 6,700	7
6,701 - 7,600	8
7,601 - 8,500	9
8,501 - 12,900	10 (Selah's current requirement)

Disinfection Byproducts (DBPs): Samples are to be collected from two locations within the distribution system identified in the City's *Stage 2 DBP Monitoring Plan*. The City is required to begin routine Stage 2 monitoring starting with the year following October 1, 2013. For Stage 2 monitoring, two dual sample sets of TTHM and HAA5 samples are required at each of two locations annually. These locations must have the highest averages of total trihalomethanes (TTHMs) and haloacetic acids (HAA5).

Inorganic Chemical and Physical Analyses: Generally, a minimum of one sample from each source well is required per compliance period because of the IOC waivers. The samples shall be collected from a point representative of the source, after treatment, and prior to entry into the distribution system.

Radionuclides: Radionuclide samples from each source are required once every three years. The samples shall be collected from a point representative of the source, after treatment, and prior to entry into the distribution system.

Volatile Organic Chemicals (VOCs): VOC samples shall be taken at each source once every 3 months for the first 12 months of operation, or as directed by DOH. If no VOCs are detected in the first 12 months from a ground water source, only one annual sample will be required for the first three years of sampling, per 40 CFR 141.24. If no VOCs are detected during the first three years of testing, future monitoring shall be at least once every compliance period. The DOH may grant waivers for monitoring requirements. The samples shall be collected from a point representative of the source, after treatment, and prior to entry into the distribution system.

Synthetic Organic Chemicals (SOCs): SOC samples shall be taken at each source once every 3 months for the first 12 months of operation, or as directed by DOH. If no SOCs are detected in the first 12 months from a ground water source, only one annual sample will be required for the first three years of sampling, per 40 CFR 141.24. If no SOCs are detected during the first three years of testing, future monitoring shall be at least once every compliance period. The DOH may grant waivers for monitoring requirements. The samples shall be collected from a point representative of the source, after treatment, and prior to entry into the distribution system.

Lead and Copper: A minimum of 30 samples at targeted sample tap locations throughout the distribution system are required every three years for lead and copper monitoring.

Other Substances: No other substances are required to be monitored at this time. Monitoring of other substances in the future will be as required by DOH.

6.6.2 Testing Laboratories

Samples which have been collected must be transported and analyzed in accordance with DOH requirements. The analyses must be done by a state public health laboratory or a state certified private laboratory.

The City of Selah routinely delivers bacteriological samples to Cascade Analytical, Inc. on the same day they are taken. Sample bottles are obtained from the laboratory.

Samples for other required tests, e.g., Inorganic Chemical and Physical Analysis, are shipped to Cascade Analytical, Inc., of Union Gap, WA on the same day they are taken. As with the bacteriological samples, sample bottles are obtained from the laboratory.

6.6.3 Violation Procedures

The City of Selah is responsible for complying with the standards of water quality identified in WAC 246-290-310. If any substance exceeds its maximum contaminant level (MCL) and/or maximum residual disinfectant levels (MRDLs), the City shall take follow-up action as outlined under WAC 246-290-320.

Maximum Contaminant Levels (MCLs) and Maximum Residual Disinfectant Levels (MRDLs)

Bacteriological – If any coliform bacteria are present in any sample, follow-up action as described under WAC 246-290-320(2) shall be taken in accordance with the City's Coliform Monitoring Plan and the Groundwater Rule (GWR) requirements.

Disinfection Byproducts (DBPs) and Residuals – MCLs and MRDLs for disinfection byproducts and residuals are as shown in Table 6-2

TABLE 6-2 DISINFECTION BYPRODUCTS AND RESIDUALS

DISINFECTION BYPRODUCT	MCL (mg/l)
Total Trihalomethanes (TTHMs)	0.080
Haloacetic acids (HAA5)	0.060
Bromate	0.010
Chlorite	1.0
DISINFECTION RESIDUAL	**MRDL (mg/l)**
Chlorine	4.0 (as $C1_2$)
Chloramines	4.0 (as $C1_2$)
Chlorine Dioxide	0.8 (as $C1O_2$)

Inorganic Chemical and Physical (IOC) – MCLs for inorganic chemical and physical properties are as shown in Table 6-3 .

TABLE 6-3 INORGANIC CHEMICAL MCLS

Chemical or Physical Characteristics	MCL (mg/l)
Primary Substances	
Antimony (Sb)	0.006
Arsenic (As)	0.010
Asbestos	7 million fibers/liter
Barium (Ba)	2.0
Beryllium (Be)	0.004
Cadmium (Cd)	0.005
Chromium (Cr)	0.1
Copper (Cu)*	1.3
Cyanide (HCN)	0.2
Fluoride (F)	4.0
Lead (Pb)*	0.015
Mercury (Hg)	0.0020
Nickel (Ni)	0.10
Nitrate (as N)	10.0
Nitrite (as N)	1.0
Selenium (Se)	0.05
Sodium (Na)*	20
Thallium (Tl)	0.002
Secondary Substances	
Chloride (Cl)	250.0
Fluoride (F)	2.0
Iron (Fe)	0.3
Manganese (Mn)	0.05
Silver (Ag)	0.1
Sulfate (SO_4)	250.0
Zinc (Zn)	5.0
Color	15 Color Units
Specific Conductivity	700 umhos/cm
Total Dissolved Solids (TDS)	500
* No DOH established MCL. Represents EPA established “action levels” for lead and copper and recommended level for sodium.	

Radionuclides – MCLs for Radionuclides are as shown in Table 6-4 .

TABLE 6-4 RADIONUCLIDE MCLS

RADIONUCLIDE	MCL
Combined Radium-226 and Radium-228	5 pCi/l
Gross alpha particle activity (excluding uranium and radon)	15 pCi/l
Beta particle and photon radioactivity	4 mrem/year
Uranium	30 µg/l

Volatile Organic Chemicals (VOCs) – MCLs for VOCs are as shown in Table 6-5 .

TABLE 6-5 VOLATILE ORGANIC CHEMICAL MCLS

VOLATILE ORGANIC CHEMICAL	MCL (mg/l)
Benzene	0.005
Carbon Tetrachloride	0.005
para-Dichlorobenzene	0.075
Trichloroethylene	0.005
Vinyl Chloride	0.002
1,1,1-Trichloroethane	0.2
1,1-Dichloroethylene	0.007
1,2 Dichloroethane	0.005
cis-1,2-Dichloroethylene	0.07
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
Trans-1,2-Dichloroethylene	0.1
Xylenes	10
1,2-Dichloropropane	0.005
Dichloromethane	0.005
1,1,2-Trichloroethane	0.005
1,2,4-Trichlorobenzene	0.07

Synthetic Organic Chemicals (SOCs) – MCLs for SOCs are as shown in Table 6-6 .

TABLE 6-6 SYNTHETIC ORGANIC CHEMICAL MCLS

SYNTHETIC ORGANIC CHEMICAL	MCL (mg/l)
Alachlor	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
EDB	0
DBCP	0.0002
Heptachlor	0.0004
Heptachlor Epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
Toxaphene	0.0003
PCBs	0.0005
Pentachlorophenol	0.001
2,4-D	0.07
2,4,5-TP	0.05
PAHs (Benzo(a)pyrene)	0.0002
Dalapon	0.2
Di(ethylhexyl)-Adipate	0.4
Di(ethylhexyl)-Phthalate	0.006
Dinoseb	0.007
Diquat	0.1
Endothall	0.1
Endrin	0.002
Glyphosate	0.7
Hexachlorobenzene	0.001
Hexachlorocyclo-Pentadiene	0.05
Oxymal	0.2
Picloram	0.5
Simazine	0.004
2,3,7,8-TCDD (Dioxin)	0

6.6.4 Follow-up Action

1. General:

   a. If water quality exceeds any MCL or MRDL listed in WAC 246-290-310, the purveyor shall notify DOH and take follow-up action as described in this section.
   b. When a primary MCL violation occurs, the purveyor shall:

      i. Notify DOH within 48 hours in accordance with WAC 246-290-480;
      ii. Notify the public according to the procedures outlined under WAC 246-290-71001;
      iii. Determine the cause of the contamination; and
      iv. Take corrective action as required by DOH.

   c. When a secondary MCL violation occurs, the purveyor shall notify DOH and take corrective action as directed by DOH.

2. Bacteriological:

   a. When coliform bacteria are present in any sample and the sample is not invalidated under e. of this subsection, the purveyor shall ensure the following actions are taken:

      i. The sample is analyzed for fecal coliform or E. coli. When a sample with a coliform presence is not analyzed for E. coli or fecal coliforms, the sample shall be considered as having a fecal coliform presence for MCL compliance purposes;
      ii. Repeat samples are collected in accordance with b. of this subsection;
      iii. Collect triggered source samples in accordance with c. of this subsection and have them tested for E. coli.
      iv. DOH is notified in accordance with WAC 246-290-480; and
      v. The cause of the coliform presence is determined and corrected.

   b. Repeat samples: The purveyor shall collect and submit for analysis a set of repeat samples for every sample in which the presence of coliforms is detected in accordance with the following:

      i. A set of three (3) repeat coliform samples is required for Group A systems collecting more than one routine coliform sample each month and shall be collected at the following locations:

         (1) At the site of the previous sample with a coliform presence.
         (2) Within five active services upstream of the site of the sample with a coliform presence.
         (3) Within five active services downstream of the site of the sample with a coliform presence.

      ii. For Group A systems, all samples in a set of repeat samples shall be collected on the same day and submitted for analysis within 24 hours after notification by the laboratory of a coliform presence. If the purveyor can demonstrate to the satisfaction of DOH that logistical problems beyond the purveyor's control make analysis of the samples in the repeat sample set impractical because the time between sample collection and analysis will exceed 30 hours, then the purveyor shall collect the required set of repeat samples as directed by DOH.

      iii. When repeat samples have coliform presence, the purveyor shall:

         (1) Contact DOH and collect a minimum of one additional set of repeat samples as directed by DOH; or
         (2) Collect one additional set of repeat samples for each sample where coliform presence was detected.

iv. If a sample with a coliform presence was collected from the first two or last two active services, the purveyor shall monitor as directed by DOH.

v. The purveyor may change a previously submitted routine sample to a sample in a set of repeat samples when the purveyor:

(1) Collects the sample within five adjacent service connections of the location from which the initial sample with a coliform presence was collected;
(2) Collects the sample after the initial sample with a coliform presence was submitted for analysis;
(3) Collects the sample on the same day as other samples in the set of repeat samples, except under b. ii. of this subsection; and
(4) Requests and receives approval from DOH of the change.

vi. The DOH may waive the requirement to collect sets of repeat samples under this subsection during a month when a non-acute coliform MCL violation is determined for the system.

c. Triggered Source Sampling: In accordance with the Groundwater Rule (GWR) requirements, triggered source samples must be collected and tested for E. coli when coliform bacteria are present in any routine distribution sample. Triggered source sampling shall be conducted as follows:

i. Triggered source samples must be collected within 24 hours of notification of the total coliform positive result.
ii. Each source that was in operation at the time the routine sample was collected must be tested prior to treatment.
iii. If one of the triggered source samples is E. coli positive, corrective action shall be taken as directed by DOH, or five additional source samples must be taken within 24 hours.
iv. If any of the five additional source samples is E. coli positive, one or more of the following corrective actions may need to be taken, as directed by the DOH:

(1) Provide an alternate source of water.
(2) Eliminate the source of contamination.
(3) Provide 4-log treatment.

v. Customers must be notified within 24 hours of receiving an E. coli positive triggered source sample.

d. Monitoring frequency following a coliform presence: Group A systems having one or more coliform presence samples that were not invalidated during the previous month shall collect and submit for analysis the minimum number of routine samples shown in Table 6-1 .

i. The DOH may waive the monitoring frequency requirement when one or more samples with a coliform presence were collected during the previous month, if the purveyor proves to the satisfaction of DOH:

(1) The cause of the sample with a coliform presence; and
(2) The problem is corrected before the end of the next month the system provides water to the public.

ii. If DOH waives this monitoring frequency requirement:

(1) The purveyor shall collect and submit at least the minimum number of samples required when no samples with a coliform presence were collected during the previous month; and
(2) The DOH shall make available a written description explaining:

(a) The specific cause of the coliform presence; and
(b) Action taken by the purveyor to correct the cause of coliform presence.

e. Invalid samples.

i. The DOH shall consider coliform samples with no coliform presence detected invalid when:

(1) A certified laboratory determines that the sample results show:

(a) Multiple tube technique cultures are turbid without appropriate gas production;
(b) Presence-absence technique cultures are turbid in the absence of an acid reaction;
(c) There are confluent growth patterns or growth of TNTC (too numerous to count) colonies without a surface sheen using a membrane filter analytic technique;
(d) There is excess debris in the sample; or
(e) That improper sample collection and analysis occurred.

ii. The DOH may also invalidate a coliform sample when:

(1) The DOH determines a nondistribution system problem occurred as indicated by:

(a) All samples in the set of repeat samples collected at the same location as the original coliform presence sample also have coliform presence; and
(b) All other samples in the set of repeat samples are free of coliform.

(2) The DOH determines a coliform presence result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, when the Department invalidates a sample:

(a) The purveyor shall collect a set of repeat samples following the sample invalidation in accordance with 2.b. above; and
(b) The DOH rationale for invalidating the sample shall be documented in writing and made available to the public. The documentation shall state the specific cause of the coliform presence and what action the purveyor has taken or will take.

iii. When a coliform sample is determined invalid, the purveyor shall collect and submit for analysis:

(1) An additional coliform sample from the same location as each invalid sample within 24 hours of notification of the invalid sample; or
(2) If determined that invalid sample resulted from circumstances not reflective of distribution system water quality, collect a set of samples as outlined in section b. i. of this subsection; and
(3) Additional coliform samples as directed by DOH.

iv. When DOH or laboratory invalidates a sample, the sample shall not count towards the purveyor's minimum coliform monitoring requirements.

3. Inorganic Chemical and Physical (IOC): When an initial analysis of any substance exceeds the MCL, the purveyor shall take the following action:

   a. For nitrate, immediately take one additional sample from the same sampling point. If the average of the two samples exceeds the MCL, a violation is confirmed, or
   b. For all other inorganic chemical and physical substances, within 30 days take three additional samples from the same sample point. If the average of all four samples exceeds the MCL, a violation is confirmed.

4. Inorganic Turbidity: When the turbidity exceeds the maximum allowable limit identified under WAC 246-290-310 for longer than one hour monitored continuously, the purveyor shall report to DOH within 48 hours. When the results of a manual turbidity analysis exceeds maximum allowable limit, another sample shall be collected within one hour. When the repeat sample confirms the maximum allowable limit has been exceeded, the purveyor shall notify DOH.

5. Volatile Organic Chemicals (VOCs): The purveyor shall be responsible for the following follow-up actions:

   a. After the purveyor's receipt of the first VOC analysis results from the laboratory, the purveyor shall provide notice to persons served by the system as described under WAC 246-290-71001.
   b. When a List 1 VOC is verified at a concentration above the detection limit, the purveyor shall, at a minimum:

      i. Sample the source once every three months for at least three years; and
      ii. Make analysis results available to consumers within three months of receipt from the laboratory as described under WAC 246-290-71006.

   c. When a List 1 VOC is verified at a concentration greater than an MCL, and the level will not cause the running annual average to exceed the MCL, the purveyor shall repeat sample the source as soon as possible. If a concentration greater than an MCL is confirmed, the purveyor shall:

      i. Notify DOH within seven days of receipt of the repeat sample analysis results;
      ii. Provide consumer information in accordance with WAC 246-290-71006;
      iii. Submit documentation to DOH describing the water system's strategy for gathering and analyzing additional data, and identify plans for keeping the public informed; and
      iv. Sample the source a minimum of once every three months for at least three years.

   d. When the running annual average of a List 1 VOC is greater than an MCL, or one sample analysis result causes the annual average to exceed an MCL, the purveyor shall:

      i. Notify DOH within seven days of receipt of analysis results;
      ii. Notify the public as described under WAC 246-920-71006, including mandatory health effects language;
      iii. Submit an action plan to DOH for approval addressing follow-up activities, including corrective action. The purveyor shall submit the action plan within four months of receipt of Department notice that the annual average exceeds the MCL. The purveyor's action plan shall, at a minimum, contain:

         (1) Tabulation of VOC sample analysis results, including the location where VOCs were detected;
         (2) Description of monitoring plans for system sources;
         (3) Strategy for informing the public of monitoring results and investigations; and
         (4) Description of short and long-term plans to minimize exposure and/or eliminate the source of contamination.

iv. Implement the action plan within one year of DOH approval. The DOH may require the purveyor's earlier compliance, if necessary, to eliminate an immediate health threat, or may require a revision of the action plan based upon additional sample results. The DOH may extend the purveyor's period of compliance when DOH determines:

(1) Substantial construction is required; and
(2) The purveyor has taken all appropriate measures to protect the health of consumers served by the public water system.

If DOH grants the purveyor an extension, the purveyor shall issue a notice identifying the MCL exceeded and the amount by which the repeat sample analysis results exceeded the MCL. The purveyor shall include the notice in all bills mailed to affected customers until DOH determines that the purveyor complies with the MCL.

v. Sample the source a minimum of once every three months for at least three years.

e. When a List 2 or List 3 VOC is verified at a concentration above the detection limit, the purveyor shall:

i. Submit the sample analysis results to DOH within seven days of receipt from the laboratory; and
ii. Sample the source a minimum of once every three months for one year, and then annually thereafter during the three-month period when the highest previous measurement occurred.

f. If DOH determines a List 2 or List 3 VOC is verified at a level greater than a state advisory level (SAL), DOH shall notify the purveyor in writing. The purveyor shall repeat sample the source as soon as possible after initial Department notice that a SAL has been exceeded. The purveyor shall submit the analysis results to DOH within seven days of receipt from the laboratory. If any repeat sample confirms that a SAL has been exceeded, the purveyor shall:

i. Provide consumer information in accordance with WAC 246-290-71006;
ii. Sample the source a minimum of once every three months for at least three years; and
iii. Submit documentation to DOH listing VOC analysis results, describing the water system's strategy for gathering and analyzing additional data, and identifying plans for keeping the public informed. The purveyor shall submit this information to DOH within six months of the date of the first notice from DOH that an SAL has been exceeded.

g. The DOH may reduce the purveyor's monitoring requirement for a source detecting a List 1 VOC if, after three years of quarterly monitoring, all analysis results are less than the MCL. The purveyor's reduced monitoring frequency shall be no less than one sample per year.
h. The DOH may reduce the purveyor's monitoring requirement for a source detecting a List 2 or List 3 VOC if the source has been monitored annually for at least three years, and all analysis results are less than the SAL.
i. In establishing SAL's for List 2 and List 3 VOCs, DOH shall use the most recent edition of DOH document titled "Procedures and References for Determination of State Advisory Levels for Drinking Water Contaminants" which has been approved by the State Board of Health. Copies are available from DOH upon request.
j. When List 1, List 2 (exclusive of TTHMs), or List 3 VOCs are verified in well fields, the purveyor shall repeat sample individual wells within the well field.

k. When the sum of all trihalomethanes detected exceeds 0.100 mg/L, the purveyor shall sample within three months for total trihalomethanes as required under WAC 246-290-300(5).
l. The DOH may collect samples from a water system or may require that specified quality assurance techniques be used to collect samples.

6. For any additional substance exceeded, follow-up action shall be determined by DOH when the MCL violation occurs.

Public Notification

1. Responsibility: The purveyor of a Group A water system shall notify the water system users and DOH for any of the following conditions:

   a. Exceedances of maximum contaminant levels (MCLs) or maximum residual disinfectant levels (MRDLs);
   b. Violation of treatment techniques;
   c. Monitoring and testing procedure violations;
   d. Failure to comply with the schedule of a variance or exemption;
   e. Operation under a variance or exemption;
   f. Occurrence of a waterborne disease outbreak or other waterborne emergency;
   g. Exceedance of the secondary maximum contaminant level for fluoride; and
   h. Availability of unregulated contaminant monitoring results.

   These conditions are grouped into three categories, and require public notification in English and in Spanish within different time periods as described below:

   a. Tier 1 Conditions require public notification within 24 hours. Such conditions include:

      i. Violation of the MCL for total coliform, when fecal coliform or E. coli are present in the water distribution system, or failure to test for fecal coliform or E. coli when any repeat sample tests positive for coliform;
      ii. An E. coli positive groundwater source sample;
      iii. Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite; or when a confirmation sample is not taken within 24 hours of the system's receipt of the first sample showing exceedance of the nitrate or nitrite MCL;
      iv. Violation of the turbidity MCL of 5 NTU, where the primary agency determines after consultation that a Tier 1 notice is required or where consultation does not occur in 24 hours after the system learns of violation;
      v. Violation of the treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit, where the primary agency determines after consultation that a Tier 1 notice is required or where consultation does not take place in 24 hours after the system learns of violation;
      vi. Occurrence of a waterborne disease outbreak, as defined in 40 CFR 141.2, or other waterborne emergency; and
      vii. Other violations or situations with significant potential to have serious adverse effects on human health because of short-term exposure, as determined by the primary agency, either in its regulations or on a case-by-case basis.

b. Tier 2 conditions require public notification within 30 days. Such conditions include:

   i. All violations of the MCL, MRDL, and treatment technique requirements except where Tier 1 notice is required;
   ii. Violations of the monitoring requirements where the primary agency determines that a Tier 2 public notice is required, taking into account potential health impacts and persistence of the violation; and
   iii. Failure to comply with the terms and conditions of any variance or exemption in place.

c. Tier 3 conditions require public notification within one year. Such conditions include:

   i. Monitoring violations, except where Tier 1 notice is required, or the primary agency determines that the violation requires a Tier 2 notice;
   ii. Failure to comply with an established testing procedure, except where Tier 1 notice is required, or the primary agency determines that the violation requires a Tier 2 notice;
   iii. Operation under variance granted under §1415 or exemption granted under §1416 of the Safe Drinking Water Act;
   iv. Availability of unregulated contaminant monitoring results; and
   v. Exceedance of the secondary maximum contaminant level for fluoride.

2. Content: Notices in English and in Spanish shall provide:

   a. A clear, concise, and simple explanation of the violation;
   b. Discussion of any potential adverse health effects and any segment of the population which may be at higher risk;
   c. Mandatory health effects information in accordance with subsection (4) of this section;
   d. A list of steps the purveyor has taken or is planning to take to remedy the situation;
   e. A list of steps the consumer should take including advice on seeking an alternative water supply if necessary; and
   f. The purveyor's name and phone number.

   The purveyor may provide additional information to further explain the situation.

3. Distribution:

   a. Public notice of a Tier 1 condition shall occur within 24 hours after learning of the condition by placing notices on the front door of every system user. The public notice shall be written in both English and in Spanish.
   b. Public notice of a Tier 2 condition shall occur within 30 days after learning of the condition and shall be provided in both English and in Spanish.
   c. Public notice of a Tier 3 condition shall occur within 1 year after learning of the condition and shall be provided in both English and in Spanish.
   d. The purveyor of a community water system shall give a copy of the most recent public notice for all outstanding violations to all new billing units or new hookups before or at the time water service begins.
   e. The purveyor shall provide DOH with a copy of the public notification at the time the purveyor notifies the public.

4. Mandatory Language:

   a. The purveyor shall provide specific health effects language in English and Spanish in the notice when a violation involves:

      i. A primary VOC MCL;
      ii. A secondary fluoride MCL;
      iii. An acute coliform MCL;
      iv. A non-acute coliform MCL;
      v. Granting or continuation of exemption or variance; or
      vi. Failure to comply with a variance or exemption schedule.

   b. Required specific language is contained in DOH guideline titled "Health Effects Language for Drinking Water Public Notification."

5. VOC Notification Procedure:

   a. Availability of results: After receipt of the first analysis results, the purveyor of a community or NTNC water system shall notify persons served by the system of the availability of results and shall supply the name and telephone number of a contact person.

      i. The purveyor shall initiate notification within three months of the purveyor's receipt of the first VOC analysis results. This notification is only required one time.
      ii. Notification shall occur by:

         (1) Inclusion in the first set of water bills issued after receipt of the results;
         (2) Newspaper notice which shall run at least one day each month for three consecutive months;
         (3) Direct mail;
         (4) Posting if NTNC system; or
         (5) Any other method approved by DOH.

      iii. Within three months of receipt of analysis results, purveyors selling water to other public water systems shall provide copies of the analysis results to the purchasing system.
      iv. Within 30 days of receipt of analysis results, purveyors purchasing water shall make results available to their customers. The purveyor's notification shall occur by the method outlined under (a)(i) of this subsection.

   b. Consumer information:

      i. The purveyor shall provide consumer information within 21 days of receipt of confirmation sample results when:

         (1) A List 1 VOC is confirmed at a concentration greater than an MCL, and the level will not cause the running annual average to exceed the MCL; or
         (2) The DOH determines a List 2 or List 3 VOC is confirmed at a level greater than an SAL.

ii. Consumer information shall include:

(1) Name and level of VOC detected;
(2) Location where the VOC was detected;
(3) Any health effects the VOC could cause at its present concentration;
(4) Plans for follow-up activities; and
(5) Phone number to call for further information.

iii. Consumer information shall be distributed by any of the following methods:

(1) Notice placed in the major newspaper in the affected area;
(2) Direct mail to customers;
(3) Posting if NTNC system; or
(4) Any other method approved by DOH.

6. Fluoride Notification Procedure: When a secondary MCL violation occurs, the purveyor of a community water system shall send notice to:

a. The DOH annually;
b. Water system users annually; and
c. New billing units added while the violation exists.

7. When circumstances dictate the purveyor give a broader or more immediate notice to protect public health, DOH may require the purveyor's notification by whatever means necessary.

8. When the State Board of Health grants a public water system a waiver, the purveyor shall notify customers and new billing units or new hookups before water service begins. The purveyor shall provide a notice annually and send a copy to DOH.

9. The DOH may give notice to the water system users as required by this section on behalf of the water purveyor. However, the purveyor remains responsible for ensuring DOH requirements are met.

6.7 EMERGENCY RESPONSE PROGRAM

Selah's Emergency Response Program is a plan addressing the City's response to and operation of the water system during unplanned emergency events. The Emergency Response Program consists of the following elements:

- System Information
- Chain of Command
- Emergency Events
- Severity of Emergencies
- Emergency Notification
- Water Quality Sampling
- Response Actions for Specific Events
- Alternative Water Sources
- Returning to Normal Operations

6.7.1 System Information

The following is current information pertinent to the Selah Water System:

System Name:	City of Selah Water System
System Identification Number:	774006
System Address:	220 South Rushmore Road Selah, WA 98942
System Phone Number:	(509) 698-7365
City Mayor:	Sherry Raymond
Public Works Director/Water System Manager:	Joe Henne/Ty Jones
System Consulting Engineer:	HLA Engineering and Land Surveying, Inc. (HLA) 2803 River Road Yakima, WA 98902 (509) 966-7000 Justin Bellamy, PE
System Service Population:	7,718 (2020 WFI)
System Service Connections:	2,953 (DOH calculated from 2020 WFI)
Emergency Plan Responsible Party:	Joe Henne (509) 698-7365

6.7.2 Chain of Command

When an emergency occurs, there can be confusion, lack of coordination, and poor communication. Timely and effective response can minimize the effects of an emergency. Often, the initial response sets the tone for how the entire emergency is handled.

Having a chain of command that defines clear lines of authority and responsibilities for system personnel during an emergency speeds up response time and helps eliminate confusion. Water system personnel need to know who to report the emergency to, who manages the emergency, who makes decisions, and what their own responsibilities are.

The first step in any emergency is to notify the person at the top of the chain of command - the person responsible for managing the emergency and making key decisions. This lead person will assess the situation and initiate a series of response actions based on the type and severity of emergency. In addition to an individual having the lead responsibility, other key duties that should be assigned to system personnel include the following:

- Handling incoming phone calls and administrative support.
- Providing information to the public and the media.
- Contacting and providing information to system customers.
- Assessing the water system's facilities, condition, and ability to operate.
- Organizing and completing system repairs.

Table 6-7 shows the Selah Water System's emergency chain of command and responsibilities of individuals during water system emergencies:

TABLE 6-7 EMERGENCY CHAIN-OF-COMMAND AND RESPONSIBILITIES

Name / Title	Responsibilities	Contact Numbers
Mayor	Lead for providing information to the public and the media.	Phone: (509) 698-7332
City Administrator	Coordinates responses and actions of the PWD and of the WSM, and assists the Mayor as requested.	Phone: (509) 698-7333
Public Works Director (PWD)	Overall management and decision-making for the water system. Lead for managing the emergency, providing information to regulatory agencies.	Phone: (509) 698-7365 Cell: (509) 728-3498
Public Works Supervisor Water System Manager (WSM)	Operation of the water system, performing inspections, maintenance, and sampling, relaying critical information, and assessing facilities, and providing recommendations to the PWD.	Phone: (509) 698-7365 Cell: (509) 728-1296
Public Works Assistant	Administrative functions, including receiving phone calls and keeping a log of events.	Phone: (509) 698-7365
Public Works Utility Worker Lead	Perform duties, functions, and activities as directed by the WSM.	Phone: (509) 697-7584 Cell: (509) 961-3268
Public Works Utility Worker III	Perform duties, functions, and activities as directed by the WSM.	Cell: (509) 945-4933
Public Works Utility Worker III	Perform duties, functions, and activities as directed by the WSM.	Phone: (509) 949-0266 Cell: (509) 728-6037

6.8 EMERGENCY EVENTS

Emergencies happen for a variety of reasons including:

- Natural disasters, including high winds, excessive snowfall and ice storms, floods, drought, well contamination, landslides and earthquakes, and volcanic eruptions.
- Accidents.
- Deliberate acts of vandalism or terrorism.
- System neglect, poor operation, or deferred maintenance.

6.9 SEVERITY OF EMERGENCIES

Emergencies usually have a wide range of severity. Defining categories of severity can significantly aid in determining appropriate response actions. Knowing the severity of the emergency and being able to communicate it to others will help system personnel keep their response balanced and effective.

Deciding on severity should be collaborative among system personnel but is ultimately made by the person in charge of the emergency. The person in charge may also choose to coordinate with external parties, especially if partnerships have been formed in advance of the event. The information for making the decision will accumulate over time and may result in the level of severity being changed.

An assessment of severity once determined, must be communicated immediately to all those dealing with the emergency. Make sure staff have cell phones, pagers, and/or radios when they are in the field. Remember to have an alternate method of communicating if cell phones and pagers will not work.

The following is a four-level emergency severity classification system for the Selah Water System.

A. Level 1 - Routine Emergencies

Routine emergencies are normally resolved within 24 hours, and with minimal outside assistance. The Selah Water System considers the following to be Level 1 emergencies:

- Short power outages.
- Minor mechanical problems in pumphouses and booster stations.
- Distribution line breaks.
- Other minor situations where it is not likely that public health will be jeopardized.

B. Level 2 - Minor Emergencies

Minor emergencies are those where the water system experiences minor disruption in supply or has indications of possible contamination. In these types of emergencies, public health may be jeopardized, the system may need to coordinate with DOH, and the City may consider issuing a health advisory to customers. It is important for water system personnel to be on alert and to initiate a quick response. Minor emergencies can usually be resolved within 72 hours. The Selah Water System considers the following to be Level 2 emergencies:

- Disruption of supply such as a transmission line break, pump failure with a potential for backflow, and loss of pressure.
- Storage is not adequate to handle disruption in supply.
- An initial positive coliform or E. coli sample test result.
- An initial primary chemical sample test result above the DOH standard.
- A disruption in chlorine feed to the water supply.
- A minor act of vandalism.

C. Level 3 - Significant Emergencies

The system experiences a significant mechanical or contamination problem where disruption in supply is inevitable, and issuance of a health advisory is necessary to protect public health. Significant emergencies should be reported to DOH as soon as possible to determine the best available means to protect the health of the system users. Resolution of the emergency may require the aid and assistance of outside entities and may take longer than 72 hours to resolve. The Selah Water System considers the following to be Level 3 emergencies:

- A verified sample test result above a DOH standard requiring immediate consideration of a health advisory notice to customers.
- A loss or failure of a major water system component resulting in a water shortage or requiring system shutdown.
- An act of vandalism or terrorist threat such as intrusion or damage to a major water system component.

D. Level 4 - Catastrophic Disasters/Major Emergencies

The water system experiences major damage or contamination from a natural disaster, an accident, or an act of terrorism. Such incidents usually require immediate notification of local law enforcement and local emergency management services. Immediate issuance of health advisories and declaration of water supply emergencies are critical to protect public health. These events often take several days or weeks to resolve before the system returns to normal operation. The Selah Water System considers the following to be Level 4 emergencies:

- An earthquake or landslide that shuts down the system or impacts sources, lines, etc.
- An act of terrorism possibly contaminating the water system with biological or chemical agents.
- A significant chemical spill near one of the system's sources.
- A storm that significantly damages system facilities.

6.10 EMERGENCY NOTIFICATION

During most emergencies, it will be necessary to quickly notify a variety of parties. Preparation for such notification has the following three essential components:

- Assigning responsibility to oversee and carry out the notifications.
- Assembling comprehensive call-up lists with names and contact numbers.
- Writing out procedures for quickly disseminating information to appropriate parties.

Valuable response time can be lost without readily available notification information or the means to deliver it. Having well-formed partnerships will help during these times.

In addition to phone, email, and media (radio, television, newspaper) for notification, the water system may consider forming partnerships with local community groups to assist in delivering information to customers when needed.

Call-up lists should be comprehensive, including local law enforcement, Yakima County Emergency Management, Yakima County Health District, DOH Drinking Water, WDOE, county and neighboring city officials, service and repair providers, and water testing laboratories. A list of priority customers, such as nursing homes, medical clinics, and schools should also be maintained for immediate notification. Provided in Table 6-8, Table 6-9, Table 6-10, and Table 6-11 are notification lists to be used during emergency situations.

TABLE 6-8 LOCAL NOTIFICATION LIST	
Entity	Contact Numbers
Selah Public Works (Water) Department	daytime phone: (509) 698-7365 24-hour phone: (509) 698-7365
Selah Police Department	daytime phone: (509) 698-7347 24-hour phone: 911
Yakima County Sheriff's Office	daytime phone: (509) 574-2500 24-hour phone: (509) 574-2500
Yakima County Office of Emergency Management	daytime phone: (509) 574-1900 24-hour phone: (509) 574-2500
Yakima Health District	daytime phone: (509) 575-4040 24-hour phone: (509) 575-4040
Yakima County Public Works Department	daytime phone: (509) 574-2300 24-hour phone: (509) 574-2300
City of Yakima Water Department	daytime phone: (509) 575-6154 24-hour phone: (509) 575-6154
Water Testing Laboratory: Cascade Analytical, Inc.	daytime phone: (509) 452-7707
Newspaper: Yakima Herald Republic	daytime phone: (509) 248-1251
Radio Stations: KIT - 1280 AM	daytime phone: (509) 972-5481
Television Stations: KAPP KNDO KIMA	daytime phone: (509) 453-0351 daytime phone: (509) 225-2300 daytime phone: (509) 575-0029

TABLE 6-9 STATE NOTIFICATION LIST	
Entity	Contact Numbers
Department of Health (DOH), Eastern Region	daytime phone: (509) 329-2100 24-hour phone: 1 (877) 481-4901
Washington Department of Ecology (WDOE)	daytime phone: (509) 575-2490 24-hour phone: (509) 575-2490
DOH Drinking Water After-Hours Emergency Hotline	1 (877) 481-4901

TABLE 6-10 SERVICE / REPAIR NOTIFICATION LIST	
Entity	Contact Numbers
Electrical: Primary Electric and Design	 daytime phone: (509) 823-4442
Pumps: PumpTech, Inc. HN Electric	 daytime phone: (509) 766-6330 daytime phone: (800) 795-3537 (509) 547-1691
Telemetry System: Technical Systems, Inc. (service) Crown Control (supplies)	 daytime phone: (206) 775-5696 daytime phone: (206) 775-7309
Water System Materials: H.D. Fowler Co. Pacific Waterworks Western Utilities	 daytime phone: (509) 952-7751 daytime phone: (800) 422-0057 daytime phone: (509) 535-1396
Chlorination System: Spokane Instruments	 daytime phone: (509) 292-8560

TABLE 6-11 SENSITIVE USERS NOTIFICATION LIST	
Entity	Contact Numbers
Schools: Selah School District Yakima Valley School	 daytime phone: (509) 697-0706 voice mail: (509) 697-0700 daytime phone: (509) 697-1245
Medical / Dental Facilities: Selah Family Medicine Selah Medical Center Selah Clinic Selah Family Dentistry Terry Savage, DDS Jennifer King, DDS Richard Washut, DDS Selah Physical Therapy	 daytime phone: (509) 697-5511 daytime phone: (509) 697-8008 daytime phone: (509) 697-4827 daytime phone: (509) 697-4744 daytime phone: (509) 697-7206 daytime phone: (509) 697-4821 daytime phone: (509) 697-4666 daytime phone: (509) 607-9109
Nursing Homes: Riverview Manor Selah Convalescent	 daytime phone: (509) 697-3333 daytime phone: (509) 697-8503
Red Cross:	daytime phone: (509) 457-1690

Notification procedures describe who is responsible for conducting notifications, who assists in the notifications, how to make notifications to specific parties, and what methods are used to complete the notifications. Notification procedures include how to issue a health advisory in the event the water supply is unsafe for drinking or use.

Other procedures include:

- Notifying water system personnel who are on-call and/or off-duty.
- Notifying customers, priority customers, and industrial users.
- Alerting local law enforcement, local emergency management, local health officials, drinking water officials, and water testing laboratories when appropriate.
- Contacting service and repair contractors.
- Contacting neighboring water systems for assistance, if necessary.
- Arranging for alternative water supplies.

Table 6-12, Table 6-13, Table 6-14, Table 6-15, and Table 6-16 provide notification procedures for the Selah Water System.

TABLE 6-12 CUSTOMER NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director (PWD) should consult with the Mayor, the City Administrator, and the Water System Manager (WSM) as part of the decision-making process, whether to notify customers regarding a potential water shortage, water contamination, or other situation that results in water use restrictions. Once the decision is made to notify customers, procedures for notification should be initiated.
Procedures:	The PWD confers with the WSM to verify problems. The Mayor, the City Administrator, and the PWD develop the message to be delivered to the customers and to the media. PWD consults with DOH regarding the problem and response alternatives. WSM continues to investigate problem and make repairs/take action, as necessary. Notice to customers will be distributed by: a. Water System staff placing water notices on customers' doors and on signs posted on travel routes throughout the City. b. PWD contacts media requesting issuance of notice and information on the problem. c. Administrative support person will provide a pre-scripted message to phone callers and log in each phone call. WSM continuously updates the Mayor, the City Administrator, and the PWD on the current condition of the problem. Once the problem is resolved: a. Water System staff re-notify customers through signs on doors. b. PWD notifies media regarding problem resolution.

TABLE 6-13 LAW ENFORCEMENT, EMERGENCY MANAGEMENT, COUNTY HEALTH, DOH, AND WDOE NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director (PWD) is responsible for notifying law enforcement, emergency management, county health, DOH, and WDOE.
Procedures:	PWD consults with the Mayor and the City Administrator regarding when to notify law enforcement, emergency management, county health, DOH, and WDOE. PWD consults with DOH regarding the problem and response alternatives. PWD informs law enforcement, emergency management, county health, and WDOE, and requests assistance as appropriate.

TABLE 6-14 SERVICE AND REPAIR CONTRACTOR NOTIFICATION PROCEDURES	
Responsibility:	The Water System Manager (WSM) is responsible for contacting service and repair contractors.
Procedures:	WSM determines what repairs and/or services are needed to return the water system to normal operation. WSM contacts service and repair contractors and monitors the progress of the work. WSM informs the PWD of the progress of repairs and time estimate for returning the system to normal operation.

TABLE 6-15 NEIGHBORING WATER SYSTEM NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director (PWD) is responsible for contacting neighboring water systems.
Procedures:	PWD consults with the Mayor and with the City Administrator regarding when a neighboring water system will be contacted, and what assistance will be requested. PWD contacts neighboring water system and requests appropriate assistance.

TABLE 6-16 HEALTH ADVISORY ISSUANCE NOTIFICATION PROCEDURES	
Responsibility:	The Public Works Director (PWD) is responsible for issuing a health advisory.
Procedures:	PWD consults with DOH regarding problem and response procedures.

6.11 WATER QUALITY SAMPLING

Many types of emergencies can jeopardize the quality of water and potentially sicken those using the water. Because the most important goal for any water system is to protect human health, the system must know how to act quickly and make decisions on whether to issue a health advisory.

Contamination of drinking water, whether intentional or unintentional, comes in many forms, and are classified in the following four general categories:

- Bacteriological organisms.
- Inorganic substances such as metals or cyanide.
- Organic substances such as pesticides or volatile compounds.
- Radionuclides.

The Selah Water System monitors its system's water quality in accordance with DOH requirements. Selah's regular water testing program was described earlier in this chapter.

If there is reason to believe that the water has been contaminated, the Public Works Director should consult with DOH and consider issuing a health advisory as soon as possible - often before conducting water quality sampling.

If Selah determines that water quality sampling and testing should be conducted, the City should immediately contact the laboratory that will be performing the analysis to obtain appropriate sampling bottles, and sampling and chain-of-custody procedures. Selah typically uses Cascade Analytical for its water quality analysis.

Cascade Analytical, Inc.
1008 West Ahtanum Road
Union Gap, WA 98903
Phone: 452-7707

Bacteriological testing should be conducted in accordance with the City's current Coliform Monitoring Plan. A copy of that document is included in CHAPTER 10.

6.12 RESPONSE ACTIONS FOR SPECIFIC EVENTS

For any emergency, there is a series of general steps that a water system should take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate action to save lives.
3. Take action to reduce injuries and system damage.
4. Prioritize and accomplish system repairs.
5. Return the system to normal operation.

Table 6-17, Table 6-18, Table 6-19, Table 6-20, Table 6-21, Table 6-22, Table 6-23, and Table 6-24 identify the assessment, response actions, notifications, and follow-up actions required for various emergency situations.

TABLE 6-17 RESPONSE ACTIONS FOR POWER OUTAGES

Assessment	The Selah Water System experiences an average of 2 outages per year that last 20 minutes to several hours. Of the system's sources, only Well No. 7 is equipped with an emergency electrical generator. Of the system's booster pump stations, only the Well No. 6 Booster Pump Station can operate with a City-owned electrical generator. Historically, power outages have been of short duration such that reservoir storage has been able to supply the City with water until power is restored.
Immediate Actions	1. Assess whether the outage is likely to last more than 2 hours. If not, be on alert for changing conditions and monitor reservoir levels. If yes, complete the following: a. Ensure the standby generator at Well No. 7 is running. b. Operate the Well No. 6 Booster Pump Station using a City-owned portable generator. c. Implement water shortage response actions to inform customers to reduce water usage until power is restored.
Notifications	1. Pacific Power (power company) - Let them know that a public water system is experiencing an outage. 2. Implement water shortage response actions to inform customers to reduce water usage until power is restored.
Follow-Up Actions	1. Turn off and disconnect standby generator at Well No. 7 and the portable generator at the Well No. 6 Booster Pump Station. 2. Return system to general power supply. 3. Inspect reservoirs and pumping facilities to ensure proper operation and to assess any damages.

TABLE 6-18 RESPONSE ACTIONS FOR WATER MAIN BREAK	
Assessment	Visually determine the physical nature of the problem.
Immediate Actions	Visually assess the problem. Return to the area if the water needs to be turned off to allow repairs.
Notifications	Notify customers prior to shutting off water.
Follow-Up Actions	Check with all customers to ensure water has been returned to normal service. Take water samples for bacteriological testing.

TABLE 6-19 RESPONSE ACTIONS FOR MICROBIAL CONTAMINATION	
Assessment	Collect repeat samples to confirm contamination. If confirmed, determine cause or source, and locations of the contamination.
Immediate Actions	Inform the Public Works Director, who will review the assessment with appropriate personnel. Immediately take corrective actions.
Notifications	Contact DOH to discuss public notification, follow-up requirements, and additional steps to resolve the problem. Acute maximum containment levels (MCL) violations require public notification within 24 hours, and a boil water order will almost always be issued.
Follow-Up Actions	If contamination was accidental due to construction or a repair procedure, then those procedures need to be reviewed. If the cause was intentional, then new, or existing safeguards need to be implemented or reviewed.

TABLE 6-20 RESPONSE ACTIONS FOR CHEMICAL CONTAMINATION	
Assessment	Collect repeat samples to confirm contamination. If confirmed, determine the cause or source and location(s) of the contamination.
Immediate Actions	Inform the Public Works Director, who will review the assessment with the appropriate personnel. Immediately take corrective action.
Notifications	Contact DOH to discuss public notification, follow-up requirements, and steps to resolve the problem. Maximum containment levels (MCL) violations require public notification within 24 hours.
Follow-Up Actions	Follow-up actions for chemical contamination monitoring and sampling frequency will be conducted under the procedures listed in WAC 246-290-320 and the Code of Federal Regulation 141.24. If contamination was accidental due to construction or a repair procedure, then those procedures need to be reviewed. If the cause was intentional, then new, or existing safeguards need to be implemented or reviewed.

TABLE 6-21 RESPONSE ACTIONS FOR EARTHQUAKE	
Assessment	Visually determine the nature and extent of damage to the water system.
Immediate Actions	Inform the Mayor, City Administrator, Public Works Director, and Water System Manager of the nature and extent of damage/disruption to the water system.
Notifications	Notify affected customers.
Follow-Up Actions	Provide customers with estimated length of service disruption.

TABLE 6-22 RESPONSE ACTIONS FOR HAZARDOUS MATERIAL SPILL	
Assessment	Assess the nature and extent of the spill.
Immediate Actions	Contact local agencies including DOH, WDOE, Selah Police, Yakima County Sheriff, and Yakima County Office of Emergency Management.
Notifications	Notify affected customers.
Follow-Up Actions	Provide customers with estimated length of service disruption.

TABLE 6-23 RESPONSE ACTIONS FOR ELECTRONIC EQUIPMENT FAILURE	
Assessment	Assess the nature and extent of the failure.
Immediate Actions	Contact certified electrician.
Notifications	Notify all affected customers.
Follow-Up Actions	Provide customers with estimated length of service disruption.

TABLE 6-24 RESPONSE ACTIONS FOR VANDALISM OR TERRORIST ATTACK	
Assessment	Assess the nature and extent of the situation/condition.
Immediate Actions	Contact Selah Police Department.
Notifications	Notify all affected customers.
Follow-Up Actions	Repair all known problems.

6.13 ALTERNATIVE WATER SOURCES

Water contamination or disruption of supply may require the water system obtain water from another source to meet basic community needs, and water systems should plan ahead to provide safe water during an emergency. It is important to evaluate potential alternative water supplies ahead of time to ensure the water is safe and the supply is available.

Table 6-25 provides information regarding alternative water sources.

TABLE 6-25 ALTERNATIVE WATER SOURCES

Alternative Source	Name	Phone	Availability	Safe for Drinking?
City of Yakima in conjunction with tanker trucks	City of Yakima Dave Brown	(509) 575-6204	yes	yes
Bottled Water	Central Vending	(509) 248-1212	yes	yes
	Crystal Springs Water Co.	(509) 225-7822	yes	yes
	Culligan Water Conditioning	(509) 452-6601	yes	yes
	Independent Water Service	(509) 457-3631	yes	yes

6.14 RETURNING TO NORMAL OPERATIONS

As the emergency passes, the system must prepare to return to normal operation. This may be a very simple or very complex process, depending on the type and severity of the emergency. Returning to normal operation may simply mean the system restores power and the portable generator is disconnected, or it could mean the system has to be repeatedly disinfected to obtain the proper number of satisfactory coliform tests necessary to lift a health advisory.

Many factors may need to be considered before a water system is returned to normal operation. Examples include:

- Has the system been repaired to the point that it can meet demand?
- Has the system manager made a safety and operational inspection of all system components?
- Has the system been properly flushed, disinfected, and pressure tested?
- Has the water been adequately tested in accordance with sampling regulations?
- Does the water meet drinking water standards?
- Is there adequate staff to operate and manage the system?
- Do federal, state, and local agencies support returning the system to normal operation?
- Have the proper public messages and notifications been provided?

Table 6-26 presents a guide of actions and activities for returning the system to normal operation.

TABLE 6-26 ACTIONS FOR RETURNING THE SYSTEM TO NORMAL OPERATION

Action / Activity	Description
Inspect, flush, and disinfect the system	Water System Manager (WSM) and support staff inspect all system facilities and verify the system has been flushed and disinfected and that all water quality tests have been done.
Verification of water quality	WSM and Public Works Director (PWD) verify water quality sampling results.
Coordinate with DOH	PWD coordinates with DOH regarding system condition and water quality results.
Notify customers	PWD meets with WSM to write and distribute notice to customers.

6.15 CROSS-CONNECTION CONTROL PROGRAM

In 1998, Selah developed a cross-connection control program intended to protect the City's water distribution system from the possibility of contamination due to existing or potential cross-connections. Selah's cross-connection program includes the following elements:

1. Adoption of a written ordinance authorizing the establishment and implementation of a cross-connection control program (City Ordinance No. 1137, enacted 1994, now exists as Chapter 9.02.046 – Cross-Connection Control, within the City of Selah Municipal Code);
2. Written procedures for implementing the cross-connection control program;
3. Identification of a staff position delegated for organization and implementation of the cross-connection control program, and the qualifications required of personnel working in the cross-connection control program;
4. Detailed procedures for conducting surveys of new and existing facilities to identify all existing and potential cross-connections;
5. A list of approved backflow assemblies;
6. A procedure to ensure all required backflow assemblies are tested upon installation, after a repair or relocation, and on a routine basis as established by State regulation;
7. A record system which includes a list identifying the location of all required cross-connection control devices, the type of device, the testing schedule, the performance results, a description of repairs and/or repair recommendations, and the tester's name and certification number; and
8. A description of the process which will provide cross-connection control information to existing and future users.

A copy of Selah's *Cross-Connection and Backflow Policy and Procedures* is included within CHAPTER 10.
A copy of Selah's *2012 Cross Connection Summary Report* is included within CHAPTER 10.

6.16 CUSTOMER COMPLAINT RESPONSE PROGRAM

The City of Selah maintains a Water System Customer Complaint Response Program. The program is designed to formally receive, track, and record complaints received regarding the City's water system. Water system complaints typically include taste, cloudy and/or discolored, odor, low or excessive pressure, and leaky or broken service connections or water mains. 66 complaints have been received by the City during the reporting period between 2007 and 2012, as shown in Table 6-27 .

TABLE 6-27 SELAH WATER SYSTEM COMPLAINTS 2007-2012

Year	Taste	Cloudy and/or Discolored	Odor	Low/High Pressure	Leaky/Broken Service Connections	Other
2007	0	3	1	5	2	1
2008	1	1	0	1	0	0
2009	1	1	0	1	0	0
2010	0	1	0	8	2	0
2011	0	4	0	5	1	2
2012	1	6	6	6	5	1
TOTALS	3	16	7	26	10	4

Complaints received by the City are routed to the Public Works Department, where the information is recorded onto a Water System Complaint Response Form. The complaint information and form are routed to the Public Works staff for investigation and to resolve the problem. Actions taken to resolve the problem are recorded on the form and kept on file by the Public Works Department. A copy of the Water System Complaint Response Form is included in CHAPTER 10.

6.17 RECORD KEEPING AND REPORTING

The City of Selah keeps and maintains records on its water system as shown in Table 6-28 .

TABLE 6-28 SELAH WATER SYSTEM RECORDS

Record Type	Location of Records	Retained For:
Water Consumption (by user category)	City Hall	5 Years
Water Production (by well)	City Hall	10 Years
Well Water Level Measurements	City Hall	5 Years
Water Quality Testing Results	City Hall	5 Years*
Equipment Maintenance	City Hall	5 Years
Water System Complaints	City Hall	5 Years
Backflow Assembly Testing	City Hall	5 Years
* Does not include chemical analysis results, which shall be kept if the system is in operation.		

Water quality monitoring results are reported to the DOH as required.

6.18 O&M IMPROVEMENTS

Improvements required for operation of the existing water system, including routine sanitary surveys by the DOH, planning document updates, and other miscellaneous operational improvements are discussed in CHAPTER 8. System operational costs associated with water quality testing and administrative tasks are included in the City's general water operational budget and have not been identified or estimated separately.

Recommended improvements necessary for maintenance of the existing system, such as meter replacement and calibration, hydrant replacement, well rehabilitation, reservoir cleaning and inspection, and other miscellaneous maintenance related improvements, are also discussed in detail in CHAPTER 8. CHAPTER 8 also includes a schedule for completion of both routine and individual O&M improvements, including their estimated costs.

CHAPTER 7 -

DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

HLA
Engineering and Land Surveying, Inc.

7.1 PROJECT REVIEW PROCEDURES

The City of Selah requires that all water system improvements proposed by others (e.g., developers, industries, etc.) be designed and appropriate construction documents prepared by a professional engineer licensed to practice in the State of Washington. The City may require a project report prior to design and document preparation if the proposed work includes pumps, reservoirs, and/or other unique characteristics.

Project reports and/or construction plans and specifications for water distribution main improvements shall be submitted to the City for review. Review of said documents is undertaken by the City's Public Works Department, Fire District, and engineering consultant under the provisions of WAC 246-290-125(2). Comments and/or required changes are then forwarded to the proponent. Resubmittal of the revised documents, review, and City approval are required before construction may proceed. Following completion of construction and acceptance by the City, a completed DOH Construction Completion Report form shall be submitted to the City.

In addition to being reviewed and approved by the City Public Works Department, City Fire Department, and engineering consultant, project design reports and/or construction plans and documents for all projects with the exception of distribution-related projects, as defined in WAC 246-290-010, must be submitted to and approved by DOH as specified in WAC 246-290-120 before construction may proceed. Required documents shall be submitted by the proponent to the following address:

Washington State Department of Health
Office of Drinking Water
Eastern Drinking Water Operations
16201 East Indiana Avenue, Suite #1500
Spokane Valley, WA 99216

7.2 POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

Selah will provide water service to properties outside the City Limits, but within its service area in accordance with the service area policies of Chapter 9.15 of the City's Municipal Code. Customers outside the City Limits must execute an outside utility agreement and will be assessed water rates which are higher than those charged to customers within the City Limits. A copy of the City's Municipal Code is provided in CHAPTER 10.

As a prerequisite to obtaining domestic water service, Selah requires property owners to make a sanitary sewer connection, if available, within 200 feet or less of the nearest property corner. If sanitary sewer is not available within 200 feet, the property owner is required to sign a waiver prohibiting the property owner from opposing a future Local Improvement District (LID) for sewer service.

All costs associated with extending water mains to unimproved properties are the responsibility of the developer, including any required inspection fees by the City. Requirements to be met by developers when extending the City's water system are identified in the *Extension by Developers Policy* and the *City of Selah Design and Construction Standards and Specifications for Public Works Improvements*. Copies of these documents are provided in CHAPTER 10. In addition, Selah has established through Ordinance 1450 a *Latecomer's Agreement* for extension of water mains. A copy of this ordinance is provided in CHAPTER 10.

7.3 DESIGN STANDARDS AND CONSTRUCTION STANDARDS

All water system improvements must conform to Selah's most current design and construction standards, *City of Selah Design and Construction Standards and Specifications for Public Works Improvements*. A copy of the design and construction standards is provided in CHAPTER 10.

7.4 CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

Selah confirms that water system extensions are constructed in accordance with City requirements through construction inspection by City Public Works staff and observation of pressure testing of new water lines by the developer. Construction inspection procedures are addressed in the *City of Selah Design and Construction Standards and Specifications for Public Works Improvements* and in the *Extension by Developers Policy* as provided in CHAPTER 10. The City may reject construction for which it has not had ample opportunity for inspection.

CHAPTER 8 -

CAPITAL IMPROVEMENT PROGRAM

HLA
Engineering and Land Surveying, Inc.

8.1 IMPROVEMENT PROGRAM OBJECTIVE

The development of a water system improvement program is a primary goal of this Water System Plan. Through the analysis of existing system demands, capabilities, and deficiencies, and by projecting future system growth, improvements have been identified throughout the Plan.

In previous sections, deficiencies in the existing City of Selah water system have been identified and specific improvements have been recommended. The costs of such improvements often prohibit their completion within a short time period without seriously impacting budgets and user rates. It is prudent, therefore, to group improvements so they might be reasonably accomplished over several years.

Recommended system improvements have been categorized into three main categories: 1) Operational and Maintenance (O&M) Improvements, 2) Major Capital Improvements, and 3) Future Capital Improvements (Planning). The O&M improvements are system operation and maintenance of existing facilities, including meter calibration and replacement, hydrant and valve replacements, well and reservoir rehabilitation, water use efficiency (WUE) measure implementation, and other miscellaneous improvements. Major capital improvements are those necessary to improve a system deficiency such as fire flow, source and/or storage capacity, water quality, or replacement of aging and/or undersized system components. The future planning improvements category includes improvements that would be necessary to accommodate system expansion to serve the future service area because of new development.

Included in each improvement category section, with the exception of the future planning improvements section, is a prioritized listing of the recommended system improvements, together with a brief description of the need, anticipated construction elements, and estimated project costs (based on 2020 construction costs). Actual costs will vary from those shown in the following estimates because of changes in the construction industry, the competitive bid process, availability of materials and equipment, and the timing of the improvements. The estimated improvement costs should be increased by the rate of inflation for each subsequent year after 2020.

8.2 OPERATIONAL AND MAINTENANCE (O&M) IMPROVEMENTS

The following is a prioritized listing of the required and/or recommended O&M improvements, including a brief description of the need for each improvement.

8.2.1 Year 2021 Through Year 2030 Prioritized Improvements

1. SOURCE AND LARGE SERVICE METER CALIBRATION

To ensure the accuracy of well production data and potentially reduce the percentage of DSL, as described in CHAPTER 2, the City will begin routine calibration of source meters. Calibration of the City's source and large service meters will be completed approximately every two (2) years in accordance with industry standards and manufacturer recommendations. The cost of calibrating the City's source meters and large service meters, four inches in diameter and greater, if half of the meters are calibrated each year, will be approximately $3,000 annually.

2. FIRE HYDRANT REPLACEMENTS/INSTALLATIONS

As part of the City's routine maintenance program, fire hydrants that are found to be leaking, damaged and/or of an older style that is less operator-friendly and in need of replacement are repaired and/or replaced. Installation of new hydrants, where hydrant spacing is found to be inadequate, is also necessary to improve fire protection service. The City plans to budget approximately $5,000 annually for in-house repair/replacement of existing fire hydrants and/or installation of new hydrants to improve hydrant spacing.

3. WELLHEAD PROTECTION PLAN UPDATE

The City is a participant in the *Upper Yakima Valley Regional Wellhead Protection Plan*, as discussed in CHAPTER 5. Semi-annual updates of the City's potential contaminant source and notification list within the wellhead protection areas are required. The next update is scheduled for 2021, and the approximate cost is $500 every two (2) years.

4. WELL NO. 6 PROTECTIVE COVENANTS

The City of Selah owns all its well sites, and all but Well No. 6 appear to have a recorded protective covenant establishing a 100-foot radius of sanitary protection, in accordance with DOH requirements, for source wells. The City plans to execute and file a "Declaration of Covenant" for Well No. 6 with the Yakima County Auditor's Office. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Survey of Well Location	LS	–	–	$6,000
Legal Description Preparation	LS	–	–	$10,000
Covenant Preparation and Filing	LS	–	–	$4,000
			TOTAL ESTIMATED COST	**$20,000**

5. LOOKOUT POINT RESERVOIR CLEANING AND INSPECTION

The Lookout Point Reservoir was constructed in 2009. It is recommended the City routinely have its reservoirs cleaned and inspected approximately every five (5) years. The overflow piping leaks when water levels reach the top joint of the overflow cone. The overflow leak should be repaired during the cleaning and inspection. The approximate cost of this required improvement is $20,000.

6. BRADER HILL RESERVOIR CLEANING AND INSPECTION

The Brader Hill Reservoir was last cleaned and inspected in 2009. It is recommended the City routinely have its reservoirs cleaned and inspected approximately every five (5) years. The approximate cost of this required improvement is $5,000.

7. VALHALLA RESERVOIRS CLEANING AND INSPECTION

The Valhalla Reservoirs were constructed in 2009. It is recommended the City routinely have its reservoirs cleaned and inspected approximately every five (5) years. The approximate cost of this required improvement is $10,000.

8. NORTH RESERVOIR CLEANING AND INSPECTION

The larger of the two North Hill Reservoirs was last cleaned and inspected in 2012. It is recommended the City routinely have its reservoirs cleaned and inspected approximately every five (5) years. The approximate cost of this required improvement is $10,000.

9. GOODLANDER RESERVOIR CLEANING AND INSPECTION

The Goodlander Reservoir was last cleaned and inspected in 2017. It is recommended the City routinely have its reservoirs cleaned and inspected approximately every five (5) years. The approximate cost of this required improvement is $10,000.

10. PALM PARK RESERVOIR CLEANING AND INSPECTION

The Palm Park Reservoir was last cleaned and inspected in 2017. It is recommended the City routinely have its reservoirs cleaned and inspected approximately every five (5) years. The approximate cost of this required improvement is $10,000.

11. WELL NO. 6 REHABILITATION

Well No. 6 has not been serviced since the Well No. 6 and Zone 3 Booster Station was placed on-line in 2009 as discussed in CHAPTER 3. The well, pump, and motor need to be inspected, cleaned, and rehabilitated to prevent premature failure and to maintain the current capacity of this source of supply. This improvement will include removal and inspection of the well pump, video inspection of the well, general cleaning and redevelopment of the well casing and screen, repair of pump and motor wear parts, and reinstallation of the well pump and well pump testing. This improvement project does not include more extensive cleaning and well redevelopment work that may be needed depending on conditions observed, such as chemical cleaning, induced resonance/impulse generation treatment, repair of existing well screen and casing, replenishment of filter pack material, replacement of well pump and motor, etc. Provided below are the estimated costs of this improvement.

Item	Unit	Qty.	Unit Cost	Total Cost
Mobilization	LS	–	–	$15,000
Remove and Inspect Well Pump/Motor	LS	–	–	$20,000
Video Inspection	EA	2	$1,000	$2,000
Clean and Bail Existing Well	LS	–	–	$60,000
Repair Existing Well Pump and Motor	LS	–	–	$20,000
Reinstall Well Pump/Motor and Pump Testing	LS	–	–	$20,000

Construction Cost Subtotal	$137,000
Sales Tax (8.3%)	$11,400
Subtotal	$148,400
Contingency (15%)	$22,300
Subtotal	$170,700
Engineering & Administration (15%)	$25,600
Construction Engineering (15%)	$25,600
TOTAL ESTIMATED COST	$221,900

12. WELL NO. 8 REHABILITATION

Well No. 8 has not been serviced since it was placed on-line in 2009 as discussed in CHAPTER 3. The well, pump, and motor need to be inspected, cleaned, and rehabilitated to prevent premature failure and to maintain the current capacity of this source of supply. This improvement will include removal and inspection of the well pump, video inspection of the well, general cleaning and redevelopment of the well casing and screen, repair of pump and motor wear parts, and reinstallation of the well pump and well pump testing. This improvement project does not include more extensive cleaning and well redevelopment work that may be needed depending on conditions observed, such as chemical cleaning, induced resonance/impulse generation treatment, repair of existing well screen and casing, replenishment of filter pack material, replacement of well pump and motor, etc. Provided below are the estimated costs of this improvement.

Item	Unit	Qty.	Unit Cost	Total Cost
Mobilization	LS	–	–	$10,000
Remove and Inspect Well Pump/Motor	LS	–	–	$15,000
Video Inspection	EA	2	$1,000	$2,000
Clean and Bail Existing Well	LS	–	–	$40,000
Repair Existing Well Pump and Motor	LS	–	–	$15,000
Reinstall Well Pump/Motor and Pump Testing	LS	–	–	$15,000

Construction Cost Subtotal	$97,000
Sales Tax (8.3%)	$8,100
Subtotal	$105,100
Contingency (15%)	$15,800
Subtotal	$120,900
Engineering & Administration (15%)	$18,100
Construction Engineering (15%)	$18,100
TOTAL ESTIMATED COST	$157,100

13. WELL NO. 5 REHABILITATION

Well No. 5 was last rehabilitated in 2012 as discussed in CHAPTER 3. The well, pump, and motor need to be inspected, cleaned, and rehabilitated to return the recent loss in well pump capacity. This improvement will include removal and inspection of the well pump, video inspection of the well, general cleaning and redevelopment of the well casing and screen, repair of pump and motor wear parts, and reinstallation of the well pump and well pump testing. This improvement project does not include more extensive cleaning and well redevelopment work that may be needed depending on conditions observed, such as chemical cleaning, induced resonance/impulse generation treatment, repair of existing well screen and casing, replenishment of filter pack material, replacement of well pump and motor, etc. Provided below are the estimated costs of this improvement.

Item	Unit	Qty.	Unit Cost	Total Cost
Mobilization	LS	–	–	$10,000
Remove and Inspect Well Pump/Motor	LS	–	–	$15,000
Video Inspection	EA	2	$1,000	$2,000
Clean and Bail Existing Well	LS	–	–	$30,000
Repair Existing Well Pump and Motor	LS	–	–	$10,000
Reinstall Well Pump/Motor and Pump Testing	LS	–	–	$15,000

Construction Cost Subtotal	$82,000
Sales Tax (8.3%)	$6,800
Subtotal	$88,800
Contingency (15%)	$13,300
Subtotal	$102,100
Engineering & Administration (15%)	$15,300
Construction Engineering (15%)	$15,300
TOTAL ESTIMATED COST	$132,700

14. WELL NOS. 3 AND 4 REHABILITATION

Well Nos. 3 and 4 have not been serviced since 1993 when the wells were placed on-line as discussed in CHAPTER 3. The wells, pumps, and motors need to be inspected, cleaned, and rehabilitated to prevent premature failure and to maintain the current capacity of this source of supply. This improvement will include removal and inspection of the well pumps, video inspection of the wells, general cleaning and redevelopment of the well casings and screens, repair of pumps and motor wear parts, and reinstallation of the well pumps and well pump testing. This improvement project does not include more extensive cleaning and well redevelopment work that may be needed depending on conditions observed, such as chemical cleaning, induced resonance/impulse generation treatment, repair of existing well screen and casing, replenishment of filter pack material, replacement of well pump and motor, etc. Provided below are the estimated costs of this improvement.

Item	Unit	Qty.	Unit Cost	Total Cost
Mobilization	LS	–	–	$15,000
Remove and Inspect Well Pump/Motor	LS	–	–	$20,000
Video Inspection	EA	2	$1,000	$2,000
Clean and Bail Existing Well	LS	–	–	$60,000
Repair Existing Well Pump and Motor	LS	–	–	$20,000
Reinstall Well Pump/Motor and Pump Testing	LS	–	–	$20,000

Construction Cost Subtotal	$137,000
Sales Tax (8.3%)	$11,400
Subtotal	$148,400
Contingency (15%)	$22,300
Subtotal	$170,700
Engineering & Administration (15%)	$25,600
Construction Engineering (15%)	$25,600
TOTAL ESTIMATED COST	$221,900

15. WELL NO. 7 REHABILITATION

Well No. 7 was recently redeveloped, but it is likely the well and new pump and motor will need to be serviced within the next 10-15 years to prevent premature failure and maintain the current capacity of this source of supply. This improvement will include removal and inspection of the well pump, video inspection of the well, general cleaning and redevelopment of the well casing and screen, repair of pump and motor wear parts, and reinstallation of the well pump and well pump testing. This improvement project does not include more extensive cleaning and well redevelopment work that may be needed depending on conditions observed, such as chemical cleaning, induced resonance/impulse generation treatment, repair of existing well screen and casing, replenishment of filter pack material, replacement of well pump and motor, etc. Provided below are the estimated costs of this improvement.

Item	Unit	Qty.	Unit Cost	Total Cost
Mobilization	LS	–	–	$15,000
Remove and Inspect Well Pump/Motor	LS	–	–	$20,000
Video Inspection	EA	2	$1,000	$2,000
Clean and Bail Existing Well	LS	–	–	$60,000
Repair Existing Well Pump and Motor	LS	–	–	$20,000
Reinstall Well Pump/Motor and Pump Testing	LS	–	–	$20,000

Construction Cost Subtotal	$137,000
Sales Tax (8.3%)	$11,400
Subtotal	$148,400
Contingency (15%)	$22,300
Subtotal	$170,700
Engineering & Administration (15%)	$25,600
Construction Engineering (15%)	$25,600
TOTAL ESTIMATED COST	$221,900

16. WELL NO. 7 ASR EVALUATION

As discussed in CHAPTER 3, evaluation of alternatives to supplement the existing Well No. 7 aquifer will be necessary in the future as usage of the well continues to increase. Development of an aquifer storage and recovery (ASR) program to determine the viability and extent of improvements required to stabilize and reverse aquifer level declines is important, so the City can continue withdrawing authorized quantities into the future. The approximate cost of this project is $30,000.

17. DOH SANITARY SURVEY

The DOH conducts sanitary surveys for community water systems approximately every five (5) years. The anticipated date of the next sanitary survey for Selah is 2021. The approximate cost of this required improvement is $5,000, including any minor repairs.

18. WATER SYSTEM PLAN UPDATE

The DOH requires Water System Plans to be reviewed and updated every ten (10) years. The next Water System Plan update is planned for 2031. The approximate cost of this improvement project is $120,000.

8.2.2 Schedule of Recommended O&M Improvements

Provided in Table 8-1 is a 10-year schedule for completion of recommended O&M improvements. Scheduling of improvements beyond the 10-year planning period should be reviewed annually as priorities and City growth patterns change and progress. The estimated improvement costs are provided in Table 8-1, as well as the total projected yearly cost. The estimated costs in Table 8-1 have been inflated for each year after 2020 to reflect possible future costs based upon the projected year the improvement will be completed. Improvements that are projected to take place after year 2030 have been inflated to reflect year 2031 costs although many of these improvements will take place after the year 2031.

TABLE 8-1 SCHEDULE OF RECOMMENDED O&M IMPROVEMENTS

Priority No.	Improvement Description	Estimated Cost in 2020 Dollars	Completion Year											Funding Source
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031 to 2041	
1	Source Meter Calibration	3,000	3,100	3,200	3,300	3,400	3,500	3,600	3,700	3,800	3,900	4,000	4,100	City
2	Fire Hydrant Replacements/Installations	5,000	5,200	5,300	5,500	5,700	5,900	6,100	6,300	6,500	6,700	6,900	7,100	City
3	Wellhead Protection Plan Update	500	500		600		600		700		700		800	City
4	Well No. 6 Protective Covenants	20,000		22,200									N/A	City
5	Lookout Point Reservoir Cleaning and Inspection	20,000	21,600					23,900					27,700	City
6	Brader Hill Reservoir Cleaning and Inspection	10,000	10,300					11,900					13,800	City
7	Valhalla Reservoirs Cleaning and Inspection	10,000		10,600					12,300				13,800	City
8	North Reservoir Cleaning and Inspection	10,000			10,900					12,700			13,800	City
9	Goodlander Reservoir Cleaning and Inspection	10,000				11,300					13,100		13,800	City
10	Palm Park Reservoir Cleaning and Inspection	10,000					11,600					13,500	13,800	City
11	Well No. 6 Rehabilitation	221,900	228,600										307,200	City
12	Well No. 8 Rehabilitation	157,100		166,700									217,500	City
13	Well No. 5 Rehabilitation	132,700				225,100							183,700	City
14	Well Nos. 3 and 4 Rehabilitation	221,900						264,960					307,200	City
15	Well No. 7 Rehabilitation	221,900									289,500		307,200	City
16	Well No. 7 ASR Evaluation	30,000			32,800								N/A	
17	DOH Sanitary Survey	5,000	5,200					6,000					6,900	City
18	Water System Plan Update	120,000										161,300	166,100	City
	TOTAL COSTS	366,800	274,500	208,000	53,100	245,500	21,600	316,460	23,000	23,000	313,900	185,700	1,604,500	
Note: Improvement costs for years following 2020 include 3% inflation per year.														

8.3 MAJOR CAPITAL IMPROVEMENTS

The following listing of recommended major capital improvements has been sub-divided into two categories: 1) year 2021 through year 2030 prioritized improvements and 2) year 2031 through year 2041 prioritized improvements, since not all of the recommended improvements can be completed within the next ten years. The recommended improvements from both categories are identified in Figure 8-1 Recommended Water System Improvements.

8.3.1 Year 2021 through Year 2030 Prioritized Improvements

1. SERVICE METER REPLACEMENT

The City currently has approximately 2,670 service meters ranging in size from 3/4-inch to 4-inch. Most of the City's meters are more than 10 years old and are primarily direct-read style meters. The City would like to upgrade their direct-read meters to a radio read style automatic meter reading (AMR) or advanced meter infrastructure (AMI) system. Replacement of older service meters will improve accuracy and potentially reduce the percentage of DSL. Replacement of the existing meters to radio read will also reduce the time needed for monthly meter readings, allow for readings during the winter months, and provide the ability to potentially use advanced system features such as customer alerts and real time data, further improving water use efficiency. This improvement project will include supply of new meters for installation within existing meter boxes, including meter radio interface units. It is anticipated that the cost to replace existing direct-read meter registers will be equivalent to replacing the entire meter unit. It is also assumed that City forces will be used to replace the existing meters over a three-year period. Provided below are the estimated project costs.

Item	Unit	Qty.	Unit Cost	Total Cost
Bond, Insurance, and Submittals	LS	–	–	$20,000
Meter Data Colleciton Equipment, Software, Onsite Training, Support Services, and Annual Software Service Fees	LS	–	–	$30,000
3/4-Inch Meter and Interface Unit	EA	2,404	$250	$601,000
1-Inch Meter and Interface Unit	EA	193	$300	$57,900
1-1/2-Inch Meter and Interface Unit	EA	16	$700	$11,200
2-Inch Meter and Interface Unit	EA	39	$900	$35,100
3-Inch Meter and Interface Unit	EA	4	$1,200	$4,800
4-Inch Meter and Interface Unit	EA	13	$1,500	$19,500
6-Inch Meter and Interface Unit	EA	2	$2,000	$1,500
			Construction Cost Subtotal	$781,000
			Sales Tax (8.3%)	$64,800
			Subtotal	$845,800
			Contingency (15%)	$126,900
			Subtotal	$972,700
			Engineering & Administration (12%)	$116,700
			TOTAL ESTIMATED COST	**$1,089,400**

CITY OF SELAH

Water System Plan Update

RECOMMENDED WATER SYSTEM IMPROVEMENTS

N
W E
S

0 375 750 1500

LEGEND

- RETAIL SERVICE AREA BOUNDARY (CITY LIMITS)
- FUTURE SERVICE AREA BOUNDARY (URBAN GROWTH AREA)

RECOMMENDED SYSTEM IMPROVEMENTS

Year 2021 Improvements

1. Service Meter Replacement (Not Shown Completed over 3-year Period)

Year 2022 Improvements

2. Lyle Loop Water Main and PRV Station

Year 2024 Improvements

3. Orchard Ave. Water Main Replacement and Upsizing

Year 2025 Improvements

4. W. Naches Ave. Water Main Replacement and Upsizing

Year 2026 Improvements

5. Portable Generator for Well No. 6

Year 2027 Improvements

6. Goodlander Heights Water Main Replacement and Upsizing

Year 2028 Improvements

7. S. Second St. and Yakima Ave. Water Main Replacement and Upsizing

Year 2030 Improvements

8. W. Bartlett Ave. and N. 7th St. Water Main Replacement and Upsizing

Year 2031 Improvements

9. Hillcrest Drive Water Main Replacement
10. Valhalla Reservoir #3 (Private)

Year 2032 - 2041 Improvements

11. Hillcrest Area Water Main Replacement
12. North Reservoir Replacement
13. Tree Top Ross Plant Water Main Upsizing (Private)
14. North Park Center Loop to N. Wenas Rd. (Private)
15. Zone 7 Booster Pump Station (Private)
16. Heritage Hills Dr. to N. 16th St. Water Main (Private)

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 8-1

2. LYLE LOOP WATER MAIN EXTENSION AND PRV STATION

This improvement project will include looping existing water main extensions serving the Lyle Loop area, and installation of a Zone 3 to Zone 2 pressure reducing valve (PRV) station to provide an additional source of supply and increased fire flow capacity to the area. New water main piping with be 8-inch ductile iron. A packaged PRV station will be installed with a 6-inch fire flow valve and 2-inch domestic service valve. This improvement will increase system reliability and fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$15,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	350	$45	$15,750
Shoring or Extra Excavation	LF	520	$1	$520
Select Backfill, as Directed	CY	100	$40	$4,000
D.I. Pipe for Water Main 8 In. Diam.	LF	520	$60	$31,200
Gate Valve 8 In.	EA	2	$1,600	$3,200
Packaged PRV Station, Complete	LS	–	–	$80,000
			Construction Cost Subtotal	$179,670
			Sales Tax (8.3%)	$14,910
			Subtotal	$194,580
			Contingency (15%)	$29,200
			Subtotal	$223,780
			Engineering & Administration (12%)	$26,900
			Construction Engineering (15%)	$33,600
			TOTAL ESTIMATED COST	**$284,280**

3. ORCHARD AVENUE WATER MAIN REPLACEMENT

This improvement project will include replacement of existing aging and deteriorated 4-inch and 6-inch water main piping with new 8-inch ductile iron piping in Orchard Avenue from North 8th Street to 12th Street and North 3rd Street to North Wenas Avenue. This project will improve water quality, reduce distribution system leakage (DSL), increase system reliability, and enhance fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$35,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	1,650	$45	$74,250
Shoring or Extra Excavation	LF	2,470	$1	$2,470
Select Backfill, as Directed	CY	270	$40	$10,800
D.I. Pipe for Water Main 8 In. Diam.	LF	2,470	$60	$148,200
Gate Valve 8 In.	EA	12	$1,600	$19,200
Service Connection	EA	62	$1,600	$99,200
			Construction Cost Subtotal	$419,120
			Sales Tax (8.3%)	$34,790
			Subtotal	$453,910
			Contingency (15%)	$68,100
			Subtotal	$522,010
			Engineering & Administration (12%)	$62,600
			Construction Engineering (15%)	$78,300
			TOTAL ESTIMATED COST	**$662,910**

4. WEST NACHES AVENUE WATER MAIN REPLACEMENT

This improvement project will include replacement of existing aging and deteriorated 6-inch water main piping with new 8-inch ductile iron piping in West Naches Avenue. This project will improve water quality, reduce DSL, increase system reliability, and enhance fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$27,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	1,900	$45	$85,500
Shoring or Extra Excavation	LF	1,300	$1	$1,300
Select Backfill, as Directed	CY	440	$40	$17,600
D.I. Pipe for Water Main 8 In. Diam.	LF	1,300	$60	$78,000
Gate Valve 8 In.	EA	14	$1,600	$22,400
Service Connection	EA	40	$1,600	$64,000
			Construction Cost Subtotal	$325,800
			Sales Tax (8.3%)	$27,040
			Subtotal	$352,840
			Contingency (15%)	$52,900
			Subtotal	$405,740
			Engineering & Administration (12%)	$48,700
			Construction Engineering (15%)	$60,900
			TOTAL ESTIMATED COST	**$515,340**

5. WELL NO. 6 PORTABLE GENERATOR

This improvement project will include purchase and installation of a larger trailer mounted diesel standby engine generator for the Well No. 6 and Zone 3 Booster Pump Station to power both the well pump and booster pumps during an outage. This project will also include modification of the existing generator plug to accept the larger generator. The existing portable generator will be utilized at one of the City's other wells or booster station sites as needed. This project will improve system reliability and redundancy. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$5,000
Mobilization	LS	–	–	$20,000
Well No. 6 Portable Generator, Complete	LS	–	–	$150,000
Electrical and Control System Improvements	LS	–	–	$40,000
			Construction Cost Subtotal	$215,000
			Sales Tax (8.3%)	$17,850
			Subtotal	$232,850
			Contingency (15%)	$34,900
			Subtotal	$267,750
			Engineering & Administration (15%)	$40,200
			Construction Engineering (15%)	$40,200
			TOTAL ESTIMATED COST	**$348,150**

6. GOODLANDER HEIGHTS WATER MAIN REPLACEMENT

This improvement project will include replacement of existing undersized and aging 4-inch water main piping with new 8-inch ductile iron piping throughout the Goodlander Heights area. This project will improve water quality, reduce DSL, increase system reliability, and enhance fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$39,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	2,010	$45	$90,450
Shoring or Extra Excavation	LF	3,400	$1	$3,400
Select Backfill, as Directed	CY	230	$40	$9,200
D.I. Pipe for Water Main 8 In. Diam.	LF	3,400	$60	$204,000
Gate Valve 8 In.	EA	7	$1,600	$11,200
Service Connection	EA	50	$1,600	$80,000
			Construction Cost Subtotal	$467,250
			Sales Tax (8.3%)	$38,780
			Subtotal	$506,030
			Contingency (15%)	$75,900
			Subtotal	$581,930
			Engineering & Administration (12%)	$69,800
			Construction Engineering (15%)	$87,300
			TOTAL ESTIMATED COST	**$739,030**

7. SOUTH SECOND STREET AND YAKIMA AVENUE WATER MAIN REPLACEMENT

This improvement project will include replacement of existing aging and deteriorated 4-inch and 6-inch water main piping with new 8-inch ductile iron piping in South 2nd Street and continuing west along West Yakima Avenue. This project will improve water quality, reduce DSL, increase system reliability, and enhance fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$16,000
Project Temporary Traffic Control	LS	–	–	$15,000
HMA Surface Repair	SY	730	$45	$32,850
Shoring or Extra Excavation	LF	1,100	$1	$1,100
Select Backfill, as Directed	CY	70	$40	$2,800
D.I. Pipe for Water Main 8 In. Diam.	LF	1,100	$60	$66,000
Gate Valve 8 In.	EA	2	$1,600	$3,200
Service Connection	EA	23	$1,600	$36,800
			Construction Cost Subtotal	$183,750
			Sales Tax (8.3%)	$15,250
			Subtotal	$199,000
			Contingency (15%)	$29,900
			Subtotal	$228,900
			Engineering & Administration (12%)	$27,500
			Construction Engineering (15%)	$34,300
			TOTAL ESTIMATED COST	**$290,700**

8. WEST BARTLETT AVENUE AND NORTH SEVENTH STREET WATER MAIN REPLACEMENT

This improvement project will include replacement of existing aging and deteriorated 4-inch and 6-inch water main piping with new 8-inch ductile iron piping in Bartlett Avenue from Ninth Street to Fifth Street and Third Street to North First Street, as well as North Seventh Street from Home Avenue to Fremont Avenue. This project will improve water quality, reduce DSL, increase system reliability, and enhance fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$33,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	1,540	$45	$69,300
Shoring or Extra Excavation	LF	2,650	$1	$2,650
Select Backfill, as Directed	CY	150	$40	$6,000
D.I. Pipe for Water Main 8 In. Diam.	LF	2,650	$60	$159,000
Gate Valve 8 In.	EA	9	$1,600	$14,400
Service Connection	EA	50	$1,600	$80,000
			Construction Cost Subtotal	$394,350
			Sales Tax (8.3%)	$32,730
			Subtotal	$427,080
			Contingency (15%)	$64,100
			Subtotal	$491,180
			Engineering & Administration (12%)	$58,900
			Construction Engineering (15%)	$73,700
			TOTAL ESTIMATED COST	**$623,780**

8.3.2 Year 2031 through Year 2041 Prioritized Improvements

9. HILLCREST DRIVE WATER MAIN REPLACEMENT

This improvement project will include replacement of existing aging and deteriorated 6-inch water main piping with new 8-inch ductile iron piping in Hillcrest Drive from Ridgeview Avenue to Crusher Canyon Road. This project will improve water quality, reduce DSL, increase system reliability, and enhance fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$38,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	2,200	$45	$99,000
Shoring or Extra Excavation	LF	3,250	$1	$3,250
Select Backfill, as Directed	CY	280	$40	$11,200
D.I. Pipe for Water Main 8 In. Diam.	LF	3,250	$60	$195,000
Gate Valve 8 In.	EA	20	$1,600	$32,000
Service Connection	EA	30	$1,600	$48,000
			Construction Cost Subtotal	$456,450
			Sales Tax (8.3%)	$37,890
			Subtotal	$494,340
			Contingency (15%)	$74,200
			Subtotal	$568,540
			Engineering & Administration (12%)	$68,200
			Construction Engineering (15%)	$85,300
			TOTAL ESTIMATED COST	**$722,040**

10. VALHALLA RESERVOIR NO. 3 (PRIVATE)

This improvement project will include construction of a third 158,500-gallon reinforced concrete reservoir to serve the projected number of full build-out ERUs in the North Hill Zone 4, 5, and 6 area (Valhalla). As described in CHAPTER 3, it is anticipated that an additional Valhalla Reservoir will be needed by year 2031 to meet projected future demand, however this improvement will be constructed with private developer funds. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$40,000
Reservoir Excavation	LS	–	–	$10,000
158,500 Gallon Reservoir	LS	–	–	$200,000
Inlet/Outlet Valve Vault & Site Piping	LS	–	–	$35,000
12-Inch Water Main	LF	100	$80	$8,000
12-Inch Butterfly Valve	EA	4	$2,000	$8,000
Site Grading and Drainage	LS	–	–	$10,000
Crushed Surfacing Top Course	TON	200	$22	$4,400
Chain Link Security Fencing	LF	300	$25	$7,500
Chain Like Gate, 30 Foot Wide	EA	1	$2,000	$2,000
Electrical and Control System	LS	–	–	$30,000
			Construction Cost Subtotal	$364,900
			Sales Tax (8.3%)	$30,290
			Subtotal	$395,190
			Contingency (15%)	$59,300
			Subtotal	$454,490
			Engineering & Administration (12%)	$54,500
			Construction Engineering (15%)	$68,200
			TOTAL ESTIMATED COST	**$577,190**

11. HILLCREST AREA WATER MAIN REPLACEMENT

This improvement project will include replacement of existing aging and deteriorated 6-inch water main piping with new 8-inch ductile iron piping in the Hillcrest area between Hillcrest Drive and Crusher Canyon Road, including water main replacements in Anchor Loop, Sherlyn Drive, W. Fifth Avenue, W. Sixth Avenue, W. Seventh Avenue, Riverview Avenue, and Ridgeview Avenue. This project will improve water quality, reduce DSL, increase system reliability, and enhance fire flow capacity in this residential area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$50,000
Project Temporary Traffic Control	LS	–	–	$20,000
HMA Surface Repair	SY	2,900	$45	$130,500
Shoring or Extra Excavation	LF	4,270	$1	$4,270
Select Backfill, as Directed	CY	150	$40	$6,000
D.I. Pipe for Water Main 8 In. Diam.	LF	4,100	$60	$246,000
D.I. Pipe for Water Main 10 In. Diam.	LF	170	$65	$11,050
Gate Valve 8 In.	EA	6	$1,600	$9,600
Service Connection	EA	72	$1,600	$115,200
			Construction Cost Subtotal	$602,620
			Sales Tax (8.3%)	$50,020
			Subtotal	$652,640
			Contingency (15%)	$97,900
			Subtotal	$750,540
			Engineering & Administration (12%)	$90,100
			Construction Engineering (15%)	$112,600
			TOTAL ESTIMATED COST	**$953,240**

12. NORTH RESERVOIR REPLACEMENT

This improvement project will include replacement of existing leaking southern North Reservoir with a new 500,000-gallon reinforced concrete reservoir. This project will improve system storage capacity, reliability, and water quality. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$72,000
Reservoir Excavation	LS	–	–	$10,000
0.5 MG Res. (60' Diam. X 27' High X 24' O.F.)	LS	–	–	$660,000
Inlet/Outlet Valve Vault & Site Piping	LS	–	–	$35,000
12-Inch Water Main	LF	100	$80	$8,000
12-Inch Butterfly Valve	EA	4	$2,000	$8,000
Site Grading and Drainage	LS	–	–	$10,000
Crushed Surfacing Top Course	TON	300	$22	$6,600
Chain Link Security Fencing	LF	600	$25	$15,000
Chain Like Gate, 30 Foot Wide	EA	1	$2,000	$2,000
Electrical and Control System	LS	–	–	$40,000
			Construction Cost Subtotal	$876,600
			Sales Tax (8.3%)	$72,760
			Subtotal	$949,360
			Contingency (15%)	$142,400
			Subtotal	$1,091,760
			Engineering & Administration (12%)	$131,000
			Construction Engineering (15%)	$163,800
			TOTAL ESTIMATED COST	**$1,386,560**

13. TREE TOP ROSS PLANT WATER MAIN UPSIZING (PRIVATE)

This improvement project will replace the existing 4-inch water main pipes with 8-inch ductile iron piping within the Tree Top Ross Plant. The improvement will increase both fire flow capacity and system reliability in this industrial area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$11,000
Project Temporary Traffic Control	LS	–	–	$10,000
HMA Surface Repair	SY	550	$45	$24,750
Shoring or Extra Excavation	LF	830	$1	$830
Select Backfill, as Directed	CY	65	$40	$2,600
D.I. Pipe for Water Main 8 In. Diam.	LF	830	$60	$49,800
Gate Valve 8 In.	EA	3	$1,600	$4,800
Service Connection	EA	5	$1,600	$8,000
Pavement Markings	LS	–	–	$2,500
			Construction Cost Subtotal	$124,280
			Sales Tax (8.3%)	$10,320
			Subtotal	$134,600
			Contingency (15%)	$20,200
			Subtotal	$154,800
			Engineering & Administration (12%)	$18,600
			Construction Engineering (15%)	$23,200
			TOTAL ESTIMATED COST	**$196,600**

14. NORTH PARK CENTER TO N. WENAS RD. (PRIVATE)

This improvement project will include the construction of a new 8-inch water main loop connecting North Park Drive to North Wenas Road. The improvement will increase both fire flow capacity and system reliability in this area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$6,000
Project Temporary Traffic Control	LS	–	–	$5,000
HMA Surface Repair	SY	240	$45	$10,800
Shoring or Extra Excavation	LF	360	$1	$360
Select Backfill, as Directed	CY	90	$40	$3,600
D.I. Pipe for Water Main 8 In. Diam.	LF	360	$60	$21,600
Gate Valve 8 In.	EA	1	$1,600	$1,600
Tapping Sleeve and Valve Assembly 8 In.	EA	1	$1,600	$1,600
Service Connection	EA	4	$1,600	$6,400
			Construction Cost Subtotal	$66,960
			Sales Tax (8.3%)	$5,560
			Subtotal	$72,520
			Contingency (15%)	$10,900
			Subtotal	$83,420
			Engineering & Administration (12%)	$10,000
			Construction Engineering (15%)	$12,500
			TOTAL ESTIMATED COST	**$105,920**

15. ZONE 7 BOOSTER PUMP STATION (PRIVATE)

This improvement project will include construction of a constant pressure booster pump, pump building, and 12-inch transmission main to serve future development in the South Hill Zone 7 area. The improvement will provide water service for future development. This improvement will be constructed with private developer funds. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$40,000
Clearing and Grubbing	LS	–	–	$5,000
Building Excavation and Backfill	LS	–	–	$5,000
Shoring or Extra Excavation	LS	–	–	$1,000
Pump Building	SF	600	$200	$120,000
250 GPM Booster Pump	EA	2	$20,000	$40,000
12-Inch D.I. Water Main	LF	150	$90	$13,500
12-Inch Butterfly Valve	EA	4	$2,000	$8,000
Site Drainage Piping and Appurtenances	LS	–	–	$5,000
HVAC System, Complete	LS	–	–	$30,000
Electrical and Control System, Complete	LS	–	–	$90,000
Engine Generator and Transfer Switch	LS	–	–	$60,000
Landscaping and Irrigation System, Complete	LS	–	–	$12,000
4-Inch Cement Conc. Sidewalk	SY	65	$100	$6,500
Chain Link Security Fencing	EA	800	$25	$20,000
Chain Link Gate, 30 Foot Wide	EA	1	$2,000	$2,000
Protective Bollard	EA	2	$500	$1,000
			Construction Cost Subtotal	$469,000
			Sales Tax (8.3%)	$38,900
			Subtotal	$507,900
			Contingency (15%)	$76,200
			Subtotal	$584,100
			Engineering & Administration (15%)	$87,600
			Construction Engineering (15%)	$87,600
			TOTAL ESTIMATED COST	**$759,300**

16. HERITAGE HILLS DRIVE TO NORTH 16TH STREET (PRIVATE)

This improvement project will include the construction of a new 8-inch water main loop connecting Heritage Hills Drive to North 16th Street. The improvement will increase both fire flow capacity and system reliability in this area. Provided below are the estimated project costs:

Item	Unit	Qty.	Unit Cost	Total Cost
Minor Change	FA	–	–	$10,000
Mobilization	LS	–	–	$11,000
Project Temporary Traffic Control	LS	–	–	$10,000
Gravel Surface Repair	SY	740	$12	$8,880
Shoring or Extra Excavation	LF	1,250	$1	$1,250
D.I. Pipe for Water Main 8 In. Diam.	LF	1,250	$60	$75,000
Gate Valve 8 In.	EA	2	$1,600	$3,200
Service Connection	EA	3	$1,600	$4,800
			Construction Cost Subtotal	$124,130
			Sales Tax (8.3%)	$10,300
			Subtotal	$134,430
			Contingency (15%)	$20,200
			Subtotal	$154,630
			Engineering & Administration (12%)	$18,600
			Construction Engineering (15%)	$23,200
			TOTAL ESTIMATED COST	**$196,430**

8.3.3 Schedule of Recommended Major Capital Improvements

Provided in Table 8-2 is a 10-year schedule for completion of some of the recommended major capital improvements. Scheduling of the remaining improvements beyond this 10-year planning period should be reviewed annually as priorities and City growth patterns change and progress. The estimated improvement costs are provided in Table 8-2, as well as the total projected yearly cost. Estimated costs in Table 8-2 have been inflated for each year after 2020 to reflect the possible future costs based upon the projected year the improvement will be completed. Improvements that are projected to take place after year 2030 have been inflated to reflect year 2031 costs although many of these improvements will take place after the year 2031.

TABLE 8-2 SCHEDULE OF RECOMMENDED MAJOR CAPITOL IMPROVEMENTS

Priority No.	Improvement Description	Estimated Cost in 2020 Dollars	Completion Year										Funding Source
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031 to 2041	
1	Service Meter Replacement	1,089,400	409,800	339,800	339,800									City
2	Lyle Loop Watermain Extension and PRV Station	284,280		301,600										City
3	Orchard Avenue Water Main Replacement	662,910				746,100								City/DWSRF
4	W. Naches Avenue Water Main Replacement	515,340					597,400							City
5	Well No. 6 Portable Generator	348,150						415,700						City
6	Goodlander Heights Water Main Replacement	739,030							908,900					City/DWSRF
7	South Second Street and Yakima Avenue Water Main Replacement	290,700								368,300				City
8	West Bartlett Avenue and North Seventh Street Water Main Replacement	623,780										838,300		City
9	Hillcrest Drive Water Main Replacement	722,040											999,500	City
10	Valhalla Reservoir No. 3	577,190											799,000	Private
11	Hillcrest Area Water Main Replacement	953,240											1,319,500	City
12	North Reservoir Replacement	1,386,560											1,919,300	City/DWSRF
13	Tree Top Ross Plant Water Main Upsizing	196,600											272,200	Private
14	North Park Center Loop to N. Wenas Road	105,920											146,600	Private
15	Zone 7 Booster Pump Station	759,300											1,051,000	Private
16	Heritage Hills Drive to North 16th Street Water Main Loop	196,430											271,900	
	TOTAL COSTS	9,450,870	409,800	641,400	339,800	746,100	597,400	415,700	908,900	368,300	0	1,614,000	6,779,000	
Note: Improvement costs for years following 2020 include 3% inflation per year.														

8.4 FUTURE MAJOR CAPITAL IMPROVEMENTS (PLANNING)

A general plan for future major capital improvements that would be a result of system expansion is shown in Figure 8-2. Recommended major capital improvements discussed in Section 8.3 are also shown in Figure 8-2 for reference. This Plan represents the projected water mains/structures, including estimated sizes, required as development expands beyond what the existing system serves within the City's current and future service area boundaries. Although conditions and circumstances in the City's water system may change the exact location and/or configuration of needed improvements, the general plan shown in Figure 8-2 allows the City to review proposed development with respect to system expansion. Also, as new development is proposed and/or occurs, the City will need to further evaluate the improvements required and review effects the system expansion plans will have on the existing distribution system.

CITY OF SELAH

Water System Plan Update

FUTURE MAJOR IMPROVEMENTS MAP

FUTURE RESERVOIR

FUTURE WELL

ZONE 1

ZONE 2

ZONE 3

ZONE 4 NORTH

ZONE 4 SOUTH

ZONE 5 NORTH

ZONE 5 SOUTH

ZONE 6 NORTH

ZONE 6 SOUTH

ZONE 7

FUTURE BPS

PRV

1200

1300

1390

1460

1480

1560

1650

N

W

E

S

0 550 1100 2200

LEGEND

- RETAIL SERVICE AREA BOUNDARY (CITY LIMITS)
- FUTURE SERVICE AREA BOUNDARY (URBAN GROWTH AREA)
- WATER MAINS
- POSSIBLE FUTURE ZONE 1 IMPROVEMENTS
- POSSIBLE FUTURE ZONE 2 IMPROVEMENTS
- POSSIBLE FUTURE ZONE 3 IMPROVEMENTS
- POSSIBLE FUTURE ZONE 4 IMPROVEMENTS
- POSSIBLE FUTURE ZONE 5 IMPROVEMENTS
- POSSIBLE FUTURE ZONE 6 IMPROVEMENTS
- POSSIBLE FUTURE ZONE 7 IMPROVEMENTS
- FUTURE RESERVOIR
- FUTURE WELL
- FUTURE BOOSTER PUMP STATION
- FUTURE PRV

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

04-27-20
P:\Projects\2019\19061\WSP-Figures.dwg

FIGURE 8-2

CHAPTER 9 -

FINANCIAL PROGRAM

HLA
Engineering and Land Surveying, Inc.

9.1 PAST AND PRESENT FINANCIAL STATUS

Development of a comprehensive financial program requires an understanding of the water system's current financial status and past budgetary trends. Presented below in Table 9-1 are the City's Water Operating Fund (Fund 411) beginning and ending balance histories for the six-year period, 2014 through 2019. Provided below in Table 9-2 are the Water Reserve Fund (Fund 461) balances for the same six-year period. The Water Reserve Fund is split into three fund balances; General, Reservoir Replacement, and Auto Meter Read funds.

TABLE 9-1 WATER OPERATING FUND (FUND 411) BALANCES

Year	2014	2015	2016	2017	2018	2019
Beginning Fund Balance	713,201	698,443	846,207	1,139,944	1,401,521	850,457
Ending Fund Balance	698,443	846,207	1,139,944	1,401,521	850,457	978,311
Net Increase (Decrease)	(14,758)	147,764	293,737	261,577	(551,064)	127,854

TABLE 9-2 WATER RESERVE FUND (FUND 461) BALANCES

Year	2014	2015	2016	2017	2018	2019
Beginning General Reserve Fund Balance	178,810	417,222	580,195	662,609	758,194	1,470,454
Beginning Reservoir Replacement Fund Balance	48,961	228,507	269,941	328,389	366,711	408,456
Beginning Auto Meter Read Fund Balance	110,297	130,345	151,079	151,079	151,079	151,079
Total Beginning Reserve Fund Balance	338,068	776,074	1,001,215	1,142,077	1,275,984	2,029,989
Investment Interest	1,036	7,029	10,858	6,034	19,886	36,669
Contributed Capital	0	0	0	29,716	367,894	0
Insurance Recoveries – Capital	0	0	0	0	0	138,074
Operating Transfers In	222,000	185,000	71,556	71,498	766,438	70,343
Cap. Cost Recovery Fee (Reservoir Replacement)	115,500	20,000	47,297	28,249	31,251	40,285
Plant Investment Fee (Reservoir Replacement)	15,476	7,182	11,151	10,073	10,494	12,728
Delinquent Fees (Auto Meter Read)	20,048	20,734	0	0	0	0
Total Resources In	374,060	239,945	140,862	145,570	1,195,963	298,099
General Reserve Fund Transfers Out	(15,376)	29,056		11,663	441,958	174,825
Reservoir Replacement Fund Transfers Out	(48,570)	(14,252)	0	0	0	0
Auto Meter Read Transfers Out	0	0	0	0	0	0
Total Transfers Out	(63,946)	14,804	0	11,663	441,958	174,825
Ending General Reserve Fund Balance	417,222	580,195	662,609	758,194	1,470,454	1,540,715
Ending Reservoir Replacement Fund Balance	228,507	269,941	328,389	366,711	408,456	461,469
Ending Auto Meter Read Fund Balance	130,345	151,079	151,079	151,079	151,079	151,079
Total Ending Reserve Fund Balance	776,074	1,001,215	1,142,077	1,275,984	2,029,989	2,153,263

Presented below in Table 9-3 WATER OPERATING FUND (FUND 411) REVENUES AND EXPENDITURESTable 9-3 is a summary of the City's Water Operating Fund (Fund 411) actual revenues and expenditures history for the six-year period, 2014 through 2019.

TABLE 9-3 WATER OPERATING FUND (FUND 411) REVENUES AND EXPENDITURES

Year	2014	2015	2016	2017	2018	2019
REVENUES						
Water Sales	1,628,933	1,810,435	1,755,906	1,878,596	1,954,918	1,921,091
Miscellaneous Revenue	69,421	67,636	77,866	107,412	77,791	105,261
Subtotal Sales and Misc. Rev.	1,698,354	1,878,071	1,833,772	1,986,008	2,032,709	2,026,352
Misc. Transfers In	3,466	14,213	3,158	22,922	0	0
Water Reserve (461) Transfers In	0	29,057	16,064	0	457,233	197,223
Dept. of Commerce Grant	0	0	2,759	0	0	0
DWSRF Loan Proceeds	1,227,019	93,905	774,737	1,061,313	29,749	0
TOTAL – REVENUES	2,928,839	2,015,246	2,630,490	3,070,243	2,519,691	2,223,575
EXPENDITURES						
Water Operations						
Other Services and Charges	52,144	0	0	0	0	26,467
Salaries and Wages	379,912	403,035	422,941	481,190	508,041	484,338
Personnel Benefits	146,937	173,791	193,465	217,267	237,857	244,571
Supplies	118,437	85,354	76,474	112,027	108,972	128,752
Other Services and Charges	340,494	347,978	350,503	391,715	394,116	356,030
Desktop Services	16,809	4,293	5,905	4,925	5,528	0
Chlorine Cylinder Deposit	(300)	0	0	0	0	0
Subtotal – Water Operations	1,054,433	1,014,451	1,049,288	1,207,124	1,254,514	1,240,158
Capital Outlay						
Machinery & Equipment	3,530	45,433	22,747	17,918	16,893	36,593
Misc. Capital Improvements	0	54,741	15,332	447	476,000	70,256
Major Capital Improvements	1,310,395	149,167	785,893	1,064,532	29,749	154,923
Subtotal – Capital Outlay	1,313,925	249,341	823,972	1,082,897	522,642	261,772
Transfers Out						
Fund 110 – City St.	15,000	15,000	15,000	15,000	20,000	20,000
Fund 115 – Local Access St. Imp.	15,000	15,000	15,000	15,000	20,000	20,000
Fund 171 – PW Equip. Reserve	25,000	5,000	5,000	5,000	10,000	10,000
Fund 321 – Utility Maint. Facility	0	0	0	0	0	0
Fund 452 – W/S Bond Red.	0	0	0	0	0	0
Fund 461 – Water Reserve	222,000	185,000	71,556	71,498	766,438	70,343
Fund 461 – Res. Delinquent Fees	20,048	20,734	0	0	0	0
Subtotal – Transfers Out	297,048	240,734	106,556	106,498	816,438	120,343
Debt Service						
PWTF Loan (Includes Interest)	183,047	180,363	169,488	177,962	176,268	174,573
SRF Loan (Includes Interest)	95,144	182,593	187,448	234,185	300,893	298,875
Subtotal – Debt Service	278,191	362,956	356,936	412,147	477,161	473,448
TOTAL – EXPENDITURES	2,943,597	1,867,482	2,336,752	2,808,666	3,070,755	2,095,721
NET INCREASE (DECREASE)	(14,758)	147,764	293,737	261,577	(551,064)	127,854

It can be seen from the above table that the net difference has fluctuated between positive and negative over the six-year period. Although ending fund balances have remained positive, a close examination of the City's future financial plan, including necessary revenue increases and their rate structure, will be crucial to keep a positive account balance and construct the system improvements recommended in this Plan.

Further, the City has adopted a financial policy of maintaining a reserve fund balance of at least 25% of annual operation and maintenance expenses and an operating fund balance of at least 20% of annual operating expenditures. The City continually upholds these policies as shown in Table 9-2 and Table 9-3. Future financial plans will also need to adhere to these policies.

9.2 AVAILABLE REVENUE SOURCE

Recommended system improvements are scheduled for completion in annual increments for the next six years. In addition, as areas outside the current service area develop, extension of the City's water system will be necessary. Future transmission mains, sources of supply, and reservoirs will undoubtedly require major local bond funding and/or outside funding participation to offset the high costs of the improvements.

There are five basic categories of potential financing for domestic water-related improvements:

1. Local Public Enterprise Funds
2. Use of Local Public Powers
3. State Assisted or Guaranteed Resources
4. Federally Assisted or Guaranteed Resources
5. Private Development

Current availability of funding is limited with several the sources within these categories. Many also restrict the use of funds to certain projects and others limit their participation to a percentage of the total cost. Each of these categories is described briefly below.

1. Local Public Enterprise Funds

   Reserves in the Enterprise Fund are accumulated from available revenues from water user fees. The amount of the reserves will depend on the balance of operation and maintenance costs of the system versus total revenue generated by the fees. These reserves may be used to finance any water system related project allocated by the City Council.

   Funds for future projects may be generated by increases in user fees, thus building the reserves in the Enterprise Fund. With this method of financing, often called the "pay-as-you-go" approach, the City is collecting interest on the reserves as opposed to paying interest on a loan balance. One method used by some communities to accumulate reserves is through the development of a capital recovery charge system. This approach is similar to assessing connection fees, except the amount is based on the capital costs of constructing collection system trunk lines and treatment facilities, and the collected funds are usually set aside as capital reserves for future projects.

2. Use of Local Public Powers

   In this section, three primary bonding techniques will be presented: general obligation bonds, revenue bonds, and special assessment bonds. There are advantages and disadvantages to each. The type of bond issued to finance a community improvement depends in part on custom and in part on the circumstances of a particular offering. General information about the three principal types of municipal bonds follow.

   General Obligation Bonds: These bonds pledge the unlimited taxing power and the full faith and credit of the issuing government to meet the required principal and interest payments.

Special Assessment Bonds (LID Bonds): LID bonds are used to finance improvements where the property specially benefited can be identified. Special assessment bonds are frequently used to make capital improvements in a particular neighborhood. Principal and interest payments for these bonds are made by special assessment on the property benefiting from the improvement. Before special assessment bonds are issued, estimated costs are mailed to property owners, a public hearing is held to allow the affected property owners to say whether or not they want the improvement, and a 30-day protest period elapses during which property owners may protest the improvements prior to City Council action formally establishing the project. Debt financed by special assessment bonds is not subject to debt limitations.

Revenue Bonds: Revenue bonds are frequently used to finance City-owned utilities, industrial parks, and other municipal public facilities. The bonds pledge the revenue from a particular revenue source to meet the principal and interest payments. Revenue bonds are appropriate debt instruments when the enterprise fund can be expected to generate sufficient revenue to meet both operating and debt service cost. Revenue bonds generally do not become a general obligation of the government issuing them. Communities may have to pay higher rates of interest on these bonds than on general obligation bonds, because revenue bonds are considered less secure. But revenue bonds also have an important advantage over general obligation bonds in that the amount of the revenue bonds is not included in the amount of indebtedness subject to state debt limitations. The legal requirements for issuing revenue bonds are more complex than those for issuing general obligation bonds. When revenue bonds are issued, a special authority (Water Fund) operates the facility, and a special revenue fund receives and disburses all funds. A trust agreement to provide for the monthly reimbursement of revenues and containing provisions to protect the bond holders must be formulated.

3. State Assisted or Guaranteed Resources

Public Works Trust Fund (PWTF): This fund was created in 1985 to provide loans for replacement of public works facilities. Applications for construction funds may be submitted once each year (in May), and applications for pre-construction funds (for such items as engineering design, bid document preparation, right of way acquisition and environmental studies) may be submitted once each month. Projects are evaluated based on:

a. Merits of the project as to need;
b. Degree of capital improvement planning;
c. Adequacy of existing rate structure;
d. Degree of local participation in financing project; and
e. Whether the area is economically distressed.

Current allocations of funds have been allowed for a wide variety of projects, including domestic water system replacement projects. The interest rates on PWTF loans generally range from 0.5% to 2% depending on the amount of matching money provided by the City.

Drinking Water State Revolving Fund (DWSRF): This fund provides low-interest loans to publicly and privately owned water systems for projects which improve water systems and ensure public health. Up to 100% of eligible project costs are fundable through this program. Applications are accepted once a year between October 1st and November 30th.

4. Federally Assisted or Guaranteed Resources

   Three federally financed funding sources are available for domestic water system construction: 1) the USDA's Rural Development, Rural Utilities Service (RUS) Program; 2) the Economic Development Administration's (EDA) Public Works Grants and Loans Program; and 3) the Department of Housing and Urban Development's (HUD) Community Development Block Grants administered by the State Department of Community Planning and Development.

   Rural Utilities Service Water & Waste Disposal Direct Loans and Grants Program: This program is one of several programs established by the USDA to provide public works assistance to small communities in rural areas. Public entities such as municipalities, counties, special purpose districts or authorities, Indian tribes, and nonprofit corporations or cooperatives are eligible in areas with a population under 10,000. Priority will be given to public entities in areas smaller than 5,500 people to restore a deteriorating water supply, or to improve, enlarge, or modify a water facility. Preference will also be given to requests which involve the merging of small facilities and those serving low-income communities. Loans and grant funds may be used to construct, repair, improve, expand, or otherwise modify rural water supply and distribution, including reservoirs, pipelines, wells, and pumping stations. Targeted at the neediest communities, grants are designed to keep costs economical. Grants are limited to reducing the facility per user costs for debt service to a minimum of 1% of the area's family income. Loans in the past have also been available at a 5% interest rate for the useful life of the facility, or the statutory limit on the applicant's borrowing authority, or for a maximum of 40 years.

   Public Works Grants and Loans Program: This program is funded by the Economic Development Administration (EDA) and is used to encourage long-range development gains in jurisdictions where economic growth is lagging, or where the economic base is shifting. The program provides public works and development facilities needed to attract new industry and provide business expansion. Financial aid may be used to acquire and develop land and improvements for public works, and to acquire, construct, rehabilitate, alter, expand, or improve such facilities, including related machinery and equipment. When completed, such projects are expected to bring additional private investment to the area.

   U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant Program: This program is administered by the State Department of Community Development. Communities with a population under 50,000 can apply for grants to undertake activities in providing adequate housing, expanded economic opportunities, and correcting deficiencies in public facilities which affect public safety and health of an area or community of residents. The program is designed to aid low- and moderate-income people and is also directed to have a maximum impact on stated community problems. Its primary focus is to assist blighted communities, or communities suffering a community or economic development problem.

5. Private Development

   Expansion of domestic water facilities to newly developing areas outside the existing service area is a common requirement of the private developer. Installation of public utilities within housing subdivisions is normally financed entirely by the developer. The City may participate by paying the cost of over-sizing the water main for possible extension later.

Although funding has been curtailed in several programs within the last few years, projects are still receiving financing statewide. Competition for available funds, however, has increased significantly. Projects which show the greatest need and have the largest local funding participation or benefit to low-income families are receiving most of the financing from these programs. Careful planning and packaging of the project is necessary so that the most effective dollar use, including local participation, may obtain the maximum benefit for the greatest number of people.

Table 9-4 provides a summary of funding sources and projects which are eligible under each program.

TABLE 9-4 FUNDING SOURCE SUMMARY

FUNDING SOURCE	ELIGIBLE PROJECTS
Domestic Water Enterprise Fund	All water system projects
General Obligation Bond	All water system projects
Revenue Bond	All water system projects
Special Assessment Bond	Local Improvement District projects
Public Works Trust Fund	Replacement of existing water system facilities
Drinking Water State Revolving Fund (DWSRF)	All water system projects, except for the sole purpose of fire flow or growth.
USDA RUS Rural Water Grant	All water system projects
USDA RUS Rural Water Loan	All water system projects
EDA Public Works Grant	Water system projects to attract new industries and provide for business expansion
EDA Public Works Loan	Water system projects to attract new industries and provide for business expansion
HUD Community Development Block Grant	Water system projects which directly benefit low and moderate-income families
Private Development	All water system projects necessary for new housing and/or commercial developments

9.3 RECOMMENDED FINANCING STRATEGY

Provided in Table 9-5 is a financial program for City's Water Operating Fund (Fund 411) and Water Reserve Fund (Fund 461), which incorporates projected water service fees, operating costs, improvements, and loan costs for the next 10-year period. The values for year 2020 are the budgeted figures used by the City.

The projected water department revenue from water service fees after 2020 includes additional revenue from a combination of projected increases in the number of services and rate increases at the beginning of the year. These projected revenue increases are necessary to complete the recommended system improvements, while maintaining a positive balance in the water fund. If conditions change that reduce the projected future revenue or increase future water department expenses, the financial program shown in Table 9-5 should be revised to account for the reduced revenue, or modifications to successive year rate increases will have to be made.

Future water department expenses were estimated based upon an average inflation rate of 2% per year, as shown in Table 9-5.

Over the next 10-year planning period the City of Selah will continue annual reviews of the water system's financial program during their budget preparation process. The financial program will also be reviewed and revised as needed during the next *Water System Plan* update. This continued review will allow for modifications to the proposed rate and revenue increases, should financial conditions change.

TABLE 9-5 PROPOSED WATER OPERATING FUND (411) AND RESERVE FUND (461) FINANCIAL PROGRAM

Year Ending	2020[a]	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
BEGINNING FUND 411 BALANCE	978,311	1,057,654	960,631	993,268	1,001,905	1,184,291	972,260	1,067,465	916,688	1,231,517	1,286,151	1,010,946
BEGINNING FUND 461 BALANCE	1,540,715	1,599,965	1,257,865	814,065	868,065	922,365	976,965	631,765	434,865	1,236,965	1,443,065	1,300,265
BEGINNING RESERVOIR REP. FUND	461,469	497,469	523,469	549,469	575,469	601,469	627,469	653,469	679,469	705,469	731,469	757,469
BEGINNING AUTO METER READ	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079
TOTAL – BEG. FUND BALANCE	3,131,575	3,306,168	2,893,045	2,507,882	2,596,519	2,859,204	2,727,774	2,503,779	2,182,102	3,325,031	3,611,765	3,219,760
OPERATING FUND (411) REVENUES												
Water Sales	1,998,000	2,057,000	2,118,000	2,181,000	2,246,000	2,313,000	2,382,000	2,453,000	2,526,000	2,601,000	2,679,000	2,759,000
Miscellaneous Revenue	130,000	131,144	132,235	134,265	136,158	139,300	139,714	142,313	143,223	147,428	149,847	149,993
Subtotal Sales and Misc. Rev.	2,128,000	2,188,144	2,250,235	2,315,265	2,382,158	2,452,300	2,521,714	2,595,313	2,669,223	2,748,428	2,828,847	2,908,993
Water Reserve (461) Transfers In	23,750	400,000	500,000	0	0	0	400,000	400,000	0	0	200,000	0
DWSRF Loan Proceeds	0	0	0	0	746,100	0	0	0	908,900	0	0	0
TOTAL – FUND 411 REV.	2,097,750	2,533,274	2,694,480	2,258,609	3,070,686	2,393,795	2,862,260	2,934,893	3,516,720	2,686,024	2,965,425	2,844,535
RESERVE FUND (461) RESOURCES												
Reserve Fund (461) Invest In	18,000	7,900	6,200	4,000	4,300	4,600	4,800	3,100	2,100	6,100	7,200	6,500
Operating (411) Transfers In	65,000	50,000	50,000	50,000	50,000	50,000	50,000	200,000	800,000	200,000	50,000	200,000
TOTAL – FUND 461 RES.	83,000	57,900	56,200	54,000	54,300	54,600	54,800	203,100	802,100	206,100	57,200	206,500
RESERVOIR REP. FUND (461)												
Cap. Cost Recovery Fee	25,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Plant Investment Fee	11,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
TOTAL – RES. REP. FUND	36,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000
TOTAL – WATER FUND REVENUE	2,216,750	2,617,174	2,776,680	2,338,609	3,150,986	2,474,395	2,943,060	3,163,993	4,344,820	2,918,124	3,048,625	3,077,035
OPERATING FUND EXPENDITURES												
Water Operations[b]												
Other Services and Charges	80,500	0	0	0	0	0	0	0	0	0	0	0
Salaries and Wages	511,320	527,000	543,000	560,000	577,000	595,000	613,000	632,000	651,000	671,000	692,000	713,000
Personnel Benefits	241,898	250,000	258,000	266,000	274,000	283,000	292,000	301,000	311,000	321,000	331,000	341,000
Supplies	116,000	120,000	124,000	128,000	132,000	136,000	141,000	146,000	151,000	156,000	161,000	166,000
Other Services and Charges	410,344	423,000	436,000	450,000	464,000	478,000	493,000	508,000	524,000	540,000	557,000	574,000
Subtotal – Water Operations	1,360,062	1,320,000	1,361,000	1,404,000	1,447,000	1,492,000	1,539,000	1,587,000	1,637,000	1,688,000	1,741,000	1,794,000
Capital Outlay												
Machinery, Equipment & Misc.	44,750	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
O&M Improvements	0	274,500	208,000	53,100	245,500	21,600	316,460	23,000	23,000	313,900	185,700	25,000
Major Capital Improvements	0	409,800	641,400	339,800	746,100	597,400	415,700	908,900	368,300	0	838,300	0
Subtotal – Capital Outlay	1,404,812	2,054,300	2,260,400	1,846,900	2,488,600	2,161,000	2,321,160	2,568,900	2,078,300	2,051,900	2,815,000	1,869,000
Operating (411) Transfers Out												
Fund 110 – City St.	20,000	20,000	20,000	25,000	25,000	25,000	25,000	25,000	30,000	30,000	30,000	30,000
Fund 115 – Local Access St. Imp.	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	30,000	30,000	30,000	30,000
Fund 171 – PW Equip. Reserve	35,000	15,000	15,000	15,000	15,000	15,000	20,000	20,000	20,000	20,000	20,000	20,000
Fund 321 – Utility Maint. Facility	0	0	0	0	0	0	0	0	0	0	0	0
Fund 452 – W/S Bond Red.	0	0	0	0	0	0	0	0	0	0	0	0
Fund 461 – Water Reserve	65,000	50,000	50,000	50,000	50,000	50,000	50,000	200,000	800,000	200,000	50,000	200,000
Fund 461 – Res. Delinquent Fees												
Subtotal – Transfers Out	145,000	110,000	110,000	115,000	115,000	115,000	120,000	270,000	880,000	280,000	130,000	280,000
Operating (411) Debt Service												
PWTF Loan (Includes Interest)	172,878	171,183										
SRF Loan (Includes Interest)	295,717	294,814	291,443	288,072	284,700	281,329	277,958	199,392	196,773	194,154	191,535	188,915
Future Debt Service (Incl. Interest)	0	0	0	0	0	48,497	47,937	47,377	46,818	105,337	104,095	102,854
Subtotal – Debt Service	468,595	465,997	291,443	288,072	284,700	329,826	325,895	246,770	243,591	299,491	295,630	291,770
TOTAL – FUND 411 EXP.	2,018,407	2,630,297	2,661,843	2,249,972	2,888,300	2,605,826	2,767,055	3,085,670	3,201,891	2,631,391	3,240,630	2,440,770
Reserve Fund (461) Transfers Out	23,750	400,000	500,000	0	0	0	400,000	400,000	0	0	200,000	0
Reservoir Replacement Fund Trans.	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL – WATER FUND EXPENDITURES	2,042,157	3,030,297	3,161,843	2,249,972	2,888,300	2,605,826	3,167,055	3,485,670	3,201,891	2,631,391	3,440,630	2,440,770
Ending Operating Fund (411) Balance	1,057,654	960,631	993,268	1,001,905	1,184,291	972,260	1,067,465	916,688	1,231,517	1,286,151	1,010,946	1,414,711
Ending Reserve Fund (461) Balance	1,599,965	1,257,865	814,065	868,065	922,365	976,965	631,765	434,865	1,236,965	1,443,065	1,300,265	1,506,765
Ending Reservoir Replacement Fund	497,469	523,469	549,469	575,469	601,469	627,469	653,469	679,469	705,469	731,469	757,469	783,469
Ending Auto Meter Read	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079	151,079
TOTAL – ENDING FUND BALANCE	3,306,168	2,893,045	2,507,882	2,596,519	2,859,204	2,727,774	2,503,779	2,182,102	3,325,031	3,611,765	3,219,760	3,856,025
Increase or (Decrease) in Fund Balance	174,593	(413,123)	(385,163)	88,637	262,685	(131,430)	(223,995)	(321,677)	1,142,929	286,734	(392,005)	636,265
Projected Rate Increase at Start of Year	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

[a] 2020 figures are consistent with actual budget by the City.
[b] Water Operations expenditures include 2% inflation per year.

9.4 WATER RATES

Selah's current water rates and rate structure were adopted in November 2019, Resolution No. 2775. The water service rates are split into the following five separate categories:

1. Within corporate limits;
2. Two-family dwellings, multiple dwellings, group houses and condominiums, apartment houses, and mobile home parks;
3. Low-income senior citizens and low-income disabled persons occupant rate;
4. Outside utility users; and
5. Bulk water users.

A summary of the current water service rates for the City is provided below. All consumption beyond the consumption threshold is charged at the overage rate shown per one hundred (100) cubic feet of usage. The complete list of the City's current water rates is provided in Chapter 9.02.190 of the City's municipal code, a copy of which is provided in CHAPTER 10.

a) Within Corporate Limits

Meter Size	Consumption (100 cubic ft.)	Minimum	Overage (per 100 cubic ft.)
3/4" or smaller	First 3	$17.59	
	Next 7		1.56
	Over 10		1.21
1"	First 4	$23.37	
	Next 6		1.56
	Over 10		1.21
1-1/4" through 1-1/2"	First 5	$29.21	
	Next 5		1.56
	Over 10		1.21
2"	First 5	$35.01	
	Next 5		1.56
	Over 10		1.21
3"	First 10	$46.72	
	Next 10		1.56
	Over 20		1.21
4"	First 20	$70.06	
	Next 180		1.97
	Over 200		1.56
Over 4"	First 20	$70.06	
	Next 4,980		1.97
	Over 5,000		1.56

b) The minimum charge per month for the availability of water service for two-family dwellings, multiple dwellings, group houses and condominiums, apartment houses, and mobile home parks as defined in Chapter 10.02 shall be twelve dollars and sixty-four cents ($12.64) for each dwelling unit or mobile home space. Each dwelling unit or mobile home space shall be allotted 300 cubic feet of minimum consumption, and water used over this minimum amount shall be charged at the applicable rate in section (a) above.

c) Low-Income Senior Citizens and Low-Income Disabled Persons Occupant Rate.

1) Single-family dwellings shall be charged eleven dollars and fourteen cents ($11.14) per month, for the first 300 cubic feet of water consumption. Additional water consumption will be charged at the rate of one dollar and thirty-eight cents ($1.38) per 100 cubic feet for the next 700 cubic feet and one dollar and ten cents ($1.10) per 100 cubic feet for over 1,000 cubic feet.
2) A senior citizen is a person who occupies a dwelling unit where either the person or the person's spouse is sixty-two years of age or older at the commencement of any month.
3) A low-income senior citizen shall be a senior citizen whose income, combined with the income of the spouse, if any, for the calendar year preceding was fifteen thousand dollars ($15,000.00) or less.
4) A disabled person is a person who occupies a dwelling unit and qualifies for special parking privileges under RCW 46.16.381(l)(a) through (f) or a blind person as defined in RCW 74.18.020(4) or developmentally disabled as defined in RCW 71A.10.020(2) or a mentally ill person as defined in RCW 71.05.020(1).
5) A low-income disabled person shall be a disabled person whose income, combined with the income of the spouse, if any, for the calendar year preceding was fifteen thousand dollars ($15,000) or less.
6) Combined income shall be income from all sources, provided that only two-thirds (2/3) of any social security benefits, two-thirds (2/3) of any retirement pension, two-thirds (2/3) of disability benefits, and the full amount of any other income shall be considered as income for the purpose of this section, and provided further, that the gain realized by any person from the sale, transfer, or upon being displaced from, his or her residence shall not be considered as income for the purposes of this section, if reinvested in a replacement residence within eighteen (18) months of its realization.
7) Determination of eligibility shall be made by the City Clerk-Treasurer based upon the statement of the low-income senior citizen or low-income disabled person, or any other reasonable and verifiable means at the discretion of the Clerk-Treasurer.

d) Outside utility users shall pay one hundred fifty percent (150%) of the applicable water service charges charged to City residents and commercial/business users.

e) Bulk water consumers shall be served at the convenience of the City and shall pay the sum of ten dollars ($10.00) per fill and one dollar and ninety-seven cents ($1.97) per hundred-gallon unit.

Based on the above rates, the typical monthly charge for a Single-Family residential customer (3/4" meter) within the corporate limits, consuming 1,000 cubic feet of water in a month would be equal to $28.51. This monthly service charge is reasonable, compared with neighboring cities of a similar size and amount of water use.

As shown in Section 9.3, the City's current rates and/or total revenue will need to be increased in future years in order to maintain a positive operating fund balance, pay for rising O&M costs, fund necessary improvement projects, and make the necessary debt service payments for prior and future improvement projects. The annual rate increases will have a minor impact on customers, but will be necessary for operations, maintenance, and system improvements.

A more detailed rate analysis will be necessary in the future to determine the rate structure required to achieve the recommended revenue increases as shown in the financial program. Following the proposed rate analysis, annual review of the proposed rates and revenue increases will be necessary to determine required adjustments to either base rates, usage charges, or both.

Inclining-Block Water Rate Structure Consideration – With the City's current rate structure, customers pay a monthly ready-to-serve charge plus a volume-based consumption charge per unit of water used. The charge per 100 cubic-foot unit decreases with increased water usage. This is considered a declining block rate structure. Customer utility bills increase with increased water use, but as water use exceeds a certain amount, such as during irrigation season, the additional charges do not continue to incline. Further water conservation may be possible by changing the current rate structure to an inclining block rate or similar method.

Changing the current rate structure to an inclining-block rate that further penalizes customers for excessive water use, may result in additional water savings. If 30 percent of single-family residential customers (2,457 in year 2021) used 10 percent less water annually (ADD of 380 gpd/service), as a result of inclining-block rates, annual water system consumption could be reduced by about 10.2 million gallons, or 1.1% of annual system demand.

Careful consideration will need to be made of how the inclining block rates are structured to not have adverse impacts on typical residential users (particularly low-income users) or other customer categories. If not structured properly, industrial and commercial users could be impacted significantly with this change. Users will likely experience larger swings in monthly bills due to irrigation or other seasonal uses, when compared to the current rate structure. The usage blocks and increases will need to be structured differently for larger meter sizes to not unequally penalize customers that require higher volumes of water (e.g., larger households with larger consumptive use). The City will also need to keep in mind the potential for increased variability in revenue streams with this type of rate structure.

A comparison of the current rate structure to an example inclining block rate structure for a typical 3/4-inch single-family residential water service is provided in Table 9-6. Typical residential user charges are broken down by month to show the seasonal variation and changes with a different rate structure.

TABLE 9-6 EXAMPLE RATE STRUCTURE COMPARISON

Month	Average Demand (gpd)	Average Demand (cubic feet)	Current Rate				Proposed Rate			
			Base Charge (300 CF)	Usage Charges (to 1,000 CF)	Usage Charges (above 1,000 CF)	Total Charge	Base Charge (500 CF)	Usage Charges (to 1,500 CF)	Usage Charges (above 1,500 CF)	Total Charge
			$5.86/ 100 CF	$1.56/ 100 CF	$1.21/ 100 CF		$3.52/ 100 CF	$1.56/ 100 CF	$2.00/ 100 CF	
January	4,400	588	$17.59	$4.49	$0.00	$22.08	$17.59	$1.37	$0.00	$18.96
February	4,400	588	$17.59	$4.49	$0.00	$22.08	$17.59	$1.37	$0.00	$18.96
March	4,400	588	$17.59	$4.49	$0.00	$22.08	$17.59	$1.37	$0.00	$18.96
April	6,700	896	$17.59	$9.30	$0.00	$26.89	$17.59	$6.18	$0.00	$23.77
May	14,200	1,898	$17.59	$10.92	$7.24	$35.75	$17.59	$21.81	$0.00	$39.40
June	19,900	2,660	$17.59	$10.92	$16.46	$44.97	$17.59	$15.60	$13.2	$46.39
July	26,100	3,489	$17.59	$10.92	$26.49	$55.00	$17.59	$15.60	$29.78	$62.97
August	25,100	3,356	$17.59	$10.92	$24.88	$53.39	$17.59	$15.60	$27.12	$60.31
September	17,300	2,313	$17.59	$10.92	$12.26	$40.77	$17.59	$15.60	$6.26	$39.45
October	10,000	1,337	$17.59	$10.92	$0.45	$28.96	$17.59	$13.06	$0.00	$30.65
November	4,400	588	$17.59	$4.49	$0.00	$22.08	$17.59	$1.37	$0.00	$18.96
December	4,400	588	$17.59	$4.49	$0.00	$22.08	$17.59	$1.37	$0.00	$18.96
TOTAL	141,300	18,889	$211.08	$97.27	$87.78	$396.13	$211.08	$110.30	$76.36	$397.74

As can be seen in Table 9-6, adjusting the rate structure to incline with higher use results in typical residential water users paying the same amount annually, but with higher peak charges in the summer. This type of rate structure will penalize excessive water users more than the current structure. The rate structure can be adjusted for different user types and meter sizes to not disproportionately charge customers. A change to the current rate structure should be considered by the City to help reduce water consumption. Further evaluation of alternate rate structures will be necessary prior to implementation of conservation-based rates, to determine what structure will be the most suitable and effective for all users within the City's system.

CHAPTER 10 -

MISCELLANEOUS DOCUMENTS

HLA
Engineering and Land Surveying, Inc.

10.1 MISCELLANEOUS DOCUMENTS INDEX

1. State Environmental Policy Act (SEPA) Documentation
2. Water Facility Inventory (WFI) Form
3. WSP Comments and Responses
4. Consumer Meeting & Water System Plan Adoption
5. WUE Program Goal Adoption
6. Local Government Consistency Review Checklist(s)
7. City of Selah Fire Department Letter
8. City of Selah Municipal Code, Ordinances, and Resolutions
   - Chapter 9.02 Municipal Water Supply
   - Chapter 9.06 Water Fund
   - Chapter 9.15 Service Outside City Limits
   - Chapter 9.16 Water and Sewer Facilities Act
   - Chapter 9.17 Plant Investment Fee
   - Chapter 9.19 Utility Latecomer Agreements, Ordinance 940 (Latecomer's Agreement; June 1989)
   - Chapter 13.01 City of Selah Design, Construction Standards and Specifications for Public Works Improvements
   - Chapter 20.80 Plant Investment Fees
   - Chapter 20.90 Fee for Municipal Water System Reservoir Capacity Capital Cost Recovery Program No. 1
   - Chapter 20.91 Fee for Water Connections in Lookout Point Reservoir Water Pressure Capital Cost Recovery Area (Capital Recovery Area)
   - Chapter 21.11 Appeals
   - Resolution 1341 Regional Wellhead Protection Program Interlocal Agreement (November 2000)
   - Resolution 1343 Regional Wellhead Protection Program Adoption (November 2000)
   - Resolution 2775 Resolution Revising Rates for Water Utility Services (November 2019)
9. Extension by Developers Policy
10. Property Deeds and Protective Well Covenants
    - Well No. 3
    - Well No. 4
    - Well No. 5
    - Well No. 6
    - Well No. 7
    - Well No. 8
11. Well Logs
    - Well No. 3
    - Well No. 4
    - Well No. 5
    - Well No. 6
    - Well No. 7
    - Well No. 8
12. Water Rights
    - Well No. 1
    - Well No. 2
    - Well No. 3
    - Well No. 4
    - Well No. 5
    - Well No. 6
    - Well No. 7
    - Well No. 8

13. Susceptibility Assessment Forms
    Well Nos. 3 & 4
    Well No. 5
    Well No. 6
    Well No. 7
    Well No. 8
14. Regional Wellhead Protection Plan Interlocal Agreement and Updates
15. City Wellhead Protection Plan
16. USGS Groundwater Status and Trends for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho
17. Well No. 7 Evaluation, Rehabilitation, and Testing Report
18. Coliform Monitoring Plan
19. Stage 2 Disinfection Byproducts Monitoring Plan
20. Accident Prevention and Safety Program
21. Chlorine Safety Plan
22. Hazard Communication Program
23. Confined Space Entry Safety Program
24. Cross-Connection Control Policy and Procedures
25. Cross-Connection Control Program Summary Report
26. Consumer Confidence Report
27. Water Quality Monitoring Schedule
28. Source Sample Chemical Analysis Results (IOC, Nitrate, VOC, SOC, and Radionuclide)
29. Distribution System Chemical Analysis Results (Bacteriological, Disinfection Byproducts, Lead, and Copper)
30. Department of Health Sanitary Survey
31. Computer Printout of Hydraulic Analysis Results
32. Telemetry Control System Screen Printout
33. City of Selah Design and Construction Standards and Specifications for Public Works Improvements
34. Water System Complaint Response Form
35. Lead and Copper Monitoring Plan

Map A - Existing Water System
Map B - Hydraulic Analysis Nodes and Pipes

1.
STATE ENVIRONMENTAL POLICY ACT (SEPA) DOCUMENTATION

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH
Yakima County, Washington

CITY OF SELAH
2021 WATER SYSTEM PLAN UPDATE

STATE ENVIRONMENTAL POLICY ACT

ENVIRONMENTAL CHECKLIST

Prepared by

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

HLA Project No. 19061E
June 2020

STATE ENVIRONMENTAL POLICY ACT

ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. *Name of Proposal, if Applicable:* 2021 Water System Plan Update

2. *Name of Proponent:* City of Selah
   Phone Number: (509) 698-7328
   Address of Proponent: 222 S. Rushmore Rd.
   Selah, WA 98942

3. *Person Completing Form:* Justin Bellamy, PE
   Phone Number: (509) 966-7000
   Address: HLA Engineering and Land Surveying, Inc.
   2803 River Road
   Yakima, WA 98902

4. *Date Checklist Prepared:* June 2020

5. *Agency Requesting Checklist:* City of Selah

6. *Proposed timing or schedule (including phasing, if applicable):*
   Water System Plan Update adoption in February 2021.

7. *Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.*
   The water system plan update identifies on-going maintenance activities and replacement and growth-related improvements for the City's municipal water system.

8. *List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.*
   None.

9. *Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.*
   None at this time.

10. *List any governmental approvals or permits that will be needed for your proposal, if known.*
    Department of Health – Approval of water system plan.

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.*
    Adoption of the Water System Plan (WSP) for the City of Selah Urban Growth Area. The WSP identifies recommended maintenance- and growth-related improvements to the Selah water system. Construction, with potential construction-related impacts, will be necessary to implement the WSP recommendations. Further environmental review

is required for all non-exempt construction activities, and project specific checklist responses will be provided at that time

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 detailed plans submitted with any permit application related to this checklist.*

    The proposed water system improvements are located throughout the incorporated and unincorporated areas within the City of Selah Growth Area boundary and are shown on Map B of the Water System Plan.

B. ENVIRONMENTAL ELEMENTS

1. EARTH

a. *General description of the site (underline one): Flat, rolling, hilly, steep slopes, mountainous, other*.

b. *What is the steepest slope on the site (approximate percent slope)?*

    25% slope.

c. *What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.*

    A wide variety of soils exist within the current Selah water service areas, including silt, clay, sand, and gravel. Some of the soils within the Selah area are classified by the U.S. Department of Agriculture Natural Resource Conservation Service as Prime Farmland. Future construction of the water system to serve areas within Selah's Urban Growth Area may cross some of these prime farmland areas.

d. *Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.*

    Some steep slope areas within the Urban Growth Area may contain unstable soils.

e. *Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.*

    None proposed.

f. *Could erosion occur as a result of clearing, construction, or use? If so, generally describe.*

    No.

g. *About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or building)?*

    No additional impervious surfaces.

h. *Proposed measures to reduce or control erosion, or other impacts to the earth, if any:*

    None.

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, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

None.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

None.

3. WATER

a. Surface Water:

1. 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)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The Selah Ditch, the Naches River, the Yakima River, Wenas Creek, and irrigation canals and drains lie within or immediately adjacent to the current and future water service areas.

2. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No.

3. 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.

None.

4. Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

5. Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

The City of Selah Urban Growth Area boundary contains lands located within the 100-year floodplains of the Yakima River and the Naches River.

6. Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground Water:

1. Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Approximately 2,653 acre-feet of ground water is presently being withdrawn for water supply of the Selah water system. The City has rights for 4,760 acre-feet per year. It is forecast that Selah's groundwater withdrawals will increase to 3,134 acre-feet an-annually by year 2031.

2. *Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage, 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.

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). Where will the water flow? Will this water flow into other waters? If so, describe.*

Not applicable.

2. *Could waste materials enter ground or surface waters? If so, generally describe.*

No.

3. *Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.*

No.

d. *Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:*

Not applicable.

4. PLANTS

a. *Check or underline type of vegetation found on the site:*

__X__ deciduous tree: alder, maple, aspen, other
__X__ evergreen tree: fir, cedar, pine, other
__X__ shrubs
__X__ grass
__X__ pasture
__X__ crop or grain
__X__ Orchards, vineyards or other permanent crops
__X__ wet soil plants; cattail, buttercup, bullrush, skunk cabbage, other
____ water plants: water lily, eelgrass, milfoil, other
____ other types of vegetation

b. *What kind and amount of vegetation will be removed or altered?*

None.

c. *List threatened or endangered species known to be on or near the site.*

None are known to exist.

d. *Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:*

None.

e. List all noxious weeds and invasive species known to be on or near the site.

None.

5. ANIMALS

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include:

Bird: hawk, heron, eagle, songbird, other
Mammals: deer, bear, elk, beaver, other
Fish: bass, salmon, trout, herring, shellfish, other

b. List any threatened or endangered species known to be on or near the site.

Bald eagles (Haliaeetus leucocephalus) listed by the U.S. Fish & Wildlife Service as "Threatened," are present along the Yakima and Naches Rivers in the Selah vicinity during the winter months. Mid-Columbia River Steelhead (Oncorhynchus mykiss), currently listed by National Marine Fisheries Service as "Threatened," and the Bull Trout (Salvelinus confluentus), currently listed by the U.S. Fish & Wildlife Service as "Threatened," are present in the Naches and Yakima Rivers.

c. Is this site part of a migration route? If so, explain.

The City of Selah Urban Growth Area boundary may be within a migratory route for some bird species.

d. Proposed measures to preserve or enhance wildlife, if any:

None.

e. List any invasive animal species known to be on or near the site.

None.

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.

None.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None.

7. ENVIRONMENTAL HEALTH

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No.

1. Describe any known or possible contamination at the site from present or past uses.

None.

2. *Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmissions pipelines located within the project area and in the vicinity.*

   None.

3. *Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.*

   None.

4. *Describe special emergency services that might be required.*

   None.

5. *Proposed measures to reduce or control environmental health hazards, if any:*

   None.

b. *Noise*

1. *What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?*

   None.

2. *What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.*

   None.

3. *Proposed measures to reduce or control noise impacts, if any:*

   None.

8. LAND AND SHORELINE USE

a. *What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.*

   The City of Selah Urban Growth Area is a combination of agricultural, residential, commercial, industrial, public, and quasi-public land uses.

b. *Has the project site been used as working farmlands or working forest land? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?*

   Historically, land within the City of Selah Urban Growth Area has been used for agriculture. However, some of the land area has been converted to non-agricultural urban uses.

1. *Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:*

   No.

c. *Describe any structures on the site.*
Not applicable.

d. *Will any structures be demolished? If so, what?*
No.

e. *What is the current zoning classification of the site?*
The incorporated and unincorporated City of Selah Urban Growth Area consists of a wide range of zoning classifications including agricultural, residential, commercial, industrial, and public.

f. *What is the current comprehensive plan designation of the site?*
Not applicable.

g. *If applicable, what is the current shoreline master program designation of the site?*
Not applicable.

h. *Has any part of the site been classified as a critical area by the city or county? If so, specify.*
No.

i. *Approximately how many people would reside or work in the completed project?*
Not applicable.

j. *Approximately how many people would the completed project displace?*
None.

k. *Proposed measures to avoid or reduce displacement impacts, if any:*
Not applicable.

l. *Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:*
None.

m. *Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:*
None.

9. HOUSING

a. *Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.*
None.

b. *Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.*
None.

c. *Proposed measures to reduce or control housing impacts, if any:*
Not applicable.

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Not applicable.

b. What views in the immediate vicinity would be altered or obstructed?

None.

c. Proposed measures to reduce or control aesthetic impacts, if any:

None.

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Not applicable.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

None.

12. RECREATION

a. What designated and informal recreational opportunities are in the immediate vicinity?

The City of Selah Urban Growth Area contains numerous municipal parks and school playgrounds. Numerous informal recreational opportunities such as fishing, bird watching, walking, jogging, bicycling, etc., exist within the Urban Growth Area.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

None.

13. HISTORIC AND CULTURAL PRESERVATION

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.

No.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Is there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

None.

c. *Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.*

None.

d. *Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.*

None.

14. TRANSPORTATION

a. *Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.*

The City of Selah Urban Growth Area contains numerous City of Selah, Yakima County, and Washington Department of Transportation streets and highways. Public streets are shown on Map B of the Water System Plan.

b. *Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?*

Public transit service is provided on First Street within the City of Selah.

c. *How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?*

Not applicable.

d. *Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).*

No.

e. *Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.*

The Burlington Northern-Santa Fe Stampede Pass main line traverses the City of Selah Urban Growth Area.

f. *How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?*

None.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

None.

h. *Proposed measures to reduce or control transportation impacts, if any:*

None.

15. PUBLIC SERVICES

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other?) If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any.

None.

16. UTILITIES

a. *Underline the utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, irrigation, cable TV, drains, other.*

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.

None.

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.

Digitally signed by Justin Bellamy
Date: 2020.10.08 12:00:40 -07'00'

June 30, 2020

Justin L. Bellamy, PE — Date
Project Engineer
HLA Engineering and Land Surveying, Inc.

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

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?*

   The 2021 Water System Plan addresses and identifies improvements to and expansion of the City of Selah's water system necessary to accommodate projected growth within the City and its Urban Growth Area over the next 20-year period. Increases in treated wastewater discharge will be as described in the City's 2018 General Sewer Plan and generally correspond with increased water usage. No increases in the emissions to air, production, storage, or release of toxic or hazardous substances, or production of noise are likely to result from this proposal.

   Proposed measures to avoid or reduce such increases are:

   Not applicable.

2. *How would the proposal be likely to affect plants, animals, fish, or marine life?*

   No effects are likely because of this proposal.

   Proposed measures to protect or conserve plants, animals, fish or marine life are:

   Not applicable.

3. *How would the proposal be likely to deplete energy of natural resources?*

   Because some water system components operate electrically, this proposal may result in a minor increase in energy requirements to operate electrical equipment over current amounts.

   Proposed measures to protect or conserve energy and natural resources are:

   The increase of electrical energy requirements will be reduced to the extent possible through use of high-efficiency electrical motors and equipment.

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 proposal is not likely to use or affect environmentally sensitive areas.

   Proposed measures to protect such resources or to avoid or reduce impacts are:

   Environmentally sensitive areas were identified during the development of Selah's Water System Plan. These areas will be avoided when detailed plans are prepared, and pipeline alignments selected.

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?*

   The proposal will not affect land or shoreline use in ways incompatible with existing plans.

   Proposed measures to avoid or reduce shoreline and land use impacts are:

   None.

6. *How would the proposal be likely to increase demands on transportation or public services and utilities?*

   This proposal identifies the future demand upon the Selah water system and identifies the measures the City will take to accommodate that future demand.

Proposed measures to reduce or respond to such demand(s) are:

Proposed measures include expansion of the water system to serve lands within the City's Urban Growth Area.

7. *Identify, if possible whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.*

This proposal does not conflict with laws or requirements for the protection of the environment. Improvements identified within this proposal will allow the City to comply with public health requirements.

CITY OF SELAH
Planning Department • 222 South Rushmore RD. • Selah, WA 98942 • Ph: (509) 698-7365 • www.selahwa.gov

Determination of Nonsignificance

Description of Proposal: State Environmental Policy Act Checklist for the Environmental Review of its 2021 Water System Plan Update

Proponent: City of Selah
115 W. Naches Avenue
Selah, WA. 98942

Location of Proposal including street address, if any: City Wide

Lead Agency: City of Selah

City File Number: SEPA-2020-008
The lead agency for this proposal has determined that it will 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.

This DNS is being issued using the process in WAC 197-11-340. There is no further comment period.

Responsible Official: Donald C. Wayman

Position / Title: City Administrator/SEPA Responsible Official

Signature:

Date of Issuance: February 3, 2021

Appeals: You may appeal this determination to the Selah City Council by filing a written appeal with the required $300.00 filing fee at the Selah Planning Department, 222 S. Rushmore Road no later than 5:00 p.m. on February 8, 2020. You should be prepared to make specific factual objections. Contact the Planning Department at 698-7365 to read or ask about the procedures for SEPA appeals.

2.
WATER FACILITY INVENTORY (WFI) FORM

HLA
Engineering and Land Surveying, Inc.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 02/22/2019
Printed: 12/10/2020
WFI Printed For: On-Demand
Submission Reason: Pop/Connect Update

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

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
77400 6	SELAH CITY OF	YAKIMA	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS
DANIEL T. JONES [FOREMAN] CITY OF SELAH 220 SOUTH RUSHMORE ROAD SELAH, WA 98942	SELAH, CITY OF DANIEL T. JONES 222 SOUTH RUSHMORE ROAD SELAH, WA 98942 FOREMAN
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (509) 698-7365		Owner Daytime Phone: (509) 698-7365	
Primary Contact Mobile/Cell Phone:		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone: (509) 698-7365		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax: (509) 698-7372	E-mail: xxxxxxxxxxxxxxxxxxx	Fax: (509) 698-7372	E-mail: xxxxxxxxxxxxxxxxxxx

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [x] Agricultural
- [x] Commercial / Business
- [x] Day Care
- [x] Food Service/Food Permit
- [x] 1,000 or more person event for 2 or more days per year
- [x] Hospital/Clinic
- [x] Industrial
- [x] Licensed Residential Facility
- [x] Lodging
- [ ] Recreational / RV Park
- [x] Residential
- [x] School
- [ ] Temporary Farm Worker
- [x] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
☐ Association	☐ County	☐ Investor	☐ Special District	
☒ City / Town	☐ Federal	☐ Private	☐ State	3,400,000

- 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
77400 6	SELAH CITY OF	YAKIMA	A	Comm

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE				TREATMENT						DEPTH		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	Well #3 - AFK978				X							X			Y		X					~~430~~ 321	400	SW SE	35	14N	18E
S02	Well #4 - AFK968				X							X			Y		X					~~448~~ 131	400	SW SE	35	14N	18E
S03	Well #5 - AFK982		X									X			Y		X					~~555~~ 201	~~750~~ 600	SW SW	36	14N	18E
S04	Well #6 - ABR091		X									X			Y		X					~~918~~ 86	1800	SW NE	35	14N	18E
S05	WF/A(S01,S02)			X								X			Y		X					~~430~~ 131	800	SW SE	35	14N	18E
S06	Well #7 - AFK967		X									X			Y		X					~~745~~ 742	~~1950~~ 2000	NE NW	36	14N	18E
S07	Well #8 - AAS171		X									X			Y		X					297	1100	SE SE	35	14N	18E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
77400 6	SELAH CITY OF	YAKIMA	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		2597	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	2057		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	54		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	540		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
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.	356	356	
28. TOTAL SERVICE CONNECTIONS		2953	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 7718

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?	4150	4150	4150	4150	4150	4150	320	320	4150	4150	4150	4150
B. How many days per month are they present?	20	20	20	15	20	14	20	20	20	20	17	12

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	10	10	10	10	10	10	9	9	10	10	10	10

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: December 10, 2020

PRINT NAME: Justin L. Bellamy, PE TITLE: Consulting Engineer

Intentionally left blank

3.
WSP COMMENTS AND RESPONSES

HLA
Engineering and Land Surveying, Inc.

DOH Comment Response Form

DOH Comment No.	DOH Comment	Water System Response	Page Number of Response	Other Water System Comments
1	Under "Planning Requirement," the DOH *Water System Planning Guidebook* was adopted in August 2020.	References to "DRAFT" planning guidebook have been removed and the revision date of August 10, 2020 has been added.	i	
2	Page ii, the WSP is not required every 6 years. It is a requirement for water systems over 1,000 connections and approvals can be granted for up to 10 years, depending on provided projections.	The reference to 6 years has been removed.	ii	
3	Page 1-5, section 1.2.3, and page 1-14, section 1.8, would the City consider consolidation with neighboring systems if need arises? If so, what additional steps would be required?	The City is not interested in pursuing consolidation with neighboring small water systems at this time. They are willing to administratively assist these systems if a need arises or supply water on an emergency basis if necessary.	1-14	
4	Provide Yakima County land use (current and future) for properties within the City's future service area.	Table 1-4 has been updated to reference Yakima County land use designations. A separate land use map (Figure 1-4) has been added to the plan for clarification.	1-12 and 1-13	
5	Provide Local Government Consistency Determination forms for Selah Planning Department and Yakima County Planning Department. Include a subsection in Chapter 1 referencing these forms in Chapter 10.	Signed Local Government Consistency Determination forms have been added to Chapter 10, Section 6. Subsection 1.13 has been added to the plan referencing the forms in Chapter 10.	1-17 Chapter 10	
6	Chapter 2, general comment: provide a statement that confirms that "service" is the same as "connection."	A statement confirming that "service" and "connection" are synonymous has been added.	2-2	
7	Provide at least one complete production year, per source, with monthly production values.	Table 2-7A, showing monthly water production for year 2017 (year of highest annual production) has been added.	2-6	
8	Page 2-8, Figure 2-1, in addition to this Figure, provide a Figure or table comparing seasonal water use over one full year from the different customer classes.	Figure 2-2, showing seasonal water use from different customer classes for year 2017, has been added.	2-9	
9	Page 3-30, Table 3-24, while not required, DOH recommends the Asset Condition Assessment to go a step further by defining the criticality scale and assigning criticality values to assets. This additional step may provide the City with additional bonus points on DWSRF applications.	A criticality scale and values will not be added to the asset condition assessment summary at this time.	3-30	
10	Page 3-36, Table 3-26, provide years for 10-year and 20-year forecasts (2031, 2041).	Years have been added to Table 3-26.	3-36	
11	The Department of Ecology has issued a comment letter regarding this submittal dated August 12, 2020. Please address the issues, if any, contained in the letter in the second draft submittal.	There are no comments to address in the second draft submittal.	N/A	
12	Provide documentation of WUE goal adoption, including public notice, signed meeting minutes, and signed resolution.	WUE goal adoption public notice, signed meeting minutes, and signed resolution have been added to Chapter 10, Section 5.	Chapter 10	

DOH Comment No.	DOH Comment	Water System Response	Page Number of Response	Other Water System Comments
13	Page 4-4, Water Bill Notification, please specify how many customer classes receive these notifications.	Notifications are applied to water bills of all customer classes.	4-4	
14	Provide water demand projections for the plan approval period (2031) and 20-year period (2041) with water use efficiency savings and demand forecast if all cost-effective WUE measures are implemented.	Section 4.1.8 has been added to the WUE program to show water demand projections with and without WUE savings.	4-9	
15	Provide text that explores reclaimed water opportunities.	Reclaimed water opportunities are discussed in Section 3.4.1 Source of Supply and Reliability Analysis on page 3-33	3-33	
16	Provide text discussion and reference to Chapter 10 regarding sanitary control area (SCA) covenants, deeds, and additional protections, such as signage and fencing.	Discussion of sanitary control area requirements, including reference to covenants and deeds in Chapter 10 is provided in Section 2.3.6 Water Supply Characteristics and Trends on page 2-12.	2-12	
17	Page 5-1, 5-2, the Potential Contaminant Source and Notification List must be updated.	An updated contaminant list has been added.	5-2	
18	Provide updated contaminant and time-of-travel (minimum calculated fixed radius) map for all City sources.	A copy of the updated contaminant source inventory and time-of-travel maps are included in Chapter 10, Section 14 as referenced on page 5-3.	5-3	
19	Clarify the section on Page 5-2 about the use of “Exempt Wells” within the City of Selah service area. Consider the following questions: • Does the City attempt to identify an area within the Retail Service Area and outside of the existing City limits? • If the area is within the City limits, is the City building and planning department reviewing whether the proposed wells are sited and constructed properly, and meet general water quality standards? • Are these domestic wells subject to the County’s ordinance process for new domestic wells? This information is available under the Yakima County Water Resource System (YCWRS). • Did the City include an ordinance that explicitly identifies the use of these wells, and limit them for a single home? In some cases, these wells will be shared or used to create a small public water system. • The City should note these wells will be required to be decommissioned in the future. Most domestic wells do not meet the approval requirements, including water quality, capacity, sanitary control area, and so forth, for use as a large City well.	The referenced exempt well section has been removed from the plan. In accordance with City zoning regulations (Title 10 of Selah Municipal Code), the use of “exempt wells” is only allowed in the Selah service area if there are pre-existing lots that have been approved, or under special circumstances that would prevent extension of water service from the City’s water system. Any new domestic wells would be subject to the YCWRS requirements. The City does not currently have an ordinance that explicitly identifies the use of “exempt wells.”	5-2	
20	Review the enclosed copy of the current Water Quality Monitoring sheet. Note the following changes to the text provided on Pages 6-4 and 6-5. • Lead and Copper sampling is a distribution sampling requirement. • Some of the City’s sources were not granted waivers for specific Inorganic Chemical samples. • Radionuclide samples are required from the sources once every three years. • The information on these pages should be consistent with the information provided on Pages 6-11 and 6-12	The suggested revisions have been made to pages 6-4 and 6-5	6-4 and 6-5	

DOH Comment No.	DOH Comment	Water System Response	Page Number of Response	Other Water System Comments
21	Provide a copy of the Lead and Copper Monitoring plan, including a map of the sample sites. The plan must include a copy of the Public Notification requirements, and a sample map. It is in the City's best interest to include more than the 30 required sample sites; in the event a site must be replaced.	The City does not have a stand-alone Lead and Copper Monitoring plan. Sampling requirements provided in the City's Water Quality Monitoring Schedule (WQMS) are followed. A current list of sampling sites and results is provided on Page 3-13. DOH notification requirements are followed for lead and copper sampling and results.	Page 3-13	
22	No comment.	N/A	N/A	
23	No comment.	N/A	N/A	
24	Provide text discussion of annual reserve goals.	The City has adopted a financial policy of maintaining a reserve fund balance of at least 25% of annual operation and maintenance expenses for each utility. They have also adopted a policy of maintaining an operating fund balance of at least 20% of annual operating expenditures. This text discussion has been added to Section 9.1.	9-3	
25	Page 9-4, DWSRF, applications are accepted once a year between October 1st and November 30th.	The application dates have been changed.	9-4	
26	Page 9-6, Table 9-4, DWSRF does not allow projects for the purpose of fire flow or growth.	Text was added to Table 9-4 to clarify that DWSRF funds cannot be utilized for fire flow or growth-related projects.	9-6	
27	Section 1, provide signed Threshold Determination	A signed threshold determination has been added to Chapter 10, Section 1.	Chapter 10	
28	Section 7, provide updated letter from Selah Fire Department.	An updated letter from the Selah Fire Department has been added to Chapter 10, Section 7.	Chapter 10	
29	The draft WSP must be stamped, dated, and signed by a professional engineer licensed in the state of Washington.	The final draft plan has been stamped, dated, and signed.	N/A	
30	Provide an updated and signed copy of the WFI. Please note, the information on the WFI must match the information in Section 3.3.1 Water Sources (Pages 3-19 through 3-21), which includes Table 3-18. The following for the sources is not correct; depth to open interval for all sources, and capacities for S03 and S06.	An updated and signed copy of the WFI has been added to Chapter 10, Section 2. The depth to open interval for S06 was incorrect in Table 3-18. This value has been updated in the table. Clarification has also been added to the table for casings that are perforated, and where open hole or screen assemblies exist.	Chapter 10 Page 3-21	
31	Provide a copy of the notice sent to adjacent utilities regarding the draft WSP and copies of any responses.	A copy of the notice sent to adjacent utilities regarding the draft WSP has been added to Chapter 10, Section 1.	Chapter 10	
32	The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation (agenda/public notice and singed meeting minutes) of a consumer meeting discussing the Water System Plan prior to its approval.	A copy of the consumer input process documentation has been added to Chapter 10, Section 4.	Chapter 10	
33	Following receipt of the WSP second draft, review, and any final comments, DOH will notify you that the document is ready for approval. At that time the governing body will need to officially approve the WSP and send DOH documentation of plan approval by the governing body, such as a copy of the signed meeting minutes or a copy of the signed resolution. When the documentation is received, we will send a letter documenting DOH approval. Approval by the governing body prior to DOH notification may result in re-adoption requirement.	Noted.	N/A	

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
EASTERN DRINKING WATER REGIONAL OPERATIONS
16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830
711 Washington Relay Service

October 7, 2020

Sherry Raymond, Mayor
City of Selah
115 W Naches Ave
Selah, WA 98942

Subject: Selah City of; PWS ID #77400; Yakima County
Water System Plan; Submittal #20-0703; DOH Comments

Dear Mayor Raymond:

Thank you for providing the draft Water System Plan (WSP) for the City of Selah received in this office on July 8, 2020. The following comments will need to be addressed before the Department of Health (DOH) can approve the document:

Introduction

1) Under "Planning Requirements", the DOH *Water System Planning Guidebook* was adopted in August 2020.

2) Page ii, the WSP is not required every 6 years. It is a requirement for water systems over 1,000 connections and approvals can be granted for up to 10 years, depending on provided projections.

Chapter 1

3) Page 1-5, section 1.2.3, and page 1-14, section 1.8, would the city consider consolidation with neighboring systems if need arises? If so, what addition steps would be required?

4) Provide Yakima County land use (current and future) for properties within the city's future service area.

5) Provide Local Government Consistency Determination forms from Selah Planning Department and Yakima County Planning Department. Include a subsection in Chapter 1 referencing these forms in Chapter 10.

Chapter 2

6) Chapter 2, general comment: provide a statement that confirms that "service" is the same as "connection".

7) Provide at least one complete production year, per source, with monthly production values.

8) Page 2-8, Figure 2-1, in addition to this Figure, provide a Figure or table comparing seasonal water use over one full year from the different customer classes.

Chapter 3

9) Page 3-30, Table 3-24, while not required, DOH recommends the Asset Condition Assessment go a step further by defining a criticality scale and assigning criticality values to assets. This additional step may provide the city with additional bonus points on DWSRF applications.

10) Page 3-36, Table 3-26, provide years for 10-year and 20-year forecasts (2031, 2041).

11) The Department of Ecology has issued a comment letter regarding this submittal dated August 12, 2020. Please address the issues, if any, contained in the letter in the second draft submittal.

Chapter 4

12) Provide documentation of WUE goal adoption, including public notice, signed meeting minutes, and signed resolution.

13) Page 4-4, Water Bill Notifications, please specify how many customer classes receive these notifications.

14) Provide water demand projections for the plan approval period (2031) and 20-year period (2041) with water use efficiency savings and demand forecast if all cost-effective WUE measures are implemented.

15) Provide text that explores reclaimed water opportunities.

Chapter 5

16) Provide text discussion and reference to Chapter 10 regarding the sanitary control area (SCA) covenants, deeds, and additional protections, such as signage and fencing.

17) Page 5-1, 5-2, the Potential Contaminant Source and Notification List must be updated.

18) Provide updated contaminant and time-of-travel (minimum calculated fixed radius) map for all city sources.

19) Clarify the section on Page 5-2 about the use of "Exempt Wells" within the City of Selah service area. Consider the following questions:

- Does the city attempt to identify an area within the Retail Service Area and outside of the existing city limits?
- If the area is within the city limits, is the city building and planning department reviewing whether the proposed wells are sited and constructed properly, meet general water quality standards?
- Are these domestic wells subject to the County's ordinance process for new domestic wells? This information is available under the Yakima County Water Resource System (YCWRS).
- Did the city include an ordinance that explicitly identifies the use of these wells, and limit them for a single home? In some cases, these wells will be shared or used to create a small public water system.
- The city should note these wells will be required to be decommissioned in the future. Most domestic wells do not meet the approval requirements, including water quality, capacity, sanitary control area, and so forth, for use as a large city well.

Chapter 6

20) Review the enclosed copy of the current Water Quality Monitoring sheet. Note the following changes to the text provided on pages 6-4 and 6-5.

- Lead and Copper sampling is a distribution sampling requirement.
- Some of the city's sources were not granted waivers for specific Inorganic Chemical samples.
- Radionuclide samples are required from the sources once every three years.
- The information on these pages should be consistent with the information provided on Pages 6-11 and 6-12.

21) Provide a copy of the Lead and Copper Monitoring plan, including a map of the sample sites. The plan must include a copy of the Public Notification requirements, and a sample map. It is in the city's best interest to include more than the 30 required sample sites; in the event a site must be replaced.

Chapter 7

22) None.

Chapter 8

23) None.

Chapter 9

24) Provide text discussion of annual reserve goals.

25) Page 9-4, DWSRF, applications are accepted once a year between October 1st and November 30th.

26) Page 9-6, Table 9-4, DWSRF does not allow projects for the purpose of fire flow or growth.

Chapter 10

27) Section 1, provide a signed Threshold Determination.

28) Section 7, provide updated letter from Selah Fire Department.

Other

29) The draft WSP must be stamped, dated, and signed by a professional engineer licensed in the state of Washington.

30) Provide an updated and signed copy of the WFI. Please note, the information on the WFI must match the information in section 3.3.1 Water Sources (Pages 3-19 through 3-21), which includes Table 3-18. The following for the sources is not correct; depth to open interval for all sources, and the capacities for S03 and S06.

31) Provide a copy of the notice sent to adjacent utilities regarding the draft WSP and copies of any responses.

32) The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation (agenda/public notice and signed meeting minutes) of a consumer meeting discussing the Water System Plan prior to its approval.

33) Following receipt of the WSP second draft, review, and any final comments, DOH will notify you that the document is ready for approval. At that time the governing body will need to officially approve the WSP and send DOH documentation of plan approval by the governing body, such as a copy of the signed meeting minutes or a copy of the signed resolution. When the documentation is received we will send a letter documenting DOH approval. Approval by the governing body prior to DOH notification may result in re-adoption requirement.

END OF COMMENTS

The department's review of your water system plan does not confer or guarantee any right to a specific quantity of water. Our review is based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have

use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

We hope that you have found these comments to be clear, constructive, and helpful in the development of your final WSP. We ask that you submit **two copies** (one paper, one electronic) of the revised WSP **on or before February 7, 2021.** In order to expedite the review of your revised submittal, please complete the enclosed DOH Comment Response Form summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.).

Regulations establishing a schedule for fees for review of planning, engineering, and construction documents have been adopted (WAC 246-290-990). Please note that we have included an invoice for **$3,705** for the review of the Water System Plan. This fee covers our cost for review of the initial submittal, plus the review of one revised document. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: DOH, Revenue Section, P.O. Box 1099, Olympia, WA 98507-1099.

Thank you again for submitting your draft Water System Plan for our review. If you have any comments or questions concerning our review please contact either of us at (509) 329-2120 or (509) 329-2137, respectively.

Sincerely,

Andres Cervantes, PE
Regional Engineer
Office of Drinking Water
Division of Environmental Public Health

Jamie Gardipe
Regional Planner
Office of Drinking Water
Division of Environmental Public Health

Enclosures: Invoice
Comment Response Form

cc: Yakima Health District
Yakima County Planning Department
Daniel Jones, Foreman, City of Selah
Justin Bellamy, PE, HLA Engineering and Land Surveying
Ying Fu, Department of Ecology, Eastern Regional Office
George Simon, DOH Compliance Program Manager
Matt Hadorn, DOH Regional Specialist

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Office of Drinking Water
INVOICE
Engineering, Planning, and Sanitary Survey Review Form

TO: SHERRY RAYMOND, MAYOR
SELAH CITY OF
220 SOUTH RUSHMORE ROAD
SELAH WA 98942

Invoice Number	E002783
Invoice Date	October 7, 2020
Billing Period	30 days EA

DATE	DESCRIPTION	QTY	COST	AMOUNT
7/8/20	REVIEW AND/OR APPROVAL OF PROJECT REPORT SELAH CITY OF YAKIMA COUNTY – PWS ID # 77400 WSP UPDATE SUBMITTAL #: 20-0703	1	1	$3705.00
	DOH Share			-$0.00
	Total			$3705.00
	Payment due within 30 days. Interest shall accrue at 1% per month after 30 days.			

Make Checks Payable to Department of Health
Return Lower Portion to:
Department of Health
PO Box 1099
Olympia, WA 98507-1099

Office of Drinking Water
Engineering, Planning, and Sanitary Survey Review Form

NAME	SELAH CITY OF
INVOICE NUMBER	E002783
INVOICE DATE	10/7/2020 20-0703 EA
AMOUNT	$3705.00

DOH Form #331-332

Return to:
Department of Health
Revenue Section
PO Box 1099
Olympia, WA 98507-1099

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).

2 044129 00878

DOH COMMENT RESPONSE FORM

DOH Comment No.	DOH Comment	Water System Response	Page Number of Response	Other Water System Comments

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N Monroe Street • Spokane, Washington 99205-1295 • (509)329-3400

COPY

August 12, 2020

SCANNED

RECEIVED
AUG 14 2020
DEPARTMENT OF HEALTH
EASTERN REGIONAL OFFICE

Ms. Sherry Raymond, Mayor
City of Selah
115 W. Naches Ave
Selah, WA 98942

Re: City of Selah; PWS ID # 77400; Yakima County
Water System Plan Update; DOH Project #20-0703

Dear Ms. Raymond:

I have reviewed the above referenced document in accordance with the *2007 Memorandum of Understanding* between Department of Health (DOH) and Department of Ecology (DOE), and in accordance with RCW 90.03.386. Ecology's review is focused only on the subject water system's water rights legitimacy, adequacy and related issues affecting the submitted report.

City of Selah has 7 water rights. They are all listed in the Water Right Self-Assessment Table 3.26. They seem to be accurate and current. The city has total Qi (instantaneous flow) quantity of 5,500 gpm; total Qa (annual quantity) of 4,700 ac-ft/year. The City has adequate water rights to support its current operation, 10 year and 20 year growth.

If the City has concerns about water right total Qi as the limiting factor beyond 2041 for ERU capacity, the City can apply for Qi only water right. Requesting additional Qi with zero Qa is not appropriation of additional water resource Qa, so the application and processing period should be fairly short without the usual waiting in line process. Also, the City can consider consolidating all their water rights, so each individual well can pump up to the total Qi quantity as long as all wells are in the same body of ground water.

These are my comments at this time. Please don't hesitate to contact me should you have any questions regarding this letter. I can be reached at (509) 329-3451 or by email at yifu461@ecy.wa.gov.

Sincerely,

Ying Fu
Water Resources Program

YF:em
cc: Jamie Gardipe, DOH/ERO
Scott Turner, DOE/CRO

4.
CONSUMER MEETING & WATER SYSTEM PLAN ADOPTION

HLA
Engineering and Land Surveying, Inc.

City of Selah Notice of Public Study Session – Consumer Input Meeting

Posted on February 1, 2021 (February 1, 2021) by mlake

The City of Selah has scheduled a public study session and consumer input meeting for February 9, 2021, to review the City of Selah's, draft 2021 Water System Plan update which is required by the Washington State Department of Health, and WAC 246-290-100(8). Notice is hereby given by the City of Selah, Washington, City council will conduct the required study session – consumer input meeting on **Tuesday, February 9, 2021**, **commencing at 3:30 p.m.**, or as soon thereafter via Zoom.

Copies of the water system plan are available for inspection during regular business hours at the City of Selah Planning Department, 222 South Rushmore Road, Selah, WA. And at https://selahwa.gov/water-irrigation/.

COVID-19 Notification: Interested parties, please be advised in accordance with the multiple proclamations by the governor of the State of Washington, (in particular proclamation 20-28) guidance from the State Attorney General on the requirements of the Open Public Meetings Act, directives by the State Health Department and Yakima Health District regarding COVID-19, the above scheduled study session may be held by electronic and telephonic means via Zoom. Procedures for attendance of this study session will be provided on the City of Selah's website along with the city council agenda.

If you have questions please feel free to contact Jeff Peters, Community Development Supervisor by phone at (509) 698-7365, by fax at (509) 698-7372 or by e-mail at jeff.peters@selahwa.gov.

‹ Interested in serving on the Planning Commission?

News

- **Interested in serving on the Planning Commission?**
  January 26, 2021
  The City of Selah is currently accepting applications from individuals ...Read More »
- **Notice of Council Retreat Jan. 27, 2021**
  January 19, 2021
  PLEASE TAKE NOTICE that the City of Selah City Council ...Read More »
- **Notice of Civil Service Meeting**
  January 12, 2021
  There will be a special meeting of the City of ...Read More »
- **Notice of Lodging Tax Advisory Committee Special**

YAKIMA HERALD-REPUBLIC
WE TELL YOUR STORIES YAKIMAHERALD.COM
El Sol de Yakima

-Ad Proof-

This is the proof of your ad scheduled to run on the dates indicated below.
Please confirm placement prior to deadline, by contacting your account rep at (509) 759-7970.

Date:	01/29/21
Account #:	110017
Company Name:	CITY OF SELAH
Contact:	Kim White,AP
Address:	115 W NACHES AVENUE SELAH, WA 98942
Telephone:	(509) 698-7327
Fax:	

Ad ID:	970131
Start:	02/02/21
Stop:	02/02/21
Total Cost:	$106.95
# of Inserts:	2
Lines:	62.0
Ad Class:	6021
Ad Class Name:	Public Legal Notices
Account Rep:	Merrijo Goodman
Phone #	(509) 759-7970
Email:	mgoodman@YAKIMAHERALD.COM

Run Dates:

Yakima Herald-Republic	02/02/21
YakimaHerald.com	02/02/21

Ad Proof

City of Selah Notice of Public Study Session – Consumer Input Meeting: The City of Selah has scheduled a public study session and consumer input meeting for February 9, 2021, to review the City of Selah's, draft 2021 Water System Plan update which is required by the Washington State Department of Health, and WAC 246-290-100(8).: Notice is hereby given by the City of Selah, Washington, City council will conduct the required study session – consumer input meeting on **Tuesday, February 9, 2021, commencing at 3:30 p.m.**, or as soon thereafter via Zoom: Copies of the water system plan are available for inspection during regular business hours at the City of Selah Planning Department, 222 South Rushmore Road, Selah, WA. And at https://selahwa.gov/water-irrigation/.: **COVID-19 Notification:** Interested parties, please be advised in accordance with the multiple proclamations by the governor of the State of Washington, (in particular proclamation 20-28) guidance from the State Attorney General on the requirements of the Open Public Meetings Act, directives by the State Health Department and Yakima Health District regarding COVID-19, the above scheduled study session may be held by electronic and telephonic means via zoom. Procedures for attendance of this study session will be provided on the City of Selah's website along with the city council agenda.: if you have questions please feel free to contact Jeff Peters, Community Development Supervisor by phone at (509) 698-7365, by fax at (509) 698-7372 or by e-mail at jeff.peters@selahwa.gov. Dated this 29th day of January 2021.

(970131) February 2, 2021

Study Session Minutes
Selah City Council
February 9, 2021
3:30pm

Mayor Raymond opened the Study Session on the Water System Plan then turned the meeting over to Public Works Director Henne and Justin Bellamy, HLA Engineering and Land Surveying, Inc.

Public Works Director Henne said that the plan is in draft form and substantially complete, covering construction, future projects, the financial aspects of the water system, and future rate requests. He noted that the plan was provided to Council on thumb drives. introduced Justin from HLA as author of the document, want to focus mostly on future projects and the financial chapter, can also discuss other portions of the document

Justin Bellamy gave an overview of the plan, referring to several pages in the plan that are shared on screen. Starting with background information, he explained that water systems are a WAC requirement administered by the State Department of Health, which are required to be updated every ten years, with the purpose of the plan to demonstrate system capacity for present and future water system demands, and provide eligibility for future funding opportunities with improvements identified in the plan. He reviewed the current water system, discussing the different pressure zones, the booster stations, wells, and reservoirs; laid out the improvements identified as future projects in the plan; and explained the financial plan, including a proposed summary of the budget, projection of future revenues and expenditures for the system, and the water rate structure.

Discussion followed, including topics such as estimates on water use reduction via raising the rate adjustment; advantages to automatic meter reading system; water rights and the potential of acquiring more in the future; Crusher Canyon development; encouraging low water usage landscaping for new and existing construction; warehouses using well water; and finalizing the document, which includes a ninety-day review and comment period with the Health Department.

The Study Session ended at 4:59 pm.

City of Selah
Council Minutes
February 9, 2021

Regular Meeting
Electronically Via Zoom
115 West Naches Avenue
Selah, WA 98942

A. Call to Order — Mayor Raymond called the meeting to order at 5:30 pm.

B. Roll Call

Members Present: Kevin Wickenhagen; Jacquie Matson; Clifford Peterson; Roger Bell; Russell Carlson; Suzanne Vargas; Michael Costello

Members Absent: None

Staff Present: Donald Wayman, City Administrator; Rob Case, City Attorney; Dale Novobielski, Clerk/Treasurer; Dan Christman, Police Chief; Gary Hanna, Fire Chief; Jim Lange, Deputy Fire Chief; Joe Henne, Public Works Director; Jeff Peters, Community Development Supervisor; Ty Jones, Public Works Utility Supervisor; Treesa Morales, Public Records Specialist; Monica Lake, Executive Assistant

C. Councilmember Absence – Motion to Excuse **None**

D. Pledge of Allegiance

Mayor Raymond led the Pledge of Allegiance.

E. Invocation

Pastor Tom Morris gave the prayer.

F. Agenda Changes **None**

G. Public Appearances/Introductions/Presentations

1. Katrina Henkle, Selah Downtown Association – Update

Katrina Henkle, Selah Downtown Association (SDA) Executive Director, addressed the Council. She said that, as mentioned at the past few meetings, they have the have façade grant open through 26th of this month, and have only received one application thus far. She remarked that they are also getting ready for the business discovery easter egg hunt and asked that businesses check their emails and let her know if they want to participate. She commented that they have a We heart Selah display in the old Belltone building to draw attention to the space, and are working on showing three sixty-degree tours of empty commercial and business spaces in town. She noted that they are working on new bins of flowers for the year.

H. Getting To Know Our Businesses **None**

I. Communications

1. Oral

Mayor Raymond opened the Public Meeting.

City Attorney Case read aloud the rules of conduct as stated in the Agenda.

Executive Assistant Lake said that there were three comments submitted to be read aloud.

From Daniel Callahan, Selah:

I believe the city should open up the position of city attorney to new applicants in order to weigh all the options Selah could potentially have. Perhaps Selah could get a better deal on an attorney, since $160,000 is a rather steep price for the taxpayers. Especially considering no city attorneys get paid a similar salary for any city of Selah's size and approximate geographic location. I think it would be pretty likely that attorneys in the area would agree to a more normal salary. Perhaps Selah could also look for an attorney that could skillfully keep the city from getting sued. After all there are 3 lawsuits that have come about just in the past year alone.

From Mindy Clark, Selah:

The personal lawyer for City Administrator Donald Wayman, should not be the city of Selah's attorney. Mayor Raymond and City Council members need to listen to the Selah residents they represent. Documents were signed by Rob Case stating that there would be no conflict of interest, but to the residents of Selah, there certainly is the impression of one. I do believe we do not need a full-time attorney and I believe our current, part time, attorney needs to be replaced.

From Julianne Moore, Selah:

I think the salary for the City Attorney is too high
The Council should look at Attorney General office, staff Attorney salaries to establish a salary range

Mayor Raymond closed the Meeting.

2. Written **None**

J. Proclamations/Announcements **None**

K. Consent Agenda

Executive Assistant Lake read the Consent Agenda.

All items listed with an asterisk (*) were considered as part of the Consent Agenda.

* 1. Approval of Minutes: January 26, 2021 Council Meeting

* 2. Approval of Claims and Payroll:

Payroll Checks Nos. 84068 – 84084 for a total of $286,509.92
Claim Checks Nos. 76064 – 76131 for a total of $215,860.98

* 3. Resolution N – 1: Resolution Accepting the East Goodlander Road Improvements Project, STPUS-4710(001) as Complete

* 4. Resolution N – 3: Resolution Authorizing the Mayor to Sign the Kilpatrick Outside Utility Agreement (OUA 21-001)

Council Member Bell moved, and Council Member Costello seconded, approval of the Consent Agenda as read. By a show of hands, approval was unanimous.

L. Public Hearings **None**

M. General Business

1. New Business

a. Facilities Committee

Mayor Raymond addressed M – 1a. She said that during their retreat they discussed having a facilities committee, and requested that those Council Members who had expressed interest remind her who they were.

Council Members Carlson, Costello, Bell and Peterson all indicated their interest.

Mayor Raymond commented that four Council Members would put them in violation of the Open Public Meetings Act, and asked if one of the four would like to step back. Seeing no indication from any of them that they would do so, she stated that Council Members Costello, Peterson and Bell would form the committee and work together on a plan. She added that Police Chief Christmas would be there for them to ask questions and discuss the matter as they moved forward with the process.

Council Member Bell remarked that part of their discussion had been whether it would be a police station or a combination police station/city hall, and wondered if they were to consider just a police station or an option for both.

Mayor Raymond responded that she thought they had decided on just a police station.

Council Member Carlson felt that they had talked about all options, but in an effort to save costs they had discussed a remodel to City Hall and a new police station.

Mayor Raymond asked Council Member Bell if that answered his question.

Council Member Bell replied in the affirmative.

Mayor Raymond said that the three committee members should get together and decide how they were going to meet to fulfill the committee.

Police Chief Christman commented that he remembered discussion as to whether the court would be included in the same facility.

Mayor Raymond answered that it would be included. She noted that Amy Swayze and Samantha Peterson had been appointed to fill the two positions on the Planning Commission. She went on to say that they would both be attending the meeting next Tuesday to listen in, then start as full Commissioners at the next meeting.

Council Member Carlson inquired who was leaving the Planning Commission.

Mayor Raymond replied that the two departing were Jennifer Huber and Christine Moore.

2. Old Business **None**

N. Resolutions

* 1. Resolution Accepting the East Goodlander Road Improvements Project, STPUS-4710(001) as Complete

2. Resolution authorizing the Mayor to extend a contractual offer to D. R. (Rob) Case to become the City's full-time, directly-employed City Attorney and, if he accepts such offer, further authorizing the Mayor to sign and enter into an "Employment Contract" with him

City Administrator Wayman addressed N – 2. He read aloud the title of the Resolution, saying that he had a pen change to start with on paragraph 3.1, where it says that employee shall receive employee's step scale increases, which was to be stricken as they don't have a step process for that position,.

Council Member Peterson asked if they were striking the sentence containing 'at the turn of each calendar year'.

City Administrator Wayman replied in the affirmative. He said that staff recommends approval, with no fiscal impact as the budget was already approved for the position at that rate, noting that they have the attorney present who worked with them on the contract, who could answer the more technical aspects of the contract if Council had questions. He stated that the City Attorney position was created through Selah's Municipal Code, with the duties of said position outlined in State RCW, and that this particular position is a little more unique in that the Mayor chooses the City Attorney to present to Council for confirmation, and in a case of separation, discharge or firing, that must be confirmed by Council as well, providing a second level of protection for the City. He remarked that Rob Case was selected in a competitive process that went out for bid in September 2019, and entered into a contract with the City with a last paragraph worded the way it was as they were contemplating adding a full-time attorney on staff, then read aloud the pertinent section of the City Attorney's contract. He went on to talk about City Attorney Case's background, his accomplishments as a litigator at the local, State, and Federal levels,

his extensive experience in real state matters, union grievances and appeals, contract negotiations, tax appeals, and his recent success with regard to the Owens appeal case. He added that City Attorney Case also crafted the Mayor's Proclamation with regard to the Governor's Stay Safe, Stay Home Proclamation, of which not one bit needed to be changed per the Governor's office and County Prosecutor Brusic, and was actively defending the City on three other lawsuits. He requested that Judge Federspiel comment on City Attorney Case's performance before Council asked questions.

Doug Federspiel addressed the Council. He said that over the ten years he was on the bench he had the privilege of having some cases and motions litigated in front of him by City Attorney Case, and his observations from memory were that he is a very aggressive litigator and aggressively represents his clients, relating one instance as an example. He remarked that when attorneys begin they are often uniformly aggressive in all cases all the time, and as they mature they learn when to be aggressive appropriately and when to sit back, and his observations over that period of time were that City Attorney Case did a good job of evolving from a young litigator to knowing what fights to pick and remain aggressive and which ones to sit back and let go under the bridge. He stated that he didn't have any criticisms of his litigation that he had the privilege of having him in front of him in court on.

City Administrator Wayman said that the recommended motion is approval of the Resolution to enter into a contract with City Attorney Case.

Council Member Matson questioned paragraph 6.1 where it stated that the City would pay employee six months of applicable salary as a severance payment, saying that she would like to have that discussed and shortened, as she understands the need for severance but felt that six months was a bit long.

City Administrator Wayman asked if she thought it was a bit much.

Mayor Raymond wondered what she would prefer as a shorter amount of time.

Council Member Matson suggested that a three-month period of time would be more applicable.

City Administrator Wayman requested that she confirm the three-month period of pay.

Council Member Matson replied that was correct.

City Administrator Wayman said that they discussed and had some negotiation, and this was what both parties felt was most equitable if he had to be discharged without cause. He expressed confidence that if that was necessary, it would preclude the City from having to go into a nastier breakup, while handing out a three-month severance without cause could actually lead them into litigation that could result in a much bigger layout of cash by the City. He stated that they were trying to come up with the most equitable offer can if he had to go without cause, as litigation would likely follow with only a three-month discharge, as he could seek damages or recompense from the City for a reason not stated. He felt that a judge receiving this type of information would see that the City went out of its way to offer a six-month separation.

Mr. Federspiel remarked that there are two separate issues involved in termination under an at-will employment situation, noting that this was structured to be at the recommendation of the Mayor with

consent of the majority of Council if they decide to terminate the contract prior to 2030, and that he was reviewing the contract at the City's behest. He explained the reasoning behind the termination clause, outlining the pros and cons for both the City and City Attorney Case.

Council Member Matson commented that had answered her questions.

City Administrator Wayman remarked that another aspect of that is that City Attorney Case is coming to them not vested in any retirement program at this point, whereas the new Police Chief had come to the City already invested in a retirement program and was still offered a six-month severance in the unlikely case he needed to be separated without cause.

Council Member Vargas said that the sunset of nine years in the same paragraph seemed very long to her, given that she thought Police Chief Christman's was five years.

City Administrator Wayman responded that it goes back to him not being vested in retirement, as he would be coming out of the private sector to do municipal work for the City. He added that this was something City Attorney Case wanted and felt very strongly about, and they thought it was fair.

Council Member Wickenhagen expressed some concern regarding he moonlighting clause that would allow City Attorney Case to take on the clients he currently has for an unlimited amount of time without having an obligation to the City, as he didn't see how that was fair to the City or every other employee.

City Administrator Wayman referred Council to paragraph 8.73 of the contract, saying that City Attorney Case can't just drop the clients he currently has with matters that will need to be litigated and may not come to fruition for many years with the current situation affecting courts. He explained that City Attorney Case needs to see them through or com to an agreement with his clients, or he could be subject to discipline for failing to do what he committed to prior to taking the full-time position, but this would not allow him to take on new clients or cases beyond what he has, and he would be accounting for his time and coordinate with both the Mayor and himself to manage his caseload and provide the City with forty hours per week.

Council Member Wickenhagen requested that he specify the contract section that says he has to perform his eighty hours in the pay period.

City Administrator Wayman replied that it was in paragraph 1.4 and read the pertinent section aloud.

Council Member Vargas requested clarification regarding the language in paragraph three of page nine, which describes the clients he would be able to continue working with.

City Attorney Case explained that it would only be a pending current issue where a client has been seeking advice and needs additional advice just on that matter, as the idea was to wrap up his other cases as quickly as possible. He stated that ethically he cannot disclose all his clients, but it would not be an open-ended situation, only pertaining to something active and ongoing with the necessity for more advice before being concluded.

Council Member Carlson wondered how they would monitor that to stay protected and ensure they were getting their service for the City, indicating a clause says that there are days on end when he might not be around, questioning how they would double-check that and make stay accountable to the taxpayers.

City Administrator Wayman replied that they have time sheets where he will have to account for his hours at end of each pay period, and that he would work with himself, the Mayor, or the Clerk/Treasurer in making up those hours. He added that they would not be asking for a list of clients, but they would certainly be ensuring that he was providing them the hours he signed up to do and was getting paid for.

Council Member Carlson pointed out that there are only so many hours in a day or week and how would they protect themselves. He remarked that the whole proposal was based on the need for a full-time attorney yet this would be allowing their attorney to not be there full-time during business hours.

City Administrator Wayman answered that the caseload they were talking about wouldn't take him away for long periods of time frequently, and that if he was unable to meet those hours he would be in breach of contract. He added that City Attorney Case knows what the expectations are and he's willing to work with them and manage his legacy clientele on his own time.

Council Member Carlson commented that he was having a hard time with the concept that cases cannot be passed off, opining that it happens all the time with very good attorneys for various reasons, and to claim it's an undefined time frame is a challenge. He also felt the nine-year clause was a big challenge, as was the inclusion of the contractual authority of the City Administrator instead of the Mayor as they had specifically amended in the Police Chef's contract. He added that he was in the private sector and failed to see why risk couldn't be taken as everyone takes risks, and that while he understood the request for a contract, he didn't understand the need nor did he like setting a precedent that provided authority to someone other than the Mayor or her designee.

Mayor Raymond replied that there were a lot of differences between the Police Chief's contract and this one, as the Police Chief is close to retirement while City Attorney Case is young and has years before he retires. She asked if he would expect the City Attorney to drop him if he were a client.

Council Member Carlson commented that they can't consider age as a hiring factor.

Mayor Raymond answered that they weren't, but when the Police Chief came in they understood that they might only have him for five years.

Council Member Carlson opined that retirement was the responsibility of each individual, and he didn't feel they could give him an offer based on whether he has retirement or not. He reiterated that people take risks all the time for new employment, and to provide a nine-year moonlighting was extreme when he knows attorneys pass of clients all the time.

Mr. Federspiel remarked that each individual instance is unique and there's not a uniform methodology for moving from point a to point b. He added that, while Council Member Carlson's comments were well-taken, there are many different factors to consider such as whether the person was sole practitioner or a member of a firm to transition out of their client base, and it also depends on the nature of the practice. He went on to say that there's no set protocol for it, it's just dependent on a case by case

scenario, but Council Member Carlson's observations are well-taken to at least raise the issue to have a conversation about that. He noted that his involvement wasn't to negotiate the terms, but to look at the drafting aspect of it.

City Attorney Case started by saying that he was trying to stay mostly muted and off video to avoid the appearance of advocating for the contract and advising the City on the matter. He confirmed that Mr. Federspiel wasn't involved in negotiations, but City Administrator Wayman thought it advisable to protect the City's interest by retaining Mr. Federspiel for consistency, logic, and so on. He understood the issue raised by Council Member Carlson but didn't see why it mattered, so long as City got its requisite number of hours and adequate service from it, and that he wasn't contemplating a nine-year moonlighting period. He referred Council to paragraph 1.2 with regard to the earlier question about supplanting the Mayor and putting the City Administrator over the position, reading aloud the pertinent part then clarifying it was not drafted in a way to have the City Administrator supplant the Mayor. He clarified that there would have to be a transition if he was selected to be the City's full-time attorney, and that while some cases would be easier to hand off than others, the City would still receive the appropriate hours within each pay period, so he failed to see how that matters.

Council Member Carlson replied that he did see section 1.2 but opined that the wording gave additional authority and discretion to the City Administrator without the direction of the Mayor, which he disagrees with. He commented that he had discussed the period of time needed to transfer cases with some attorneys, who indicated that six months was very generous, and he felt that offering a year and a half more than appropriate. He stated that he was not in favor of the six-month severance package or the nine-year sunsetting, as he didn't believe it necessary in an employee's contract.

Council Member Wickenhagen moved to approve the Resolution authorizing the Mayor to extend a contractual offer to D. R. (Rob) Case to become the City's full-time, directly-employed City Attorney and, if he accepts such offer, further authorizing the Mayor to sign and enter into an "Employment Contract" with him, with the following changes: that in Section 1.1 the termination earlier than December 31 be changed from year 2030 to 2026, and that the City will pay employee three months of severance pay.

Mayor Raymond asked that he repeat his motion.

Council Member Wickenhagen repeated his motion.

Council Member Carlson wanted to encourage-

Council Member Wickenhagen called point of order, saying they have to wait for a second.

Council Member Costello said that, since that addressed his concerns, he would second the motion.

Council Member Carlson commented that they were allowed to take additional discussion.

Council Member Matson requested that the motion be read one more time.

Council Member Wickenhagen restated his motion.

Council Member Carlson requested a clause limiting the transition period.

Mayor Raymond stated that they have a motion and second and asked for roll call.

Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – no; Council Member Peterson -

Council Member Peterson said he was trying to decide if he had a point of order, as they have a motion to accept the contract with those changes, but Council Member Carlson had further changes to address, so he was trying to figure out a procedural way to accept the changes without ending discussion and coming to a final agreement. He opined that it fell under parliamentary procedure and things, so he wasn't sure procedurally if they were doing it in the right order.

Mayor Raymond asked for clarification on what he had said.

Council Member Peterson replied that Council Member Wickenhagen's motion was to accept the Resolution with those changes, which he views as sort of an amended motion, and wondered if accepting it would close the possibility of additional amendments.

City Administrator Wayman commented that he believes the Mayor was compelled to ask for a vote after receiving a second for the motion.

Mayor Raymond deferred to the City Attorney for his opinion on the matter.

City Attorney Case answered that his best understanding would be that because there was a motion and second, they need to finish roll call on that motion. He thought it well taken that Council Member Wickenhagen said it would to be approve with the changes to the underlying document, and that absent a withdrawal of the motion they should continue forward.

Council Member Peterson –no; Council Member Bell – yes; Council Member Costello – no; Council Member Carlson – no. Motion failed with three yes votes and four no votes.

Council Member Matson asked if they had the opportunity to have Council Member Carlson bring his concerns and additions to the contract with the failed motion.

Mayor answered in the affirmative.

Council Member Carlson urged Council to consider having a time period where transition of clients takes place, and also to remove the City Administrator's authority that comes in this contract to be consistent with the Police Chief, where authority resides solely with the Mayor and Mayor's designee.

Council Member Peterson inquired if they were headed for a motion.

Council Member Carlson opined that it was a simple legal issue to remove the authority provided to the City Administrator in the contract, as they did with the Police Chief's contract.

City Administrator Wayman reminded Council that the contract was crafted in concert with negotiations that had already been made with the potential employee, and any major change would have a strong likelihood that the employee would not sign the contract.

Council Member Vargas remarked that they seemed to be making adjustments they normally wouldn't just to get City Attorney Case to approve, adding the she would like to see someone selected in a competitive process, as the terms had changed so greatly that undoubtedly their pool would change as well, and they owed it to taxpayers to open it to a competitive process to get best terms for the City.

Mayor Raymond expressed her full confidence in City Attorney Case, saying that he was the best choice when initially hired and was the best choice now, and she would greatly appreciate it if Council would stand behind her, reminding them that this is her city just as it is City Attorney Case's city.

Council Member Matson asked if there was an opportunity to revise the contract with the suggestions made by Council and have it come back to them fully revised for their consideration.

City Administrator Wayman responded that what they have is what was negotiated, noting that they have gone back and forth on the severance and moonlighting clauses, and while he didn't want to misrepresent what City Attorney Case would say if there was a major revision, this is the deal he'll accept. He had no confidence that modifying it from the current form would be acceptable, pointing out that the Mayor has stated she has confidence in him now and that it's Council's job to confirm not to choose, along with the duty to ask if he's qualified. He opined that making major changes would be problematic, and asked if there was another motion to be made.

Council Member Matson opined that per to Mr. Federspiel, negotiating the terms of the contract was up to them, to make sure they were supplying the City with the best contract, and that there were enough concerns for a request for quite a few revisions. She felt that City Attorney Case understood what they were all doing there and reiterated her desire to discuss and revise the contract.

Council Member Bell commented that the Council doesn't have the same authority with other employee contracts as offered to them under this one, as they would have to vote to remove the City Attorney with a majority vote, which outs them in a stronger position of oversight than with other contracts. He suggested that the Mayor and City Administrator discuss the contract with City Attorney Case and bring it back at the next council meeting.

Council Member Peterson wasn't sure if that comment was a motion, but if it was he seconded it.

Council Member Bell moved, and Council Member Peterson seconded, that they send the contract back for renegotiation and bring it back to the next Council Meeting.

City Administrator Wayman requested clarification on what they were renegotiating.

Council Member Bell replied that he heard the different concerns voiced by Council and that they should discuss whether any of those were acceptable to City Attorney Case.

Council Member Wickenhagen started to make a motion.

Mayor Raymond told him to hold off as they had a motion on the table.

Roll was called: Council Member Wickenhagen –no; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – no. Motion passed with five yes votes and two no votes.

Mr. Federspiel thanked the Mayor and Council for the opportunity to assist the city of Selah in this respect, noting that he would be happy to help with additional assistance.

* 1. Resolution Authorizing the Mayor to Sign the Kilpatrick Outside Utility Agreement (OUA 21-001)

O. Ordinances

1. Ordinance Amending the 2021 Budget For Miscellaneous Adjustments

Clerk/Treasurer Novobielski addressed O – 1. He said that he has closed the books for 2020 and identified the amount of cash investments in various funds, reviewing the presented budget adjustment to adjust beginning cash investments and ending cash investments in the amount of approximately one point seven million dollars.

Council Member Wickenhagen moved, and Council Member Carlson seconded, to approve the Ordinance Amending the 2021 Budget For Miscellaneous Adjustments. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – yes. By voice vote, approval was unanimous.

P. Public Appearances **None**

Q. Reports/Announcements

1. Departments

Clerk/Treasurer Novobielski said that Thursday at 1pm they have an exit conference with the State Auditor concerning the recently completed accountability audit. He noted that Council Members Wickenhagen and Carlson had requested the link to attend, and that it also appears that Council Member Bell would like to participate as well, which is the limit as far as Council Member attendance.

Public Works Director Henne remarked that they were getting task orders together for Crusher Canyon water rights and to maintain the capacity of the treatment plant.

Community Development Supervisor Peters thanked the Mayor for bringing in two new Planning Commissioners to replace those leaving. He said that they would attend the meeting next Tuesday to go over the shorelines master program, and while the two new Commissioners wouldn't be voting, they would be introduced and become part of the Commission. He noted that at least one other Planning Commissioner has agreed to stay on until the public hearing is done and the process completed. He commented that they were trying to replace the Permit Technician in the next month or so.

Police Chief Christman said that he was looking forward to working with the committee on the building. He informed Council that they have concluded the process for selecting a new sergeant, and Michael Gause would become the new Sergeant as of February 16. He remarked that they have two new vacancies immediately in the entry level and would be wrapping up oral boards for these folks and also filling Gause's position from them.

City Attorney Case said that the City prevailed on appeal with the Owens litigation case to uphold the prior trial court decision, noting that the matter is public record if the public would like to look it up. He suggested that s Council Member make a motion to move the Resolution for the City Contract to a new section R/S for the next Council Meeting, to allow Department Heads to do their reports prior to the discussion, clarifying that the motion would be for the forthcoming meeting on February 23 to have the Resolution for a City Contract be considered as R/S on the agenda.

Council Member Carlson moved, and Council Member Matson seconded, to create a new one-time item for the agenda for our upcoming meeting R/S to consider potential revisions to the attorney position. By a show of hands, approval was unanimous.

Council Member Peterson wondered if R/S was appropriate since the agenda is established in code, and if they call it R/S did that put it under executive session and adjournment. He noted that they frequently have actions than between R and S.

City Administrator Wayman replied that they would look into the matter, as they frequently take votes after an executive session but he didn't feel there was anything wrong with doing so.

Council Member Peterson responded that he just thought there needed to be something between the executive session and adjournment.

2. Council Members

Council Member Bell had no report.

Council Member Peterson had no report.

Council Member Wickenhagen gave a brief update on Yakima Valley Tourism and commented that he was at Volunteer Park over the weekend and the playground was full of people.

Council Member Costello had no report.

Council Member Carlson reemphasized the SDA façade grant, opining that it was a fantastic program. He clarified that his no vote regarding the City Attorney contract was simply in attempt to have a competitive bid with parameters.

Council Member Matson had no report.

Council Member Vargas had no report.

3. City Administrator

City Administrator Wayman said that it was clear to him that Council wanted him to renegotiate a contract they've already negotiated and they found unacceptable, and requested an Executive Session that night to understand the parameters of what they would be discussing to present something coherent and have a full discussion.

Executive Assistant Lake asked for a moment to review the RCW concerning Executive Sessions.

Mayor Raymond commented that they would be hosting the YVCOG meeting.

City Administrator Wayman replied that they are wanting to discuss what's going on in Selah.

Mayor Raymond noted that it would be next Wednesday night.

Community Development Supervisor Peters asked if staff could be excused.

Mayor Raymond excused staff and called for a three-minute recess.

Executive Assistant lake read aloud the RCW 42.30.110(1)(g), which states "To evaluate the qualifications of an applicant for public employment or to review the performance of a public employee. However, subject to RCW 42.30.140(4), discussion by a governing body of salaries, wages, and other conditions of employment to be generally applied within the agency shall occur in a meeting open to the public, and when a governing body elects to take final action hiring, setting the salary of an individual employee or class of employees, or discharging or disciplining an employee, that action shall be taken in a meeting open to the public", and said that there could be no Executive Session as requested.

City Administrator Wayman commented that he would try to capture what they discussed tonight.

4. Boards **None**

5. Mayor

Mayor Raymond clarified that the YVCOG meeting would be hosted remotely by Selah.

R. Executive Session **None**

S. Adjournment

Council Member Carlson moved, and Council Member Matson seconded, that the meeting be adjourned. By a show of hands, approval was unanimous.

The meeting adjourned at 7:33pm.

Sherry Raymond, Mayor

Roger Bell, Council Member

Russell Carlson, Council Member

Jacquie Matson, Council Member

Kevin Wickenhagen, Council Member

Clifford Peterson, Council Member

Suzanne Vargas, Council Member

ATTEST:

Michael Costello, Council Member

Dale E. Novobielski, Clerk/Treasurer

5.
WUE PROGRAM GOAL ADOPTION

HLA
Engineering and Land Surveying, Inc.

RESOLUTION NO. 2826

A RESOLUTION OF THE CITY OF SELAH, WASHINGTON ADOPTING WATER USE EFFICIENCY (WUE) GOALS AND MEASURES.

WHEREAS, the Department of Health (DOH) requires all public water systems evaluate and reestablish water use efficiency (WUE) goals through a public process as part of updating a water system plan, in accordance with WAC 246-290-830, and

WHEREAS, the WUE program is intended to help water customers use water more efficiently and reduce future water system demands, and

WHEREAS, the WUE goals must include evaluation and reestablishment of measures supporting how the goals will be met, and

WHEREAS, it is the goal of the City to promote water conservation, and

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SELAH, that the following WUE goals and measures are hereby adopted

GOAL: Reduce the current residential average day consumption per service by 2% over the next ten years.

MEASURES:

1. New Service Connection Charge Based on Consumption (Equivalent Residential Unit, "ERU")
2. Water Bill Notification (Consumption History)
3. Heritage Garden Demonstration
4. Customer Leak Detection
5. Include Water Efficiency Program in City web page
6. Water Rate Structure (Inclining Block Rate)

PASSED BY THE CITY COUNCIL AND APPROVED BY THE MAYOR AT ITS REGULAR MEETING ON December 8, 2020.

Sherry Raymond

Sherry Raymond, Mayor

ATTEST:

Dale Novobielski, Clerk Treasurer

APPROVED AS TO FORM:

Rob Case, City Attorney

RESOLUTION NO. 2826

City of Selah
Council Minutes
December 8, 2020

Regular Meeting
Electronically Via Zoom
115 West Naches Avenue
Selah, WA 98942

A. Call to Order — Mayor Raymond called the meeting to order at 5:30 pm.

B. Roll Call

Members Present: Kevin Wickenhagen; Jacquie Matson; Clifford Peterson; Roger Bell; Russell Carlson; Suzanne Vargas; Michael Costello

Members Absent: None

Staff Present: Donald Wayman, City Administrator; Rob Case, City Attorney; Dale Novobielski, Clerk/Treasurer; Dan Christman, Police Chief; Gary Hanna, Fire Chief; Jim Lange, Deputy Fire Chief; Joe Henne, Public Works Director; Jeff Peters, Community Development Supervisor; Zack Schab, Parks & Recreation Manager; Treesa Morales, Public Records Specialist; Monica Lake, Executive Assistant

C. Councilmember Absence – Motion to Excuse **None**

D. Pledge of Allegiance

Mayor Raymond led the Pledge of Allegiance.

E. Invocation

Council Member Wickenhagen gave the prayer.

F. Agenda Changes

Mayor Raymond stated that items O – 2 and O – 3 had been amended earlier that day, with copies provided to Council via email and uploaded to the website, and that the two items had also flipped spots as the 2021 Salary Ordinance required approval prior to approval of the 2021 Budget.

G. Public Appearances/Introductions/Presentations

1. Katrina Henkle, Selah Downtown Association – Update

Katrina Henkle, Selah Downtown Association (SDA) Executive Director, addressed the Council. She said that the lighted trucks were delightful on Friday, and that she posted a video on the SDA Facebook page. She added that they may make another couple appearance in Selah, directing people to check out the Yakima Christmas trucks group on Facebook for information. She remarked that Governor Inslee announced today that he would extend the current shutdown through January 4, and she wanted to

remind everyone to support small businesses and restaurants through carryout, gift cards for Christmas or whatever they sell. She noted that Police Chief Christman was doing meet & greets with business owners on Zoom, with this week focused on restaurant owners, and reminded business owners to watch their emails or contact the SDA to get signed up.

Mayor Raymond Christmas commented that the boxes around town look great.

Ms. Henkle replied that they did put out some gnomes.

H. Getting To Know Our Businesses **None**

I. Communications

1. Oral

Mayor Raymond opened the Public Meeting.

City Attorney Case read aloud the rules of conduct as stated in the Agenda.

Executive Assistant Lake said that there were two comments submitted, neither of which would be read aloud.

Mayor Raymond closed the Meeting.

2. Written **None**

J. Proclamations/Announcements **None**

K. Consent Agenda

Executive Assistant Lake read the Consent Agenda.

All items listed with an asterisk (*) were considered as part of the Consent Agenda.

* 1. Approval of Minutes: November 24, 2020 Council Meeting

* 2. Approval of Claims and Payroll:

Payroll Checks Nos. 83949 – 83966 for a total of $284,291.41
Claim Checks Nos. 75765 – 75831 for a total of $182,026.63

* 3. Resolution N – 1: Resolution declaring police service weapon surplus and authorizing disposition of the same as additional consideration for service provided

Council Member Peterson moved, and Council Member Matson seconded, approval of the Consent Agenda as read. By a show of hands, approval was unanimous.

L. Public Hearings

1. Open Record Public Hearing to consider adoption of Water Use Efficiency Goals and Measures, required by the Washington State Department of Health in conjunction with the update of the City of Selah's 2021 Water System Comprehensive Plan

Public Works Director Henne said that he was having drop out issues.

City Administrator Wayman requested that Community Development Supervisor Peters take over.

Community Development Supervisor Peters addressed L – 1. He stated that this was Public Hearing to consider adoption of Water Use Efficiency Goals and Measures, as required by the Washington State Department of Health in conjunction with the update of the City of Selah's 2021 Water System Comprehensive Plan, saying that basically these are designed to guide customers to use water more efficiently to reduce overall consumption of water in the City over time. He went on to say that the City started an update of the water plan in 2019, and that this public hearing and accompanying Resolution are there to ensure they comply with Department of Health (DOH) requirements for the water system plan, which they expect to bring to Council for final approval in May of 2021. He added that the staff recommendation is to hold the open record hearing then consider the Resolution later in the agenda.

Mayor Raymond opened the Open Record Public Hearing. She asked if anyone from public would like to ask questions on the topic.

Public Records Specialist Morales reminded the public that they would need to raise their hands to speak

Seeing no one wish to speak, Mayor Raymond closed the Open Record Public Hearing.

2. Open Record Public Hearing regarding a recommendation by the City of Selah Community Development and Planning Department that the City Council adopt the 2018 International Code Updates to the following building codes and standards: International Building; Residential; Energy; Mechanical; Existing Building; Property Maintenance; Uniform Plumbing; Fire; Fuel Gas; and Swimming Pool and Spa

Community Development Supervisor Peters addressed L – 2. He said that this was a public hearing regarding a land use and building codes matter, with a recommendation by the Community Development and Planning Department and the Planning Commission to adopt the 2018 International Building Codes. He briefly reviewed the codes to be adopted as provided in the Council packet, noting that they also included Washington State amendments to those codes. He remarked that this is a normal item this time of year, and that adoption of the new building codes allows the City to be in compliance with Washington State law to meet building code requirements from the State, and recommended that they hold the required public hearing and at the conclusion of the hearing adopt the Planning Commission's findings as their own, with adoption of the Ordinance later in the agenda.

Mayor Raymond opened the Open Record Public Hearing.

Council Member Vargas inquired as to how often they release new codes, and requested clarification as to who 'they' are.

Community Development Supervisor Peters answered that they generally adopt these every two to four years, and that the International Code Council is comprised of members of communities across the country who release updated codes and give communities one to two years to review and adopt, modify, or opt out of them. He went on to say that the Washington State Code Council reviews them all and puts forth their amendments as well, and once they've done so cities are required to adopt them the following year, putting them one to two years behind the latest edition from the International Code Council.

City Attorney Case clarified that when Community Development Supervisor Peters used the word behind he meant in a colloquial sense, as they were adopting them in a timely manner.

Community Development Supervisor Peters concurred with City Attorney Case, adding that the City of Yakima building official was a little behind Selah, as they are proposing to bring it to their Council sometime in January.

Council Member Peterson asked, when building codes are amended, if they take affect when the permit is approved or when they build.

Community Development Supervisor Peters responded that the first part of his answer was that they become effective five days from publication in the paper, which Executive Assistant Lake would generally have published on Friday, making it effective five days from then. He went on to say that as far as existing developments and people who have submitted building permits, those who are paid for are vested to the 2015 building codes and would have their plans reviewed under the 2015 codes, with any increases subject to 2015 rates.

Executive Assistant Lake gave a brief explanation regarding publication of legal notices in the Yakima Herald-Republic.

Mayor Raymond asked if anyone from the public had questions.

City Attorney Case commented that they could close the public hearing and do an action later on.

Community Development Supervisor Peters stated that he needs Council to adopt the Planning Commission's findings.

City Attorney Case agreed with the necessity of a motion.

Council Member Matson moved, and Council Member Peterson seconded, to adopt the Planning Commission's Findings as their own. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – yes. By voice vote, approval was unanimous.

Seeing no one else wish to speak, Mayor Raymond closed the Open Record Public Hearing.

3. Open Record Public Hearing to take public comment and consider adoption of a resolution authorizing the mayor to sign an application for federal assistance from the

U.S. Department of Agriculture, Rural Development, Rural Utilities Service requesting $2,036,290.00 in funding to be used to construct the City of Selah's "Wastewater Collection System Improvement Project"

Public Works Director Henne deferred the matter to Community Development Supervisor Peters, as he had connection issues.

Community Development Supervisor Peters addressed L – 3. He said that this was a public hearing to take testimony and consider adoption of the Resolution authorizing the Mayor to sign an Application for Federal Assistance from the U.S. Department of Agriculture, Rural Development, Rural Utilities Service for construction of the City of Selah's "Wastewater Collection System Improvement Project", with two hundred sixty-four thousand coming out of the Sewer Reserve Fund for engineering and design services and the loan covering the remaining project cost. He referred Council to the packet for background information, a breakdown of the project total, and how the numbers played out.

Mayor Raymond opened the Open Record Public Hearing.

Council Member Carlson requested a brief overview of what portion of improvements this was affecting at the Wastewater Treatment Plant.

Public Works Director Henne responded that it's not the facility.

City Administrator Wayman stated that it was for the collection system over a number of streets, not the Wastewater Treatment Plant.

Community Development Supervisor Peters clarified that the project includes sewer improvements along Railroad Avenue and a couple cross streets to increase carrying capacity back to the treatment plant, as they currently have several bottlenecks throughout at the Railroad Avenue corridor and some side streets, along with restoring the roadway back to a drivable surface.

City Administrator Wayman commented that they would be going through and updating some of the oldest infrastructure on a regular basis, noting that their engineers had already presented a report on it.

Public Works Director Henne specified that would be Fremont and Fourth to Naches, then Naches across City Hall and down to Railroad Avenue, then Railroad Avenue to the treatment plant.

Council Member Vargas requested clarification regarding the USDA loan.

Public Works Director Henne replied that it would be a two point seventy-five percent interest loan.

Community Development Supervisor Peters repeated what Public Works Director Henne said.

City Administrator Wayman believed it to be a twenty-year loan with annual payments.

Seeing no one else wish to speak, Mayor Raymond closed the Open Record Public Hearing.

M. General Business

1. New Business **None**

2. Old Business **None**

N. Resolutions

* 1. Resolution declaring police service weapon surplus and authorizing disposition of the same as additional consideration for service provided

2. Resolution Revising Rates For 2021 Water Utility Services

Clerk/Treasurer Novobielski addressed N – 2. He said that this Resolution was to establish the 2021 water utility service rate with a three percent increase, with the amount of impact for different customers disclosed on the information provided in the packet.

Council Member Carlson requested an explanation as to the background or the increase, as the only information he had seen said the rate increase was determined appropriate for the water fund.

Clerk/Treasurer Novobielski replied that, as discussed previously, Public Works Director Henne has HLA maintain a water comprehensive plan that goes out twenty plus years forecasting certain improvements, project increases in cost, and estimates what they believe should be the increase in rates in order to maintain cash flows, and Public Works Director Henne had requested a three percent increase in water utility services when asked.

City Administrator Wayman remarked that it's on adherence with comprehensive plan. He informed Council that one of the pumps went out at Well 4 yesterday evening and will require replacement, going on to say that it's a requirement for them to maintain the system and pay for the salaries of the water employees, and that the comprehensive plan is a prudent way to anticipate and be prepared for planned improvements as well as unexpected expenses without having to come back and ask for large amounts of money.

Council Member Carlson wondered when the plan of assessment of three percent was revised or assessed, or did they simply take a look at the plan and decide to go for it.

City Administrator Wayman answered that happened when they adopted the last comprehensive plan.

Clerk/Treasurer Novobielski added that a three percent increase has been fairly standard, although there was one year during his tenure where they had a thirty percent increase.

Community Development Supervisor Peters commented that the last water plan was adopted close to 2015 or 2016, and they started the new water system plan in 2019.

Public Works Director Henne stated that they try to adopt a new plan every six years, and in that plan is a list of all the projects that they have.

Community Development Supervisor Peters said that the water system plan and the sewer comprehensive plan each have a list of all system or plant improvements with a projected cost to maintain those as well as to put in new systems, and also projected rates designed to keep enough money flowing into the water and sewer funds to maintain and meet demand, with large system improvement plans scheduled to build in the funding for them, such as the project they just held a public hearing on.

Council Member Carlson questioned whether a plan adopted every six years has taken into consideration the COVID increase in costs and how will it affect their constituents who are struggling right now, as he's extra sensitive about giving tax increases in 2020 for 2021 based on what they've seen.

Community Development Supervisor Peters responded that it doesn't take COVID into account, but they are required to adopt and plan out for improvements, and it's strictly a financial calculation. He reminded Council that they considered rate changes two or three years ago to the sewer rates and connection fees, and if they adopt a lesser amount then there may not be funds available when they're ready to go out for special financing or to have a local match for grant money.

City Administrator Wayman remarked that the reality that residents face is that they would see far less on their utility bills because the required sunset on the Marudo tax will drop the utility tax from twenty-nine to fourteen percent, resulting in a net drop for utility customers across the board even with a three percent increase for all three utility rates.

Council Member Matson asked if they anticipate any plans for water services to be affected due to COVID, and if they would be implementing all plans.

City Administrator Wayman answered that they would move forward with all projects, with no plans to postpone anything.

Council Member Matson inquired if they anticipate higher prices with regard to availability of product.

City Administrator Wayman asked Public Works Director Henne to answer.

Public Works Director Henne replied that he hadn't seen an increase but he had seen a lot of delays, which was why Well 7 isn't back online yet.

Mayor Raymond asked if that answered her question.

Council Member Matson answered that it did for the most part but wondered if they were extending projects a little longer due to COVID, or if they would have to ask for additional funds due to delay of projects, noting that they had a project last council meeting where they approved funds for HLA due to a delay of projects.

Public Works Director Henne responded that there were delays on Goodlander with the main contractor.

Community Development Supervisor Peters clarified that the Goodlander contract was a delay with the main contractor's performance, but with regard to new contracts they would conform to the time frames

of whatever agency was overseeing that, with contractor identified delays built into the schedule as best as possible.

Council Member Carlson wondered if there were any projects aside from Well 7 not completed in 2020.

Community Development Supervisor Peters responded in the negative.

City Administrator Wayman confirmed that there were none aside from Well 7, although they expect additional costs or time on that project.

Council Member Wickenhagen moved, and Council Member Matson seconded, to approve the Resolution Revising Rates For 2021 Water Utility Services. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – no; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – no. Motion passed with five yes votes and two no votes.

3. Resolution Revising Rates For 2021 Sewer Utility Services

Clerk/Treasurer Novobielski addressed N – 3. He said that during budget discussions, Public Works directed him to build a three percent increase into the sewer utility rates, giving an example of the increase and referring Council to their packets for additional information.

Council Member Vargas inquired if they knew how much was going into the sewer reserve fund versus the amount needed just to cover costs.

City Administrator Wayman replied that they have to prepare for eventualities such as future projects, repair and maintenance, and ongoing projects, and that this increase pays for parts and labor to continue providing the excellent service customers receive.

Community Development Supervisor Peters commented that they do generally know how much is split out as it's broken down in the budget itself, but he would have to look at the sewer reserve fund to see how much it would go up. He added that Public Works Director Henne said it would be somewhere around fifty thousand dollars, but that three percent was broken up into the operating fund as well as capital improvements.

Public Works Director Henne noted that it pays for that loan as well.

Clerk/Treasurer Novobielski stated that the detailed budget for the sewer fund shows a sixty thousand dollar increase in revenues, adding that for the current year Public Works Director Henne had transferred one hundred twenty-five thousand, with the intent to transfer a larger amount next year to help fund future improvement projects.

Council Member Matson asked if their payments for that loan come from those reserves, and if so, could they know an anticipated yearly payment.

Public Works Director Henne answered that they would review the City's ability to pay back the loan, determine an interest rate from one point seven five to two point seven five, and give them a loan repayment schedule. He noted that that should be able to afford a payment of one hundred fifty thousand dollars per year plus interest.

Community Development Supervisor Peters commented that they were also asking if the payment funds come from the three percent increase.

Public Works Director Henne replied that it just goes into the operating fund; there's the loan repayment and other things that are part of it, and it allows the City to afford to operate and allow them to buy new equipment and a new sewer line system.

Council Member Matson wondered if they could get a lower loan rate if the reserve fund was higher.

Public Works Director Henne responded that they look at how much the City has in reserve, if they have any low-income housing areas, ask how much infrastructure they own and what other payments they're making to agencies for other loans, then determine a loan rate and make an offer.

Council Member Matson moved, and Council Member Peterson seconded, to approve the Resolution Revising Rates For 2021 Sewer Utility Services. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – no; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – no. Motion passed with five yes votes and two no votes.

4. Resolution Revising Rates For 2021 Solid Waste Utility Services

Clerk/Treasurer Novobielski addressed N – 4. He said that they had received a letter from BDI as to the contractual allowance for a consumer price index increase along with the information that Yakima County landfill tipping fees were increasing in cost, so a three percent rate increase was built into the 2021 rates. He gave an example of the average rate increase as listed in the Resolution.

Council Member Carlson asked if it was a dollar for dollar increase with BDI or if there were additional costs out of pocket.

Clerk/Treasurer Novobielski replied that they are subject to their increases and within the City they have staff providing administrative support for billing and collection.

Council Member Bell moved, and Council Member Carlson seconded, to approve the Resolution Revising Rates For 2021 Solid Waste Utility Services. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – yes. By voice vote, approval was unanimous.

5. Resolution of the City of Selah, Washington Adopting Water Use Efficiency (WUE) Goals and Measures

Public Works Director Henne addressed N – 5. He said that they are working on a new water system plan, part of which includes adopting water use efficiency goals to try to reduce consumption of groundwater by getting residents to utilize less water. He referred Council to their packets and the projection of a two percent reduction over the next ten years of average residential consumption utilizing six measures to do so, saying that he wanted to include the statement and six measures in the water use plan, but were required to conduct a separate public hearing and have Council adopt a resolution for this portion prior to submittal to the Department of Health for a final review.

Council Member Matson asked if they knew when the new service connection electronic meters were slated to start being installed.

Public Works Director Henne replied that it shows 2021 to 2022, but once they get plan specs and an estimate together then go out to bid might be too late in the year, so it would likely start in 2022.

Council Member Matson wondered if it would be like Yakima's EyeonWater.

Public Works Director Henne answered in the affirmative, saying that it's an automatic meter read and intelligence which transmits data to a central computer installed at City Hall that will download everyone's consumption for the month similar to the manual process done now.

Council Member Matson commented that Yakima's EyeonWater residents were able to look at usage every single day to help them identify leaks, and inquired if that was what they were talking about.

Public Works Director Henne responded that they haven't even had approval yet to move forward with the project, although they have looked at different purveyors with differing types of systems, battery life, etc. He added that overall a customer will be able to log on, see the consumption and make adjustments.

Council Member Peterson anted to clarify that they were just setting goals for the water plan coming in a couple months.

Community Development Supervisor Peters replied in the affirmative.

Public Works Director Henne added that they want to put those in there and submit all of it to the Department of Health for review, and when it's sent back it will come to Council to review and adopt.

Council Member Peterson asked what customer leak detection looks like.

Public Works Director Henne answered that they ask is if anything is dropping or running, then if they suspect it's likely in the service lines they tracing the service line or do other things to determine the location of the leak.

Council Member Wickenhagen moved, and Council Member Peterson seconded, to approve the Resolution of the City of Selah, Washington Adopting Water Use Efficiency (WUE) Goals and Measures. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes;

Council Member Costello – yes; Council Member Carlson – yes. By voice vote, approval was unanimous.

6. Resolution of the City of Selah, Washington authorizing the Mayor to sign an Application for Federal Assistance from the U.S. Department of Agriculture, Rural Development, Rural Utilities Service requesting $2,036,290.00 in funding to be used to construct the City of Selah's "Wastewater Collection System Improvement Project"

Public Works Director Henne addressed N – 6. He said that this resolution authorizes the Mayor to sign an application for a loan of two million, thirty-six thousand, two hundred and ninety dollars, which they will put together and send off to see how they are ranked for interest rates and if they can then afford the loan. He added that this project would alleviate a lot of bottle points and create increased capacity for areas in development, and if they don't eliminate these there will be a need to restrict projects in those basins until improvements are made. He requested approval of the resolution.

Council Member Bell moved, and Council Member Matson seconded, to approve the Resolution of the City of Selah, Washington authorizing the Mayor to sign an Application for Federal Assistance from the U.S. Department of Agriculture, Rural Development, Rural Utilities Service requesting $2,036,290.00 in funding to be used to construct the City of Selah's "Wastewater Collection System Improvement Project". Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – yes. By voice vote, approval was unanimous.

O. Ordinances

1. Ordinance Amending Title 11 of the Selah Municipal Code Relating to the Regulation of Building Codes and Standards, so as to Adopt the 2018 International Code Updates

Community Development Supervisor Peters addressed O – 1. He said that this is the Ordinance amending Title 11 with regard to building codes and the adoption of the 2018 International Building Codes and Washington State amendments and recommended approval.

Council Member Wickenhagen moved, and Council Member Costello seconded, to Approve the Ordinance Amending Title 11 of the Selah Municipal Code Relating to the Regulation of Building Codes and Standards, so as to Adopt the 2018 International Code Updates. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – yes. By voice vote, approval was unanimous.

2. Ordinance Establishing the 2021 Base Salary and Wage Schedule for Management, Confidential and Unrepresented Employees.

Clerk/Treasurer Novobielski addressed O – 2. He said that this Ordinance establishes the 2021 base salaries for management, confidential and unrepresented employees and deferred to City Administrator Wayman for details.

City Administrator Wayman thanked the five Council Members who worked with them on the changes to come up with a more acceptable set of proposals, reviewing those individuals receiving a clear raise above the two percent cost of living adjustment (COLA). He said that he and the Mayor decided that, while the will want parity with the department heads, they would approach it in an incremental way and ask for one-fourth of the original amount to close that gap. He opined that the matter isn't quite as simple as measuring a city of equal or greater size to Selah, as many larger cities have multiple employees doing the same task, and in many cases, they have to be more skilled than employees at larger cities.

Council Member Costello desired to do the increases mid-year based off the current situation with COVID, in hopes that vaccinations and other things start at least mid-year, adding that he thought starting it in January was bad timing.

City Administrator Wayman responded that all fifty-eight individuals who work for the City are essential personnel, saying that he had forwarded an email to all employees that they are essential and would have to have specific requirements to call in sick, and felt that especially during this time they should be offering these raises as they are doing essential work during this tough time.

Council Member Carlson had an issue with term essential, as he felt that everyone was essential, and that while the Governor has deemed some essential and some not, staff have continued to do their jobs as before and he was very hesitant to give pay increases when they have businesses struggling or to keep things equal between department heads with varying responsibilities. He expressed his respect for the department heads and staff but didn't agree with the justification for increases about the two percent COLA or increasing taxes. He agreed with Council Member Costello that they should bring it back mid-year and reassess at that point.

Council Member Peterson commented that he had gone back and forth on it, and while he appreciates that they've listened to Council and not had the increases as large as they were, they all still seem kind of arbitrary. He pointed out that he had asked for a comparison but had yet to receive it, and he realizes in comparing the needs of Selah to Toppenish, Prosser, or other similar cities there are people with the same title who may not have the same responsibility. He expressed appreciation for the work their employees do and wanted to give them a competitive salary but was still unsure about the numbers.

Council Member Vargas expressed similar concerns regarding dramatic pay increases without seeing comparables, as well as issues with the City Attorney position. She remarked that only a year prior Council discussed hiring a full-time attorney for one hundred thirty-two thousand annually and decided against it, as it would have placed the attorney as one of the highest paid attorneys for a city of their size, but only a year later they were being asked to consider a full-time attorney at one hundred sixty thousand dollars, twenty-eight thousand more than what was rejected the year before. She was astonished over the amount, saying that the taxpayers require them to be good stewards of their tax dollars, and that while she would want to retain staff, she doesn't believe in significant increases just to match salaries or offering a significant wage without offering a competitive post.

City Administrator Wayman responded that former City Attorney Noe offered a reduced pay demand to stay, as he was happy working for Selah, but they're now in different circumstances where they're

asking for an individual to come without legal support to handle their legal affairs. He presented the legal department for the City of Yakima as an example, saying that their top attorney makes one hundred seventy-eight thousand annually, with a staff of seven attorneys and seven clerks, while Selah is asking one attorney to handle all of their requirements with no support, and finding a bargain basement attorney isn't going to bring them the quality of attorney they need for Selah. He opined that this salary would bring a competitive attorney with appropriate experience. He addressed responsible management of the budget next, listing the rollover for 2016, 2017, 2018, 2019, and 2020, and the projected amount for 2021, which he felt was an indication that the staff and Mayor have been quite diligent with City funds and worked every day to cut costs and project viable options to go forward without incurring more costs, which he felt was responsible stewardship of taxpayer money. He stated that what was presented is sustainable and fair to hardworking employees, as they are doing hard work during the current situation and providing necessary support to keep the community running on a daily basis, and that the City can more than afford this. He noted that he had a conversation earlier that day with an employee asking for a raise who may move to another position, and requested that Council please consider the options their employees have and how they will take this if Council says not now, maybe later, or not at all.

Council Member Carlson expressed appreciation for the staff, but didn't appreciate the attitude he felt City Administrator Wayman took with Council, He was concerned with what he felt were dramatic and arbitrary increases, given that they have longevity pay and people coming to Selah because they're competitive. He questioned whether there was a way to have increased time with an attorney without making a dramatic jump or having an attorney as the highest paid employee without going out to bid, suggesting a higher contract wage on a yar to year basis rather than a full-time employee, and allowing them to continue working with other clients. He added that he hasn't heard anything regarding HR that was acceptable, and that he had requested last year for the City Administrator to be included on the Ordinance yet he wasn't last year or this year.

City Administrator Wayman stated that the City Administrator is a contract employee created by code, and is fully public; anyone can look it up and see.

Council Member Carlson pointed out that they have another contract employee who does show up on the Ordinance and as he's a W-2 employee like everyone else, he should be represented in the report.

Council Member Matson thanked every employee for their hard work, adding that it's Council's responsibility to review these and look at them carefully. She reiterated the comments regarding department heads, disagreeing with an adjustment to bring their salaries closer to a contract employee, although she supported the two percent COLA. She also agreed with a step approach for the billing specialist and administrative staff as Council Member Costello had stated.

City Administrator Wayman asked for confirmation that she was suggesting to cut raises for Henne, Hanna and Novobielski and hold in abeyance all other raises until a later date.

Council Member Matson responded that she was saying the three department heads and Public Works Utility Supervisor Jones, along with a step program for administrative staff of one hundred fifty dollars in January with a review in six months.

City Administrator Wayman wasn't clear on her proposal.

Council Member Matson restated it as cut out the four entirely and cut the Utility Specialist in half with a review in June.

City Administrator Wayman rephrased it, saying that the Utility Billing Specialist, Accounts Payable/Payroll, Court Clerk, Public Works Department Assistant, Executive Assistant, and Planning a& Building Permit Specialist, would receive a one hundred fifty dollar raise and the raises for Jones, Henne, Hanna and Novobielski would be eliminated.

Council Member Matson agreed that was her proposal.

Council Member Carlson requested discussion about the Payroll/Accounts Payable Specialist hired a month ago deserving a raise as well as the Public Records Specialist keeping the same rate she had as a Department Head when the prior person was at a much lower rate.

Clerk/Treasurer Novobielski responded that the offer letter provided to the Payroll/Accounts Payable Specialist gave her the top of the offered wage schedule advertised, saying that based on her experience and understanding of Vision they would make her equal to pay for the utility billing person after completion of probation, and give the two percent COLA prior to that.

Council Member Carlson wondered about any discussion prior to the offer that allowed them to offer the position at that rate.

Clerk/Treasurer Novobielski replied that Ms. Farley had been equal in pay prior to leaving, and Ms. Dean was offered a low-ball amount for probation then equal after probation.

Council Member Carlson responded that made sense to him, and he had no issue with it. He added that his recommendation would be the same as Council Member Matson's, although he would also remove the full-time attorney position. He then asked again regarding the Public Records Specialist.

City Administrator Wayman answered that the position would be filled full-time on January 1st, and that she's been pulling the same pay received as the Recreation Manager, with her training in the new position completed January 1st. He added that her pay is following her as she has a master's degree in HR and legal compliance that give her a leg up on her predecessor and make her far more qualified to do the job. He went on to say that for comparables he has sixty different cities he checks the range of all across the state, and the average for her position is approximately five thousand seven hundred, with many large cities having multiple staff rather than a single person. He said that they feel very comfortable presenting this as ongoing pay for a highly qualified Public Records Specialist.

Council Member Carlson agrees that Ms. Morales was a great asset to the community and the City, but his concern was the increase in that specific position, and he didn't see it as a position that required a master's degree or to be payable to that point. He felt that using cities such as Seattle, Spokane and Richland were horrible comparisons, and that using statewide comparables wasn't appropriate for Selah. He reiterated that HR should be on the table but one shouldn't pay for a master's degree, and that if staff was promised something they don't receive it isn't the fault of the Council, but the City Administrator's responsibility to advise City staff this was the best move going forward.

City Administrator Wayman thanked him for his advice on leadership, opining that once again he was dismissing the fact that this job is one person deep while Seattle has dozens doing the job.

Council Member Carlson replied that they aren't Seattle.

City Administrator Wayman said that his point was that they have lots of people doing it and Selah only has one, and they need to pay that person what they are worth.

Council Member Carlson responded that he was comparing Selah to Spokane and Seattle.

City Administrator Wayman answered that he was asking for a Public Records Specialist, and he could vote as he saw fit.

Council Member Carlson thanked him and said he would.

Council Member Peterson commented that the Fire Department Administrative Assistant was a new position not listed in the Ordinance.

Clerk/Treasurer Novobielski replied that it was an omission he failed to enter under the Fire Department.

Council Member Peterson asked if it should be four thousand, six hundred and sixty-nine to the Fire Department.

Clerk/Treasurer Novobielski answered in the affirmative, saying that the Fire Department Administrative Assistant would have the same wage as other administrative assistants.

Council Member Peterson inquired if the position was filled and had someone in it already.

Clerk/Treasurer Novobielski responded in the negative, saying that it's a new position they intend to create at the first of the year.

Council Member Matson asked for clarification on the new position, as she thought it was a sixty percent position going to full-time.

Clerk/Treasurer Novobielski replied that the person was a part-timer.

Council Member Carlson thought that the hourly rate previously under part-time would move to Fire.

Clerk/Treasurer Novobielski answered that they would replace that hourly position at City Hall.

Council Member Matson commented that the office assistant's hourly wage was eighteen dollars and thirteen cents.

Mayor Raymond asked if there was any further discussion.

Council Member Wickenhagen moved to Approve the Ordinance Establishing the 2021 Base Salary and Wage Schedule for Management, Confidential and Unrepresented Employees with changes, to drop position adjustments to dept heads, and reduce other proposed by 1/2.

Clerk/Treasurer Novobielski asked about Mr. Jones.

Council Member Wickenhagen responded that he would leave that in place.

Council Member Matson asked if Council Member Wickenhagen was wanting to review it in six months with regard to a possible second half raise.

Council Member Wickenhagen responded that his issue with that was how do they relook at the budget if they're looking at a yearly budget.

City Administrator Wayman agreed that anything looked at in June would be a budget adjustment.

Council Member Matson seconded the motion.

Council Member Carlson requested clarification as to whether they were including the adjustment by Clerk/Treasurer Novobielski regarding the Fire Department Administrative Assistant and if they were removing the pay for a City Attorney.

Council Member Wickenhagen replied that it includes the Fire Department Administrative Assistant and the City Attorney.

Council Member Bell asked that he restate the motion.

Council Member Wickenhagen repeated his motion with the following changes: adjustments for department heads were to be dropped, the other cut in half to one hundred fifty, and with the change noted by Clerk/Treasurer Novobielski for the Fire Department.

Council Member Peterson requested clarification on the Public Works Utility Supervisor's raise.

Council Member Wickenhagen answered that it remains.

Clerk/Treasurer Novobielski said that he needed to revise the Ordinance to reflect the changes to then disclose to Council.

City Administrator Wayman requested a ten-minute recess.

Council took a ten-minute recess.

Clerk/Treasurer Novobielski read aloud the changes proposed.

Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – no; Council Member Peterson – yes; Council Member Bell – yes; Council

Member Costello – no; Council Member Carlson – no. Motion passed with four yes votes and three no votes.

3. Ordinance Adopting the Budget for the City of Selah, Washington for the Year ending December 31, 2021

Clerk/Treasurer Novobielski addressed O – 3. He said that he had made adjustments to the Ordinance to reflect the Salary Ordinance changes and reviewed the changes.

Council Member Matson wanted to clarify that he was talking about position adjustments only.

Clerk/Treasurer Novobielski replied that those were decreases in expenditures.

Council Member Matson asked if those were the position increases, not just the COLA.

Clerk/Treasurer Novobielski answered that with the eliminations and decreases, it resulted in a reduction of expenditures, including fringe benefits.

Council Member Matson thanked him.

City Administrator Wayman noted that there were two other adjustments made to Fund 521 Police, in the amount of five hundred dollars for the Citizens Academy and one thousand for community events.

Council Member Matson moved, and Council Member Bell seconded, to Approve the Ordinance Adopting the Budget for the City of Selah, Washington for the Year ending December 31, 2021. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – no; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – no; Council Member Carlson – no. Motion passed with four yes votes and three no votes.

4. Ordinance Amending the 2020 Budget for Miscellaneous Expenditures.

Clerk/Treasurer Novobielski addressed O – 4. He said it was the final budget adjustment for 2020 and reviewed the expenditures as stated on the Ordinance.

Council Member Matson moved, and Council Member Wickenhagen seconded, to Approve the Ordinance Amending the 2020 Budget for Miscellaneous Expenditures. Roll was called: Council Member Wickenhagen – yes; Council Member Matson – yes; Council Member Vargas – yes; Council Member Peterson – yes; Council Member Bell – yes; Council Member Costello – yes; Council Member Carlson – abstain. Motion passed with six yes votes and one abstention.

Council Member Carlson stated that his abstention was due to the CARES Act expenditures that he personally benefitted from.

P. Public Appearances **None**

Q. Reports/Announcements

1. Departments

Clerk/Treasurer Novobielski thanked Council for a very interesting year..

Public Records Specialist Morales had no report.

Police Chief Christman said that his department volunteered their time at Wray's to collect food and money for the Selah Food bank, and collected nearly thirteen hundred pounds of food and roughly sixteen hundred dollars in cash. He noted that they would be doing it again Saturday at Grocery Outlet.

Public Works Director Henne said that he wasn't sure when Well No. 7 would be online, and that since they lost the submersible pump and motors in Well No. 5, he authorized the contractor to do repairs estimated to be forty to fifty thousand dollars to get Well No. 5 back online.

City Administrator Wayman added that the pump at Well No. 5 burned up the day before, and they are investigating it right now. He noted that the water supply is adequate and the reservoirs are fine, but they would be presenting Council with a bill for repairs for Well No. 5 in the future.

Parks & Recreation Manager Schwab had no report.

Community Development Supervisor Peters gave a brief update on his department, listing the items he would be bringing to Council next year for approval.

City Attorney Case had no report.

2. Council Members

Council Member Vargas had no report.

Council Member Bell commented that they've a year where everyone has struggled a little bit and they've not always been comfortable with the things they've been faced with and the decisions they had to make. He thanked his fellow council members, the City staff and every single City employee for their hard work getting them through the year.

Council Member Matson echoed Council Member Bell's comments, and added thanks to the Selah community members who are donating time, effort, and money to assist their neighbors to ensure they have a happy holiday season.

Council Member Peterson wanted to assure all of the employees how much they do appreciate the work that they put in, adding that discussions of salary and things was not to diminish their value. He also echoed Council Member Bell's comment about this being a tough year for everybody to go through, and to go above and beyond as well as what Council Member Matson said about members of the community reaching out. He asked that the community reach out to their friends, neighbors and families that might

be struggling throughout the holiday season, as a lot of people are struggling emotionally and it's amazing what a phone call will do.

Council Member Wickenhagen echoed Council Member Matson, saying that this community is frankly amazing.

Council Member Carlson echoed the gratitude for staff and for the community. He wondered about an update prior to a new year on their potential litigation.

Mayor Raymond responded that they were just doing reports right now.

City Attorney Case asked what sort of update he wanted.

Council Member Carlson replied that he wanted to discuss deadlines and timelines and make sure everything's in order and they're moving forward.

City Attorney Case inquired if he was referring to the OPMA lawsuit.

Council Member Carlson answered in the affirmative to that and an alleged new lawsuit.

City Attorney Case answered that any deadlines on the OPMA lawsuit have been met or will be met, and as far as the reference to a new lawsuit, multiple media outlets were referencing a new lawsuit filed yesterday but he wanted to remind everyone that allegations are not proof.

Council Member Costello thanked the City staff and City employees out there working especially now that it's starting to get cold. He hoped that everything goes as well as can be expected for the community.

3. City Administrator

City Administrator Wayman thanked the five Council Members who came in and worked with them on amending the budget, reemphasizing that this year had a lot of good news too. He briefly reviewed the numbers for the 2020 budget and the predictions for 2021, saying that it's going well for some sectors while some industries like restaurants, hair salons, barbers, and nail salons are hurting badly. He went on to say that the Mayor has been fighting every week with YVCOG and trying along with some of our County leadership to fight for the County and Cities to help our businesses and get them back to work, and that their ending balance for 2020 is evidence of great stewardship, of a great Mayor and staff doing their jobs, and a Council over the years who made wise decisions, but the most important reason they are doing well is their City and residents. He discussed the assessed property values from 2016 to present, the opportunities offered for developers to come into Selah, investing in the right places and making smart decisions as a City, and the need to make some important decisions in the future with regard to infrastructure, expansion, and a new City Hall/Police Station. He stated that the Yakima Herald-Republic erroneously claimed in their article on the Marudo project that there had been no development, but approximately eighty-five percent of the eighteen acres purchased was currently occupied by businesses. He requested a motion to hold a retreat in late January or early February on Zoom to discuss those really

important decisions going forward for the next decade, and expressed happiness over a motion to create a committee to look into building a new City Hall/Police Station.

4. Boards **None**

5. Mayor

Mayor Raymond suggested that they discuss the committees at the first meeting in January.

Council Member Matson thought perhaps they should have their retreat before forming committees.

Mayor Raymond said they would get with Executive Assistant Lake and figure out a date for the retreat.

Council Member Carlson asked if there was a way to have a retreat in person but socially distanced and broadcast to community.

Executive Assistant Lake explained the logistics of attempting to do so, and the need to hire someone with the equipment to do a live broadcast.

City Administrator Wayman felt that it would be worth the expenditure to be face to face.

Council Member Carlson moved to authorize an expenditure of up to $1000 to have the meeting face to face.

City administrator Wayman replied that there was no need for a motion; they would come back with a budget adjustment if required.

Council Member Carlson withdrew his motion.

Mayor Raymond thanked all the departments for stepping up and recovering for sick employees the past couple weeks. She said that they would set up new committees for representatives for YVCOG, SPRSA, etc., in January and asked Council to think about that. She requested that they check their emails for a letter from the Health Department as well, as they need a representative for their committee. She noted that they were still in lockdown, and encouraged everyone to reach out to those people suffering from depression and feeling that nothing is ever going to change.

R. Executive Session **None**

S. Adjournment

Council Member Costello moved, and Council Member Matson seconded, that the meeting be adjourned. By a show of hands, approval was unanimous.

The meeting adjourned at 8:33pm.

Sherry Raymond

Sherry Raymond, Mayor

Roger Bell, Council Member

Russell Carlson, Council Member

Jacquie Matson, Council Member

Kevin Wickenhagen, Council Member

Clifford Peterson, Council Member

Suzanne Vargas, Council Member

Michael Costello, Council Member

ATTEST:

Dale E. Novobielski, Clerk/Treasurer

YAKIMA HERALD-REPUBLIC
WE TELL YOUR STORIES YAKIMAHERALD.COM

El Sol de Yakima

-Ad Proof-

This is the proof of your ad scheduled to run on the dates indicated below.
Please proof read notice carefully to check spelling and run dates,
if you need to make changes

Date:	**11/19/20**
Account #:	**110017**
Company Name:	**CITY OF SELAH**
Contact:	**Kim White,AP**
Address:	**115 W NACHES AVENUE** **SELAH, WA 98942**
Telephone:	**(509) 698-7327**
Fax:	

Account Rep:	**Merrijo Goodman**
Phone #	**(509) 759-7970**
Email:	**mgoodman@YAKIMAHERALD.COM**
Ad ID:	**964968**
Start:	**11/21/20**
Stop:	**11/21/20**
Total Cost:	**$170.20**
Lines:	**92.0**
# of Inserts:	**1**
Ad Class:	**6021**

Run Dates:
Yakima Herald-Republic 11/21/20

?

CITY OF SELAH NOTICE OF PUBLIC HEARING: PUBLIC HEARING TO CONSIDER A RESOLUTION OF THE CITY OF SELAH, WASHINGTON ADOPTING WATER USE EFFICIENCY GOALS AND MEASURES REQUIRED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH AS PART OF ITS 2021 WATER SYSTEM COMPREHENSIVE PLAN UPDATE, AND WAC 246-290-830.: NOTICE IS HEREBY GIVEN BY THE CITY OF SELAH, WASHINGTON, THAT THE SELAH CITY COUNCIL WILL CONDUCT A PUBLIC HEARING ON TUESDAY, DECEMBER 8, 2020, COMMENCING AT 5:30 P.M., OR AS SOON THEREAFTER AS PRACTICAL, IN THE COUNCIL CHAMBERS, SELAH CITY HALL, 115 W. NACHES, SELAH, WA.: COPIES OF THE RESOLUTION ARE AVAILABLE FOR PUBLIC INSPECTION DURING REGULAR BUSINESS HOURS AT THE CITY OF SELAH PLANNING DEPARTMENT, 222 SOUTH RUSHMORE ROAD, SELAH, WA. AND AT HTTPS://SELAHWA.GOV/WATER-IRRIGATION/.: ALL PERSONS WISHING TO OFFER COMMENTS FOR OR AGAINST THE PROPOSED WATER USE EFFICIENCY GOALS ARE ENCOURAGED TO ATTEND. ALL WRITTEN COMMENTS RECEIVED PRIOR TO THE DAY OF THE PUBLIC HEARING WILL BE CONSIDERED IN THE CITY COUNCIL DELIBERATIONS.: COVID-19 HEARING NOTIFICATION: INTERESTED PARTIES, PLEASE BE ADVISED IN ACCORDANCE WITH THE MULTIPLE PROCLAMATIONS BY THE GOVERNOR OF THE STATE OF WASHINGTON, (IN PARTICULAR PROCLAMATION 20-28) GUIDANCE FROM THE STATE ATTORNEY GENERAL ON THE REQUIREMENTS OF THE OPEN PUBLIC MEETINGS ACT, DIRECTIVES BY THE STATE HEALTH DEPARTMENT AND YAKIMA HEALTH DISTRICT REGARDING COVID-19, THE ABOVE SCHEDULED PUBLIC HEARING MAY BE HELD BY ELECTRONIC AND TELEPHONIC MEANS VIA ZOOM. PROCEDURES FOR ATTENDANCE OF THIS CLOSED RECORD PUBLIC HEARING WILL BE PROVIDED ON THE CITY OF SELAH'S WEBSITE ALONG WITH THE CITY COUNCIL AGENDA.: IF YOU HAVE QUESTIONS PLEASE FEEL FREE TO CONTACT JEFF PETERS, COMMUNITY DEVELOPMENT SUPERVISOR IN PERSON AT 222 SOUTH RUSHMORE ROAD, SELAH, WA OR BY PHONE AT (509) 698-7365, BY FAX AT (509) 698-7372 OR BY E-MAIL AT JEFF.PETERS@SELAHWA.GOV. DATED THIS 19TH DAY OF NOVEMBER 2020.

(964968) November 21, 2020

Courtesy of Yakima Herald-Republic

6.
LOCAL GOVERNMENT CONSISTENCY REVIEW CHECKLIST(S)

HLA
Engineering and Land Surveying, Inc.

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: CITY OF SELAH PWS ID: 77400 6

Planning/Engineering Document Title: WATER SYSTEM PLAN Plan Date: 2021

Local Government with Jurisdiction Conducting Review: CITY OF SELAH

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: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.	1-6 and 1-11 to 1-14	Yes
b) The growth projection 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.	2-1 to 2-2	Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	1-15 to 1-18	Yes
d) Service area policies 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.	1-15 to 1-18	Yes
e) Other relevant elements 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.	1-8 to 1-10	Yes

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.

Jeffrey R Peters 8-10-2020

Signature Date

Jeff Peters, Community Development Supervisor/City Planner, City of Selah

Printed Name, Title, & Jurisdiction

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: CITY OF SELAH PWS ID: 77400 6

Planning/Engineering Document Title: WATER SYSTEM PLAN Plan Date: 2021

Local Government with Jurisdiction Conducting Review: YAKIMA 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.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	1-6 and 1-11 to 1-14	Yes
b) The growth projection 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.	2-1 to 2-2	Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	1-15 to 1-18	Not Applicable
d) Service area policies 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.	1-15 to 1-18	Yes
e) Other relevant elements 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.	1-8 to 1-10	Yes

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.

Phil Hoge

Signature

10/5/2020

Date

Phil Hoge, Project Planner – Long Range, Yakima County Public Services
Printed Name, Title, & Jurisdiction

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).

7.
CITY OF SELAH FIRE DEPARTMENT LETTER

HLA
Engineering and Land Surveying, Inc.

Selah Fire Department
Yakima County Fire District # 2

Chief Gary Hanna

206 West Fremont Avenue - Selah, Washington 98942
Business Phone (509) 698-7310 • Fax (509) 698-7317

November 20, 2020

City of Selah
222 South Rushmore Road
Selah, WA 98942

Attn: Joe Henne, Public Works Director

Re: City of Selah
Fire Suppression Storage

Dear Joe:

The Selah Fire Department is satisfied with the City of Selah's total water storage reservoir capacity of 3,731,000 gallons that supplies the City with potable water. It is my understanding that 1,440,000 gallons of the total capacity is allocated to fire suppression storage, which provides flow of 6,000 gallons per minute over a four-hour duration. This fire suppression supply is adequate for Selah's largest building (Tree Top) and its associated fire suppression demand. The Selah Fire Department understands the required fire suppression storage volume accounts for a large percentage of the total water system storage; therefore, it approves nesting standby storage within the fire suppression storage volume.

Very truly yours,

Gary Hanna
Fire Chief

8.
CITY OF SELAH MUNICIPAL CODE, ORDINANCES, AND RESOLUTIONS

HLA
Engineering and Land Surveying, Inc.

Chapter 9.02
MUNICIPAL WATER SUPPLY

Sections:

9.02.010 Definitions.
9.02.020 Application for water use.
9.02.030 Responsibility for water charge.
9.02.031 Proration of water charge.
9.02.040 Meters.
9.02.044 Water supply pressure.
9.02.045 Pressure reducing valve.
9.02.046 Cross-connection control.
9.02.047 Shut-off valve.
9.02.060 Sale or gift of water prohibited.
9.02.070 Depth of connections.
9.02.080 Failure to apply for water.
9.02.085 Water conservation and rationing.
9.02.090 Water may be shut off.
9.02.100 Limitation on use of water.
9.02.110 Access to water meters.
9.02.120 Charge in the event of meter failure.
9.02.130 Water permit fee, installation fee, connection fee.
9.02.131 Permit fee.
9.02.132 Meter installation charges.
9.02.133 Connection fees.
9.02.135 Municipal water system reservoir capacity capital cost recovery program No. 1.
9.02.136 Fees for municipal water system reservoir capacity capital cost recovery program No. 1.
9.02.137 Lookout Point Reservoir water pressure capital cost recovery area.
9.02.138 Fees for connections within Lookout Point Reservoir water pressure capital cost recovery area (capital recovery area).
9.02.140 Water service charges.
9.02.150 Connection or disconnection at request of property owner.
9.02.160 Unoccupied building or unit.
9.02.170 Water charge during construction period.
9.02.175 Temporary use of fire hydrants and meters.

9.02.180 Minimum charge where property not receiving water service.
9.02.190 Rates.
9.02.200 Penalties.

Prior legislation: Ords. 27, 68 § 1, 125 § 3-11, 296 § 1, 316, 393, 411.

9.02.010 Definitions.

As used in this chapter, the following definitions shall apply:

"Consumer" means the person using the service.

"Equivalent residential unit (ERU)" based on an average day demand (ADD) of five hundred forty-four gallons per service and a maximum day demand (MDD) of one thousand seven hundred eighteen gallons per service. All other nonsingle-family residential services will be assessed a multiple of the "per ERU" SW Basin Water Pressure Benefit Area/Capital Cost Recovery Fee based on their projected ADD or MDD water volume.

"Minimum charge" means the rate each metered service shall be charged no matter how many consumers use the service in any one month.

"Property owner" means the person owning the property according to the Yakima County treasurer's records as the person owing real property taxes.

"Service" means the activities described in this chapter incident to the availability of water supply to consumers.

All words that are defined in Selah Code, Chapter 10.02 shall have the same definitions for this chapter. (Ord. 1726, 2008; Ord. 680 § 1, 1978; Ord. 602 § 1, 1976; Ord. 447, 1970.)

9.02.020 Application for water use.

All applications for water shall be made to the clerk-treasurer by the property owner or his agent. (Ord. 447, 1970.)

9.02.030 Responsibility for water charge.

All accounts for water shall be kept in the name of the property owner who shall be responsible for payment of all charges set forth in this chapter. At the request of the property owner, the clerk-treasurer may bill the consumer or consumers but the charge shall ultimately be the responsibility of the property and property owner. (Ord. 447, 1970.)

9.02.031 Proration of water charge.

Where more than one user on an account/service address is to be charged for services during any one month, the minimum monthly service charges will be prorated between the users based upon the percentage of days of service provided to each user in that month. (Ord. 1502, 2001.)

9.02.040 Meters.

All services including fire protection pipes extending into buildings are to be metered, and shall meet the provisions of Chapter 4 of the City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements, as adopted in Section 13.01.010. If more than one service pipe or meter serves one building, the minimum charges are to apply in the same manner as if the metered services were to different ownerships. (Ord. 2081 § 1, 2019; Ord. 447, 1970.)

9.02.044 Water supply pressure.

All new lots and developments shall be served by a public water line in accordance with the city of Selah's 2014 water system plan or hereafter amended, and maintained by the city of Selah. All water lines shall be capable of providing the minimum water system pressures established by the Washington State Department of Health and described in WAC 246-290-230(5) and (6). In accordance with these Department of Health requirements, the city of Selah must be able to provide domestic water at no less than thirty psi at all service connections throughout the distribution system. The water system must be able to provide this minimum pressure at all existing and proposed service water meters, or along property lines adjacent to mains if no meters exist. The city is not required to meet the thirty-psi minimum pressure during fire suppression events, but must be able to provide twenty-psi minimum pressure at ground level at all points throughout the distribution system during a fire suppression event. In the event that approval of a development would result in water pressures less than thirty psi, the city shall not approve the development, and the developer shall be required to install and dedicate the necessary system improvements to attain the required water pressure. Furthermore, if a customer requires higher pressure, then the customer is responsible for installing and operating pumps and ancillary equipment, at their own expense, to increase the pressure after the city's water meter. (Ord. 2042 § 1, 2018.)

9.02.045 Pressure reducing valve.

Pressure reducing valves shall be designed and installed in accordance with Chapter 4 of the City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements as adopted in Section 13.01.010. If the utility superintendent determines that in a high-pressure area of the water system a pressure reducing valve installation is necessary, he shall notify the property owner in writing requiring the installation of a pressure valve meeting city specifications within sixty days from the date of notice. (Ord. 2081 § 2, 2019; Ord. 489, 1973.)

9.02.046 Cross-connection control.

Certain documents, of which three copies of each are on file in the office of the city clerk-treasurer of the city of Selah, being designated as the Cross-Connection Control Regulation, Rules and Regulations of the State Board of Health Regarding Public Water Supplies, WAC 246-290-490, including their appendices, and hereafter amended, are adopted by reference. (Ord. 1137, 1994.)

9.02.047 Shut-off valve.

A shut-off valve shall be installed on the pipe leading from the meter into each property served and no branch pipe, bibb, or fixture of any kind shall be connected to the pipe between this valve and the meter. This valve shall be installed and maintained by the property owner or water user; it shall be for his use in making extensions and repairs of the plumbing upon the property, and it shall be accessible at all times and, where necessary, a suitable box and key shall be provided. In case the water is shut off from any service which is not provided with such a valve or with one which is not in good condition, the property owner or water user shall make arrangements to install, repair, or replace such valve. The water shall not be turned on again until such valve has been installed, repaired or replaced. (Ord. 1136, 1994.)

9.02.060 Sale or gift of water prohibited.

It is unlawful for any property owner or consumer to sell or give away water furnished by the city. (Ord. 447, 1970.)

9.02.070 Depth of connections.

All pipes leading to or from the city stopcock shall be laid not less than thirty inches below ground level. (Ord. 447, 1970.)

9.02.080 Failure to apply for water.

Any person making any connection with or any alteration to any pipe allowing water to be withdrawn without first applying for water shall be subject to the penalties of this chapter. (Ord. 447, 1970.)

9.02.085 Water conservation and rationing.

The public works director is authorized to conserve water and ration water upon filing with the mayor and city clerk-treasurer the rules, stages of reduction, and water conservation or rationing program. (Ord. 1058, 1992.)

9.02.090 Water may be shut off.

The water may, at any time, be shut off from the mains without notice for repairs, extensions or other necessary purposes and persons having boilers supplied by direct pressure from the mains are cautioned against danger of explosion or collapse and where meters are in use on such service, a safety valve shall be placed between the boiler and the meter at the owner's expense and the owner shall be responsible for all damage caused to the meter by hot water. The city shall not be responsible for the failure to supply water. The city shall make a reasonable effort to notify the customer when the water is to be shut off for repair. (Ord. 447, 1970.)

9.02.100 Limitation on use of water.

The city may, through its administrative officials, regulate the use of water and may limit the use of water in the event of shortage. The city shall not be responsible for any damages caused to property or property owners by reason of decreased water supply. (Ord. 447, 1970.)

9.02.110 Access to water meters.

Authorized city employees shall have free access to stopcocks and water meters and no other person shall alter, operate, or remove meters or stopcocks. (Ord. 447, 1970.)

9.02.120 Charge in the event of meter failure.

In the event of meter failure the property owner shall be charged an estimated billing based upon previous account history until the meter is repaired. (Ord. 1412, 1998; Ord. 447, 1970.)

9.02.130 Water permit fee, installation fee, connection fee.

There shall be charged a permit fee, an installation fee and a connection fee for every connection to the city water system, and for every connection to a privately constructed water line, which shall become a part of the city water system. (Ord. 489 § 1, 1973.)

9.02.131 Permit fee.

A permit fee of twenty-five dollars shall be charged for each connection of any size. (Ord. 1046 § 1, 1992; Ord. 1041 § 1, 1992; Ord. 489 § 1, 1973.)

9.02.132 Meter installation charges.

Charges for installation of water meters shall be in accordance with the following schedule:

Size of Meter	Installation Charge
¾"	$ 480.00
1"	680.00
1½"	1,100.00
2"	1,500.00

All meter sizes in excess of two inches shall be charged for the actual time and materials.

Where the city does not elect to install the water service connection, the owner shall have the water service connection installed complete, including the meter, at his own expense. An inspection fee of fifty dollars shall be paid to the city to compensate for the expenses incurred determining the conformance of the water service connection to city standards. (Ord. 1046 § 1, 1992; Ord. 1041 § 1, 1992.)

9.02.133 Connection fees.

For each water service connection, the connection fee shall be based upon meter size in accordance with the following schedule:

Size of Meter	Connection Charge
¾"	$ 50.00
1"	100.00
1½"	150.00
2"	250.00
3"	600.00
4"	1,000.00
over 4"	1,500.00

(Ord. 1046 § 1, 1992; Ord. 1041 § 1, 1992.)

9.02.135 Municipal water system reservoir capacity capital cost recovery program No. 1.

A municipal water system reservoir capacity capital cost recovery program No. 1 is established for the purpose of assessing fees to recover the city's capital costs to provide additional water capacity to the city. (Ord. 1674 § 1(A)(i), 2006.)

9.02.136 Fees for municipal water system reservoir capacity capital cost recovery program No. 1.

Fees shall be assessed for new water connections within the city of Selah in addition to any costs or fees already in existence. The amount of the fee shall be six hundred five dollars per ERU as established under Selah Municipal Code Chapter 20.90. (Ord. 1727, 2008; Ord. 1674 § 1(A)(ii), 2006.)

9.02.137 Lookout Point Reservoir water pressure capital cost recovery area.

A Lookout Point Reservoir water pressure capital cost recovery area (capital recovery area) is established for the purpose of assessing fees to recover the city's capital costs to provide water system storage capacity, water pressure, and the ability to connect to the transmission main. The capital recovery area is that area indicated on the Attachment A map of the ordinance codified in this section. (Ord. 1675 § 1(A)(i), 2006.)

9.02.138 Fees for connections within Lookout Point Reservoir water pressure capital cost recovery area (capital recovery area).

Fees shall be assessed for new water connections within the capital recovery area depicted in Section 9.02.137 and such fee shall be in addition to any costs or fees already in existence. The amount of the fee shall be one thousand five hundred forty-one dollars per ERU as established under Selah Municipal Code Chapter 20.90. (Ord. 1728, 2008; Ord. 1675 § 1(A)(ii), 2006.)

9.02.140 Water service charges.

(a) All charges for water service shall be due to the city clerk-treasurer on or before the tenth day of the month succeeding the date the bill was rendered. Water bills shall be presented monthly for water services delivered in the metered month prior to the bill. Water service shall be suspended to any property for which the service charge remains unpaid by the tenth day of the next succeeding month. The clerk-treasurer shall notify the property owner or consumer in the next succeeding month following the initial service charge billing of the fact that

payment has not been received. In the event of failure to pay the one month delinquent payment appearing upon the bill notifying the property owner or consumer of the nonpayment the water service shall be discontinued.

(b) In the event of disconnection of water service for delinquencies, the property owner or occupant shall be charged ten dollars for the service of disconnecting the water service. The property owner or occupant shall be charged ten dollars for the service of reconnecting the water service. Service to any property disconnected for delinquencies shall not be reinstated until all delinquencies, disconnection charges, and reconnection charges have been paid to the clerk-treasurer. (Ord. 1412, 1998.)

9.02.150 Connection or disconnection at request of property owner.

At the request of a property owner water service shall be disconnected or reconnected with no charge to the property owner. (Ord. 447, 1970.)

9.02.160 Unoccupied building or unit.

In the event that property served is unoccupied for more than a metered month without a request from the property owner to disconnect, a minimum charge shall be owing. (Ord. 447, 1970.)

9.02.170 Water charge during construction period.

During the construction of a building or buildings following application for water use the minimum charge shall be charged to the property owner for periods prior to occupancy. "Occupancy" shall include any use or occupancy of the property or building during any metered month. (Ord. 447, 1970.)

9.02.175 Temporary use of fire hydrants and meters.

(a) All persons, corporations or any other entities desiring to connect to city fire hydrants for temporary water supplies must first apply to the public works department for and receive permission from them to do so. The application will be on the form provided by the public works department.

(b) All persons, corporations or any other entities using city hydrants as temporary water supplies shall pay a refundable deposit on the water meter and associated equipment of seventy-five dollars for a three-quarter inch meter, one hundred fifty dollars for a one and one-half inch meter and three hundred dollars for a three-inch meter. The rental fee for use of the water meter shall be five dollars per day, sixty dollars per month or any portion thereof. In addition, the person, corporation or any other entity using the water meter shall pay a fee based on water consumption as shown on the water meter. The consumption fee shall be calculated pursuant to Selah's current water rates for the meter size used.

(c) In the event all city equipment is not promptly returned, or is returned in damaged condition, the user shall become liable to the city for the full replacement cost. (Ord. 1916 § 1, 2013; Ord. 1490, 2000; Ord. 1262, 1995.)

9.02.180 Minimum charge where property not receiving water service.

Any occupied property or building shall pay the minimum charge for water service whether or not connected to the municipal water supply where the service is available. (Ord. 447, 1970.)

9.02.190 Rates.

The monthly rates for all water service shall be set by resolution of the city council from time to time and said rates shall be on file and available at the office of the city clerk. (Ord. 1416, 1998.)

9.02.200 Penalties.

Persons violating the provisions of this chapter shall be subject to fine not to exceed $500.00 or confinement in jail not to exceed six (6) months. (Ord. 447, 1970.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 9.06
WATER FUND

Sections:

9.06.010 Water fund created.
9.06.020 Revenue from water system.
9.06.030 Use of water fund.
9.06.040 City clerk-treasurer to issue warrants.
9.06.050 Presentation of warrants, insufficient funds, interest.
9.06.060 Order of priority, notice of sufficiency after prior insufficiency.

9.06.010 Water fund created.

A fund to be known and designated as "water fund" is created. (Ord. 82 § 1, 1938.)

9.06.020 Revenue from water system.

All money received by the city from the operation of its water system shall be deposited in the water fund for the payment of warrants issued on the fund. (Ord. 82 § 2, 1938.)

9.06.030 Use of water fund.

Money deposited in the water fund shall be used for the following purposes only; for the operation and maintenance of the water system of the city; for the making of additions and betterments to the extensions of the water system of the city; and for the payment of principal and interest of revenue bonds against the water department or transferring from the water fund of any moneys therein for the purpose of meeting sinking fund requirements for the retirement of revenue bonds issued against the water department. (Ord. 82 § 3, 1938.)

9.06.040 City clerk-treasurer to issue warrants.

The city clerk-treasurer is authorized and directed to issue warrants drawn on said fund in payment of any of the purposes set forth in S.C. 9.06.030 of this ordinance, said warrants to be issued only upon proper vouchers therefor duly audited and allowed by the city council. (Ord. 82 § 4, 1938.)

9.06.050 Presentation of warrants, insufficient funds, interest.

That upon the issuance of any warrant on said fund the same shall be presented to the city treasurer for payment and if there is then sufficient money in said fund to pay said warrant he must then pay the same, but if there is not sufficient money in said fund to pay such warrant he must endorse on said warrant the words "not paid for want of funds," the date of the endorsement and his signature. That from and after the date of such endorsement said warrant shall draw interest at the rate of 4 percent per annum and until paid as hereinafter provided. (Ord. 82 § 5, 1938.)

9.06.060 Order of priority, notice of sufficiency after prior insufficiency.

All warrants issued on said fund shall be paid in the order of their date and presentation to the treasurer for payment and if not paid for want of funds when thereafter there is sufficient money in said fund to pay any warrant or warrants with interest, the city treasurer shall give notice thereof in the official paper of the city by one publication. Said notice shall fix a day certain not less than five (5) days after the date of publication of said notice on or after which said warrants will be paid and all interest on such warrants shall cease on said day. (Ord. 82 § 6, 1938.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 9.15
SERVICE OUTSIDE CITY LIMITS

Sections:

9.15.010 Statement of policy.
9.15.020 Criteria for water/sewer service outside city limits.
9.15.030 Conditions and covenants to approval.
9.15.035 Fees and charges.
9.15.040 Connections to existing utility extensions outside city limits.

9.15.010 Statement of policy.

It is the policy of the city of Selah to annex areas contiguous to the city limits that are requesting utility services. The city, at its sole discretion, shall determine the timing and annexation requirements for any parcel of land seeking utility services.

Prospectively, for noncontiguous area, if the city of Selah has determined that it is in the public interest and general welfare of the city of Selah in order to encourage orderly and planned growth, or to help eliminate a public health hazard, the city may allow certain selected extensions of city water and sewer services to property outside the city limits if the criteria of this chapter are fulfilled. (Ord. 2058 § 1, 2018; Ord. 1080, 1993; Ord. 693 § 1, 1978; Ord. 565 § 1, 1975.)

9.15.020 Criteria for water/sewer service outside city limits.

The city pursuant to RCW 35.92.200 can enter into contracts for the provision of water/sewer service outside of its city limits. The city authorizes the public works director to enter into such contracts and the city water or sewer service may be extended outside the city of Selah city limits, as authorized by the city's public works director, upon the following events occurring:

(1) That the area to be served lies within the city of Selah's urban growth boundaries;

(2) That the proposed extension of city water and sewer mains and system appurtenances conform to the city's water and sewer system plans, and comprehensive plans;

(3) That the applicant has executed an outside utility agreement containing the following conditions, as a minimum:

(A) The agreement shall be executed by the property owner(s) and shall be recorded and constitute a covenant upon the land,

(B) The owner(s) shall pay all connection charges, service fees, etc. as prescribed by city ordinance when the service is applied for,

(C) The owner(s) shall assist the city in taking the necessary steps to obtain the approval of the Yakima Boundary Review Board,

(D) The owner(s) shall comply with city ordinances concerning short or long platting and shall construct all improvements to city standards as if the property affected by this agreement were situated within the boundaries of the city,

(E) The owner(s) agree to sign in favor of any and all notices, petitions and any other documents requested concurrent with this agreement or at any time requested by the city leading to the annexation to the city of the property,

(F) The agreement may also contain other conditions or covenants, as determined by the city to assure the orderly, planned development of the area. (Ord. 2058 § 1, 2018; Ord. 1080, 1993; Ord. 693 § 2, 1978.)

9.15.030 Conditions and covenants to approval.

The city council may require the applicant to execute a concomitant agreement concerning the orderly development of the property or other restrictive covenants running with the land to ensure the policy set forth above. (Ord. 2058 § 1, 2018; Ord. 1080, 1993; Ord. 693 § 3, 1978.)

9.15.035 Fees and charges.

The application fee for processing an outside utility agreement is contained in Title 20, Chapter 20.14. (Ord. 2058 § 1, 2018; Ord. 1418 § 34, 1998.)

9.15.040 Connections to existing utility extensions outside city limits.

The public works director is authorized to allow lateral service connections to existing water/sewer extensions outside the city limits if the following minimum conditions are met:

(1) The land, parcel or lot for which the service is requested has been previously reviewed as part of a development for which an overriding outside utility agreement currently exists.

(2) An outside utility agreement has been executed for the above land, parcel or lot. (Ord. 2058 § 1, 2018; Ord. 1080, 1993.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 9.16
WATER AND SEWER FACILITIES ACT

Sections:

9.16.010 Adoption of municipal water and sewer facilities act.

9.16.010 Adoption of municipal water and sewer facilities act.

The city is authorized to contract with owners of real estate in the manner provided for in RCW 35.91. All such contracts by the city shall provide for a period of reimbursement of up to twenty years. (Ord. 1994 § 1, 2016; Ord. 603, 1976.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 9.17
PLANT INVESTMENT FEE

Sections:

9.17.010 Definitions.
9.17.020 Plant investment fee – Water system.
9.17.021 Plant investment fee – Sewer system.

9.17.010 Definitions.

"Water or sewer facilities" means storm, sanitary or combination sewers, pumping stations and disposal plants, water mains, hydrants or appurtenances connecting to the public water or sewerage system, and as further defined in RCW 35.91.020. (Ord. 678 § 2, 1978.)

9.17.020 Plant investment fee – Water system.

(a) Any property owner, prior to connecting to the municipal water system, shall be required to purchase a portion of the depreciated water source, transmission, and storage system and system capacity improvements outlined in the city's comprehensive water plan through the payment of a plant investment fee (P.I.F.)

(b) Any new or expanded existing use, requesting or requiring connection to the municipal water system which requires the installation of a new or expanded water service shall pay the required P.I.F. The P.I.F. is due and payable prior to the installation of the new or expanded water service. A P.I.F. is nonrefundable and shall remain as part of the property to which it has been assigned, to be passed on with the sale of the land.

(c) Funds collected from the water system plant investment fee shall be deposited in the Water Reserve Fund No. 461.

(d) The water system P.I.F. is listed in Title 20, Chapter 20.80. (Ord. 1451 § 2, 1999; Ord. 678 § 3, 1978; Ord. 489 § 1, 1973.)

9.17.021 Plant investment fee – Sewer system.

(a) Any property owner, prior to connecting to the municipal sewer system, shall be required to purchase a portion of the depreciated wastewater treatment, interceptor, trunk, and pumping facilities and system capacity improvements outlined in the city's comprehensive sewer plan through the payment of a plant investment fee (P.I.F.).

(b) Any new or expanded existing use, requesting or requiring connection to the municipal sewer system shall pay the required P.I.F. The P.I.F. is due and payable prior to the connection of the new or expanded use. A P.I.F. is nonrefundable and shall remain as part of the property to which it has been assigned, to be passed on with the sale of the land.

(b) Funds collected from the sewer system plant investment fee shall be deposited in the Sewer Reserve Fund No. 465.

(d) The sewer system P.I.F. is listed in Title 20, Chapter 20.80. (Ord. 1451 § 3, 1999; Ord. 678 § 3, 1978.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 9.19
UTILITY LATECOMER AGREEMENTS

Sections:

9.19.010 Latecomer charge.
9.19.020 Latecomer charge procedure.

9.19.010 Latecomer charge.

Pursuant to RCW 65.08 (Chapter 72, Laws of 1977), the city is authorized to levy a charge on property pertaining to:

(1) The amount required by the provisions of a contract pursuant to Selah Code Chapter 9.16, under which the water or sewer facilities so tapped into or used were constructed; or

(2) Any connection charges which are in fact reimbursement for the cost of facilities constructed by the sale of revenue bonds; or

(3) The additional connection charge authorized in RCW 35.92.025. (Ord. 1450 § 1, 1999.)

9.19.020 Latecomer charge procedure.

In the event the city desires to establish a benefit area subject to the levy for the improved water or sewer facility, it shall do so by resolution authorizing city representatives to record with the Yakima County auditor, notice pursuant to RCW 65.08. Prior to tapping into the water or sewer facility, the city council shall determine the equitable share to be borne by the property owners in the benefited area, as provided by RCW 35.92.025. In addition to the equitable share shall be added interest from the date the water or sewer facility is accepted by the city council until payment. The rate of interest shall be stated in the resolution. (Ord. 1450 § 1, 1999.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 13.01
CITY OF SELAH DESIGN, CONSTRUCTION STANDARDS AND SPECIFICATIONS FOR PUBLIC WORKS IMPROVEMENTS

Sections:

13.01.010 City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements.

13.01.020 Copy of City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements maintained at public works department.

13.01.010 City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements.

The city adopts and incorporates as if fully set forth herein the City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements, as it now exists or is hereafter amended, as set forth in Exhibit "A" of the ordinance codified in this chapter, as its standards and specifications for use with public works projects. (Ord. 2094 § 1, 2020; Ord. 2083 § 3, 2019.)

13.01.020 Copy of City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements maintained at public works department.

The city of Selah shall maintain a copy of the City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements as it exists now or is hereafter amended at its public works department and shall make it available for public inspection during regular business hours. (Ord. 2083 § 4, 2019.)

The Selah Municipal Code is current through Ordinance 2098, passed February 11, 2020.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

Note: This site does not support Internet Explorer. To view this site, Code Publishing Company recommends using one of the following browsers: Google Chrome, Firefox, or Safari.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 20.80

PLANT INVESTMENT FEES[1]

Sections:

20.80.020 Water system plant investment fee.

20.80.040 Sewage system plant investment fee.

1 Editor's note: Notwithstanding any language contained in this chapter to the contrary, any existing residential dwelling units within the city limits of the city of Selah as of August 31, 1999 shall, upon application to hook-up to city sewer and/or water, be charged the plant investment fees in effect prior to the adoption of the ordinance codified in this chapter (in the amounts of sixty-five dollars for a water hook-up and forty-eight dollars for a sewer hook-up). This exception to the fees adopted in the ordinance codified in this chapter will be in effect for ten years from the effective date of the ordinance codified in this chapter.

20.80.020 Water system plant investment fee.

(a)

Size of Meter	Plant Investment Fee
¾"	$ 237.00
1"	403.00
1½"	782.00
2"	1,256.00
3"	2,773.00
4"	4,740.00
6"	9,883.00
8"	14,220.00

No refund for reduction of meter size from existing meter size.

(b) Property located outside the municipal boundary shall pay one hundred fifty percent of the applicable water system plant investment fee for municipal residents.

(c) The water system plant investment fee is due when the request is made to install the water meter. Applicants for meters one and one-half inches or larger may pay the water system plant investment fee in three equal

installments with one-third due at the time of application and the balance in two equal installments which are due one year and two years from the date of the original application. (Ord. 1449 § 2, 1999.)

20.80.040 Sewage system plant investment fee.

(a)

Size of Water Meter	Plant Investment Fee
¾"	$1,282.00
1"	2,179.00
1½"	4,231.00
2"	6,795.00
3"	14,999.00
4"	25,640.00
6"	53,460.00
8"	76,920.00

No refund for reduction of meter size from existing meter size.

(b) Property located outside the municipal boundary shall pay one hundred fifty percent of the applicable sewage system plant investment fee for municipal residents.

(c) The sewage system plant investment fee is due when the request is made to install the water meter. Applicants for meters one and one-half inches or larger may pay the sewage plant investment fee in three equal installments with one-third due at the time of application and the balance in two equal installments which are due one year and two years from the date of the original application.

(d) The sewage system plant investment fee, for a connection to the municipal sewage system when no connection is proposed to the municipal water system, shall be based on a comparable water meter size required to serve the proposed use (i.e., three-fourths inches water meter for a single-family residence; one inch water meter to serve a duplex; etc.) as determined by the director of public works. The sewer system plant investment fee, when no connection to the municipal water system is proposed, is due in full when the request is made to connect to the sewage system. (Ord. 1449 § 3, 1999.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 20.90
FEE FOR MUNICIPAL WATER SYSTEM RESERVOIR CAPACITY CAPITAL COST RECOVERY PROGRAM NO. 1

Sections:

20.90.010 Fee for municipal water system reservoir capacity capital cost recovery program No. 1.

20.90.010 Fee for municipal water system reservoir capacity capital cost recovery program No. 1.

A fee of six hundred five dollars per ERU shall be assessed for any connection made to the city's water system. Such fee, as set forth in Selah Municipal Code Section 9.02.136, is assessed for the purpose of recovering capital costs associated with improvements necessary to the city's water system to in-crease capacity. (Ord. 1727, 2008; Ord. 1674 § 1(B)(i), 2006.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 20.91
FEE FOR WATER CONNECTIONS IN LOOKOUT POINT RESERVOIR WATER PRESSURE CAPITAL COST RECOVERY AREA (CAPITAL RECOVERY AREA)

Sections:

20.91.010 Fee for water connections in Lookout Point Reservoir water pressure capital cost recovery area (capital recovery area).

20.91.010 Fee for water connections in Lookout Point Reservoir water pressure capital cost recovery area (capital recovery area).

A fee of one thousand five hundred forty-one dollars per ERU shall be assessed for any water connection made within the capital recovery area defined in Selah Municipal Code Section 9.02.137. Such fee, as set forth in Selah Municipal Code Section 9.02.138, is assessed for the purpose of recovering capital costs associated with water supply, service pressure, and the ability to connect to the new transmission mains. (Ord. 1728, 2008; Ord. 1675 § 1(B)(i), 2006.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

Chapter 21.11
APPEALS

Sections:

21.11.010 Appeal of administrative interpretations and approvals.
21.11.020 Appeal to the city council.
21.11.030 Judicial appeal.

21.11.010 Appeal of administrative interpretations and approvals.

Administrative interpretations and administrative approvals may be appealed, by applicants or parties of record, to the council. (Ord. 1641 § 36, 2004.)

21.11.020 Appeal to the city council.

(a) *Filing.* Every appeal to the council shall be filed with the city clerk within ten days after the date of the decision of the matter being appealed and must include the appeals fee.

(b) *Contents.* The notice of appeal shall contain a concise statement identifying:

(1) The decision being appealed.

(2) The name and address of the appellant and his interest(s) in the matter.

(3) The specific reasons why the appellant believes the decision to be wrong. The appellant shall bear the burden of proving the decision was wrong.

(4) The desired outcome or changes to the decision. (Ord. 1641 § 37, 2004.)

21.11.030 Judicial appeal.

(a) Appeals from the final decision of the council, board of adjustment, or board of appeals, or another city board or body involving Titles 14 through 18, SMC, and for which all other appeals specifically authorized have been timely exhausted, shall be made to Yakima County Superior Court within twenty-one days of the date the decision or action became final, unless another time period is established by state law or local ordinance.

(b) Notice of the appeal and any other pleading required to be filed with the court shall be served on the city clerk, city administrator, mayor and city attorney within the applicable time period. This requirement is jurisdictional.

(c) The cost of transcribing and preparing all records ordered certified by the court or desired by the appellant for such appeal shall be borne by the appellant. The appellant shall post with the city clerk prior to the preparation of any records an advance fee deposit in the amount specified by the city clerk. Any overage will be promptly returned to the appellant. (Ord. 1879 § 1, 2012; Ord. 1641 § 38, 2004.)

The Selah Municipal Code is current through Ordinance 2084, passed July 23, 2019.

Disclaimer: The finance department has the official version of the Selah Municipal Code. Users should contact the finance department for ordinances passed subsequent to the ordinance cited above.

City Website: selahwa.gov
City Telephone: (509) 698-7334
Code Publishing Company

RESOLUTION NO. 1341

A RESOLUTION AUTHORIZING THE MAYOR TO SIGN AN INTERLOCAL AGREEMENT FOR REGIONAL WELLHEAD PROTECTON PROGRAM.

WHEREAS, Section 1428 of the 1986 Amendments to the federal Safe Drinking Water Act mandates that every state develop a wellhead protection program, and that the state Drinking Water Act requires that all Group A water systems using ground water as their source implement a Wellhead Protection Program; and

WHEREAS, these water purveyors prepared a Regional Wellhead Protection Plan in 1998 financed by a 75 percent grant from the Washington State Department of Ecology (DOE) Centennial Clean Water Fund; and

WHEREAS, Yakima County, the City of Moxee, the Town of Naches, the City of Selah, the Town of Tieton, the City of Yakima, the City of Union Gap and the Nob Hill Water Association are individually and collectively concerned with responsible wellhead protection in their communities, and in particular fulfilling continuing Wellhead Protection plan maintenance requirements by the Washington State Department of Health (DOH) detailed in WAC 246-290-135; and,

WHEREAS, the City wishes to enter into an Interlocal Agreement to establish responsibilities for the maintenance of the regional Wellhead Protection Plan developed by the aforementioned water purveyors under the Interlocal Agreement established in 1998.

THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SELAH, WASHINGTON, that the Mayor be authorized to sign an Interlocal Agreement for Wellhead Protection Plan maintenance.

PASSED AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF SELAH, WASHINGTON, this 14th day of November, 2000.

Robert L. Jones, Mayor

ATTEST:

Dale E. Novobielski, Clerk Treasurer

APPROVED AS TO FORM:

Kevin M. Roy, City Attorney

RESOLUTION NO. 1341

RESOLUTION NO. 1343

A RESOLUTION TO ADOPT THE UPPER YAKIMA VALLEY REGIONAL WELLHEAD PROTECTON PROGRAM.

WHEREAS, Section 1428 of the 1986 Amendments to the federal Safe Drinking Water Act mandates that every state develop a wellhead protection program, and that the state Drinking Water Act requires that all Group A water systems using ground water as their source implement a Wellhead Protection Program; and

WHEREAS, Yakima County, City of Moxee, the Town of Naches, the City of Selah, the Town of Tieton, the City of Yakima, the City of Union Gap and Nob Hill Water Association are collectively known as Upper Yakima Valley Regional Wellhead Protection Committee. The purpose of the Upper Yakima Valley Regional Wellhead Protection Plan (WHPP) is to identify potential sources of contamination near the member purveyors' groundwater supplies, implement management strategies to prevent contamination of those supplies, and develop a contingency plan for the contamination mitigation in the event that groundwater does become contaminated; and

WHEREAS, these water purveyors have had a Regional Wellhead Protection Plan prepared; and

WHEREAS, the City wishes to adopt the Upper Yakima Valley Regional Wellhead Protection Plan that has been prepared by Gray & Osborne, Inc. for the aforementioned water purveyors under the Interlocal Agreement established in 1998;

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SELAH, WASHINGTON, that the Council adopt the Upper Yakima Valley Regional Wellhead Protection Plan.

PASSED AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF SELAH, WASHINGTON, this 14th day of November, 2000.

Robert L. Jones, Mayor

ATTEST:

Dale E. Novobielski, Clerk/Treasurer

APPROVED AS TO FORM:

Kevin M. Roy, City Attorney

RESOLUTION NO. 1343

RESOLUTION NO. 2775

A RESOLUTION REVISING RATES FOR WATER UTILITY SERVICES

WHEREAS, Section 9.02.190 of the Selah Municipal Code provides that rates for Water Utility services be set by resolution of the City Council from time to time, and

WHEREAS, the City Council has determined that a revision in the Water Rate structure is appropriate;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SELAH, WASHINGTON, as follows:

Water Service Charges:

a) Within Corporate Limits

Meter Size	Consumption (100 cubic ft)		Minimum	Overage (per 100 cubic ft)
3/4" or smaller	First	3	$17.59	
	Next	7		1.56
	Over	10		1.21
1"	First	4	23.37	
	Next	6		1.56
	Over	10		1.21
1-1/4" through 1-1/2"	First	5	29.21	
	Next	5		1.56
	Over	10		1.21
2"	First	5	35.01	
	Next	5		1.56
	Over	10		1.21
3"	First	10	46.72	
	Next	10		1.56
	Over	20		1.21
4"	First	20	70.06	
	Next	180		1.97
	Over	200		1.56
Over 4"	First	20	70.06	
	Next	4,980		1.97
	Over	5,000		1.56

b) The minimum charge per month for the availability of water service for two-family dwellings, multiple dwellings, group houses and condominiums, apartment houses, and mobile home parks as defined in Chapter 10.02 shall be twelve dollars and sixty-four cents ($12.64) for each dwelling unit or mobile home space. Each dwelling unit or mobile home space shall be allotted 300 cubic feet of minimum consumption, and water used over this minimum amount shall be charged at the applicable rate in section (a) above.

c) Low-Income Senior Citizens and Low-Income Disabled Persons Occupant Rate.

(1) Single-family dwellings shall be charged be eleven dollars and fourteen cents ($11.14) per month, for the first 300 cubic feet of water consumption. Additional water consumption will be charged at the rate of one dollar and thirty-eight cents ($1.38) per 100 cubic feet for the next 700 cubic feet and one dollar and ten ($1.10) per 100 cubic feet for over 1,000 cubic feet.

(2) A senior citizen is a person who occupies a dwelling unit where either the person or the person's spouse is sixty-two years of age or older at the commencement of any month.

(3) A low-income senior citizen shall be a senior citizen whose income, combined with the income of the spouse, if any, for the calendar year preceding was fifteen thousand dollars ($15,000.00) or less.

(4) A disabled person is a person who occupies a dwelling unit and qualifies for special parking privileges under RCW 46.16.381(1)(a) through (f) or a blind person as defined in RCW 74.18.020(4) or developmentally disabled as defined in RCW 71A.10.020(2) or a mentally ill person as defined in RCW 71.05.020(1).

(5) A low-income disabled person shall be a disabled person whose income, combined with the income of the spouse, if any, for the calendar year preceding was fifteen thousand dollars ($15,000) or less.

(6) Combined income shall be income from all sources, provided that only two-thirds (2/3) of any social security benefits, two-thirds (2/3) of any retirement pension, two-thirds (2/3) of disability benefits, and the full amount of any other income shall be considered as income for the purpose of this section, and provided further, that the gain realized by any person from the sale, transfer, or upon being displaced from, his or her residence shall not be considered as income for the purposes of this section, if reinvested in a replacement residence within eighteen (18) months of its realization.

(7) Determination of eligibility shall be made by the City Clerk-Treasurer based upon the annual statement of the low-income senior citizen or low-income disabled person, or any other reasonable and verifiable means at the discretion of the Clerk-Treasurer.

d) Outside utility users shall pay one hundred fifty percent (150%) of the applicable water service charges charged to City residents and commercial/business users.

e) Bulk water consumers shall be served at the convenience of the City and shall pay the sum of ten dollars ($10.00) per fill and one dollar and ninety-seven cents ($1.97) per hundred gallon unit.

BE IT FURTHER RESOLVED that the rates set forth herein shall be effective commencing January 1, 2020.

PASSED AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF SELAH, WASHINGTON, this 26th day of November, 2019.

Sherry Raymond

Sherry Raymond, Mayor

ATTEST:

Dale E. Novobielski, Clerk/Treasurer

APPROVED AS TO FORM:

Rob Case, City Attorney

RESOLUTION NO. 2775

9.
EXTENSION BY DEVELOPERS POLICY

HLA
Engineering and Land Surveying, Inc.

EXTENSION BY DEVELOPERS

If a developer, or other person desires to extend the water system, they must do so at their own expense, provided they comply with the standards and other requirements of the City.

1. At the time that the preliminary proposal is submitted to the City, a letter requesting the availability of water should be submitted to the City for approval. A map showing the area to be served, the number of units, and the type of units should accompany this request.

2. If the area to be served is inside the service area but outside the City Limits, and Outside Utility Service Agreement must be executed.

3. Prior to the installation of water mains, an application to extend the water system must be submitted by the Developer for approval by the City. At this time, the Developer should authorize his consulting engineer to proceed with design and furnish the City three copies of the preliminary drawings. After review and approval by all applicable agencies, the Developer's consulting engineer must provide four copies of the final water system extension design to the City.

4. After the plans are complete, the developer may call for bids for the work described herein. It is required that the Developer secure a Performance Bond guaranteeing the completion of this work and payment of bills and guarantee the materials and workmanship for one year. It is required that licensed and bonded contractors be employed by the Developer.

5. After the award of the Contract and before proceeding with any work on the job, the City must be notified at least five working days in advance of start of work. Any work that is performed without proper notification of the City will be summarily rejected.

6. During the progress of the work, the City should be kept informed and inspection requested prior to covering pipe and other major phases of construction.

7. After completion of construction, the standard pressure test must be performed.

8. After the pressure test, lines must be tested and approved for purity. The procedure used for disinfection shall conform to the 1991 Standard Specifications for Road, Bridge, and Municipal Construction or other standards acceptable to the Washington State Department of Health. In cases of new construction, drinking water shall not be furnished to the consumer until satisfactory bacteriological samples have been analyzed by a laboratory certified by the State.

9. All fees must be paid prior to ordering meters. This includes cut-in fees, engineering fees, and connection charges that might be applicable to this development.

10. At this point, the Developer and the Contractor should ask for an inspection and acceptance of the mains. This inspection must be performed by the City, Contractor, and the Developer.

11. The developer must furnish the City with a cost breakdown showing the total cost of construction for this development.

12. The Developer must furnish the City permanent easements that might be necessary or applicable to this installation.

13. The Developer must furnish to the City a Maintenance Bond guaranteeing materials and workmanship for a period of one year. This Bond can be a part of the Performance Bond.

14. At this time of development, the Developer may order meters. Any areas where excessive pressure exists (in excess of 90 pounds per square inch), the Developer is responsible for the installation of pressure reducing valves.

15. After acceptance of the water mains by the City, the Developer must sign a Bill of Sale deeding these mains to the City. The Conditions and Standards, which

correspond to the Specifications, on all Developer's jobs are on file with the City. It is the responsibility of the Developer and his Contractor to familiarize themselves with the Specifications prior to starting work. On all construction work, the Developer is responsible to the City for performance of all required work and the Developer will be responsible for directing his Contractor. Nothing contained herein or advice given by the project inspector shall relieve the Developer from his responsibility for conformance with the approved plans and specifications or the City's Standards and Specifications.

10.
PROPERTY DEEDS AND PROTECTIVE WELL COVENANTS

HLA
Engineering and Land Surveying, Inc.

Fee No. 1097536

TITLE
GUARANTY
COMPANY
"The Corner Office"

Warranty Deed

WELL NO. 3 & 4

THE GRANTORS, VERNON A. HARRISON, FLOY A. COFFMAN, MARIANNA RAY LINDEMAN, INA C. HARRISON, as their separate property,

for and in consideration of Ten & no/100- - - - - - - - - - - - - - - -Dollars ($ 10.00), in hand paid, conveys and warrants to THE TOWN OF SELAH, a municipal corporation,

the following described real estate, situate in the County of Yakima State of Washington:

Tracts 5 and 12 Selah Garden Tracts, according to the official plat thereof recorded in Volume "B" of Plats, page 39, Records of Yakima County, Washington.

Subject to any easements, reservations, exceptions or rights of way existing over and across said premises.

Dated this 24th day of August, A. D. 1945.

Vernon A. Harrison (Seal)

Floy A. Coffman (Seal)

Marianna Ray Lindeman (Seal)

Ina C. Harrison (Seal)

STATE OF WASHINGTON } ss.
County of Yakima }

On this day personally appeared before me VERNON A. HARRISON, MARIANNA RAY LINDEMAN and INA C. HARRISON to me known to be the individuals described in and who executed the within and foregoing instrument, and acknowledged that they signed the same as their free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 24 day of August, 1945.

C. W. Halverson
Notary Public in and for the State of Washington,
residing at Yakima, Washington.

STATE OF CALIFORNIA)
) ss.
County o f Alameda)

On this day personally appeared before me FLOY A. COFFMAN to me known to be the individual described in and who executed the within and foregoing instrument, and acknowledged that she signed the same as her free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 24th day of August, 1945.

Notary Public in and for the State of California, residing at Oakland, California

My Commission Expires June 25, 1948

Town of Selah
Plat Work

MAIL TO:
Town of Selah
Selah Wash
Attn: Harold Ringsrud

Warranty Deed

VERNON A. HARRISON, et al

TO

THE TOWN OF SELAH

Filed for record at the request of Title Guarantee Company
Sep 6 1945 A.D., 19
at 1 9 Min. Past 4 P M.
and recorded in vol. 408
Deeds Pages 609
Records of Yakima County, Wash.
HAROLD PURDIN
County Auditor
By Dixie Greenelp Deputy
Fee $
From the office of

09535 14-WAR-1945

Wixon Park

OCT 19 1995

DECLARATION OF COVENANT

Know all men by these presents that the City of Selah the undersigned, owner in fee simple of the land described herein, hereby declare this covenant and place same on record.

We, the grantors herein, are the owners in fee simple of (an interest in) the following described real estate situated in Yakima County, State of Washington, to wit:

3111956

That portion of the Southwest Quarter of the Southeast Quarter, described as follows:

Beginning at the southeast corner, of the Southwest Quarter, of the Southeast Quarter; thence west 200 feet; thence north 400 feet; thence east 170 feet; thence north to the County Road; thence east along the County Road 30 feet, more or less, to the east line of the Southwest Quarter, of the Southeast Quarter; thence south 1,068 feet to the point of beginning, all being in Section 35, Township 14 North, Range 18 East, W.M.

3111956

22

SUBJECT TO any easements, reservations or rights of way appearing in the chain of title or existing over and across said premises.

on which the grantors own and operate a well and waterworks supplying water for public use located on said real estate, to wit:

Beginning at the southwest corner of Section 35, Township 14 North, Range 18 East, W.M. Thence west 1,423 feet; thence north 99 feet to the center of said Well.

and grantors are required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantors land which might contaminate said water supply.

NOW, THEREFORE, the grantors agree and covenant that said grantors, their heirs, successors, and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantors and within 100 (one-hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: cesspools, sewers, privies, septic tanks, drainfields, manure piles, garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens, or other enclosures or structures for the keeping or maintenance of fowls or animals, or storage of liquid or dry chemicals, herbicides, or insecticides.

These covenants shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in the land herein or any part thereof, and shall inure to the benefit of each owner thereof.

R Sweesy
Mayor John Sweesy

10-16-95
Date

ACKNOWLEDGEMENT

State of Washington)
) ss
County of Yakima)

I certify that I know or have satisfactory evidence that John Sweesy is the person who appeared before me, and said person acknowledged that he signed this document and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: 10/16/95

Ken - Ag
Notary Public

My Appointment Expires 8/20/98

YAKIMA COUNTY WASH
SELAH CITY
OCT 19 11 27 AM '95
DOUG COCHRAN

VOL 1495 1941

95008\DEC.COV.WATERWELL.wc

Wixon Park

OCT 19 1995

DECLARATION OF COVENANT

3111957

3111957

Know all men by these presents that the City of Selah the undersigned, owner in fee simple of the land described herein, hereby declare this covenant and place same on record.

We, the grantors herein, are the owners in fee simple of the following described real estate situated in Yakima County, State of Washington, to wit:

That portion of the Southwest Quarter, of the Southeast Quarter, described as follows:

Beginning at the southeast corner, of the Southwest Quarter, of the Southeast Quarter; thence west 200 feet; thence north 400 feet; thence east 170 feet; thence north to the County Road; thence east along the County Road 30 feet, more or less, to the east line of the Southwest Quarter, of the Southeast Quarter; thence south 1,068 feet to the point of beginning, all being in Section 35, Township 14 North, Range 18 East, W.M.

22

SUBJECT TO any easements, reservations or rights of way appearing in the chain of title or existing over and across said premises.

on which the grantors own and operate a well and waterworks supplying water for public use located on said real estate, to wit:

Beginning at the southeast corner of Section 35, Township 14 North, Range 18 East, W.M. Thence west 1,427 feet; thence north 321 feet to the center of said well.

and grantors are required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantors land which might contaminate said water supply.
NOW, THEREFORE, the grantors agree and covenant that said grantors, their heirs, successors, and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantors and within 100 (one-hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: cesspools, sewers, privies, septic tanks, drainfields, manure piles, garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens, or other enclosures or structures for the keeping or maintenance of fowls or animals, or storage of liquid or dry chemicals, herbicides, or insecticides.

These covenants shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in the land herein or any part thereof, and shall inure to the benefit of each owner thereof.

J. Sweesy

Mayor John Sweesy

10-16-95

Date

ACKNOWLEDGEMENT

State of Washington)
) ss
County of Yakima)

I certify that I know or have satisfactory evidence that John Sweesy is the person who appeared before me, and said person acknowledged that he signed this document and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: 10/16/95

YAKIMA COUNTY
WASH
FILED
Selah City
Oct 19 11 27 AM '95

Notary Public

My Appointment Expires 8/20/98

DOUG COCHRAN

VOL 1495 1942

15-WTR-1746 F

TITLE GUARANTY COMPANY
"The Corner Office"

1087668

WELL NO. 5

Warranty Deed

THE GRANTORS ALBERT H. RIVARD and EMILY M. RIVARD, husband and wife,

for and in consideration of TEN HUNDRED FIFTY and - - - - - - - - NO/100 Dollars ($1,050.00), in hand paid, conveys and warrants to the TOWN OF SELAH

the following described real estate, situate in the County of Yakima, State of Washington:

Lots nine (9), ten (10) and eleven (11) in Block eleven (11) of the A. H. Rivard Addition to Selah, according to the official plat thereof recorded in Volume "I" of Plats, page 33, records of Yakima County, Washington.

Dated this 10th day of April, A. D. 1945.

Albert H Rivard (Seal)

Emily M Rivard (Seal)

STATE OF WASHINGTON }
County of Yakima. } ss.

On this day personally appeared before me ALBERT H. RIVARD

to me known to be the individual described in and who executed the within and foregoing instruments, and acknowledged that he signed the same as his free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 10 day of April, 1945.

E. V. Velikanje

Notary Public in and for the State of Washington,
residing at Yakima, Wash.

(over)

STATE OF WASHINGTON)
) ss.
County of K i n g)

ON THIS DAY personally appeared before me EMILY M. RIVARD to me known to be the individual described in and who executed the within and foregoing instrument, and acknowledged that she signed the same as her free and voluntary act and deed, for the uses and purposes therein mentioned.

DATED this 19th day of April, 1945.

NOTARY PUBLIC in and for the State of Washington, residing at Seattle.

MAIL TO:

E. E. Allen, City Treas.,

Selah, Wash.

MAY 1 1945

Warranty Deed

ALBERT H. RIVARD, et ux

TO

TOWN OF SELAH

Filed for record at the request of
SELAH STATE BANK
MAY 1 - 1945 A.D., 19
at 2 Min. Past 11 M.
and recorded in vol 397
Deeds, Page 388
Records of Yakima County, Wash.
HAROLD PURDIN
County Auditor
By [illegible] Deputy
Fee $

From the office of

607

Shop Site

311958

OCT 19 1995

311958

DECLARATION OF COVENANT

Know all men by these presents that the City of Selah, owner in fee simple of the land described herein, hereby declares this covenant and place same on record.

We, the grantors herein, are the owners in fee simple of the following described real estate situated in Yakima County, State of Washington, to wit:

> Lots Nine (9), Ten (10), and Eleven (11), in block 11 of the A.H. Rivard Addition to Selah, according to the official plat thereof, recorded in Volume "I" of Plats, page 33, records of Yakima County, Washington.

on which the grantors own and operate a well and waterworks supplying water for public use located on said real estate, to wit:

> Beginning at the southwest corner of Section 36, Township 14 North, Range 18 East, W.M.; thence north 943 feet; thence east 1,139 feet to the center of said well.

and grantors are required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantors land which might contaminate said water supply. NOW, THEREFORE, the grantors agree and covenant that said grantors, their heirs, successors, and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantors and within 100 (one-hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: cesspools, sewers, privies, septic tanks, drainfields, manure piles, garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens, or other enclosures or structures for the keeping or maintenance of fowls or animals, or storage of liquid or dry chemicals, herbicides, or insecticides.

These covenants shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in the land herein or any part thereof, and shall inure to the benefit of each owner thereof.

John Sweesy
Mayor John Sweesy

10-16-95
Date

ACKNOWLEDGEMENT

State of Washington)
) ss
County of Yakima)

I certify that I know or have satisfactory evidence that John Sweesy is the person who appeared before me, and said persons acknowledged that he signed this document and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: 10/16/95

Notary Public

My Appointment Expires 8/20/98

YAKIMA COUNTY
WASH
FILED
Selah
Oct 19 11 27 AM '95
DOUG [illegible]

VOL 1495 1943

95006\DEC.COV.WATER\WELL #5

October 2, 1995

WASHINGTON
TITLE INSURANCE
COMPANY

WELL NO. 6

Statutory Warranty Deed

THE GRANTOR, ANNA K. TYRRELL, a widow,

for and in consideration of FIFTY# - Dollars
($ 50.00), in hand paid, conveys and warrants to

TOWN OF SELAH, WASHINGTON, a municipal corporation,

the following described real estate, situated in the County of Yakima, State of Washington:

That part of Lot Nine (9) in Tyrrell's Addition adjacent to Selah (now Selah), Washington, lying Northeasterly of the County Road as recorded in the office of the County Auditor of Yakima County, Washington, in Volume 250 of Deeds, County Auditor's fee number 610441.

Dated this 12th day of December, A. D. 19 39.

Anna K Tyrrell (SEAL)

(SEAL)

STATE OF WASHINGTON, }
} ss:
County of Yakima, }

On this day personally appeared before me Anna K. Tyrrell, a widow,

to me known to be the individual described in and who executed the within and foregoing instrument, and acknowledged that she signed the same as her free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 18th day of December, 1939.

Notary Public in and for the State of Washington,
residing at Selah, Wash.

Form L 3

880806

18-WAR-1739F

INDEXED JAN 19 1940

WARRANTY DEED

ANNA K. TYRRELL
Wells Nos. 1 and 2.
South Portion
(a widow)
TO

TOWN OF SELAH,
Washington

Filed for record at the request of
SELAH STATE BANK
JAN 5 - 1940 A. D., 19
at 5 Min. past 10 A. M.
and recorded in Vol. 345
Deeds Page 466
Records of Yakima County, Wash.
J. L. WILLETT
County Auditor
By Ida Darnell Deputy
60¢

WASHINGTON TITLE INSURANCE COMPANY
SEATTLE, WASHINGTON

SELAH STATE BANK
Selah
Wash

Carbon Park

Selah Comp Water

OCT 19 1995

DECLARATION OF COVENANT

3111955

Know all men by these presents that the City of Selah, owner in fee simple of the land described herein, hereby declare this covenant and place same on record.

We, the grantors herein, are the owners in fee simple of (an interest in) the following described real estate situated in Yakima County, State of Washington, to wit:

That portion of the Northeast Quarter, of the Northwest Quarter, of Section 36, Township 14 North, Range 18 East, W.M., described as follows: Beginning at a point on the north line of said Section, which is North 89°43' West, 463.07 feet from the north quarter corner of said Section; thence South 22°20' West, 21.58 feet to the true point of beginning; thence North 89°43' West, 300 feet; thence South 22°20' West, 150 feet; thence South 89°43' East, 300 feet to the westerly right of way line of Wenas Road; thence North 22°20' East, along the westerly line of Wenas Road 150 feet to the true point of beginning, EXCEPT beginning at a point on the north line of said Section 36, which is North 89°43' West, 463.07 feet from the north quarter corner of said Section 36; thence South 22°40' West, 27.04 feet to the true point of beginning; thence North 89°43' West, parallel with the north line of said Section 150.00 feet; thence South 0°17' West, 79.45 feet; thence South 67°20' East, 108.43 feet, more or less, to the westerly right of way line of the Wenas Road; thence North 22°40' East, along said right of way line 130.59 feet to the true point of beginning, and EXCEPT the north 5 feet thereof for road.

3111955

27

on which the grantors own and operate a well and waterworks supplying water for public use located on said real estate, to wit:

The center of said Well being described as follows:

A point 727 feet west, and 89 feet south of the northeast corner, of the Northwest Quarter, of Section 36, Township 14 North, Range 18 East, W.M;

and grantors are required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantors land which might contaminate said water supply.
NOW, THEREFORE, the grantors agree and covenant that said grantors, their heirs, successors, and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantors and within 100 (one-hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: cesspools, sewers, privies, septic tanks, drainfields, manure piles, garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens, or other enclosures or structures for the keeping or maintenance of fowls or animals, or storage of liquid or dry chemicals, herbicides, or insecticides.

These covenants shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in the land herein or any part thereof, and shall inure to the benefit of each owner thereof.

Mayor John Sweesy — Date 10-16-95

ACKNOWLEDGEMENT

State of Washington)
) ss
County of Yakima)

I certify that I know or have satisfactory evidence that John Sweesy is the person who appeared before me, and said person acknowledged that he signed this document and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: 10/16/95 — Notary Public

My Appointment Expires 8/20/98

YAKIMA COUNTY
FILED
Selah City
OCT 19 11 27 AM '95
DOUG SUTHERLAND

VOL 1495 1940

FILE# 7693553
YAKIMA COUNTY, WA
06/04/2010 10:25:06AM
COVENANT
PAGES: 5
HUIBREGTSE LOUMAN ASSOCIATES

Recording Fee: 66.00

AFTER RECORDING RETURN TO:

City of Selah
115 W. Naches Ave.
Selah, WA 98942

AMENDED
DECLARATION OF RESTRICTIVE COVENANTS
(FOR WELL PROTECTION AREA, WELL 8)

Grantor:	**CITY OF SELAH**
Grantee:	**CITY OF SELAH**
Abbreviated Legal Description:	**Portion of the SE ¼, Sec. 35, T.14N., R.18E., W.M.**
Complete legal descriptions are on pages 4 and 5 of this document.	
Assessor's Tax Parcel ID No:	**181435-43008, 181435-44437**

DATED: _____, 2010

DECLARANT/OWNER: CITY OF SELAH
115 W. NACHES AVE.
SELAH, WA 98942

NOTE: THIS COVENANT SUPERCEDES THAT DECLARATION OF RESTRICTIVE COVENANT, RECORDED UNDER AUDITOR'S FILE NO. 7692615

IN WITNESS WHEREOF, the undersigned have set their hands on the day and year first above written.

OWNER/DECLARANT:

CITY OF SELAH

By: _____

STATE OF WASHINGTON)
) ss.
County of Yakima)

I certify that I know or have satisfactory evidence that Robert Jones is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the Mayor of the City of Selah, to be the free and voluntary act of such party for the uses and purposes therein described.

Dated this 1st day of June, 2010

FRANK SWEET NOTARY PUBLIC STATE OF WASHINGTON My Comm. Expires July 01, 2010

_____
(*print name*)
NOTARY PUBLIC in and for the state of Washington, residing at Yakima County
My appointment expires 7-1-2010

EXHIBIT "B" COVENANT AREA

A 100 foot radius well control zone, the center of said radius being described as follows:

Commencing at the Southeast corner, of the Southwest Quarter, of the Southeast Quarter of Section 35, Township 14 North, Range 18 East, W.M.;
Thence Northerly along the East line of said Southwest Quarter of the Southeast Quarter 222.18 feet;
Thence Westerly at a right angle 64.31 feet to the Center of said radius.

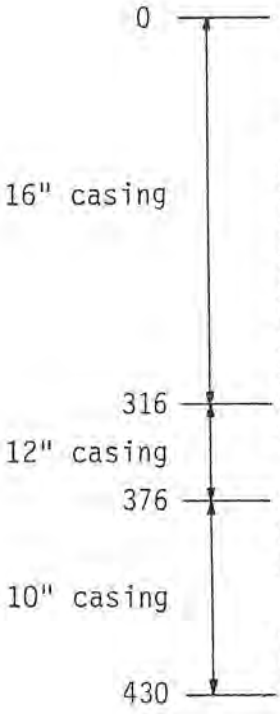
Situate in Yakima County, Washington.

11.
WELL LOGS

HLA
Engineering and Land Surveying, Inc.

WELL NO. 3 LOG

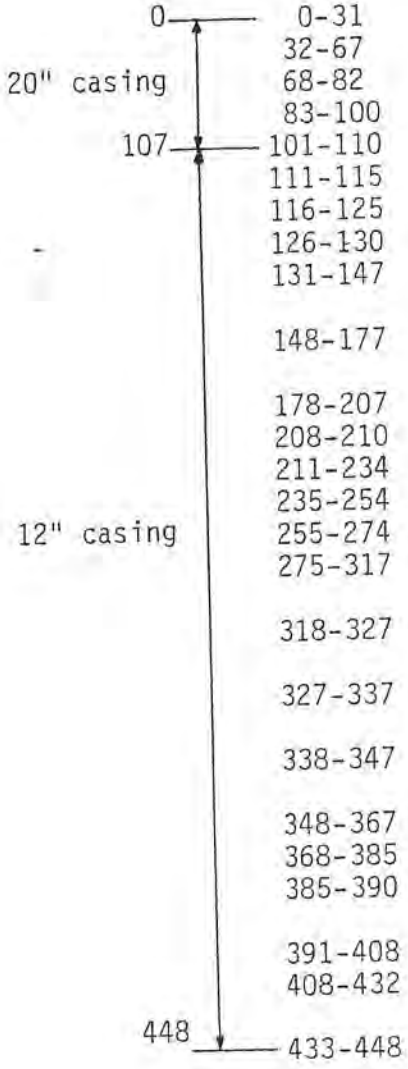
Drilled: 1944
Elevation: 1118 ft.
Initial Flow & Drawdown: 85gpm artesion
1976 Flow & Drawdown: 360 gpm @ 100 ft.
1976 Static Water Level: 40 ft.



Depth (ft)	Soil
0-28	Soil, sand & gravel
29-70	Sand & gravel
71-85	Red clay
86-90	Grey clay
91-110	Sandy shale
111-115	Sand
116-125	Red clay
126-143	Sand & gravel
144-153	Sand
154-180	Sandy clay
181-211	Brown shale
212-310	Red clay
311-320	Hard sandstone
321-340	Coarse sand & gravel (PERFORATED CASING)
341-383	Red clay
384-387	Sand & gravel
388-405	Yellow clay (PERFORATED CASING)
406-411	Fine sand
412-419	Coarse sand
420-430	Sand

WELL NO. 4 LOG

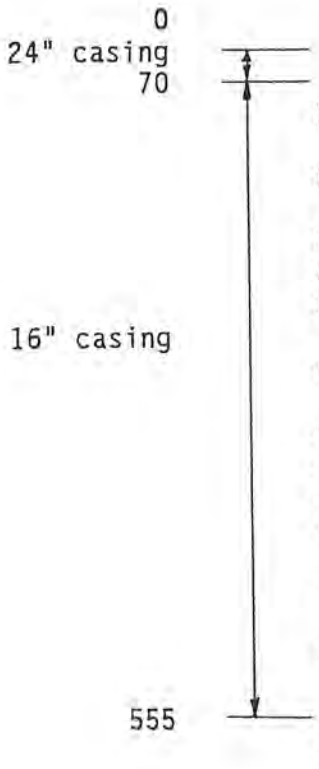
Drilled: 1947
Elevation: 1125 ft.
Initial Flow & Drawdown: 1430gpm @ 97 ft.
1976 Flow & Drawdown: 400gpm @ 60 ft.
1976 Static Water Level: 60 ft.



Depth (ft)	Soil
0-31	Soil, sand & gravel
32-67	Sand & gravel
68-82	Red clay
83-100	Sand
101-110	Sandy shale
111-115	Sand
116-125	Red clay
126-130	Red shale
131-147	Sand & gravel (PERFORATED CASING)
148-177	Sand (PERFORATED CASING)
178-207	Sandy clay
208-210	Brown shale
211-234	Red clay
235-254	Sandy red clay
255-274	Sandy red shale
275-317	Sticky fine sandy red clay
318-327	Sandstone (PERFORATED CASING)
327-337	Coarse sand & gravel (PERFORATED CASING)
338-347	Hard packed fine sand (PERFORATED CASING)
348-367	Red shale
368-385	Red clay
385-390	Sand & gravel (PERFORATED CASING)
391-408	Sandy red clay
408-432	Sand (PERFORATED CASING)
433-448	Red clay w/little sand

WELL NO. 5 LOG

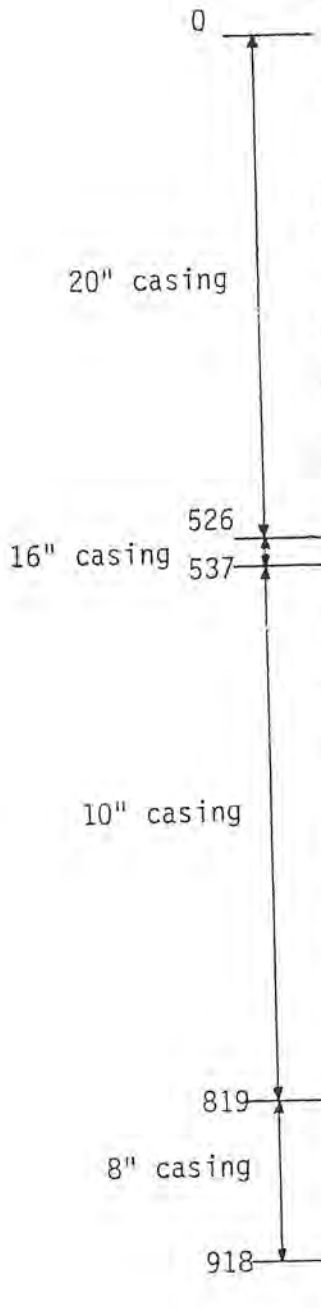
Drilled: 1951
Elevator: 1110 ft.
Initial Flow & Drawdown: 1400 gpm @ 150 ft.
1976 Flow & Drawdown: 775 gpm @ 170 ft.
1986 Flow & Drawdown: 900 gpm @ 215 ft.
1986 Static Water Level: 15 ft.



Depth (ft)	Soil
0-53	Gravel & boulders
54-200	Brown clay
201-210	Sand & Gravel (fine) (PERFORATED CASING)
210-220	Brown clay (PERFORATED CASING)
221-330	Brown clay
331-350	Blue clay
351-440	Blue clay w/streaks of shale & layers of sand
441-450	Blue clay w/streaks of gravel
451-480	Blue clay
481-490	Gravel w/streaks of clay
491-494	Gravel
494-540	Gravel (PERFORATED CASING)
541-550	Gravel & porous basalt (PERFORATED CASING)
551-554	Porous basalt (PERFORATED CASING)
555-560	Porous basalt
561-578	Hard basalt

WELL NO. 6 LOG

Drilled: 1960
Elevation: 1156 ft.
Initial Flow & Drawdown: 1500gpm @ 110 ft.
1976 Flow & Drawdown: 750 gpm @ 70 ft.
1976 Static Water Level: 30 ft.



Depth (ft)	Soil
0-12	Soil, gravel
13-68	Sand-rock
68-73	Yellow clay-gravel
74-85	Sand-rock
86-164	(PERFORATED CASING)
165-249	Sand-rock
250-260	Sand-rock, little gravel
	(PERFORATED CASING)
261-300	Sand, rock, gravel, little clay
301-315	Yellow clay, little sand & gravel
316-345	Sand, gravel with gray & yellow clay
	(PERFORATED CASING)
340-553	Clay & shale with little sand & gravel
554-651	Black & gray basalt
	(PERFORATED CASING)
652-684	Sand, gravel & little clay
685-701	Brown sand-rock & clay
	(PERFORATED CASING)
702-729	Clay, shale & sand
730-738	Blue sand-rock
	(PERFORATED CASING)
739-752	Shale & clay with sand
753-775	Blue sand, little gravel with clay
	(PERFORATED CASING)
776-829	Gray & blue clay with shale
830-917	Black basalt with shale & sand
	(PERFORATED CASING)
918-952	Blach basalt
952-966	Clay, sand & basalt

CITY OF SELAH

Public Works Department
113 West Naches Avenue
Selah, Washington 98942

Bus: (509) 698-7365
Fax: (509) 698-7372

January 19, 1995

Department of Ecology
3601 West Washington
Yakima, WA 98903

Attn: Darlene Frye
Section Manager
Water Resources Program

Re: City of Selah
NEW DOMESTIC WELL NO. 7
Ground Water Application No. G4-30642

Dear Ms. Frye:

The City of Selah submitted an "Application For Permit" to appropriate ground water in March 1991, with the purpose of drilling a new municipal well. The Department of Ecology issued a "Preliminary Permit" on August 19, 1993, authorizing the construction and pump testing of a "test" well. Subsequently, the City contracted, via the public bid process, with Aqua Drilling & Engineering to construct a new 16 inch diameter well within Carlon Park at the southwest corner of the Goodlander Road/Wenas Road intersection in Selah, Washington.

Construction of the well began September 9, 1994, and was completed on November 2, 1994. Test pumping was performed during December 10 and 11, 1994. Enclosed for your review is a technical report on the new well prepared by the City's engineering consultant, Huibregtse, Louman Associates, Inc. Both the City and it's engineering consultant kept WDOE staff advised of the progress during construction, and conferred with them on a number of occasions regarding recommended well depth and casing construction.

At WDOE staff's recommendation, the City continued through the Saddle Mountains Basalt aquifer identified in the Preliminary Permit, and drilled into the Wanapum Basalt formation. The resulting well is 1020 feet deep with a shut-in pressure of 15 psi and has an unassisted artisan flow of 1100 gpm. The City supplied basalt cutting samples to the Washington State University GeoAnalytical Laboratory for analysis and formation identification. The samples taken from the 630 foot, 810 foot, and 1020 foot depths were all identified as various members of the Wanapum Basalt formation.

The City's permit application requested a withdrawal flow of 2000 gpm from the new well. The pump test conducted with a centrifugal pump installed on the surface discharge line provided evidence that the well is easily capable of such a flow rate. The 24 hour pump test was run at a rate of 1900 gpm and still registered a positive pressure of 0.5 psi at the well head.

In January 1993, the Department of Ecology reviewed Selah's Draft Comprehensive Water Plan, dated July 1992, and identified the City's current water rights for its four existing wells to be collectively 3850 gpm and 1600 acre-feet per year. The City had interpreted the authorized withdrawal volume from it's collective Water Rights Certificates to be 2670 acre-feet per year, as stated on the certificate document faces. WDOE advised that the "Report of Examination" prepared during review of the application for Well No. 6, established the total volume right to be 1600 acre-feet and it is that volume which is currently authorized for withdrawal by WDOE.

Due to the City's interpretation of it's water rights, annual water production in Selah has exceeded the 1600 acre-feet volume recognized by WDOE. The City's adopted Comprehensive Water Plan dated May 1994, shows that Selah's water consumption was over 2000 acre-feet during the year 1986. During 1993, the City withdrew 2540 acre-feet of ground water from its four wells.

Selah's Comprehensive Water Plan provided population projections through the year 2015, and identified current per service demands within the system. Provided in the table below is a water demand forecast for the next 20 year period based on Comprehensive Water Plan data.

FUTURE WATER DEMAND FORECAST PROJECTION FOR YEAR 2015

Type of Services	Number	Annual Demand MG	Peak Day Demand MG	Peak Hour Demand GPM
Residential	3,621	796.6 MG	5.98 MG	8,365 GPM
Commercial	204	77.6 MG	0.30 MG	404 GPM
Industrial	8	651.5 MG	2.18 MG	3,031 GPM
Public	43	64.5 MG	0.38 MG	535 GPM
TOTAL	3,876	1,590.2 MG	8.84 MG	12,335 GPM

The projected annual demand of 1590 million gallons or 4880 acre-feet by the year 2015 exceeds the City's current WDOE recognized water right of 1600 acre-feet by 3280 acre-feet. Selah's "Application For Permit" requested authorization to appropriate an additional 3220 acre-feet per year from a new well (Well No. 7).

The City of Selah formally requests that the Department of Ecology issue a Water Rights Permit for the appropriation of 2000 gpm, 3220 acre-feet per year from Selah Municipal Well No. 7. The City further requests that WDOE consider Selah's March 1991 Application For Permit as soon as possible for the following reasons:

- The City's current peak day demand as calculated in the Comprehensive Plan is 4.12 MGD based upon data accumulated for the peak consumption month of July, 1993. The City maintains a daily log of pump run times, water flow, and storage levels during the irrigation season and has experienced a peak day demand as high as 5.0 MGD. During the peak two week period of time of July, 1994, the average peak day demand was 4.35 MGD. The current source capacity of the City's four existing wells is 4.68 MGD. This current capacity has been reduced from the 5.26 MGD reported in the Comprehensive Plan due to a reduction in pumping capacity of Wells No. 3 and 4 to avoid said production. The loss of any single well source seriously jeopardizes the City's supply capabilities. Loss of Well No. 6 would eliminate over 2 MGD, 43% of the total water supply to the system. Reservoir levels would be dramatically reduced, if not eliminated, creating potential low pressure situations affecting domestic supply and fire protection.

- Well No. 3 and Well No. 4 were both out of production at the same time last summer due to pump failure. Both well pumps were damaged by a fine sand being produced with the well water at design flow rates. The pumps bowl assemblies were replaced within a week but the City's system was seriously impacted as reservoir levels dropped dangerously low during a peak fire hazard period. In fact, one reservoir along with a few homes in an upper elevation went dry for a short period of time, eliminating any fire protection capabilities for one of the most fire prone areas in the City.

  Since the new pumps have been installed, their flow rate has been reduced in an effort to eliminate or at least limit sand production. However, the pumps will continue to be susceptible to premature wear and potential failures from sand in the wells.

- On September 7, 1994, Well No. 5 failed when the submersible pump motor failed. This caused a loss in water supply of 750 GPM. Fortunately, this was not during the peak water consumption season and the other wells were able to keep up, but not without serious draw down of the reservoir levels during the day.

- In December of 1994, Well No. 6 was pulled for a routine headshaft repair. It was discovered that sand had seriously worn the shaft bearings and pump assembly. Repairs and refurbishing was completed within a month and the well was back on line. Again, the City was fortunate that the pump did not fail during the high water consumption season.

- The above well failures and repairs illustrates the City's vulnerability with only the four existing wells in service. Well No. 7 will not only provide additional capacity to meet the City's typical day to day water demand and future demand as growth occurs, but it will also provide the essential reserve capacity in the event a City well fails. This reserve capacity is viewed as a vital element for the safety and well being of the City residents.

- The Comprehensive Water Plan identified a hydraulic imbalance within the City's distribution system, which adversely affects one of the low zone reservoirs. The location of the proposed new Well No. 7 was selected to reduce this imbalance helping to maintain adequate reservoir levels.

It is the City of Selah's desire and intent to construct new pump and pumphouse facilities at new Well No. 7 as soon as possible. Last year's crisis with the loss of Wells No. 3 and 4 clearly identified the vulnerable position the City is currently in. It is critical, therefore, that a new water rights permit be approved for Well No. 7.

Should you have any questions or require additional information please contact Public Works Director Dale Nobel, PE, at telephone number 509-698-7365. Your earliest review and favorable action will be most appreciated.

Very truly yours,

John Sweesy
Mayor

JS/jk
SE7-26

Enclosure

copy: Dale Nobel, City Public Works
Huibregtse, Louman Associates, Inc.

City of Selah

New Municipal Well No. 7
Ground Water Application No. G4-30642

Well Construction Report

A. Well Location:

Located 1930 feet east and 90 feet south of the Northwest Corner of Section 36, Township 14 North, Range 18 East, W.M. in Carlon Park at the southwest corner of the Goodlander Road/Wenas Road intersection (see attached map).

B. Well Driller:

Aqua Drilling and Engineering Corp.
3130 - 15th Avenue SE
Albany, OR 97321

C. Well Drillers On-Site:

Harold Hathaway and Darryl Galipeau

D. Drilling Method:

Mud Rotary from 0 ft to 295 ft.
Reverse Circulation Rotary from 295 ft to 1022 ft.

E. Well Construction:

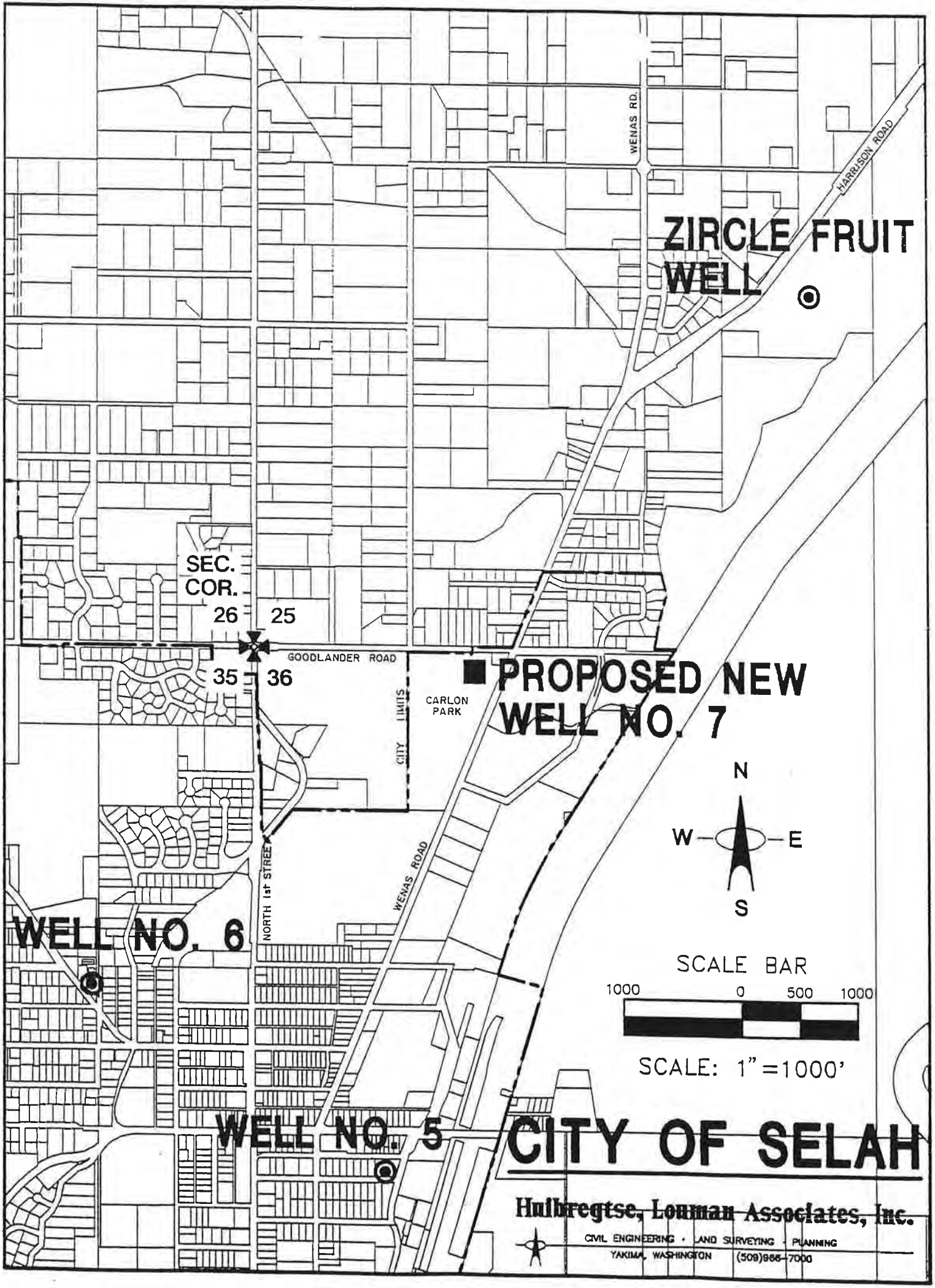
Enclosed is a drawing of the well log information provided by Aqua Drilling and Engineering Corp. Their information has been supplemented with data from our files and from geologist Newell Campbell to provide as accurate a record drawing as possible. We have attached a copy of Aqua Drilling's Water Well Report dated November 24, 1994, although we understand that Mr. Gene Potts, WDOE has contacted the well driller regarding revising the report to reflect known construction features, i.e. the 12" liner.

At the surface, the well discharge is controlled via a 16" diameter butterfly valve on the side outlet of a 16" x 16" x 16" Tee. A 16" knife valve is installed at the top of the tee fitting as shown on the attached sketch.

F. Pump Test

Attached is a summary of the test pumping data recorded by the on-site well driller Harry Hathaway. A pump test curve is also provided on the enclosed well log drawing. Due to the substantial artisan flow and pressure, it was determined not to install a deepwell turbine pump, but to instead install an in-line centrifugal booster pump at the surface. This procedure was confirmed with Tim Rierson, WDOE, as being appropriate prior to conducting the pump test.

Due to the significant capacity of the well, a step rate test was possible which provided positive wellhead pressure information at various flow rates. At the completion of the 24 hour constant rate test, the shut-in pressure of 15 psi returned immediately upon closing the discharge valve.


WENAS RD.
HARRISON ROAD
ZIRCLE FRUIT WELL
SEC. COR. 26 25
35 36
GOODLANDER ROAD
CARLON PARK
CITY LIMITS
PROPOSED NEW WELL NO. 7
N
W
E
S
NORTH 1st STREET
WENAS ROAD
WELL NO. 6
SCALE BAR
1000 0 500 1000
SCALE: 1"=1000'
WELL NO. 5
CITY OF SELAH
Hulbregtse, Louman Associates, Inc.
CIVIL ENGINEERING • LAND SURVEYING • PLANNING
YAKIMA, WASHINGTON (509)966-7000

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 34301
UNIQUE WELL I.D. # 740
Water Right Permit No. G4-30642

(1) **OWNER:** Name City of Selah, Washington Address 115 West Naches Ave

(2) **LOCATION OF WELL:** County Yakima NW 1/4 NE 1/4 NW 1/4 Sec 36 T. 14 N., R. 18 W.M.

(2a) **STREET ADDRESS OF WELL** (or nearest address) Intersection of Wenas/Goodlander 150 feet South West

(3) **PROPOSED USE:** ☐ Domestic ☐ Industrial ☐ Municipal ☒ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) **TYPE OF WORK:** Owner's number of well (If more than one) Well # 7

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 26"X20"X16"X12" inches. Drilled 1011 feet. Depth of completed well 1011 ft.

(6) **CONSTRUCTION DETAILS:**

Casing Installed: 26" Diam. from +1 ft. to 140 ft.
Welded ☒ 20" Diam. from +1 ft. to 293 ft.
Liner installed ☐ Threaded ☐ " Diam. from +1 ft. to 594 ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 610 KB ft.
Material used in seal Neat Cement
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? Depth of strata
Method of sealing strata off Cement grout to surface for 26", 20" and 16" casings.

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level ft.
Static level Flowing ft. below top of well Date 11/94
Artesian pressure 10-20 lbs. per square inch Date 11/94
Artesian water is controlled by 16" Flanged Knigevalve (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? AQUA
Yield: 1900 gal./min. with 0 ft. drawdown after 28 hrs.
" 0 GPM " 15 PSI GAGE "
" 500 GPM " 10 PSI GAGE 1900 GPM 0PSI

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	0 PSI	when pump running			
	15 PSI	immed after pump shut down			

Date of test. December 14 and 15 1994
Baller test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow ≥ 1900 g.p.m. Date
Temperature of water 71 Was a chemical analysis made? Yes ☐ No ☒

(10) **WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO	
Topsoil	0	3	
Gravel no water	3	10	
Brown Clay and rock intermixed	10	45	
Tan&Blue Clay with Gravel	45	90	
Brown and Tan Clay no Gravel set	90	140	
140 of 26" .375 casing with cement grout to sur			
Clay with Sand Green and Tan	140	269	
Sandstone with Basalt Gravel	269	274	
Basalt Gray Hard Fractured Form,	274	287	
flowed approx 700GPM at surface			
Basalt Gray set 20" with cement	287	327	
grout to 293'			
Basalt Hard Gray Fractured	327	384	
Clay Green and Tan with Basalt	384	405	
Clay Gray with Sandstone	405	480	
Clay Green&Tan with Sand and Grav	480	530	
Sandstone	530	540	
Clay with Black Basalt	540	580	
Basalt Black Fractured	580	610	
Basalt Gray Hard Set 16" casing	610	704	
with cement grout to surface			
Basalt Black Soft	704	714	*
Basalt Black with Gray Clay 714	714	733	
Basalt Black Medium Hard	733	768	
Basalt Black & Gray Med Hard	768	801	
Basalt Black	801	835	
Basalt Gray Hard	835	859	
Basalt Gray with small amts clay	859	896	
Black Vesicular Basalt Wth Pyrite	896	900	*
Black Basalt Soft	900	913	
Basalt Black Med Hard	913	933	
Basalt Vesicular Soft Black	933	937	*
Basalt Black Med Hard	937	981	
Basalt Red & Black Porous	981	984	*

Work Started 9/10/94 19. Completed 11/94 19

Cont on page 2

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME AQUA DRILLING and ENGINEERING Corp (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 3130 15Th Ave SE Albany, OR 97321
(Signed) Doug Galipeau (WELL DRILLER) License No. 2175
Doug Galipeau
Contractor's Registration No. AQUADEC 08503 Date Nov 24, 19 94

(USE ADDITIONAL SHEETS IF NECESSARY)

ECL 050-1-20 (2/93)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 24301
UNIQUE WELL I.D. # 740
Water Right Permit No. G4-30642

(1) OWNER: Name City of Selah Wash. Address

(2) LOCATION OF WELL: County Yakima 1/4 1/4 Sec 36 T. 14 N., R 18 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address)

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☒ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (If more than one) Well # 7
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well inches. Drilled feet. Depth of completed well ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.
Liner installed ☐ " Diam. from ft. to ft.
Threaded ☐

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Continued from page 1		984
Basalt Black Hard	984	1017
Basalt Fractured	1017 *	1022
* Indicates water bearing zone		

Work Started 19. Completed 19

WELL CONSTRUCTOR CERTIFICATION:

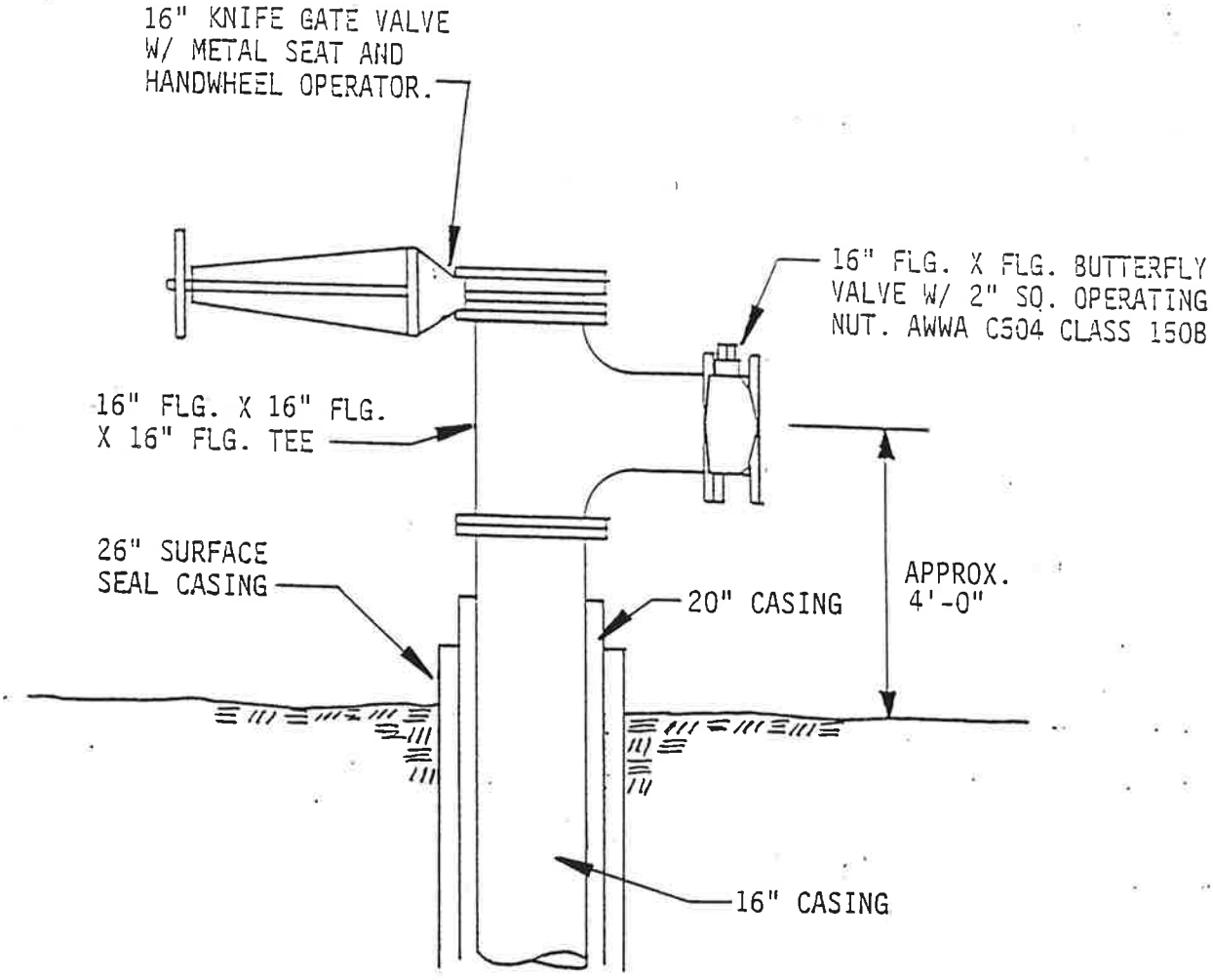
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME AQUA DRILLING & ENG. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 3130 15th AVE SE
(Signed) Doug Colipeace (WELL DRILLER) License No. 2175
Contractor's Registration No. AQUADE005O3 Date 19

(USE ADDITIONAL SHEETS IF NECESSARY)

ECL 050-1-20 (2/93)

CITY OF SELAH
WELL NO. 7



WELL DISCHARGE HEAD

NOT TO SCALE

City of Selah

Municipal Well No. 7

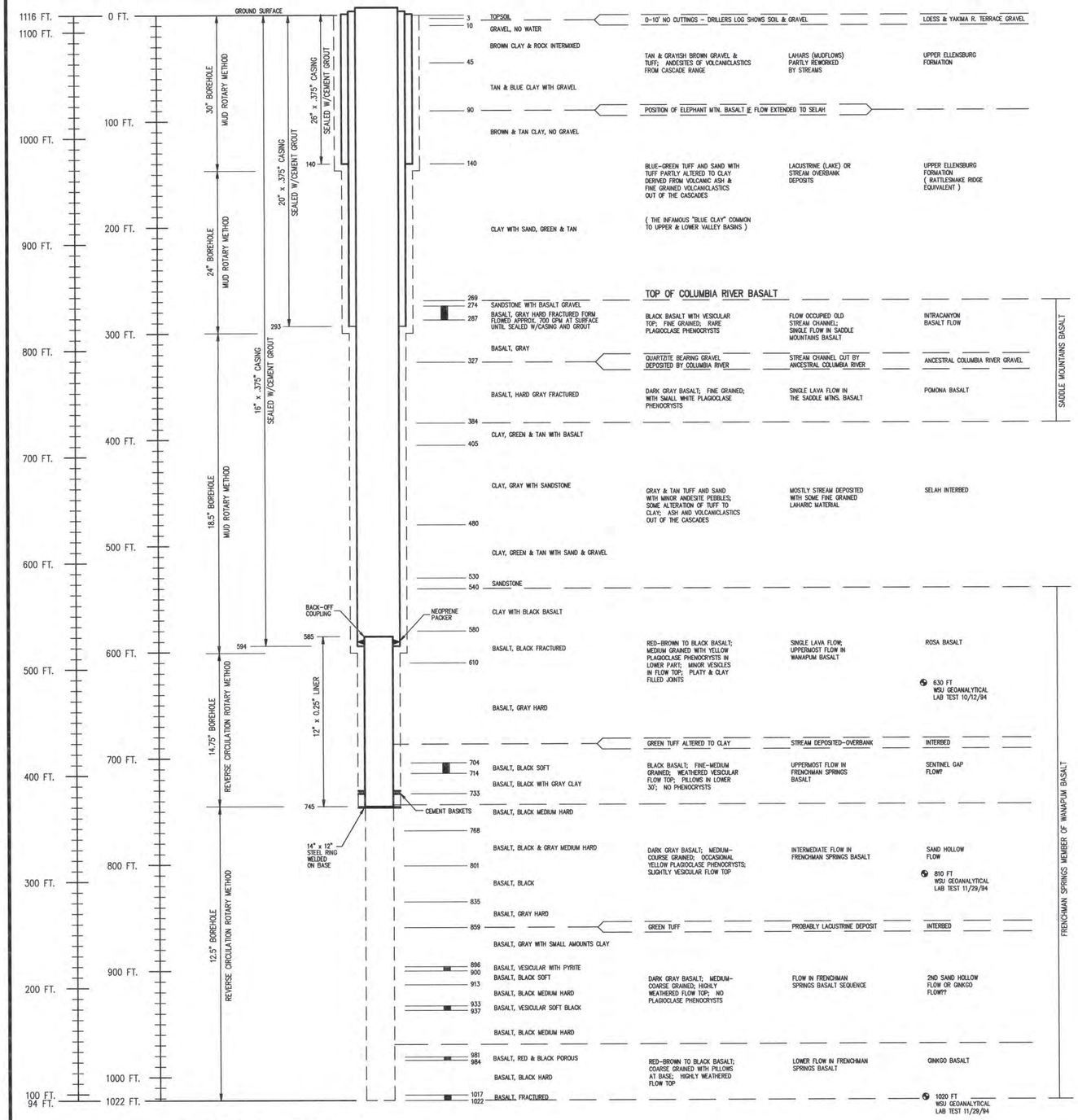
Pump Test Data

Date Conducted: December 10-11, 1994

Conducted By: Harold Hathaway and Darryl Galipeau
Aqua Drilling and Engineering Corp.
3130 - 15th Avenue SE
Albany, OR 98321

Equipment: Diesel Engine Powered Centrifugal Pump
8" Propeller Flow Meter off 16" discharge head
10" Aluminum Irrigation Pipe to free discharge outlet

Date	Time	Flow Rate	Pressure Gauge Reading
12/10/95	12:30 PM	0 gpm	15.0 psi (shut-in)
	12:31 PM	550 gpm	13.5 psi
	1:30 PM	550 gpm	13.5 psi
	1:31 PM	900 gpm	11.0 psi
	2:30 PM	900 gpm	11.0 psi
	2:31 PM	1900 gpm	0.5 psi
	3:30 PM	1900 gpm	0.5 psi
	3:31 PM	1500 gpm	6.0 psi
	4:30 PM	1500 gpm	6.0 psi
	4:31 PM	1900 gpm	1.0 psi
	5:30 PM	1900 gpm	1.0 psi
	6:30 PM	1900 gpm	1.0 psi
	7:30 PM	1900 gpm	1.0 psi
	8:30 PM	1900 gpm	0.5 psi
	11:30 PM	1900 gpm	0.5 psi
12/11/95	2:30 AM	1900 gpm	0.5 psi
	5:30 AM	1900 gpm	0.5 psi
	8:30 AM	1900 gpm	0.5 psi
	9:30 AM	1850 gpm	1.0 psi
	10:30 AM	1850 gpm	1.0 psi
	4:30 PM	1850 gpm	1.0 psi
	4:30 PM	0 gpm	15.0 psi (immed. recovery)



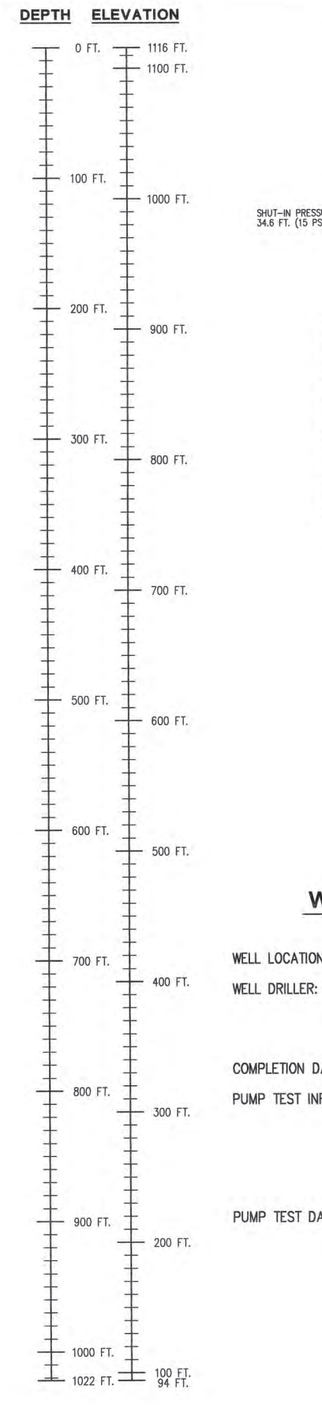
WELL LOG

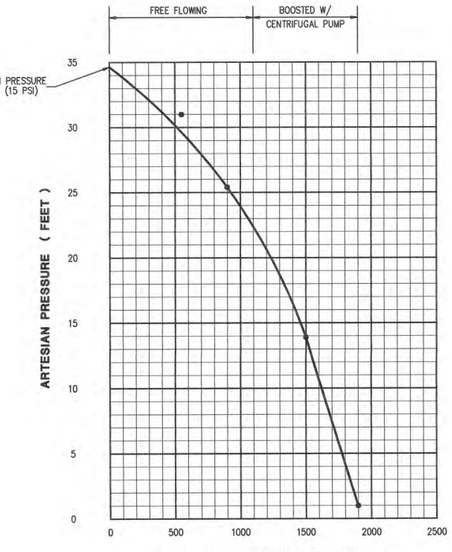
DATA PROVIDED BY AQUA DRILLING AND ENGINEERING CORP. 11/24/94

■ INDICATES WATER BEARING

GEOLOGICAL ANALYSIS

DATA PROVIDED BY GEOLOGIST NEWELL CAMPBELL 1/12/95





PUMP TEST CURVE

WELL INFORMATION

WELL LOCATION: NW 1/4 NE 1/4 NW 1/4 SEC. 36, T. 14 N., R. 18 E.W.M.

WELL DRILLER: AQUA DRILLING AND ENGINEERING CORP.
3130 15th. AVENUE SE
ALBANY, OR 97321
CONTRACTOR'S REGISTRATION NO. AQUADEC 08503

COMPLETION DATE: NOVEMBER 2, 1994

PUMP TEST INFORMATION:

CONSTANT RATE TEST = 1900 GPM @ +0.5 PSI PRESSURE FOR 24 HOURS

RECOVERY RATE = RETURNED TO 15 PSI SHUT-IN PRESSURE IMMEDIATELY WHEN FLOW REDUCED TO 0 GPM

PUMP TEST DATE: DECEMBER 10 & 11, 1994

Huibregtse, Louman Associates, Inc.
CIVIL ENGINEERING - LAND SURVEYING - PLANNING
YAKIMA, WASHINGTON (509)966-7000

CITY OF SELAH WASHINGTON

DOMESTIC WELL NO. 7
WELL LOG & PUMP TEST CURVE

SELAH

JOB NO.	94025
FILE NAME:	94025LOG.DWG
DRAWN:	KDY
DATE:	DEC. 19, 1994
SCALE: HORIZ:	NONE
VERT:	
REVISED BY:	DATE:
KDY	1-24-95
SHEET	1 OF 1

Please print, sign and return to the Department of Ecology

Water Well Report

Original – Ecology, 1st copy – owner, 2nd copy – driller.

Construction/Decommission

☑ Construction

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

Current
Notice of Intent No. WE10576

Unique Ecology Well ID Tag No. AAS171

Water Right Permit No. 1050A & cert1, p361-D

Property Owner Name City of Selah

Well Street Address 218 S 3rd St

City Selah County Yakima

Location SW 1/4-1/4 SE 1/4 Sec 35 Twn 14 R 18 EWM or WWM ☑ circle one

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____

Tax Parcel No. 18143543008

PROPOSED USE: ☐ Domestic ☐ Industrial ☑ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) 8

☑ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☑ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 16x10 inches, drilled 674 ft.
Depth of completed well 670 ft.

CONSTRUCTION DETAILS

Casing Installed: ☑ Welded pitless unit Diam. from +2 ft. to 5 ft.
☐ Liner installed 16 " Diam. from 5 ft. to 304 ft.
☐ Threaded _____ " Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☑ No
Type of perforator used _____
SIZE of perfs _____ in. by ____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☑ Yes ☐ No ☐ K-Pac Location _____
Manufacturer's Name Alloy
Type V-wire wrap Model No. 304 SS
Diam 10 Slot size .040 from * ft. to * ft.
Diam _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☑ Yes ☐ No ☐ Size of gravel/sand CSSI 8x12
Materials placed from 264 ft. to 674 ft.

Surface Seal: ☑ Yes ☐ No To what depth? 304 ft. including formation seal
Material used in seal cement; except pitless interval is bentonite
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name Goulds
Type: submersible H.P. 200

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure 1/2 ft abv ground lbs. per square inch Date 4/6/10
Artesian water is controlled by 6" valve on side & flange on top of pitless (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☑ Yes ☐ No If yes, by whom? Schneider
Yield: 1100 gal./min. with 183 ft. drawdown after 24 hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test began 11/24/09
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Air test _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water 60 F Was a chemical analysis made? ☑ Yes ☐ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
See attached formation log.		
Screen Assembly:	*	*
J receptor and 12x10 std bell reducer	264	268
10" x .365 blank	268	297
10" PS screen	297	302
10" x .365 blank	302	307
10" PS screen	307	357
10" x .365 blank	357	376
10" PS screen	376	391
10" x .365 blank	391	403
10" PS screen	403	423
10" x .365 blank	423	429
10" PS screen	429	444
10" x .365 blank	444	513
10" PS screen	513	523
10" x .365 blank	523	542
10" PS screen	542	547
10" x .365 blank	547	597
10" PS screen	597	612
10" x .365 blank	612	618
10" PS screen	618	628
10" x .365 blank	628	641
10" PS screen	641	666
10" x .365 blank	666	670

Start Date 9/17/09 Completed Date 4/7/10

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller/Engineer/Trainee Name (Print) Steve Schneider

Driller/Engineer/Trainee Signature Stephen J Schneider

Driller or trainee License No. 0643

Drilling Company Schneider Equipment, Inc.

Address 21881 River Road NE

City, State, Zip St. Paul, OR 97137

Contractor's Registration No. SCHNEEI940R8 Date 5/4/10

IF TRAINEE,
Driller's Licensed No. _____
Driller's Signature _____

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 2/03)

CITY OF SELAH

AAS171 - WELL NO. 8 - Formation Log

by Schneider Drilling Co.

FM	TO	DESCRIPTION
0	1	Top soil
1	9.5	Clay, brown, firm w/ gravel, 3" minus
9.5	50	Gravel, multi-colored (m.c.), 3/4"- & sand, m.c., coarse-fine w/clay, brown, medium
50	64	Sand, medium & gravel, 3/4" minus; multi-colored w/cementation
64	71	Clay, red, medium
88	118	Sand, brown, medium w/cementation
118	127	Clay, brown, soft
127	161	Sand, multi-colored, coarse w/some gravel, m.c., 3/8"-
161	176	Clay, brown, hard w/gravel, m.c., 3/8"-
176	186	Clay, brown, soft w/gravel, m.c., 3/8"-
186	206	Clay, brown, med w/some gravel, m.c., 3/8"-
206	296	Clay, brown, med w/sand, black, fine-coarse, cementation
296	301	Clay, brown, med-soft
301	303	Clay, brown, med, w/sand, brown, very fine - coarse, cementation
303	309	Sand, brown, very fine-fine some coarse & some gravel, m.c., 1/4"-
309	311	Sand, brown, coarse, w/ gravel 1/2"-, brown; some cementation
311	336	Sand, m.c., coarse-fine w/gravel, m.c., 1-1/2"-
336	341	Sand, m.c., coarse-fine w/gravel, m.c., 1-1/2"- w/cementation
341	346	Siltstone, m.c., medium w/claystone, m.c., medium & sand, grey, fine, cemented
346	350	Claystone red, medium w/sandstone, tan, fine & gravel, m.c., 3/4" w/some clay, tan, soft
350	355	Sandstone, brown, medium
355	377	Sandstone, brown, medium w/claystone, brown, medium & some clay, brown, soft-medium
377	385	Gravel, m.c., 2"- w/sand, coarse-fine w/cementation
385	389	Sandstone, dark brown, medium w/siltstone, brown, medium
389	398	Claystone, brown, medium
398	403	Clay, tan, medium
403	406	Siltstone, tan, medium w/sand & gravel, m.c., 1/2"-, cemented
406	421	Gravels, m.c., 3/4" minus w/sand, m.c., fine-medium
421	429	Claystone, m.c., medium
429	441	Sandstone, brown, medium w/siltstone, tan, medium
441	446	Claystone, dark brown, medium
446	451	Clay, brown, medium
451	461	Clay, grey & tan, soft-medium
461	464	Claystone, grey & tan, medium
464	468	Sandstone, dark grey, medium w/claystone, m.c., medium
468	473	Claystone, dark green, medium

CITY OF SELAH

AAS171 - WELL NO. 8 - Formation Log

by Schneider Drilling Co.

FM	TO	DESCRIPTION
473	498	Claystone, dark green, medium w/some claystone, tan, medium
498	513	Clay, greyish green, soft w/claystone, dark green, medium
513	521	Sandstone, dark green, v-hard w/some claystone, m.c., medium
521	542	Sandstone, dark green, medium w/claystone, m.c., medium & some clay dark grey, soft
542	547	Sandstone, dark green, medium
547	566	Clay, dark green, soft-medium
566	573	Clay, dark green, soft-medium w/claystone, dark green, medium
573	596	Clay, dark green, soft-medium w/claystone, dark green, medium
596	602	Sandstone, dark green, medium
602	604	Claystone, green, medium w/sandy clay, green, soft
604	608	Claystone, green, medium w/siltstone, green, medium & wood & some gravel, m.c., 1"-
608	611	Gravel, m.c., 1"- w/some cementation
611	618	Clay, dark green, soft w/sandstone, dark green, medium
618	625	Cemented sand, medium & gravel, 1-1/2"-; m.c.
625	635	Clay, green, medium
635	640	Clay, green, sandy, medium
640	650	Basalt, black, vesicular
650	660	Basalt, black & brown, medium, fractured
660	674	Basalt, black & brown, medium-hard, fractured

12.
WATER RIGHTS

HLA
Engineering and Land Surveying, Inc.

S. F. No. 7362—1-47—1M. 14278.

CERTIFICATE RECORD NO. 1 PAGE NO. 359-D UNDER DECLARATION OF CLAIM NO. 408

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY *That* TOWN OF SELAH

of Selah, Washington *has filed in the office of the State Supervisor of Hydraulics of Washington Declaration of Claim No.* 408 *to withdraw ground waters of the State from a* Pump Well #1, *located within* the Original Town Site of Selah, in the block bounded by 5th Street and Speyers Road and Bartlett Avenue 35-18-19E

for the purpose of Municipal Supply

The right to the use of said ground waters has been sustained and approved by the Supervisor of Hydraulics in accordance with Chapter 263, Laws of Washington for 1945, and is hereby entered of record in Volume 1 *of Ground Water Certificates at page* 359-D*; the right approved has a priority of* the year 1920*; the amount of water which the Declarant is entitled to withdraw for the aforesaid purpose is limited to the amount actually beneficially used and shall not exceed* 300 *gallons per minute;* 147 *acre-feet per year; and is appurtenant to the following described lands or place of use:*

Town of Selah, Yakima County, Washington

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 11th *day of* July, *19* 47

RODNEY RYKER
State Supervisor of Hydraulics.

By: Chas J Barthelet
CHAS. J. BARTHOLET, Deputy

Declaration of Claim No. 408

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 1 *of Ground Water Right Certificates, on page* 359-D *on the* 11th *day of* July, *19* 47.

STATE OF WASHINGTON,
County of Yakima } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... *of Book of Water Right Certificates, page* ..... *on the* ..... *day of* ....., *19*.....

.....

STATE PRINTING PLANT, OLYMPIA, WASH.

REPORT OF FINDINGS ON GROUND WATER **Declaration #408**

NAME **TOWN OF SELAH**

TYPE OF WORKS: **Pump Well #1** Date of Examination **May 23, 1947**

Dimensions: **10" x 292** Progress of Works **Completed**

QUANTITY Claimed ~~xxx~~
~~xxxxxxxxxxxx~~ **300** g.p.m. **160** acre feet per year

LOCATION **Block in the Original Town Site of Selah bounded by 5th Street and Speyers Road and Bartlett Avenue**

USE: **Municipal supply**

Irrigation- acreage: Present_____ Planned_____ Feasible_____

Municipal: Population **2000** as of **present time**

Industrial:_____

Time Pump Will Be Operated: **Continuously**

Other Water Rights of Applicant: **Town of Selah Well #2 South 30'; Town of Selah Well #3 South 2420'**

Proximity to existing works, springs or streams:_____

Estimated effect of withdrawal of water on existing water rights:

Water Bearing Zone:_____

RECOMMENDATIONS

Approved for **300** g.p.m. **147** acre-feet per year, subject to existing water rights.

The amount of water used from the three wells covered by Declarations 408, 409 and 410 has been calculated on the basis of the wells furnishing 1/2 million gallons a day for nine months and 1/3 million gallons a day for three months, which amounts to 513 acre-feet a year. The 513 acre-feet a year has been prorated to the wells as follows:

Declaration #408	**147**	**acre**	**feet**	**per**	**year**
Declaration #409	**171**	**"**	**"**	**"**	**"**
Declaration #410	**195**	**"**	**"**	**"**	**"**

Signed this 30th day of June, 1947

Fred B. Roberts

FRED B. ROBERTS
Ground Water Geologist
Division of Hydraulics

S. F. No. 7362—1-47—1M. 14278.

CERTIFICATE RECORD NO. 1 PAGE NO. 360-D UNDER DECLARATION OF CLAIM NO. 409

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY *That* TOWN OF SELAH

of Selah, Washington *has filed in the office of the State Supervisor of Hydraulics of Washington Declaration of Claim No.* 409 *to withdraw ground waters of the State from a* Pump Well #2, *located within* the Original Town Site of Selah, in the block bounded by 5th Street and Speyers Road and Bartlett Avenue

for the purpose of Municipal supply

The right to the use of said ground waters has been sustained and approved by the Supervisor of Hydraulics in accordance with Chapter 263, Laws of Washington for 1945, and is hereby entered of record in Volume 1 *of Ground Water Certificates at page* 360-D *; the right approved has a priority of* the year 1927 *; the amount of water which the Declarant is entitled to withdraw for the aforesaid purpose is limited to the amount actually beneficially used and shall not exceed* 350 *gallons per minute;* 171 *acre-feet per year; and is appurtenant to the following described lands or place of use:*

Town of Selah, Yakima County, Washington

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 11th *day of* July, 1947

RODNEY RYKER
State Supervisor of Hydraulics.

By: Chas J Bartholet
CHAS. J. BARTHOLET, Deputy

Declaration of Claim No. 409

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 1 *of Ground Water Right Certificates, on page* 360-D *on the* 11th *day of* July, *19* 47

STATE OF WASHINGTON,
County of Yakima } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... *of Book of Water Right Certificates, page* ..... *on the* ..... *day of* ....., *19* .....

.....

STATE PRINTING PLANT, OLYMPIA, WASH.

REPORT OF FINDINGS ON GROUND WATER Declaration #409

NAME TOWN OF SELAH

TYPE OF WORKS: Pump Well #2 Date of Examination May 23, 1947

Dimensions: 10" x 285' Progress of Works Completed

QUANTITY Claimed ~~xxx~~
~~Approved for~~ 350 g.p.m. 160 acre feet per year

LOCATION In Block of Original Town Site bounded by 5th Street and Speyers Road and Bartlett Avenue

USE: Municipal supply

Irrigation- acreage: Present _____ Planned _____ Feasible _____

Municipal: Population 2000 as of the present time

Industrial: _____

Time Pump Will Be Operated: _____

Other Water Rights of Applicant: Town of Selah Well #1 North 30'; Town of Selah Well #3 South 2390'

Proximity to existing works, springs or streams: _____

Estimated effect of withdrawal of water on existing water rights:

Water Bearing Zone: _____

RECOMMENDATIONS

Approved for 350 g.p.m. 171 acre-feet per year, subject to existing water rights.

The amount of water used from the three wells covered by Declarations 408, 409 and 410 has been calculated on the basis of the wells furnishing 1/2 million gallons a day for nine months and 1/3 million gallons a day for three months, which amounts to 513 acre-feet a year. The 513 acre-feet a year has been prorated to the wells as follows:

Declaration #408 147 acre-feet per eyar
Declaration #409 171 acre-feet per year
Declaration #410 195 acre-feet per year

Signed this 30th day of June, 1947

Fred B Roberts

FRED B. ROBERTS
Ground Water Geologist
Division of Hydraulics

S. F. No. 7362—1-47—1M. 14278.

CERTIFICATE RECORD NO. 1 PAGE NO. 361-D UNDER DECLARATION OF CLAIM NO. 410

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY *That* TOWN OF SELAH

of Selah, Washington *has filed in the office of the State Supervisor of Hydraulics of Washington Declaration of Claim No.* 410 *to withdraw ground waters of the State from a* Pump Well #3, *located within* Selah View Home Tracts, in the block bounded by South Selah Avenue and Yakima Avenue and West of 5th Street, Selah, Washington

35-14-14 E

for the purpose of Municipal Supply

The right to the use of said ground waters has been sustained and approved by the Supervisor of Hydraulics in accordance with Chapter 263, Laws of Washington for 1945, and is hereby entered of record in Volume 1 *of Ground Water Certificates at page* 361-D*; the right approved has a priority of* December, 1944*; the amount of water which the Declarant is entitled to withdraw for the aforesaid purpose is limited to the amount actually beneficially used and shall not exceed* 400 *gallons per minute;* 195 *acre-feet per year; and is appurtenant to the following described lands or place of use:*

Town of Selah, Yakima County, Washington

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 11th *day of* July, *19* 47

RODNEY RYKER
State Supervisor of Hydraulics.

BY: Chas. J. Barthollet
CHAS. J. BARTHOLET, Deputy

Declaration of Claim No. 410

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 1 *of Ground Water Right Certificates, on page* 361-D *on the* 11th *day of* July, *19* 47

STATE OF WASHINGTON,
County of Yakima } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... *of Book of Water Right Certificates, page* ..... *on the* ..... *day of* ....., *19* .....

.....

STATE PRINTING PLANT, OLYMPIA, WASH.

REPORT OF FINDINGS ON GROUND WATER Declaration #410

NAME TOWN OF SELAH

TYPE OF WORKS: Pump Well #3 Date of Examination May 24, 1947

Dimensions: 16" x 431 Progress of Works Completed

QUANTITY Claimed ~~xxxxxxxxxxxxxxxx~~ 400 g.p.m. 400 acre feet per year

LOCATION Selah View Home Tracts bounded by So. Selah Ave., Yakima Ave., and West of 5th Street

USE: Municipal supply

Irrigation- acreage: Present _____ Planned _____ Feasible _____

Municipal: Population 2000 as of the present time

Industrial: _____

Time Pump Will Be Operated: Continuously

Other Water Rights of Applicant: Town of Selah Well #1 North 2420'; Town of Selah Well #2 North 2390'

Proximity to existing works, springs or streams: _____

Estimated effect of withdrawal of water on existing water rights:

Water Bearing Zone: _____

RECOMMENDATIONS

Approved for 400 g.p.m. 195 acre-feet per year, subject to existing water rights.

The amount of water used from the three wells covered by Declarations 408, 409 and 410 has been calculated on the basis of the wells furnishing 1/2 million gallons a day for nine months and 1/3 million gallons a day for three months, which amounts to 513 acre-feet a year. The 513 acre-feet a year has been prorated to the wells as follows:

Declaration #408 147 acre-feet per year
Declaration #409 171 " " " "
Declaration #410 195 " " " "

Signed this 30th day of June, 1947

Fred B Roberts

Fred B. Roberts
Ground Water Geologist
Division of Hydraulics

1050

S. F. No. 7361—3-51—3M. 27753.

CERTIFICATE RECORD NO. 3 PAGE NO. 1050-A

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY *That* TOWN OF SELAH

of Selah, Washington, *has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a* well

located within block bounded by South Selah Avenue and Yakima Avenue; West of 5th Street in Selah View Home Tracts in the Town of Selah, Washington, Sec. 35, Twp. 14 N., Rge. 14 E.W.M.

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. 461 *issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is herby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume* 3 *at page* 1050-A; *that the right hereby confirmed dates from* April 8, 1947; *that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 750 gallons per minute; 350 acre-feet per year. ~~for irrigation of ..... acres.~~

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

Town of Selah, Yakima County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 24th *day of* April, *19* 52.

Thos J Kiddoo

State Supervisor of Water Resources

NEERING DATA

MSW

1050

Ground Water Permit No......

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of the State Supervisor of Water Resources, Olympia, Washington, in Book No. ..... *of Ground Water Right Certificates, on page* ....., *on the* ..... *day of* ....., *195*.....

STATE OF WASHINGTON,
County of ..... } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... *of Book of Water Right Certificates, at page* ....., *on the* ..... *day of* ....., *19*.....

.....

STATE PRINTING PLANT, OLYMPIA, WASH.

REPORT OF FINDINGS ON GROUND WATER Application #507

NAME TOWN OF SELAH

TYPE OF WORKS: Well Date of Examination May 23, 1947

Dimensions: 16" to 8" x 500' Progress of Works Not started

QUANTITY ~~xxxxxxxxxx~~
Applied for: 750 g.p.m. _____ acre feet per year

LOCATION Block bounded by So. Selah Ave. and Yakima Ave., West of 5th Street of Salah View Home Tracts, Selah

USE: Municipal supply

Irrigation- acreage: Present _____ Planned _____ Feasible _____

Municipal: Population 3000 as of 1957

Industrial: _____

Time Pump Will Be Operated: Continuously

Other Water Rights of Applicant: Town of Selah Well #1 North 2200'; Well #2 North 2170'; Well #3 South 220'

Proximity to existing works, springs or streams: _____

Estimated effect of withdrawal of water on existing water rights:

Water Bearing Zone: _____

RECOMMENDATIONS

Approved for 750 g.p.m. 350 acre-feet per year, subject to existing water rights.

The amount of water needed from this well is estimated to be 350 acre-feet per year since 2000 people and industries now use 513 acre-feet a year according to figures computed on Ground Water Declaration 408. The population in 1957 is estimated at 3000.

Signed this 30th day of June, 1947

Fred B Roberts

FRED B. ROBERTS
Ground Water Geologist
Division of Hydraulics.

1348

S. F. No. 7361—3-51—3M. 27753.

CERTIFICATE RECORD NO. 3 PAGE NO. 1348-A

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY *That* TOWN OF SELAH, WASHINGTON

~~of~~, *has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a* well *located within* Lot 10, Block 11 of A. H. Rivard Addition, Selah, Washington, Sec. 36, Twp. 14 N., Rge. 18 E.W.M.

for the purpose of municipal supply *under and subject to provisions contained in Ground Water Permit No.* 2135 *issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is herby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume* 3 *at page* 1348-A *; that the right hereby confirmed dates from* November 16, 1951 *; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 700 gallons per minute; 525 acre-feet per year. ~~for irrigation of xxxxxxxxxxxxxxxxxx acres~~

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

City of Selah, Yakima County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 23rd *day of* January, *19*53.

Thos J. Gatheart

State Supervisor of Water Resources

ENGINEERING DATA

1348

Ground Water Permit No......

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of the State Supervisor of Water Resources, Olympia, Washington, in Book No. ..... *of Ground Water Right Certificates, on page* ....., *on the* ..... *day of* ....., *195*.....

STATE OF WASHINGTON,
County of ..... } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... *of Book of Water Right Certificates, at page* ....., *on the* ..... *day of* ....., *19*.....

.....

STATE PRINTING PLANT, OLYMPIA, WASH.

Report of Examination on Ground Water

Received date 11-16-51 Date of exam. 2-28-52 Appli. No. 2220

Name Town of Selah Address Selah, Washington

Type of works well Dimensions 22" x 200'

Progress of works Well is drilled; pump not yet installed.

Quantity ~~claimed or~~ applied for 700 g.p.m. 525 acre-feet per year

Legal sub. Blk. 11 of A. H. Rivard Add. to Selah Lot 10/ Sec. 36 Twp. 14 N. Rge. 18 E. County Yakima

Use municipal supply

Irrigation-acreage: Present Planned Feasible

Municipal: Population 3000 as of 1955

Industrial

Time pump will be operated continuously

Other water rights appurtenant to this land 4 other wells supplying town - #4 - 640 g.p.m. #3 - 400 g.p.m. #1-#2 - not in use

Proximity to existing works, springs, wells, or streams none known

Area Sub-area Zone

RECOMMENDATIONS

Approved for 700 g.p.m. 525 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

This application shall be approved for the annual withdrawal of 525 acre-feet less an amount which is available and being used from town wells covered by Cert. 359-D - 361-D inclusive and Permit #461. The total annual withdrawal from all wells shall not exceed 890 acre-feet.

The applicant will furnish information to this office as to the size and type of equipment installed and the gallons per minute furnished. The size of hole openings and number of sprinklers operated, if such be the case, will give this information.

The installation of an access port to well, as described in attached Ground Water Bulletin No. 1, is recommended.

Under the above permit and 3 certificates the town holds right for a total withdrawal of 890 acre-feet annually an amount in excess of the normal requirement of a town of 3000 population. Based on a withdrawal of 200 gallons per day per person the requirement should not exceed 675 acre-feet annually for which the figure 890 is already in excess. The provision is therefore not felt to be out of order.
Issue as applied for and recommended subject to existing rights and provisions.

Signed this 6th day of March, 1952.

Fred D. Hahn

FRED D. HAHN
Engineer

S. F. No. 7361—5-60—3M. 62306.

CERTIFICATE RECORD NO. 9 PAGE NO. 4003-A

STATE OF WASHINGTON, COUNTY OF Yakima

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY *That* TOWN OF SELAH, WASHINGTON

of , *has made proof*

to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of

the ground waters of a well 2 on proof

located within NW¼SE¼

Sec. 35 , *Twp.* 14 *N., R.* 18 E. *W. M.,*

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. 4996 *issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume* 9 *at page* 4003-A ; *that the right hereby confirmed dates from* May 11, 1959 ; *that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 1000 gallons per minute; 1600 acre-feet per year for municipal supply.

Special provisions required by the Supervisor of Water Resources:

A description of the lands to which such ground water right is appurtenant:

Town of Selah, Yakima County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 12th *day of* September , 19 61.

M B Walker

State Supervisor of Water Resources.

ENGINEERING DATA
6.7.71

Ground Water Permit No......

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of the State Supervisor of Water Resources, Olympia, Washington, in Book No......*of Ground Water Right Certificates, on page*....., *on the*.....*day of*..... *19*.....

STATE OF WASHINGTON,
County of..... } *ss.*

I certify that the within was received and duly recorded by me in Volume..... *of Book of Water Right Certificates, at page*....., *on the*.....*day of*....., *19*.....

.....

STATE PRINTING PLANT OLYMPIA, WASH., 1960

Rep of Examination on Ground Water

Received date 5-11-59 Date of exam. 5-20-59 Appli. No. 5254

Name Town of Selah, Washington Address

Type of works well Dimensions 20"x16"x500'

Progress of works not started

Quantity applied for 2000 g.p.m. acre-feet per year

Legal sub. NW¼SE¼ Sec. 35 Twp. 14 N. Rge. 18 E. County Yakima

Use municipal supply

Irrigation-acreage: Present Planned Feasible

Municipal: Population 3800 as of 1970

Industrial

Time pump will be operated continuously

Other water rights appurtenant to this land Certificates 359-D,360-D,361-D,1050-A,1348-A

Proximity to existing works, springs, wells, or streams see plans

Area Sub-area Zone

RECOMMENDATIONS

Approved for 2000 g.p.m. 1600 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.) The installation of an access port to well as described in attached Ground Water Bulletin No. 1 is recommended.

The applicant will furnish information to this office as to the size and type of equipment installed and the gallons per minute furnished. The size of hole openings and number of sprinklers operated, if such be the case, will give this information.

The present rights of the Town of Selah are as follows:

Certificate #359-D	300 g.p.m.	147 acre-feet per year	Well #1
Certificate #360-D	350 g.p.m.	171 acre-feet per year	Well #2
Certificate #361-D	400 g.p.m.	195 acre-feet per year	Well #3
Certificate #1050-A	750 g.p.m.	350 acre-feet per year	Well #4
Certificate #1348-A	700 g.p.m.	525 acre-feet per year less an amount which is available from other rights.	Well #5

(Total annaul withdrawal from all wells shall not exceed 890 acre-feet.)

In accordance with our normal water allowances for municipalities, the requested 1600 acre-feet would seem rather excessive. However, this figure was calculated by the engineers in charge of the project on the basis of estimated number of hours pumping throughout a year, so it does not appear that there should be any reduction in the requested amount at this time. Considering the existing rights which have a total annual withdrawal limitation of 890 acre-feet, the permit on this application should issue as follows: 2000 g.p.m. - 1600 acre-feet per year (710 acre-feet -- additional water; 890 acre-feet -- supplemental to existing rights.)

Consequently, the total annual withdrawal from all of the wells will be limited to 1600 acre-feet. Instantaneous withdrawals will only be limited by the quantities granted under the individual certificates.

Our records indicate that Wells #1 and #2 (Cert. 559-D and Cert. 560-D) were not in use in 1951 and apparently have not been used since that date. If these wells are to be permanently abandoned with no further use contemplated, it is thought that the Town of Selah should request the rights pertaining to these wells also be abandoned or cancelled. This action would remove the old rights from our active records and the town would still have a complete coverage of all present water use under the remaining rights.

Signed this 2nd day of October, 1959.
Division of Water Resources

Eugene F. Wallace
EUGENE F. WALLACE, Geologist

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1250 W Alder St • Union Gap, WA 98903-0009 • (509) 575-2490

December 9, 2019

City of Selah
Attn: Ty Jones
115 W Naches Ave
Selah, WA 98942

Re: Water Right Permit No. G4-30642P

Dear City of Selah:

Upon review of the information submitted with the *Construction Notice* for Water Right Permit No. G4-30642P, it was found that the City of Selah (City) is not done with construction under this permit. The City still has plans to increase their service area and still has infrastructure to install to serve those future areas. The City has prematurely submitted their construction notice stating that the construction is complete.

In response to your request to extend the development schedule, you are hereby granted an extension to complete construction for the reason(s) below:

- Continuing to add connections to City's Service area
- Plans to recondition the point of withdrawal for this permit

The new deadline to submit your *Construction Notice* is **December 31, 2031.**

As a condition of this extension Ecology is adding the following provisions to update your permit with the most recent provisions and metering laws, per RCW 90.03.360, RCW 90.44.450, and chapter 173 173 WAC.

- **Authority to Access Project**
  Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

- **Proof of Appropriation**
  Consistent with the development schedule given in this report (unless extended by Ecology), the water right holder must file a Notice of Proof of Appropriation (PA) of

FILE COPY

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

CITY OF SELAH
ATTN. TY JONES
115 W NACHES AVE
SELAH WA 98942

9590 9402 3859 8060 2960 57

2. Article Number (Transfer from service label)
91 7199 9991 7037 9074 3217

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name)
Dale Novobilski K.

C. Date of Delivery
12.11.19

ddress different from item 1? ☐ Yes
delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
d Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Water with Ecology. The PA documents the project is complete and all the water needed has been put to full beneficial use (perfected). In order to verify the extent of water use under this permit, an inspection of water use is typically required, known as a "proof exam". After filing the PA, the water right holder's next step is to hire a Certified Water Rights Examiner (CWRE) to conduct this proof exam. A list of CWREs is provided to the water right holder upon filing the PA with Ecology. The final water right document, a water right certificate, then may issue based upon the findings of the CWRE. Statutory county and state filing fees may apply prior to certificate issuance.

- **Water Measurement**
  An approved measuring device must 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", WAC 173-173, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

  Recorded water use data shall be submitted via the Internet. To set up an Internet reporting account, contact the Central Regional Office. If you do not have Internet access, you can still submit hard copies by contacting the Central Regional Office for forms to submit your water use data.

- **Conservation**
  The water right holder is required to maintain efficient water delivery systems and use of up-to-date water conservation practices consistent with RCW 90.03.005.

If you have any questions, please contact Water Resources Help Desk at 509-575-2597.

YOUR RIGHT TO APPEAL

You have a right to appeal this Decision to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Decision. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Decision:

- File your appeal and a copy of this Decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION	
Street Addresses	**Mailing Addresses**
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey WA 98503 **Pollution Control Hearings Board** 1111 Israel Road SW, Suite 301 Tumwater WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia WA 98504-0903

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov
To find laws and agency rules visit the Washington State Legislature Website: http://www.leg.wa.gov/CodeReviser

Sincerely,

Trevor Hutton, Section Manager
Water Resources Program
Central Regional Office

TH:CK:aa 191245

Enclosures: Completion of Construction Notice
Your Right to Be Heard
Water Measurement Requirements Form 1,Form 2, and Telemetered Metering Options

By certified mail: 91 7199 9991 7037 9074 3217

cc: Phil Rigdon, Yakama Nation

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

file

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
March 15, 1991	G4-30642	G4-30642P	

NAME
City of Selah

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
115 W Naches Ave	Selah	Washington	98942-1396

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described 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
a well (Well No. 7)

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2000	3160

QUANTITY, TYPE OF USE, PERIOD OF USE

3160 acre-feet per year for continuous municipal supply.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

1900 feet east and 90 feet south of the northwest corner of Section 36

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼NE¼NW¼	36	14	18 E.	39	Yakima

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Selah Water Service Area

DESCRIPTION OF PROPOSED WORKS

An existing 1022 feet deep well to be connected to the City potable water distribution system.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Begun	February 1, 2017	February 1, 2017

PROVISIONS

Completion of Construction and Proof of Appropriation (full use) of the recommended Permit are due February 1, 2017 unless further extended for good cause and with reasonable diligence being shown. Progress reports describing system improvements and water usage under this authorization are required at six year intervals to coincide with Comprehensive Water System Plan updates, with the first report due by February 1, 2002.

The City shall document usage under this authorization by recording the source, flow rate, annual volume of use under the recommended Permit, measurement year, along with any other explanatory comments. This documentation shall be made available to the Department upon request.

This authorization is for the Wanapum Basalt Formation aquifer.

The casing shall be set or placed (not driven) at least twenty (20) feet into the first solid, nonporous, nonvesicular basalt flow of the Roza Member of the Wanapum Basalt Formation. The well annulus shall be pressure grouted using cement grout as a sealing agent from the bottom of the casing to land surface and the annulus shall be at least two (2) inches greater in diameter than the permanent casing. The well shall be restricted to a depth corresponding to the top of the Vantage Member (or Grande Ronde Formation if the Vantage is not present).

All other requirements specified by WAC 173-160 shall apply to this well.

For the purpose of the Department's water level monitoring program, access for water level measurements is required. Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gage may be installed in addition to the access port. A pressure gage arrangement to allow measurement of shut-in pressure or an air line and gage are required. The air line shall be constructed of ¼ inch minimum diameter galvanized steel pipe, or comparable material if pre-approved by the department. The air line shall be equipped with a standard tire valve. Distance from land surface to the bottom end of the air line shall be clearly posted at the well site, accurate to 0.5 feet or less. The air line, pressure gage, and all well equipment shall be installed and maintained to provide access for measurement of water levels.

A suitable measuring device approved by the Department of Ecology shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040.

A proof inspection will be conducted prior to final Certificate issuance. The Certificate will reflect the extent of the project perfected within the limitations of the Permit. Aspects will include as appropriate the source(s), system instantaneous capacity, beneficial use(s), primary annual volumes, place of use, and satisfaction of provisions.

The City shall implement an approved water conservation plan(s) as described in "Conservation Planning Requirements" [Ecology Publication No. 94-24, Health PUB 331-008, Dated March, 1994.]

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Yakima, Washington,

this 18th *day of July, 1995.*

Department of Ecology

ENGINEERING DATA
OK
46x116 TDR:ska

by Darlene M. Frye
Darlene M. Frye, Section Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

file

REPORT OF EXAMINATION

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
March 15, 1991	G4-30642		

NAME
City of Selah

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
115 W Naches Ave	Selah	Washington	98942-1396

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
a well (Well No. 7)

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2000	3160

QUANTITY, TYPE OF USE, PERIOD OF USE

3160 acre-feet per year for continuous municipal supply.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL

1900 feet east and 90 feet south of the northwest corner of Section 36

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼NE¼NW¼	36	14	18 E.	39	Yakima

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Selah Water Service Area

DESCRIPTION OF PROPOSED WORKS

An existing 1022 feet deep well to be connected to the City potable water distribution system.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Begun	February 1, 2017	February 1, 2017

REPORT

Summary

A permit is recommended to issue for municipal supply from the Wanapum Basalt Formation aquifer. The requested annual volume of 3220 acre-feet is recommended to be reduced to 3160 acre-feet based on projected water savings due to conservation.

Applicant's Request

On March 15, 1991, the City of Selah filed an application for permit to appropriate public ground water. The application was accepted, assigned number G4-30642 and public notice was made. No letters of protest were received during the thirty day protest period. The City requests authorization to withdraw a maximum rate of 2000 gallons per minute (gpm) and 3220 acre-feet per year from a well for continuous municipal water supply. The requested place of use is the "City of Selah Water Service Area."

The City has reported that its water supply is extremely vulnerable, because its full supply capacity from currently used wells is needed to meet system demands, particularly during peak use times such as July. Failure of any of the current main supply wells could place City residents and structures in jeopardy in case of fire. Low pressure and low reservoir volumes may result which affect domestic supply.

Investigation

Preliminary Permit. A Preliminary Permit was issued on August 19, 1993 authorizing drilling and testing of a well for the purpose of collecting information necessary for making a decision on the application. The test well was completed on November 2, 1994 and flow testing was conducted December 10 and 11, 1994. The City reported that "The resulting well is 1020 feet deep with a shut-in pressure of 15 psi and has an unassisted artesian flow of 1100 gpm...The pump test conducted with a centrifugal pump installed on the surface discharge line provided evidence that the well is easily capable of [the requested 2000 gpm]...flow rate. The 24 hour pump test was run at a rate of 1900 gpm and still registered a positive pressure of 0.5 psi at the well head." The pressure recovery at the end of the test was recorded as "immediate recovery" to 15 psi.

Chemical analysis of selected drilling cuttings was done and a geological analysis was provided by geologist Newell Campbell. The well is constructed to withdraw from the Wanapum Basalt Formation aquifer and achieves nearly full penetration of the aquifer. The well construction meets the requirements of the recommended permit.

Water sampled from the well has been underground for approximately 10,000 years based on analysis performed by the Washington State University Radiocarbon Dating Laboratory (Lab Report Dated February 8, 1995).

Water Rights to Meet Projected Demand. The following discussion is based on the City's approved Water Conservation Plan dated March, 1995, and the document entitled "Conservation Planning Requirements" [Ecology Publication No. 94-24, Health PUB 331-008, Dated March, 1994]. The City's projected total demand (not including projected conservation) is 4880 acre-feet per year by the year 2015. For new water rights, the "Conservation Planning Requirements" (p. 13) require that the forecast include an estimated reduction in per capita water use. The City estimates a 5% reduction in per capita water use by the year 2015. By reducing the year 2015 projected residential demand (2446 acre-feet) by 5% (120 acre-feet), the year 2015 total demand, including projected conservation, is 4760 acre-feet.

A total of 1600 acre-feet per year in primary water rights has issued to the City under the following water right documents: Ground Water Certificates Nos. 359-D, 360-D, 361-D, 1050-A, 1348-A, and 4003-A. Each certificate authorizes a single well, for a total of six wells. In combination, these documents issued for a maximum total of 3500 gpm and 1600 acre-feet per year for municipal supply within the "City of Selah." The City's 1993 usage was approximately 2500 acre-feet. To meet the year 2015 projected demand, 3160 acre-feet per year of additional water rights would be needed.

The authorized place of use under pre-existing water rights is the "Town/City of Selah." The place of use for the recommended permit is to be described as the "City of Selah Water Service Area." Therefore, quantities served outside the City would be considered to be provided under and governed by the recommended authorization.

Water rights which are transferred to the City in the future from other parties may be considered to be in addition to its currently held water rights.

Senior Water Rights. Besides the new City well, there is one other large production well which is interpreted to withdraw from the Wanapum Formation aquifer in the area. This well, the Roche Pomona Orchards well (900 feet deep, drilled in 1977) has been monitored by the Department. No long-term declining water level trend is indicated by the data. It is noted that the water level elevation of the Roche well is approximately 70 feet higher than the City well, which may indicate horizontal separation of zones in the Wanapum Formation, a local condition, or some other cause.

Ground Water Certificate No. G4-24593C issued for the 900 feet deep Roche well, which is located within the SW¼SW¼ Section 16, T. 14 N., R. 19 E.W.M. The Roche well is approximately 3½ miles northeast from the City well site which affords ample separation to prevent impairment due to local drawdown affects.

One other well which may possibly withdraw from the Wanapum Formation is a group domestic well located in the Selah Heights area. Ground Water Certificate No. G4-26449C issued to Bruce French, authorizing a 770 feet deep well located within the NE¼SW¼ Section 15, T. 14 N., R. 18 E.W.M. This well is approximately 3½ miles northwest from the City well site.

Conclusions and Recommendations

An investigation has been made and a permit is recommended for approval. The annual volume of 3220 acre-feet requested by the City has been reduced to an allocation of 3160 acre-feet to include projected water savings due to conservation. Senior water rights will not be impaired through this allocation. Approval of the application will not be detrimental to the public welfare.

The City will need to change several of its water rights or reduce annual pumping volumes at some wells to ensure that withdrawals are within water right limitations. It is recommended that the City review all of its water rights and adjust operations accordingly.

The recommended Permit shall be limited to the maximum amounts, time of use, location of source(s), and location of use area which are given on the cover sheet to this Report.

The following Provisions shall also apply to the Permit:

Completion of Construction and Proof of Appropriation (full use) of the recommended Permit are due February 1, 2017 unless further extended for good cause and with reasonable diligence being shown. Progress reports describing system improvements and water usage under this authorization are required at six year intervals to coincide with Comprehensive Water System Plan updates, with the first report due by February 1, 2002.

The City shall document usage under this authorization by recording the source, flow rate, annual volume of use under the recommended Permit, measurement year, along with any other explanatory comments. This documentation shall be made available to the Department upon request.

This authorization is for the Wanapum Basalt Formation aquifer.

The casing shall be set or placed (not driven) at least twenty (20) feet into the first solid, nonporous, nonvesicular basalt flow of the Roza Member of the Wanapum Basalt Formation. The well annulus shall be pressure grouted using cement grout as a sealing agent from the bottom of the casing to land surface and the annulus shall be at least two (2) inches greater in diameter than the permanent casing. The well shall be restricted to a depth corresponding to the top of the Vantage Member (or Grande Ronde Formation if the Vantage is not present).

All other requirements specified by WAC 173-160 shall apply to this well.

For the purpose of the Department's water level monitoring program, access for water level measurements is required. Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gage may be installed in addition to the access port. A pressure gage arrangement to allow measurement of shut-in pressure or an air line and gage are required. The air line shall be constructed of ¼ inch minimum diameter galvanized steel pipe, or comparable material if pre-approved by the department. The air line shall be equipped with a standard tire valve. Distance from land surface to the bottom end of the air line shall be clearly posted at the well site, accurate to 0.5 feet or less. The air line, pressure gage, and all well equipment shall be installed and maintained to provide access for measurement of water levels.

A suitable measuring device approved by the Department of Ecology shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040. (Installation, operation and maintenance requirements attached hereto.)

A proof inspection will be conducted prior to final Certificate issuance. The Certificate will reflect the extent of the project perfected within the limitations of the Permit. Aspects will include as appropriate the source(s), system instantaneous capacity, beneficial use(s), primary annual volumes, place of use, and satisfaction of provisions.

The City shall implement an approved water conservation plan(s) as described in "Conservation Planning Requirements" [Ecology Publication No. 94-24, Health PUB 331-008, Dated March, 1994.]

REPORT BY: Timothy D. Reierson DATE: 19 March, 1995
Timothy D. Reierson

APPROVED BY: G Phillips Crane DATE: March 22 1995
for Darlene M. Frye, Section Manager

46x116 ska

file

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

3601 W. Washington • Yakima, Washington 98903-1164 • (509) 575-2800

May 23, 1995

CERTIFIED MAIL
P 857 227 633

City of Selah
115 W Naches Ave
Selah WA 98942-1396

RE: Ground Water Application No. G4-30642

Your application has been approved and a permit will be issued in accordance with the enclosed Report of Examination upon payment of the statutory fee of $20.00. Please make your check payable to the Department of Ecology.

This letter and enclosed Report of Examination constitute our determination and order. You have the right to obtain review of this order. Request for review must be made, within thirty (30) days of receipt of this order, to the Washington Pollution Control Hearings Board, PO Box 40903, Olympia, Washington 98504-0903. Concurrently, a copy of the request must be sent to the Department of Ecology, PO Box 47600, Olympia, Washington 98504-7600. These procedures are consistent with the provisions of Chapter 43.21B RCW and the rules and regulations adopted thereunder.

Please send your permit fee within 30 days.

Sincerely,

G Philip Crane

for Darlene M. Frye, Section Manager
Water and Shorelands Resources Program
Central Regional Office

DMF:TDR:ska

Enclosure(s): Report of Examination
Findings of Fact and Order, Docket No. DE 95WR-C134
Ground Water Bulletin No. 1
Flow Meter Requirements

cc: Yakama Indian Nation

f-2:Form
(01/95)

file

BEFORE THE
DEPARTMENT OF ECOLOGY
STATE OF WASHINGTON

IN THE MATTER OF APPLICATION NUMBER G4-30642 FOR PERMIT TO APPROPRIATE PUBLIC WATERS	)))	FINDINGS OF FACT AND ORDER Docket No. DE 95WR-C134

Upon review of the Examiner's report, I find that all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, in accordance with the Examiner's conclusions and recommendations, I find that water may be appropriated for beneficial use and that said use will not impair existing rights or be detrimental to the public welfare.

IT IS ORDERED that a permit issue under Application Number G4-30642 authorizing appropriation of public waters in the amount, and for the use, and subject to the provisions set forth in the Examiner's report.

You have the right to obtain review of this order. Request for review must be made, within thirty (30) days of receipt of this order, to the Washington Pollution Control Hearings Board, PO Box 40903, Olympia, Washington 98504-0903. Concurrently, a copy of the request must be sent to the Department of Ecology, PO Box 47600, Olympia, Washington 98504-7600. These procedures are consistent with the provisions of Chapter 43.21B RCW and the rules and regulations adopted thereunder.

Signed at Yakima, Washington this 23rd day of May, 1995.

for Darlene M. Frye, Section Manager
Shorelands and Water Resources Program
Department of Ecology

DEPARTMENT OF ECOLOGY
State of Washington

WATER RESOURCES PROGRAM
Showing of Compliance with RCW 90.44.100(3)

Water Right Certificate or Permit Number: 361-D and 1050-A

Parcel tax identification number: 181435-43008

Landowner(s) name: City of Selah

Part of complying with RCW 90.44.100(3) is for the project proponent to notify the Department of Ecology (Ecology) that the statutory criteria of RCW 90.44.100(3) have been satisfied. Please attach to this document the water well report for the additional or replacement well and any additional information you have to support your affidavit.

Affidavit:

I, Joe Henne, do certify that I caused the well described in the attached water well report to be drilled as an additional or replacement well(s) for use under Water Right Number 361-D & 1050-A. This notice and attached documents describe and support my assertion that the replacement or additional well(s) complies with RCW 90.44.100(3) (a-g) and RCW 90.44.100(4):

Please check one:

☒ This is an additional well (Attach well log)

☐ This is a replacement well (Attach well log for new well & Decommissioning log for old well)

a. The well is an additional or replacement well(s) that will tap the same body of public ground water as the original well;

b. If a replacement well is constructed, the use of the original well(s) shall be discontinued and the original well(s) shall be properly decommissioned;

c. The combined withdrawal of water from the additional or replacement well(s) and the original well authorized by the water right certificate does not enlarge the water right conveyed by the original water right certificate to the extent the certificate has been developed (perfected) and maintained by use of water;

d. The construction and use-of the additional or replacement well(s) does not interfere with or impair water rights with an earlier priority date;

e. The additional or replacement well(s) is located no closer than the original well to a well or surface water body it might interfere with;

f. A specified manner of construction for the additional or replacement well(s) has been complied with, if required, and the new well was constructed in compliance with chapter 18.104 RCW and chapter 173-160 WAC;

g. The additional or replacement well(s) is located within the area described as the point of withdrawal in the public notice published for the original application for water right, or the most current legal description published for the right. Both the original well and the additional or replacement well(s) are located in SW1/4 SE1/4 S 35 T 14N. R 18E. W.M. (legal description).

Therefore the well is in compliance with the requirements for a statutorily granted amendment to the water right permit or certificate.

I understand the acceptance of this affidavit, and any attachments, by the Department of Ecology shall not be construed as affirming the validity of any water right permit or certificate. The responsibility to comply with RCW 90.44.100(3) is with the water right permit or certificate holder asserting an amendment pursuant to RCW 90.44.100(3).

Joe Henne — May 20, 2010

Name — Date

Acknowledgement:

State of Washington
County of Yakima

I certify that I know or have satisfactory evidence that Joe Henne *is the person who appeared before me, and said person acknowledged that (he/she) signed this affidavit and acknowledged it to be (his/her)free and voluntary act for the uses and purposes mentioned in the affidavit.*

Dated: May 20, 2010

DIANA L TURNER
NOTARY
STATE OF WASHINGTON
PUBLIC

Diana L Turner
(Signature)
Yakima
Residing in
Administrative Assistant
Title
My appointment expires: 6/1/14

If you have any questions please contact the Water Resources Section of the closest regional office. Please submit copies of new well logs and decommissioned well logs along with this completed and notarized form to the nearest regional office.

Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
(425) 649-7000

Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775
(360) 407-6300

Eastern Regional Office
4601 N. Monroe Street
Spokane, WA 99205-1295
(509) 329-3400

Central Regional Office
15 W. Yakima Ave., Suite 200
Yakima, WA 98902-3452
(509) 575-2597

Vancouver Field Office
2108 Grand Boulevard
Vancouver, WA 98661-4622
(360) 690-7171

Bellingham Field Office
1204 Railroad Ave., Suite 200
Bellingham, WA 98225
(360) 738-6250

Please print, sign and return to the Department of Ecology

Water Well Report

Original – Ecology, 1st copy – owner, 2nd copy – driller.

Construction/Decommission

☑ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

Current
Notice of Intent No. WE10576

Unique Ecology Well ID Tag No. AAS171

Water Right Permit No. 1050A & cert1, p361-D

Property Owner Name City of Selah

Well Street Address 218 S 3rd St

City Selah County Yakima

Location SW1/4-1/4 SE 1/4 Sec 35 Twn 14 R 18 EWM or WWM ☑ circle one

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____

Tax Parcel No. 18143543008

PROPOSED USE: ☐ Domestic ☐ Industrial ☑ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) 8

☑ New well ☐ Reconditioned Method: ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☑ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 16x10 inches, drilled 674 ft.
Depth of completed well 670 ft.

CONSTRUCTION DETAILS

Casing Installed: ☑ Welded pitless unit Diam. from +2 ft. to 5 ft.
☐ Liner installed 16 " Diam. from 5 ft. to 304 ft.
☐ Threaded _____ " Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☑ No
Type of perforator used _____
SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☑ Yes ☐ No ☐ K-Pac Location _____
Manufacturer's Name Alloy
Type V-wire wrap Model No. 304 SS
Diam. 10 Slot size .040 from * ft. to * ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☑ Yes ☐ No ☐ Size of gravel/sand CSSI 8x12
Materials placed from 264 ft. to 674 ft.

Surface Seal: ☑ Yes ☐ No To what depth? 304 ft. including formation seal
Material used in seal cement except pitless interval is bentonite
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name Goulds
Type: submersible H.P. 200

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure 1/2 ft abv ground lbs. per square inch Date 4/6/10
Artesian water is controlled by 6" valve on side & flange on top of pitless (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☑ Yes ☐ No If yes, by whom? Schneider
Yield: 1100 gal./min. with 183 ft. drawdown after 24 hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test began 11/24/09
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water 60 F Was a chemical analysis made? ☑ Yes ☐ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
See attached formation log.		
Screen Assembly:	*	*
J receptor and 12x10 std bell reducer	264	268
10" x .365 blank	268	297
10" PS screen	297	302
10" x .365 blank	302	307
10" PS screen	307	357
10" x .365 blank	357	376
10" PS screen	376	391
10" x .365 blank	391	403
10" PS screen	403	423
10" x .365 blank	423	429
10" PS screen	429	444
10" x .365 blank	444	513
10" PS screen	513	523
10" x .365 blank	523	542
10" PS screen	542	547
10" x .365 blank	547	597
10" PS screen	597	612
10" x .365 blank	612	618
10" PS screen	618	628
10" x .365 blank	628	641
10" PS screen	641	666
10" x .365 blank	666	670

Start Date 9/17/09 Completed Date 4/7/10

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller/Engineer/Trainee Name (Print) Steve Schneider
Driller/Engineer/Trainee Signature Stephen J Schneider
Driller or trainee License No. 0643

IF TRAINEE,
Driller's Licensed No. _____
Driller's Signature _____

Drilling Company Schneider Equipment, Inc.
Address 21881 River Road NE
City, State, Zip St. Paul, OR 97137
Contractor's Registration No. SCHNEEI940R8 Date 5/4/10

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 2/03)

CITY OF SELAH

AAS171 - WELL NO. 8 - Formation Log

by Schneider Drilling Co.

FM	TO	DESCRIPTION
0	1	Top soil
1	9.5	Clay, brown, firm w/ gravel, 3" minus
9.5	50	Gravel, multi-colored (m.c.), 3/4"- & sand, m.c., coarse-fine w/clay, brown, medium
50	64	Sand, medium & gravel, 3/4" minus; multi-colored w/cementation
64	71	Clay, red, medium
88	118	Sand, brown, medium w/cementation
118	127	Clay, brown, soft
127	161	Sand, multi-colored, coarse w/some gravel, m.c., 3/8"-
161	176	Clay, brown, hard w/gravel, m.c., 3/8"-
176	186	Clay, brown, soft w/gravel, m.c., 3/8"-
186	206	Clay, brown, med w/some gravel, m.c., 3/8"-
206	296	Clay, brown, med w/sand, black, fine-coarse, cementation
296	301	Clay, brown, med-soft
301	303	Clay, brown, med, w/sand, brown, very fine - coarse, cementation
303	309	Sand, brown, very fine-fine some coarse & some gravel, m.c., 1/4"-
309	311	Sand, brown, coarse, w/ gravel 1/2"-, brown; some cementation
311	336	Sand, m.c., coarse-fine w/gravel, m.c., 1-1/2"-
336	341	Sand, m.c., coarse-fine w/gravel, m.c., 1-1/2"- w/cementation
341	346	Siltstone, m.c., medium w/claystone, m.c., medium & sand, grey, fine, cemented
346	350	Claystone red, medium w/sandstone, tan, fine & gravel, m.c., 3/4" w/some clay, tan, soft
350	355	Sandstone, brown, medium
355	377	Sandstone, brown, medium w/claystone, brown, medium & some clay, brown, soft-medium
377	385	Gravel, m.c., 2"- w/sand, coarse-fine w/cementation
385	389	Sandstone, dark brown, medium w/siltstone, brown, medium
389	398	Claystone, brown, medium
398	403	Clay, tan, medium
403	406	Siltstone, tan, medium w/sand & gravel, m.c., 1/2"-, cemented
406	421	Gravels, m.c., 3/4" minus w/sand, m.c., fine-medium
421	429	Claystone, m.c., medium
429	441	Sandstone, brown, medium w/siltstone, tan, medium
441	446	Claystone, dark brown, medium
446	451	Clay, brown, medium
451	461	Clay, grey & tan, soft-medium
461	464	Claystone, grey & tan, medium
464	468	Sandstone, dark grey, medium w/claystone, m.c., medium
468	473	Claystone, dark green, medium

CITY OF SELAH

AAS171 - WELL NO. 8 - Formation Log

by Schneider Drilling Co.

FM	TO	DESCRIPTION
473	498	Claystone, dark green, medium w/some claystone, tan, medium
498	513	Clay, greyish green, soft w/claystone, dark green, medium
513	521	Sandstone, dark green, v-hard w/some claystone, m.c., medium
521	542	Sandstone, dark green, medium w/claystone, m.c., medium & some clay dark grey, soft
542	547	Sandstone, dark green, medium
547	566	Clay, dark green, soft-medium
566	573	Clay, dark green, soft-medium w/claystone, dark green, medium
573	596	Clay, dark green, soft-medium w/claystone, dark green, medium
596	602	Sandstone, dark green, medium
602	604	Claystone, green, medium w/sandy clay, green, soft
604	608	Claystone, green, medium w/siltstone, green, medium & wood & some gravel, m.c., 1"-
608	611	Gravel, m.c., 1"- w/some cementation
611	618	Clay, dark green, soft w/sandstone, dark green, medium
618	625	Cemented sand, medium & gravel, 1-1/2"-; m.c.
625	635	Clay, green, medium
635	640	Clay, green, sandy, medium
640	650	Basalt, black, vesicular
650	660	Basalt, black & brown, medium, fractured
660	674	Basalt, black & brown, medium-hard, fractured

13. SUSCEPTIBILITY ASSESSMENT FORMS

HLA
Engineering and Land Surveying, Inc.

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

¡MPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : City of Selah

Water system name : City of Selah

County: Yakima

Water system number: 774006 Source number: S.O.S. Wellfield A(S1,S2)

Well depth: 433 (ft.) (*From WFI form*)

Source name: Well's 3 & 4

WA well identification tag number:___ ___ ___-___ ___ ___

_____ well not tagged

Number of connections: 1,682 Population served: 5,110

Township: 14N Range: 18E

Section: 35 1/4 1/4 Section: SW - SE

Latitude/longitude (if available): 46°39'15" / 120°31'48"
Corner of 1st and Naches

How was lat./long. determined?

_____ global positioning device X survey _____ topographic map
____other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: ___ / ___ / 47 month/day/year

last reconstruction: ___ / ___ /___ month/day/year

_____ information unavailable

2) Well driller: _____

_____

_____

___ well driller unknown

3) Type of well:

___Drilled: ___ rotary ___ bored ___ cable (percussion) ___ Dug

___ Other: ___ spring(s) ___ lateral collector (Ranney)

___ driven ___ jetted ___ other: _____

Additional comments: _____

_____

4) Well report available? X YES (attach copy to form) ___ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 1,100 (gallons/min)

Source of information: Flow Meter

If not documented, how was pumping rate determined? _____

_____

___ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:
CL2
X disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

To maintain residual in distribution system

_____

7) If source is chlorinated, is a chlorine residual maintained: X YES ___ NO

Residual level: .6 (*At the point closest to the source.*)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20-50 ft ___ 50-100 ft _X_ 100-200 ft ___ >200 ft

___ information unavailable ('< ' *means less than;* '> ' *means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft ___ 20-50 ft _X_ 50-100 ft ___ >100 ft

___ flowing well/spring (artesian)

How was water level determined?

_X_ well log ___ other: _____

___ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES ___ NO

5) Wellhead elevation (height above mean sea level): 1125 (ft)

How was elevation determined? ___ topographic map _X_ Drilling/Well Log ___ altimeter

___ other: _____

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_X_ evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? _X_ YES ___ NO

___ information unavailable

7) Sanitary setback:

___ < 100 ft* _X_ 100-120 ft ___ 120-200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

This well is located in a City park (Wixson)

8) Wellhead construction:

_X_ wellhead enclosed in a wellhouse

_X_ controlled access (describe): Metal construction with door pad locked at all times.

___ other uses for wellhouse (describe): n/a

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('< ' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('< ' *means less than*)

___ > 18 ft ('> ' *means greater than*)

_X_ depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

_X_ < 10 in/yr ___ 10-25 in/yr ___ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 45 mil. (gallons)

How was this determined?

X meter

___ estimated: ___ pumping rate (_____)

___ pump capacity (_____)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 800 (ft)

1 year ground water travel time : 1,140 (ft)

5 year ground water travel time: 2,540 (ft)

10 year ground water travel time: 3,590 (ft)

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/open interval: 95 (ft) 5 Perferations

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	____
stormwater injection wells	____	____	____	____
other injection wells	____	____	____	____
abandoned ground water well	____	____	____	____
landfills, dumps, disposal areas	____	____	____	____
known hazardous materials clean-up site	____	____	____	____
water system(s) with known quality problems	____	____	____	____
population density > 1 house/acre	____	____	____	____
residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
sites used for land application of waste	____	____	____	____

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

_____

_____

_____

_____

_____

_____

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	X
< 2 mg/liter nitrate	X	___
2–5 mg/liter nitrate	___	X
> 5 mg/liter nitrate	___	X

___ Nitrate sampling records unavailable

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	X
VOCs never detected	X	___

___ VOC sampling records unavailable

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	___

X EDB/DBCP tests required but not yet completed

___ EDB/DBCP tests not required

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected	___	___
(pesticides and other synthetic organic chemicals)		

___ Other SOC tests performed but none detected

(list test methods in comments

___ Other SOC tests not performed

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	____	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	____	X

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

X YES ___ NO

Describe with references to map produced in Part IV:

Steep hill west of well within 6 month C.F.R. This hill side has trees, shrubs and part barren.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES X NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

X YES ___ NO

Sand and gravel

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES ___X___ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	X	___
6 month–1 year travel time	___	X	___
1–5 year travel time	___	X	___
5–10 year travel time	___	X	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

		YES	NO	unknown
< 1 year travel time		___	X	___
1–5 year travel time		___	X	___
5–10 year travel time	Dry Well	X	___	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

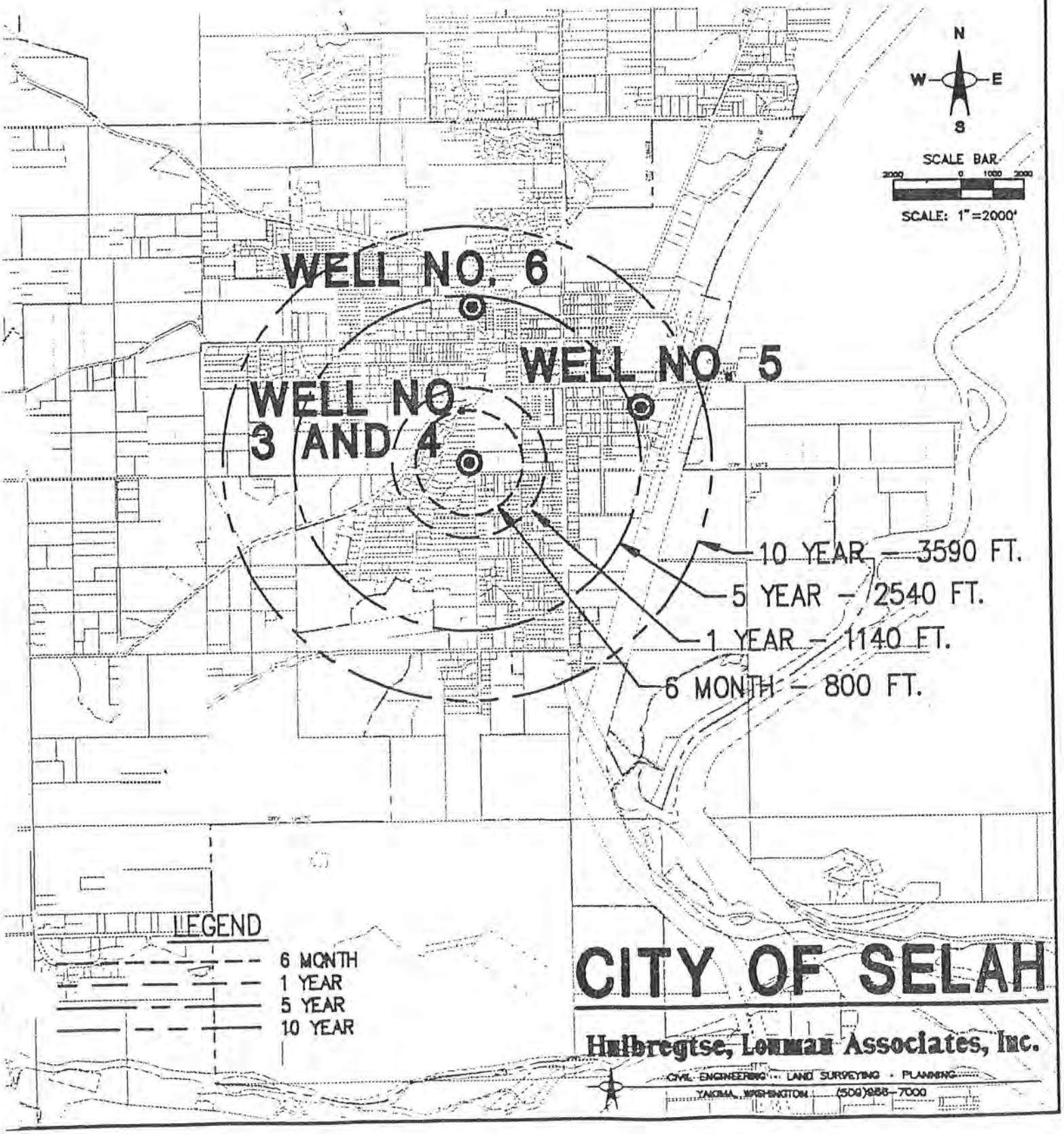
Suggestions and Comments

Did you attend one of the susceptibility workshops? X YES ___ NO

Did you find it useful? X YES ___ NO

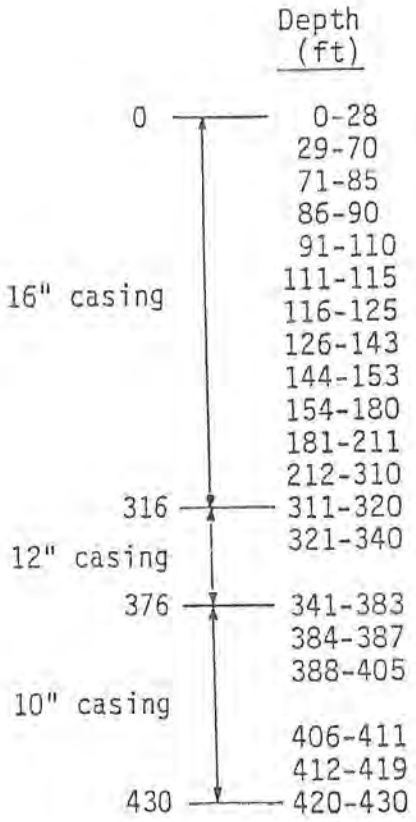
Did you seek outside assistance to complete the assessment? ___ YES X NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.


N
W
E
S
SCALE BAR
2000 0 1000 2000
SCALE: 1"=2000'
WELL NO. 6
WELL NO. 5
WELL NO. 3 AND 4
10 YEAR - 3590 FT.
5 YEAR - 2540 FT.
1 YEAR - 1140 FT.
6 MONTH - 800 FT.
LEGEND
6 MONTH
1 YEAR
5 YEAR
10 YEAR
CITY OF SELAH
Hulbregtse, Lowman Associates, Inc.
CIVIL ENGINEERING · LAND SURVEYING · PLANNING
YAKIMA, WASHINGTON (509)966-7000

WELL NO. 3 LOG

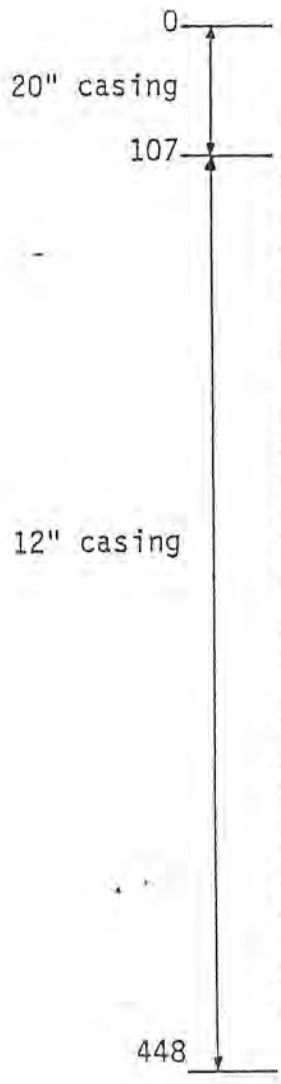
Drilled: 1944
Elevation: 1118 ft.
Initial Flow & Drawdown: 85gpm artesion
1976 Flow & Drawdown: 360 gpm @ 100 ft.
1976 Static Water Level: 40 ft.



Depth (ft)	Soil
0-28	Soil, sand & gravel
29-70	Sand & gravel
71-85	Red clay
86-90	Grey clay
91-110	Sandy shale
111-115	Sand
116-125	Red clay
126-143	Sand & gravel
144-153	Sand
154-180	Sandy clay
181-211	Brown shale
212-310	Red clay
311-320	Hard sandstone
321-340	Coarse sand & gravel (PERFORATED CASING)
341-383	Red clay
384-387	Sand & gravel
388-405	Yellow clay (PERFORATED CASING)
406-411	Fine sand
412-419	Coarse sand
420-430	Sand

WELL NO. 4 LOG

Drilled: 1947
Elevation: 1125 ft.
Initial Flow & Drawdown: 1430gpm @ 97 ft.
1976 Flow & Drawdown: 400gpm @ 60 ft.
1976 Static Water Level: 60 ft.



Depth (ft)	Soil
0-31	Soil, sand & gravel
32-67	Sand & gravel
68-82	Red clay
83-100	Sand
101-110	Sandy shale
111-115	Sand
116-125	Red clay
126-130	Red shale
131-147	Sand & gravel (PERFORATED CASING)
148-177	Sand (PERFORATED CASING)
178-207	Sandy clay
208-210	Brown shale
211-234	Red clay
235-254	Sandy red clay
255-274	Sandy red shale
275-317	Sticky fine sandy red clay
318-327	Sandstone (PERFORATED CASING)
327-337	Coarse sand & gravel (PERFORATED CASING)
338-347	Hard packed fine sand (PERFORATED CASING)
348-367	Red shale
368-385	Red clay
385-390	Sand & gravel (PERFORATED CASING)
391-408	Sandy red clay
408-432	Sand (PERFORATED CASING)
433-448	Red clay w/little sand

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : City of Selah

Water system name : City of Selah

County: Yakima

Water system number: 774006 Source number: S03

Well depth: 578 (ft.) (*From WFI form*)

Source name: Well #5

WA well identification tag number:___ ___ ___-___ ___ ___

_____ well not tagged

Number of connections: 1,682 Population served: 5,110

Township: 14N Range: 18E

Section: 35 1/4 1/4 Section: SW - SW

Latitude/longitude (if available): 46°39'15" / 120°31'48"

Naches and 1st

How was lat./long. determined?

_____ global positioning device ___X___ survey _____ topographic map

____other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: ___ / ___ / 51 month/day/year

last reconstruction: ___ / ___ /___ month/day/year

_____ information unavailable

2) Well driller: N.C. Jansen Drilling & MFG. Co Seattle, WA.

___ well driller unknown

3) Type of well:

___Drilled: _X_ rotary ___ bored ___ cable (percussion) ___ Dug

___ Other: ___ spring(s) ___ lateral collector (Ranney)

___ driven ___ jetted ___ other: _____

Additional comments: _____

4) Well report available? _X_ YES (attach copy to form) ___ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 750 (gallons/min)

Source of information: Flow Meter

If not documented, how was pumping rate determined? _____

___ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

_X_ CL_2 disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

To maintain residual in distribution system

7) If source is chlorinated, is a chlorine residual maintained: _X_ YES ___ NO

Residual level: .6 (*At the point closest to the source.*)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20–50 ft ___ 50–100 ft ___ 100–200 ft _X_ >200 ft

___ information unavailable ('< ' *means less than;* '> ' *means greater than*)

2) Depth to ground water (static water level):

_X_ < 20 ft ___ 20–50 ft ___ 50–100 ft ___ > 100 ft

___ flowing well/spring (artesian)

How was water level determined?

_X_ well log ___ other: _____

___ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES ___ NO

5) Wellhead elevation (height above mean sea level): 1,110 (ft)

How was elevation determined? ___ topographic map _X_ Drilling/Well Log ___ altimeter

___ other: _____

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_X_ evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? _X_ YES ___ NO

___ information unavailable

7) Sanitary setback:

X < 100 ft* ___ 100-120 ft ___ 120-200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

North of well City shop storage of equipment = 97'

West of well City Shop 90'

East of well 65' to City fenced lot paved road 100'

South of well Tree Top Scale house paved road in between 90'

8) Wellhead construction:

X wellhead enclosed in a wellhouse

X controlled access (describe): Wood construction locked door also inside fenced compound with gate locked after working hours.

___ other uses for wellhouse (describe): none

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('< ' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('< ' *means less than*)

___ > 18 ft ('> ' *means greater than*)

X depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

X < 10 in/yr ___ 10-25 in/yr ___ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

) Annual volume of water pumped: 27 mil (gallons)

How was this determined?

X meter

___ estimated: ___ pumping rate (_____)

___ pump capacity (_____)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 800 (ft)

1 year ground water travel time : 1,390 (ft)

5 year ground water travel time: 3,110 (ft)

10 year ground water travel time: 4,400 (ft)

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/open interval: 32' (ft) 19' 13'

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	____
stormwater injection wells	____	____	____	____
other injection wells	____	____	____	____
abandoned ground water well	____	____	____	____
landfills, dumps, disposal areas	____	____	____	____
known hazardous materials clean-up site	____	____	____	____
water system(s) with known quality problems	____	____	____	____
population density > 1 house/acre	____	____	____	____
residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	X	____
sites used for land application of waste	____	____	____	____

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

_____

_____

_____

_____

_____

_____

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	X
< 2 mg/liter nitrate	X	___
2-5 mg/liter nitrate	___	X
> 5 mg/liter nitrate	___	X
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	X
VOCs never detected	X	___
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	___
_X_ EDB/DBCP tests required but not yet completed		
___ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected (pesticides and other synthetic organic chemicals)	___	___

___ Other SOC tests performed but none detected
(list test methods in comments

X ___ Other SOC tests not performed

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	____	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	____	X

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

___ YES X NO

Describe with references to map produced in Part IV:

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

Porous Basalt

X YES ___ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

Gravel

X YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES ___X___ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	___	___
6 month–1 year travel time	___	___	___
1–5 year travel time	___	___	___
5–10 year travel time	___	___	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	X	___
1–5 year travel time	___	X	___
5–10 year travel time	___	X	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Suggestions and Comments

Did you attend one of the susceptibility workshops? X YES ___ NO

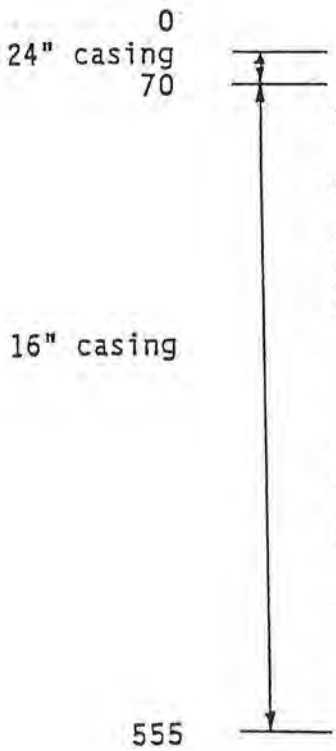
Did you find it useful? X YES ___ NO

Did you seek outside assistance to complete the assessment? ___ YES X NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

WELL NO. 5 LOG

Drilled: 1951
Elevator: 1110 ft.
Initial Flow & Drawdown: 1400 gpm @ 150 ft.
1976 Flow & Drawdown: 775 gpm @ 170 ft.
1986 Flow & Drawdown: 900 gpm @ 215 ft.
1986 Static Water Level: 15 ft.



Depth (ft)	Soil
0-53	Gravel & boulders
54-200	Brown clay
201-210	Sand & Gravel (fine) (PERFORATED CASING)
210-220	Brown clay (PERFORATED CASING)
221-330	Brown clay
331-350	Blue clay
351-440	Blue clay w/streaks of shale & layers of sand
441-450	Blue clay w/streaks of gravel
451-480	Blue clay
481-490	Gravel w/streaks of clay
491-494	Gravel
494-540	Gravel (PERFORATED CASING)
541-550	Gravel & porous basalt (PERFORATED CASING)
551-554	Porous basalt (PERFORATED CASING)
555-560	Porous basalt
561-578	Hard basalt

N
W
E
S
SCALE BAR
SCALE: 1"=2000'
WELL NO. 6
WELL NO. 5
WELL NO. 3 AND 4
10 YEAR – 4400 FT.
5 YEAR – 3110 FT.
1 YEAR – 1390 FT.
6 MONTH – 800 FT.
INDUSTRIAL WASTE LAGOON
LEGEND
6 MONTH
1 YEAR
5 YEAR
10 YEAR
CITY OF SELAH
Hulbregtse, Louman Associates, Inc.
CIVIL ENGINEERING · LAND SURVEYING · PLANNING
YAKIMA, WASHINGTON (509)966-7000

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : City of Selah

Water system name : City of Selah

County: Yakima

Water system number: 774006 Source number: S.0.4

Well depth: 966 (ft.) (*From WFI form*)

Source name: Well 6

WA well identification tag number: ___ ___ ___-___ ___ ___

_____ well not tagged

Number of connections: (City wide, all wells) 1,682 Population served: 5,110

Township: 14N Range: 18E

Section: 36 1/4 1/4 Section: SW - NE

Latitude/longitude (if available): 46°39'15" / 120°31'48"

How was lat./long. determined? Naches & 1st Street

_____ global positioning device _____ survey __X__ topographic map

____other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: ___ / ___ /60 month/day/year

last reconstruction: ___ / ___ /___ month/day/year

_____ information unavailable

2) Well driller: N.C. Jannsen Drilling Co. Seattle, WA

__ well driller unknown

3) Type of well:

__Drilled: X rotary __ bored __ cable (percussion) __ Dug

__Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other: _____

Additional comments: _____

(Well log only available, attached)

4) Well report available? X YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 1,550 (gallons/min)

Source of information: Flow meter

If not documented, how was pumping rate determined? _____

__ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

CL2

X disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

To maintain residual in distribution system

7) If source is chlorinated, is a chlorine residual maintained: X YES __ NO

Residual level: .6 (*At the point closest to the source.*)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20–50 ft ___ 50–100 ft __X__ 100–200 ft ___ >200 ft

___ information unavailable *('< ' means less than; '> ' means greater than)*

2) Depth to ground water (static water level):

___ < 20 ft __X__ 20–50 ft ___ 50–100 ft ___ >100 ft

___ flowing well/spring (artesian)

How was water level determined?

__X__ well log ___ other: Recent measurements

___ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure: N/A

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES ___ NO N/A

5) Wellhead elevation (height above mean sea level): 1,156 (ft)

How was elevation determined? ___ topographic map __X__ Drilling/Well Log ___ altimeter

___ other: _____

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

__X__ evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? __X__ YES ___ NO

___ information unavailable

7) Sanitary setback:

X < 100 ft* ___ 100–120 ft ___ 120–200 ft ___ > 200 ft

* if less than 100 ft describe the site conditions:

North of well City resident property line apx. 72' House 90'

West of well City's property maintained by City 100'

East of well 17' to paved road 41' east to shoulder of road 97' to city resident.

South of well apx. 82' to City property line paved road center line apx. 100'

8) Wellhead construction:

X wellhead enclosed in a wellhouse

X controlled access (describe): Metal construction lid pad locked at all times

___ other uses for wellhouse (describe): N/A

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) (*'<' means less than*)

___ < 18 ft (Approved by Ecology, include documentation) (*'<' means less than*)

___ > 18 ft (*'>' means greater than*)

X depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

X < 10 in/yr ___ 10–25 in/yr ___ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 161 mil (gallons)

How was this determined?

X meter

___ estimated: ___ pumping rate (_____)

___ pump capacity (_____)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 360 (ft)

1 year ground water travel time : 510 (ft)

5 year ground water travel time: 1,140 (ft)

10 year ground water travel time: 1,610 (ft)

Information available on length of screened/open interval?

__ YES __ NO

Length of screened/open interval: 337' (ft) . 8 perforated areas

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	____
stormwater injection wells	____	____	____	____
other injection wells	____	____	____	____
abandoned ground water well	____	____	____	____
landfills, dumps, disposal areas	____	____	____	____
known hazardous materials clean-up site	____	____	____	____
water system(s) with known quality problems	____	____	____	____
population density > 1 house/acre	____	____	____	____
residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
sites used for land application of waste	____	____	____	____

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

_____

_____

_____

_____

_____

_____

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	X
< 2 mg/lit nitrate	X	___
2–5 mg/liter nitrate	___	X
> 5 mg/liter nitrate	___	X
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	X
VOCs never detected	X	___
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	___
X EDB/DBCP tests required but not yet completed		
___ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected	___	___
(pesticides and other synthetic organic chemicals)		
___ Other SOC tests performed but none detected		
(list test methods in comments		
___ Other SOC tests not performed		

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

___ YES X NO

Describe with references to map produced in Part IV:

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

X YES deep ___ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

X YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES X NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	X	___
6 month–1 year travel time	___	X	___
1–5 year travel time	___	X	___
5–10 year travel time	___	X	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	X	
1–5 year travel time	___	X	___
5–10 year travel time	___	X	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

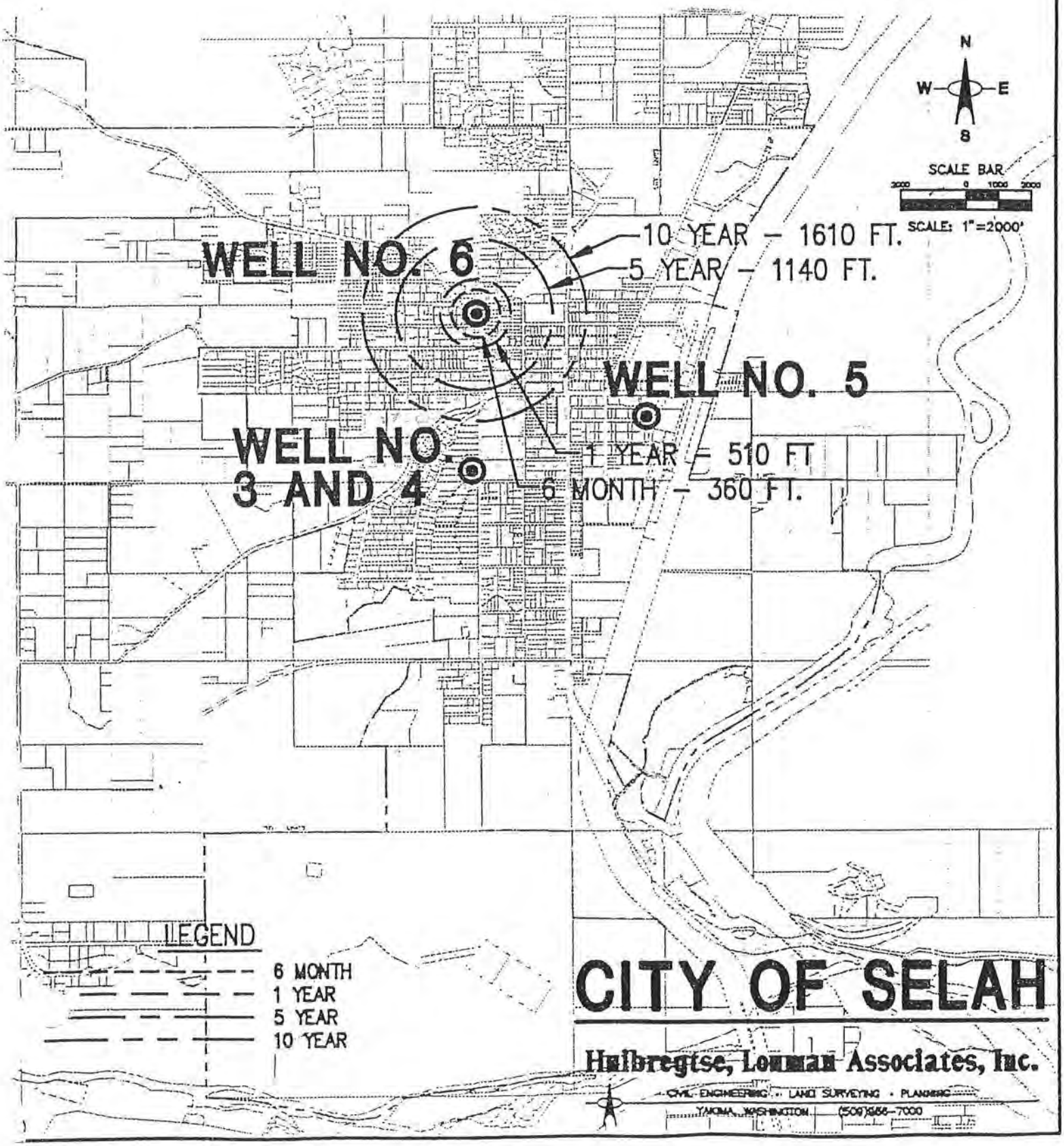
Suggestions and Comments

Did you attend one of the susceptibility workshops? X YES ___ NO

Did you find it useful? X YES ___ NO

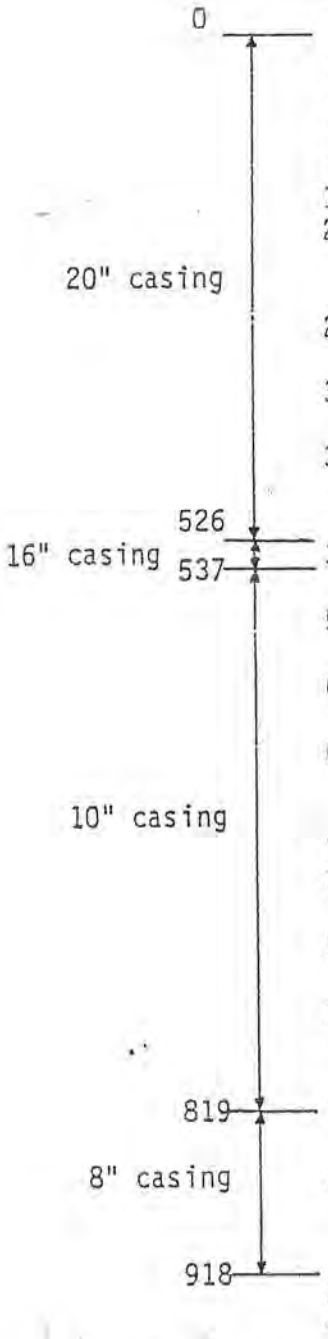
Did you seek outside assistance to complete the assessment? ___ YES X NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.


N
W
E
S
SCALE BAR
2000 0 1000 2000
SCALE: 1"=2000'
WELL NO. 6
10 YEAR - 1610 FT.
5 YEAR - 1140 FT.
WELL NO. 5
1 YEAR - 510 FT
6 MONTH - 360 FT.
WELL NO. 3 AND 4
LEGEND
6 MONTH
1 YEAR
5 YEAR
10 YEAR
CITY OF SELAH
Hulbregtse, Louman Associates, Inc.
CIVIL ENGINEERING • LAND SURVEYING • PLANNING
YAKIMA, WASHINGTON (509)966-7000

WELL NO. 6 LOG

Drilled: 1960
Elevation: 1156 ft.
Initial Flow & Drawdown: 1500gpm @ 110 ft.
1976 Flow & Drawdown: 750 gpm @ 70 ft.
1976 Static Water Level: 30 ft.



Depth (ft)	Soil
0-12	Soil, gravel
13-68	Sand-rock
68-73	Yellow clay-gravel
74-85	Sand-rock
86-164	(PERFORATED CASING)
165-249	Sand-rock
250-260	Sand-rock, little gravel
	(PERFORATED CASING)
261-300	Sand, rock, gravel, little clay
301-315	Yellow clay, little sand & gravel
316-345	Sand, gravel with gray & yellow clay
	(PERFORATED CASING)
340-553	Clay & shale with little sand & gravel
554-651	Black & gray basalt
	(PERFORATED CASING)
652-684	Sand, gravel & little clay
685-701	Brown sand-rock & clay
	(PERFORATED CASING)
702-729	Clay, shale & sand
730-738	Blue sand-rock
	(PERFORATED CASING)
739-752	Shale & clay with sand
753-775	Blue sand, little gravel with clay
	(PERFORATED CASING)
776-829	Gray & blue clay with shale
830-917	Black basalt with shale & sand
	(PERFORATED CASING)
918-952	Blach basalt
952-966	Clay, sand & basalt

Ground Water Contamination Susceptibility Assessment Survey Form

Version 2.1

MPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : CITY OF SELAH

Water system name : CITY OF SELAH

County: YAKIMA

Water system number: 774006 Source number: SO#6 (S.0.6)

Well depth: 1,011 (ft.) (*From WFI form*)

Source name: WELL #7

WA well identification tag number: ___ ___ ___-___ ___ ___

_____ well not tagged

Number of connections: 1682 (ALL CONNECTIONS) Population served: 5,110

Township: 14 Range: 18

Section: 38 1/4 1/4 Section: NE - NW

Latitude/longitude (if available): 49°39'15" / 120°31'48"

How was lat./long. determined?

_____ global positioning device _____ survey __X__ topographic map

____other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 11 / ___ / 94 month/day/year

last reconstruction: ___ / ___ /___ month/day/year

_____ information unavailable

2) Well driller: AQUA DRILLING & ENGINEERING 3130 15TH AVE ALBANY, OR 97321

___ well driller unknown

3) Type of well:

___Drilled: X rotary ___ bored ___ cable (percussion) ___ Dug

___ Other: ___ spring(s) ___ lateral collector (Ranney)

___ driven ___ jetted ___ other: _____

Additional comments: _____

4) Well report available? X YES (attach copy to form) ___ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 1,550 (gallons/min)

Source of information: _____

If not documented, how was pumping rate determined? FLOW TEST

___ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

X disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

TO MAINTAIN RESIDUAL IN DISTRIBUTION SYSTEM

7) If source is chlorinated, is a chlorine residual maintained: X YES ___ NO

Residual level: .5 (*at the point closest to the source.*)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20–50 ft ___ 50–100 ft ___ 100–200 ft X > 200 ft

___ information unavailable ('< ' *means less than;* '> ' *means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft ___ 20–50 ft ___ 50–100 ft ___ > 100 ft

X flowing well/spring (artesian)

How was water level determined?

X well log ___ other: _____

___ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

15 psi (pounds per square inch)

or

_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES X NO

5) Wellhead elevation (height above mean sea level): 1120 (ft)

How was elevation determined? X topographic map ___ Drilling/Well Log ___ altimeter

___ other: VARIFIED BY SURVEY

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

X evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? X YES ___ NO

___ information unavailable

7) Sanitary setback:

___ < 100 ft* ___ 100–120 ft ___ 120–200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

___ wellhead enclosed in a wellhouse STILL IN DESIGN STAGE

___ controlled access (describe): _____

_____

___ other uses for wellhouse (describe): _____

_____

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('<' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('<' *means less than*)

X > 18 ft NEAT CEMENT ('>' *means greater than*)

___ depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

X < 10 in/yr ___ 10–25 in/yr ___ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 500MIL (gallons)

How was this determined?

___ meter

_X_ estimated: ___ pumping rate (_____)

___ pump capacity (_____)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 800 (ft)

1 year ground water travel time : 1,140 (ft)

5 year ground water travel time: 2,540 (ft)

10 year ground water travel time: 3,590 (ft)

Information available on length of screened/open interval?

__ YES __ NO

Length of screened/open interval: _____(ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES _X_ NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES _X_ NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	____
stormwater injection wells	____	____	____	____
other injection wells	____	____	____	____
abandoned ground water well	____	____	____	____
landfills, dumps, disposal areas	____	____	____	____
known hazardous materials clean-up site	____	____	____	____
water system(s) with known quality problems	____	____	____	____
population density > 1 house/acre	X	X	X	X
residences commonly have septic tanks	X	X	X	X
Wastewater treatment lagoons	____	____	____	____
sites used for land application of waste	____	____	____	____

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

_____

_____

_____

_____

_____

_____

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	___
< 2 mg/liter nitrate	___	___
2-5 mg/liter nitrate	___	___
> 5 mg/liter nitrate	___	___
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	X
VOCs never detected	X	___
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	___
___ EDB/DBCP tests required but not yet completed		
___ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected	___	___
(pesticides and other synthetic organic chemicals)		
___ Other SOC tests performed but none detected		
(list test methods in comments		
___ Other SOC tests not performed		

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

___ YES X NO

Describe with references to map produced in Part IV:

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

X YES ___ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

___ YES X NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES X NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	X	___
6 month–1 year travel time	___	X	___
1–5 year travel time	___	X	___
5–10 year travel time	___	X	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	X	___
1–5 year travel time	___	X	___
5–10 year travel time	___	X	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Suggestions and Comments

Did you attend one of the susceptibility workshops? ___ YES ___ NO

Did you find it useful? ___ YES ___ NO

Did you seek outside assistance to complete the assessment? ___ YES ___ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : City of Selah

Water system name : City of Selah

County: Yakima

Water system number: 77400 Source number: S07

Well depth: 670 (ft.) (*From WFI form*)

Source name: Well #8

WA well identification tag number:_ ___ ___-_ _ _

_____ well not tagged

Number of connections: 3,087 Population served: 7,718

Township: 14 N. Range: 18 E. W.M.

Section: 35 1/4 1/4 Section: SW/SE

Latitude/longitude (if available): 1631380.59 E / 480539 .96 N

How was lat./long. determined?

_____ global positioning device ___X___ survey _____ topographic map
___other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 4 / 7 / 2010 month/day/year

last reconstruction: __ / __ / __ month/day/year

_____ information unavailable

2) Well driller: Schneider Equipment, Inc.

__ well driller unknown

3) Type of well:

__Drilled: _X_ rotary __ bored __ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other:

Additional comments: _____

4) Well report available? _X_ YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 1,100 (gallons/min)

Source of information: Water Well Report

If not documented, how was pumping rate determined? _____

__ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

_X_ disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Control of coliform bacteria

7) If source is chlorinated, is a chlorine residual maintained: _X_ YES __ NO

Residual level: 1.0 ppm (*At the point closest to the source.*)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

__ < 20 ft __ 20–50 ft __ 50–100 ft __ 100–200 ft _X_ >200 ft

__ information unavailable ('<' *means less than;* '>' *means greater than*)

2) Depth to ground water (static water level):

__ < 20 ft __ 20–50 ft __ 50–100 ft __ >100 ft

_X_ flowing well/spring (artesian)

How was water level determined?

_X_ well log __ other: _____

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_1/2_ feet above ~~wellhead~~ ground

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: __ YES _X_ NO

5) Wellhead elevation (height above mean sea level): 1,121 (ft)

How was elevation determined? __ topographic map __ Drilling/Well Log __ altimeter

_X_ other: Survey

__ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_X_ evidence of a confining layer in well log

__ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? _X_ YES __ NO

__ information unavailable

7) Sanitary setback:

__ < 100 ft* _X_ 100-120 ft __ 120-200 ft __ > 200 ft

* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

_X_ wellhead enclosed in a wellhouse

__ controlled access (describe): _____

_____

__ other uses for wellhouse (describe): _____

_____

__ no wellhead control

9) Surface seal:

__ 18 ft

__ < 18 ft (no Department of Ecology approval) ('<' *means less than*)

__ < 18 ft (Approved by Ecology, include documentation) ('<' *means less than*)

_X_ > 18 ft ('>' *means greater than*)

__ depth of seal unknown

__ no surface seal

10) Annual rainfall (inches per year):

_X_ < 10 in/yr __ 10-25 in/yr __ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 177,577,000 (gallons)

How was this determined?

__ meter

__ estimated: __ pumping rate (_____)

__ pump capacity (_____)

_X_ other: Maximum annual water right capacity

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 360 (ft)

1 year ground water travel time : 510 (ft)

5 year ground water travel time: 1,140 (ft)

10 year ground water travel time: 1,610 (ft)

Information available on length of screened/open interval?

_X_ YES __ NO

Length of screened/open interval: 170 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? __ YES _X_ NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? __ YES _X_ NO (mark and identify on map).

Comments: _____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	X	X	X	
stormwater injection wells				X
other injection wells				X
abandoned ground water well				X
landfills, dumps, disposal areas				X
known hazardous materials clean-up site				X
water system(s) with known quality problems				X
population density > 1 house/acre	X	X	X	
residences commonly have septic tanks				X
wastewater treatment lagoons				X
sites used for land application of waste				X

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES
Results greater than MCL	
< 2 mg/liter nitrate	X
2-5 mg/liter nitrate	
> 5 mg/liter nitrate	
Nitrate sampling records unavailable	

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES
Results greater than MCL or SAL	
VOCs detected at least once	X
VOCs never detected	
VOC sampling records unavailable	

C. EDB/DBCP: (EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)	YES
EDB/DBCP detected below MCL at least once	
EDB/DBCP detected above MCL at least once	
EDB/DBCP never detected	
EDB/DBCP tests required but not yet completed	
EDB/DBCP tests not required	X

D. Other SOCs (Pesticides):	YES
Other SOCs detected (pesticides and other synthetic organic chemicals)	
Other SOC tests performed but none detected (list test methods in comments)	X
Other SOC tests not performed	

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: WA SOC Short List, EPA Test Method 515.4, EPA Test Method 531.2

E. Bacterial contamination: YES

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)..... X

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source..... _____

Source sampling records for bacteria unavailable ..... _____

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

X YES __ NO

Describe with references to map produced in Part IV:

There is a steep hillside to the west with residential homes above, as shown in the attached map.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

X YES __ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

__ YES X NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

__ YES X NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within:

	YES	NO	unknown
< 6 month travel time	X		
6 month–1 year travel time		X	
1–5 year travel time		X	
5–10 year travel time		X	

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within:

	YES	NO	unknown
< 1 year travel time		X	
1–5 year travel time		X	
5–10 year travel time		X	

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

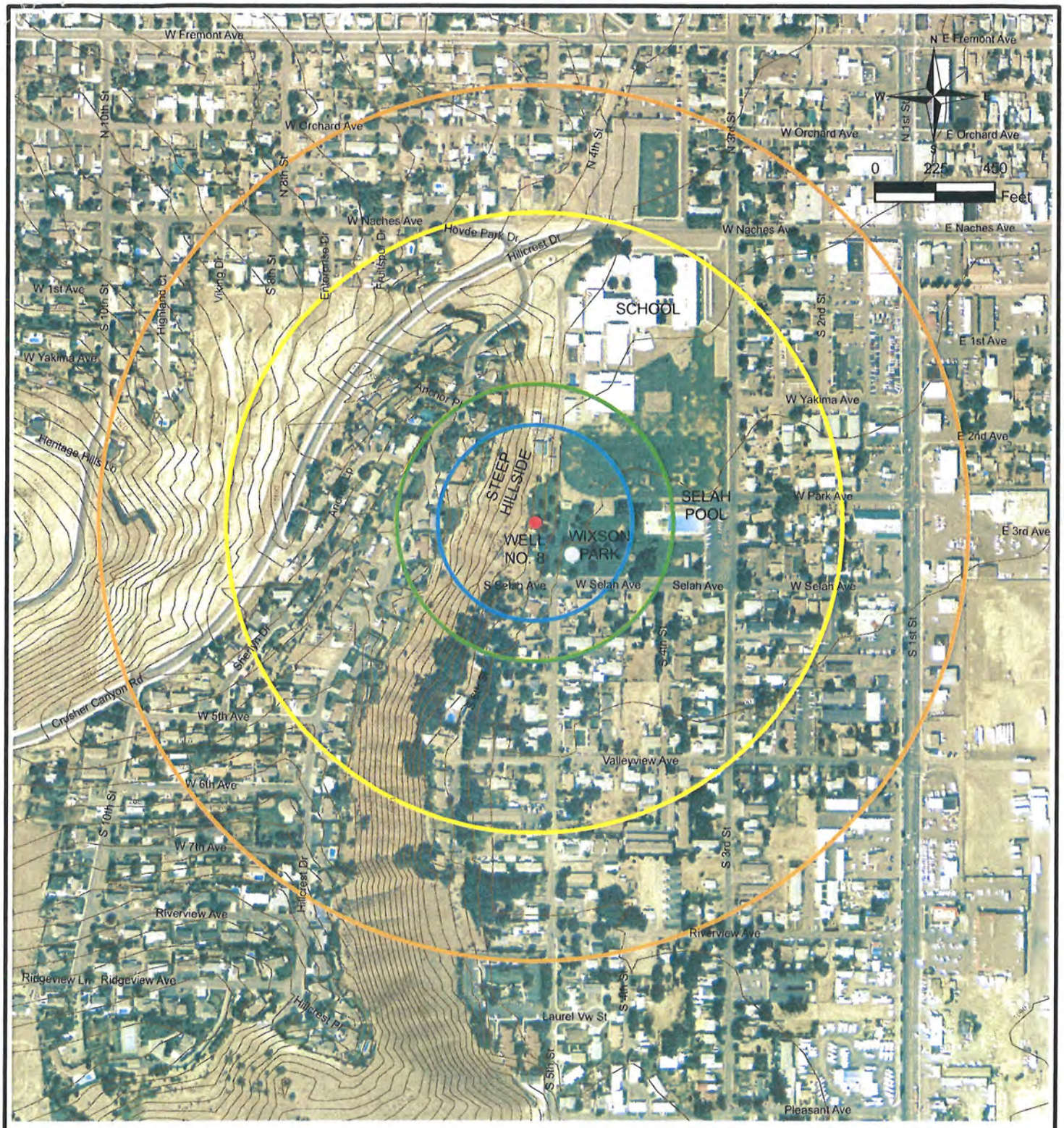
Suggestions and Comments

Did you attend one of the susceptibility workshops? __ YES _X_ NO

Did you find it useful? __ YES __ NO

Did you seek outside assistance to complete the assessment? __ YES _X_ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.



LEGEND

- WELL NO. 8
- 6 MONTH TRAVEL TIME
- 1 YEAR TRAVEL TIME
- 5 YEAR TRAVEL TIME
- 10 YEAR TRAVEL TIME

CITY OF SELAH

WELL NO. 8
SUSCEPTIBILITY ASSESSMENT SURVEY

CALCULATED FIXED RADIUS (CFR)

Huibregtse, Louman Associates, Inc.
CIVIL ENGINEERING • LAND SURVEYING • PLANNING

5-12-2010
P:\arcview\2006\06042\Well No. 8 CFR Map.mxd

FIGURE 1

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
1500 West 4th Avenue, Suite 305 • Spokane, Washington 99201
Phone: (509) 456-3115
FAX: (509) 456-2997

October 14, 2008

RECEIVED
OCT 17 2008
Huibregtse Louman Associates, Inc.

Daniel T. Jones, Public Works Foreman
City of Selah
113 S 2nd St
Selah WA 98942

Subject: Selah, City of, Water System; PWS ID # 774006, Yakima County
Well Site Inspection for Proposed Source No. 8

Dear Mr. Jones:

On September 5, 2008, John Wilson (Yakima Health District) conducted a well site inspection with Terry Alapeteri (Huibregtse Louman Associates, Inc.) for your proposed Well No. 8. The new well will be located in Wixson Park per the attached exhibit. **The proposed well location is satisfactory**.

Each new source must meet the minimum requirements listed under WAC 246-290-130 Source Approval. A *Source Approval Information* packet is enclosed for your use to assist you in the source approval process.

Please contact me at (509) 456-3186, if you have any questions regarding this letter.

Sincerely,

Michael D. Wilson, PE
Regional Engineer
Office of Drinking Water
Division of Environmental Health

Enclosure: Well Site Inspection Form
Wixson Park Exhibit
Source Approval Information Packet

cc: Yakima Health District
Terry D. Alapeteri, PE, Huibregtse Louman Associates, Inc.

14.
REGIONAL WELLHEAD PROTECTION PLAN INTERLOCAL AGREEMENT AND UPDATES

HLA
Engineering and Land Surveying, Inc.

INTERLOCAL AGREEMENT

This agreement is made and entered into between Yakima County, hereinafter referred to as the COUNTY, and the following jurisdictions: the City of Moxee, the Town of Naches, the City of Selah, the Town of Tieton, the City of Yakima, the City of Union Gap, and the Nob Hill Water Association.

The purpose of the agreement is to establish responsibilities for the maintenance of the regional Wellhead Protection Plan developed by the aforementioned water purveyors under an Interlocal Agreement established in 1997 and funded by a Washington State Department of Ecology Centennial Clean Water Fund grant.

WHEREAS, the Washington State Legislature has provided for the formation of interlocal agreements, as established in Chapter 39.34, RCW; and,

WHEREAS, Section 1428 of the 1986 Amendments to the federal Safe Drinking Water Act mandates that every state develop a wellhead protection program, and that the state Drinking Water Act requires that all *Group A* water systems using ground water as their source implement a Wellhead Protection Program; and,

WHEREAS, these water purveyors prepared a Regional Wellhead Protection Plan in 1998 financed by a 75 percent grant from the Washington State Department of Ecology (DOE) Centennial Clean Water Fund; and,

WHEREAS, the County, Moxee, Naches, Selah, Tieton, Yakima, Union Gap, and Nob Hill are individually and collectively concerned with responsible wellhead protection in their communities, and in particular fulfilling continuing Wellhead Protection plan maintenance requirements by the Washington State Department of Health (DOH) detailed in WAC 246-290-135; and,

WHEREAS, the County has been requested by these seven water purveyors in Yakima County to act on their behalf to coordinate the regional efforts detailed in the plan;

NOW, THEREFORE, in consideration of the mutual benefits to be derived from this agreement, the County and the seven water purveyors, the undersigned entities, agree as follows:

1. DEFINITIONS

A. "Regional Wellhead Protection Committee (RWPC)" means the committee consisting of one member from the County and one member from each of the seven water purveyors selected to represent their jurisdiction during the development of the plan.

B. "Upper Yakima Valley" means that part of the Yakima Valley lying north of Ahtanum Ridge and the Rattlesnake Hills and south of South Umptanum Ridge.

C. "Participants" mean Yakima County, the City of Moxee, the Town of Naches, the City of Selah, the Town of Tieton, the City of Yakima, the City of Union Gap, and the Nob Hill Water Association.

D. "The County" means Yakima County Public Works, Planning, Geographical Information Services, Information Services, Health District, Local Emergency Planning Committee and any other pertinent divisions discussed herein. Additionally, Yakima County exists both as the regional coordinator and as a local participant in the RWPC.

E. "Wellhead Protection Plan (WHPP)" means the Upper Yakima Valley Wellhead Protection Plan developed under a 1997 Department of Ecology Centennial Clean Water grant.

F. "Wellhead Protection Area (WHPA)" means the delineated zone within which lie potential contamination sources that must be managed in order to protect the groundwater supplies.

2. RESPONSIBILITIES

A. Each jurisdiction shall support the County as lead agency, and coordinator for the plan maintenance process, by authorization of the legislative body to enter into this agreement.

B. Each jurisdiction agrees to provide a proportional share of the local match as defined in Article 3.

C. Each jurisdiction shall designate, in writing, an RWPC member to represent their jurisdiction for the continuing maintenance and evolution of the Plan. Each jurisdiction shall notify the County, in writing, upon any change in the appointment of its Committee member.

D. The RWPC shall biannually elect by majority vote a Committee Chairperson, the term of which shall extend two calendar years from January 1 to December 31. The Chairperson shall be responsible for the following:

1. Coordination and development of semi-annual meeting times and locations with RWPC members and guests;
2. Development of a meeting agenda, including status of the plan and any new management strategies that should be discussed;
3. Chairmanship of meetings including opening and closing addresses and discussion coordination; and

4. Dissemination of meeting minutes following each meeting.

The County shall assume the Committee Chairmanship for the first biennial period (2000-2001).

E. The County will execute and coordinate the regional management efforts detailed in the WHPP, including, but not limited to, the following:

1. Coordination and perpetuation of the regional water quality and potential contaminant source inventory at least biennially, including updates of local inventories to be provided by each community;
2. Incorporation of GPS-located wells and septic tanks supplied by Yakima County Health District into the GIS database at least biennially;
3. Incorporation of Washington State Department of Health sanitary survey information into the GIS database at least biennially;
4. Incorporation of Washington State Department of Ecology hazardous materials assistance sweep information into the GIS database at least biennially;
5. Development of a zoning overlay of the WHPAs to be used as a planning trigger for more thorough information-gathering during review of building permits, plat and zoning changes, and other planning efforts within the purview of Yakima County as detailed in the plan;
6. Maintenance of a WHPP internet website by Yakima County Information Services;
7. Coordination of contingency planning efforts with the Local Emergency Planning Committee;
8. Attendance and participation in semi-annual meetings;
9. Assumption of interim chairperson status for the 2000-2001 term;
10. Coordination with the Educational Services District, Yakima River Watershed Council, and other agencies, entities, and service groups for the dissemination of wellhead protection literature, videos, and other public education paraphernalia;
11. Maintenance of wellhead protection area signs within County jurisdiction, and maintenance of wellhead protection signs within other RWPC community jurisdictions on request, and at a cost agreed to by both parties;
12. Dissemination of notification to all potential contamination sources at least biennially;
13. Coordination of all state agency, local agency, and consultant participation that may be needed throughout the perpetuation of the plan; and
14. Other lead agency activities that may be required to ensure compliance with WAC 246-290-135.

F. The local jurisdictions will execute and coordinate the local management efforts detailed in the Regional Wellhead Protection Management Plan and will coordinate with Yakima County all regional efforts discussed in the plan, including, but not limited to, the following:

1. Attendance and active participation at RWPC meetings;
2. Dissemination of information on the status of the wellhead protection planning efforts of the RWPC to their respective legislative bodies;
3. Development of a zoning overlay of the WHPAs to be used as a planning trigger for more thorough information-gathering during review of building permits, plat and zoning changes, and other planning efforts within the purview of the jurisdiction as detailed in the plan;
4. Maintenance of a local potential contaminant inventory to be distributed to Yakima County at each semi-annual RWPC meeting for storage and update into the regional database at least biennially;
5. Presentation of an annual seminar to at least one grade, middle, or high school in the Upper Yakima Valley on wellhead protection planning efforts;
6. Dissemination of notification to all local potential contamination sources within the WHPAs; and
7. Maintenance of wellhead protection area signs within each community's local jurisdiction.

3. LOCAL MATCH

Each participant understands that the regional efforts administered by Yakima County will be funded through proportionate local matches by each community on an annual basis for the tasks described previously. Annual costs for each biennial reporting period shall be developed by the County and approved by a majority of the RWPC.

4. TERMINATION

Any participant may terminate its obligation herein by providing written notice to the County.

5. LIMITATIONS OF COUNTY ADMINISTRATION

From the time of termination of this agreement, the implementation, administration, and amendment of each participant's portion of the plan shall be the sole responsibility of that participant.

6. EFFECTIVE DATE AND DURATION OF AGREEMENT

This agreement shall be effective upon the date the plan is approved by DOE and DOH.

This agreement shall be in effect indefinitely or until amended or duly terminated.

In Witness Whereof, this agreement is hereby executed, on behalf of their respective jurisdictions, by the below signed individuals, who are so authorized to encumber their jurisdictions.

City of Moxee

Greg LaBree

Mayor Greg Labree

10-13-00

Date

Town of Naches

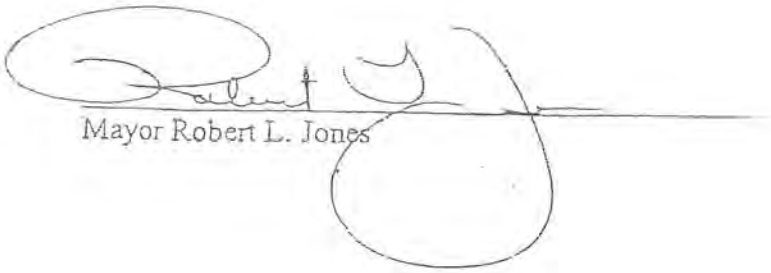
C.B. Ross

Mayor Charles Ross

October 10, 2000

Date

City of Selah

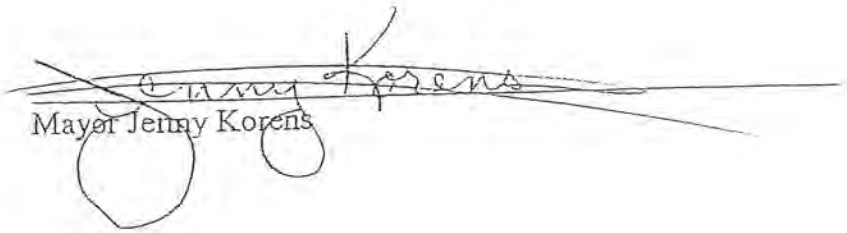


Mayor Robert L. Jones

11/14/00

Date

Town of Tieton



Mayor Jenny Korens

10-16-07
Date

City of Yakima

Richard A. Zais, Jr., City Manager

November 8, 2000
Date

Attest:

Karen S Roberts
City Clerk

November 8, 2000
Date

City Contract No. 2000-89
Resolution No. R-2000-139

City of Union Gap

Aubrey C. Reeves, Jr. Mayor

Mayor Aubrey C. Reeves, Jr.

11-3-00

Date

Nob Hill Water Association

Melvin H. Carlson, President, Board of Directors

10-10-00
Date

Yakima County Board of Commissioners

Excused
Jesse S. Palacios, Chairman

October 17, 2000
Date

Bettie Ingham
Bettie Ingham, County Commissioner

October 17, 2000
Date

James M. Lewis
James M. Lewis, County Commissioner

October 17, 2000
Date

Approved as to Form

Ron Zickle
Ron Zickle, Deputy Prosecuting Attorney

10/13/00
Date

BOARD OF YAKIMA COUNTY COMMISSIONERS STATE OF WASHINGTON SEAL OF THE

Attest: Sylvia E. Hinojosa

Sylvia E. Hinojosa
Clerk of the Board

October 17, 2000
Date

Upper Yakima Valley Regional Wellhead Protection Program

For more information please contact:

Yakima County
(509) 574-2300

City of Yakima
(509) 575-6154

City of Union Gap
(509) 248-0432

City of Selah
(509) 698-7365

City of Moxee
(509) 575-8851

Nob Hill Water Association
(509) 966-0272

City of Tieton
(509) 673-3162

Town of Naches
(509) 653-2647

Department of Health
(509) 456-3115

December 13, 2019

Jamie Gardipe
Regional Planner
Washington State Department of Health
Eastern Drinking Water Operations
River View Corporate Center
16201 East Indiana Avenue
Suite 1500
Spokane Valley, WA 99216

RE: Upper Yakima Valley Regional Wellhead Protection Program

Dear Jamie,

The Upper Yakima Valley Regional Wellhead Protection Committee has completed our 2019 update. The update included completion of the following items:

- Completed windshield surveys of well site wellhead protection areas.
- Updated the inventory on the County's GIS database.
- Mailed letters to each of the potential contaminate sources located within each wellhead protection area (attached).
- Reviewed information posted on Wellhead Protection website for accuracy and appropriateness for public information at http://www.yakimacounty.us/584/Wellhead-Protection
- Reviewed current Exceedance Map and continue to monitor trends.

The Town of Naches has been actively involved in previous committee updates, but was unable to participate this year. They currently do not have any potential contaminate sites within any of their wellhead protection areas. We'll look forward to their participation with the next update in 2021.

If you have any questions or if you need additional information, please let me know.

Sincerely,

Mike Shane
Water/Irrigation Engineer
City of Yakima

Upper Yakima Valley Regional Wellhead Protection Program

For more information please contact:

Yakima County
(509) 574-2300

City of Yakima
(509) 575-6154

City of Union Gap
(509) 248-0432

City of Selah
(509) 698-7365

City of Moxee
(509) 575-8851

Nob Hill Water Association
(509) 966-0272

City of Tieton
(509) 673-3162

Town of Naches
(509) 653-2647

Department of Health
(509) 456-3115

December 3, 2019

Dear Property Owner or Business Owner:

The Regional Wellhead Protection Committee (RWPC) was formed by eight water purveyors in the Upper Yakima Valley including the City of Yakima in 1996 in response to Washington State Department of Health (DOH) wellhead protection planning requirements. The RWPC and the City of Yakima are taking a proactive approach to wellhead protection planning to ensure that each community's groundwater supplies are adequately protected from potential contamination sources on the ground surface. The purpose of this letter is to notify you of the location of your business within one of the City's wellhead protection areas and provide you with information on how you can help protect the City's drinking water supplies.

Wellhead protection planning includes the following four elements:

- Development of wellhead protection areas, or areas which may be susceptible to contamination
- Identification of potential contamination sources, which include septic tanks, underground storage tanks, abandoned wells, and certain businesses
- Coordination of management efforts to help minimize the impact of potential contamination sources, including posting of signs, distribution of literature, and public education efforts
- Development of contingency planning to ensure that prompt response procedures are in place in the event that a well becomes contaminated

The RWPC and the City understand that most business owners recognize the need to protect the environment in and around your business. We hope that informing you of the location of business within the City's wellhead protection area will result in an increase in precautions to ensure your activities do not adversely impact our drinking water supply. The following practices can greatly reduce the threat of contamination to groundwater supplies:

- Recycle all hazardous wastes used on the premises including solvents, paints, cleaners, printing supplies, or other chemicals through Yakima County's free small quantity generator or recycling programs (574-2450).
- Reduce the amount of hazardous waste used through waste minimization efforts. Free literature on waste minimization is available from the Department of Ecology (DOE) and your local water purveyor.
- Conserve water whenever possible. Water conservation reduces waste volumes and reduces the threat of contaminant transport.

For more information or to view your location in the WHPA, please visit the RWPC Website at:

http://www.yakimacounty.us/584/Wellhead-Protection

Sincerely,

Water/Irrigation Engineer
City of Yakima

c/o Yakima County Public Works - 128 North 2nd Street, Room 408 - Yakima, Washington 98901-2614

Upper Yakima Valley Regional Wellhead Protection Program

For more information please contact:

Yakima County
(509) 574-2300

City of Yakima
(509) 575-6154

City of Union Gap
(509) 248-0432

City of Selah
(509) 698-7365

City of Moxee
(509) 575-8851

Nob Hill Water Association
(509) 966-0272

City of Tieton
(509) 673-3162

Town of Naches
(509) 653-2647

Department of Health
(509) 456-3115

December 4, 2019

Dear Property owner or Resident:

The purpose of this letter is to inform you that your property is located within a wellhead protection area of the County's Terrace Heights Water System, and to provide you with information on how you can help protect the Terrace Heights drinking water supply.

The Upper Yakima Valley Wellhead Protection Committee and Yakima County understand that most property owners recognize the need to protect the environment. We hope that by informing you that your property is located within a wellhead protection area that you will take additional precautions to ensure your activities do not adversely impact our drinking water supply. The following practices can greatly reduce the threat of contamination to groundwater supplies:

- Recycle all household cleaners, paint thinner, motor oil, pesticides, antifreeze, batteries, and other chemicals at free local collection points throughout the valley. Contact Yakima County Solid Waste Division at 574-2450 for locations, drop times, and materials accepted.
- Reduce the amount of hazardous waste used through waste minimization efforts. Free literature on waste minimization is available from the Department of Ecology (DOE) and the City of Yakima.
- Conserve water whenever possible. Water conservation reduces waste volumes and reduces the threat of contaminant transport.

For more information, you may contact me at 574-2300 or visit the RWPC Website at: http://www.yakimacounty.us/584/Wellhead-Protection

Sincerely,

Joe Stump, P.E.
Utilities Manager
Yakima County Public Services

c/o Yakima County Public Services - 128 North 2nd Street, 4th Floor - Yakima, Washington 98901-2614

UG PUBLIC WORKS NEWSLETTER ARTICLES ~ *Revised 11.14.19*

Important Notice to all Union Gap Property Owners, Business Owners and/or Residents:

In 1996, the Regional Wellhead Protection Committee (RWPC) was formed by eight (8) water purveyors in the Upper Yakima Valley, including the City of Union Gap, under the leadership of Yakima County (YC) in response to Washington State Department of Health (DOH) wellhead protection planning requirements.

The RWPC and the City are taking a proactive approach to wellhead protection planning to ensure that each community's groundwater supplies are adequately protected from potential contamination sources on the ground surface.

The purpose of this letter is to notify you of the location of your parcel, within the City's wellhead protection area, and provide you with information on how you can help protect the City's drinking water supplies.

Wellhead protection planning includes four (4) elements, as follows:

1. Development of wellhead protection area, or areas, which may be susceptible to contamination;
2. Development of contingency planning to ensure that prompt response procedures are in place in the event a well becomes contaminated;
3. Identification of potential contamination sources, which include septic tanks, underground storage tanks, abandoned wells, and certain businesses; and
4. Coordination of management efforts to help minimize the impact of potential contamination sources, including posting of signs, distribution of literature, and public education efforts.

The RWPC and the City understand that most property owners, business owners and residents recognize the need to protect the environment in and around their property. We hope that informing you of your location within the City's wellhead protection area will result in an increase in precautions to ensure your activities do not adversely impact our drinking water supply. The following practices can greatly reduce the threat of contamination to groundwater supplies:

- Recycle all hazardous wastes used on the premises, including solvents, paints, paint thinner, printing supplies, and/or other known chemicals through Yakima County's free small quantity generator or recycling programs or other free local collection points throughout the valley. Contact YC Solid Waste Division at 509.574.2450 for locations, drop times, and materials accepted.
- Reduce the amount of hazardous waste used through waste minimization efforts. Free literature on waste minimization is available from the Department of Ecology (DOE) and Union Gap Public Works Administration at 509.225.3524.
- Conserve water whenever possible; water conservation reduces waste volumes and reduces the threat of contaminant transport.

For more information, or to view your location in the WHPA, please visit the RWPC Website at http://www.yakimacounty.us/668/City-of-Union-Gap-Wellhead-Protection-Pl

Sincerely,

CITY OF UNION GAP
Dennis Henne, Director
Public Works & Community Development

Notification: 4th Quarter 2019

Upper Yakima Valley Regional Wellhead Protection Program

November 25, 2019

For more information please contact:

Yakima County
(509) 574-2300

City of Yakima
(509) 575-6154

City of Union Gap
(509) 248-0432

City of Selah
(509) 698-7369

City of Moxee
(509) 575-8851

Nob Hill
Water Association
(509) 966-0272

Town of Tieton
(509) 673-3162

Town of Naches
(509) 653-2647

Department of Health
(509) 456-3115

Dear Property Owner or Resident:

The Regional Wellhead Protection Committee (RWPC) was formed by eight water purveyors in the Upper Yakima Valley including Nob Hill Water in 1996 in response to Washington State Department of Health (DOH) wellhead protection planning requirements. The RWPC and Nob Hill Water are taking a proactive approach to wellhead protection planning to ensure that each community's groundwater supplies are adequately protected from potential contamination sources on the ground surface. The purpose of this letter is to notify you of the location of your property or business within one of Nob Hill Water's wellhead protection areas and provide you with information on how you can help protect the community's drinking water supplies.

Wellhead protection planning includes the following four elements:

1. development of wellhead protection areas, or areas which may be susceptible to contamination
2. identification of potential contamination sources, which include septic tanks, underground storage tanks, abandoned wells, and certain businesses
3. coordination of management efforts to help minimize the impact of potential contamination sources, including posting of signs, distribution of literature, and public education efforts
4. development of contingency planning to ensure that prompt response procedures are in place in the event that a well becomes contaminated

The RWPC and Nob Hill Water understand that most property and business owners recognize the need to protect the environment. We hope that informing you of the location of your property or business within Nob Hill Water's wellhead protection area will result in an increase in precautions to ensure your activities do not adversely impact our drinking water supply. The following practices can greatly reduce the threat of contamination to groundwater supplies:

- Recycle all hazardous wastes used on the premises including solvents, paints, cleaners, printing supplies, or other chemicals through Yakima County's free small quantity generator or recycling programs (574-2450).
- Reduce the amount of hazardous waste used through waste minimization efforts. Free literature on waste minimization is available from the Department of Ecology (DOE) and the City of Yakima.
- Conserve water whenever possible. Water conservation reduces waste volumes and reduces the threat of contaminant transport.

For more information, you may contact me at 966-0272 or visit the RWPC Website at http://www.yakimacounty.us/584/Wellhead-Protection

Sincerely,

NOB HILL WATER ASSOCIATION

David W. England
Assistant Manager

c/o Yakima County Public Works · 128 North 2nd Street, Room 408 · Yakima, Washington 98901-2614

CITY OF SELAH
PUBLIC WORKS
222 S Rushmore Rd.
Selah, WA 98942

BUS: (509) 698-7365
FAX: (509) 698-7372

November 22, 2019

Dear Property Owner or Resident:

The Regional Wellhead Protection Committee (RWPC) was formed by eight water purveyors in the Upper Yakima Valley including the city of Selah in 1996 in response to Washington State Department of Health (DOH) wellhead protection planning requirements. The RWPC and the City are taking a proactive approach to wellhead protection planning to ensure that each community's groundwater supplies are adequately protected from potential contamination sources on the ground surface. The purpose of the Wellhead Protection Plan is to inform the public they are in or near a wellhead protection area and to inform you of this program and provide information on how you can help protect your City's drinking water supplies.

Wellhead protection planning includes the following four elements:

- Development of wellhead protection areas, or areas which may be susceptible to contamination.
- Identification of potential contamination sources, which include septic tanks, underground storage tanks, abandoned wells, and certain businesses.
- Coordination of management efforts to help minimize the impact of potential contamination sources, including posting of signs, distribution of literature, and public education efforts.
- Development of contingency planning to ensure that prompt response procedures are in place in the event that a well becomes contaminated.

The RWPC and the City understand that most homeowners recognize the need to protect the environment in and around their residence. We hope that informing you of your location within the City's wellhead protection area will result in an increase in precautions to ensure your activities do not adversely impact our drinking water supply. The following practices can greatly reduce the threat of contamination to groundwater supplies:

- Recycle all household cleaners; paint thinner, motor oil, pesticides, antifreeze, batteries, and other chemicals at Free local collection points throughout the valley. Contact Yakima County Solid Waste Division at 574-2450 for locations drop times, and materials accepted.
- Do not dispose of any oil, antifreeze; paint thinner, or other chemicals on the ground.
- Use natural fertilizers, pesticides, and herbicides whenever possible.

For more information or to view your location in the WHPA, please visit the RWPC Website at:
www.yakimacounty.us/584/wellheadprotection

Very Truly Yours,

Ty Jones
Public Works Supervisor

Upper Yakima Valley Regional Wellhead Protection Program

For more information please contact:

Yakima County
(509) 574-2300

City of Yakima
(509) 575-6154

City of Union Gap
(509) 248-0432

City of Selah
(509) 698-7369

City of Moxee
(509) 575-8851

Nob Hill Water Association
(509) 966-0272

City of Tieton
(509) 673-3162

Town of Naches
(509) 653-2647

Department of Health
(509) 456-3115

December 9, 2019

Dear Property Owner or Resident:

The Regional Wellhead Protection Committee (RWPC) was formed by eight water purveyors in the Upper Yakima Valley including the City of Moxee in 1996 under the leadership of Yakima County in response to Washington State Department of Health (DOH) wellhead protection planning requirements. The RWPC and the City are taking a proactive approach to wellhead protection planning to ensure that each community's groundwater supplies are adequately protected from potential contamination sources on the ground surface. The purpose of this letter is to notify you of the location of your residence or business within the City's wellhead protection area and provide you with information on how you can help protect the City's drinking water supplies.

Wellhead protection planning includes the following four elements:

- development of wellhead protection areas, or areas which may be susceptible to contamination
- identification of potential contamination sources, which include septic tanks, underground storage tanks, abandoned wells, and certain businesses
- coordination of management efforts to help minimize the impact of potential contamination sources, including posting of signs, distribution of literature, and public education efforts
- development of contingency planning to ensure that prompt response procedures are in place in the event that a well becomes contaminated

The RWPC and the City understand that most residents and business owners recognize the need to protect the environment in and around their residences and businesses. We hope that informing you of the location of residences and businesses within the City's wellhead protection area will result in an increase in precautions to ensure your activities do not adversely impact our drinking water supply. The following practices can greatly reduce the threat of contamination to groundwater supplies:

- Recycle all hazardous wastes used on the premises, including solvents, paints, cleaners, printing supplies, or other chemicals through Yakima County's free small quantity generator or recycling programs (574-2450).
- Reduce the amount of hazardous waste used through waste minimization efforts. Free literature on waste minimization is available from the Department of Ecology (DOE) and your local water purveyor.
- Conserve water whenever possible. Water conservation reduces waste volumes and reduces the threat of contaminant transport.

For more information or to view your location in the WHPA, please visit the RWPC Website at:

http://www.yakimacounty.us/584/Wellhead-Protection

Very Truly Yours,

Byron Adams
City of Moxee, Public Works Director

c/o Yakima County Public Works - 128 North 2nd Street, Room 408 - Yakima, Washington 98901-2614

Upper Yakima Valley Regional Wellhead Protection Program

December 09, 2019

For more information Please contact:

Yakima County
(509) 574-2300

City of Yakima
(509) 575-6154

City of Union Gap
(509) 248-0432

City of Selah
(509) 698-7369

City of Moxee
(509) 575-8851

Nob Hill Water Association
(509) 966-0272

City of Tieton
(509) 673-3162

Town of Naches
(509) 653-2647

Department of Health
(509) 456-3115

Dear Property Owner or Resident:

The Regional Wellhead Protection Committee (RWPC) was formed by eight water purveyors in the Upper Yakima Valley including Nob Hill Water in 1996 in response to Washington State Department of Health (DOH) wellhead protection planning requirements. The RWPC and City of Tieton are taking a proactive approach to wellhead protection planning to ensure that each community's groundwater supplies are adequately protected from potential contamination sources on the ground surface. The purpose of this letter is to notify you of the location of your property or business within one of the City of Tieton's wellhead protection areas and provide you with information on how you can help protect the community's drinking water supplies.

Wellhead protection planning includes the following four elements:

1. Development of wellhead protection areas, or areas which may be susceptible to contamination
2. Identification of potential contamination sources, which include septic tanks, underground storage tanks, abandoned wells, and certain businesses
3. Coordination of management efforts to help minimize the impact of potential contamination sources, including posting of signs, distribution of literature, and public education efforts
4. Development of contingency planning to ensure that prompt response procedures are in place in the event that a well becomes contaminated

The RWPC and City of Tieton understand that most property and business owners recognize the need to protect the environment. We hope that informing you of the location of your property or business within the City of Tieton's wellhead protection area will result in an increase in precautions to ensure your activities do not adversely impact our drinking water supply. The following practices can greatly reduce the threat of contamination to groundwater supplies:

- Recycle all hazardous wastes used on the premises including solvents, paints, cleaners, printing supplies, or other chemicals through Yakima County's free small quantity generator or recycling programs (574-2450).
- Reduce the amount of hazardous waste used through waste minimization efforts. Free literature on waste minimization is available from the Department of Ecology (DOE) and the City of Yakima.
- Conserve water whenever possible. Water conservation reduces waste volumes and reduces the threat of contaminant transport.

For More information, you may contact me at 673-3162 or visit the RWPC Website at http://www.yakimacounty.us/584/Wellhead-Protection

Sincerely,

City of Tieton
Mike Henderson
Public Works Supervisor

Exceedance Map 2016

- Microbiological
- Inorganic Contaminates
- Wellheads
- Streets
- 10 Year wellhead

YAKIMA COUNTY
GEOGRAPHIC INFORMATION SERVICES

Parcel Lot lines are for visual display only. Do not use for legal purposes.

NORTH

Copyright (C) 2017 Yakima County
This map was derived from several databases. The County can not accept responsibility for any errors. Therefore, there are no warranties for this product.

NITRATE-N
5.7mg/L

NITRATE-N
5.17mg/L

TOTAL
COLIFORM

NITRATE-N
6.18mg/L

NITRATE-N
5.41mg/L

Selah 7

Selah 6

Selah 5

Selah 4

Selah 3

Naches 3

Naches 2

Naches 1

TOTAL
COLIFORM

TOTAL
COLIFORM

NITRATE-N
5.88mg/L

TH 1

TOTAL
COLIFORM

NITRATE-N
5.86mg/L

TH 2

TOTAL
COLIFORM

Nob Hill 3

Nob Hill 2

Nob Hill 4

TH 3

TH 6

TH 5

TH 4

TOTAL
COLIFORM

TOTAL
COLIFORM

TOTAL
COLIFORM

NITRATE-N
7.12mg/L

Kiwanis

NITRATE-N
5.9mg/L

Nob Hill 1

TOTAL
COLIFORM

Nob Hill 5

Kissel

NITRATE-N
5.18mg/L

Airport

Union Gap 6

NITRATE-N
8.3mg/L

Nob Hill 7

Union Gap 4

TOTAL
COLIFORM

Union Gap 5

Union Gap 1

Union Gap 3

TOTAL
COLIFORM

Tieton 3

Tieton 1

Tieton 2

Moxee 2

Moxee 3

Moxee 1

NITRAT
5.71mg

0 0.5 1 2 3 4 Miles

Date Saved: 10/25/2017 10:53:59 AM

Path: R:\disk_5\projects\county\pw\wellhead_2017Report\contaminants_17.mxd

YAKIMA COUNTY

GEOGRAPHIC INFORMATION SERVICES

Wellhead Protection Contamination Source Inventory

Date: 10/31/2019

- Wellhead
- 10 Year wellhead
- Potential Contaminate Sites

Yakima County Copyright (C) 2019
This map was derived from several databases. The county cannot accept responsibility for any errors. Therefore, there are no warranties for this product.

Selah Aquatic Center	214 SOUTH THIRD STREET
USPS Selah 547686002	114 E NACHES
Power Clean Systems Inc	208 E NACHES AVE
GRAHAM PACKAGING	510 E NACHES AVE
SELAH ROOFING INC	1104 W CHERRY AVE
WSDOT SR823 Selah Vicinity Re-Route Highway	SR823
WA DSHS Yakima Valley School	609 SPEYERS RD
Tree Top Storm Sewer Improvements	111 S RAILROAD AVE
Road A W Goodlander Rd to Speyers Rd	
TREE TOP INC OF SELAH UST 6550	209 E 5TH AVE
Selah School Dist 119 High School	316 W NACHES AVE
YAKIMA CO OP ASSOCIATION INC	110 E 1ST AVE
207 East Goodlander Rd	207 E GOODLANDER RD
LARSON FRUIT PACKING WENAS AVE	109 N WENAS RD
Tree Top Inc Ross Plant	101 S RAILROAD AVE
Pingrey Motor Co	102 W NACHES AVE
PACIFICORP SELAH SUBSTATION	NE CORNER OF N 11TH ST AND W PEAR AVE
TREE TOP INC SELAH	1500 HARRISON RD
Robert Lince Elementary School	316 W NACHES AVE
BNRR SELAH MP 94 PRINT 401	LS048 SUB3RD PORTLAND DIVISION
NACHES SELAH IRRIGATION DISTRICT	143 E NACHES AVE
SELAH POLE YARD	501 E NACHES AVE
YAKAMA JUICE LLC	1 RAILROAD AVE
Fremont Ave Spill	605 FREMONT AVE

American Red Cross Yakima	302 S 2ND ST
DEL MONTE CORP 125 NPDES	108 W WALNUT
ARREOLAS AUTOMOTIVE INC	300 CHALMERS
Carey Co	311 S 1ST ST
INDEPENDENT FOREIGN AUTO SERVICE	207 E WALNUT
Property on Front Street	309 S FRONT ST
AT&T WIRELESS DOWNTOWN YAKIMA	208 E YAKIMA AVE
YAKIMA HARDWARE COMPANY	226 S 1ST ST
Apple King Processing Plant	113 EMHOFF RD
UNION PACIFIC RAILROAD SECTION 19	2ND & PINE ST
SPRUCE STREET	E SPRUCE ST & S FIAR ST
Freedom Container LLC	2003 ANTHANUM RD
JADE TREE SITE	202 E YAKIMA AVE
YAKIMA CHIEF HOP UNION FGX	227 S FRONT ST
USPS YAKIMA Central 549436014	112 S 3RD ST
YAKIMA TRANSIT	100 S 4TH ST
Senske Lawn Tree Care	6 E CHESTNUT AVE
East Spruce Street Apartments Ph II	1208 E SPRUCE ST
ADVANCED CARPET WAREHOUSE	124 S 2ND ST
BNSF Yakima Warehouse	202 S FRONT ST
Paint & Equipment Supply Inc	401 S 3RD ST
QUAKER STATE MINIT LUBE 1520	301 S 1ST ST
DAVE SCOTT AUTO SERVICE INC	129 S 1ST
Tray Plant	922 N 1ST AVE
TIGER OIL CORPORATION YAKIMA	15 E WALNUT AVE
FIRESTONE MASTER CARE	202 S 1ST ST
US GSA William O Douglas Fed Bldg	25 S 3RD ST
Pactiv Corp Warehouse	221 S FRONT ST
WA AGR Yakima 4	515 S FAIR AVE
YAKIMA FEDERAL SAVINGS & LOAN	24 S 2ND ST
Finish Line Powder Coating LLC	217 S 2ND ST
CAHOON LINCOLN MERCURY	321 S 1ST ST
Lee Peterson Motors	410 S 1ST ST
JOE RICHMOND & DILBERT SOUTHARDS	102 S 1ST ST
YAKIMA CITY KIWANIS WELL	MAPLE ST E OF FAIR AVE
YAKIMA FRUIT & COLD STORAGE CO	N 1ST AVE & B ST
Goodwill City of Yakima	222 S 3RD ST

NW PIPELINE ST YAKIMA	2607 TERRACE HEIGHTS DR
BUSH PROPERTY	5412 MORNINGSIDE DR
Maple Avenue Improvement Project	
Yakima Ridge Phase 2 & 3	N OF SYCAMORE DR & W OF N 57TH
Terrace Heights Elementary School	4300 MAPLE CT

WA DA M Yakima 11	603 N 58TH AVE

Northwest Striping and Sealing LLC	7320 SADDLE BROOK DR
ATT YAKIMA VALLEY CANAL	200 N 72ND AVE
ERICH E F HECHT	216 N 72ND AVE
EVANS FRUIT CO INC SUMMITVIEW	SUMMITVIEW 300 FEET NW OF HATTON
USWCOM Yakima West Co	3 N 72ND AVE

AIRLINE MARKET 080	1002 W WASHINGTON AVE
TAHOMA CEMETARY	1802 TAHOMA AVE
SCHWITZER BUILDING	1916 S 16TH AVE
CobCrafters	1918 S 16TH AVE
Basin A Underground Infiltration	1630 S. 16TH AVENUE
Lewis & Clark Middle School	1114 W PIERCE ST
Perry Tech Maintenance Bldg	1620 PERRY ST
Plath Hall	2011 W WASHINGTON AVE
CITY OF YAKIMA GARDNER WELL	CORNELL AVE & PIERCE ST
Martin Paint & Floors	1811 S 4TH AVE
STANTON SCHOOL	901 WHITMAN ST
MCALLISTER FLYING SERVICE	2000 S 16TH AVE
Autocraft Paint Body Works LLC	1804 S 3RD AVE
Meaas Transmission Center	415 W WASHINGTON AVE
US EPA Nob Hill Mercury Response	1303 S 15TH AVE
US ARMY Reserve Training Center	1708 TAHOMA AVE
Yakima Armory	1702 TAHOMA AVE
Yakima City Gardner Well ASR	GARDNER PARK SE CORNER CORNELL AVE & W P
RUDY MONDACA	1607 S 16TH AVE
Yakima School Dist Central Coop	1802 PERRY ST
DESIGN SERVICES	1507 S 9TH AVE
Perry Technical Institute	2011 W WASHINGTON AVE
Hans Properties LLC	1601 W WASHINGTON AVE

West Valley Middle School Athletic Fields	S 75TH AVE & MEAD AVE
West Valley Junior High	7505 ZIER RD
West Valley Middle School	1500 S 75TH AVE

CREEKSIDE BUSINESS PARK	40TH & WASHINGTON AVE
YAKIMA CITY KISSEL WELL	S 32ND AVE & MEADE AVE
Creekside Dental	1501 S 40TH AVE

Federal Express Corp Yakima	2108 W WASHINGTON AVE
Yakima Airport Helicopter Service	2400 W WASHINGTON AVE
YAKIMA CITY AIRPORT WELL	W WASHINGTON AVE BETWEEN 16TH & 24TH AVE
Yakima Airport	2800 W WASHINGTON AVE
YAKIMA AIR TERMINAL	2400 W WASHINGTON AVE
TSA Yakima Air Terminal McAllister Field	2400 W WASHINGTON AVE TSA
WA AGR M Yakima 12	OFF MOORE RD 2 MI NW OF WILEY CY
HORIZON AIR YAKIMA AIR TERMINAL	2400 W WASHINGTON AVE
Richardson Airways	YAKIMA MUNICIPAL AIRPORT
NATIONAL WEATHER SERVICE	2406 W WASHINGTON AVE
Airfield Development	24TH & WASHINGTON
YAKIMA CITY FIRE DEPARTMENT UST 7636	2404 W WASHINGTON AVE
Heath Signs	2323 W WASHINGTON AVE

WA DOC AHTANUM VIEW CORRECTIONAL COMPLEX	2009 S 64TH AVE
Ahtanum Crossing	2415 S 64TH AVE

Macro Plastics Washington	3555 BAY ST

SHARPS AUTOMOTIVE SERVICE	208 E MOXEE AVE
Frenchies Fill N Food	106 E MOXEE AVE
Moxee City of	255 E SEATTLE AVE
BLUELINE MANUFACTURING	105 N SPOKANE ST
ROY FARMS CHARRON RD	1300 E CHARRON RD

PACIFICORP UNION GAP SUBSTATION COMM TECH	LAT: 46.557778 LONG: -120.488056
Western Recreational Vehicles Service Ce	2921 SUTHERLAND PARK DR
Holiday Inn Express Union Gap	1215 AHTANUM RIDGE DR
Lot 3 Alder Street Union Gap	
New Office Building	LONGFIBER RD & ALDER ST
US DEA Fire Mountain Yakima	PINE MOUNTAIN LANE .5 M N OF ANTANUM RD
Liberty Bottleworks Inc	2900 SUTHERLAND RD
Northwest Truck Repair & Salvage Inc	805 W AHTANUM RD
Pacificorp Union Gap Substation	1007 W AHTANUM RD
Pacific Power & Light Yakima Power	2718 LOWER AHTANUM RD
Union Gap Fire Sta	107 AHTANUM FIRE STA
NOEL FOODS INC	601 W AHTANUM RD
Dept of Ecology Union Gap	1250 W ALDER ST
PACIFICORP UNION GAP SUBSTATION UNION GAP	903 W AHTANUM RD

Selah 7
Selah 6
Selah 5
Selah 4
Selah 8
Selah 3
Kissel
Gardner
Airport
Nob Hill 1
Nob Hill 2
Nob Hill 3
Nob Hill 4
Nob Hill 5
Nob Hill 7
Naches 3
Naches 2
Naches 1
Tieton 3
Tieton 1
Tieton 2
Union Gap 5
Union Gap 4
Union Gap 6
Union Gap 3
TH 1
TH 2
TH 3
TH 4
TH 5
TH 6
Moxee 1
Moxee 2
Moxee 3
1685 ft
1850 ft
1528 ft
3009 ft
1971 ft
2244 ft

Selah Valley
Pomona Heights
East Selah
Yakima Ridge
Kiwanis
Terrace Heights
Yakima Country Club
Yakima Sportsman State Park
Suntides Golf Course
Yakima Elks Golf
Yakima Air Terminal/McAllister
Union Gap
West Valley
Tieton
Naches
Tasker
Moxee
Powerhouse Canal Pathway

Miles
0 0.5 1 2 3 4

Path: R:\disk_5\projects\county\pw\wellhead\WellheadProtection\WellheadProtection.aprx

Layout Name: WellheadProtection_2019

15.
CITY WELLHEAD PROTECTION PLAN

HLA
Engineering and Land Surveying, Inc.

SELAH WELLHEAD PROTECTION PLAN

This Wellhead Protection Plan (WHPP) for the City of Selah describes the relationship between the Selah WHPP and the Regional Wellhead Protection Management Plan discussed previously. Consistent with the City's DOH-approved Water System Plan, a 20-year planning period has been selected for this plan.

This plan is organized into the following major headings:

- Water System Summary
- Wellhead Protection Area Delineations
- Inventory of Potential Contamination Sources
- Contingency Plan
- Selah Wellhead Protection Management Plan

WATER SYSTEM SUMMARY

This section includes a brief discussion of the history of the City of Selah and the characteristics of its water system based on information provided in the 1994 Water System Plan. For reference purposes, the City's DOH identification number is 774006.

BACKGROUND

The City of Selah is located in Yakima County in central Washington approximately 5 miles north of the City of Yakima. The City of Selah is governed by a City Council and Mayor. Utility service in the unincorporated areas surrounding the City is provided by Yakima County agencies located in the City of Yakima. Within the City of Selah service area, the water system is owned by the City and managed and operated by City employees.

Incorporated in 1919, the City of Selah was served by Wells No. 1 and 2 until 1944 when Well No. 3 was constructed. From 1944 to 1947, Well No. 3 was the primary source for the City. Wells No. 4 and 5 came on line in 1947 and 1951, respectively, and in 1952 the City abandoned Wells No. 1 and 2. Well No. 6 was added to the system in 1960. The City built two reservoirs at the North reservoir site in 1938. Hillcrest, Pleasant Hills, and Goodlander reservoirs were built in 1952, 1967, and 1978, respectively. To improve capacity, Well No. 5 was rehabilitated in 1981, as were Wells No. 3 and 4 in 1993. Well No. 7 was constructed in 1994.

Currently, the City's wells are operated by a telemetry system that turns wells on and off automatically according to the water surface level in the two North reservoirs. To meet system demands for water the telemetry is programmed to turn on Well No. 3 first. If more water is required, Well No. 4 is turned on followed by Well No. 5 then Well No. 7. Well No. 6 is the last well to turn on. Piping in the distribution system is predominantly cast or ductile iron pipe. A map of the system, including well locations, city limits, and zoning is shown on Figure S-1.

Figure S-1: System Components

Selah Wells

Selah

Selah 6

Selah 5

Selah 4

Selah 3

Water Service Area

Sewer Service Area

Urban Growth Area

City Limits

Railroads

Wellhead

Zoning

Residential Single Family

Residential Two Family

Residential Multiple Family

Residential Low Density/ Single Family

Modified Business

Local Business

Manufacturing

Planned Development

Yakima County GIS

October 27, 1998

N

Gray & Osborne, Inc

CONSULTING ENGINEERS

1 Inch = 2000 Feet

SOURCE

The following sections provide a discussion of the characteristics, capacity, water rights, and water quality of the City's wells.

Source Characteristics

A summary of the source characteristics of the Selah wells is provided in Table S-1.

Table S-1: Existing Domestic Source Data

Source	Parameter	Value
Well No. 3	DOH Source No.	SO1-Wellfield w/ SO2
	Status	Primary
	Year Drilled	1944
	Total Depth	430 feet
	Pump Type	Lineshaft
	Number of Stages	10
	16-in casing depth	0 to 316 feet
	12-in casing depth	316 to 376 feet
	10-in casing depth	376 to 430 feet
	Motor size	100 Hp
	Speed	1800
	Emergency Power	None
	Rated Flow (estimated)	600 gpm
Well No. 4	DOH Source No.	SO2-Wellfield w/ SO1
	Status	Primary
	Year Drilled	1947
	Total Depth	448 feet
	20-in casing depth	0 to 107 feet
	10-in casing depth	107 to 448 feet
	Pump type	Lineshaft
	Number of Stages	10
	Pump bowl diameter	8 inches
	Motor size	100 Hp
	Speed	1800 rpm
	Emergency Power	None
	Rated Flow	800 gpm

Table S-1: Existing Domestic Source Data (continued)

Source	Parameter	Value
Well No. 5	DOH Source No.	SO3
	Status	Primary
	Year Drilled	1951
	Total Depth	578 feet
	24-in casing depth	0 to 74 feet
	16-in casing depth	74 to 555 feet
	Pump type	Submersible
	Number of Stages	5
	Motor size	100 Hp
	Speed	3600 rpm
	Emergency Power	None
	Rated Flow	750 gpm
Well No. 6	DOH Source No.	SO4
	Status	Primary
	Year Drilled	1960
	Total Depth	960 feet
	20-in casing depth	0 to 526 feet
	16-in casing depth	526 to 537 feet
	10-in casing depth	537 to 819 feet
	8-inch casing depth	819 to 918
	Pump type	Lineshaft
	Number of Stages	8
	Motor size	200 Hp
	Speed	1800 rpm
	Emergency Power	None
	Rated Flow	1500 gpm
Well No. 7	DOH Source No.	SO5
	Status	Primary
	Year Drilled	1994
	Total Depth	1,011 feet
	Pump Type	Centrifugal
	26-in casing depth	140
	20-in casing depth	293
	16-in casing depth	594
	12-in casing depth	745
	Motor size	150 Hp
	Speed	1800 rpm
	Emergency Power	None yes
	Rated Flow	1900

Water Rights

The City currently has a primary, maximum instantaneous withdrawal water right of 5,675 gpm and a total, primary, annual withdrawal water right of 4,760 acre-feet. A summary of the City's water rights is presented in Table S-2.

Table S-2: City of Selah Water Rights

Source	Water Right Certificate Number	Priority Date	Maximum Instantaneous Withdrawal	Annual Withdrawal
Well #3	361-D	12/44	400 gpm [P]	195 acre-feet [1,2]
Well #4	1050-A	4/47	750 gpm [P]	350 acre-feet [1,2]
Well #5	1348-A	11/51	700 gpm [P]	525 acre-feet [1,2]
Well #6	4003-A	5/59	2,000 gpm [P],[3]	1,600 acre feet [2]
Well # 7	G4-30642 [4]	3/15/91	2,000 gpm [P]	3,160 acre feet
Total	--	--	**5,675 gpm**	**4,760 acre-feet**

[1] The total of Wells No. 3, No. 4 and No. 5 may not exceed 890 acre-feet.
[2] The total of Well No. 3, No. 4, No. 5, and No. 6 may not exceed 1600 acre-feet.
[3] The report of examination and 1994 WSP list the instantaneous withdrawal as 2,000 gpm for Well No. 6. The certificate lists the instantaneous withdrawal as 1,000 gpm. The Report of Examination for Well No. 7 indicates that the total instantaneous withdrawal for Wells No. 3-6 is 3,500 gpm, or 1,825 gpm available from Well No. 6. The City is working with DOE to determine the exact instantaneous withdrawal allowed from Well No. 6. Consistent with the 1994 WSP, 2,000 gpm instantaneous withdrawal is used in this plan.
[4] This water right is in the permit phase.
[P] Primary water right, additive.

Water Quality

The City's sources have historically provided high quality water. The City has not recorded any synthetic organic compound (SOC) detections in routine monitoring, and has recorded no inorganic compounds (IOCs) above the maximum contaminant level (MCL). In December 1994 and February 1996 volatile organic compound (VOC) tests indicated trace amounts of toluene in water samples from Well No. 5. The detections were 0.7 and 0.5 microgram/liter while the MCL is 1,000 microgram/liter. During that time the City had repaired breaks in the pump shaft several times. It is thought that the contaminant was introduced into the well during repair work. Toluene is a constituent of petroleum products which may have been in contact with well water. Successive tests have shown no trace of VOCs.

As discussed in the Regional Wellhead Management Plan, the DOH routinely compiles all water quality data from Group A water systems into a public water quality database. The City will continue to sample its sources according to DOH requirements and will work with Yakima County to monitor any trends in water quality contaminants.

WELLHEAD PROTECTION AREA (WHPA) DELINEATIONS

The following section provides a discussion of the City of Selah's WHPA delineations. A discussion of the mechanisms of groundwater contamination, methods for the delineation of WHPAs, and the decision-making process behind the development of the Selah WHPAs is presented in Appendix G.

The sources for the City were delineated using a simple analytical model. A summary of the WHPA areas for each of the sources is provided in Table S-3.

Table S-3: WHPA Characteristics for Simple Analytical Model

Source	Simple Analytical Model Area (acres)			
	6-Month	1-Year	5-Year	10-Year
Wells No. 3 & 4	15.2	26.2	118.3	263.0
Well No. 5	6.5	12.0	55.2	109.2
Well No. 6	6.5	12.0	55.3	109.6
Well No. 7	21.6	42.0	205.9	410.9

The delineated WHPAs for the City are shown on Figure S-2 and S-3.

INVENTORY OF POTENTIAL SOURCES OF CONTAMINATION

After delineating the WHPAs associated with the City's wells, an inventory of existing and potential sources of groundwater contamination was compiled and mapped. Inventorying potential sources of groundwater contamination serves several functions in the scope of the WHPP. The inventory provides a comprehensive source of information about types of and risks from potential sources of contamination. By ranking contamination sources in the inventory, the City can formulate strategies for the management of those sources. Also, long-term tracking of the inventory and comparison with the water quality database established in the regional management plan will help in protecting the City's future groundwater supply.

DATA COLLECTION METHODOLOGY

In order to facilitate the update of this plan according to the biennial schedule outlined in WAC 246-290-135, existing, easily-accessible databases of potential contamination sources were explored. These sources form the foundation of the inventory database in the regional management plan compiled and stored with the GIS department of Yakima County. This database was augmented with a telephone book search of high risk businesses and a windshield survey of the WHPAs. A summary of the available data used to form the potential contamination source inventory and maps of the locations of these sources within the Selah WHPAs is presented in Appendix I.

Figure S-2: City of Selah Wellhead Protection Area Delineations

Well No. 3, Well No. 4, Well No. 5 and Well No. 6

- Water Service Area
- Sewer Service Area
- Urban Growth Area
- City Limits
- Railroads
- Wellhead
- Ten Year Analytical Model
- Five Year Analytical Model
- One Year Analytical Model
- Six Month Analytical Model

Yakima County GIS

October 27, 1998

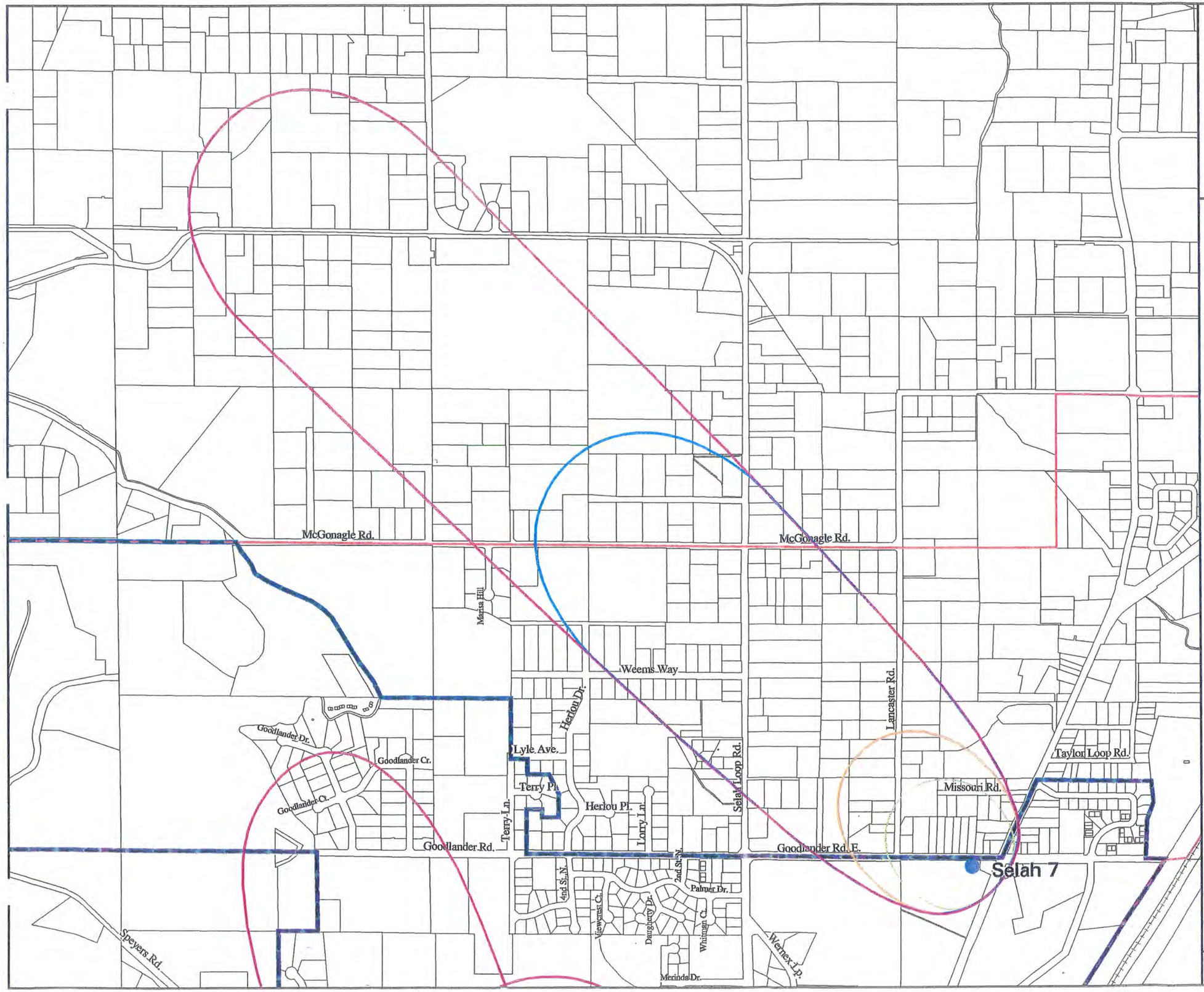
N

Gray & Osborne, Inc.
CONSULTING ENGINEERS

1 Inch = 800 Feet

Figure S-3:
City of Selah
Wellhead Protection
Area Delineations

Well No. 7



- Water Service Area
- Sewer Service Area
- Urban Growth Area
- City Limits
- Railroads
- Wellhead
- Ten Year Analytical Model
- Five Year Analytical Model
- One Year Analytical Model
- Six Month Analytical Model

Yakima County GIS

October 27, 1998

N

Gray & Osborne, Inc.
CONSULTING ENGINEERS

1 Inch = 800 Feet

INDIVIDUAL WELLHEAD CONTAMINANT INVENTORIES

Following a review of the available databases, susceptibility assessments, and the windshield survey, wellhead contaminant inventories for each of the City's sources were identified. The inventory of potential contamination sources for the wells is shown on Figures S-4 and S-5. These data are summarized in Tables S-4 through S-8.

Two types of notification were distributed to property owners, businesses, and residents within the WHPAs. Owners of businesses identified in the potential contaminant source inventory received notification letters detailing the literature and programs available to help them minimize their impact on the WHPAs. Property owners within the WHPAs received a residential notification discussing "common sense" safe water practices and programs available to help home-owners reduce their impact on the WHPAs. Copies of these notifications letters and the list of those notified are presented in Appendix N.

INVENTORY RANKING DEVELOPMENT

In order to focus wellhead protection and management efforts on the contamination sources which pose the greatest threat to the wells, the contaminant sources were ranked based on their relative risk. A contaminant risk ranking method is presented in the EPA's 1994 Groundwater and Wellhead Protection Handbook. This ranking method was developed during the Cape Cod Aquifer Management Project to evaluate the pollution potential from 32 land use categories. Sixteen types of contaminants were rated based on their overall threat to human health, their mobility, and whether they may occur naturally in significant concentrations. The overall threat to the water supply was determined by the number of contaminants associated with each land use category and the potential threat posed by each contaminant. A rank of low (L), moderate (M), or high (H) threat was assigned to each potential contaminant source located within a WHPA. The potential threat posed by each land use category is illustrated in Table S-9. The ranking of the contaminant sources compiled in the City's wellhead protection inventory are summarized in Table S-4 through S-8.

Table S-4: Selah Well No. 3 Contaminant Inventory

Contaminant Category and Relative Risk [2]	Total Sites [4]	Database Reference [1]			
		6-Month	1-Year	5-Year	10-Year
Hazardous Substance Handlers (SARA Title III) [High Risk]	0	0	0	0	0
Hazardous Waste Treatment, Transport, Storage, or Disposal (RCRA) [High Risk]	1	72	72	72	72
Underground Storage Tanks [High Risk]	3	97671	97671	97671	97671, 7232, 6461
Leaking USTs [High Risk]	0	0	0	0	0
Confirmed / Suspected Contamination Sites (CSCS) [High Risk]	0	0	0	0	0
Solid Waste Facilities [High Risk]	0	0	0	0	0
Moderate Risk Businesses [Moderate Risk]	0	0	0	0	0
High Risk Businesses [High Risk]	0	0	0	0	0
Presence/Absence of Septic Tanks [3] [Low Risk]	--	Absent	Absent	Absent	Present
Presence/Absence of Sewer Pipe [Low Risk]	--	Present	Present	Present	Present
Presence/Absence of Private Wells [3] [Low Risk]	--	Absent	Absent	Absent	Present
Improperly Abandoned Wells [High Risk]	0	0	0	0	0
Wastewater Treatment Lagoons [High Risk]	0	0	0	0	0
Stormwater Injection Wells and Collection Basins [Medium Risk]	0	0	0	0	0
Presence/Absence of Railroad Lines (Low Risk)	--	Absent	Absent	Absent	Absent
Population Centers [Low Risk]	Yes	Selah's zoning classifications allow population densities greater than one house per acre, but areas zoned residential have the lowest lot size and are likely to have high population densities. Yakima County Rural and Agricultural zoning are not likely to have high population densities unless water and sewer service become available.			
Pesticide Application Areas [High Risk]	Yes	Specific pesticide application areas have been identified where possible and are included in the High Risk Business category. Additionally, agriculturally zoned areas are also at risk.			

[1] Inventory items listed in each delineation are cumulative.
[2] See Appendix K for complete data on the inventory items. Relative risk assessed according to the EPA criteria outlined in Table S-9.
[3] Locations of septic systems and private wells were estimated by locating those homes within the WHPAs but outside the sewer and water service areas. The Yakima County Health District is currently working on using GPS to locate septic tanks and private wells. This information, including exact numbers of septic tanks and private wells, will be incorporated into GIS during the first biennial update.
[4] Multiple sites may be identified on one parcel and identified on mappings as one symbol.

Table S-5: Selah Well No. 4 Contaminant Inventory

Contaminant Category and Relative Risk [2]	Total Sites [4]	Database Reference[1]			
		6-Month	1-Year	5-Year	10-Year
Hazardous Substance Handlers (SARA Title III) [High Risk]	0	0	0	0	0
Hazardous Waste Treatment, Transport, Storage, or Disposal (RCRA) [High Risk]	1	72	72	72	72
Underground Storage Tanks [High Risk]	3	97671	97671	97671	97671, 7232, 6461
Leaking USTs [High Risk]	0	0	0	0	0
Confirmed / Suspected Contamination Sites (CSCS) [High Risk]	0	0	0	0	0
Solid Waste Facilities [High Risk]	0	0	0	0	0
Moderate Risk Businesses [Moderate Risk]	0	0	0	0	0
High Risk Businesses [High Risk]	0	0	0	0	0
Presence/Absence of Septic Tanks [3] [Low Risk]	--	Absent	Absent	Absent	Present
Presence/Absence of Sewer Pipe [Low Risk]	--	Present	Present	Present	Present
Presence/Absence of Private Wells [3] [Low Risk]	--	Absent	Absent	Absent	Present
Improperly Abandoned Wells [High Risk]	0	0	0	0	0
Wastewater Treatment Lagoons [High Risk]	0	0	0	0	0
Stormwater Injection Wells and Collection Basins [Medium Risk]	0	0	0	0	0
Presence/Absence of Railroad Lines (Low Risk)	--	Absent	Absent	Absent	Absent
Population Centers [Low Risk]	Yes	Selah's zoning classifications allow population densities greater than one house per acre, but areas zoned residential have the lowest lot size and are likely to have high population densities			
Pesticide Application Areas [High Risk]	Yes	Specific pesticide application areas have been identified where possible and are included in the High Risk Business category. Additionally, agriculturally zoned areas are also at risk.			

[1] Inventory items listed in each delineation are cumulative.
[2] See Appendix K for complete data on the inventory items. Relative risk assessed according to the EPA criteria outlined in Table S-9.
[3] Locations of septic systems and private wells were estimated by locating those homes within the WHPAs but outside the sewer and water service areas. The Yakima County Health District is currently working on using GPS to locate septic tanks and private wells. This information, including exact numbers of septic tanks and private wells, will be incorporated into GIS during the first biennial update.
[4] Multiple sites may be identified on one parcel and identified on mappings as one symbol.

Table S-6: Selah Well No. 5 Contaminant Inventory

Contaminant Category and Relative Risk [2]	Total Sites [4]	Database Reference[1]			
		6-Month	1-Year	5-Year	10-Year
Hazardous Substance Handlers (SARA Title III) [High Risk]	5	0	787	787, 731, 10018, 10019	787, 731, 10018, 10019, 770
Hazardous Waste Treatment, Transport, Storage, or Disposal (RCRA) [High Risk]	0	0	0	0	0
Underground Storage Tanks [High Risk]	9	8995	8995	8995, 3840, 101245	8995, 3840, 101245, 8585, 2989, 12517, 12526, 3953, 9257
Leaking USTs [High Risk]	1	0	0	0	9257
Confirmed / Suspected Contamination Sites (CSCS) [High Risk]	0	0	0	0	0
Solid Waste Facilities [High Risk]	0	0	0	0	0
Moderate Risk Businesses [Moderate Risk]	0	0	0	0	0
High Risk Businesses [High Risk]	3	0	0	2, 23	2, 23, 4
Presence/Absence of Septic Tanks [3] [Low Risk]	--	Absent	Absent	Absent	Present
Presence/Absence of Sewer Pipe [Low Risk]	--	Present	Present	Present	Present
Presence/Absence of Private Wells [3] [Low Risk]	--	Absent	Absent	Absent	Present
Improperly Abandoned Wells [High Risk]	0	0	0	0	0
Wastewater Treatment Lagoons [High Risk]	0	0	0	0	0
Stormwater Injection Wells and Collection Basins [Medium Risk]	0	0	0	0	0
Presence/Absence of Railroad Lines (Low Risk)	--	Absent	Absent	Present	Present
Population Centers [Low Risk]	Yes	Selah's zoning classifications allow population densities greater than one house per acre, but areas zoned residential have the lowest lot size and are likely to have high population densities. Yakima County Rural and Agricultural zoning are not likely to have high population densities unless water and sewer service become available.			
Pesticide Application Areas [High Risk]	Yes	Specific pesticide application areas have been identified where possible and are included in the High Risk Business category. Additionally, agriculturally zoned areas are also at risk.			

[1] Inventory items listed in each delineation are cumulative.
[2] See Appendix K for complete data on the inventory items. Relative risk assessed according to the EPA criteria outlined in Table S-9.
[3] Locations of septic systems and private wells were estimated by locating those homes within the WHPAs but outside the sewer and water service areas. The Yakima County Health District is currently working on using GPS to locate septic tanks and private wells.
[4] Multiple sites may be identified on one parcel and identified on mappings as one symbol.

Table S-7: Selah Well No. 6 Contaminant Inventory

Contaminant Category and Relative Risk [2]	Total Sites [4]	Database Reference[1]			
		6-Month	1-Year	5-Year	10-Year
Hazardous Substance Handlers (SARA Title III) [High Risk]	0	0	0	0	0
Hazardous Waste Treatment, Transport, Storage, or Disposal (RCRA) [High Risk]	1	72	72	72	72
Underground Storage Tanks [High Risk]	3	97671	97671	97671	97671, 7232, 6461
Leaking USTs [High Risk]	0	0	0	0	0
Confirmed / Suspected Contamination Sites (CSCS) [High Risk]	0	0	0	0	0
Solid Waste Facilities [High Risk]	0	0	0	0	0
Moderate Risk Businesses [Moderate Risk]	0	0	0	0	0
High Risk Businesses [High Risk]	0	0	0	0	0
Presence/Absence of Septic Tanks [3] [Low Risk]	--	Absent	Absent	Absent	Absent
Presence/Absence of Sewer Pipe [Low Risk]	--	Present	Present	Present	Present
Presence/Absence of Private Wells [3] [Low Risk]	--	Absent	Absent	Absent	Absent
Improperly Abandoned Wells [High Risk]	0	0	0	0	0
Wastewater Treatment Lagoons [High Risk]	0	0	0	0	0
Stormwater Injection Wells and Collection Basins [Medium Risk]	0	0	0	0	0
Presence/Absence of Railroad Lines (Low Risk)	--	Absent	Absent	Absent	Absent
Population Centers [Low Risk]	Yes	Selah's zoning classifications allow population densities greater than one house per acre, but areas zoned residential have the lowest lot size and are likely to have high population densities. Yakima County Rural and Agricultural zoning are not likely to have high population densities unless water and sewer service become available.			
Pesticide Application Areas [High Risk]	Yes	Specific pesticide application areas have been identified where possible and are included in the High Risk Business category. Additionally, agriculturally zoned areas are also at risk.			

[1] Inventory items listed in each delineation are cumulative.
[2] See Appendix K for complete data on the inventory items. Relative risk assessed according to the EPA criteria outlined in Table S-9.
[3] Locations of septic systems and private wells were estimated by locating those homes within the WHPAs but outside the sewer and water service areas. The Yakima County Health District is currently working on using GPS to locate septic tanks and private wells. This information, including exact numbers of septic tanks and private wells, will be incorporated into GIS during the first biennial update.
[4] Multiple sites may be identified on one parcel and identified on mappings as one symbol.

Table S-8: Selah Well No. 7 Contaminant Inventory

Contaminant Category and Relative Risk [2]	Total Sites [4]	Database Reference[1]			
		6-Month	1-Year	5-Year	10-Year
Hazardous Substance Handlers (SARA Title III) [High Risk]	0	0	0	0	0
Hazardous Waste Treatment, Transport, Storage, or Disposal (RCRA) [High Risk]	0	0	0	0	0
Underground Storage Tanks [High Risk]	0	0	0	0	0
Leaking USTs [High Risk]	0	0	0	0	0
Confirmed / Suspected Contamination Sites (CSCS) [High Risk]	0	0	0	0	0
Solid Waste Facilities [High Risk]	0	0	0	0	0
Moderate Risk Businesses [Moderate Risk]	0	0	0	0	0
High Risk Businesses [High Risk]	0	0	0	0	0
Presence/Absence of Septic Tanks [3] [Low Risk]	--	Present	Present	Present	Present
Presence/Absence of Sewer Pipe [Low Risk]	--	Absent	Absent	Absent	Absent
Presence/Absence of Private Wells [3] [Low Risk]	--	Present	Present	Present	Present
Improperly Abandoned Wells [High Risk]	0	0	0	0	0
Wastewater Treatment Lagoons [High Risk]	0	0	0	0	0
Stormwater Injection Wells and Collection Basins [Medium Risk]	0	0	0	0	0
Presence/Absence of Railroad Lines (Low Risk)	--	Absent	Absent	Absent	Absent
Population Centers [Low Risk]	Yes	Selah's zoning classifications allow population densities greater than one house per acre, but areas zoned residential have the lowest lot size and are likely to have high population densities. Yakima County Rural and Agricultural zoning are not likely to have high population densities unless water and sewer service become available.			
Pesticide Application Areas [High Risk]	Yes	Specific pesticide application areas have been identified where possible and are included in the High Risk Business category. Additionally, agriculturally zoned areas are also at risk.			

[1] Inventory items listed in each delineation are cumulative.

[2] See Appendix K for complete data on the inventory items. Relative risk assessed according to the EPA criteria outlined in Table S-9.

[3] Locations of septic systems and private wells were estimated by locating those homes within the WHPAs but outside the sewer and water service areas. The Yakima County Health District is currently working on using GPS to locate septic tanks and private wells. This information, including exact numbers of septic tanks and private wells, will be incorporated into GIS during the first biennial update.

[4] Multiple sites may be identified on one parcel and identified on mappings as one symbol.

TABLE 5-9: POTENTIAL CONTAMINANT SOURCE RISK RANKING METHODOLOGY

Land Use Considerations	POTENTIAL CONTAMINANTS																
	Acid	Base	Chloride	Fluoride	Fe/Mn	Other Metals	Nitrate	Pathogens	Pesticides/Herbicides	Petroleum Products	Phenols	Radioactivity	Sodium	Solvents	Sulfate	Surfactants (Detergents)	
Overall Threat to Human Health	L-M	L-M	L	L	L	H	M	L	H	H	H	H	L	H	L	L	
Mobility	M	L	H	H	M	L-H	H	L	L-H	M	M	L-H	H	H	H	H	
Naturally Occurring	YES	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	YES	NO	YES	NO	
Land Use Categories																	**Overall Threat to Water Supply**
Agriculture/Golf Courses							▒		▒								M
Airstrips/Airports						▒			▒	▒				▒		▒	M-H
Asphalt, Concrete, Coal Tar Plants						▒				▒							L-M
Beauty Parlors		▒				▒								▒		▒	L
Boat Yards/Builders						▒				▒	▒			▒			L
Car Washes			▒			▒				▒			▒	▒		▒	L
Cemeteries/Graveyards									▒								H
Chemical Manufacturing	▒	▒	▒	▒	▒	▒	▒		▒	▒	▒	▒	▒	▒	▒	▒	H
Clandestine Dumping	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒		H
Dry Cleaning														▒			H
Furniture Stripping/Painting	▒	▒				▒								▒			M
Hazardous Materials Storage and Transfer	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	H
Industrial Lagoons and Pits	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	H
Jewelry and Metal Plating	▒	▒		▒	▒	▒				▒			▒	▒		▒	M
Junkyards	▒				▒	▒				▒				▒	▒		L
Landfills/Burn Pits	▒		▒		▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	H
Laundromats								▒						▒		▒	L-M
Machine Shops/Metal Working	▒	▒				▒				▒				▒		▒	H
Municipal Wastewater/Sewer Lines			▒		▒	▒	▒	▒					▒	▒		▒	H
Photography Labs/Printers	▒	▒				▒								▒		▒	L-M
Railroad Tracks and Yards	▒	▒	▒	▒	▒	▒	▒		▒	▒	▒	▒	▒	▒	▒	▒	M
Research Labs/Universities/Hospitals	▒	▒		▒	▒	▒	▒	▒	▒	▒	▒	▒		▒		▒	L-M
Road and Maintenance Shops			▒						▒	▒			▒	▒			M
Sand and Gravel Mining/Washing Operations										▒				▒			L
Septage Lagoons and Sludge			▒		▒	▒	▒	▒					▒	▒		▒	H
Septic Systems, Cesspools, Water Softeners			▒		▒	▒	▒	▒	▒				▒	▒		▒	H
Stables, Feedlots, Kennels, Manure Pits							▒	▒					▒				M-H
Stormwater Drains/Retention Basins			▒			▒		▒	▒	▒			▒	▒			L-M
Stump Dumps					▒	▒	▒										L
Underground/Above Ground Storage Tanks									▒	▒				▒			H
Vehicular Services						▒				▒				▒		▒	H
Wood Preserving						▒				▒	▒			▒	▒	▒	L

Key:

L Ranked as a low threat based on the number of potential contaminants associated with the category and the potential threat posed by each contaminant.

M Ranked as a moderate threat based on the number of potential contaminants associated with the category and the potential threat posed by each contaminant.

H Ranked as a high threat based on the number of potential contaminants associated with the category and the potential threat posed by each contaminant.

▒ Indicates that contaminants released from this land use category may render groundwater at a public supply well undrinkable in accordance with state and federal MCLs.

Indicates that this land use category is not generally associated with the release of the particular contaminant in quantities that would render the groundwater at a public supply well undrinkable.

Figure S-4: City of Selah Inventory of Potential Contamination Sources

Well No. 3, Well No. 4, Well No. 5 and Well No. 6

- Water Service Area
- Sewer Service Area
- Urban Growth Area
- City Limits
- Railroads
- Wellhead
- Ten Year Analytical Model
- Five Year Analytical Model
- One Year Analytical Model
- Six Month Analytical Model
- Confirmed Or Suspected Contaminated Site
- Leaking Underground Storage Tank
- Underground Storage Tank
- EPCRA Site
- High Risk Business
- Moderate Risk Business
- RCRA Business
- Toxic Release Inventory
- Private Wells
- Septic Tanks

Yakima County GIS

November 13, 1998

N

1 Inch = 800 Feet

Selah 7

Selah 6

Selah 5

Selah 4

Selah 3

Weems Way
Goodlander Dr.
Goodlander Ct.
Lyle Ave.
Herlou Dr.
Terry Pl.
Herlou Pl.
Terry Ln.
Lorry Ln.
Selah Loop Rd.
Lancaster Rd.
Taylor Loop Rd.
Missouri Rd.
Goodlander Rd.
Goodlander Rd. E.
2nd St. N.
4nd St. N.
Palmer Dr.
Viewcrest Ct.
Dauphiney Dr.
Whitman Ct.
Wernex Ln.
Melinda Dr.
Speyers Rd.
Lynwood Ln.
12Th St. N.
Hovde Ln.
14Th St. N.
Cherry Ave.
Sage Ave.
Stacy Ct.
Viewcrest Pl.
Weems St. N.
1St St. N.
13Th St. N.
11Th St. N.
Senter St.
Pear Ave.
Sun Vly.
4St St. N.
9Th St. N.
Home Ave. W.
Home Ave. E.
Maru Ave.
Bartlett Ave. W.
Bartlett Ave. E.
Fremont Ave. W.
Fremont Ave. E.
Orchard Ave. W.
Orchard Ave. E.
Railroad Ave. N.
Rushmore Rd. N.
Hill Rd.
14Th St. N.
13Th St. N.
12Th St. N.
11Th St. N.
8Th St. N.
5Th St. N.
4St St. N.
3St St. N.
Cedar Ave.
Fremont Hills
Naches Ave. W.
Naches Ave. E.
Driscoll Rd.
1St Ave. W.
Highland Ct.
Vista Dr.
8Th St. S.
Enterprise Dr.
Fruitspur Dr.
Hovde Park Dr.
3Th St. S.
2Th St. S.
1Th St. S.
1St Ave. E.
Yakima Ave. W.
Weems St. S.
2Nd Ave. E.
3Rd Ave. E.
10Th St. S.
Wernex Ln.
Park Ave.
Selah Ave.
Rushmore Rd. S.
Railroad Ave. S.
Crusher Canyon Rd.
Sheelyn Dr.
Hillcrest Dr.
5Th Ave. W.
6Th Ave. W.
7Th Ave. W.
Riverview Ave.
10Th St. S.
7Th St. S.
6Th St. S.
5Th St. S.
4Th St. S.
Valley View Ave.

CONTINGENCY PLAN

The objectives of a wellhead protection contingency plan are to:

1. Identify the susceptibility of each groundwater source to surface contamination;
2. Identify source deficiencies that could affect the purveyor during an emergency or in the event a source becomes contaminated;
3. Identify the emergency response capabilities of the purveyor and the surrounding communities; and
4. Identify short-term and long-term contingency actions that can be followed during an emergency or in the event a source becomes contaminated.

The first element of a contingency plan is an assessment of the susceptibility of each source in the system to surface contamination. This assessment is based on several criteria that define the likelihood of contamination entering the wellhead and adversely affecting water quality. These criteria include quantity and relative risk of potential contamination sources within the WHPA, well characteristics, and aquifer characteristics.

The second element of a contingency plan is an evaluation of the ability of a purveyor to meet future demand based on existing capacity and water rights, even with the loss of a well to contamination. A comprehensive analysis of the system was done in the 1994 Water System Plan. A summary of the source evaluation is provided in the following section.

Third, in order to minimize the effect of a release of contaminants into the environment, procedures must be in place to ensure that decision-making personnel can execute the proper mitigation measures. This contingency plan contains emergency response procedures to be implemented immediately following a release of contaminants into the environment. These procedures identify the appropriate personnel to contact at the local, state, and federal levels, the appropriate equipment needed, and a structured plan of action to respond quickly to effectively mitigate environmental damage resulting from such a release.

Finally, in the event that the City's source water becomes contaminated, additional sources of drinking water, or treatment of the contaminated water, will be necessary. Both short-term and long-term alternative drinking water supplies, and treatment methods for common contaminants, are identified in this section.

SUSCEPTIBILITY TO CONTAMINATION

In 1994 the City of Selah completed Susceptibility Assessments for each of the City's wells in compliance with DOH-mandated wellhead protection planning and SOC monitoring requirements. In determining the ratings of the wells, the DOH used the data collected in the susceptibility assessments, including well characteristics and past water quality history. The wells were rated moderate susceptibility with the exception of Well

No. 5 which was rated high and Well No. 7 which was rated low. Since the 1995 ratings, DOH has reduced the "High" rating of Well No. 5 to "Moderate". Well No. 5 was ranked as a high risk due to test results that indicated toluene was observed in two Well No. 5 VOC tests. The well was reduced to a moderate risk after three successive tests showed no trace of contamination as shown in Table S-10.

Table S-10: 1994 Susceptibility Rating for Selah

Source	Rating
Well No. 3	Moderate
Well No. 4	Moderate
Well No. 5	Moderate
Well No. 6	Moderate
Well No. 7	Low

Regardless of the susceptibility rating of the wells to contamination, it is important to provide a contingency plan that outlines emergency procedures for the mitigation of the contamination of the City's groundwater supplies. Such a plan is presented in the following sections.

SOURCE ANALYSIS

This section provides a summary of the source analysis completed in the 1994 Water System Plan.

Source Demand Projections

Source demand projections for the 6-year planning period were completed in the 1994 Water System Plan. The projections were revised to include current projections and extrapolated to 20 years based on population projections in the 1994 Water System Plan. Table S-11 summarizes the average day demand (ADD) projections.

Table S-11: City of Selah Average Day Production Projections

Source	Projected Production (gpd)			Well Capacities (gpd) [3]
	1993 [1]	1998 [2]	2018 [2]	
Well No. 3	613,000	613,000	648,000	648,000
Well No. 4	613,000	613,000	648,000	648,000
Well No. 5	590,000	1,080,000	1,080,000	1,080,000
Well No. 6	454,000	0	636,000	2,376,000
Well No. 7	0	454,000	2,268,000	2,736,000
Total ADD	**2,270,000**	**2,760,000**	**5,280,000**	**7,488,000**

[1] Source: 1994 Water System Plan updated to current production levels.
[2] Source: City of Selah.
[3] Based on the rated capacity of the pumps, pumping 24-hours per day.

The Maximum Day Demand (MDD) peaking factor calculated in the 1994 Water System Plan is 1.96. The MDD peaking factor is defined as the ratio of the maximum day production to the average day production. Based on this peaking factor, the existing and 2018 MDDs are approximately 5,410,000 gpd and 10,349,000 gpd, respectively.

Source Capacity Evaluation

The DOH design criteria require that the total quantity of water available at the source be sufficient to meet the MDD, and the quantity of water available with the largest well out of service be sufficient to meet the ADD. An evaluation of the City's ability to meet these design criteria is shown in Table S-12.

Table S-12: Source Capacity Analysis

Year	ADD (gpd)	Source Capacity (gpd) [1]	Surplus (+) / Deficit (-)
1998	2,760,000	4,752,000	+ 1,992,000
2018	5,280,000	4,752,000	- 528,000
Year	**MDD (gpd)**	**Source Capacity (gpd) [2]**	**Surplus (+) / Deficit (-)**
1998	5,410,000	7,488,000	+ 2,078,000
2018	10,349,000,	7,488,000	- 2,861,000

[1] Source capacity assumes that Well No. 7, the largest well is out of service.
[2] Source capacity assumes all wells in service.

As shown in Table S-12, the City is currently able to meet the required source capacity design criteria; however, the City is unable to meet design criteria for the 20-year projected demands. The 20-year projections indicate the City will be deficient in meeting ADD and MDD by 528,000 gpd and 2,861,000 gpd respectively. This analysis indicates the City will require an additional 2,000 gpm source to meet demand projections within the 20-year planning period.

The source capacity design criteria is intended for short-term well unavailability, as in the case of pump replacement or minor rehabilitation. In wellhead contingency planning, it is necessary to assume that the contamination of a well may make it unusable for a significantly longer period of time. As such, the available source capacity must be sufficient to meet the MDD with the largest well (Well No. 7) out of service. If Well No. 7 becomes contaminated, the City cannot meet the 1998 and 2018 projected MDD by 658,000 and 5,597,000 gpd, respectively. An additional short-term or long-term source would be required if Well No. 7 were removed from service due to contamination. When it is necessary to develop a new source the City will consider current wellhead protection design criteria. Under these criteria, an additional 3,900 gpm is needed. Sources to mitigate this shortfall will be discussed in the Short-Term and Long-Term Contingency Planning sections.

Source Reliability

Source reliability criteria in the DOH *Draft Waterworks Standards* include source reliability for backup power, water rights reliability, and facilities reliability. A discussion of source capacity and water rights has been presented in the previous sections. The DOH requires all systems to be protected against loss of power through minimum power grid reliability criteria, back-up power, or standby storage. The DOH is in the process of establishing minimum power grid reliability criteria, but the industry standard is provision of power from two independent grid sources and history of infrequent extended power outages. Where backup power is required, the DOH provides the following requirements:

- Backup power shall be designed to enable the delivery of the ADD at 30 psi.
- Backup power shall be located at each source of supply.
- Backup power facilities shall be brought on-line through an automatic transfer switch.
- Backup power shall be fueled consistent with the local WHPP.

The City has provided standby storage consistent with DOH requirements and is not required to provide backup storage. Furthermore, Pacific Power, the local provider of electricity, has two portable substation available to energize a power distribution grid should the normal substation fail. The portable substations can be connected in approximately 4 to 6 hours to provide back-up power.

While substation redundancy provides for reliability of the power source, it does not increase the reliability of the power distribution system. In the event of a power distribution failure the City would be unable to provide source water and would rely solely on storage.

Well No. 7 is configured to accept power from a portable generator in the event of a power outage. However, because no outages have been experienced, the City has not found it necessary to pursue the purchase and installation of a generator. If power supply becomes unreliable the City will pursue a generator to supply back-up power to Well No. 7.

Source Water Rights Evaluation

An evaluation of the ability of the City's water rights to meet the existing and 20-year planned production is shown in Table S-13.

Table S-13: Water Rights Analysis

Source	Production Instantaneous Production (gpm) [1]	Water Rights Maximum Instantaneous Withdrawal (gpm)	Surplus (+) / Deficit (-) (gpm)
Well No. 3	450	400	- 50
Well No. 4	450	750	+ 300
Well No. 5	750	525	- 225
Well No. 6	1,650	2,000	+ 350
Well No. 7	1,900	2,000	+ 100
Source	**Annual Production (acre-feet) [2]**	**Annual Withdrawal (acre-feet)**	**Surplus (+) / Deficit (-) (acre-feet)**
1998 Total	3,092	4,760	+ 1,668
2018 Total	5,915	4,760	- 1,155

[1] Based on the rated capacity of the pumps.
[2] Based on the production values in Table S-11 converted to acre-feet.

As shown in Table S-13, the City has insufficient maximum instantaneous withdrawal water rights for Well No. 3, and No. 5. The City currently has sufficient annual water rights, but may be deficient with respect to annual rights by 1,155 acre-feet by 2018. The City will apply for additional rights when it drills a new well to satisfy source capacity deficiencies.

EMERGENCY MANAGEMENT

Contingency planning for emergency situations is important to ensure that when a crisis occurs, appropriate decision-making personnel are informed of the scope and severity of the situation and that established procedures are in place for foreseeable types of emergencies. It is not possible to plan for every type of emergency that can affect a water system. However, by having appropriate contingency planning in place for foreseeable emergencies, mitigation measures can be implemented more rapidly and the impact to the system can be reduced.

The following sections provide procedures for the coordination with Yakima County Emergency Management, an emergency call-up list for local emergency personnel, and emergency response procedures for a number of different emergency situations.

Coordination with Yakima County Emergency Management

Yakima County Local Emergency Planning Committee (LEPC) has established response procedures for the hazardous materials incidents or spills in the 1988 Emergency Response Plan for Yakima County (Annex Z-7.88 Hazardous Materials). The plan details response levels for escalating levels of hazardous material incidents, including notification requirements, responsible officials, and documentation procedures. Critical excerpts from the 1988 Emergency Response Plan are presented in Appendix L, including notification procedures, a call-up list, and a HAZMAT Accident Notification Form.

In the event of a chemical spill or hazardous material incident, the Incident Command Agency for the jurisdiction of Selah is the Selah Fire Department within city limits and Yakima County Fire Protection District No. 2 outside of city limits. As command agency, the District will coordinate the required response procedures and notifications outlined in the 1988 Emergency Response Plan. Depending on the type of incident, the following agencies may be notified to coordinate cleanup or mitigation of the incident:

- Washington State Patrol
- Local Public Works Office
- Department of Ecology
- Department of Health
- Yakima County Clean Air Authority
- Medical Control Facility
- Mayor/County Executive
- Emergency Broadcast System

One of the key response efforts to an incident is to mitigate the impact of the incident on surrounding facilities. The LEPC has identified "critical facilities" throughout Yakima County that must be protected in the event of an incident. These facilities include local schools, hospitals, or government offices that may be attempting to respond to the incident. Part of the coordination of this WHPP with the LEPC will include the identification of the 6-Month WHPA for each of the City's wells as a critical "red zone" in which response efforts should be focused. This will help reduce the risk of the contamination of the City's drinking water supplies in the event of a hazardous materials incident.

Emergency Call-Up List

In order to make sure that appropriate decision-making personnel are notified in an emergency, an emergency call-up list has been provided in Table S-14. This list was presented in the 1994 Water System Plan and has been updated to reflect current telephone numbers and emergency personnel.

Table S-14: Emergency Call List

Contact	Telephone Number
Emergency, HAZMAT Incident, Fire, Police, Ambulance	911
City of Selah	
City Hall	(509) 698-7326
Public Works	(509) 698-7365
On Call Pager	(509) 698-7365
Fire Chief	(509) 698-7310
Pipe/Fitting Suppliers	
Pacific Water Works Supply	1-800-422-0057
H.D. Fowler--Yakima	1-509-248-8400
Western Utilities--Spokane	1-800-456-0531
Testing Lab (coliform)	
Yakima County Health Department	(509) 575-4265
Laucks Testing Lab	(509) 248-4695
Applied Sciences Labs	(509) 248-4034
Washington State Department of Ecology	
Central Regional Office - Teri Fisher	(509) 454-7843
Washington State Department of Health	
Eastern Regional Office - Dan Sander	(509) 456-2457
Yakima County	
Emergency Management	(509) 574-1900
Public Works	(509) 575-4151
Telephone Company: Ellensburg Telephone	
Business	(800) 426 9332
Repair	(509) 697 7267
Huibregtse, Louman Associates, Inc., Consulting Engineer	(509) 966-7000

Emergency Procedures

Emergency procedures for some foreseeable types of emergencies have been provided in this section. Procedures have been presented in the form of flowcharts for the following types of emergencies:

- Chemical spill
- VOC/SOC contaminant detection
- Bacteriological detection

These flow charts are presented in Appendix L.

SHORT-TERM CONTINGENCY PLANNING

As a matter of planning priority, it is important to identify appropriate emergency and short-term options. These include the steps required for immediate provision of water for a period of days, weeks or months. The following is a list of short-term and emergency options that could be implemented at the City of Selah following the short-term loss of a well.

Bottled Water

In an emergency situation which requires one or more wells to be shut off, bottled water is one alternative supply of drinking water. In many cases, sufficient supply is immediately available in either stores or a bottling facility. With Selah being located geographically 10 miles west of Yakima and a short distance from neighboring communities, it is feasible that enough bottled water could be supplied for a short term using available sources from other communities.

Tanker Trucks

If adequate water cannot be supplied to the City's customers during an emergency, the City may consider using an outside contractor to transport water in tanker trunks. Careful attention must be given to disinfecting the tanks to avoid bacterial contamination. If the tanker trucks assigned to haul the water are potable water hauling vehicles only, then the water need only be disinfected using a standard chlorine residual concentration. However, if the tanker trucks have been used to haul nonpotable water or the hauling status of the tanker truck(s) is not known, then the tank must be superchlorinated with a concentration of a least 50 mg/L for a period of 24 hours. After the 24 hour period, the superchlorinated water shall be discarded, the tank filled with fresh chlorinated water, and a bacteriological test taken to determine if the water is suitable for drinking. If this option is selected, a source of sanitary containers would be identified and supplied so that personnel are not required to use receptacles that could possibly be contaminated.

Water Conservation

The City of Selah has an approved water conservation plan completed in 1994. The conservation measures required for the City by the DOH include program promotion, source meter readings, evaluation of the costs and benefits of service meters and conservation pricing, and evaluation of water reuse alternatives. Additionally, the following water conservation program components are recommended:

- purveyor technical assistance
- customer technical assistance
- bills showing consumption history
- service meters
- unaccounted water/leak detection
- single-family/multi-family incentive kits
- nurseries/agricultural incentive kits
- landscape management/playfield-xeriscaping incentive kits

In an emergency situation, more aggressive water conservation measures may be required than those adopted in the 1994 Water System Plan. In an emergency situation that requires the complete or partial shutoff of the City's wells, non-essential water uses must be restricted. The City may be forced to implement aggressive water conservation measures, which may include water restrictions for activities such as landscape watering, laundry, vehicle washing, or bathing. Water conservation measures may also be used with other short-term supply options.

Groundwater Treatment

Treatment of contaminated water can be accomplished through *in situ* or *ex situ* methods. *In situ*, or in place treatment, involves the remediation of an aquifer by introducing chemical, physical, or biological agents into the subsurface which reduce contamination levels. *Ex situ*, or pump-and-treat technologies involve the removal of contaminated groundwater from the subsurface and subsequent treatment at the source. Examples of *in situ* remediation include bioremediation and soil vapor extraction, while examples of *ex situ* treatment include reverse osmosis (RO), granular activated carbon (GAC), and air stripping. All of these treatment methods can be extremely expensive. The capital investment for the treatment equipment along with cost of operating and chemical costs amount to a significant expenditure which may be difficult to implement in a short period of time.

Extensive research into water treatment methods over the past several decades has resulted in the identification of numerous effective treatment methods for different contaminants. Selection of a treatment method depends upon a number of factors, including the chemical characteristics of the contaminants, the extent and severity of the contamination, the treatment removal objective, and the financial resources available. Based on numerous case studies, the EPA has assembled a list of Best Available Technologies (BATs) in 40 CFR 141.61-62 to be used for contaminated groundwater. These BATs are summarized in Table S-15.

Existing and Potential Interties

The City of Selah does not have interties with other water systems. The potential for interties is decreased by the geographical location in relation to other water systems. Selah is north of the Naches River which separates it from the City of Yakima, the closest water system. The construction of new bridges between Yakima and Selah may make the possibility of an intertie more feasible, however the there is no benefit at this time to pursue an intertie. As such Selah is considered to have an independent water system without the likelihood for interties as a short-term contingency option for contamination of a well.

Table S-15: Best Available Technologies for Drinking Water Contaminants

Contaminant Type	BATs [14]
Antimony	[2], [7]
Asbestos	[2], [3], [8]
Barium	[5], [6], [7], [9]
Beryllium	[1], [2], [5], [6], [7]
Cadmium	[2], [5], [6], [7]
Chromium	[2], [5], [6], [7]
Cyanide	[5], [7], [10]
Mercury	[2], [4], [6], [7]
Nickel	[5], [6], [7]
Nitrate	[5], [7], [9]
Nitrite	[5], [7]
Selenium	[1], [2], [6], [7], [9]
Thallium	[1], [5]
VOCs/SOCs [13]	[4], [11], [12]

[1] Activated Alumina
[2] Coagulation/Filtration
[3] Direct and Diatomite Filtration
[4] Granular Activated Carbon
[5] Ion Exchange
[6] Lime Softening
[7] Reverse Osmosis
[8] Corrosion Control
[9] Electrodialysis
[10] Chlorine
[11] Packed Tower Aeration
[12] Oxidation
[13] BATs for specific organic compounds are listed in 40 CFR 141.61-62
[14] Some of the BATs listed above have specific limitations or other requirements; see 40 CFR 141.61-62

Surface Water Treatment

Surface water within an acceptable distance from the City is the Naches River and the Yakima River. Treating surface water is not considered a viable short-term alternative. Because surface water is susceptible to contamination it is subject to the Surface Water Treatment Rule and must be filtered prior to use in a domestic water system. Surface water treatment is likely to be difficult and expensive to implement and maintain on a short-term basis.

LONG-TERM CONTINGENCY PLANNING

Long-term water replacement options differ from emergency and short-term options in two ways. First, there is usually more time available to evaluate the various alternatives, which permits more extensive analysis of the considerations of future needs and other factors prior to making a decision. Second, the number of alternatives that are viable is larger. The following section provides a discussion of several long-term options.

Drill New Wells or Modify Existing Wells

If investigations indicate that there is an untapped supply of groundwater in the form of a separated aquifer or a portion of the contaminated aquifer which is up-gradient and uncontaminated, it may be feasible for the City to either drill new wells or modify existing wells to generate additional source capacity. These alternatives may often be more economical and carry lower risk than treatment.

One way to generate additional source capacity is to equip an existing uncontaminated well with a larger pump, provided that the aquifer can supply the additional capacity and that sufficient water rights exist or can be obtained for the increased capacity. Based on information provided by the City, it may be feasible to pump more water from Well No. 5 and 7 with larger pumps and a deeper setting in Well No. 5. Because Well No. 7 is artesian, the City would consider installing a lineshaft pump in the well. Drilling a new well could also provide additional source capacity, provided that sufficient water rights can be obtained through either a change in existing rights or an application for new rights.

Because of the water rights adjudication currently being processed in the Yakima drainage basin and the recent suit over surface water and groundwater continuity brought by the Yakima Indian Nation against the DOE, the current application period for new water rights is estimated to be 5 years or more. These issues may make drilling a new wells difficult to implement in a reasonable amount of time. If it is determined that a significant health risk exists to the community, this waiting time can be significantly reduced if the DOE evaluates a water right application under its Emergency Rule. Additionally, if a new well can be drilled in an uncontaminated portion of the aquifer, a change application under the Town's existing water rights could be processed more rapidly than filing for new rights.

Groundwater Treatment

The same treatment technologies previously described are available as permanent solutions for contaminant removal. As discussed above, treatment of contaminated water is generally expensive and should be viewed as a last resort only after other alternatives have been thoroughly evaluated.

Interconnection

Interties with other water systems is sometimes a cost effective solution. However, as discussed above, the City's geographical location relative to other water systems makes this an unlikely alternative.

Water Conservation

While it is possible to use conservation strategies to reduce consumption over the long-term, the water savings from conservation are not likely to be large enough to replace the production of a contaminated well.

Dual Systems

By separating potable water from non-potable water in the distribution system, it may be possible to reduce the demand for drinking quality water while using a contaminated or lower quality supply for lawn and garden irrigation or other uses that do not require high quality water. In the 1994 Water System Plan the future use of irrigation water in agricultural areas that convert to residential areas was discussed. It is planned that as growth continues agricultural irrigation water will be used for domestic irrigation.

Surface Water Treatment

As in the short-term surface water treatment discussion, the water quantity, water quality, water rights, and costs associated with surface water treatment make it an unattractive long-term alternative that is only attractive as a last resort.

SELAH WELLHEAD PROTECTION MANAGEMENT PLAN

Effective management strategies are essential to ensuring the long-term safety of groundwater resources. Elements of the City of Selah wellhead protection management plan include long-term coordination efforts with Yakima County, development of a pollution prevention program, and public education efforts. A discussion of these elements is presented in the following sections.

COORDINATION WITH REGIONAL MANAGEMENT PLAN

While individual wellhead management strategies targeted at protecting the City's groundwater supply are important, coordination with regional management efforts as a member of the RWPC allows for greater public outreach efforts than the City could manage alone. These efforts were discussed in detail in the Regional Wellhead Protection Management Plan and include the following:

- A regional contaminant source inventory
- A regional water quality database
- Coordination with existing regulations and regulatory agencies
- An Internet site on the World Wide Web
- Wellhead protection literature, posters, decals, and videos
- Hazardous waste clean-up days
- Pamphlet distribution at the Central Washington State Fair

The primary contribution to the regional wellhead protection planning efforts by the City will be monetary in nature. The goal of the regional efforts is to coordinate wellhead protection planning efforts that are of benefit to the entire Upper Yakima Valley, but could not easily be accomplished by any one entity. By sharing in the cost of these efforts, larger scale efforts of greater benefit can be achieved. As discussed in the Regional Management Plan, Yakima County will remain the lead agency and coordinator of many of the required elements of the WHPP in WAC 246-290-135. The magnitude of the City's monetary contribution to the regional wellhead protection efforts is estimated to be $500 per year as presented in Appendix B. A copy of the 1998 Interlocal Agreement between the City of Selah and the other members of the RWPC is presented in Appendix A.

Additionally, the City will coordinate the following efforts with Yakima County:

- The City's designated Wellhead Protection Committee representative will attend semi-annual meetings to coordinate the future direction and scope of the WHPP. The current representative is Mr. Bill Trout.
- The City will coordinate its local efforts discussed in the following sections with regional efforts wherever possible.

SELAH MANAGEMENT PLAN IMPLEMENTATION

In addition to the regional management strategies presented in the last section, individual management strategies tailored to protecting the City's groundwater have been developed. As discussed in Chapter 1, the Upper Yakima Valley Wellhead Protection Committee has decided to focus its management strategies on public education efforts, rather than regulatory strategies. The individual public education strategies for the City of Selah include the following:

- local public meetings

- street signs designating WHPAs
- annual school seminar program
- development of a local pollution program

A discussion of the individual public education strategies is provided in the following sections.

Public Meetings

In addition to the meetings held by the RWPC throughout the development and preparation of the WHPP, progress on the WHPP was reported to the Selah City Council during which the public was given the opportunity to comment. Table S-16 summarizes the meeting dates and forums in which the City was invited or involved.

Table S-16: Public Meetings

Date	Forum
January, 1998	City of Selah, City Council Meeting

Sign Posting of WHPAs

Posting of the 10-year CFR with signs is an important public education effort identified in the regional portion of this plan. Six signs will be placed in areas of high traffic in and out of the WHPAs in the City. The sign locations are listed in Table S-17.

Table S-17: Sign Locations

Well	Location Description
No. 3 and 4	Naches Avenue Near 3rd Street South
No. 5	Naches Avenue Near 1st Street South
No. 5	Wenas Street North Near Home Avenue
No. 6	Fremont Avenue West Near 3rd Street South
No. 7	McGonagle Road Near Lancaster Road
No. 7	Selah Loop Road Near Goodlander Road East

Annual School Seminar Program

In addition to the regional education efforts discussed in the Regional Management Plan, the City has committed to support an annual school seminar program. Schools are a good vehicle for public education because of the interest of young minds and the captivity of the audience. In an effort to inform the public about the need to protect groundwater and the fundamentals of wellhead protection, City Public Works staff will perform a minimum of one presentation per year to an area school. Teachers are typically receptive

to outside speakers and seminars on groundwater protection can be easily integrated into most science disciplines.

Development of a Pollution Prevention Program

As discussed in the Regional Management Plan, development of a pollution prevention program for high risk contamination sources within the WHPAs is an important management strategy. There are three elements to a pollution prevention program:

- identification of high risk contaminant sources within WHPAs
- notification of high risk contaminant sources
- distribution of pollution prevention information to high risk contaminant sources

Identification and notification of high risk contaminant sources has already been accomplished as part of the Regional Management Plan. Additionally, the City plans to provide wellhead protection information in its annual Consumer Confidence Report. Because the type of businesses in each community's WHPA may be different, the type of literature to be distributed as part of the pollution prevention program may also differ. Where possible, the literature collected has been tailored to the type of businesses currently located in the City of Selah's WHPAs or those which may located therein in the future. This and future information related to wellhead protection planning will be made available at City Hall.

1. *Managing Hazardous Waste: A Guide for Autobody Shops*, DOE Publication #92-BR-16.
2. *Managing Hazardous Waste: A Guide for Automotive Machine Shops*, DOE Publication #92-BR-11.
3. *What's Hazardous at Home? A Guide to Safer Alternatives and Proper Disposal of Hazardous Household Products*, Yakima County Solid Waste Division.
4. *Protecting Our Groundwater*, EPA 813-F-95-002, May 1995.
5. *Old Slick Says "Recycle Use Oil" and Practice Pollution Prevention*, Yakima County Solid Waste Division, August 1997.
6. *A Guide to Yakima County's Solid Waste Disposal Facilities and Expanded Recycling Opportunities*, Yakima County Solid Waste Division.
7. *A Guide to Disposal of Household Hazardous Wastes*, Yakima County Solid Waste Division.
8. *Small Quantity Generators*, Yakima County Solid Waste Division, August 1997.
9. *It All Begins At Home: A Guide to Reducing Hazardous Household Products*, Yakima County Solid Waste Division.
10. *A Guide for Photo Processors*, DOE Publication #94-138R.
11. *A Guide for Auto Body Shops*, DOE Publication #92-BR-16.
12. *Emergency Planning and Community Right-To-Know: A Guide for Businesses*, DOE Publication #93-BR-01.
13. *A Guide for Automotive Repair Shops*, DOE Publication #92-BR-12.
14. *A Guide for Service Stations*, DOE Publication #92-BR-13.
15. *A Guide for Tire Dealers*, DOE Publication #92-BR-15.
16. *A Guide for Transmission Shops*, DOE Publication #92-BR-10.

17. *A Guide for Automotive Machine Shops*, DOE Publication #92-BR-11.
18. *Water Quality Guide: Recommended Pollution Control Practices for Homeowners and Small Farm Operators*, DOE Publication #87-30.
19. *A Guide to Recycling Around the House*, DOE Publication #90-BR-6.
20. *Your Home, Your Health, and Pesticides*, DOE Publication #90-BR-17.
21. *Safer Alternatives: Reducing the Risk in the Home*, Department of Ecology.
22. *Does Your Facility Generate Industrial Wastewaters?*, EPA 570-9-91-UIC5.
23. *Empty Pesticide Container Disposal: Guidance for Growers and Commercial Applicators*, DOE Publication #92-BR-8.
24. *Hazardous Waste: Helping Small Business Understand the Law*, Department of Ecology Hazardous Substance Information Office.
25. *Frequently Asked Questions Concerning Solvent and Cleaner Disposal*, DOE Publication #96-422.
26. *Reducing and Managing Wastes from Catch Basins: A Guide for Pesticide Secondary Containment*, DOE Publication #94-186.
27. *Step by Step Fact Sheets for Hazardous Waste Generators*, DOE Publication #91-12.
28. *Waste Reduction for Vehicle Maintenance Shops*, DOE, July 1992.
29. *Pollution Prevention in the Fruit Packing and Storage Industry*, DOE Publication #94-51.
30. *Pollution Prevention in Hospitals and Medical Facilities*, DOE Publication #93-39.
31. *A Guide for Radiator Shops*, DOE Publication #92-BR-9.
32. *A Guide for Auto Dealers*, DOE Publication #92-BR-14.
33. *A Guide for Lithographic Printers*, DOE Publication #94-139R.
34. *A Guide for Screen Printers*, DOE Publication #94-137R.

The following contacts can be used to obtain additional copies of this literature or other wellhead and groundwater protection literature:

1. Yakima County Public Works: (509) 574-2300
2. Safe Drinking Water Act Hotline: (800) 426-4791
3. Environmental Protection Agency: (800) 424-4372
4. Small Flows Clearinghouse: (800) 624-8301
5. Washington State Department of Ecology: (509) 575-2491
6. National Technical Information Service: (800) 553-6847

COMMITMENT SUMMARY

In the development of this WHPP, the City is making a definitive labor and monetary commitment to protecting its groundwater supplies. A summary of the costs associated with this commitment is presented in Table B-1, Appendix B.

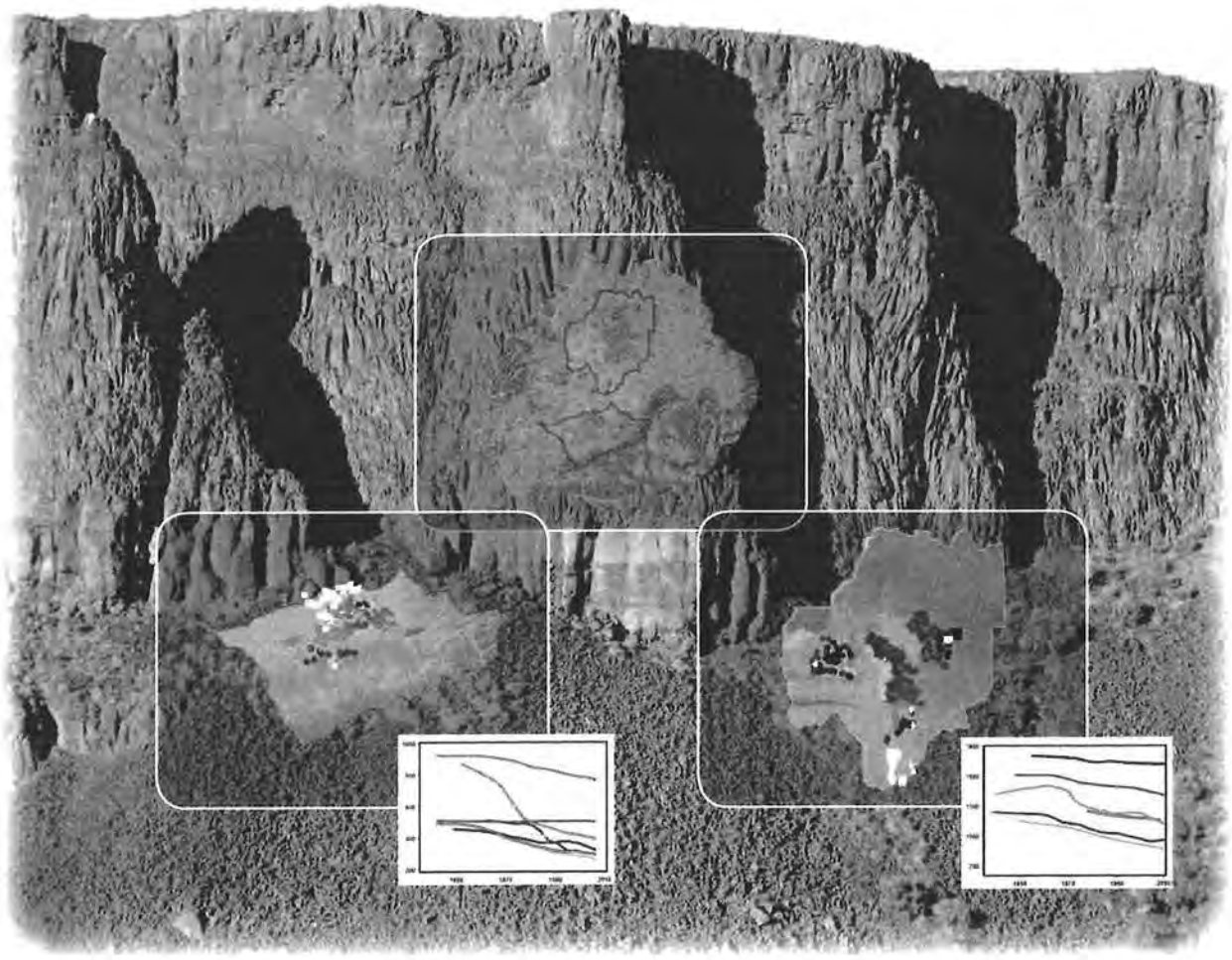
16.
USGS GROUNDWATER STATUS AND TRENDS FOR THE COLUMBIA PLATEAU REGIONAL AQUIFER SYSTEM, WASHINGTON, OREGON, AND IDAHO

HLA
Engineering and Land Surveying, Inc.

USGS
science for a changing world

U.S. Geological Survey Groundwater Resources Program and
prepared in cooperation with the Oregon Water Resources Department

Groundwater Status and Trends for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho



Scientific Investigations Report 2012–5261

U.S. Department of the Interior
U.S. Geological Survey

Cover: Lower left: Map showing select groups of wells with similar hydraulic response within portions of the Umatilla Basin, Oregon. Hydrographs showing the trend lines of spring median water levels for select groups of wells with similar hydraulic response in the Umatilla Basin, Oregon (East-West groups). (See figures 10 and 11*B*, respectively, in the report.)

Center foreground: Map showing distribution of groundwater-level trends in the Columbia Plateau Regional Aquifer System for the period 1968–2009. Red circles indicate groundwater-level declines, yellow circles indicate little or no change in groundwater levels, and blue circles indicate groundwater-level rises. Circle size is representative of magnitude of change.
(See figure 8 in the report.)

Lower right: Map showing select groups of wells with similar hydraulic response within portions of the Palouse Slope and the Columbia Basin Ground Water Management Area, Washington. Hydrographs showing the trend lines of spring median water levels for groups of wells with similar hydraulic response in the vicinity of the Palouse Slope and the Columbia Basin Ground Water Management Area, Washington (Eastern Flowpath groups).
(See figures 15 and 17, respectively, in the report)

Background: Photograph of Frenchman's Coulee in the vicinity of Quincy, Washington. (Photograph taken by Peter Prehn, private citizen, 2008. Used with permission.)

Groundwater Status and Trends for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho

By Erick R. Burns, Daniel T. Snyder, Jonathan V. Haynes, and Michael S. Waibel

U.S. Geological Survey Groundwater Resources Program and
prepared in cooperation with the Oregon Water Resources Department

Scientific Investigations Report 2012–5261

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2012

For more information on the USGS—the Federal source for science about the Earth, its natural and living resources, natural hazards, and the environment, visit http://www.usgs.gov or call 1–888–ASK–USGS.

For an overview of USGS information products, including maps, imagery, and publications, visit http://www.usgs.gov/pubprod

To order this and other USGS information products, visit http://store.usgs.gov

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Although this report is in the public domain, permission must be secured from the individual copyright owners to reproduce any copyrighted materials contained within this report.

Suggested citation:
Burns, E.R, Snyder, D.T, Haynes, J.V., and Waibel, M.S., 2012, Groundwater status and trends for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Scientific Investigations Report 2012–5261, 52 p., http://pubs.er.usgs.gov/publication/sir20125261

Contents

Abstract 1
Introduction 2
Purpose and Scope 2
Description of Study Area 4
Hydrogeologic Setting 4
Hydrogeologic Characteristics 5
Hydrologic Budget Components 7
Groundwater Occurrence and Movement 7
Study Methods 8
Sources of Data 8
Groundwater-Level Information 8
Geologic Model 10
Data Limitations 10
Measurement Accuracy and Data Compilation 10
Representative Sampling 10
Localized Conditions and Stresses 11
Influence of Well Construction 11
Commingling 12
Groundwater Status and Trends 15
Umatilla Area, Oregon 18
Palouse Slope/Eastern Yakima Fold Belt, Washington 28
Summary and Conclusions 43
Acknowledgments 45
Selected References 45
Appendix A. Interpretation Guide for Graphs of Stratigraphic Position Compared with Hydraulic Head for Wells in the Columbia River Basalt Group, Washington, Oregon, and Idaho 49

Figures

Figure 1. Map showing location of Columbia Plateau Regional Aquifer System of Washington, Oregon, and Idaho 3
Figure 2. Map showing surficial geology and structures of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho 6
Figure 3. Map showing locations of wells with usable water-level data within or immediately adjacent to the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, subsets of which were used for analysis in this study 9
Figure 4. Diagram showing effect of commingling on water levels in hypothetical wells for aquifers of equal transmissivity 12
Figure 5. Diagram showing effect of commingling on water levels in hypothetical wells for aquifers of unequal transmissivity 13
Figure 6. Diagram showing effect of commingling on water levels in hypothetical wells for aquifers with local variability 14
Figure 7. Map showing distribution of wells used for status and trends analysis for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho 16
Figure 8. Map showing distribution of groundwater-level trends in the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, for 1968–2009 17
Figure 9. Map showing distribution of groundwater-level trends for 1968–2009 in Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon 19
Figure 10. Map showing groups of wells with similar hydraulic response near the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon 20
Figure 11. Hydrographs showing groups of wells near the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon 21
Figure 12. Graphs showing estimated stratigraphic position (distance from the well bottom to the simulated top of Grande Ronde Basalt) compared with winter median water-level elevation in selected wells within and immediately adjacent to the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon, 1968, 1984, and 2006 23
Figure 13. Graph showing stratigraphic position (distance from the well bottom to the simulated top of Grande Ronde Basalt) compared with winter median water level measured in wells for shallow–deep well pairs from groups 3 and 14 near the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon 27
Figure 14. Map showing distribution of groundwater-level trends for 1968–2009 relative to the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 29
Figure 15. Map showing generalized groundwater-flow paths under 2000–2010 conditions through sets of well groups with similar hydraulic response near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 30

Figures—Continued

Figure 16. Hydrographs showing groups of wells corresponding to the western flow path near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 31
Figure 17. Hydrographs showing groups of wells corresponding to the eastern flow path near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 32
Figure 18. Hydrographs showing the middle groups of wells near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 33
Figure 19. Hydrographs showing groups of wells corresponding to the southern flow path near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 34
Figure 20. Graphs showing distance of the well bottom from the simulated top of Grande Ronde Basalt compared with water levels measured in wells near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 36
Figure 21. Map showing generalized potentiometric surface for measured Columbia River Basalt Group aquifer conditions during the pre-development period in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 41
Figure 22. Map showing generalized potentiometric surface for measured Columbia River Basalt Group aquifer conditions during 2000–2009 in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington 42

Conversion Factors, Datums, and Abbreviations and Acronyms

All conversion factors have been rounded to four significant digits. To reduce errors resulting from rounded conversion factors, reverse conversions should multiply by the inverse of the conversion factors originally used. For example, to convert feet into meters multiply by 0.3048. To convert meters into feet multiply by 1/0.3048.

Conversion Factors

Inch/Pound to SI

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	259.0	hectare (ha)
square mile (mi^2)	2.590	square kilometer (km^2)
	Volume	
acre-foot (acre-ft)	1,233	cubic meter (m^3)
	Flow rate	
acre-foot per year (acre-ft/yr)	1,233	cubic meter per year (m^3/yr)
foot per day (ft/d)	0.3048	meter per day (m/d)
foot per year (ft/yr)	0.3048	meter per year (m/yr)
inch per year (in/yr)	25.4	millimeter per year (mm/yr)
	Hydraulic conductivity	
foot per day (ft/d)	0.3048	meter per day (m/d)

SI to Inch/Pound

Multiply	By	To obtain
	Length	
meter (m)	3.281	foot (ft)

Datums

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88). Vertical coordinate information for historical data collected and stored as National Geodetic Vertical Datum of 1929 (NGVD 29) has been converted to NAVD 88 for this publication. Conversion between NAVD 88 and the commonly used NGVD 29 varies spatially; however, over most of the study area the following conversion can be used:

NGVD 29 = NAVD 88 – 3.6 feet.

This conversion generally is accurate within about ± 0.5 feet for 95 percent of the study area. The reader is directed to either the National Geodetic Survey Web site for VERTCON at http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html or the U.S. Army Corps of Engineers Web site for Corpscon at http://www.agc.army.mil/corpscon for more accurate conversions.

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83). Horizontal coordinate information for historical data collected and stored as North American Datum of 1927 (NAD 27) has been converted to NAD 83 for this publication. Conversion between NAD 83 and the commonly used NAD 27 varies spatially, and the difference in horizontal positions can be greater than 300 feet within the study area. For assistance with conversions, the reader is directed to either the National Geodetic Survey Web site for NADCON at http://www.ngs.noaa.gov/TOOLS/Nadcon/Nadcon.html or the U.S. Army Corps of Engineers Web site for Corpscon at http://www.agc.army.mil/corpscon.

Elevation, as used in this report, refers to distance above the vertical datum.

Abbreviations and Acronyms

Abbreviation or Acronym	Definition
CPRAS	Columbia Plateau Regional Aquifer System
CRBG	Columbia River Basalt Group
eYFB	eastern Yakima Fold Belt
GWMA	Columbia Basin Ground Water Management Area
MAF	million acre-feet
NWIS	National Water Information System
OWRD	Oregon Water Resources Department
SOWAT	SOil WATer balance model
USGS	U.S. Geological Survey
WADOE	Washington State Department of Ecology

This page is intentionally blank.

Groundwater Status and Trends for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho

By Erick R. Burns, Daniel T. Snyder, Jonathan V. Haynes, and Michael S. Waibel

Abstract

Well information and groundwater-level measurements for the Columbia Plateau Regional Aquifer System in Washington, Oregon, and Idaho, were compiled from data provided by the U.S. Geological Survey and seven other organizations. From the full set of about 60,000 wells and 450,000 water-level measurements a subset of 761 wells within the aquifers of the Columbia River Basalt Group (CRBG) then was used to develop a simple linear groundwater-level trend map for 1968–2009. The mean of the trends was a decline of 1.9 feet per year (ft/yr), with 72 percent of the water levels in wells declining. Rates of declines greater than 1.0 ft/yr were measured in 50 percent of wells, declines greater than 2.0 ft/yr in 38 percent of wells, declines greater than 4.0 ft/yr in 29 percent of wells, and declines greater than 8.0 ft/yr in 4 percent of wells.

Water-level data were used to identify groups of wells with similar hydraulic heads and temporal trends to delineate areas of overall similar groundwater conditions. Discontinuities in hydraulic head between well groups were used to help infer the presence of barriers to groundwater flow such as changes in lithology or the occurrence of folds and faults. In areas without flow barriers, dissimilarities in response of well groups over time resulted from the formation of groundwater mounds caused by recharge from irrigation or regions of decline caused by pumping. The areas of focus for this analysis included the Umatilla area, Oregon, and the Palouse Slope/eastern Yakima Fold Belt in the Columbia Basin Ground Water Management Area (GWMA) consisting of Adams, Franklin, Grant, and Lincoln Counties, Washington.

In the Umatilla area, water levels from 286 wells were used to identify multiple areas of high hydraulic gradient that indicate vertical and horizontal barriers to groundwater flow. These barriers divide the groundwater-flow system into several compartments with varying degrees of interconnection. Horizontal flow barriers commonly correspond to mapped geologic structure and result in horizontal hydraulic gradients that progressively become steeper from north to south corresponding to an increase in structural complexity that may be impeding recharge from the uplands into the heavily developed areas.

Most CRBG aquifers in the Umatilla area are declining and since 1970, cumulative declines range from about 100 to 300 feet. Significant vertical hydraulic gradients are documented for relatively small areas near Umatilla, and since the 1970s, downward vertical gradients in these areas have been increasing as hydraulic heads in the deeper units have declined. The absence of vertical gradients over much of the area may be a consequence of flow through commingling wells that results in the equilibration of the heads between aquifers.

On the Palouse Slope in the central GWMA, large groundwater declines occurred during 1968–2009 along a north-south swath in the middle of the region. An analysis of 1,195 wells along major flow paths and through the area of persistent groundwater-level declines indicates that barriers to flow are not as evident in this area as in Umatilla. This is consistent with the geologic interpretation of the Palouse Slope as being a gently folded structure created by voluminous sheet flows of CRBG lavas. Groundwater discharge into the sediment-filled coulees, where the upper aquifers are intersected at land surface by incised canyons, is proposed as an alternative to explain local steepening of the hydraulic gradient along the Palouse Slope previously attributed to the presence of a groundwater dam. Comparison of generalized potentiometric surface maps developed for pre-development conditions and post-2000 conditions indicate that pre-development groundwater flow was from the uplands toward the Columbia and Snake River and that post-2000 flow patterns in the area are controlled by irrigation practices that have resulted in broad regions of elevated or depressed hydraulic head. In some cases, irrigation-related changes in head have reversed groundwater flow directions. Evidence of significant vertical hydraulic gradients exists, although much of the aquifer thickness is affected by commingling of wells. The effect of commingling and its relative contribution to problems related to groundwater-level declines remains unclear.

Introduction

The Columbia Plateau Regional Aquifer System (CPRAS) covers about 44,000 mi^2 of southeastern Washington, northeastern Oregon, and western Idaho (fig. 1). The population of the region is more than 1.3 million people (U.S. Census Bureau, 2000), and an important agricultural industry valued in the billions of dollars annually has developed despite the arid to semi-arid climate and limited access to surface-water resources. Groundwater availability in the aquifers of the area is a critical water-resource management issue because of the high demand of water for agriculture, economic development, and ecological needs. Groundwater levels have declined throughout much of the Columbia Plateau (Whiteman and others, 1994, p. B61–B65; Porcello and others, 2009; Burns and others, 2012). A comparison of water-level measurements from 1984 and 2009 from 470 wells in the CPRAS indicates that water levels declined in 83 percent of the wells and that declines were greater than 25 ft in 29 percent of the wells (Snyder and Haynes, 2010).

The primary aquifers of the CPRAS are basalts of the Columbia River Basalt Group (CRBG) and in places, overlying basin-fill sediments. Water-resources issues that have implications for current and future groundwater availability in the region include (1) widespread water-level declines associated with development of groundwater for irrigation and other uses; (2) reduction in base flow to rivers and associated effects on water temperature, water quality, fish, and other aquatic organisms; and (3) current and anticipated effects of global climate change on recharge, base flow, demand, and ultimately, groundwater availability.

The U.S. Geological Survey (USGS) Groundwater Resources Program began a study of the CPRAS in 2007 with the broad goals of (1) characterizing the hydrologic status of the system, (2) identifying trends in groundwater storage and use, and (3) quantifying groundwater availability. The study approach includes updating the regional geologic and hydrogeologic frameworks, documenting changes in the hydrologic status of the system, quantifying the hydrologic budget, and developing a groundwater-flow model for the system. The model, which will be outlined in a separate report, will be used to evaluate and test the conceptual model of the groundwater flow within the system and to evaluate groundwater availability. This report, which describes the relation between groundwater levels and trends and hydrogeologic controls, along with four recently published reports (Kahle and others, 2009; Snyder and Haynes, 2010; Burns and others, 2011; Kahle and others, 2011), provides comprehensive information about the physical hydrogeologic framework of the CPRAS based on historical and current investigations. This study, in part, relied on data collection and analysis conducted as part of a cooperative agreement between the USGS and the Oregon Water Resources Department to better define the hydrologic conditions in the Umatilla basin of Oregon.

Purpose and Scope

The purpose of this report is to describe the compilation of groundwater-level data for the CPRAS that will be used for comparison with a numerical groundwater-flow model and to evaluate the status and trends in the data and their relation to hydrogeologic controls that influence the hydraulic properties of the aquifer or hydraulic stresses from recharge or pumping. The scope of this report includes a regional assessment of the importance of these controls described through the presentation of maps of groundwater elevations, water-level changes, stresses, and hydrogeologic features in the CPRAS. This information will help to develop a broad understanding of how climatic, anthropogenic, and hydrogeologic factors combine to influence groundwater flow, and how climate change and groundwater development may influence the sustainability and availability of the water supply in the region. The analyses presented in this report generally are restricted to the primary CRBG aquifers within the CPRAS to demonstrate important features in key areas, and do not seek to be an exhaustive analysis of any area.

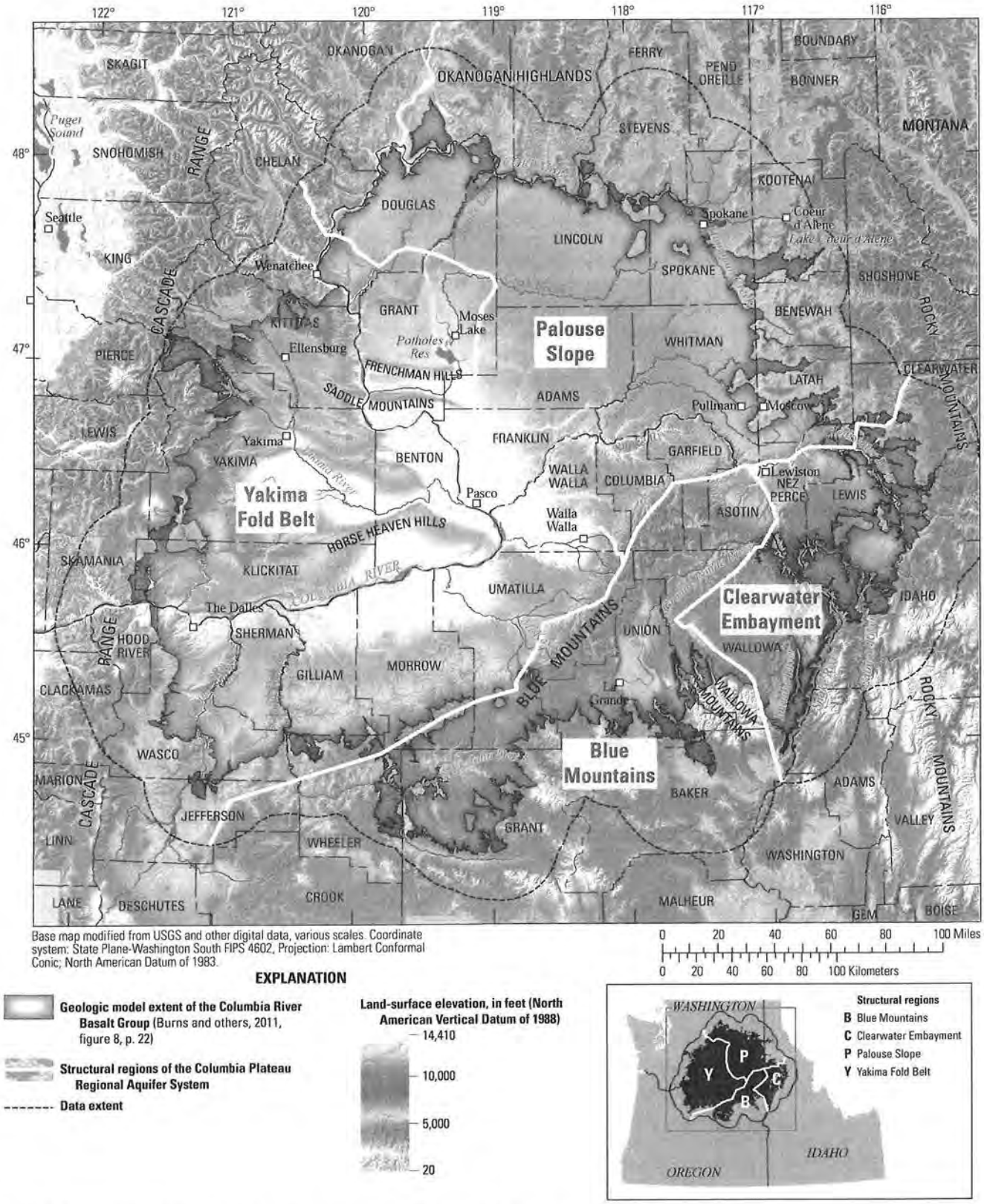


Figure 1. Location of Columbia Plateau Regional Aquifer System of Washington, Oregon, and Idaho.

Description of Study Area

A complete description of the Columbia Plateau is available in Kahle and others (2011), parts of which are presented here. The Columbia Plateau (fig. 1) is a structural and topographic basin within the drainage of the Columbia River basin. It is bounded on the west by the Cascade Range, on the east by the Rocky Mountains, on the north by the Okanogan Highlands, and on the south by the Blue Mountains. The Columbia Plateau is underlain by massive basalt flows with thickness estimated to exceed 16,000 ft near Pasco, Washington (Reidel and others, 2002, p. 211, fig. 2.6). Sedimentary deposits locally exceeding 2,000 ft in thickness overlie the basalt over large areas of the plateau.

The Columbia Plateau was divided into four informal physiographic subprovinces that represent structural regions—the Yakima Fold Belt, Blue Mountains, Palouse Slope subprovinces, and the Clearwater Embayment (fig. 1). Groundwater characteristics in each of these regions can be different because of variations in stratigraphy, depositional environment, and post-deposition folding and faulting. The presence and importance of flow barriers in the CPRAS has been recognized and discussed in numerous studies (for example, Newcomb, 1959; Porcello and others, 2009). The Yakima Fold Belt includes most of the western half of the plateau and is characterized by a series of east-west trending anticlinal ridges and synclinal basins. The Palouse Slope occupies the northeast quarter of the plateau, is much less deformed, and has a gently southwestward dipping slope. The other structural regions within the CPRAS are the Blue Mountains, a composite anticlinal structure that forms the southeastern extent of the Columbia River basin, and the Clearwater Embayment, which marks the eastward extent of the CPRAS along the foothills of the Rocky Mountains and includes a series of folds extending into Idaho.

Much of the Columbia Plateau is semiarid, the mean annual precipitation for 1895–2007 (Kahle and others, 2011, p. 4) is about 17 in/yr (about 40 million acre-ft/yr) and ranges from about 7 in. in the center of the study area to more than 60 in. in the north-westernmost extent of the study area. The types and amounts of natural vegetation growing on the Columbia Plateau are largely dependent on precipitation and land-surface elevation. The vegetation ranges from sagebrush and grasslands at lower elevations to grasslands and forest at mid elevations to barren rock and conifer forests at the upper elevations. Dry land agriculture mainly includes winter and spring wheat and lentils. Irrigated agriculture includes apples, hops, and other crops.

Overviews of the geology and hydrology of the CPRAS presented summarize detailed descriptions in reports by (1) Kahle and others (2009), who discuss the geologic framework used in this report; (2) Burns and others (2011), who describe the three-dimensional characteristics of the geology of the CPRAS; and (3) Kahle and others (2011), who discuss the hydrogeologic framework and the hydrologic budget components of the CPRAS.

Hydrogeologic Setting

The Columbia Plateau is an intermontane basin between the Rocky Mountains and the Cascade Range that is filled with mostly Cenozoic basalt and sediment. Most rocks exposed in the region are the CRBG, intercalated sedimentary rocks, and overlying younger sedimentary rocks and deposits that include Pleistocene cataclysmic flood deposits, eolian deposits, and terrace gravels of modern rivers. The CRBG consists of a series of more than 300 flows that erupted in various stages during the Miocene, 17 million to 6 million years ago. Individual flows range in thickness from 10 to more than 300 ft (Tolan and others, 1989; Drost and others, 1990). Soil and sediments that were formed or deposited on top of older lava flows and then covered and preserved by a subsequent lava flow are called sedimentary interbeds.

Generalized geologic stratigraphy discussed in this investigation is broadly based on recognized formations within the Columbia River Basalt Group. The primary geologic formations of interest, listed in order of increasing age, include the Saddle Mountains Basalt, the Wanapum Basalt, and the Grande Ronde Basalt (fig. 2; Swanson and others, 1979, p. G4–G8; Whiteman and others, 1994, p. B32–B33). Younger sedimentary deposits cover parts of the CRBG across the study area and are referred to informally as the Overburden. The Overburden consists of undivided, unconsolidated to semi-consolidated sedimentary deposits ranging from Miocene to Holocene in age (Drost and others, 1990). These include many types of deposits of local and (or) regional extent including flood gravels and slack water sediments, terrace gravels of modern rivers, and eolian deposits that can range in thickness from 0 to 1,300 ft. The Saddle Mountains Basalt formation consists mostly of basalts and associated sedimentary interbeds and is the least extensive and youngest formation of the CRBG. Most of the formation is in the west-central part of the study area, with less continuous occurrences in the Blue Mountains and eastward into Idaho. Thickness of the Saddle Mountains Basalt ranges from 0 to about 1,000 ft. The Wanapum Basalt formation, composed mostly of basalt and sedimentary interbeds, is in the central part of the study area. Much of the formation lies beneath the Overburden and Saddle Mountains Basalt. Thickness of the Wanapum Basalt ranges from 0 to about 1,200 ft. The Grande Ronde Basalt formation is the oldest and most extensive of the basalt formations discussed and comprises the vast majority of the CRBG. This formation underlies most of the study area, except for an area along the southern boundary of the CPRAS in Oregon and along the eastern edge of the aquifer system in Idaho. The Grande Ronde Basalt formation contains basalt and sedimentary interbeds. Thickness of the formation is largely unknown, but may be greater than 15,000 ft near the central part of the basin (Burns and others, 2011, p. 30, fig. 10*D*, and digital data).

Folding and faulting of the basalts occurred during the period of deposition and more recently. Younger basalt flows commonly were less-voluminous intra-canyon flows, so the distribution and thickness of these lavas are controlled by the shape of the valleys through which the lava flowed. Pleistocene outburst floods shaped the area by causing incision in the basalt, and erosion and deposition of the overlying sediment.

These geologic formations correspond to the hydrogeologic units defined for use in the USGS Regional Aquifer-System Analysis (RASA) Program and Groundwater Availability studies of the CPRAS (Whiteman and others, 1994, p. B32–B33; Kahle and others, 2009), and consist of the Overburden unit, the Saddle Mountains unit, the Wanapum unit, and the Grande Ronde unit. The informal term "unit" is used to differentiate from the formal geologic formations simplified for hydrologic discussions. For example, the geologic formations were simplified by grouping the Mabton and Vantage Interbeds into the Saddle Mountains and Wanapum units, respectively. The older rocks bordering and underling the CPRAS form the basement confining unit, referred to as the Older Bedrock hydrogeologic unit, and is composed of various rock types older than the CRBG, generally with much lower permeabilities than the basalts and considered the base of the regional flow system.

Hydrogeologic Characteristics

The hydraulic characteristics of the geologic materials determine how a groundwater-flow system functions and how it will respond to stresses such as pumpage. These characteristics include horizontal and vertical hydraulic conductivity and the storage coefficient. Because of the heterogeneity of the geologic materials that comprise the CPRAS, the hydraulic characteristics can vary considerably. The Overburden deposits are diverse in lithology and the large variation in grain size, depositional regimes, and age of the deposits account for the large range of their hydraulic characteristics (Kahle and others, 2011, p. 20). Each of the CRBG geologic units consist of tens to hundreds of individual layered basalt flows. The layers are highly variable in thickness and extent, but over much of the Columbia Plateau, the lava flows are comprised of flood basalts that form laterally extensive deposits. Hydraulic characteristics vary greatly within and between the individual basalt flows. Horizontal hydraulic conductivities generally are greatest in the interflow zones formed from the combination of basalt flow tops with the base of an overlying basalt flow, and an intervening sedimentary interbed, if present. Flow tops and bases commonly are brecciated, although they can exhibit a wide range of depositional textures. Because flow tops and bottoms commonly have open and highly-connected pore structures, the basalt interflow zones frequently exhibit high horizontal hydraulic conductivity (Lindolm and Vaccaro, 1988). The interflow zones are separated by the low hydraulic conductivity flow interior in which most fractures are cooling joints that often are vertically oriented (columnar jointing). Despite the fact that joints exist, flow interiors commonly are effective confining units. Porosity and permeability generally are lower in the older bedrock than in the Overburden and CRBG units.

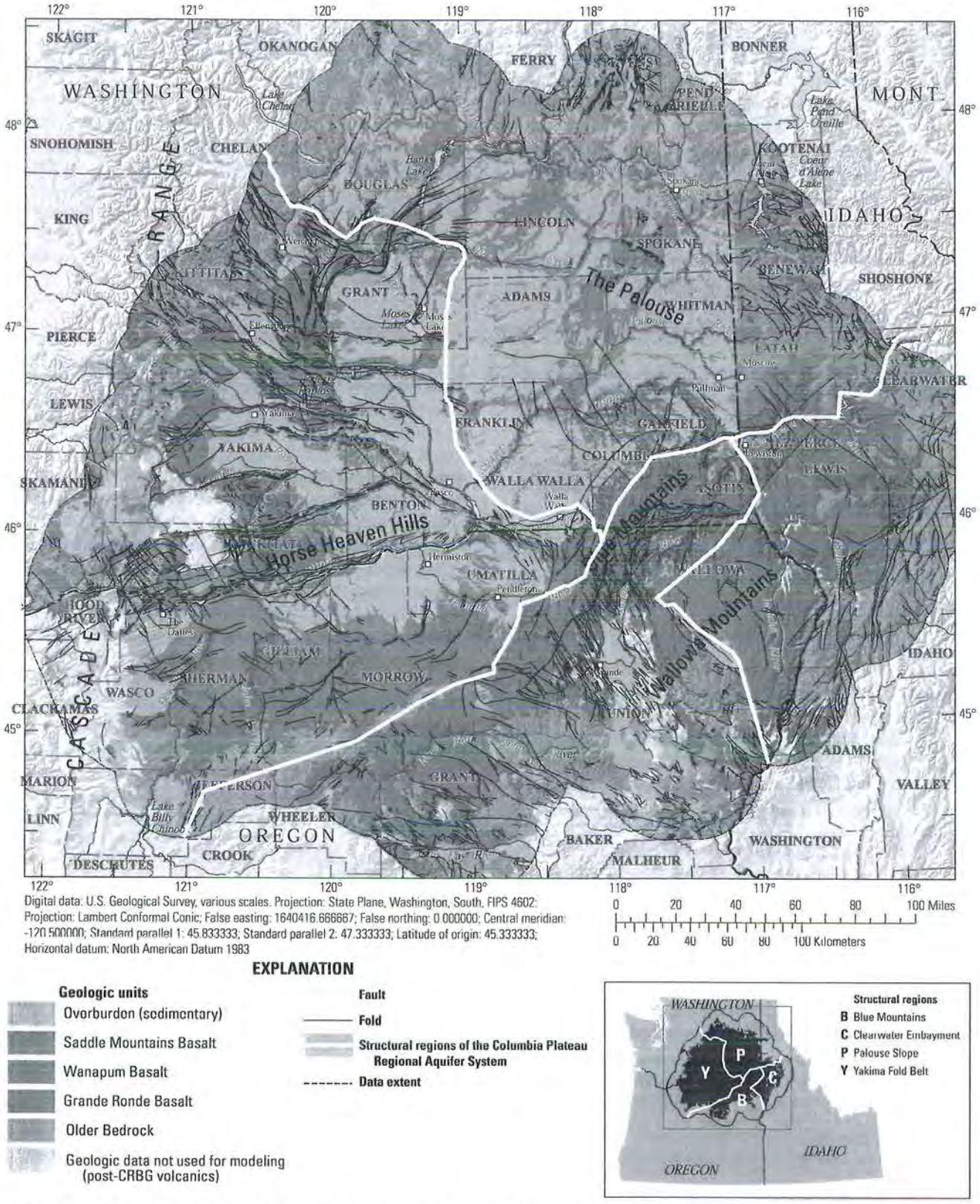


Figure 2. Surficial geology and structures of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho.

Kahle and others (2011, p. 21) estimated the median horizontal hydraulic conductivity values for the Overburden, basalt units, and older bedrock as 161, 70, and 6 ft/d, respectively, based on specific capacity data reported in previous studies. Vertical hydraulic conductivity of the geologic units in the CPRAS generally is known to be low but is poorly quantified. Estimates of vertical hydraulic conductivity range from about 0.009 to 2 ft/d for the Overburden unit, although values for some parts of this unit may be as low as 10^{-10} to 10^{-7} ft/d; values for the CRBG units range from 4×10^{-7} to 4 ft/d (Kahle and others, 2011, p. 57).

The storage characteristics of an aquifer are described by the storage coefficient, a dimensionless property defined as the volume of water that an aquifer takes into or releases from storage per unit of surface area per unit change in head. Previous estimates of the storage coefficient in the CPRAS typically range from about 0.1 to 0.2 for the unconfined parts of the Overburden unit and from about 0.01 to 10^{-6} for the CRBG basalt units (Kahle and others, 2011, p. 26–27).

Hydrologic Budget Components

The following discussion and estimates of the regional-scale hydrologic budget components for the CPRAS is from the recent work by Kahle and others (2011). Mean annual recharge from infiltration of precipitation was estimated based on annual precipitation data and previous model simulation results of recharge. The estimates of the other budget components were developed using a monthly SOil WATer (SOWAT) balance model to determine irrigation water demand, groundwater flux to the underlying modeled soil zone (recharge or discharge), direct runoff, and soil moisture in irrigated areas (Kahle and others, 2011, p. 36). The SOWAT model was developed to make use of estimates of actual evapotranspiration available from a new Simplified Surface Energy Balance method that uses remotely sensed land-surface temperature data (Senay and others, 2007).

Mean annual recharge from the infiltration of precipitation of 4.6 in/yr (10.8 million acre-ft/yr) for 1985–2007 was estimated for the CPRAS. The spatial distribution in recharge mirrors that of annual precipitation, with the highest recharge (more than 20 in/yr) occurring along the Cascade Range and the Blue Mountains. Mean annual recharge from infiltration of precipitation is less than 1 in/yr for a large part of the study area adjacent to the Columbia and Yakima Rivers where precipitation is limited.

Mean monthly irrigation throughout the study area peaks in July at 1.6 million acre-ft (MAF) (1985–2007 average), of which 0.45 and 1.15 MAF are from groundwater and surface-water sources, respectively. Annual use of irrigation water in the study area averaged 5.3 MAF during 1985–2007, with 1.4 MAF (or 26 percent) supplied from groundwater and 3.9 MAF supplied from surface water. Mean annual groundwater recharge from deep percolation of applied irrigation water in the study area was 4.2 MAF (1985–2007); 2.1 MAF (50 percent) occurred within the predominately surface-water irrigated regions of the Yakima Basin, Umatilla Basin, and Columbia Basin Project. The Columbia Basin Project, located in east central Washington, consists of more than 1,000 mi^2 of land irrigated with Columbia River water through a series of dams, pumping plants, and canals. Annual recharge rates range from less than 5 in/yr in predominately sprinkler-irrigated areas where groundwater is the source to more than 20 in/yr in surface-water supplied areas where conveyance losses and less-efficient application methods are more common.

Annual groundwater use (1984–2009) for purposes other than irrigation was estimated for the study area using information from several agencies. Public-supply groundwater use increased from about 201,000 acre-ft/yr in 1984 to about 269,000 acre-ft/yr in 2009. Domestic self-supplied groundwater use increased from about 54,600 acre-ft/yr in 1984 to about 71,200 acre-ft/yr in 2009. Industrial groundwater use decreased from about 53,400 acre-ft/yr in 1984 to about 43,900 acre-ft/yr in 2009. Other groundwater use, including for mining, thermoelectric needs, livestock, and aquaculture combined, increased from 16,900 acre-ft/yr in 1984 to about 43,600 acre-ft/yr in 2009.

Groundwater Occurrence and Movement

Groundwater moves through the regional aquifer system from the uplands to surface drainage features in the lowlands, mainly to the Columbia River and its major tributaries. Groundwater movement is affected by the geometry of the land surface and stream system, the extent, thickness, and hydraulic properties of the aquifers, the presence and nature of geologic structures, and the rate and location of groundwater recharge and discharge. Groundwater flow within the basalt units moves horizontally and vertically in the basalt interflow zones, flow centers, and sedimentary interbeds (Kahle and others, 2011, p. 27). Horizontal hydraulic conductivities generally are greatest in the interflow zones and consequently the interflow zones support most of the horizontal groundwater movement, whereas movement in the typically thick and lower horizontal hydraulic conductivity flow centers mainly is vertical. Therefore, the interflow zones in the basalt sequence form numerous, thin, semiconfined aquifers whose physical and hydraulic characteristics vary horizontally and vertically. Geologic complexity consisting of changes in lithology and folds and faults affect the geometry of flow paths by forming flow barriers or preferential pathways for groundwater flow (Snyder and Haynes, 2010, p. 7; Kahle and others, 2011, p. 27).

Study Methods

Recent and historical water-level data were compiled from a large number of wells located throughout the CPRAS. These data were used to identify "well groups" each consisting of individual wells with similar hydraulic heads (groundwater levels) and temporal trends. Comparisons were made between adjacent well groups to delineate sets of well groups, which define areas of overall similar groundwater-flow conditions with regard to groundwater-flow directions and horizontal and vertical hydraulic gradients (the change in hydraulic head per unit of distance in a given direction). Discontinuities in groundwater-flow conditions between the sets of well groups were used to help infer the presence of features that contribute to control the regional flow of groundwater. These discontinuities can result from: (1) geologic features that influence the hydraulic properties of the aquifer such as changes in lithology or the occurrence of structural folds and faults, or (2) the presence of hydrologic features such as groundwater mounds or troughs caused by stresses such as recharge from irrigation or discharge to pumping.

Sources of Data

The evaluation of groundwater status and trends for the CPRAS relied on information that was routinely collected by many agencies or that was developed in the current or previous studies of groundwater availability in the CPRAS. In particular, this report relies heavily on the development of the geologic framework and three-dimensional geologic model by Kahle and others (2009) and Burns and others (2011), respectively, and the hydrologic budget components developed by Kahle and others (2011).

Groundwater-Level Information

The primary source of well information, including location, construction, and water-level measurements, was the USGS National Water Information System (NWIS). Additional well and water-level data were provided by the U.S. Department of Energy, Washington State Department of Ecology, Oregon Water Resources Department, Columbia Basin Ground Water Management Area, GSI Water Solutions, Inc., Confederated Tribes of the Umatilla Indian Reservation, and Walla Walla Basin Watershed Council. Due to constraints on project resources, not all wells or water-level measurements from the CPRAS were included in this study. Emphasis was placed on incorporating datasets with the greatest number of wells, which included information on well construction and many water-level measurements made over relatively long periods. Wells are primarily within the extent of the CPRAS, although some wells as much as 20 mi outside of the CPRAS boundary also were included to help identify groundwater-level conditions across the boundary of the CPRAS (fig. 3). Information was acquired for 60,115 wells, although usable water-level data were available for only 39,610 wells. A total of 447,992 water-level measurements were collected from the 39,610 wells. The period of record for the water-level data extended from 1891 to 2010. The longest period of record for water-level measurements at an individual well is 96 years. Measurements at the longest annually monitored well began in 1940 and continue to the present (2011). From these data a subset of 7,772 wells and 147,563 water levels were used for the analyses presented in this report and are on file at the USGS office in Tacoma, Washington (http://wa.water.usgs.gov/projects/cpgw), and available upon request. Much of the data processing for analyzing groundwater levels was accomplished using Excel® spreadsheet tools developed by Tillman (2009).

Information on land-surface elevation was needed to calculate groundwater elevation from depth-to-water measurements. Land-surface elevations for many wells were reported by the agencies that provided the well information. Land-surface elevations were independently determined using a 10-m lateral resolution Digital Elevation Model (DEM; U.S. Geological Survey, 1999) as verification for these wells and to obtain land-surface elevations for the remaining wells with no reported values. Values of the DEM derived land-surface elevations were used if the difference between the reported and DEM derived elevations differed by greater than 100 ft.

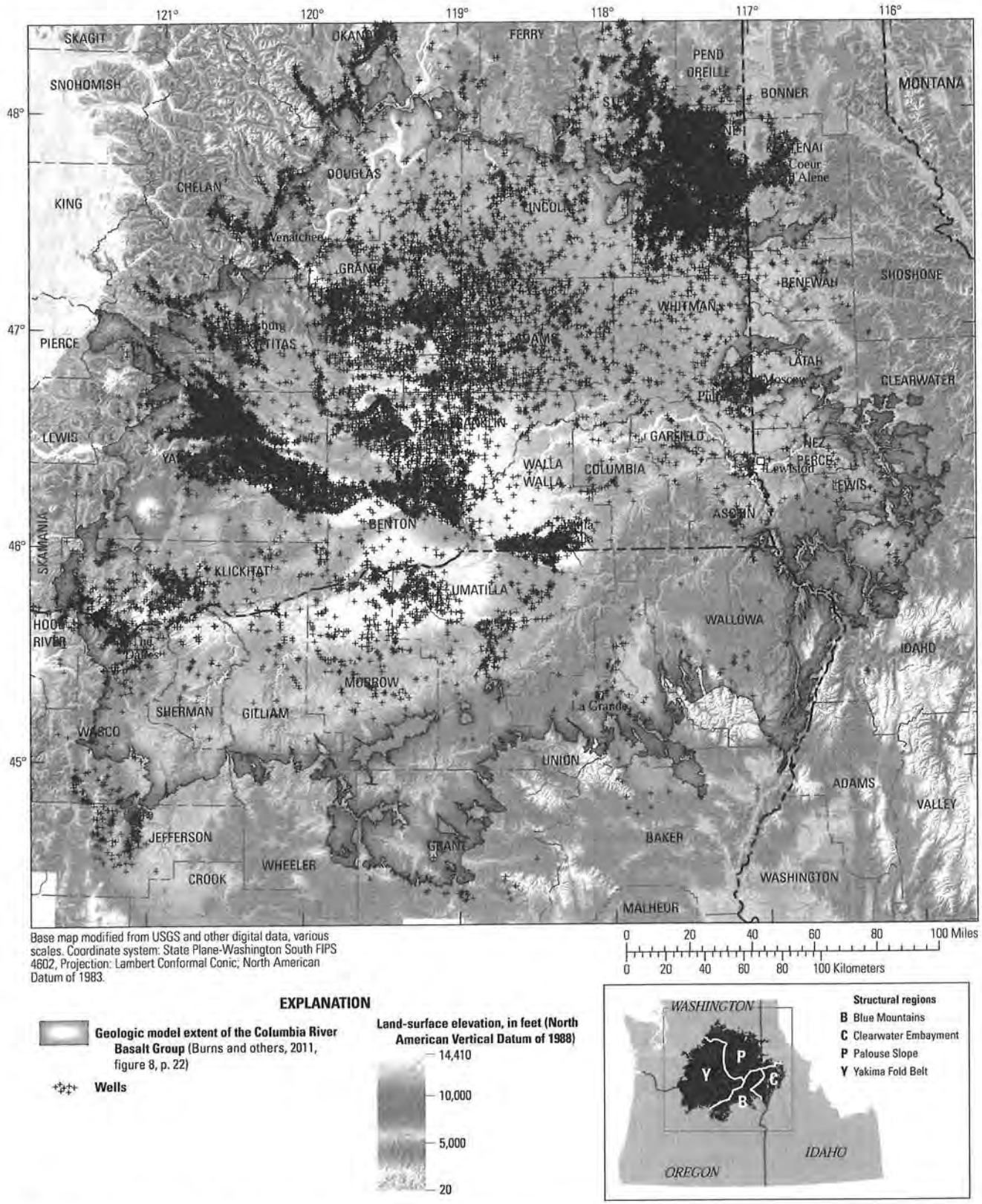


Figure 3. Locations of wells with usable water-level data within or immediately adjacent to the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, subsets of which were used for analysis in this study.

Geologic Model

A geologic model (Burns and others, 2011) provided improved estimates of CRBG and Overburden unit volumes and refined location of large structural features. This model was used to interpret the presence and significance of hydrogeologic controls on the groundwater system presented in this report. An on-line interactive tool was developed to serve point information and cross sections developed from the geologic model to the public (U.S. Geological Survey, 2012).

Data Limitations

The accuracy and representativeness of the groundwater-level measurements are dependent on various factors pertaining to measurement accuracy, quality assurance procedures, local conditions in the aquifer at the time of measurement, and well construction.

Measurement Accuracy and Data Compilation

Typical methods used to measure the depth to water in a well have precisions ranging from 0.01 ft to several feet. The precision of most measurements is expected to be in the range of about 0.1 ft. However, the accuracy of the determination of the groundwater elevation (how it compares to the actual value) depends on how the depth to water measurement is transformed to a groundwater elevation at a particular location, how it is associated with a particular aquifer, and the associated quality assurance procedures. A major factor affecting measurement accuracy is related to how the elevation for the well was determined, and the errors associated with assigning an elevation to the well. Errors also can relate to the location of the well. Errors in the latitude and longitude coordinates for the site can create errors of hundreds of feet in the assigned elevation of the water level, especially in areas with steep relief. For this report, well locations and elevations were mostly based on information reported from the respective agencies. A comparison was made between reported well elevations and those determined from a 10-m DEM on the basis of the reported latitude and longitude locations and lateral datums from the respective agencies. The median of the absolute values of the elevation differences is 4.3 ft and 90 percent of the differences are less than 44 ft.

The well and water-level data were compiled from many different agencies. Each agency has its own protocols for the description and documentation of measured wells, for the collection and recording of water-level data, and quality assurance procedures. Errors can occur when compiling large datasets due to either data entry, arithmetic errors, or treatment of exceptions when using rule-based algorithms to write all data into a common database. Common errors include incorrect well identification or location, incorrect or incomplete well construction information, errors in depth to water measurements, and incorrect determination of land-surface elevations. Additionally, some well information and water-level measurements for the same well may be reported by multiple agencies resulting in duplication of information. An effort was made to identify and correct errors in the data used in this study. However, it was not possible to ascertain the quality of the well information or water-level measurement for each well and undoubtedly, errors are present in the data. The large number of wells and measurements used in the analyses in this study should help to minimize the influence of these errors and provide a robust estimate of the groundwater elevation.

Water-level measurements in reports filed by well drillers at the time of new well installations were included in the compilation of water levels. However, measurements of water levels in newly constructed wells may not have been at equilibrium at the time of measurement and therefore may not represent static water-level conditions (Snyder, 2008, p. 11–14). Water-levels where the status indicated the well was dry, obstructed, or influenced by pumping, were excluded from the analyses as these water levels may not represent static conditions.

Representative Sampling

The groundwater-level measurements used in this study are assumed to be representative of the groundwater positions within the aquifers of the CPRAS. However, some of the data may suffer from a number of possible biases. These biases may arise from a variety of sources such as influences due to localized conditions and stresses, well construction, and commingling of groundwater. In addition, the spatial distribution and selection of wells used for the collection of water-level measurements may be biased as a result of increased scrutiny and monitoring in areas with groundwater declines. This can result in the clustering of wells and an over-representation of wells showing water-level declines.

Localized Conditions and Stresses

Pumping and recharge stresses can cause geographically localized or transient perturbations of water levels. Water-level measurements affected by such localized perturbations may not be representative of true conditions in the aquifer over a broader area.

Recharge in the CPRAS is dominated by precipitation (Kahle and others, 2011), which generally has gradual geographic variation. However, other recharge sources such as irrigation water, artificial recharge, or leakage from streams, canals, or lakes can influence groundwater levels over short distances. Stresses due to discharge by pumping, or to gaining streams, springs, seepage faces, wetlands, or evapotranspiration similarly can have large variations over short distances and influence groundwater levels.

The aquifer properties that influence the movement and storage of water in the aquifer and, therefore the groundwater level in the aquifer, include the extent, thickness, shape, hydraulic conductivity, storage coefficient, and degree of confinement. These properties can be highly heterogeneous over short distances due to variations in the original lithology or process of emplacement, subsequent modification by physical process such as erosion or fracturing due to structural deformation, or chemical changes such as dissolution, alteration, or mineralization. Variations in these properties over short distances may affect the groundwater levels and (or) the timing and magnitude of groundwater changes in response to changes in stresses relative to groundwater levels elsewhere in the aquifer.

Influence of Well Construction

Well construction may substantially influence the water levels in wells. Ideally, a well used for groundwater-level monitoring should be constructed to ensure good hydraulic connection between the well and the intended aquifer and that the water level and water-level fluctuations in the well broadly represent conditions in the aquifer. The well design must take into consideration the placement of open intervals and include appropriately-sized well screens to permit a good hydraulic connection between water in the aquifer and in the well. The use of sanitary and flow seals and well casings, where needed, help to isolate the well and the contributing aquifer from other units to prevent commingling, the collapse of rock into the well, and movement of water between the rock and the outside of the well casing. Incorrect well design, construction defects at the time of installation, insufficient well development (repeated purging and filling of a well to remove fine materials that may clog the well screen), or degradation due to age including silting, corrosion, or bacterial growth may affect how a well responds to changes in the aquifer (Taylor and Alley, 2002, p. 9).

Complete and accurate documentation of the well construction is important to ensure that the water levels measured in the well are properly interpreted. Documentation of well construction for some wells often is incomplete and does not include sufficient information, such as lithology or position of open intervals, to identify the contributing aquifer(s). This creates uncertainty on how to associate a water-level measurement from a well with the appropriate aquifer. Uncertainty with regard to the aquifer represented in a water-level measurement can contribute to misleading interpretations.

Over time, water-level declines in the CPRAS have resulted in dry wells, some of which have been deepened and reconstructed. Because water-levels from a deepened or reconstructed well represent conditions at a different location in the aquifer system, measurements always should be associated with well depth and construction at the time of measurement. However, in most instances the information on the deepening of wells was not associated with the original well for the data compilation sources used for analysis in this study. As a result, water-level measurements made subsequent to the deepening of some wells may remain associated with the depth of the original well. Hydrographs for these wells may show an initial step change in the water-levels measured in the well following deepening that could be mistakenly attributed to other causes. The water-level response of the well subsequent to deepening also may reflect the conditions in the aquifer at the new well depth. To address these limitations, robust methods of analysis were used to ensure that errors at individual wells did not strongly affect overall study conclusions.

Commingling

Commingling is the term used to describe the condition that occurs when a well is constructed so water can move from one aquifer to another through the well bore. This can occur in wells that are open to multiple aquifers through screens or uncased intervals. If the aquifers have different heads, then water will move through the well bore from the aquifer(s) with higher head to the aquifer(s) with lower head. When such commingling occurs, the static water level in the well is a composite water level, averaging conditions between all the aquifers open to the well.

In figure 4, well 3 is a hypothetical multiple completion well with open intervals in aquifers 1 and 2, which results in commingling of waters between aquifers. Because the hydraulic head in aquifer 1 (as represented by the potentiometric surface of the aquifer at the well) is greater than the hydraulic head in aquifer 2 a downward hydraulic gradient enables flow to enter the well 3 bore from aquifer 1, traversing down the well 3 bore and exiting the well 3 bore into aquifer 2. For this example, the transmissivities of aquifer 1 and 2 are equal; therefore, the resulting hydraulic head in well 3, from a transmissivity-weighted average of the heads

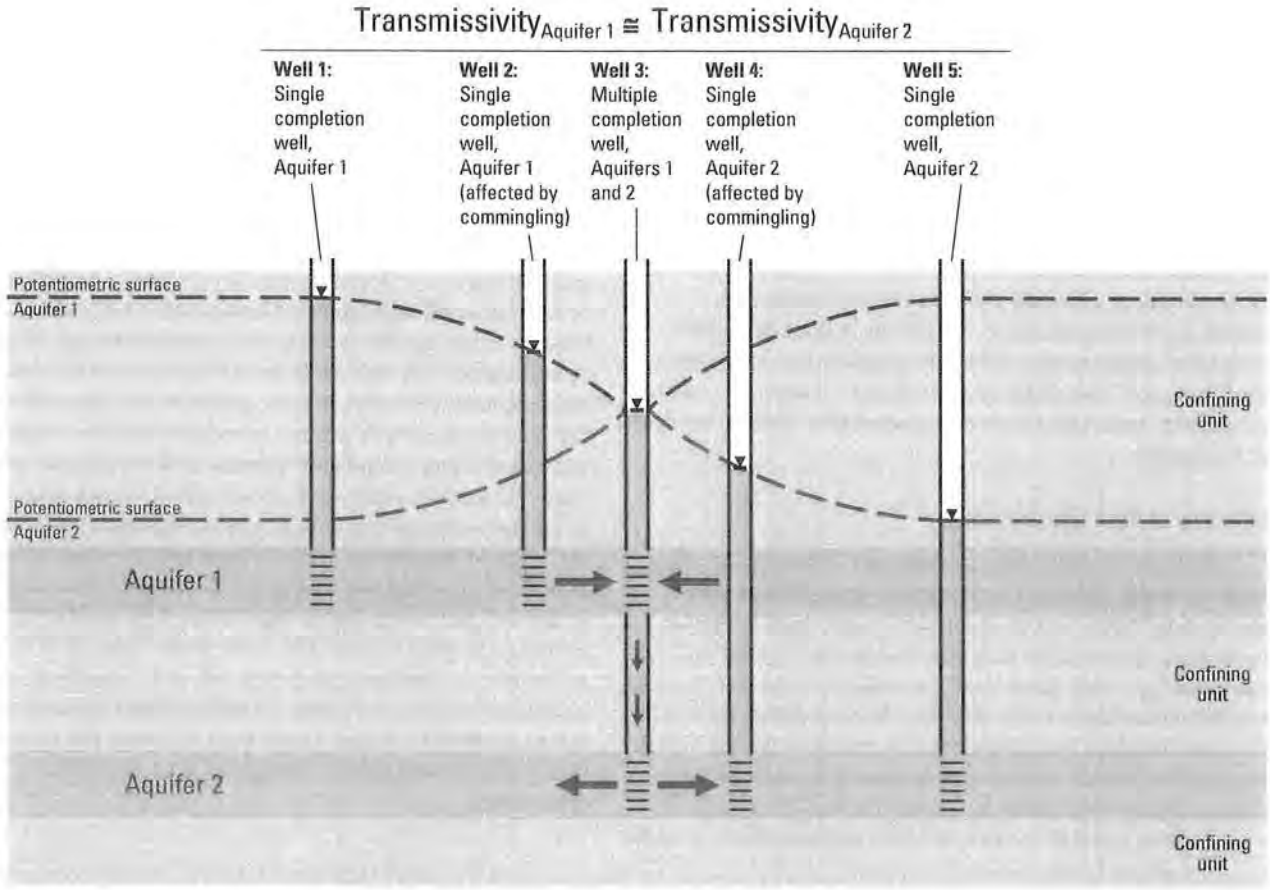


Figure 4. Effect of commingling on water levels in hypothetical wells for aquifers of equal transmissivity. Near the commingled well (well 3), the potentiometric surface is strongly affected by aquifer cross-connection. Far from the commingled well, the potentiometric surface reflects regional conditions.

in aquifers 1 and 2, is exactly one-half the vertical distance between the head in the two aquifers. Well 2 and well 4 are single completion wells with open intervals within aquifer 1 and aquifer 2, respectively, that are in close proximity to commingling well 3. These wells are within the cone of depression and cone of impression (the inverse of a cone of depression) resulting from the commingling in well 3. The hydraulic head in these wells is intermediate to the head at well 3 and the initial unaffected heads in aquifers 1 and 2 as represented by the heads in wells 1 and 5, respectively.

In figure 5, the transmissivity of aquifer 1 is much greater than the transmissivity of aquifer 2; therefore, the head in well 3 is dominated by the hydraulic head of aquifer 1. Because the cone of depression for aquifer 1 is greatly subdued, water levels in proximal wells open to aquifer 1, such as well 2, are minimally affected. However, water levels in proximal wells open to aquifer 2, such as well 4, are strongly affected due to the exaggerated cone of impression for aquifer 2.

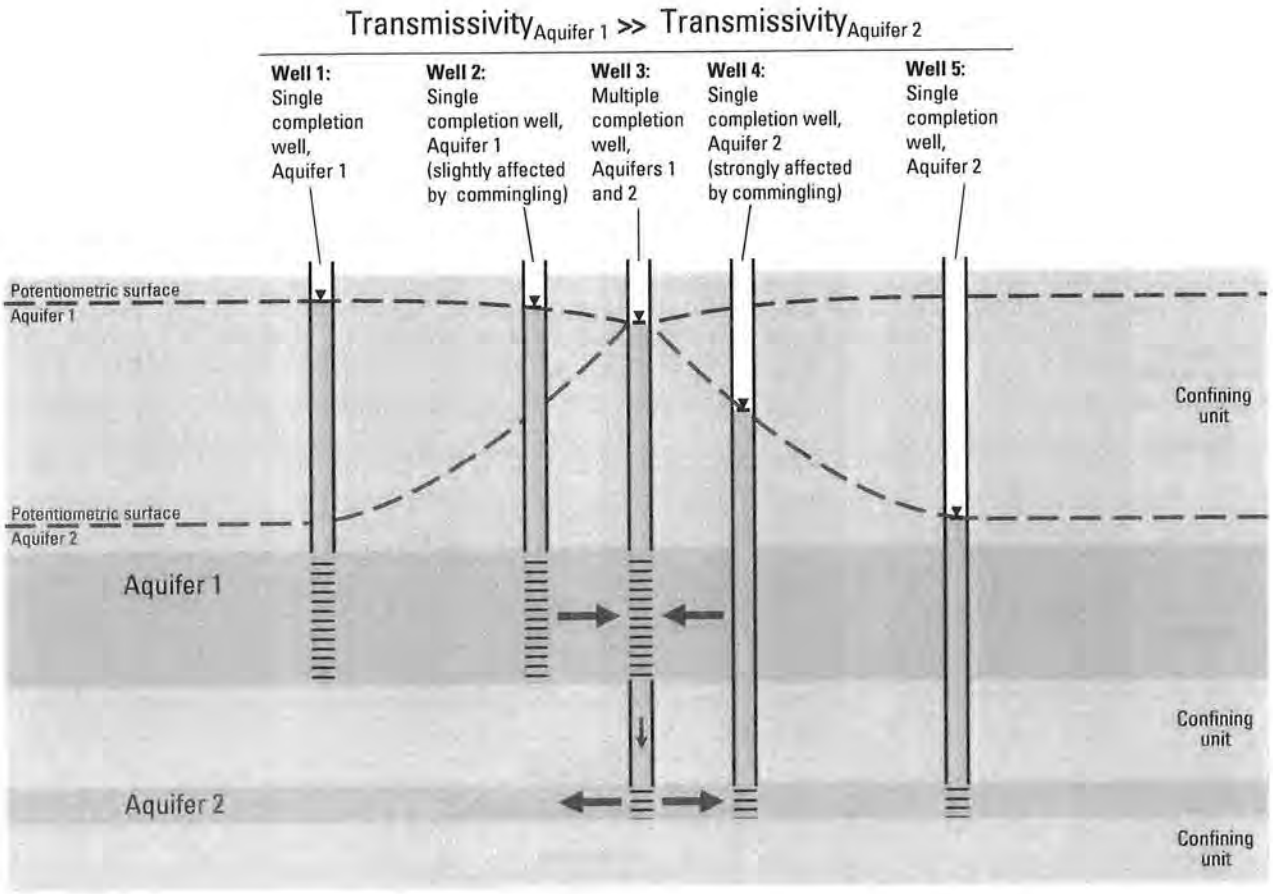


Figure 5. Effect of commingling on water levels in hypothetical wells for aquifers of unequal transmissivity. Water level in a well most closely resembles the aquifer with the higher transmissivity because the well has better hydraulic connection to this aquifer. Near the commingled well (well 3), the potentiometric surface is strongly affected by aquifer cross-connection. Far from the commingled well, the potentiometric surface reflects regional conditions.

The basalt aquifers of the CPRAS consist of a series of permeable interflow zones separated by less permeable flow interiors (Kahle and others, 2011, p. 20). The transmissivities of the aquifers can vary over several orders of magnitude (Kahle and others, 2011). The resulting water levels in commingled wells open to multiple aquifers depend on the relative transmissivity of the aquifers, which is a function of the thickness and the permeability of the aquifers. Figure 6 illustrates some possible examples for aquifers of varying transmissivity (thickness and (or) permeability).

The ratio of water-level fluctuations in a well to the groundwater-level fluctuations in an aquifer penetrated by that well is equal to the ratio of transmissivity of the aquifer in which the fluctuation occurs to the total transmissivities of all aquifers perforated by the well. As a result, the effect of the change in groundwater level of any aquifer where the well is open imposes a smaller change on the water level in the well (Sokol, 1963, p. 1,080).

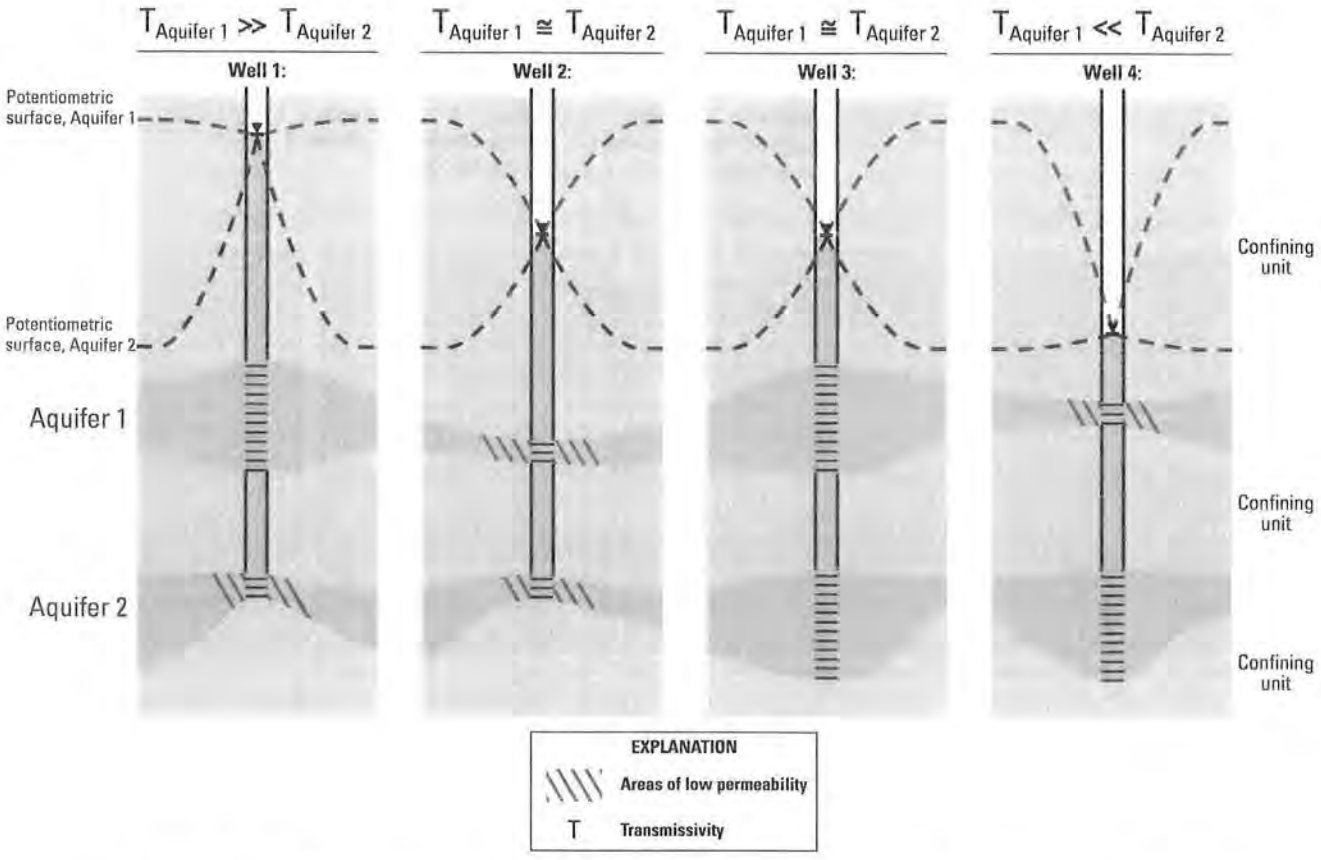


Figure 6. Effect of commingling on water levels in hypothetical wells for aquifers with local variability. Water level in a well most closely resembles the aquifer with which it is in best connection. The flow of water can be restricted by changes in aquifer thickness, aquifer lithology, or well construction, resulting in reduced hydraulic connection. Near a commingled well, the potentiometric surface is strongly affected by aquifer cross-connection. Far from the commingled well, the potentiometric surface reflects regional conditions.

Groundwater Status and Trends

Trend analyses were done on the compiled groundwater-level data for the CRBG aquifers to characterize and document changes in the hydrologic status of the system. Water levels in individual wells vary in response to natural and anthropogenic stresses on daily, seasonal, decadal, and longer time scales. Because the purpose of the USGS Groundwater Resources Program study is to evaluate the long-term availability and sustainability of groundwater resources within the CPRAS, the focus of the data analysis is to examine persistent decadal or longer trends that have occurred in many wells since the onset of widespread irrigation and groundwater pumping.

For the trend analysis, groundwater measurements representing conditions within the CRBG aquifers were used. The geologic model of Burns and others (2011) was used to identify wells with bottom elevations between the simulated top of the CRBG geologic units and the older pre-Miocene basement rocks. Water-level measurements from these identified wells then were used in the analyses. To remove daily and seasonal variation in groundwater levels induced by irrigation pumping, the median groundwater level measured in winter between January and March of each year was used in the analysis. The resulting data reflect the influence of multi-year precipitation patterns and the cumulative effects of pumping and irrigation recharge.

Water-level measurements made prior to 1951 are assumed to represent pre-development conditions because large scale irrigation started after the beginning of 1951. Because summer water levels in wells were not yet affected by large scale groundwater pumping, annual median water levels were used when winter water-level data were not available prior to 1951.

Water-level measurements in reports filed by well drillers at the time of new well installation were included to obtain the broadest spatial and temporal distribution possible in areas or periods of sparse data. Groundwater-level measurements reported as non-static measurements were excluded from analysis. The subsampled dataset includes 7,735 CRBG wells, with data representing pre-development conditions in 1,265 wells (fig. 7).

Although pumping and irrigation effects began to have appreciable effects on groundwater levels during the 1950s in the CPRAS, most persistent regional declines from pumping started after 1970. A map of the linear trends in groundwater levels for 1968–2009 was constructed to show areas of widespread declines in CRBG aquifers (fig. 8). Groundwater-level trends were computed as the slope of the best-fit line to the winter median water-level data for each well, provided that at least four data points were available that spanned at least 50 percent of the period 1968–2009. Of the 761 wells in the CRBG aquifers with sufficient data to compute water-level trends, overall declines were measured in 72 percent of the wells. The mean of the slopes of the water-level trends for all wells was a decline of 1.9 ft/yr. Rates of declines greater than 1.0 ft/yr were measured in 50 percent of wells, declines greater than 2.0 ft/yr in 38 percent of wells, declines greater than 4.0 ft/yr in 29 percent of wells, declines greater than 6.0 ft/yr in 9 percent of wells, and rates of decline greater than 8.0 ft/yr in 4 percent of wells. These results are similar to the values obtained by Snyder and Haynes (2010, table 1, p. 8) for 273 CRBG aquifer wells in the CPRAS during 1984–2009 where water levels declined in 81 percent of wells and water levels changed at an average rate of a 1.5 ft/yr decline (calculated as a weighted-mean average for all CRBG aquifer wells). Because complex anomalous behavior can occur for any single well hydrograph (for example, step changes in water level associated with nearby well construction activities), the linear water-level trend for any single well may not represent conditions over an area of interest, but the general pattern of water-level declines in multiple wells illustrates the persistent patterns across the CPRAS.

The clusters of wells with linear declines generally correspond to areas that are the subject of previous hydrogeologic studies and to continued data collection efforts by local, State, Federal, or non-governmental agencies in Oregon in the Mosier Watershed and Umatilla Basin, and in Washington in the Yakima Basin and the Palouse Slope/eastern Yakima Fold Belt in the Columbia Basin Ground Water Management Area (GWMA). The Columbia Basin GWMA, which encompasses Adams, Franklin, Grant, and Lincoln Counties (fig. 8), was designated by the Washington State Department of Ecology (WADOE), for the protection of groundwater in the area. Detailed analyses of well hydrographs for the Mosier Watershed, Oregon, and Yakima Basin, Washington, are available in Burns and others (2012) and Keys and others (2008), respectively. Well hydrographs are examined for parts of the Umatilla Basin, Oregon, and the Palouse Slope/eastern Yakima Fold Belt (within the GWMA), Washington, in this report. Groundwater-level hydrographs for the Umatilla Basin show that barriers to groundwater flow are readily identifiable. Conversely, groundwater-level hydrographs from the Columbia Basin GWMA exhibit a significantly different behavior, with fewer well-defined barriers to flow and with groundwater-level changes being dominated by the large-scale irrigation projects in the lowland near the Columbia River. An analysis describing the relation between well hydrographs and geologic features in the GWMA is presented by Porcello and others (2009); therefore, the discussion here is restricted to a complementary discussion of regional-scale flow patterns and hydraulic changes resulting from development of water resources in the GWMA since 1950.

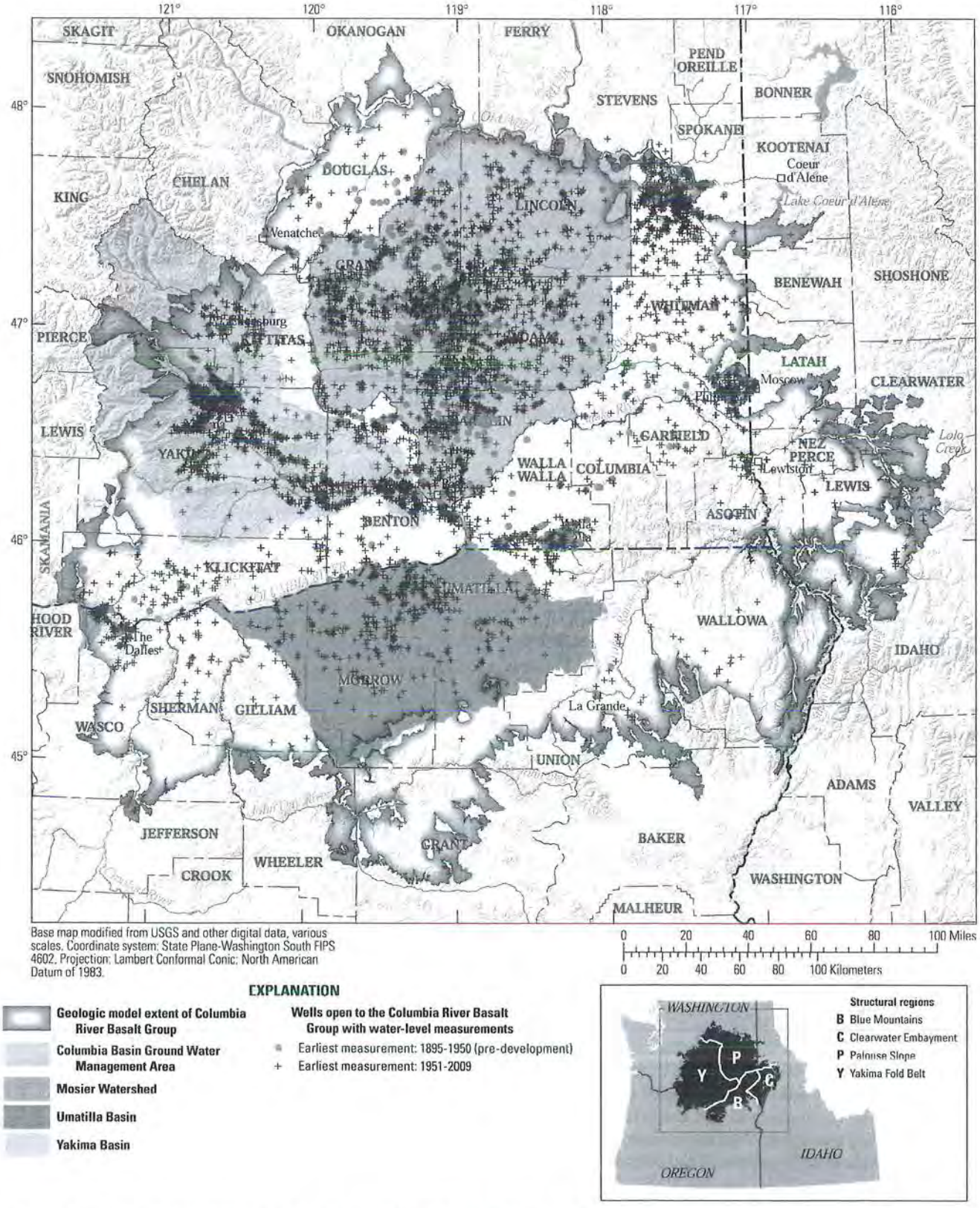


Figure 7. Distribution of wells used for status and trends analysis for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho. The water levels represent the period each year when seasonal pumping effects are minimal.

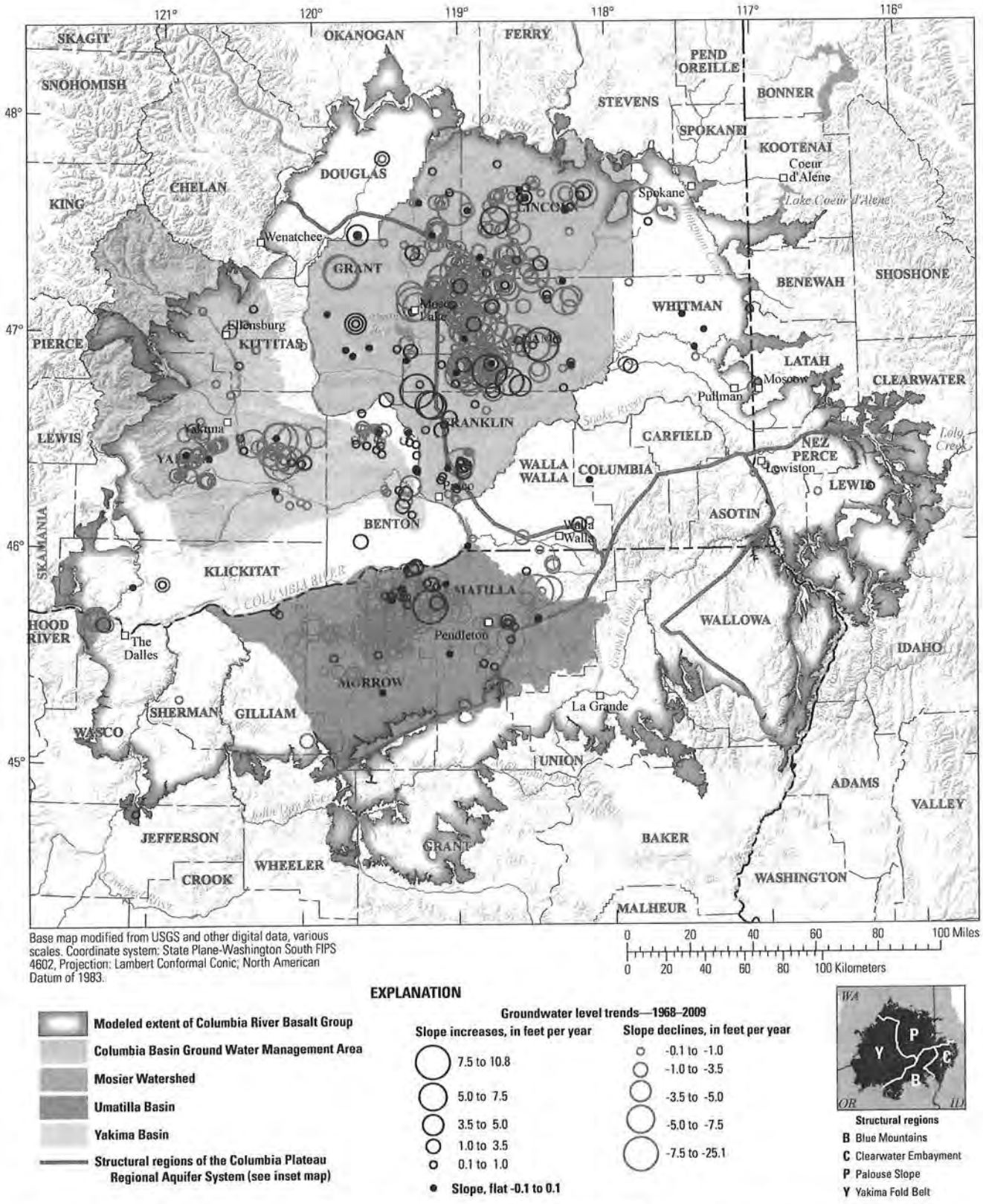


Figure 8. Distribution of groundwater-level trends in the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, for 1968–2009.

Umatilla Area, Oregon

The Oregon Water Resources Department (OWRD) established several administrative areas (Critical Ground Water Areas and Ground Water Limited Areas) in the area of the Umatilla Basin that cover most locations with large long-term groundwater declines. Administrative areas include Butter Creek, Ella Butte, Ordnance Basalt, and Stage Gulch (fig. 9; Oregon Water Resources Department, 2012). A total of 286 wells within and immediately adjacent to the OWRD administrative areas in the CRBG aquifers were divided into clustered groups of wells with similar water levels and trends (fig. 10). Figure 11 presents hydrographs showing the winter median water levels for individual wells within each well group shown in figure 10 and a trend line representing the overall water-level trend of all wells in the group constructed using the LOESS algorithm in the statistical software program TIBCO Spotfire S+ (TIBCO Software, Inc., 1988–2008). Zones of low permeability may separate the groups of wells with similar groundwater levels and trends. These zones represent leaky barriers to groundwater flow and compartmentalize the CRBG aquifer system. The degree of compartmentalization is variable, but it occurs in both the vertical and horizontal directions in the Umatilla area.

Horizontal flow barriers (barriers prohibiting or reducing horizontal groundwater flow) were identified between adjacent well groups when water levels and trends were different for wells open to the same aquifer. Because aquifers have not been mapped extensively within the study area, drilling of each well was presumed stopped when the target aquifer was found. The elevation where drilling stopped was used as an estimate of the elevation of an aquifer at that location. However, the originally flat-lying CRBG lava flows have been deformed over geologic time, so the CRBG interflow zones hosting most productive aquifers in the CPRAS are not horizontal. To correct for the departure from horizontality, the geologic model of Burns and others (2011) was used to compute estimates of the stratigraphic positions for water producing zones in each well. Correction was accomplished by subtracting the estimated top elevation of the Grande Ronde Basalt geologic model unit from each well bottom elevation. Positive values indicate aquifers are in the lavas above the top of the Grande Ronde Basalt, and negative values indicate aquifers are in the Grande Ronde Basalt. Plotting the groundwater level against this stratigraphic position for each well allows a rapid assessment of whether or not hydraulic head values are representative of the same aquifers (fig. 12). However, the flow margin of several younger (post Grande Ronde Basalt) lava flows are within the area of interest with thicker deposits to the north. The resulting wedge shape of the overlying lavas complicates the interpretation of positive elevations (fig. 12) corresponding to aquifer horizons, especially for north-south transects. Additional details regarding this method are provided in appendix A.

An example of strong horizontal compartmentalization is provided by comparing groups 2 (dark blue triangles) and 12 (gray triangles) (fig. 10). Measurements for these two groups likely are from the same aquifer within the Grande Ronde Basalt although water levels differ on average by about 500 ft (figs. 11*B* and 12*D*–*F*). Within each group, water levels for nearby wells commonly are within a few tens of feet of each other. Group 2 wells have a wider range of values than group 12 wells, which corresponds to a relatively smooth hydraulic gradient from Pendleton, Oregon, to the center of the Stage Gulch administrative area.

An example of a vertical flow barrier is provided by groups 3 (dark green squares) and 14 (light blue squares) (fig. 10). In map view, these groups apparently occupy much of the same area; therefore, horizontal compartmentalization does not explain the hydraulic head contrast between the groups that began in the 1960s (fig. 11*A*). However, based on the shallow and deep well pairs shown in figure 10, group 3 well bottoms are consistently above group 14 well bottoms (fig. 13), indicating that the aquifers are separated vertically, with the shallow group 3 wells exhibiting no persistent water-level declines, and the deeper group 14 wells exhibiting substantial declines since the 1960s. Whereas small groups of wells show ideal vertical separation (fig. 13), the pattern is obscured when considering all wells in groups 3 and 14 at the same time (fig. 12*A*–*F*). Well bottoms for group 3 wells trend to lower elevations of stratigraphic position to the south (not shown), indicating that the group 3 aquifer(s) are sloping relative to the estimated top of Grande Ronde Basalt consistent with the thickening of the younger lavas to the north. If aquifers were mapped based on similarity in hydraulic head, the apparent overlap of groups 3 and 14 (fig. 12) would disappear and the ideal vertical separation (compare fig. 13 with appendix A, fig. A1*A*) would be more apparent.

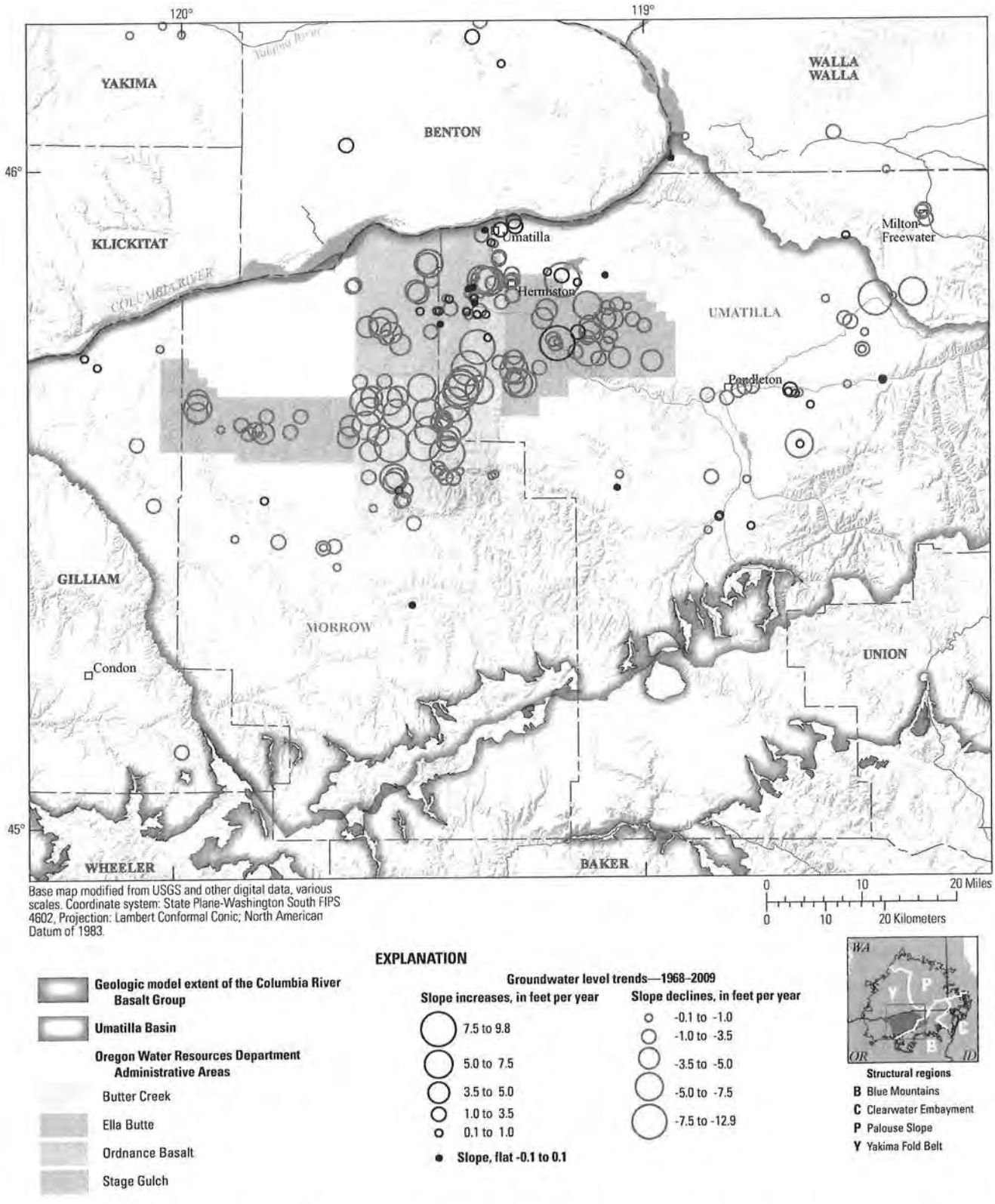


Figure 9. Distribution of groundwater-level trends for 1968–2009 in Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon.

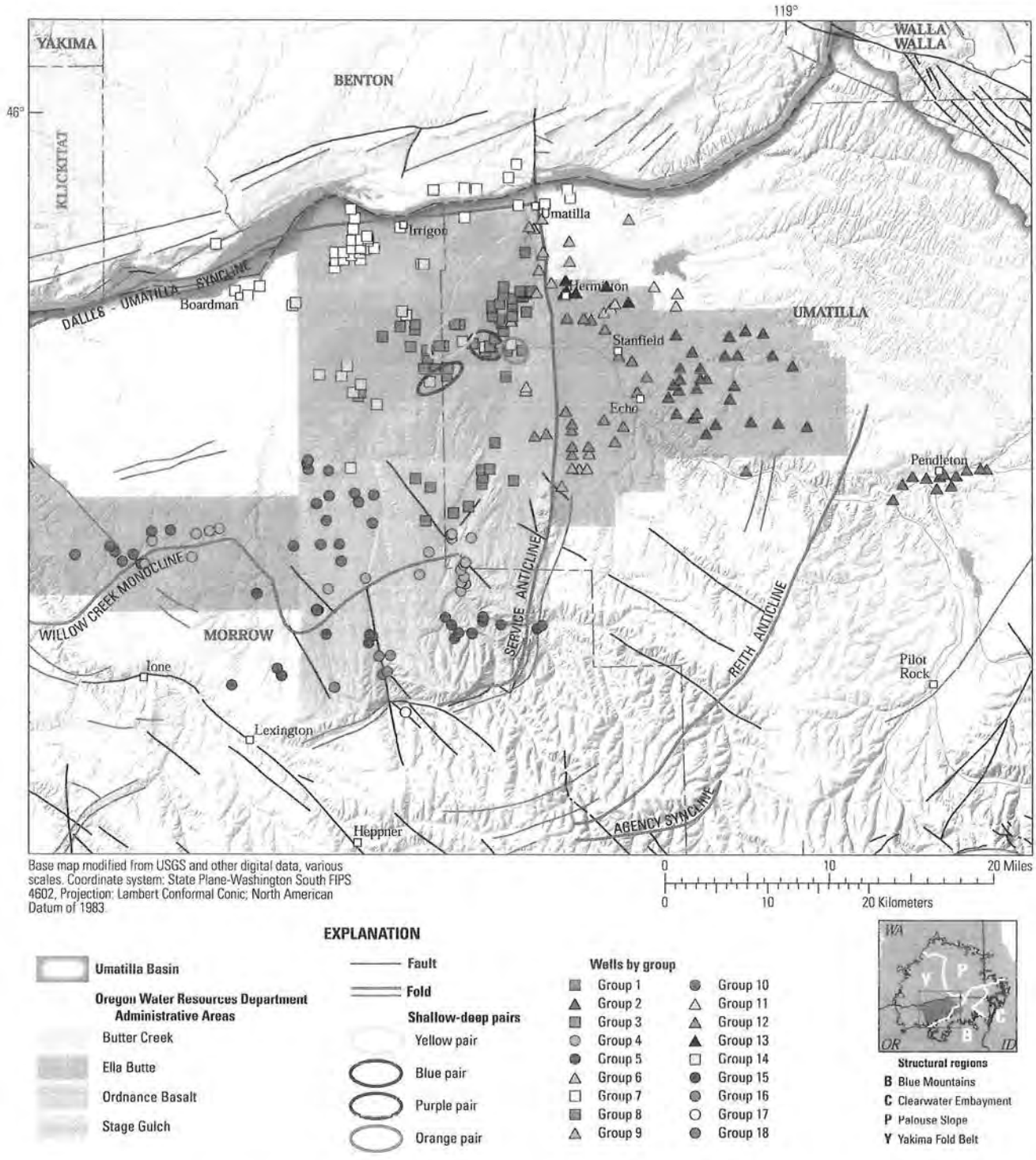


Figure 10. Groups of wells with similar hydraulic response near the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon. Wells are grouped to show a general North-South transect (circles and squares) and a general East-West transect (triangles and squares) (fig. 11).

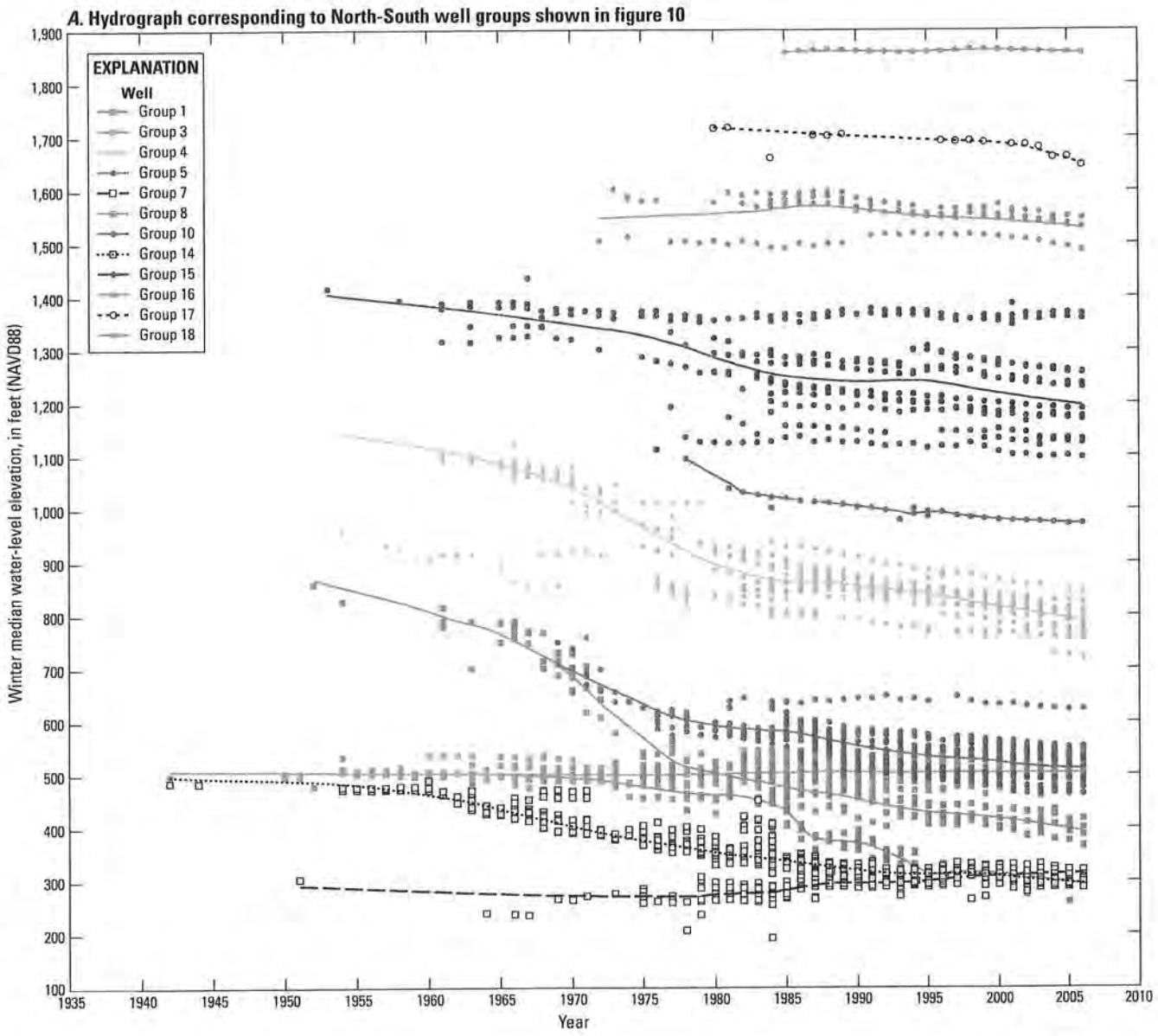


Figure 11. Groups of wells near the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon. (*A*) North–South group (circles and squares); and (*B*) East–West group (triangles and squares). Hydrographs depict the winter median water level for individual wells within each well group and LOESS curve representing the overall water-level trend of all wells in the group. Locations of wells are shown in figure 10.

B. **Hydrograph corresponding to East-West well groups shown in figure 10**

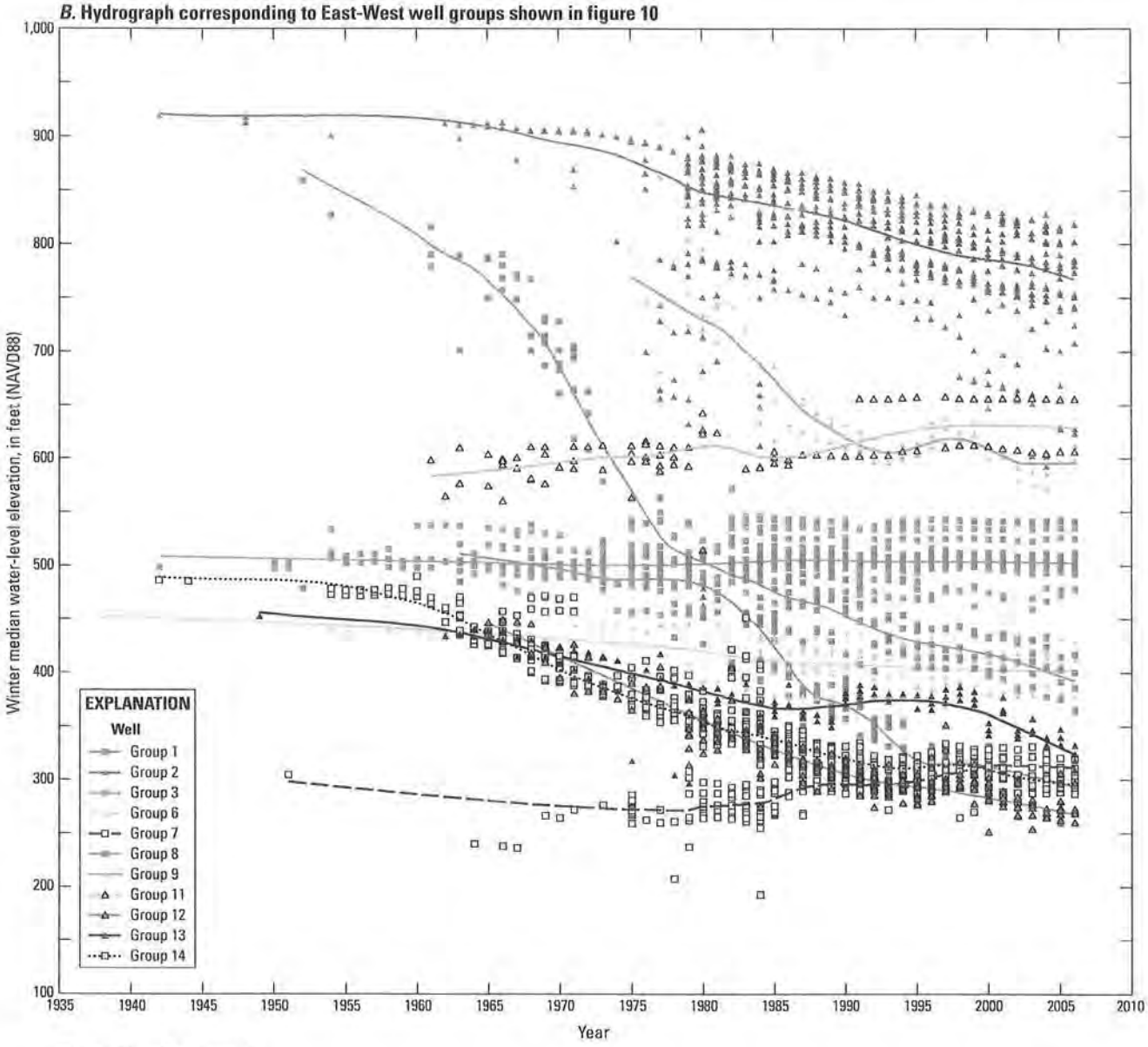


Figure 11.—Continued

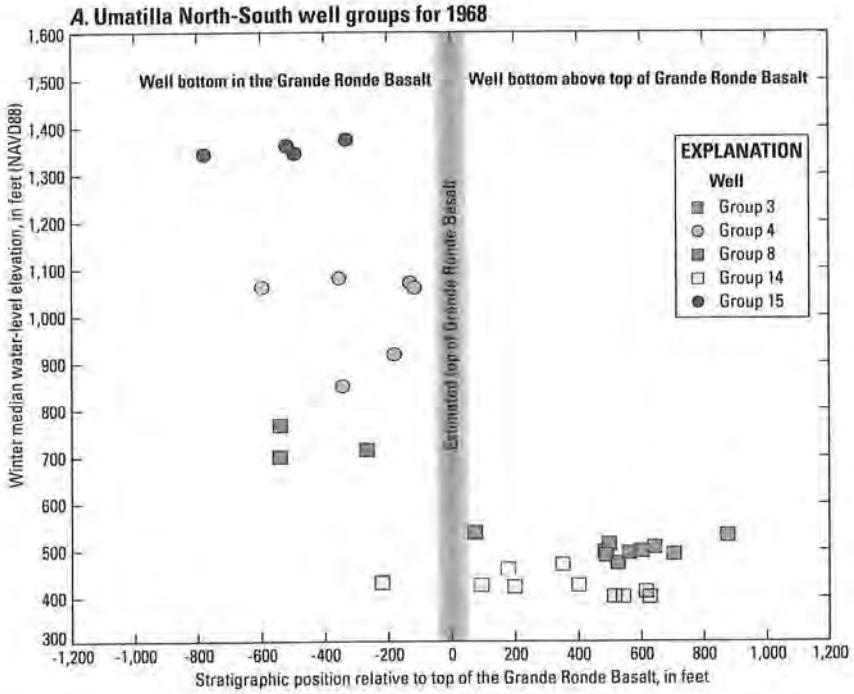


Figure 12. Estimated stratigraphic position (distance from the well bottom to the simulated top of Grande Ronde Basalt) compared with winter median water-level elevation in selected wells within and immediately adjacent to the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon, 1968, 1984, and 2006. (*A–C*) North–South group; and (*D–F*) East–West group. Locations of groups are shown in figure 10.

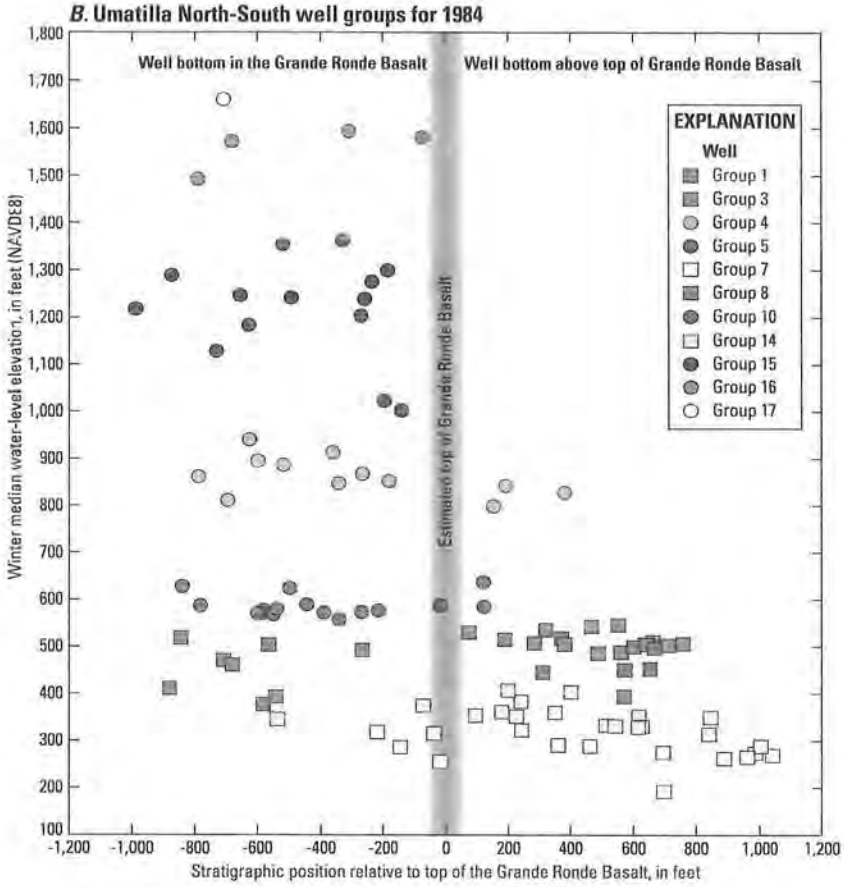
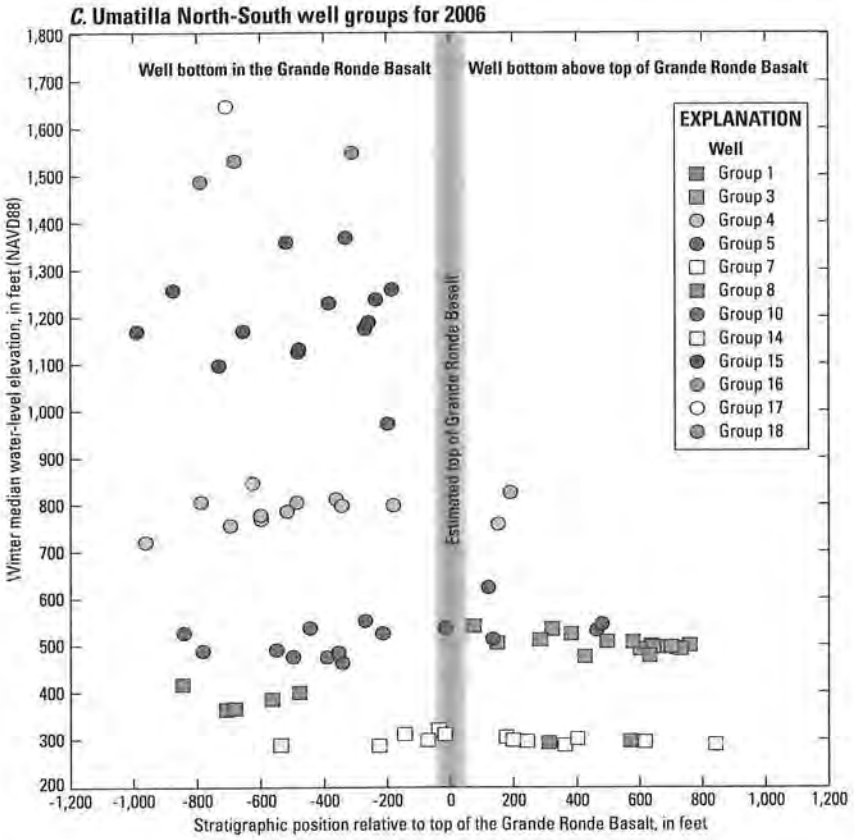


Figure 12.—Continued



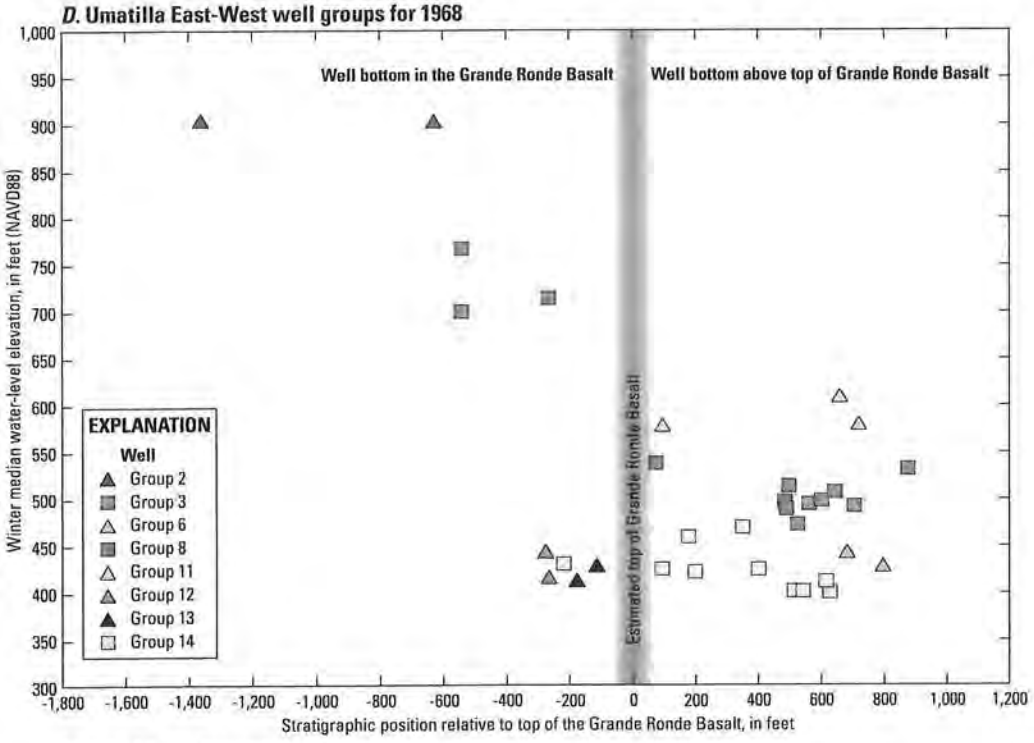


Figure 12.—Continued

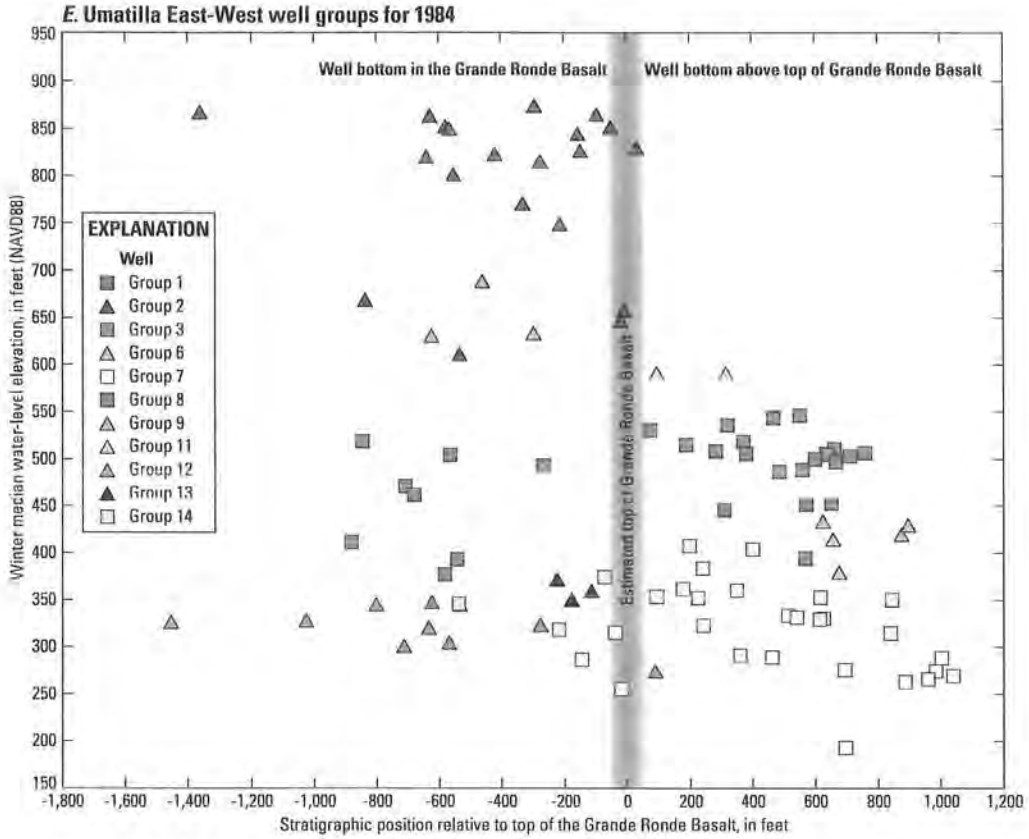


Figure 12.—Continued

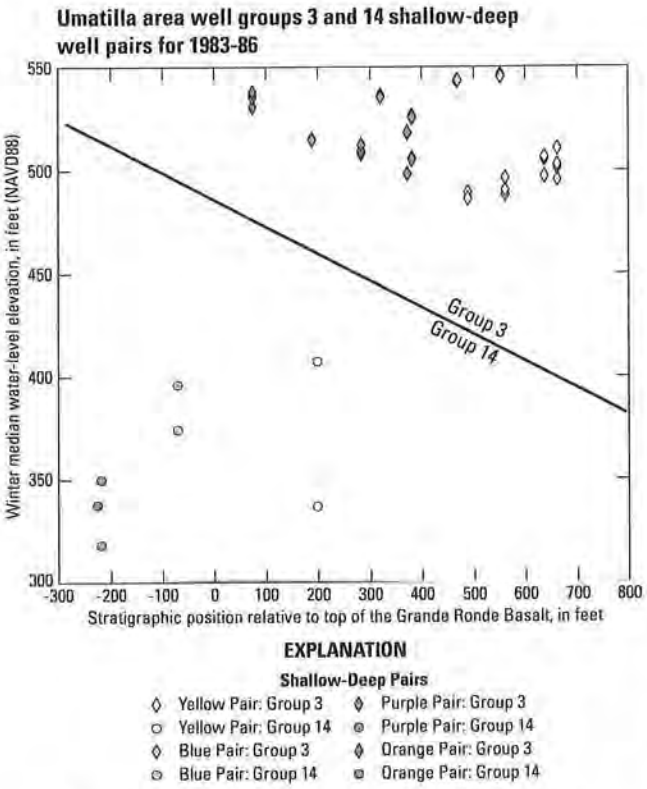


Figure 13. Stratigraphic position (distance from the well bottom to the simulated top of Grande Ronde Basalt) compared with winter median water level measured in wells for shallow–deep well pairs from groups 3 and 14 near the Oregon Water Resources Department administrative areas in the Umatilla Basin, Oregon. Colors of points correspond to colors of shallow-deep pair circles in figure 10.

Barriers to groundwater flow result from primary characteristics of the basalt, the depositional environment, and post-depositional folding and faulting. Vertical flow barriers typically result when aquifers are separated by dense impermeable CRBG lava flow interiors that are laterally extensive. Near flow margins, however, the dense interiors are discontinuous, and aquifers may be well-connected hydraulically. In the OWRD administrative areas, vertical separation is apparent only in the groundwater-level data near groups 6 (light blue triangles), 11 (pink triangles), and 14 (light blue squares), which have higher hydraulic heads than nearby wells completed in lower stratigraphic units. For example, the head in group 3 wells stayed nearly constant at about 500 ft, whereas the deeper group 14 wells have shown declines in groundwater elevation from about 450 to about 300 ft since the 1960s (fig. 11*B*).

For all other well groups, there is a conspicuous lack of vertical hydraulic gradients across thick sequences of lava that should contain many individual lava flows. Within most groups a uniform hydraulic head exists across thousands of feet of basalt thickness despite the fact that many (approximately 100-ft thick) lavas are intersected (fig. 12*A*–*F*; ideal behavior is shown in fig. A1*D*). These hydraulic heads are uniform even though the older lava flows were more extensive than the younger flows, which implies that dense flow interiors should separate the aquifers, creating the conditions necessary for vertical hydraulic gradients. The uniformity of hydraulic heads in these aquifers may be the result of hydraulic equilibration through commingling wells. For confined or other low storage aquifers, time for equilibration can be short. In the Mosier Watershed, Oregon, commingled wells equilibrated within 2 years (Burns and others, 2012). Because groundwater-level monitoring typically begins after multi-year declines have been documented, data representing pre-commingling conditions are limited.

Examination of the mapped geologic structure shows horizontal compartmentalization is frequently correlated to the structure, although not always. The correlation along the Willow Creek monocline in groups 4 (orange circles), 5 (dark red circles), 10 (purple circles), and 15 (dark blue circles) show consistent head patterns along the sinuous fold structure and high head differences between the groups across the fold indicating that the fold functions as a longitudinal conduit and a perpendicular barrier to groundwater flow (figs. 10 and 11*A*). The Service anticline also is an apparent horizontal flow barrier, although the deeper aquifers have complex, yet similar patterns particularly later in time, which indicates that some aquifers may be better hydraulically connected across the structure than others, indicating that commingling may be rendering this barrier less effective over time. To the contrary, the Reith anticline apparently is not a horizontal barrier to flow between the Pendleton area and the eastern side of the Stage Gulch administrative area as evidenced by group 2 wells (dark blue triangles) in figure 11*B*. From north to south, the hydraulic gradients increase proportionally to the amount of geologic structure (compare water levels from figure 11*A* to the well locations in figure 10), indicating that geologic structure may be impeding lateral recharge from the uplands. Curiously, the exceptionally high hydraulic head contrast between groups 2 and 12 (gray triangles) (figs. 10 and 12*D*–*E*) does not correspond to a mapped geologic structure, indicating the presence of a previously unmapped geologic feature.

Near the OWRD administrative areas, a few shallow CRBG aquifers (groups 3 [dark green squares], 6 [light blue triangles], 7 [yellow squares], and 11 [pink triangles]) are receiving recharge from irrigation projects and have stable or slightly rising hydraulic heads (fig. 11*B*). Water levels in many of the deeper CRBG aquifers, in contrast, have declined 100–300 ft since 1970 as shown in groups 4 (orange circles), 8 (red squares), 10 (purple circles), and 14 (light blue squares) (fig. 11*A*). Hydraulic heads in groups 15 [dark blue circles], 16 [green circles], 17 [white circles], and 18 [magenta circles] (figs. 10 and 11*A*) to the south have lower total decline because they are protected from the high pumping rates in the north by horizontal flow barriers immediately north of these groups.

Palouse Slope/Eastern Yakima Fold Belt, Washington

The Palouse Slope and the eastern Yakima Fold Belt (fig. 1), which forms a transition area between the two physiographic provinces, encompass the entire area of the Columbia Basin GWMA (hereafter referred to as the Palouse Slope/eYFB). Within the GWMA, WADOE has established several administrative areas (Ground Water Management Subareas) that cover most locations with large long-term groundwater-level declines (Washington State Department of Ecology, 1988a, 1988b, and 1988c). These include the Odessa, Quincy, and 508-14 subareas (fig. 14). The largest groundwater-level declines measured in the central GWMA (1968–2009) are along a north-south swath near the center of the area (fig. 14). Hydrographs for 1,195 wells blanketing the area of largest declines in the CRBG aquifers were examined and divided into groups of wells exhibiting similar changes in hydraulic head over time and a subset of these groups was selected to illustrate these trends (fig. 15). Horizontal barriers to flow are not as evident in this area as in the Umatilla area, but groups are still identifiable based on similar response to hydraulic stresses. This is consistent with the geologic interpretation of the Palouse Slope as being a gently folded structure created during subsidence where CRBG lavas were deposited in voluminous sheet flows. For this area, hydrographs of well groups are most easily viewed along general flow paths that have developed as the result of irrigation stresses on the aquifer system (fig. 15). These flow paths generally trend toward the area with large declines (fig. 14).

Figures 16–19 present hydrographs showing the winter median water levels for individual wells within each well group shown in figure 15 and the trend line for each group constructed using the statistical software program, TIBCO Spotfire S+ (TIBCO Software, Inc., 1988–2008). Water levels in wells in groups 1 (pink circles), 2 (light blue circles), 3 (dark green circles), and 4 (black circles and white circles for shallow and deep wells, respectively) associated with the western flow path (shown as circles in figure 15) start to rise during the 1950s (fig. 16). Prior to 1950, the limited data suggest lower groundwater levels and flatter hydraulic gradients. After 1950, groundwater levels rise and the hydraulic gradient steepens from west to east indicating increased groundwater flow toward Moses Lake and farther east where groundwater declines are associated with widespread irrigation from groundwater.

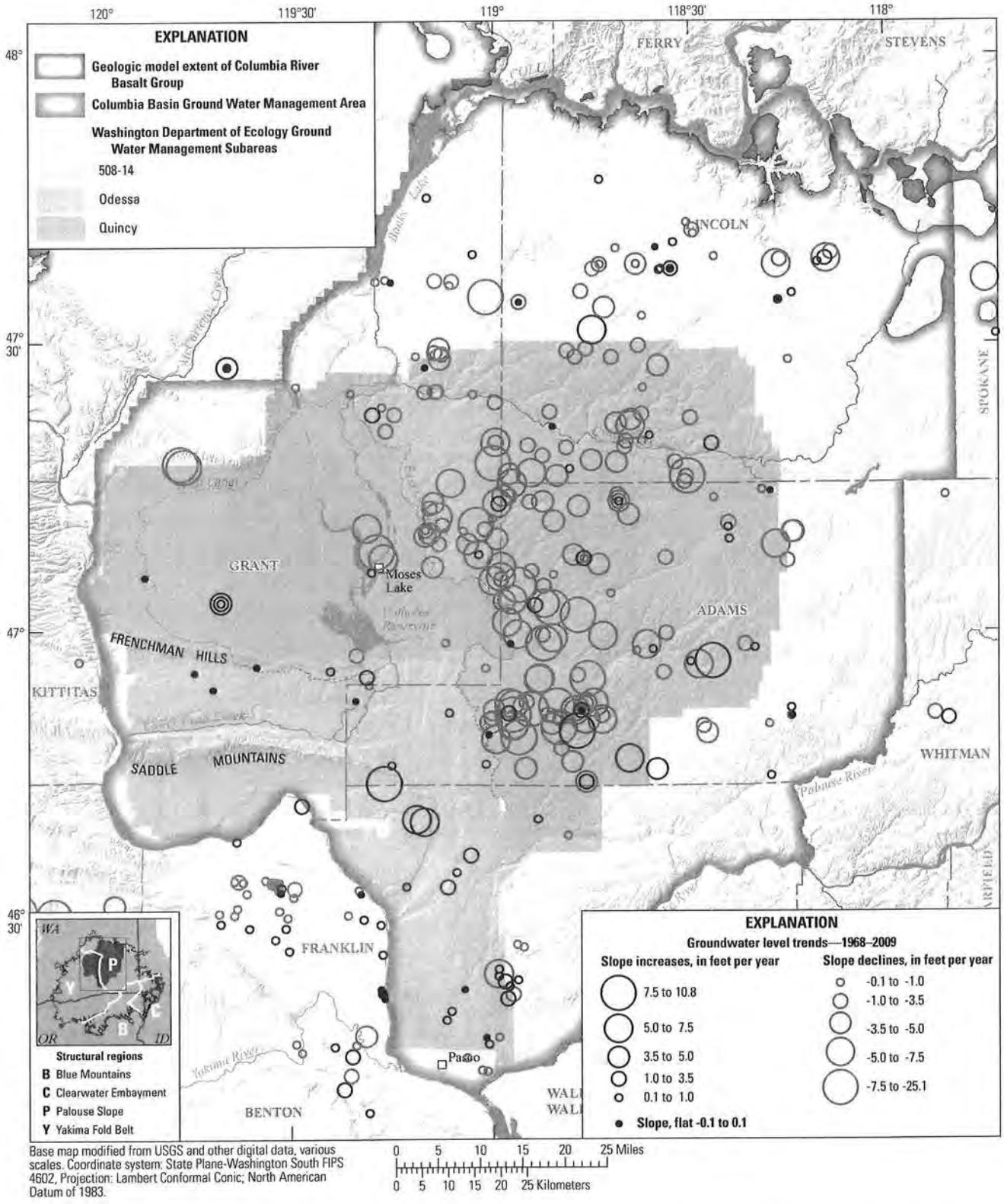


Figure 14. Distribution of groundwater-level trends for 1968–2009 relative to the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington.

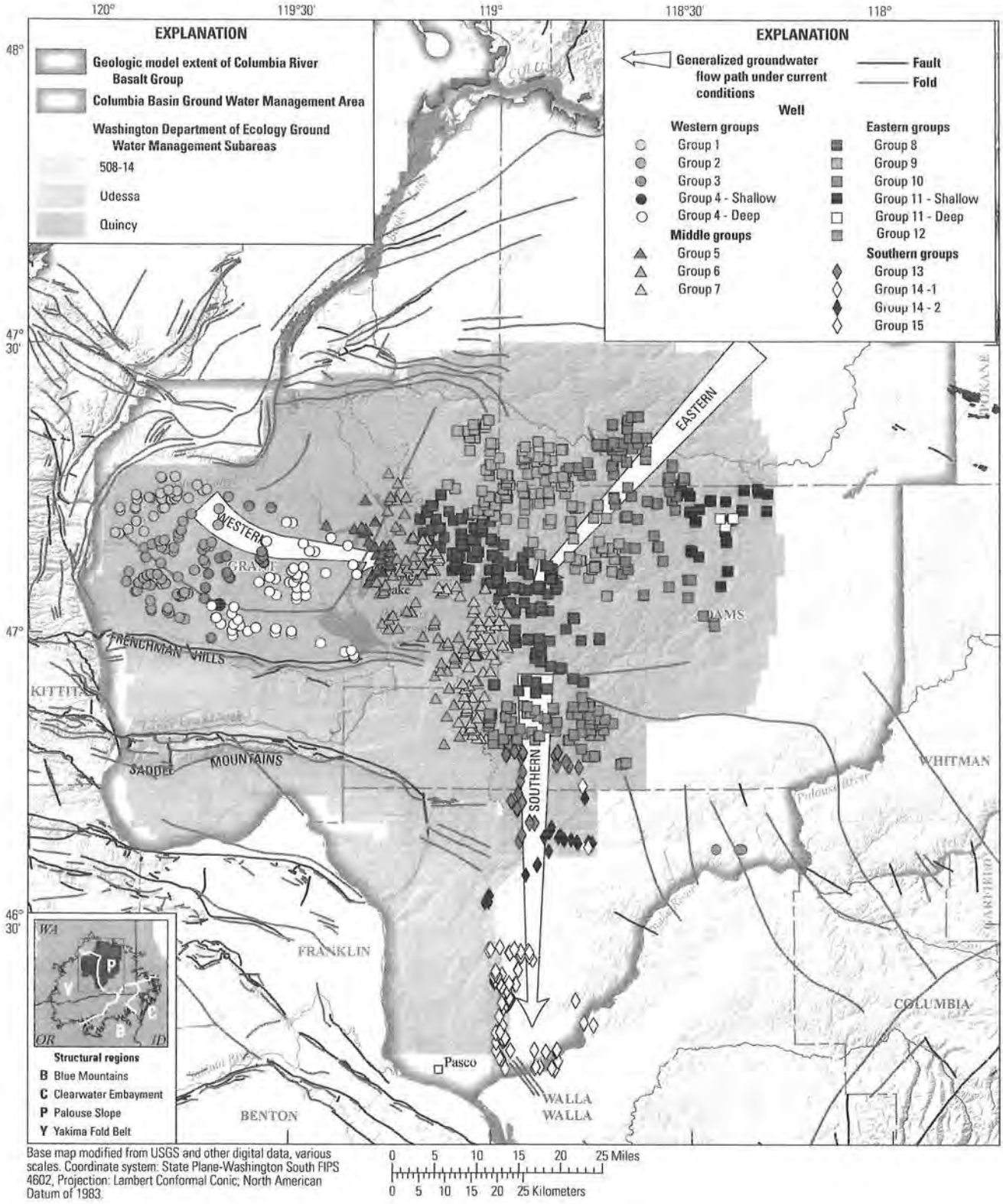


Figure 15. Generalized groundwater-flow paths under 2000–2010 conditions through sets of well groups with similar hydraulic response near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington.

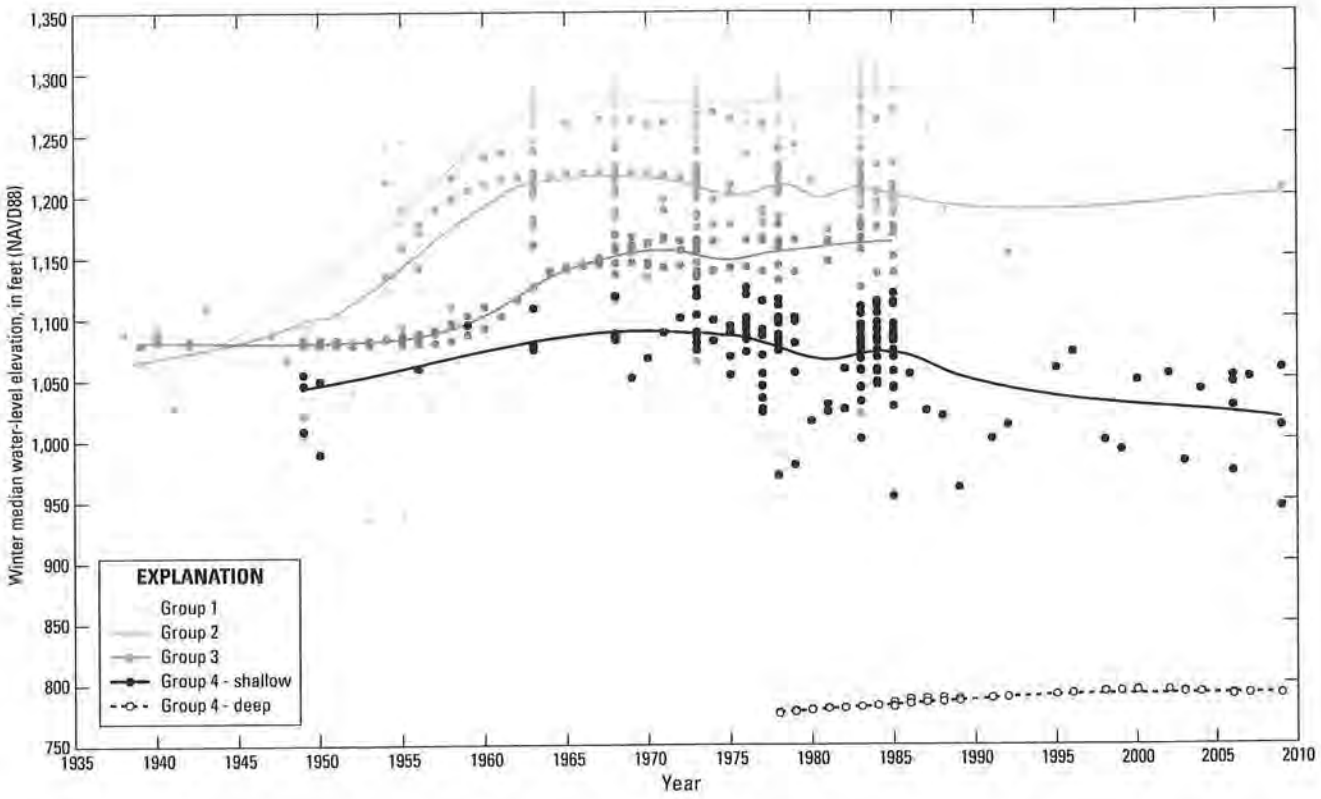


Figure 16. Groups of wells corresponding to the western flow path near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington. Hydrographs depict the winter median water level for individual wells within each well group and the trend line representing the overall water-level trend of all wells in the group. Well locations and flow paths are shown in figure 15.

The wells in groups 8 (brown squares), 9 (orange squares), 10 (dark green squares), 11 (black squares and white squares, shallow and deep), and 12 (gray squares) associated with the eastern flow path (shown as squares in figure 15) show a hydraulic gradient sloping from northeast to southwest, down the Palouse Slope (fig. 17). Water-level declines for most of these wells begin after 1970. Group 11 shallow wells (black squares) are less affected, indicating hydraulic separation between most of these wells and the wells downslope (to the west). The wells showing significant declines exhibit various decline patterns, although total drawdown is similar in most wells.

Between the eastern and western flow paths and well groups, there is a middle set of well groups, groups 5 (dark blue triangles), 6 (orange triangles), and 7 (pink triangles), (shown as triangles in figure 15), with transitional behavior of groundwater levels. Groundwater levels in most of these wells begin to increase about 1950, as observed with the western well groups. Some of these wells also show groundwater-level declines starting in the 1970s as observed with the eastern well groups (fig. 18). Since 1970, a groundwater mound has formed between Moses Lake, Potholes Reservoir, and the eastern flow path wells. Groundwater-levels in groups 6 (orange triangles) and 7 (pink triangles) generally are higher than in groups to the east and west, which consist of group 4 shallow (black circles), group 5 (dark blue triangles), group 8 (brown squares), and group 12 (gray squares) (figs. 15–18).

The southern well groups (groups 13 [red diamonds], 14 [black diamonds and white diamonds], and 15 [yellow diamonds]) associated with the southern flow path (shown as diamonds in figure 15) show a hydraulic gradient from north to south toward the Snake River (fig. 19), which locally has an elevation of about 350 ft. The hydraulic behavior is complex, although the narrow spacing between adjacent well groups and dissimilar temporal changes indicates there may be some hydraulic barriers between these groups.

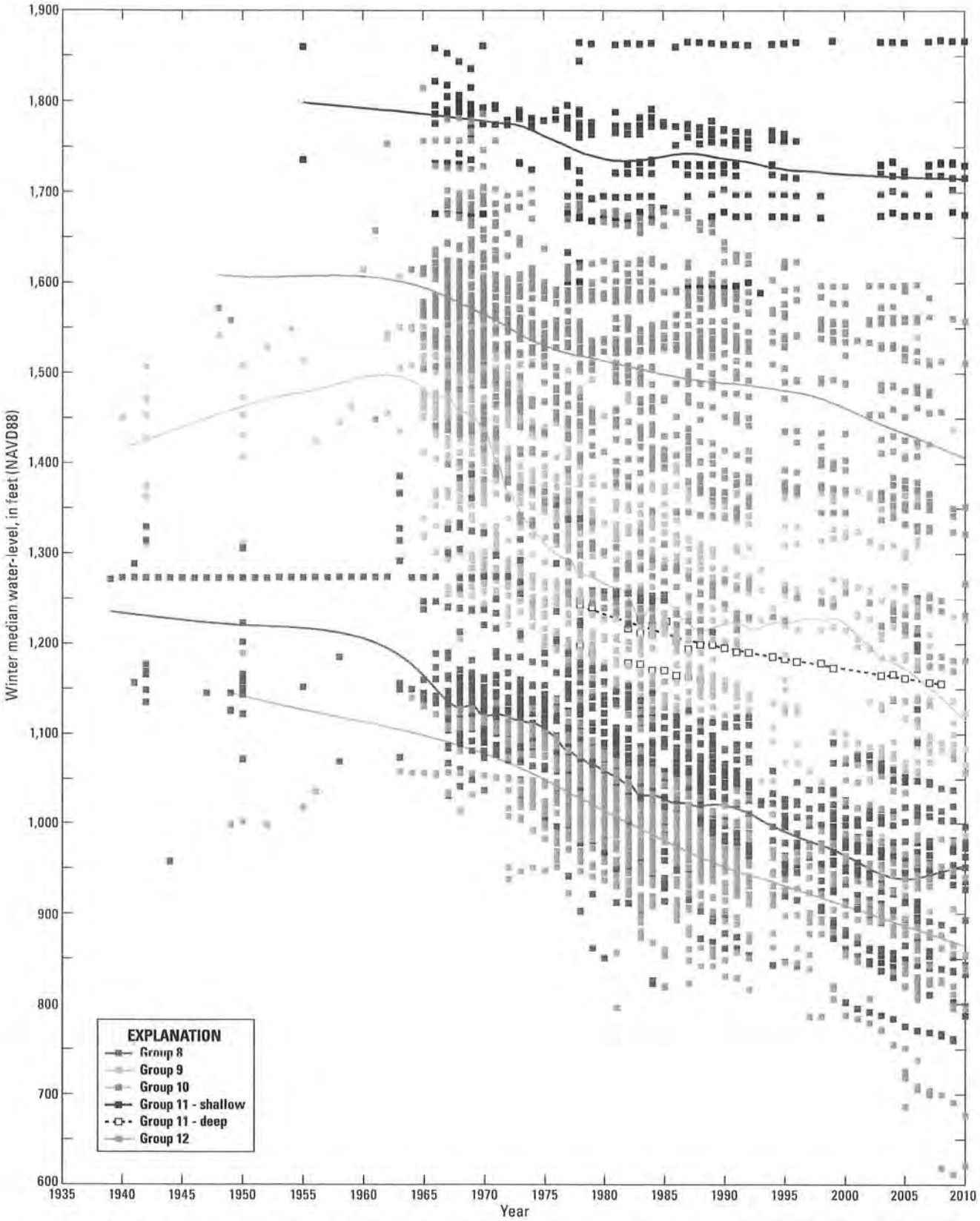


Figure 17. Groups of wells corresponding to the eastern flow path near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington. Hydrographs depict the winter median water levels for individual wells within each well group and the trend line representing the overall water-level trend of all wells in the group. Well locations and flow paths are shown in figure 15.

The hydraulic behavior of group 12 (gray squares) is at the nexus of the eastern, middle, and southern well groups and apparently is influenced by each of the adjacent groups (figs. 17 and 19), although its component wells are not easily separated into the adjacent groups based on location. Hydraulic head values for group 12 wells commonly are intermediate between the other groups, with some wells exhibiting declines similar to group 8 (brown squares) wells from the eastern well groups (fig. 17), and other group 12 water levels rising similarly to water levels in group 7 wells (pink triangles) from the middle well groups (fig. 18). No clear pattern of depth or location allows group 12 wells to be subdivided into the adjacent groups.

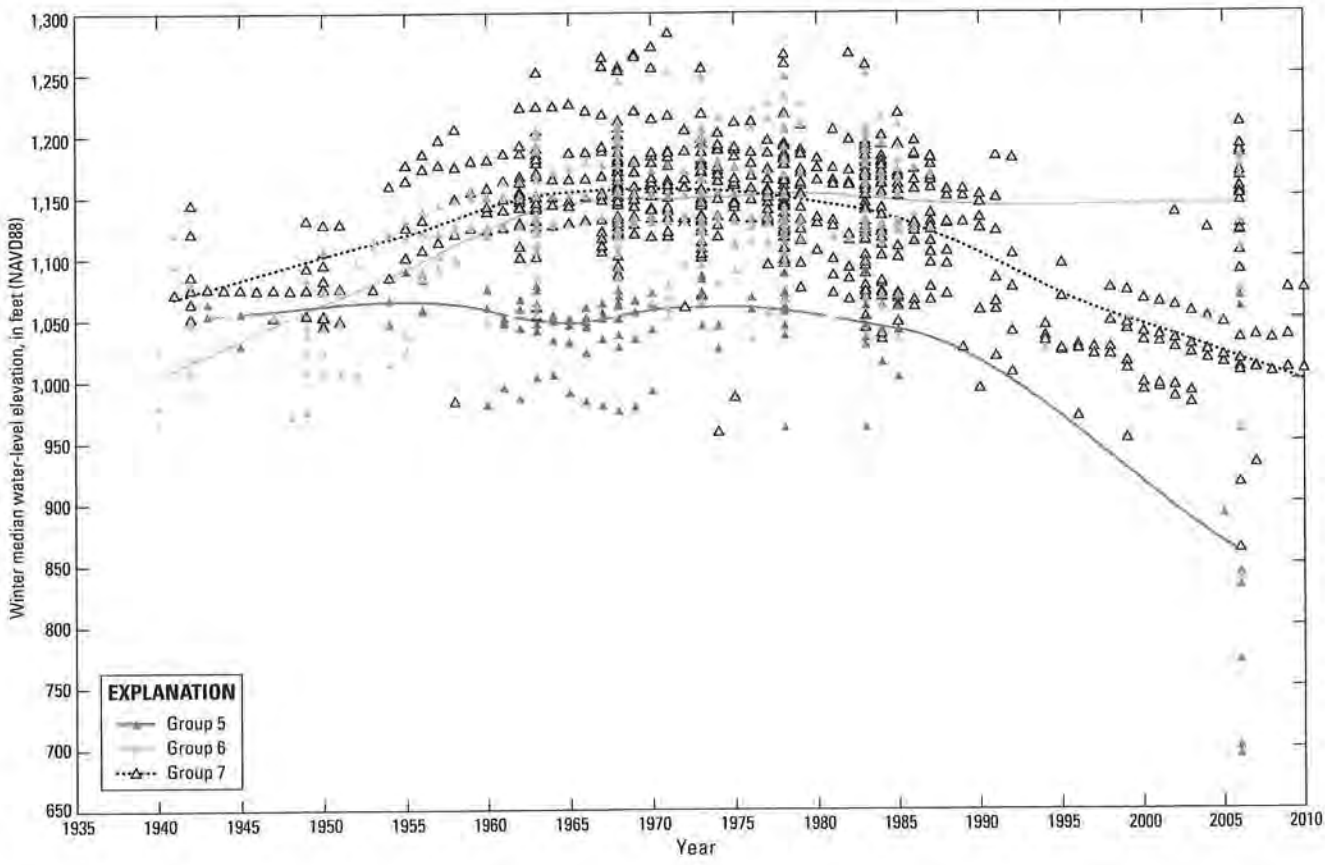


Figure 18. Middle groups of wells near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington. Hydrographs depict the winter median water levels for individual wells within each well group and the trend line representing the overall water-level trend of all wells in the group. Well locations are shown in figure 15.

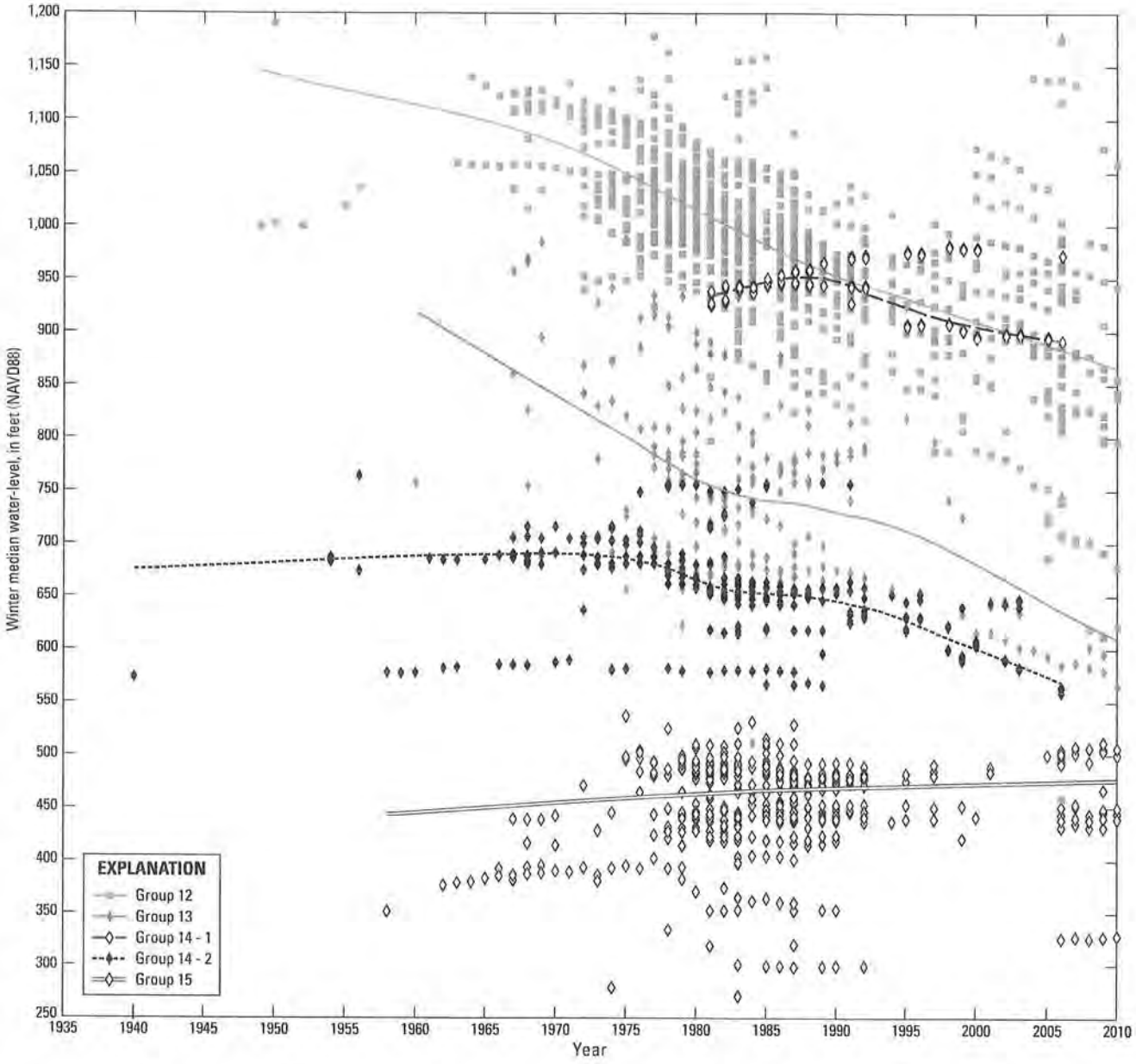


Figure 19. Groups of wells corresponding to the southern flow path near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington. An additional hydrograph for a proximal group of wells (group 12) is shown to illustrate the relation between well groups. Hydrographs depict the winter median water levels for individual wells within each well group and the trend line representing the overall water-level trend of all wells in the group. Well locations and flow paths are shown in figure 15.

Water levels on the Palouse Slope/eYFB were plotted against stratigraphic position relative to the simulated top of the Grande Ronde Basalt (fig. 20*A*–*I*). Analogous to the head distribution in the Umatilla area, heads are similar over large vertical intervals of basalt in the Palouse Slope/eYFB area indicating possible commingling of aquifers. Unlike the Umatilla area, even within a well group and for closely spaced wells, those wells constructed at the same elevation may have hydraulic heads hundreds of feet different from each other. This noisy data and the lack of apparent flow barriers between well groups, results in overlap of the hydrographs between groups. Even within well groups, division of hydrographs by approximate stratigraphic layer does not yield smoothly-varying groundwater-level data that generates well-behaved potentiometric surface maps. This may be due to the complex connectivity between wells and commingled aquifers resulting in a range of composite head elevations (fig. 6).

Generalized potentiometric surfaces were developed for pre-development conditions (prior to 1951; fig. 21) and post-2000 conditions (fig. 22). Relatively high-error generalized surfaces were created using all CRBG wells without distinction between CRBG hydrogeologic unit because hydrographs within well groups show consistent general trends (figs. 16–19); however, few measurements within each group support the division of wells into hydraulically distinct zones vertically (fig. 20). Figures 21 and 22 were constructed by using median water levels for the defined periods for each CRBG well, and smoothing the data with LOESS local linear trend models (Cleveland and others, 1992). At any location, potential error of the simulated hydraulic head is high; the measured value could be hundreds of feet higher or lower than these generalized surfaces. Because trend models were used, fit is biased toward shallow data because few deep wells with significantly different water-levels were measured (fig. 20). However, when evaluating model fit, there is little spatial bias in the residuals between the measurement points and predicted surface; therefore, the resulting surfaces are good representations of the patterns in the hydrograph groups. Because of the large amount of smoothing of these potentiometric surfaces, smaller scale features associated with streams and structural barriers to flow, for example, the Frenchman Hills (fig. 1) are not well represented.

Groundwater flow during the pre-development period was from the uplands in the northeastern part of the GWMA toward the Columbia and Snake Rivers to the west and south, respectively (fig. 21). Although the locations where groundwater has the potential for local drainage to surface water features are shaded (fig. 21), the generalized potentiometric surface was not corrected for interaction with surface drainages because flow to local streams depends on the hydraulic head and local connection between the aquifers and the streams. Following the onset of large surface-water irrigation projects near Moses Lake (fig. 22) in the 1950s, water levels in the upper CRBG aquifers increased and formed a groundwater mound, resulting in a reversal of the hydraulic gradient toward the area of declines (compare figs. 14, 21, and 22). For wells examined, groundwater levels under surface-water irrigation areas typically rise about 50 ft, with larger rises occurring locally (for example, in the fault bounded valleys to the south of the Frenchman Hills and the Saddle Mountains). To the east, in the south central area of the GWMA where groundwater pumping is the primary source of irrigation, a trough-shaped depression sloping toward the south has formed, and groundwater flows toward it from east and west (fig. 22). The axis of the trough generally is coincident with the easternmost area of dense irrigation pumping of groundwater shown in the center of figure 22, much of which is occupied by well group 8 (brown squares) in figure 15.

Because most well groups do not exhibit pronounced persistent vertical gradients, the potential for commingling to contribute to hydraulic head declines in this area is not clear from the data. The limited data show that a significant downward hydraulic gradient is present in the eastern and western well groups (group 4 shallow [black circles] and deep [white circles] wells in figures 16 and 20*B*–*C*, group 11 shallow [black squares] and deep [white squares] wells in figures 17 and 20*E*). Large vertical head differences apparently are abrupt in groups 4 and 11, while other well groups (for example group 10 [dark green squares] in figures 20*E*–*F*) show vertical gradients that are more continuous and exhibit considerable variability. The downward vertical gradients are consistent with the geologic model (Burns and others, 2011) that shows the deeper aquifers are exposed through erosion along the Snake and Columbia Rivers at elevations consistent with the lower hydraulic heads in these deeper units. In addition, hydraulic heads in the southern well groups are lower than in the trough-like cone of depression immediately to the north (fig. 22), indicating that natural or commingled well leakage might be allowing flow to pass through the possible horizontal flow barrier between group 12 (gray squares) and group 13 (red diamonds) (figs. 15 and 19). The complexity in flow near group 13 is further illustrated by the hydraulic head patterns of groups 13 and 14 (figs. 19 and 20*G*–*I*). Despite the fact that group 14 may be divided into two groups with apparently distinct behavior, groups 14-1 (white diamonds) and 14-2 (black diamonds) cannot be separated laterally or into shallow and deep groups, although each of these groups show similar post-1980 characteristics with various group 13 wells (figs. 19 and 20*H*–*I*).

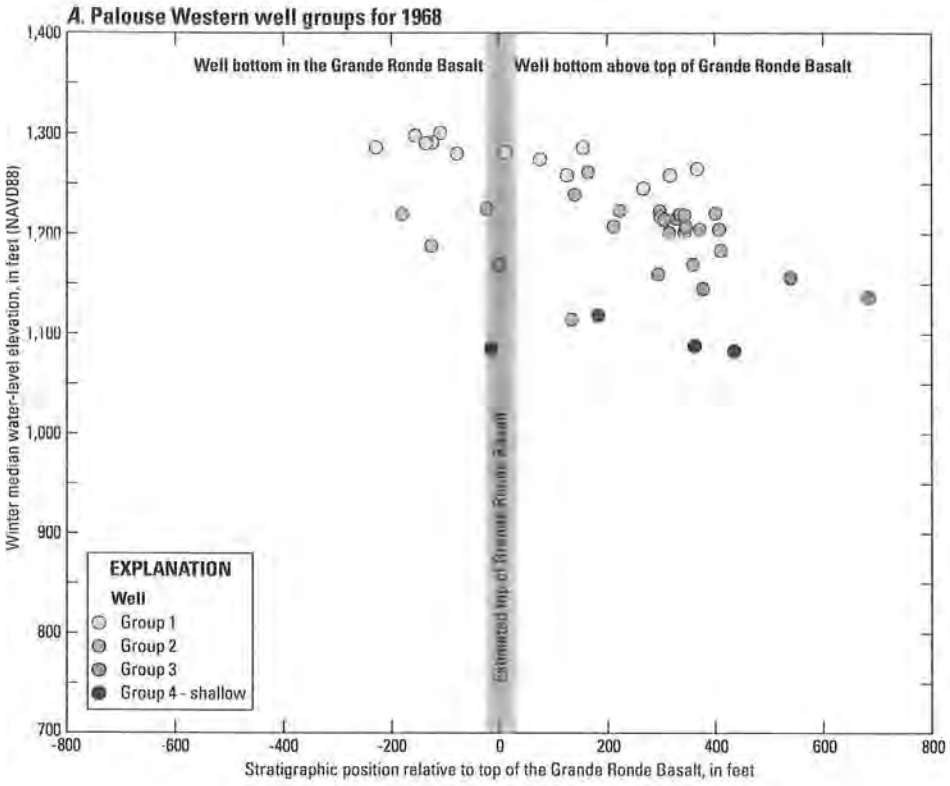
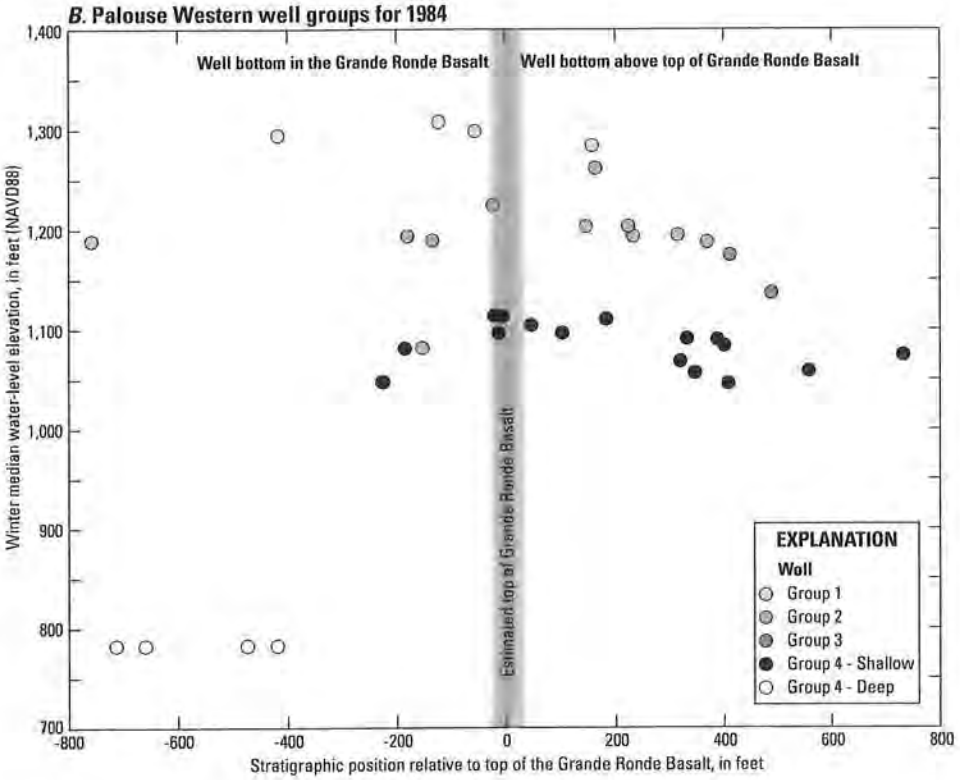


Figure 20. Distance of the well bottom from the simulated top of Grande Ronde Basalt compared with water levels measured in wells near the Washington State Department of Ecology administrative areas in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington. Palouse western well group for (*A*) 1968; (*B*) 1984; (*C*) 2006; Palouse eastern well group for (*D*) 1968; (*E*) 1984; (*F*) 2006; and Palouse southern well group for (*G*) 1968; (*H*) 1984; and (*I*) 2006. Locations of groups are shown in figure 15.



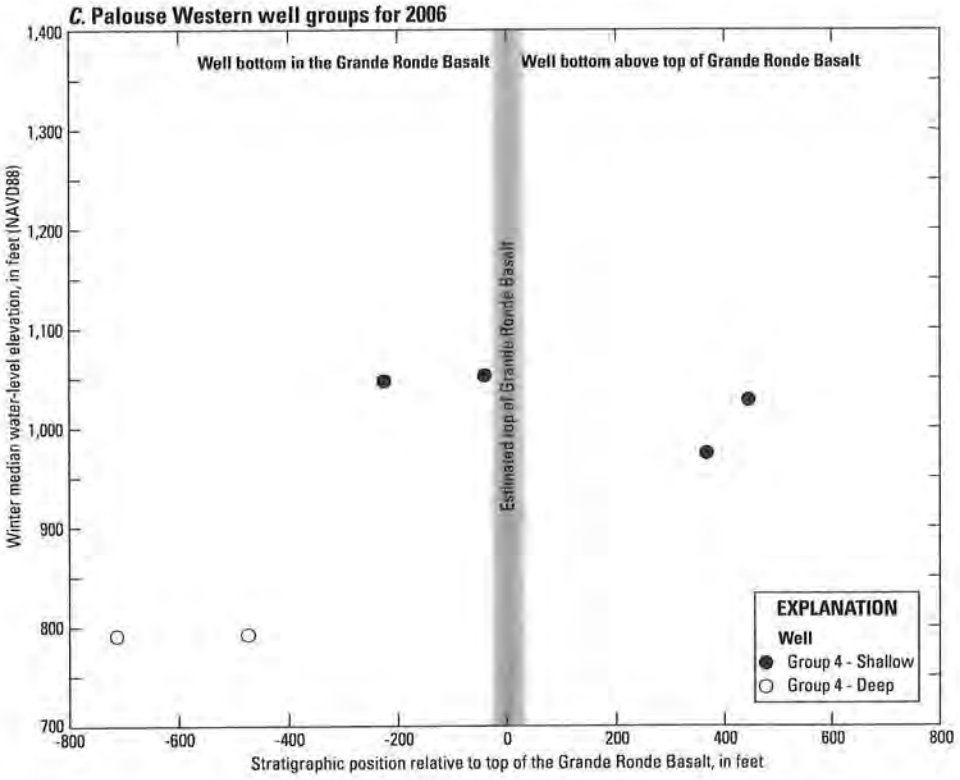
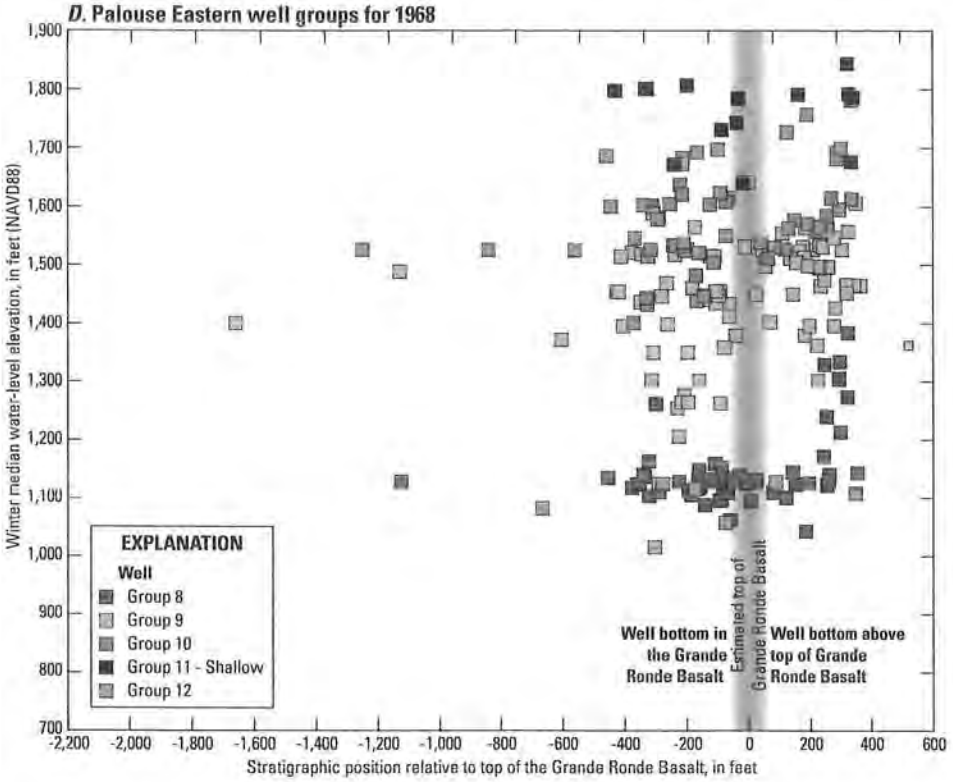


Figure 20.—Continued



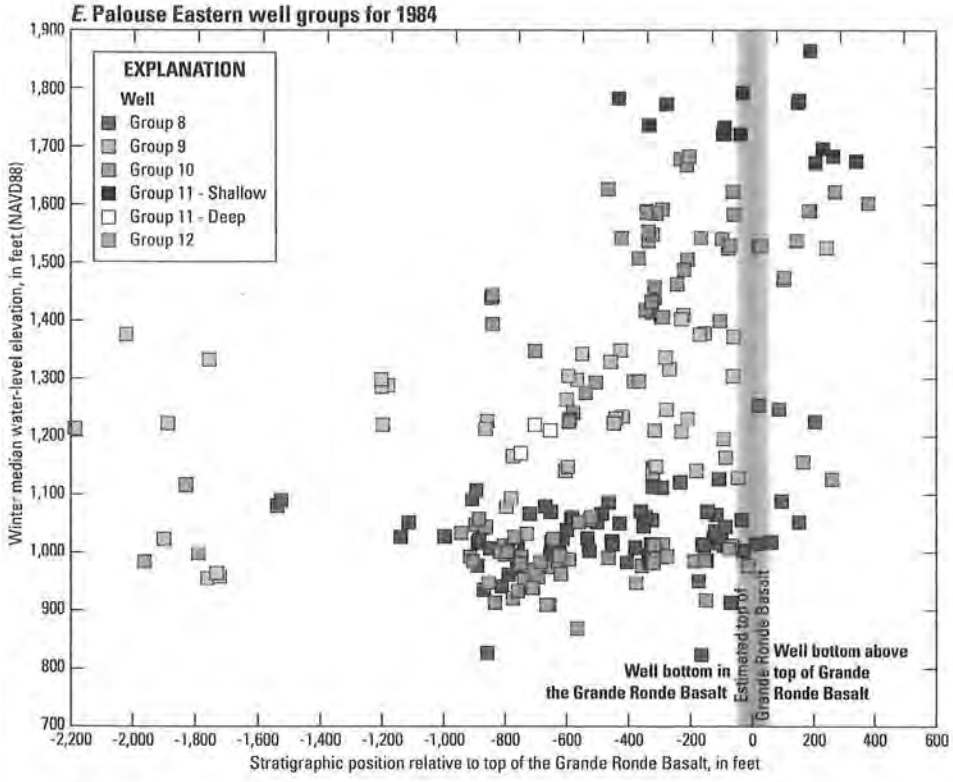
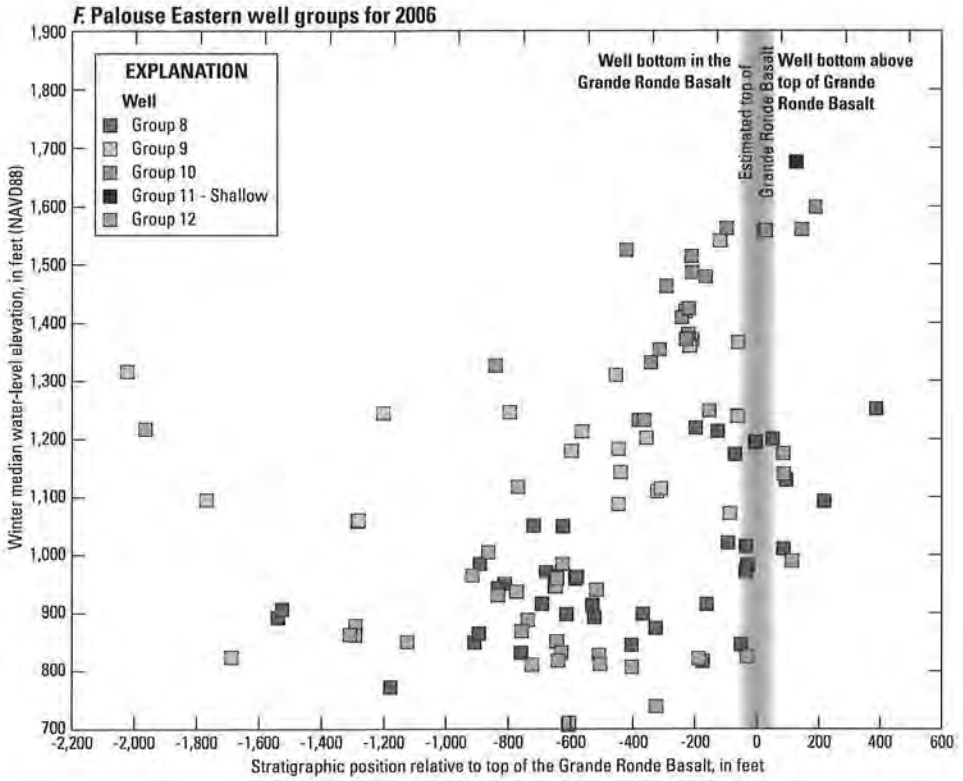


Figure 20.—Continued



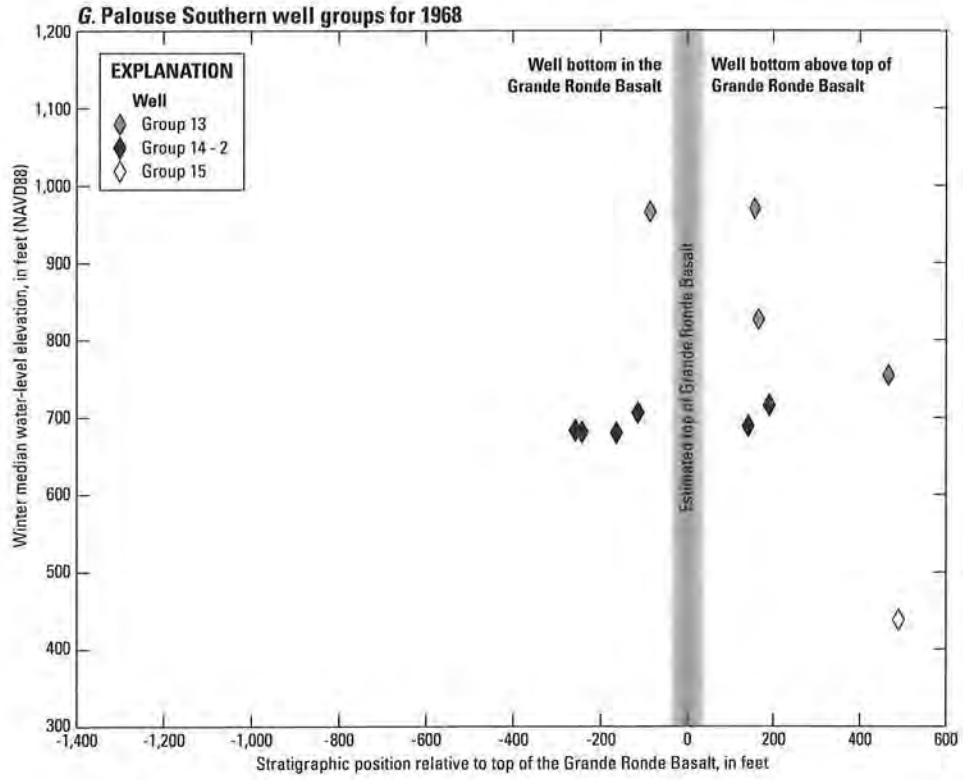


Figure 20.—Continued

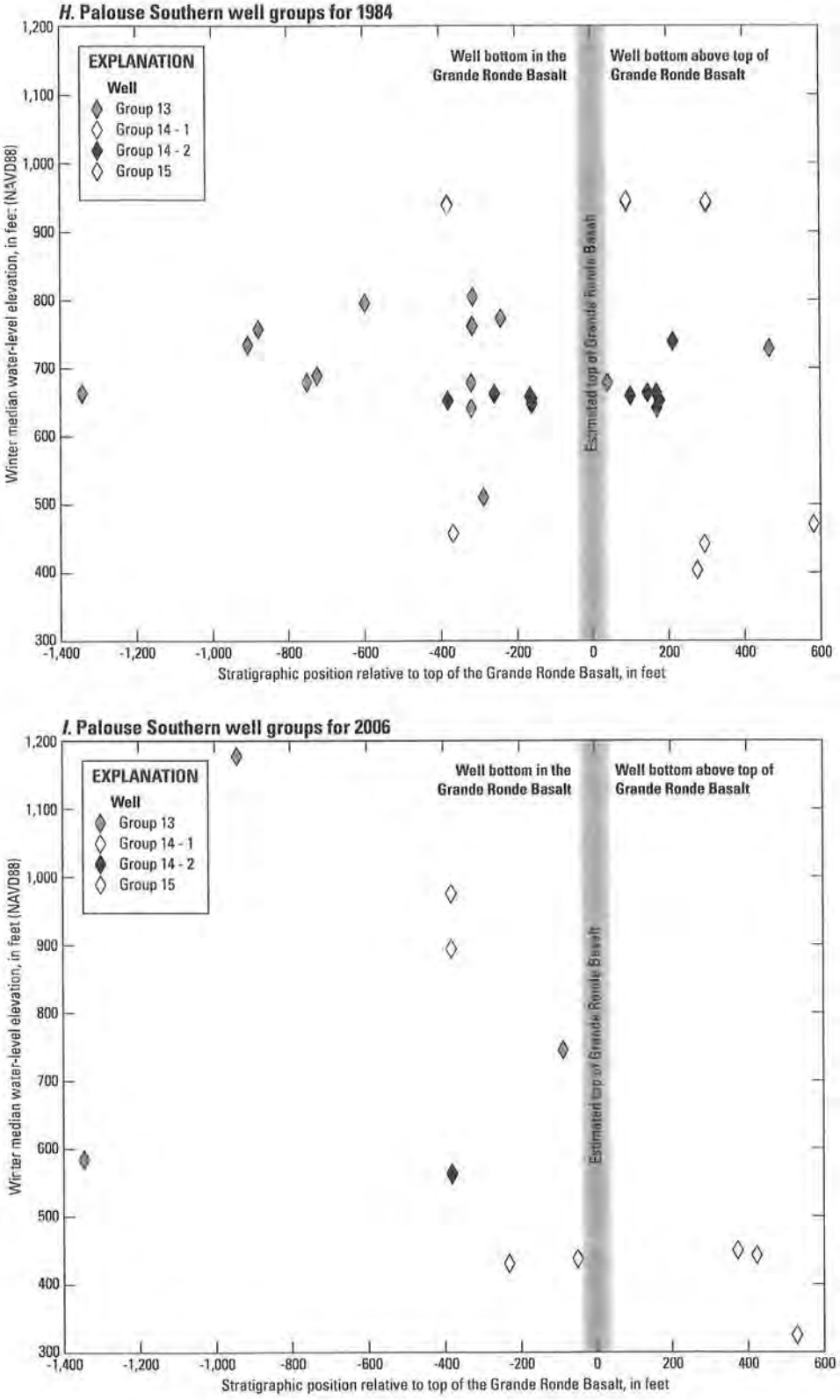


Figure 20.—Continued

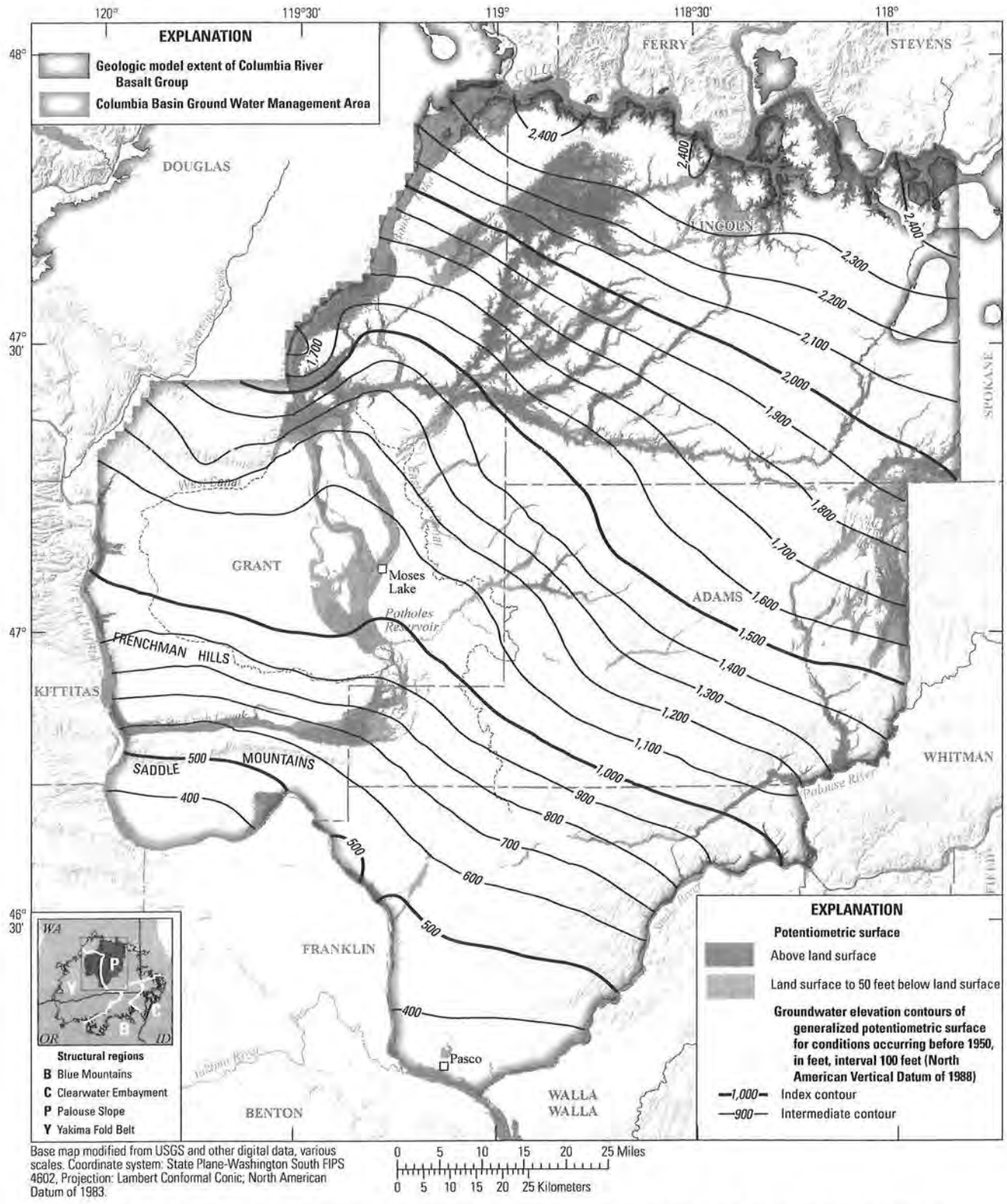


Figure 21. Generalized potentiometric surface for measured Columbia River Basalt Group aquifer conditions during the pre-development period in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington. Areas where potentiometric surface is above or near land surface indicate greater potential for groundwater discharge to coulees prior to substantial groundwater declines.

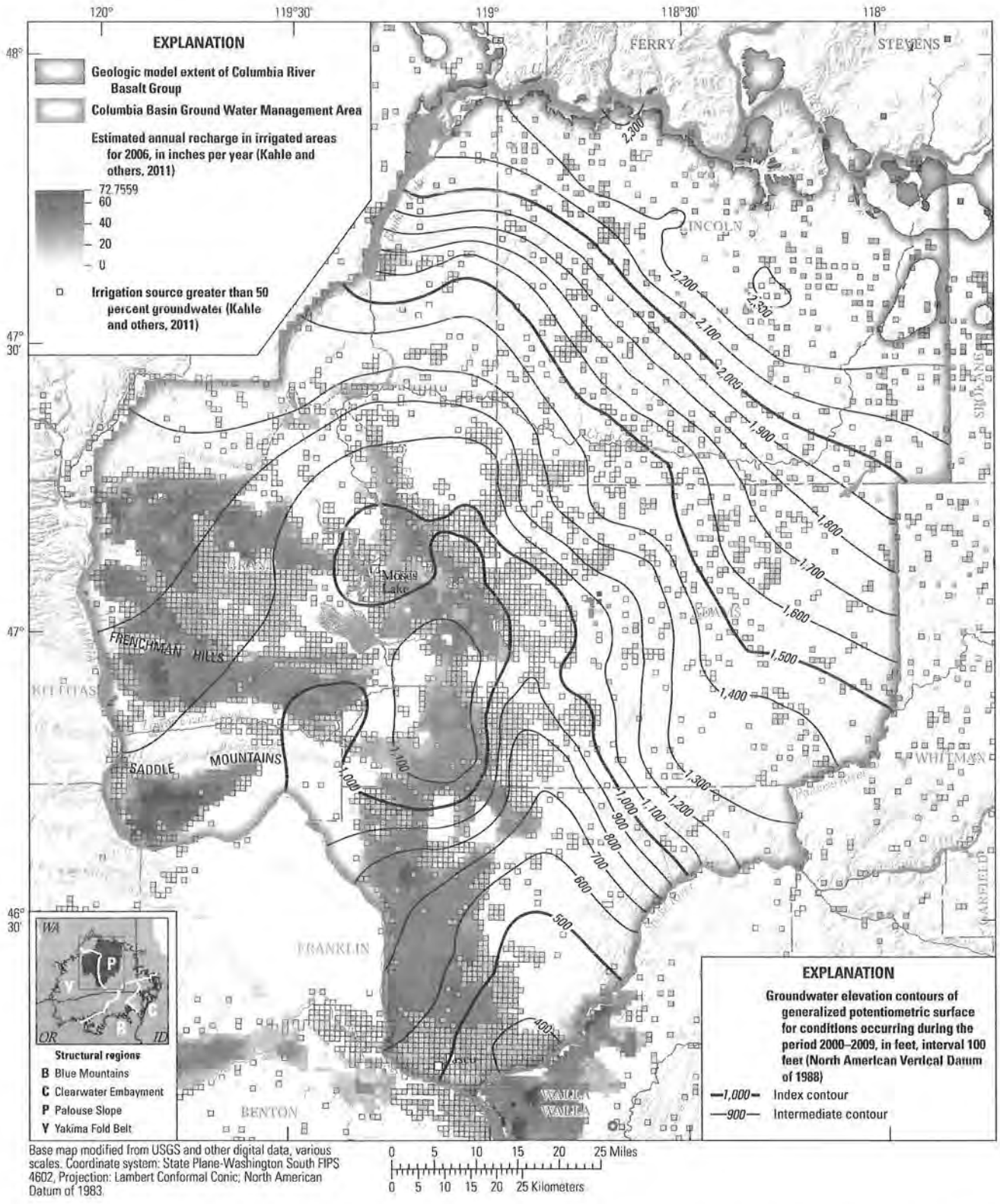


Figure 22. Generalized potentiometric surface for measured Columbia River Basalt Group aquifer conditions during 2000–2009 in parts of the Palouse Slope/eastern Yakima Fold Belt and the Columbia Basin Ground Water Management Area, Washington.

The central Palouse Slope shows a general lack of geologic structure or other evidence for strong horizontal flow barriers to the east, but the east-west trending faults associated with the ridges between the western valleys (the Frenchman Hills and the Saddle Mountains) in the eastern Yakima Fold Belt are likely barriers to flow. Luzier and Burt (1974) identified a "groundwater dam" on the Palouse Slope extending from the northwest to the southeast through the junction of Adams, Grant, and Lincoln Counties that is associated with an apparent change in hydraulic gradient (this feature is only partially represented because of the general nature of the smoothed potentiometric maps shown in figures 21 and 22). This steeper hydraulic gradient also was identified in this analysis at the boundary between group 9 (orange squares) and group 8 (brown squares) of the eastern well groups (figs. 15 and 17) and was present at least as early as 1940 prior to substantial water deliveries from the Columbia Basin Project, which began in the 1950s. One of the few locations with persistent bias in the residuals for the pre-development potentiometric surface was in the area where group 9 hydraulic heads were simulated as too high, indicating a local steepening of the hydraulic gradient to the east, and a flattening to the west. The flattening of water levels is evident in group 8 in 1968 (fig. 20*D*). As an alternative to the groundwater dam proposed by Luzier and Burt (1974), this steepened hydraulic gradient is hypothesized to result from a complex discharge boundary where the upper aquifers are intersected at land surface by incised canyons, which allows water to flow into the sediment-filled coulees. The potential for this outflow is indicated by the pre-development generalized potentiometric surface above or near the land surface in the coulees (fig. 21). Incision of the coulees into the Wanapum Basalt geologic unit (fig. 2) is sufficient that several lava flows and potentially several aquifers in the Wanapum Basalt may be intersected (Burns and others, 2011), possibly forming pathways for groundwater flow that would result in complex head patterns (not shown in figure 21) and apparent alterations in the regional hydraulic gradient. Most late-time (2000–2010) hydraulic heads are now below the elevation of the coulees, indicating that groundwater discharge to the coulees has declined over time. Two additional pieces of evidence support the hypothesis that groundwater historically discharged in this location. First, because shallow aquifers tend to drain into the coulees possibly dewatering parts of these aquifers, fewer wells are completed in the aquifers intersecting the coulees along a north-south swath in this area. Second, the apparently random highly variable heads about 300–400 ft above the Grande Ronde Basalt geologic model unit (approximate elevation of Wanapum Basalt intersected by the coulees) and flattening of the water levels below this stratigraphic elevation are characteristic of a highly variable flow field where groundwater is flowing to local drainage features (compare group 8 [brown squares] wells in figure 20*D* to hypothetical well groups in figure A2*B* and the associated discussion). The lowest land-surface elevation in the coulees where the potentiometric surface is above land surface is the controlling aquifer drainage elevation. This elevation is about 1,180 ft, which is the approximate inflection point of group 8 wells in 1968 (fig. 20*D*).

Summary and Conclusions

The Columbia Plateau Regional Aquifer System (CPRAS) covers an area of about 44,000 square miles in a structural and topographic basin within the drainage of the Columbia River in Washington, Oregon, and Idaho. The primary aquifers occur in basalts of the Columbia River Basalt Group (CRBG) and in places, overlying sediment. The system consists of a series of productive basalt aquifers within permeable interflow zones separated by less permeable flow interiors, overlaid locally by aquifers within sedimentary deposits. Groundwater levels have declined throughout much of the CPRAS since the 1970s.

Information was compiled from about 60,000 wells and 450,000 water-level measurements from wells in the CPRAS. Data are from an inventory of published and unpublished well data from many agencies. A subset of these data for the CRBG aquifer wells were used to develop a simple linear groundwater-level trend map for 1968–2009, which illustrates a persistent pattern of widespread groundwater-level declines. Overall declines from the analysis of data from 761 wells in the CRBG aquifers were measured in 72 percent of the wells. The mean of the trends was a decline of 1.9 feet per year (ft/yr). Rates of declines greater than 1.0 ft/yr were measured in 50 percent of wells, declines greater than 2.0 ft/yr in 38 percent of wells, declines greater than 4.0 ft/yr in 29 percent of wells, declines greater than 6.0 ft/yr in 9 percent of wells, and rates of decline greater than 8.0 ft/yr in 4 percent of wells.

The groundwater-level data also were used to identify groups of wells with similar hydraulic heads and temporal trends within limited subregions. Comparisons between adjacent well groups were used to define sets of well groups that delineate areas of overall similar groundwater-flow conditions. Discontinuities in hydraulic head between the sets of well groups were used to help infer the presence of barriers to groundwater flow. These barriers can include geologic features that influence the hydraulic properties of the aquifer, such as changes in lithology or the occurrence of folds and faults. In areas without flow barriers, dissimilarities in response of well groups over time result from the formation of irrigation-derived groundwater mounds or pumping induced regions of decline. The areas of focus for this analysis included the Umatilla area, Oregon, and the Palouse Slope/eastern Yakima Fold Belt (eYFB) in the Columbia Basin Ground Water Management Area (GWMA) consisting of Adams, Franklin, Grant, and Lincoln Counties, Washington.

In the Umatilla area, 286 wells were divided into groups with similar water levels and trends, and large hydraulic gradients between nearby groups defined barriers to groundwater flow. The barriers divide the groundwater-flow system in the Umatilla area into several leaky compartments that occur in vertical and horizontal directions. However, the degree of leakiness is highly variable. Significant findings for the Umatilla area include:

- Most CRBG aquifers are declining, except for a few shallow aquifers. Cumulative declines range from 100 to 300 feet since 1970.
- High horizontal hydraulic gradients and differences in temporal trends in water levels between adjacent well groups define horizontal flow barriers that generally correspond to mapped geologic structural features. Horizontal hydraulic gradients increase from north to south, which generally corresponds to an increase in structural complexity. This implies that recharge from the uplands into the heavily developed areas may be impeded.
- Significant vertical hydraulic gradients have been documented in a relatively small part of the Umatilla area, where the shallow aquifer system is distinct from the deep system. Since the 1970s, downward vertical gradients in these areas have been increasing as water-level declines have occurred in deeper wells due to pumping and commingling of these aquifers. Because the geology generally is conducive to creating vertical hydraulic gradients, the absence of vertical gradients over much of the area may be a consequence of flow through commingling wells resulting in the equilibration of the heads in the aquifers.

In the Palouse Slope of the central GWMA, the largest declining groundwater-level trends (1968–2009) follow a general north-south line through the middle of the GWMA. An analysis of 1,195 wells along major flow paths and through the area of persistent groundwater-level declines indicates that barriers to flow are not as evident in this area as near Umatilla, but well groups were still identifiable based on similar hydraulic heads and response to hydraulic stresses. This is consistent with the geologic interpretation of the Palouse Slope as being a gently folded structure created during subsidence when CRBG lavas were deposited in voluminous sheet flows. In this area, hydrographs of well groups were viewed along general flow paths that have developed as the result of irrigation stresses on the aquifer system.

Significant findings for the Palouse Slope/eYFB include:

- Groundwater levels in CRBG aquifers have risen since the 1950s in areas heavily irrigated with surface water and have declined since the 1970s in areas commonly irrigated with groundwater. For wells examined, typical rises in water level under surface-water irrigation areas are about 50 feet, with larger rises occurring locally (for example, in the fault bounded valleys to the south of the Frenchman Hills and the Saddle Mountains). Cumulative declines of 200 feet or greater are common in areas where pumping groundwater is the dominant source of irrigation water.
- Horizontal flow barriers are less apparent in this area than in the Umatilla area.
- Data indicate that significant vertical hydraulic gradients still exist, although much of the aquifer thickness is affected by commingling of wells.
- Prior to development, groundwater flow was from the uplands toward the Columbia and Snake Rivers. Late-time (2000–2010) flow patterns in the area are substantially altered by large-scale irrigation recharge and pumping patterns, and in some cases are reversed relative to pre-development conditions.
- The effect of commingling of water from multiple aquifers and its relative contribution to groundwater-level declines is not clear from these data; however, groundwater-flow modeling currently under development as part of the overall study may aid in quantifying these effects.
- The presence of a groundwater discharge boundary, where the upper aquifers are intersected at land surface by incised canyons and groundwater flows into the sediment-filled coulees, is an alternative to the hypothesis of a groundwater dam to explain local steepening of the hydraulic gradient along the Palouse Slope.

The use of stratigraphic coordinates to identify aquifers with similar water levels and trends worked well in the analysis of the groundwater conditions for the Umatilla area and Palouse Slope/eYFB. This suggests a way to advance the understanding of the geometry of local and regional aquifers by using the elevations of well bottoms for groups of wells with similar water levels and trends. This technique may be used to help identify the influence (or lack of influence) of structural features on groundwater flow or even to infer where previously unmapped structural features may exist. Trend surfaces representing aquifers and lava flow top elevations may be mapped in many areas across the Columbia Plateau, refining the current understanding of major geologic formations into smaller hydraulically important units.

Acknowledgments

The authors thank the many people who contributed their time and knowledge to help complete this study. The following organizations are noted for their special assistance with the collection of data: Columbia Basin Ground Water Management Area, Confederated Tribes of the Umatilla Indian Reservation, GSI Water Solutions, Inc., Oregon Water Resources Department, U.S. Department of Energy, Walla Walla Basin Watershed Council, and Washington State Department of Ecology. The following USGS employees are gratefully acknowledged for their contributions to the study: Danial Polette and Leonard Orzol assisted with analysis of the data; Fred Tillman developed and modified Excel® spreadsheet tools that greatly simplified the processing of the data; Sue Kahle and Marshall Gannett provided guidance and insights; and the many other USGS employees whose everyday efforts go to support this and many other studies.

Selected References

(**Bold** text indicates reference is cited in report.)

Bauer, H.H., and Hansen, A.J., 2000, Hydrology of the Columbia Plateau regional aquifer system, Washington, Oregon, and Idaho: U.S. Geological Survey Water-Resources Investigations Report 96-4106, 61 p. (Also available at http://pubs.er.usgs.gov/usgspubs/wri/wri964106.)

Burns, E.R., Morgan, D.S., Lee, K.K., Haynes, J.V., and Conlon, T.D., 2012, Evaluation of long-term water-level declines in basalt aquifers near Mosier, Oregon: U.S. Geological Survey Scientific Investigations Report 2012-5002, 134 p. (Also available at http://pubs.er.usgs.gov/publication/sir20125002.)

Burns, E.R., Morgan, D.S., Peavler, R.S., and Kahle, S.C., 2011, Three-dimensional model of the geologic framework for the Columbia Plateau Regional Aquifer System, Idaho, Oregon, and Washington: U.S. Geological Survey Scientific Investigations Report 2010-5246, 44 p. (Also available at http://pubs.er.usgs.gov/publication/sir20105246.)

Cleveland, W.S., Grosse, E., and Shyu, W.M., 1992, Local regression models, chap. 8 of Chambers, J.M., and Hastie, T.J., eds., Statistical models in S: Pacific Grove, Calif., Wadsworth and Brooks/Cole Advanced Books and Software, p. 309–376.

Drost, B.W., Whiteman, K.J., and Gonthier, J.B., 1990, Geologic framework of the Columbia Plateau Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Water-Resources Investigations Report 87-4238, 10 p., 10 sheets. (Also available at http://pubs.er.usgs.gov/usgspubs/wri/wri874238.)

Kahle, S.C., Morgan, D.S., Welch, W.B., Ely, D.M., Hinkle, S.R., Vaccaro, J.J., and Orzol, L.L., 2011, Hydrogeologic framework and hydrologic budget components of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Scientific Investigations Report 2011-5124, 66 p. (Also available at http://pubs.er.usgs.gov/publication/sir20115124.)

Kahle, S.C., Olsen, T.D., and Morgan, D.S., 2009, Geologic setting and hydrogeologic units of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Scientific Investigations Map 3088, 1 sheet. (Also available at http://pubs.er.usgs.gov/usgspubs/sim/sim3088.)

Keys, M.E., Vaccaro, J.J., Jones, M.A., and Julich, R.J., 2008, Hydrographs showing ground-water level trends for selected wells in the Yakima River basin aquifer system, Washington: U.S. Geological Survey Data Series 343. (Also available at http://pubs.er.usgs.gov/publication/ds343.)

Lindolm, G.F., and Vaccaro, J.J., 1988, Region 2, Columbia Lava Plateau, chap. 5 *of* Back, William, Rosenshein, J.S., and Seaber, P.R., eds., Hydrogeology: Boulder, Colo., Geological Society of America, The Geology of North America, v. O-2, p. 37–50, accessed June 27, 2012, at http://www.clemson.edu/ces/hydro/murdoch/Courses/Aquifer%20Systems/documents/Heath%20and%20Back%20books/Chapter%205.pdf.

Luzier, J.E., and Burt, R.J., 1974, Hydrology of basalt aquifers and depletion of ground water in east-central Washington: Washington State Department of Ecology, Water-Supply Bulletin 33, 53 p., accessed June 27, 2012, at http://www.ecy.wa.gov/programs/eap/wsb/wsb_All.html#p33.

Newcomb, R.C., 1959, Some preliminary notes on ground water in the Columbia River Basalt: Northwest Science, v. 33, no. 1, p. 1–18, accessed June 27, 2012, at http://www.vetmed.wsu.edu/org_NWS/NWSci%20journal%20articles/1950-1959/1959%20vol%2033/33-1/v33%20p1%20Newcomb.PDF.

Oregon Water Resources Department, 2012, Water protections and restrictions: Oregon Water Resources Department Web site, accessed July 11, 2012, at http://www.oregon.gov/OWRD/PUBS/aquabook_protections.aspx.

Porcello, J.J., Tolan, T.L., and Lindsey, K.A., 2009, Groundwater level declines in the Columbia River Basalt Group and their relationship to mechanisms for groundwater recharge—A conceptual groundwater system model, Columbia Basin Ground Water Management Area of Adams, Franklin, Grant, and Lincoln Counties: Othello, Wash., prepared by the Columbia Basin Ground Water Management Area of Adams, Franklin, Grant, and Lincoln Counties, June 2009, 175 p., accessed June 27, 2012, at http://www.cbgwma.org/pdf/GWMA_Groundwater%20Level%20Declines_%20TEXT_June%202009.pdf.

Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA—A guide to site characterization: Pacific Northwest National Laboratory, Richland, Washington, 277 p., accessed June 27, 2012, at http://www.pnl.gov/main/publications/external/technical_reports/PNNL-13962.pdf.

Senay, G.B., Budde, Michael, Verdin, J.P., and Melesse, A.M., 2007, A coupled remote sensing and simplified surface energy balance approach to estimate actual evapotranspiration from irrigated fields: Sensors, v. 7, p. 979-1000, accessed September 27, 2012, at http://dx.doi.org/10.3390/s7060979.

Snyder, D.T., 2008, Estimated depth to ground water and configuration of the water table in the Portland, Oregon area: U.S. Geological Survey Scientific Investigations Report 2008-5059, 40 p. (Also available at http://pubs.er.usgs.gov/publication/sir20085059.)

Snyder, D.T., and Haynes, J.V., 2010, Groundwater conditions during 2009 and changes in groundwater levels from 1984 to 2009, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Scientific Investigations Report 2010-5040, 12 p. (Also available at http://pubs.er.usgs.gov/publication/sir20105040.)

Sokol, Daniel, 1963, Position and fluctuations of water level in wells perforated in more than one aquifer: Journal of Geophysical Research, v. 68, no. 4, p. 1079–1080, accessed June 27, 2012, at http://onlinelibrary.wiley.com/doi/10.1029/JZ068i004p01079/abstract.

Swanson, D.A., Wright, T.L., Hooper, P.R., and Bentley, R.D., 1979, Revisions in the stratigraphic nomenclature of the Columbia River Basalt Group: U.S. Geological Survey Bulletin 1457-G, 59 p. (Also available at http://pubs.er.usgs.gov/publication/b1457G.)

Taylor, C.J., and Alley, W.M., 2002, Ground-water-level monitoring and the importance of long-term water-level data: U.S. Geological Survey Circular 1217, 68 p. (Also available at http://pubs.er.usgs.gov/publication/cir1217.)

TIBCO Software, Inc., 1988–2008, Spotfire S+ 8.1 for Windows: Somerville, Mass., accessed August 28, 2012, at http://spotfire.tibco.com/products/s-plus/statistical-analysis-software.aspx.

Tillman, F.D., 2009, Excel® spreadsheet tools for analyzing groundwater level records and displaying information in ArcMap™: U.S. Geological Survey Techniques and Methods 4-F1, 59 p. (Also available at http://pubs.er.usgs.gov/publication/tm4F1.)

Tolan, T.L., Reidel, S.P., Beeson, M.H., Anderson, J.L., Fecht, K.R., and Swanson, D.A., 1989, Revisions to the estimates of the areal extent and volume of the Columbia River Basalt Group, *in* Reidel, S.P., and Hooper, P.R., eds., Volcanism and tectonism in the Columbia River flood-basalt province: Geological Society of America Special Paper 239, p. 1–20.

U.S. Census Bureau, 2000, Census 2000 gateway: U.S. Census Bureau database, accessed July 6, 2012, at http://www.census.gov/main/www/cen2000.html.

U.S. Geological Survey, 1999, National Elevation Dataset: U.S. Geological Survey Fact Sheet 148-99, 2 p. (Also available at http://erg.usgs.gov/isb/pubs/factsheets/fs14899.html.**)**

U.S. Geological Survey, 2008, Ground-Water availability assessment for the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Fact Sheet 2008-3086, 2 p. (Also available at http://pubs.er.usgs.gov/usgspubs/fs/fs20083086.)

U.S. Geological Survey, 2012, A three-dimensional hydrogeologic framework model of Columbia Plateau Regional Aquifer System: U.S. Geological Survey database, accessed July 2, 2012, at http://or.water.usgs.gov/proj/cpras/index.html.

Vaccaro, J.J., 1999, Summary of the Columbia Plateau Regional Aquifer-System analysis, Washington, Oregon, and Idaho: U.S. Geological Survey Professional Paper 1413-A, 51 p. (Also available at http://pubs.er.usgs.gov/usgspubs/pp/pp1413A.)

Vaccaro, J.J., Jones, M.A., Ely, D.M., Keys, M.E., Olsen, T.D., Welch, W.B., and Cox, S.E., 2009, Hydrogeologic framework of the Yakima River basin aquifer system, Washington: U.S. Geological Survey Scientific Investigations Report 2009-5152, 106 p. (Also available at http://pubs.er.usgs.gov/usgspubs/sir/sir20095152.)

Washington State Department of Ecology, 1988a, Columbia Basin Project–Ground Waters: Washington Administrative Code, Ecology Edition, Chap. 508-14 WAC, last updated June 9, 1988, 4 p., accessed June 27, 2012, at http://www.ecy.wa.gov/pubs/wac50814.pdf.

Washington State Department of Ecology, 1988b, Odessa ground water management subarea: Washington Administrative Code, Ecology Edition, Chap. 173-128A WAC, last updated June 9, 1988, 4 p., accessed June 27, 2012, at http://www.ecy.wa.gov/pubs/wac173128a.pdf.

Washington State Department of Ecology, 1988c, Quincy ground water management subarea and zones: Washington Administrative Code, Ecology Edition, Chap. 173-124 WAC, last updated June 9, 1988, 4 p., accessed June 27, 2012, at http://www.ecy.wa.gov/pubs/wac173124.pdf.

Whiteman, K.J., 1986, Ground-water levels in three basalt hydrologic units underlying the Columbia Plateau, Washington and Oregon, spring 1984: U.S. Geological Survey Water-Resources Investigations Report 86-4046, 4 sheets. (Also available at http://pubs.er.usgs.gov/usgspubs/wri/wri864046.**)**

Whiteman, K.J., Vaccaro, J.J., Gonthier, J.B., and Bauer, H.H., 1994, Hydrogeologic framework and geochemistry of the Columbia Plateau regional aquifer system: U.S. Geological Survey Professional Paper 1413-B, 73 p. (Also available at http://pubs.er.usgs.gov/usgspubs/pp/pp1413B.**)**

This page intentionally left blank.

Appendix A. Interpretation Guide for Graphs of Stratigraphic Position Compared with Hydraulic Head for Wells in the Columbia River Basalt Group, Washington, Oregon, and Idaho

After wells have been grouped into spatial clusters based on similar values of head and similar trends, the variability within each group may be examined to evaluate vertical hydraulic gradients. This is accomplished by plotting all available head data collected during a short period (relatively unaffected by temporal trends) as a function of the stratigraphic position of the aquifer being measured. If the vertical head gradients are large relative to the slope of the potentiometric surface within each aquifer, then the vertical gradient is apparent.

The assignment of hydraulic head values to a given stratigraphic position is fraught with complications that may affect the accuracy of any single data point. For Columbia River Basalt Group (CRBG) wells, it is assumed that the well terminates in a productive aquifer, and that the measured head in that well is representative of an aquifer at that stratigraphic position. Stratigraphic position is computed as the difference between the elevation of the bottom of the well and an estimate of the elevation of a geologic horizon that originally was flat. Use of stratigraphic position removes the influence of dipping, folding, and faulting when correlating strata that can act as laterally continuous aquifers. Conversely, in areas where CRBG units are discontinuous or exhibit significant thinning or thickening, stratigraphic position may have a spatial trend. As long as the group of wells being examined does not cover too large an area, spatial bias of stratigraphic position generally will be small. In addition to this complication, well commingling can result in hydraulic head measurements that are not representative of the aquifer at the well bottom (for example, well 1 in fig. 6).

Despite the potential complications, combinations of persistent patterns in stratigraphic position and hydraulic head may be interpreted hydrologically (fig. A1). The clustering of wells at distinct stratigraphic positions is evidence that distinct aquifers are locally important, and when hydraulic heads are distinctively different between aquifers, downward (fig. A1*A*) and upward (fig. A1*B*) vertical gradients exist. Similarly, there may be multiple distinct aquifers with no vertical gradient (fig. A1*C*). For the CRBG, significant vertical distance between two distinct aquifers implies the presence of a potential confining unit and the likelihood that a vertical hydraulic gradient should exist. However, aquifers may be hydraulically connected naturally through complex CRBG geometry, or they may be connected through commingling wells. If historical evidence supports a significant vertical gradient (fig. A1*A*–*B*), but recent measurements are consistently similar for each aquifer (fig. A1C), then commingling wells are the likely cause.

For many areas in the Columbia Plateau Regional Aquifer System (CPRAS), the repeating sequence of CRBG interflows and flow interiors results in a continuum of stratigraphic position (fig. A1*D*). In this case, there is either a single aquifer or many thin aquifers, and there can be downward, upward, or no significant vertical gradient present. For most areas within the CPRAS, vertical gradients are expected, so no vertical gradient over several hundred feet of stratigraphic position (fig. A1*D*) indicates that aquifers likely are hydraulically connected either naturally or through commingling wells.

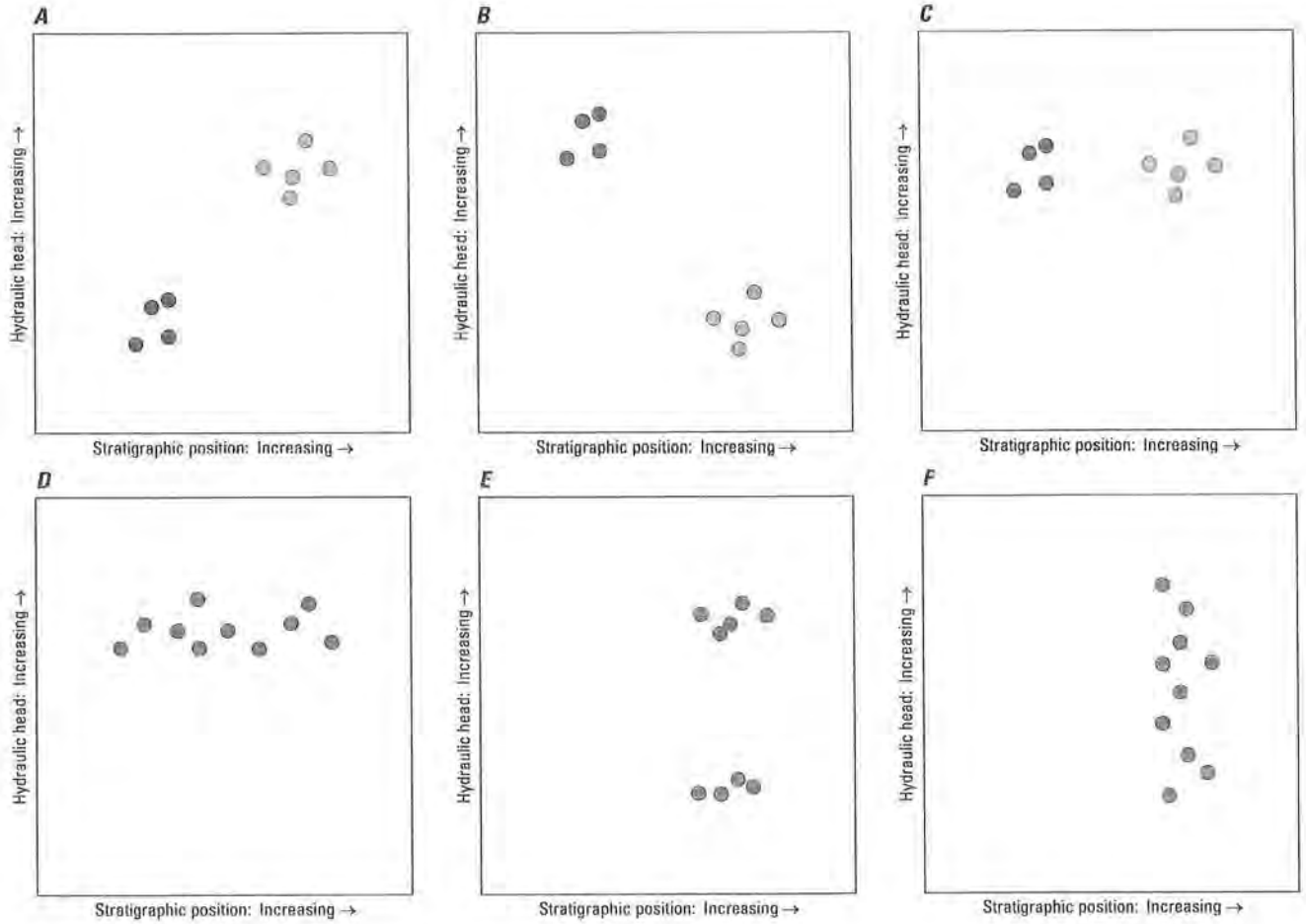


Figure A1. Expected patterns of hydraulic head as a function of stratigraphic position. (*A*) Two distinct aquifers with a significant downward hydraulic gradient; (*B*) two distinct aquifers with a significant upward gradient; (*C*) two distinct aquifers with no significant vertical gradient (*D*) a single thick aquifer or multiple thin aquifers with no significant vertical gradient; (*E*) a single aquifer with (apparently) two distinctly different hydraulic heads; and (*F*) a single aquifer with an apparent continuum of heads.

During the process of creating spatial clusters of wells, two distinctly different heads at the same stratigraphic position (fig. A1*E*) potentially signals the presence of a horizontal barrier to groundwater flow. If all higher head wells are in a separate location from the lower head wells, then some barrier to flow may exist, and the wells would be divided into separate groups. If the high and low head wells appear to be randomly mixed spatially, then well construction, pumping from adjacent wells, or geologic heterogeneity are the likely causes of the pattern (fig. 6). If a continuum of heads exist within a single aquifer (fig. A1*F*), then additional explanations may include a steep regional gradient of the potentiometric surface, or local perturbations to the potentiometric surface that may occur in the presence of groundwater discharge boundaries (such as incised canyons with springs and seeps). These local and regional effects may be separated by removing the regional trend from the potentiometric surface and examining the range of the residual heads.

Combinations of expected patterns of hydraulic head as a function of stratigraphic position (figs. A1*A*–*F*). are frequent in the real data for CRBG wells as illustrated in figures 12*A*–*F* and 20*A*–*I*. Over time, new deep wells have increasingly been required to case and seal to the aquifer, hydraulically isolating these wells from the upper commingled aquifers. Whereas the upper aquifers frequently have fairly uniform hydraulic heads, the deeper aquifers have a distinctly different head (compare fig. A2*A* to group 4 shallow and deep wells [black circles and white circles] shown in figure 20*B*–*C* and to group 11 shallow and deep wells [black squares and white squares] in fig. 20*E*). A continuum of heads associated with local groundwater drainage of upper aquifers may be combined with a uniform vertical gradient for deep aquifers (fig. A2*B*) to provide the observed pattern of group 8 wells (brown squares) during pre-development prior to lowering of the potentiometric surface below the land surface (fig. 20*D*).

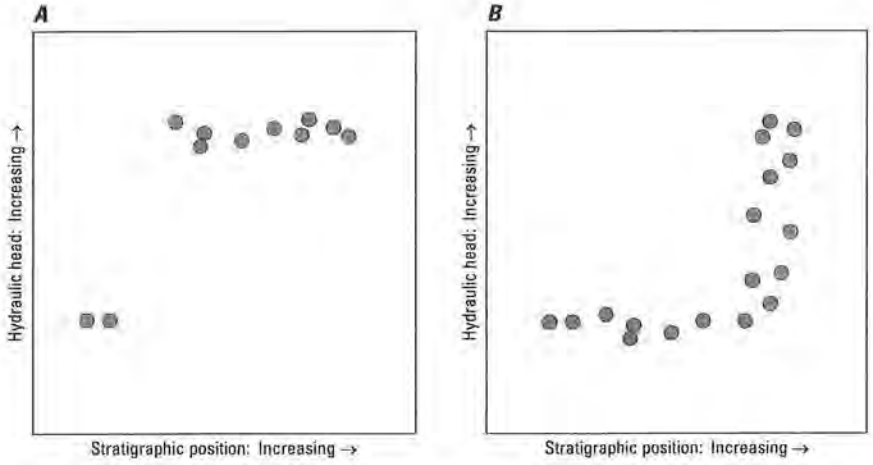


Figure A2. Combinations of expected patterns of hydraulic head as a function of stratigraphic position. (*A*) No vertical gradients exist for a thick part of the upper aquifer system (consisting of multiple aquifers), although a significant downward gradient exists in the lower aquifer system; (*B*) an apparent continuum of heads exists in the upper aquifers, and no vertical gradients exist in the lower aquifers.

This page intentionally left blank.

Publishing support provided by the U.S. Geological Survey
Publishing Network, Tacoma Publishing Service Center

For additional information contact:
Director, Oregon Water Science Center
U.S. Geological Survey
2130 SW 5th Avenue
Portland, Oregon 97201
http://or.water.usgs.gov

17.
WELL NO. 7 EVALUATION, REHABILITATION, AND TESTING REPORT

HLA
Engineering and Land Surveying, Inc.

MEMORANDUM

Project No. 180666

February 12, 2020

To: Justin Bellamy, HLA Engineering and Land Surveying, Inc.

From:

Jason M. Shira, LHG
Project Hydrogeologist
jshira@aspectconsulting.com

Tyson D. Carlson, LHG
Senior Associate Hydrogeologist
tcarlson@aspectconsulting.com

Re: **Well No. 7 Evaluation, Rehabilitation, and Testing Report**
City of Selah

HLA Engineering and Land Surveying, Inc. (HLA) requested that Aspect Consulting, LLC (Aspect) assist HLA and the City of Selah (City) with evaluation of the observed reduction in yield from the City's Well No. 7. Specifically, HLA requested Aspect to complete a hydrogeologic assessment that included an evaluation of the observed lower static water level (shut-in pressure) in Well No. 7 and reduction in pumping performance, and provide recommendations for next steps.

Data collection on Well No. 7 occurred over three field efforts:

- On March 28, 2019, a video scan of the well and short step-rate pumping test was conducted. Aspect provided a technical letter discussing the findings and made recommendations for next steps (Aspect, 2019).
- The week of November 4th, 2019, rehabilitation of the well occurred followed by a video scan of the well on November 8, 2019.
- Step-rate and constant-rate pumping tests were conducted November 18 through 21, 2019, to assess well performance and aquifer characteristics.

Summary of Findings

This memorandum provides Aspect's findings regarding reduction in yield from the City's Well No. 7. In summary:

- Video Scan of the well revealed:
  - The borehole is completed to approximately 1,001 feet below top of casing (btoc), as opposed to 1,023 feet btoc indicated by the 1994 as-built.
  - A large amount of water appears to enter the borehole through vesicular piping at the bottom of the borehole.
  - The casing, liner, and borehole are in good condition.
- Schneider Water Services (SWS) determined that the well bottom was not collapsed; therefore, well efficiency, and resultant specific capacity, cannot be improved through rehabilitation of the borehole.
- Pumping Well No. 7 at 2,000 gallons per minute (gpm) results in the following observations:
  - Pumping for 100 days is likely to result in a pumping water level of at least 36 feet below ground surface (bgs) anticipated in year 2020, and at least 51 feet bgs in year 2045 assuming no reduction in aquifer transmissivity.
  - The aquifer transmissivity is sufficient to meet 2,000 gpm demand and recover within 95 percent of drawdown in less than 1.5 minutes in the short-term.
  - Significant turbulent conditions are induced as water enters the well, the non-linear head loss (turbulence) accounts for approximately 70 percent of the drawdown.
- The predicted long-term yield is likely affected by the reduction in the potentiometric surface (static water level or shut-in pressure) over time.

Well No. 7 is in good condition and can meet short-term demands by setting a pump at a minimum depth of 100 feet bgs. Aspect recommends the City continue to monitor static and pumping water levels, along with flow rates, to evaluate changes in static water levels and specific capacity overtime. Aspect anticipates the City will continue to see long-term decline (average of 0.6 feet water pressure per year) in the static water level and a respective decline in specific capacity. This will limit the ability for Well No. 7 to meet long-term demand and perfect the authorizing water right permit (G4-30642P). Therefore, the City should begin evaluating options to either replace water supply with a new source or mitigate long-term declines in regional groundwater levels.

Geologic Setting

The City of Selah is located on the west-central margin of the Columbia River Plateau, a structural province formed by a series of continental basalt flows collectively known as the Columbia River Basalt Group (CRBG). The Columbia Plateau includes most of the Columbia River Basin and has been divided into three physiographic regions known as the Yakima Fold Thrust Belt (YFTB), Palouse Slope, and Blue Mountains sub-provinces (Kahle et. al., 2011). The City is located near the western portion of the YFTB sub-province. The following sections provide details of the geologic structure and stratigraphy and groundwater occurrence within this area.

Local Geology and Hydrostratigraphy

Regional bedrock is dominated by the CRBG, a series of stacked basalt flows and sedimentary interbeds that were deposited 17 and 6 million years ago during the Miocene epoch. The CRBG is underlain, intercalated, and overlain by volcanoclastic sedimentary deposit (Ellensburg Formation) derived from ancestral cascade volcanoes. The Ellensburg Formation is overlain by recent alluvial deposits. Local geologic characteristics are largely the result of regional tectonic processes. The City is located within the Selah Basin of the YFTB. Well No. 7 is on the north side of the east-west trending Yakima Ridge anticline, and south of the Selah syncline, as shown on Figure 1.

The hydrogeology of the area is dominated by five principal geologic units. Characteristics and distribution of each unit is described as follows:

Alluvial Terrace Deposits – Surface sediments are dominated by quaternary unconsolidated alluvial terrace deposits. The deposits are composed of silt, sand, gravel, and/or cobble sized grains deposited by fluvial processes associated with the Yakima River. This unit is approximately 10 feet thick at Well No. 7.

Upper Undifferentiated Ellensburg Formation – The Upper Undifferentiated Ellensburg (Ellensburg) formation is largely the result of deposition of volcanoclastic sediment from nearby domal volcanoes. The deposits are composed of intercalated conglomerates, sandstones, and siltstones. These sediments often occur as stratigraphic sequences alternating between laterally extensive depositional sheets of hyperconcentrated flood flow deposits to reworked sediments that are moderately sorted, bedded and crossbedded (Waitt, 1979).

The Ellensburg formation in the vicinity of Well No. 7 consists mostly of siltstone to mudstone with some gravel. Thickness of individual beds within the formation range from a few feet to more than 100 feet. Strata of clay, silt, and fine sand usually are somewhat thicker than strata of the coarser materials. Total thickness is approximately 265 feet in this area.

Columbia River Basalt Group – The CRBG is the basement bedrock unit and defined by the Pomona Member of the Saddle Mountains Basalt formation and the Frenchman Springs Member of the Wanapum Basalt formation. These units are composed of multiple basalt flows and an intervening Ellensburg formation sedimentary interbed (Selah Interbed). Groundwater in the CRBG aquifer system ultimately discharges laterally out of the Selah Basin into the Yakima River Valley near Selah Gap. In addition, vertical hydraulic gradients within the basalt aquifer indicate potential for upward vertical leakage of groundwater into the overlying aquifers.

- **Saddle Mountains Basalt** – This unit is approximately 115 feet thick and consists of black, vesicular basalt associated with an intracanyon flow overlying a thin deposit of ancestral Columbia River gravels that overlie dark gray, fractured basalt associated with the Pomona member.

- **Selah Interbed** – This unit is approximately 155 feet thick and consists of laharic material deposited by hyperconcentrated flood flow.

- **Wanapum Basalt** – This unit is at least 460 feet thick. Well No. 7 does not fully penetrate this unit. Well No. 7 does penetrate multiple basalt flows associated with the Roza and

Frenchman Springs members of the Wanapum Basalt formation. These basalt flows consist of predominantly hard gray, black, and red to black basalt with thick vesicular zones and a vesicular pipe at the bottom of the borehole. Sedimentary interbeds are absent except for a thin interbed consisting of a hard, green siltstone.

Based on review of Well No. 7 well logs and the video scans, the City's Well No. 7 is completed across the Wanapum Basalt formation and captures water from a basalt flow contact (875 feet btoc) and the vesicular pipe near the bottom (998 feet btoc) of the borehole.

Groundwater Level Trends

Figure 2 depicts regional trends in Wanapum Basalt aquifer groundwater levels, as presented previously in Aspect 2019. The figure shows that static water levels in Well No. 7 are consistent with local wells completed in the Wanapum Basalt aquifer, while groundwater levels in wells located further away appear to have a more apparent decline. The apparent decline may represent actual decline in static water levels due to limited recharge and groundwater pumping, a result of limited number of measurements, the timing of measurements (during pumping), or issues related to well construction.

Observed Well Construction

Two video scans of Well No. 7 were performed by SWS. The first video scan was performed on March 28, 2019, to evaluate the condition of the well and inform next step recommendations on rehabilitation efforts. The second video scan of the well was performed on November 8, 2019, following rehabilitation efforts. The observations from the video scans and rehabilitation are discussed below.

Video Scans

During both video scans water was allowed to flow freely at the surface. This enables qualitative observation of groundwater flow from the aquifer into the borehole over select depth intervals. Water only flowed freely while at bottom of borehole on the March 28th video scan, but flowed freely during the camera ascent on November 8th.

Main observations from the March 28, 2019 video scan were:

- Bottom of the borehole is at 999.7 feet btoc.
- Observable flow generated from vesicular pipes at bottom of borehole.
- Bottom of 12-inch casing is at 742 feet btoc.
- Four large vesicular zones exist between 870 feet btoc and the bottom of the borehole, 1,000 feet btoc.

Main observations from the November 8, 2019 video scan were:

- Bottom of borehole is at 1,000.8 feet btoc.
- Bottom of borehole has a minor amount of broken material from the rehabilitation effort.
- Observable flow generated from flow contact (pillow basalt) at 875 feet btoc, and vesicle pipes near bottom, approximately 998 btoc, of borehole.

Video scan of Well No. 7 found the construction of the well as similar to Aqua Drilling and Engineering Corporation's November 24, 1994 as-built except for discrepancy with stated depths. Table 1 provides a summary of the discrepancies.

Table 1. 1994 As Built and 2019 Video Scan Discrepancies

Description	Aqua Drilling and Engineering Corp (1994) Depth (feet btoc)	SWS (2019) Depth (feet btoc)	Difference (feet)
Top of 12-inch-diameter liner	586	580	6
Bottom of 12-inch-diameter liner	746	742	6
Bottom of borehole	1,023	1,001	22

Rehabilitation

Aspect provided the City with five options to increase production under the authorized water right. These options included clearing the apparent obstruction from approximately 1,000 to bottom of the borehole to deepening the well. The City elected to plan for clearing the apparent obstruction, baling the broken rock and sediment, and lining the well. SWS was awarded the work following open bidding.

SWS modified a bailer with a 600-pound slide hammer and spear-end to clear the apparent obstruction. SWS conducted 20-foot free falls with the slide hammer for 3 hours. The spear-end penetrated less than a few inches as measured by the painted surface on the spear-end. Minimal material (broken vesicular basalt) was bailed from the borehole.

As indicated above from the video scan observations the apparent obstruction was not cleared and is likely the bottom of the drilled hole. This is supported by the observed shape of half of the bottom of the borehole, where it appears the borehole has the shape of the drill bit.

The City elected not to install a liner given no collapse had occurred over the 25 years in service and that the vesicular pipes near the bottom of the borehole likely produce a significant quantity of the total flow into the well; therefore, installing a liner may block the vesicular pipes resulting in reduction of well efficiency.

Well Yield and Aquifer Testing

Well testing, using a temporary test pump, consisted of step rate and 24-hour constant rate pumping tests. On November 18, 2019, a 4-hour step rate test was conducted on Well No. 7. The 24-hour constant rate test and a 24-hour recovery were conducted from November 19 to November 21, 2019. Figure 3 presents the full groundwater hydrograph from the step rate test, 16-hour recovery, constant rate test, and 24-hour recovery.

Groundwater levels were monitored in the pumping well (Well No. 7) throughout the testing program. Groundwater levels were monitored in the pumping well using both a pressure gage (due to artesian conditions) and manual water level indicator and a 100 pounds per square inch (psi) Seametrics PT2X vented pressure transducer. Discharge was measured using two Seametric insertion meters. Pumped water was conveyed to the City's stormwater system ultimately discharging to Taylor Ditch.

Step Rate Test

The well was pumped at an average flow rate of approximately 940, 1,430, 1,890, and 2,090 gpm—the maximum discharge rate of the test pump. Each step was conducted for one hour as shown on Figure 4. Step 4 shows some well development occurred during the higher flow rate. The resulting drawdown and specific capacity are provided in Table 2.

Table 2. Step Rate Pumping Test Results

Step #	Pumping Rate (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)	Well Efficiency (percent)
1	940	16.6	57	46
2	1430	33.8	42	36
3	1890	54.8	35	30
4	2090	60.3	35	28

The step rate test provides a means to assess well performance. Well performance was assessed using the Hantush-Bierschenk method (Kruseman and deRidder, 2000), which allows for calculation of non-linear well loss (CQn^2). The calculated CQn^2 of Well No. 7 at 2,090 gpm is 45 feet. Comparing the non-linear well loss to the linear well loss (BQ) of 17 feet as a measure of well efficiency is 28 percent.

Well efficiency of 70 to 80 percent is considered good for screened wells (Driscoll, 1986). Well No 7 is constructed as an open hole—there is no well screen or filter/gravel pack introducing inefficiency; therefore, we would expect higher well efficiencies. The low efficiency is a direct result of the high non-linear well loss (turbulence) due to the structural characteristics of the basalt flow. Water must move through the vesicular piping near the bottom of the well, and along the flow contact around 875 feet btoc, to enter the borehole. Turbulent flow conditions are generated due to the small cross-sectional area of these structures and the high velocities necessary to satisfy the pumping rate.

Constant Rate Test

Well No. 7 was pumped at an average constant rate of 1,913 gpm for 24 hours. Figure 5 presents the constant rate pumping test drawdown hydrograph. A maximum of 52.8 feet of drawdown was measured, or 29.3 feet below grade. The specific capacity of the well near the end of the pumping test was 36 gpm per foot of drawdown. The specific capacity of the well increased following further development of the well during the last step of the step rate pumping test, as seen by the positive trend on Figure 4.

Recovery

Recovery of the aquifer was measured for a 24-hour period immediately following the constant rate pumping test. Figure 6 presents the recovery hydrograph. The aquifer recovered to within 95 percent of the total drawdown less than 1.5 minutes of initiating soft pump shutdown.

Aquifer Parameter Estimates

Transmissivity of the aquifer in the vicinity of Well No. 7 is calculated from both the constant rate pumping test drawdown and pumping test recovery measurements. Figure 7 presents the drawdown and residual drawdown (recovery) curves used to calculate the transmissivity using the Cooper-Jacob Straight-Line Method (Driscoll 1986), which states:

$T = 264Q/\Delta s$

Where:

T = Aquifer transmissivity (gallons per day per foot [gpd/foot])

Q = Discharge (gpm)

Δs = Change in drawdown, or residual drawdown, over one log cycle (feet)

The aquifer transmissivity is estimated at 2,700,000 gpd/foot (366,000 feet^2/day) on the drawdown measurements and 9,500,000 gpd/foot (1,267,000 feet^2/day) on the recovery measurements. These very high transmissivities are indicative of the vesicular piping transmitting water to the borehole.

The hydraulic conductivity is estimated at 10 to 40 centimeters/second (cm/s) assuming an aquifer thickness of 10 feet provided by the vesicular piping and basalt flow contact. This is the upper end of expected range of hydraulic conductivity for CRBG interflow zones.

Long-Term Yield and Hydraulic Conditions

Analysis of constant rate pumping test measurements allows for identification of boundary conditions (barriers, recharge, etc). No boundary conditions were identified in the constant rate pumping test measurements that indicate negative effect on long-term yield, outside the previously identified decline in regional groundwater levels. Measurements indicate the aquifer is capable to recharge, and recover from pumping the borehole at the target flow rate of 2,000 gpm.

Following construction of Well No. 7 in November 1994 a variable rate pumping test was conducted in December 1994. Table 3 below presents a comparison of percent change in specific capacity from the 1994 and the November 2019 pumping test results.

Table 3. Pumping Test Comparison

Step #	Pumping Rate (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)	Percent Change Specific Capacity
1994 Variable Pumping Test Results				
2	900	9	97	--
3	1900	34	57	--
2019 Step Rate Pumping Test Results				
1	940	17	57	-41
3	1890	55	35	-39

The change in specific capacity is likely a result of a decline in regional static water levels in the Wanapum aquifer (Aspect 2019). The static water level in Well No. 7 appears to have declined 15 feet between 1994 and 2019 (0.6 feet per year). The decline in static water level has compounding effects on well and aquifer hydraulics resulting in drawdown and the ultimate reduction in specific capacity and increased pumping costs.

Predicted Drawdown at Longer Pumping Times

Analysis of step rate pumping test measurements allows for prediction of drawdown at longer pumping times. Predicted long-term pumping levels are presented in Figure 8 using the observed static water level of 23.4 feet above grade (shut-in pressure of 8.5 psi measured at 8.75 feet above grade) and the lower estimated transmissivity of 366,000 feet^2/day. The pumping level is expected to be less than 36 feet bgs at the end of 100 days of pumping at 2,000 gpm.

A pumping level of greater than 51 feet bgs at the end of 100 days of pumping at 2,000 gpm in 2045 is expected when accounting for a reduction in static water level. A 15 feet reduction in static water level is expected based on the available data and extrapolating out 25 years. The lower pumping level assuming no decline in specific capacity. Whereas, specific capacity will decrease with a decrease in static water level; therefore, the City will likely see a pump level greater than determined above using existing data.

A YSI water quality multimeter was attached to the sampling port of the discharge line to collect general water quality field parameters near the conclusion of the constant rate test. The results are summarized in Table 4. The general water quality field parameters indicate the water entering the well is 70 degrees Fahrenheit, alkaline, low in dissolved oxygen, in a transitional oxidative state, and of typical ionic strength for groundwater.

Table 4. General Water Quality Results

Parameter	Result	Units
pH	8.4	SU
Specific Cond.	224	uS/cm
Diss. Oxygen	0.43	mg/L
ORP	150	mV
Temperature	70.5	°F

Notes:
SU – standard units
mg/L – milligrams per liter
uS/cm – microseimens per centimeter
ORP – oxidation-reduction potential
mV – millivolts
°F – degrees Fahrenheit

References

Aspect Consulting, LLC (Aspect), 2019, Letter to Justin Bellamy, PE, HLA Engineering and Land Surveying, Inc, Well No. 7 Efficiency Evaluation, May 10, 2019.

Driscoll, F. G., 1986, Groundwater and Wells, Second Edition, Johnson Screens, St. Paul, MN.

Kahle, S.C., Morgan, D.S., Welch, W.B., Ely, D.M., Hinkle, S.R., Vaccaro, J.J., and Orzol, L.L., 2011, Hydrogeologic framework and hydrologic budget components of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Scientific Investigations Report 2011–5124, 66 p.

Kruseman, G.P. and N.A. de Ridder, 2000, Analysis and Evaluation of Pumping Test Data, Second Edition, International Institute for Land Reclamation and Improvement, The Netherlands.

Waitt, J.B, 1979, Late Cenozoic Deposits, Landforms, Stratigraphy, and Tectonism in Kittitas Valley, Washington. Geological Survey Professional Paper 1127, United States Government Printing Office, Washington.

Limitations

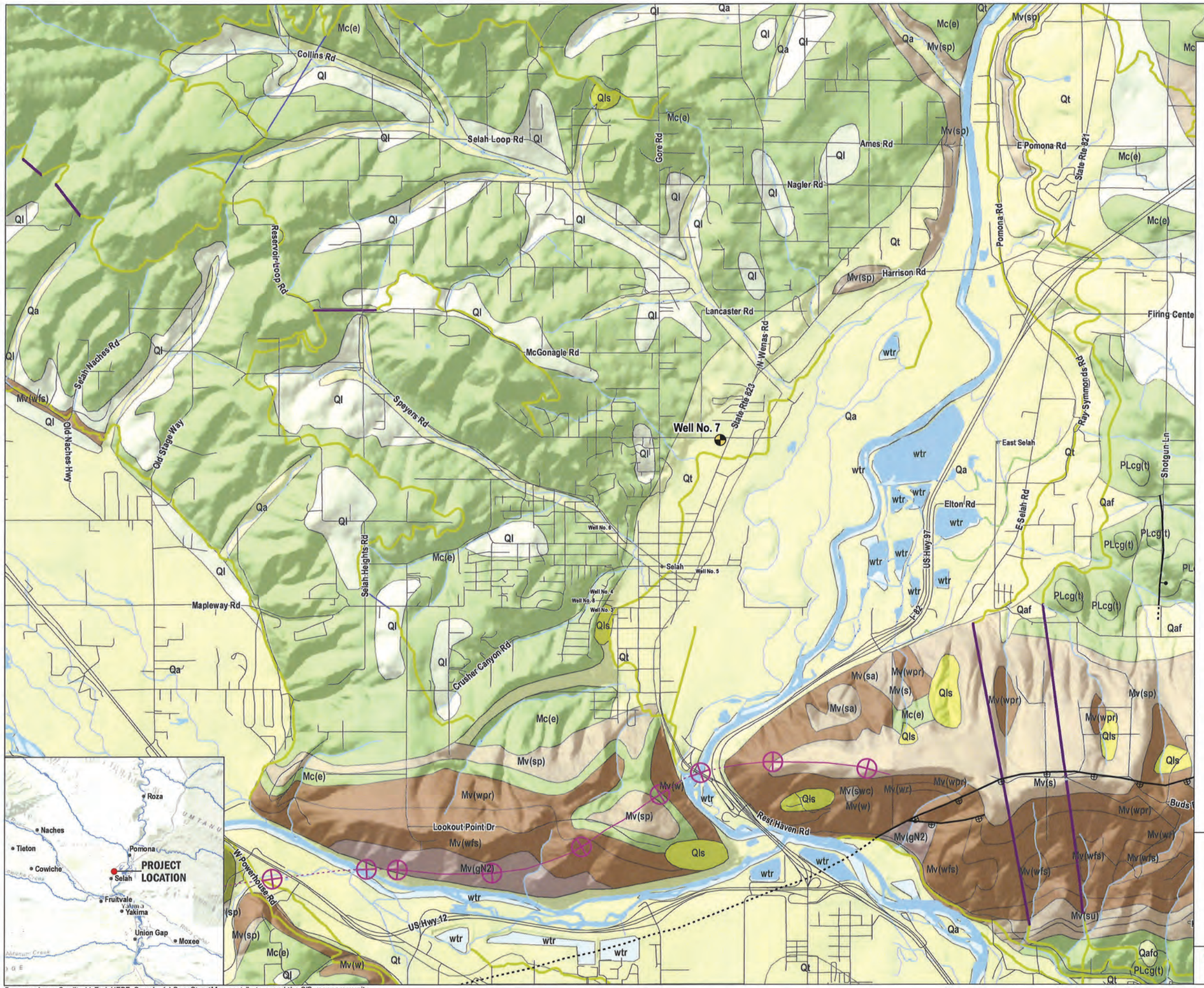
Work for this project was performed for HLA Engineering and Land Surveying, Inc (Client), and this memorandum was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This memorandum does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Attachments:
Figure 1 – Surficial Geology Map
Figure 2 – Wanapum Basalt Groundwater Level Trends
Figure 3 – Full Hydrograph
Figure 4 – Step Rate Pumping Test Hydrograph
Figure 5 – Constant Rate Pumping Test Hydrograph
Figure 6 – Recovery Hydrograph
Figure 7 – Cooper-Jacob Straight-line Analysis
Figure 8 – Predicted Pumping Levels

V:\180666 City of Selah Well 7 Efficiency\Deliverables\Well #7 Rehab & Testing\Final\Well No. 7 Rehab and Testing 20_0212.docx

FIGURES



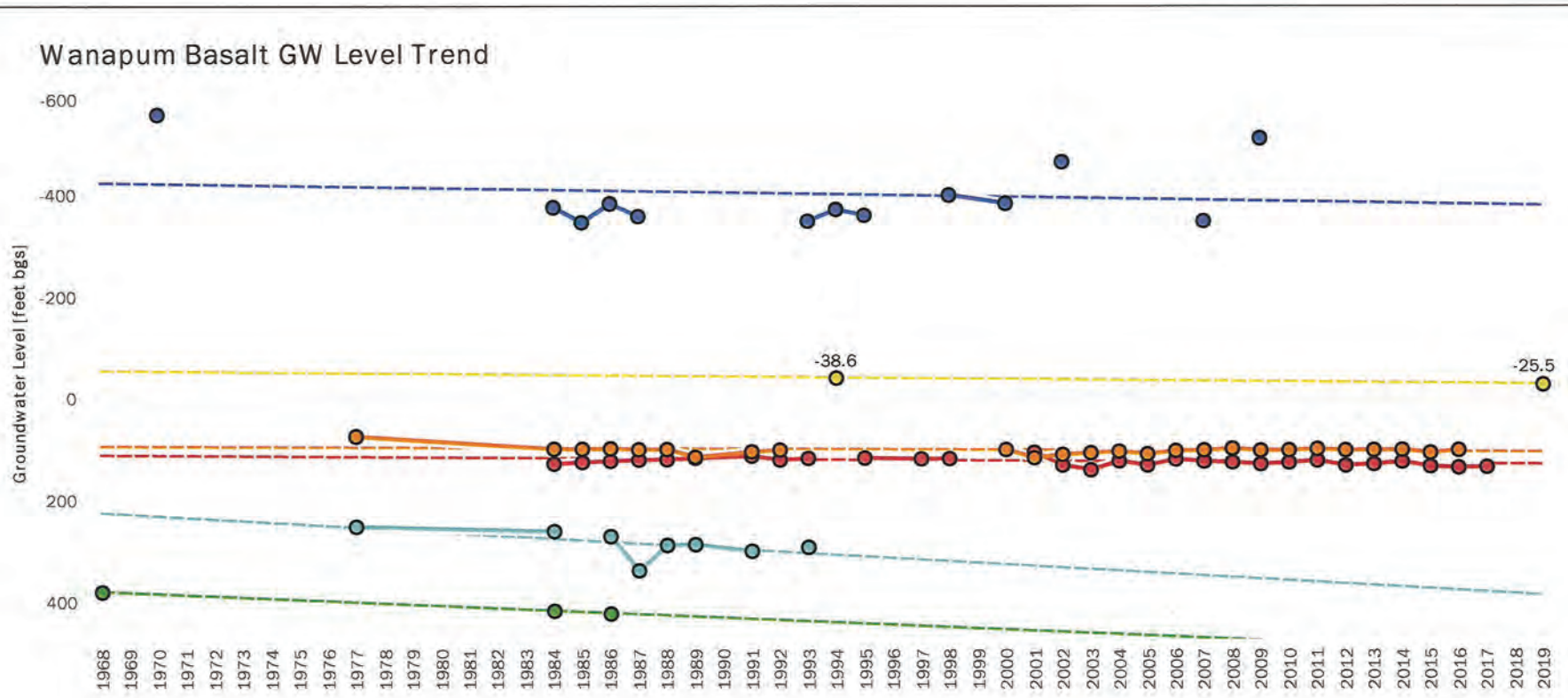
Surficial Geology Map

Well No. 7 Evaluation, Rehabilitation, and Testing
City of Selah
Selah, Washington

Aspect Consulting	JAN-2020	BY: JMS / TDR	FIGURE NO. 1
	PROJECT NO. 180666	REVISED BY: ---	

Basemap Layer Credits || Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Copyright:(c) 2014 Esri

GIS Path: T:\projects_8\CityOfSelah\Wells\7Efficiency\Evaluation_180666\Delivered\01 Surficial Geology Map.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/29/2020 || User: escumbaker || Print Date: 1/29/2020



Wanapum Basalt Groundwater Level Trends

City of Selah Well No. 7 Efficiency Evaluation
Selah, Washington

Aspect CONSULTING	MAY-2019	BY: JMS / TDR	FIGURE NO. 2
	PROJECT NO. 180666	REV BY: ---	

\\yakdisk\station.aspect.local\Projects\Projects\City of Selah 180666\Report Drafts\Well Efficiency\All\02 Wanapum Basalt GW Level Trends.ai

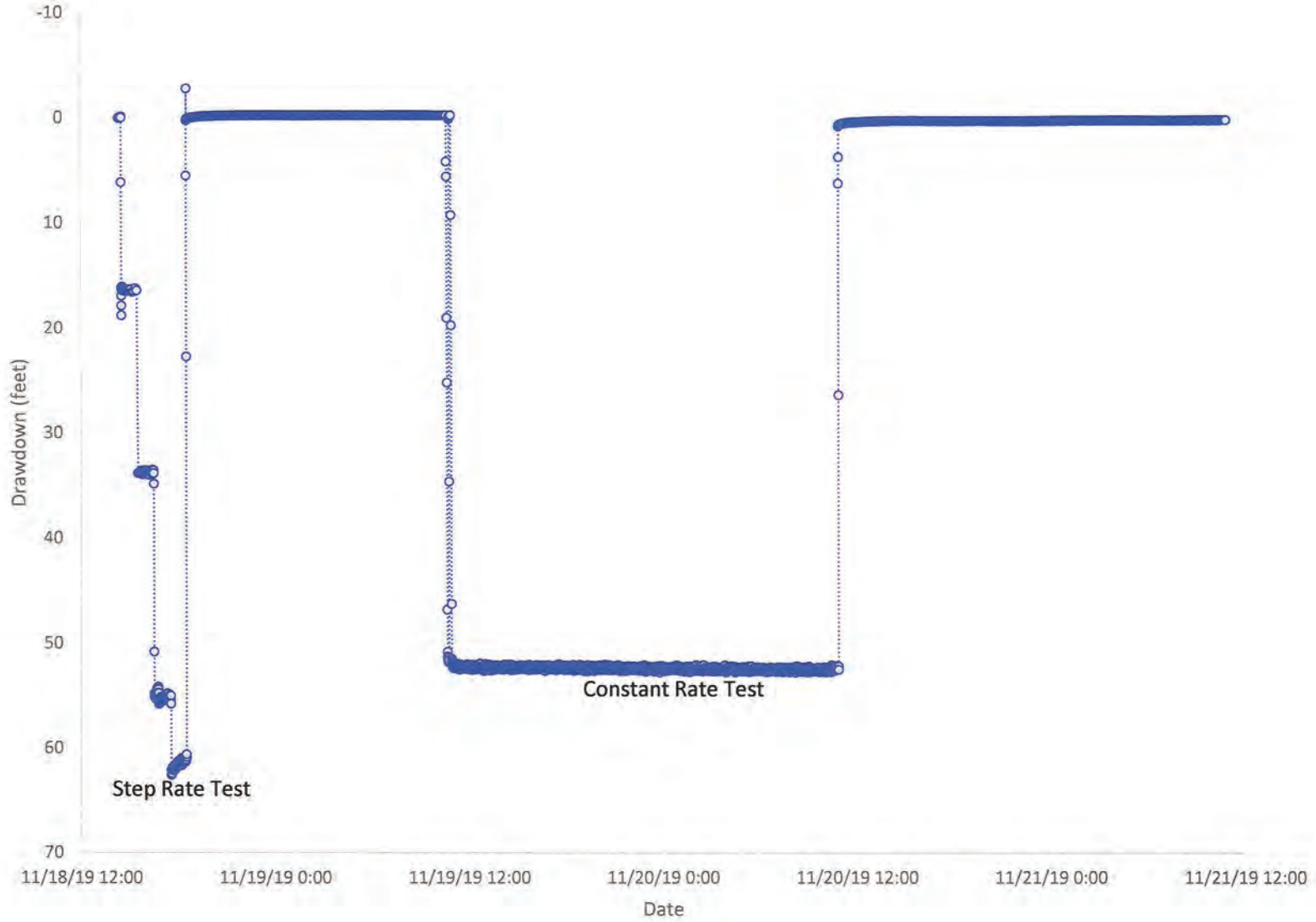


Figure 3
Full Hydrograph
Rehabilitation and Testing Report
City of Selah Well No. 7 Well Efficiency, Selah, WA

Aspect Consulting
2/12/2020
V:\180666 City of Selah Well 7 Efficiency\Deliverables\Well #7 Rehab & Testing\Final\Figures Selah Well No. 20_0212

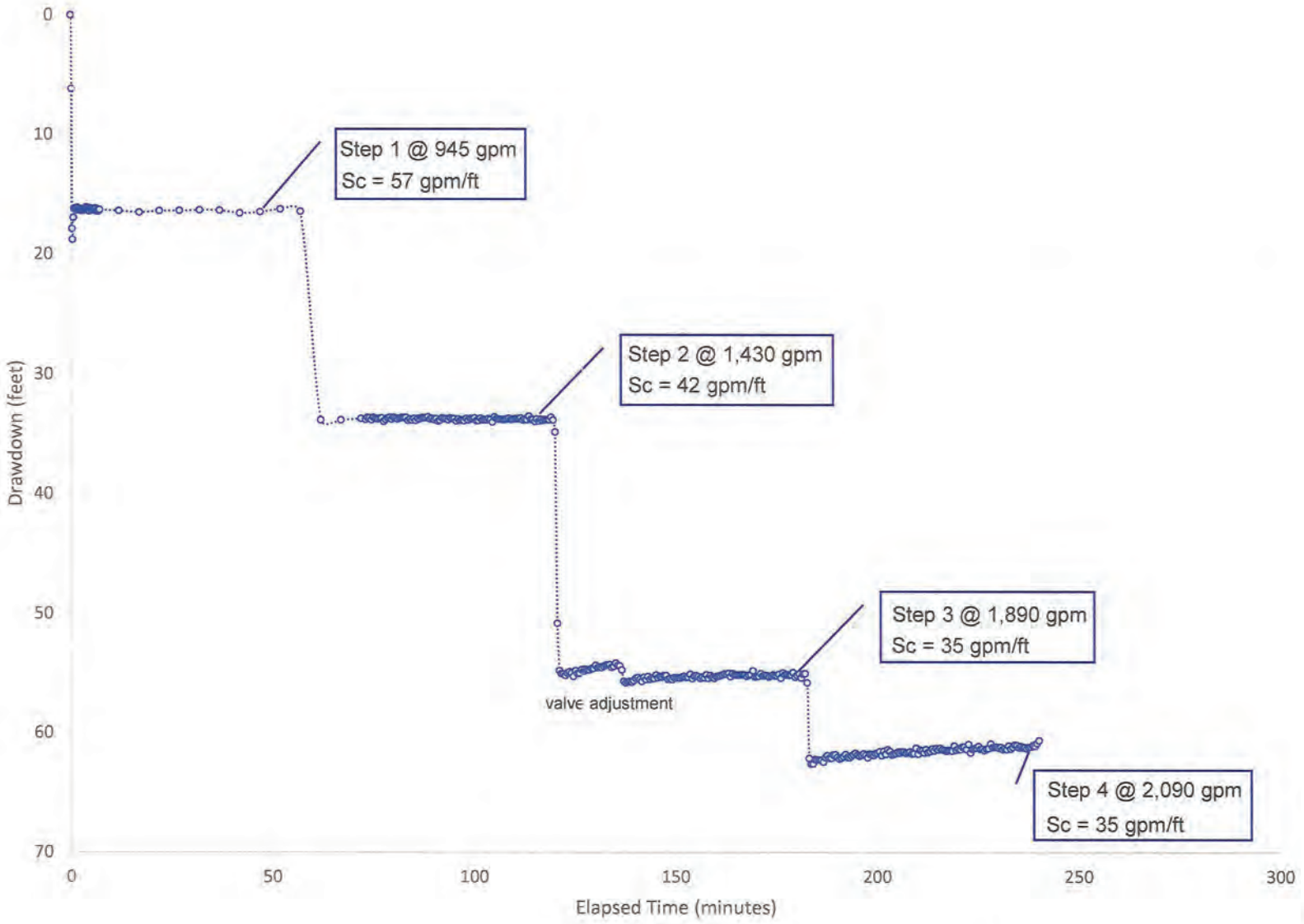


Figure 4
Step Rate Pumping Test Hydrograph
Rehabilitation and Testing Report
City of Selah Well No. 7 Well Efficiency, Selah, WA

Aspect Consulting
2/12/2020
V:\180666 City of Selah Well 7 Efficiency\Deliverables\Well #7 Rehab & Testing\Final\Figures Selah Well No. 20_0212

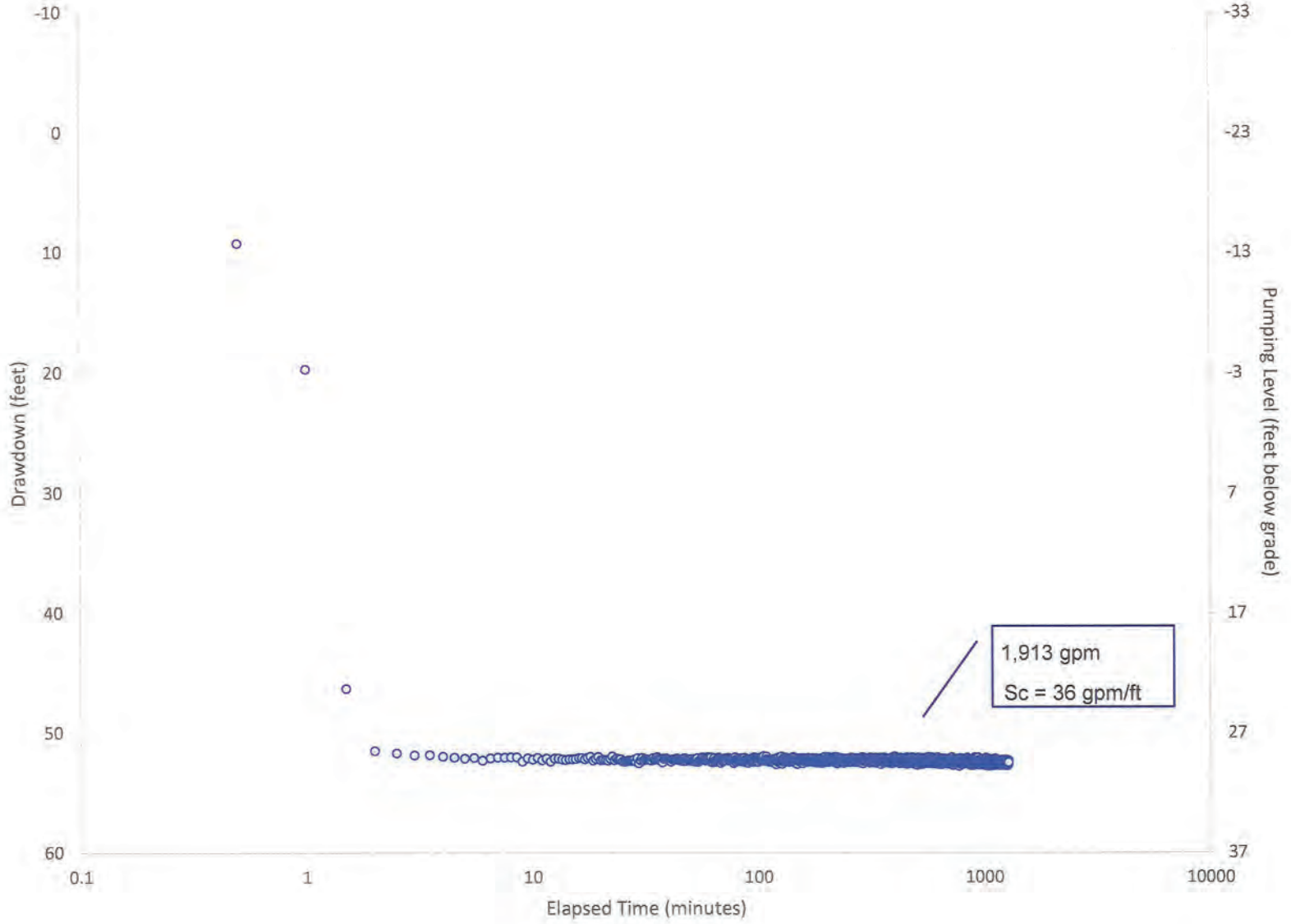


Figure 5
Constant Rate Pumping Test Hydrograph
Rehabilitation and Testing Report
City of Selah Well No. 7 Well Efficiency, Selah, WA

Aspect Consulting
2/12/2020
V:\180666 City of Selah Well 7 Efficiency\Deliverables\Well #7 Rehab & Testing\Final\Figures Selah Well No. 20_0212

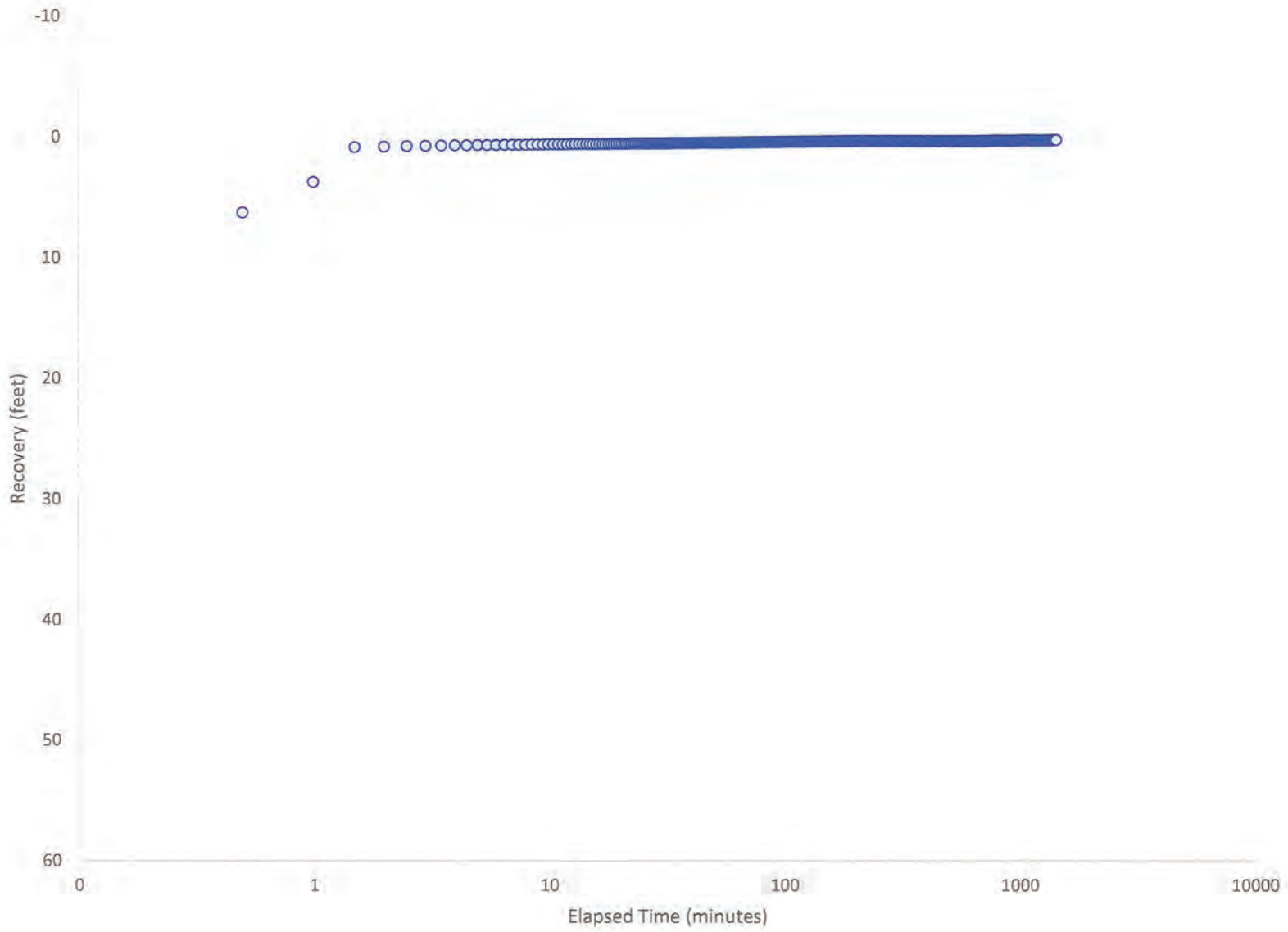


Figure 6
Recovery Hydrograph
Rehabilitation and Testing Report
City of Selah Well No. 7 Well Efficiency, Selah, WA

Aspect Consulting
2/12/2020
V:\180666 City of Selah Well 7 Efficiency\Deliverables\Well #7 Rehab & Testing\Final\Figures Selah Well No. 20_0212

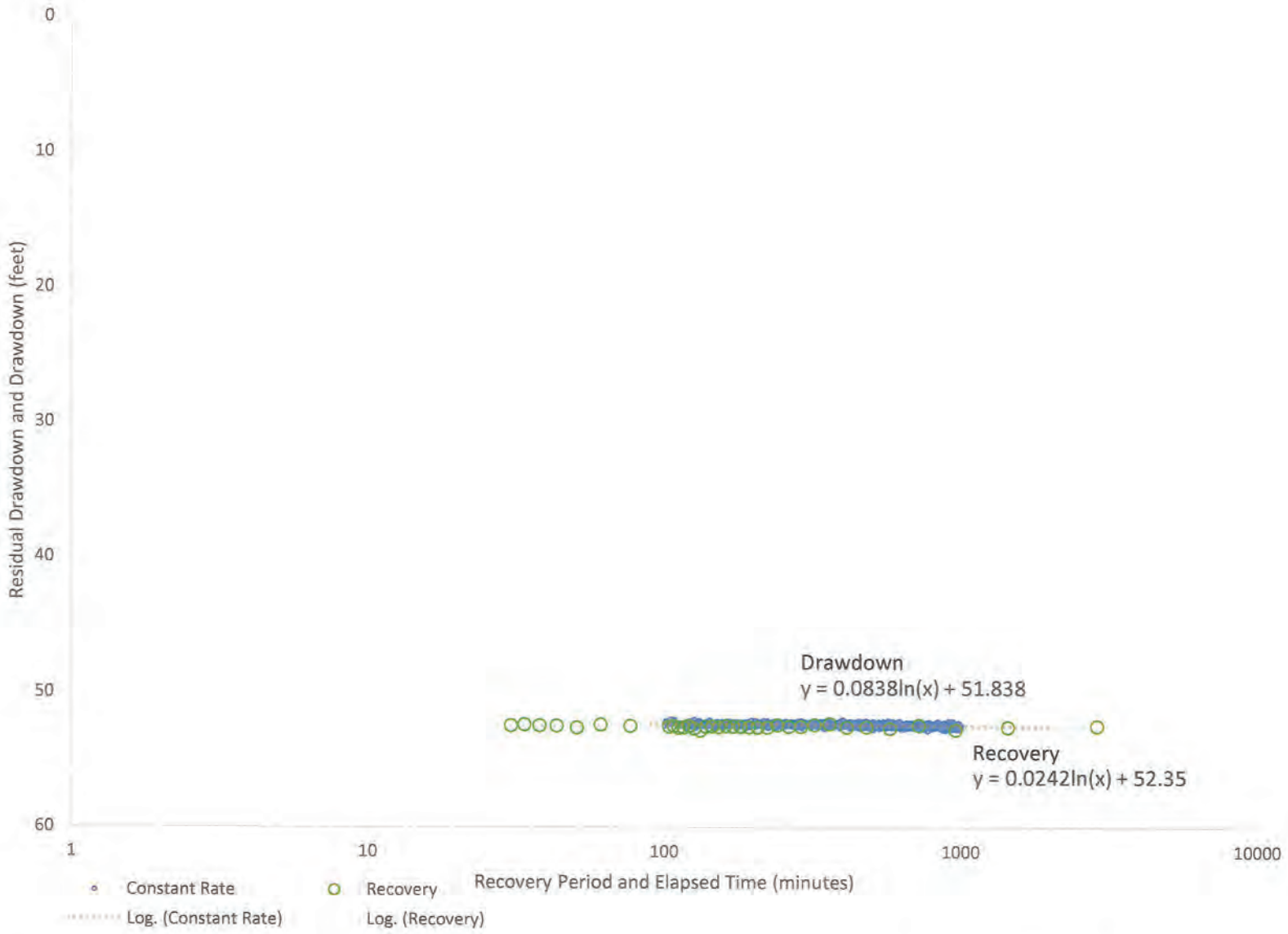
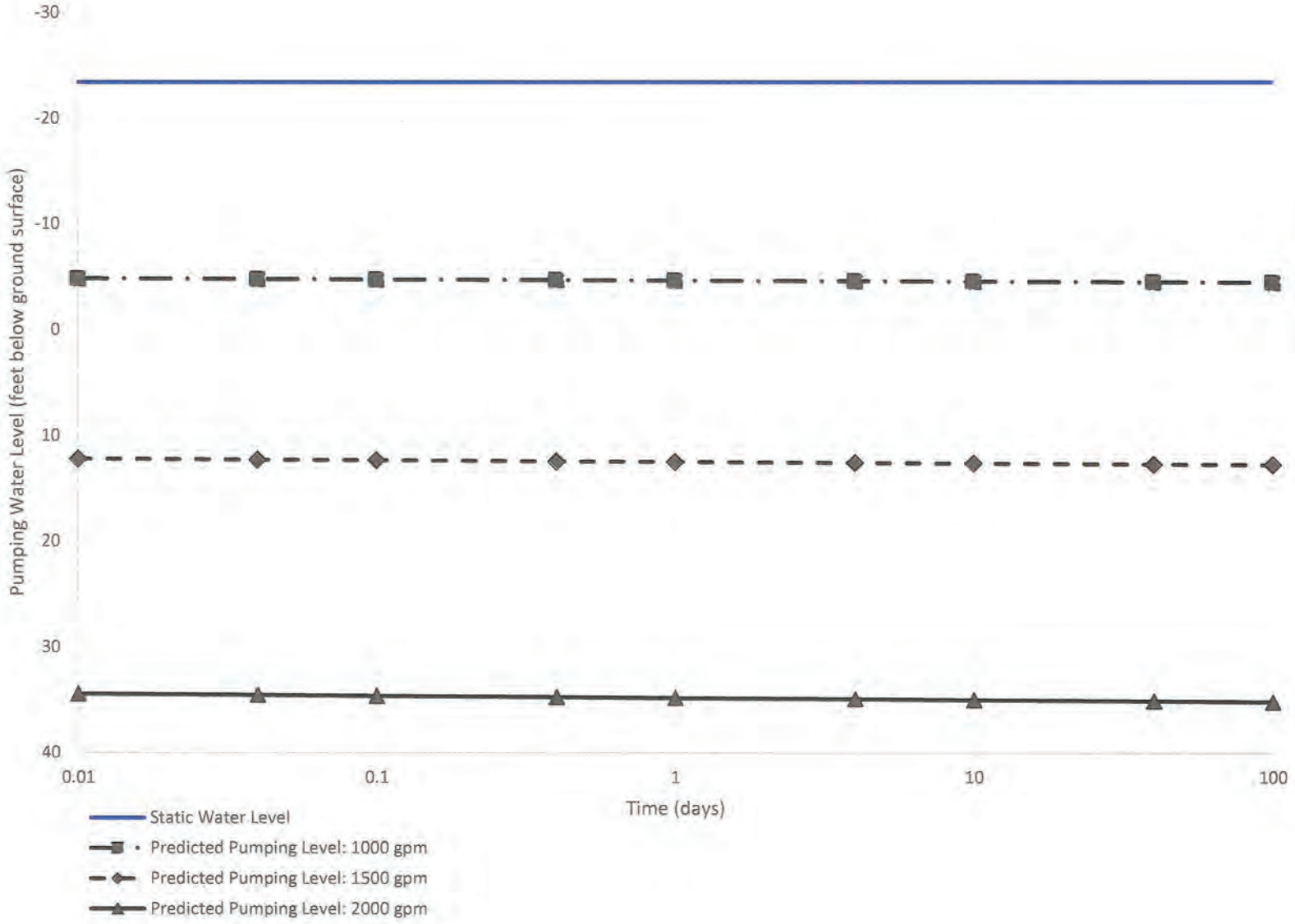


Figure 7
Cooper-Jacob Straight-line Analysis
Rehabilitation and Testing Report
City of Selah Well No. 7 Well Efficiency, Selah, WA

Aspect Consulting
2/12/2020
V:\180666 City of Selah Well 7 Efficiency\Deliverables\Well #7 Rehab & Testing\Final\Figures Selah Well No. 20_0212



Aspect Consulting
2/12/2020
V:\180666 City of Selah Well 7 Efficiency\Deliverables\Well #7 Rehab & Testing\Final\Figures Selah Well No. 20_0212

Figure 8
Predicted Pumping Levels
Rehabilitation and Testing Report
City of Selah Well No. 7 Well Efficiency, Selah, WA

18.
COLIFORM MONITORING PLAN

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH
COLIFORM MONITORING PLAN

BACKGROUND

The City of Selah currently operates with seven pressure zones. Six wells supply Selah's water system, supplying up to 5,500 GPM. Water storage is provided by eight reservoirs within Selah's water system, totaling over 3.5 million gallons. In addition to the reservoirs, the City operates booster pump stations and pressure reducing valves to maintain acceptable pressures in all zones. This Coliform Monitoring Plan is intended to form the basis of the coliform bacteria sample collection program for the City's seven zones.

PURPOSE AND OBJECTIVE

All public water systems are required to collect total coliform bacteria samples in accordance with Washington State Department of Health Drinking Water Regulations and Washington Administrative Code (WAC) Chapter 246-290. Section 246-290-300 of the WAC requires Group A water systems to prepare a written coliform monitoring plan and to base routine monitoring upon such plan. Implementation of the plan helps to ensure water provided to consumers is safe and free of disease-causing organisms.

SYSTEM INFORMATION

DOH Water System ID Number	77400
Population served[1]	11,868
Number of service connections	2,953

WATER SOURCES

DOH Source No. S01 = Well No. 3
DOH Source No. S02 = Well No. 4
DOH Source No. S03 = Well No. 5
DOH Source No. S04 = Well No. 6
DOH Source No. S06 = Well No. 7
DOH Source No. S07 = Well No. 8

WATER STORAGE

North Reservoir (southern)	164,000 gallons (offline)
North Reservoir (northern)	396,000 gallons
Palm Park Reservoir	462,000 gallons
Brader Hill Reservoir	200,000 gallons
Goodlander Reservoir	1,000,000 gallons
Valhalla Heights Reservoir (western)	158,500 gallons
Valhalla Heights Reservoir (eastern)	158,500 gallons
Lookout Point Reservoir	1,192,000 gallons
Total	3,731,000 gallons

WATER TREATMENT

Selah provides no treatment of its water supply other than disinfection. Disinfection of the City's water is accomplished through chlorination of the source water as it enters the City's distribution system. Each City well is equipped with a gas chlorinator which injects chlorine into the discharge piping of each well.

COLIFORM SAMPLING INFORMATION

Washington State Department of Health regulations require water systems serving a population of 8,501 to 12,900 to take a minimum of ten (10) samples a month when no samples with a coliform presence are collected the previous month. Regulations also require if a coliform is present in a sample, a repeat sample must be immediately taken at the site and also at one location within five services upstream and one location within five services downstream. EPA's Ground Water Rule requires triggered source water sampling within 24 hours of being notified of a positive total coliform result under routine monitoring. Triggered source water sampling includes collecting at least one ground water sample from each source in use when the positive total coliform sample was collected.

[1] Full-Time Residential Population and Regular Non-Residential Users

In conjunction with monthly coliform monitoring, the City of Selah monitors residual chlorine concentrations within the distribution system. The City collects water samples for residual chlorine concentration at the same times and locations as for coliform sampling.

The following is a list of coliform and chlorine residual sampling locations (also shown on attached Coliform Monitoring Plan Map), including upstream and downstream samples sites (a. and b.) to be used by the City of Selah within identified pressure zones:

Zone 1 Routine Sample Site Locations

1. 260 S. Rushmore Rd.
    a. 222 S Rushmore Rd.
    b. 222 S Railroad Rd.
2. 505 Lacey Ave.513 Harris Ave
    a. 504 Lacey Ave
    b. 509 Lacey Ave
3. 516 Jamie Dr
    a. 506 Jamie Dr.
    b. 604 Jamie Dr.
4. 410 S. 1st St.
    a. 408 S 1st St.
    b. 416 S 1st St.

Zone 2 Routine Sample Site Locations

5. 609 N. 14th Ave.
    a. 606 N 14th St.
    b. 611 N 14th St.
6. 111 Lyle Lp.
    a. 71 Lyle Lp.
    b. 115 Lyle Lp.
7. 408 N. 10th St.
    a. 406 N 10th St
    b. 410 N10th St.

Zone 3 Routine Sample Site Locations

8. 409 Hillcrest Dr. (repeat site in 1998)
    a. 411 Hillcrest Dr.
    b. 405 Hillcrest Dr.
9. 1705 Cedar Ln.
    a. 1706 Cedar Ln.
    b. 1703 Cedar Ln.

Zone 4 Routine Sample Site Location

10. 1015 Goodlander Dr.
    a. 1019 Goodlander Dr.
    b. 1008 Goodlander Dr.

PLAN PREPARATION INFORMATION

Prepared by: City of Selah (509) 698-7365
Ty Jones, Public Works Supervisor
Revised on June 24, 2020

CITY OF SELAH

COLIFORM MONITORING PLAN MAP

LEGEND

- SELAH CITY LIMITS
- SELAH UGA BOUNDARY
- EXISTING WATER MAIN
- ROUTINE SAMPLE SITES — 1
- REPEAT SAMPLE SITES — 8(1998)
- SOURCE SAMPLE SITES (WHEN TRIGGERED) — WL7

N W E S

0 375 750 1500

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12-11-20
P:\Projects\2019\19061\WSP-Figures.dwg

CMP MAP

19.
STAGE 2 DISINFECTION BYPRODUCTS MONITORING PLAN

HLA
Engineering and Land Surveying, Inc.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

DOH 331-464
Updated July 2013

Stage 2 DBP Monitoring Plan - Groundwater (Reduced Monitoring)

System Name	City of Selah
PWSID#	774006
Date	9/6/2013
Completed by	Ty Jones
Population	11868

Initial Stage 2 Sampling Period First sampling period following **October 1, 2013**

Number of Samples Required 2 Dual Sample Sets per Year

Samples must be a dual sample set: one at the locaiton and during the quarter with the highest TTHM single measurement and one at the location and during the quarter with the highest HAA5 single measurement.

	Stage 2 Compliance Monitoring Site ID	Projected Sampling Date
Highest TTHM Site	815 S 4th St Lp.	7/15/2014
Highest HAA5 Site	701/703 Jamie Dr	7/15/2014

If any annual or triennial sample exceeds the MCL (0.080 mg/l for TTHM or 0.060 mg/l for HAA5) you must begin quarterly monitoring for both TTHM and HAA5 for at least four consecutive quarters to determine if you exceed the MCL.

To remain on reduced monitoring:

The TTHM LRAA must be less than or equal to 0.060 mg/l AND the HAA LRAA must be less than or equal to 0.045 mg/l at each monitoring location.

What happens if you exceed any of the above levels?

You must return to routine monitoring.

Determining Compliance

Our system is required to monitor annually (or triennially). For compliance, we will determine that each sample taken is less than the MCL. If any sample exceeds the MCL, we must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations. If the locational running annual average (LRAA) exceeds the MCL for either TTHM (0.080 mg/l) or HAA5 (0.060 mg/l), an MCL violation will have occurred. The LRAA is calculated based on four consecutive quarters of monitoring. Compliance will then be achieved if the TTHM and the HAA5 LRAA at each monitoring location for the four most recent quarters is less than or equal to 0.080 mg/l for TTHM and less than or equal to 0.060 mg/l for HAA5.

Disinfectant Monitoring for TTHM and HAA5

Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl_2

Determining Compliance for disinfectant residuals

Compliance is based on the running annual average (RAA) of 12 consecutive months
Daily residual measurements will / will not be included in the compliance calculations (circle one)

Attach a distribution map with sample locations

Comments

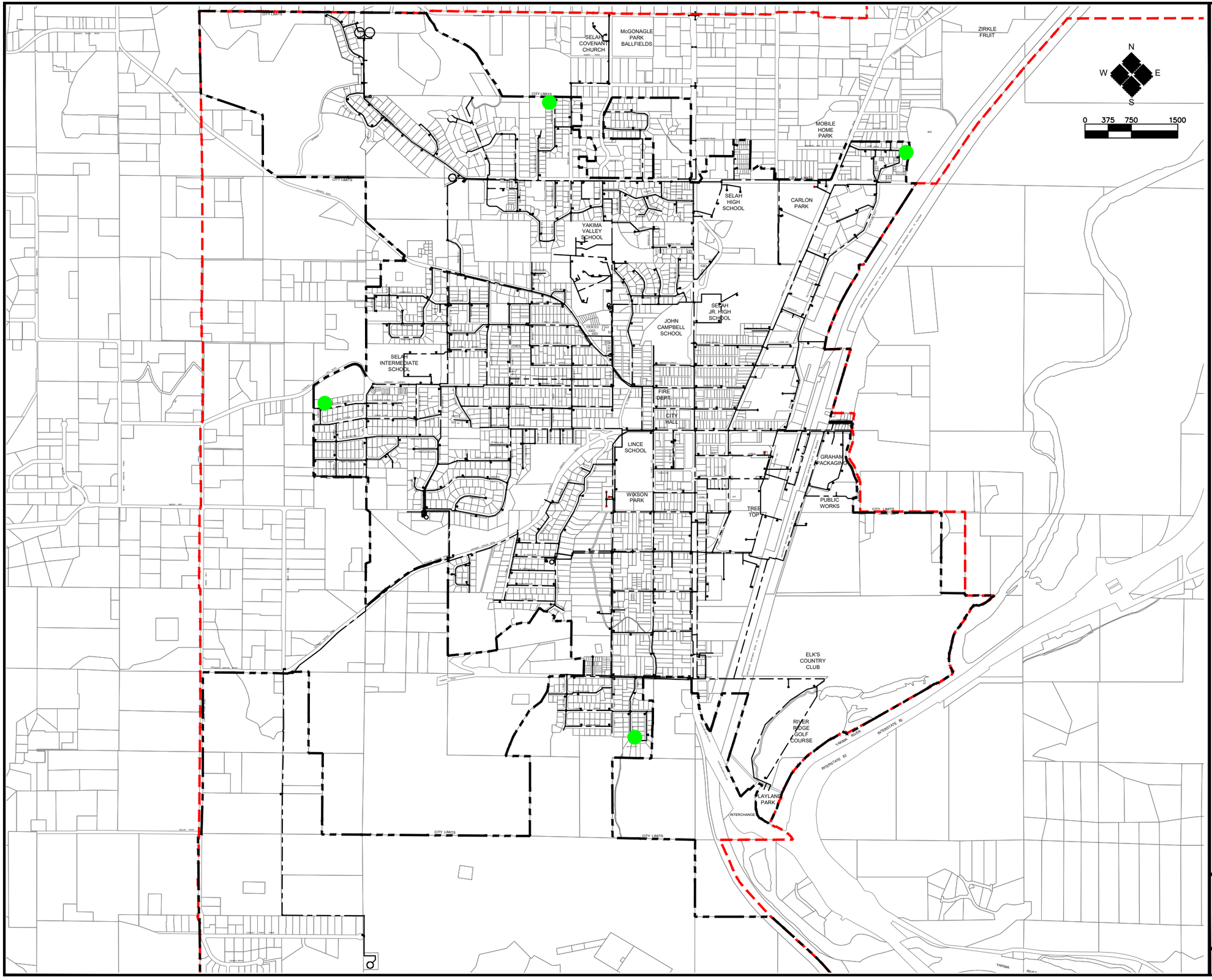
all HAA5 where ND non-dected in the system, so we used our second highest TTHM for the highest HAA5 site

You will need to print a hard copy for your records and make it available upon request. You do not need to submit a copy to DOH.

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

CITY OF SELAH

DISINFECTION BYPRODUCTS MONITORING PLAN MAP



LEGEND

- RETAIL SERVICE AREA BOUNDARY (CITY LIMITS)
- FUTURE SERVICE AREA BOUNDARY (URBAN GROWTH AREA)
- SAMPLE SITES

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12/11/20
P:\Projects\2019\19061\WSP-Figures.dwg

20.
ACCIDENT PREVENTION AND SAFETY PROGRAM

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH PUBLIC WORKS DEPARTMENT

ACCIDENT PREVENTION AND SAFETY PROGRAM

Policy Statement

It is the policy of the City of Selah to provide and maintain a safe, accident-free, and healthful working environment for all our employees. We expect every employee to actively participate in our safety programs at all times. The City provides the necessary training and equipment for a safe, accident-free environment and will investigate any accidents which may occur so we can correct any problems and prevent similar accidents in the future.

The involvement of every employee and supervisor is essential to the City's Accident Prevention and Safety Program. Involvement means several things: following all safety rules including the use of safety guards and equipment; wearing proper safety protection such as seat belts, goggles, gloves, or hardhats when and where required; attending safety orientations and briefings and our weekly Safety Meetings; the safe and proper operation of all tools and equipment including motor vehicles; and the reporting of any safety hazards to your supervisor or a Safety Committee member. Above all, the expression of full involvement on your part is the use of GOOD JUDGEMENT about safety in every part of your job.

REMEMBER - ACCIDENT PREVENTION AND SAFETY is your responsibility, too. Play an active part in the City's safety program. By accepting mutual responsibility to operate safely, we will all contribute to the well-being of personnel and subsequently the City.

ACCIDENT PREVENTION AND SAFETY: EVERYONE'S RESPONSIBILITY

There are a number of key people in the City's ACCIDENT PREVENTION AND SAFETY PROGRAM - the members of the City's Safety Committee, department directors, and supervisors. Each of these people has a role which is described below. The most important person in the program, however, is you.

As an EMPLOYEE, you are responsible for:

- Using good sense and protecting your own health on the job.
- Keeping physically fit and reporting to work alert.
- Using proper safety devices and protective equipment as required by the job and/or the City.
- Making prompt reports to your immediate supervisor of each injury or occupational illness which occurs on the job regardless of the degree of severity.
- Reporting unsafe conditions or acts.
- Maintaining a neat, clean, and hazard-free work area.
- Participating in Safety Training classes.

- Cooperating with all other employees to eliminate accidents.
- Studying and observing all safety practices governing your work.
- Performing equipment checks and reporting any problems to your supervisor before using any equipment or machinery.
- Offering suggestions which contribute to a safer work environment.

The SUPERVISOR also has a leading role in accident prevention and safety. He/She sets the example for his/her employees and has direct responsibility for working conditions at the jobsite. The SUPERVISOR is responsible for:

- Creating a work environment which encourages the free discussion and resolution of job-related safety issues.
- Providing thorough safety instruction for each employee before the employee is assigned a job.
- Enforcing all State or City adopted rules. This includes ensuring that employees wear seat belts and other personal protective clothing and equipment guards.
- Holding regular on-the-job safety meetings and briefings with employees to discuss department safety problems.
- Developing a check list of key safety points for each type of job or for operating each piece of equipment.
- Maintaining current certification in first aid and cardiopulmonary resuscitation (CPR).
- Checking all equipment for proper maintenance.
- Assuring the work site is neat, clean and hazard-free.
- Making regular inspections for unsafe practices, potentially hazardous conditions, and faulty equipment.
- Investigating all accidents promptly and making a complete written report which is forwarded to the City's Risk Manager.
- Including a safety practice review as part of each employee's periodic/annual performance evaluation.

The DEPARTMENT DIRECTOR is responsible for establishing safety standards and practices in the department which are in keeping with City and State standards. The DEPARTMENT DIRECTOR carries out this responsibility by:

- Delegating responsibility for safety-related activities within the department.
- Reviewing reports of Citywide safety inspections on departmental equipment and facilities, and initiating corrective action on hazards reported.

- Reviewing reports and circumstances of serious accidents with the supervisor in whose area the incident occurred and arriving at steps necessary to prevent recurrence.

In addition, the Safety Committee assists in accident reviews, general safety inspections, training, and making recommendations for improving employee safety.

Inspections

Effective inspections are another excellent way to find and correct potential hazards before an employee is involved in an accident.

Formal Citywide inspections of departments and work sites are conducted periodically by the Safety Committee. The standards for these formal inspections are the same as for an official WISHA (Washington Industrial Safety and Health Act) inspection by the Department of Labor and Industries. The Committee should note conditions of buildings and facilities, equipment, machines, tools, and materials; safety procedures in force; and the actions of employees. Any potential or actual problem areas should be clearly noted, and the Committee must complete a report to the departmental safety file which indicates the date of the inspection, the inspector's names, a list of the problems found, recommendations for corrective action, and a target date for completing corrections.

Any time a serious problem is found, the faulty piece of equipment should be tagged immediately and/or the work area blocked off until temporary or permanent repairs can be made. A copy of the inspectors report must be posted for review by all employees in the work area. Problems must be corrected as quickly as possible.

Informal inspections are the daily or routine checks of work sites made by employees and supervisors. One very important thing these routine checks should focus on is whether employees use personal protective equipment and follow appropriate safety procedures at all times.

The Department of Labor and Industries may at any time conduct an official inspection of any or all City work sites.

Investigations

Accidents don't just happen; they are caused. To learn the causes, accidents must be investigated as soon as possible after they take place. Ideally, investigations begins as soon as any injuries have been treated. Events leading up to the accident are still fresh in everyone's mind, and details are more easily recalled.

Even minor injuries should be investigated. An accident's seriousness is often a matter of luck. Eliminating the causes of a minor injury today may prevent a serious accident tomorrow.

Every time an accident occurs (no matter how serious or minor) and as soon as the injured are provided treatment, the supervisor is required to investigate the situation to see what may have caused the problem in order to avoid recurrence. This is the best way we know of to learn from past mistakes. Your supervisor will appreciate your assistance in accident investigations,

especially if you jot down a few notes right after the incident. The more information you can provide, the better chance we have of correcting the problem and sparing someone else injury.

Even though the Safety Committee may also investigate an accident, there are three reasons why the immediate supervisor makes the first investigation:

- The employees involved are basically their supervisor's responsibility. This includes responsibility for their safety and welfare.
- The supervisor knows the employees and the work better than anyone else, and is in a better position to get the facts and to find out a practical solution to the problem or to recognize situations where technical assistance is needed.
- The supervisor's investigation can help promote better employee relations. It demonstrates the City's concern for our employees and shows the supervisor's support for accident prevention.

In making the investigation, the supervisor should:

1. Check the scene:
    a. Begin by looking carefully at the accident site; note the location and condition of the area.
    b. Reconstruct as much as possible the chain of events leading up to the injury/illness, and attempt to determine the major event(s) and/or contributing factors which caused the injury.
    c. Draw a diagram or take photographs of the accident scene if they will be helpful in developing a conclusion about the accident.
    d. Note machinery, equipment, and any other nearby objects, together with the places where witnesses were standing.
    e. Obtain statements from witnesses as soon as possible.
2. Write down useful information, including:
    a. All facts which may relate to the cause of the injury. For example, did the employee complain of dizziness, or did anyone notice whether the employee used the proper equipment.
    b. Any procedure misinterpreted, equipment misused, or other factors not in accordance with published work rules or safety procedures.
    c. Any unsafe conditions in the work area, such as defective tools or faulty equipment.
    d. All other items noted at the time of your investigation, such as lighting conditions, weather conditions (if outdoors), statements made by employees or others relating to the case, etc.

3. Collect the evidence. If any injury/illness or near miss occurs when machine parts or structures fail, it is important to the investigation to determine what failed and why.

4. Interview the victim as soon as possible or practical. Even if the injury/illness is minor, a timely interview with the injured employee can often develop valuable information to prevent further hazards.

5. Interview witnesses at the scene immediately or as soon thereafter as possible. Make brief notes identifying who gave the information.

Accidents resulting in a death must also be investigated by an inspector from the Department of Labor and Industries. In those situations, everything at the accident site must be preserved as it was at the time of the accident until the inspector has completed his/her investigation.

Correcting the Problem

The whole point of investigating an accident is to answer two questions:

1. What caused the accident?

2. What can be done to prevent a similar accident?

In order to make an effective recommendation, the supervisor needs to determine if a particular accident is a single, isolated event, or if it is part of a pattern of accidents, such as:

- Repeated accidents at a particular work site.

- Repeated accidents when using a certain piece of equipment or performing a certain activity.

- Repeated accidents involving a particular employee or group of employees.

The immediate cause of any accident may be only a part of the cause of a pattern of accidents. It is important to stop the pattern of accidents if one exists, as well as solve the immediate problem.

Counseling and Discipline

In both isolated accidents and pattern accidents, correcting or changing employee behavior is essential. People (and their actions) cause accidents; people (by their actions) can prevent accidents.

For the supervisor, interacting with the employee through coaching and counseling, explaining to the employee how he/she is expected to behave and giving regular feedback on how well he/she is doing, is the most effective way to change behavior. If informal coaching and counseling does not work to change behavior, it will be necessary to use formal, corrective discipline. Formal discipline generally begins with oral and written warnings, and may increase to include suspensions and termination if the problem is not satisfactorily corrected. For serious problems which may threaten an employee's safety or the safety of other employees, corrective discipline can begin with suspension or termination. Supervisors and employees facing a situation where corrective discipline may be necessary should contact the Department Director on how to proceed.

Alcohol and Substance Abuse

The City of Selah recognizes that chemical dependencies on alcohol and/or drugs are treatable illnesses and will handle them as such, but it also recognizes its responsibility and commitment to provide safe conditions to the public and to all its employees. So, while reasonable accommodations will be made for the employee with such a problem to receive treatment and/or responsible help, the normal progressive disciplinary actions can and will be taken for behavioral problems occurring on or relating to the job if these problems are not immediately addressed.

An employee who has an alcohol or drug abuse problem must comply with all job performance standards at all times. He/she must maintain acceptable attendance patterns, cooperate with supervisors and co-workers, and cannot use or be under the influence of alcohol or drugs on the job, on any City-owned property, or in any City-owned vehicle or equipment.

Accident Prevention - Some Basic Rules

No one likes accidents - they waste ENERGY, TIME, AND MONEY. They do occur, however, and usually in hindsight we realize that they are preventable. With a little extra care or preparation they did not have to happen at all. **THINK SAFETY!** Prepare for every job with safety in mind. Check with your supervisor before starting any new assignment. Be sure you understand the "whys" of procedures as well as the "whats." Each job may have different safety hazards to contend with. There may also be specific accident prevention procedures which apply in special situations or which apply to certain jobs or equipment. But there are some basic rules - common sense, really, - which every employee should always follow. These are listed on the following pages.

Basic Safety Rules: All City Employees - Shop, Field and Office

- Keep fit. Staying healthy and alert only increases your ability to ensure a safe and accident-free working environment.

- Wear appropriate clothing. Loose clothing, hair or jewelry may get caught in tools or equipment such as winches, drill motors, and electric saws or in typewriters, file drawers, cutters, or presses.

- Personal protection and safety equipment. Certain items are MANDATORY in certain situations. Failure to wear and maintain personal protection and safety equipment in these situations is grounds for discipline up to and including termination.

- Hard hats shall be worn by any employee who is performing construction, repair, or inspection work in or on:

    1. Streets, roadways, median strips, or adjacent to vehicular traffic.

    2. Construction sites where cranes, overhead scaffolding, or the like are in use.

    3. Trenches, pipes, confined spaces, or whenever the supervisor or department director determines that a hazard exists from falling or propelled objects.

- Hearing protection such as ear plugs and ear protectors are required in all locations with high noise levels and should be worn whenever high RPM tools or equipment are being used.

- Safety glasses, goggles, or face shields must be worn where any hazard to the eye exists as in operations involving chipping, grinding, drilling, cutting, welding, trimming, etc.

- Respirators and air filtering devices should be worn whenever a job or operation introduces small particulates or chemical pollutants into the air, especially in a "closed" environment as when using spray paint or insecticide in an unventilated room or shop.

- Approved safety vests and/or approved uniforms shall be worn when in or adjacent to vehicular traffic or when working after dark.

- Appropriate footwear must be worn at all times in the shops and in the field.

- Gloves suitable for the job shall be worn where necessary as when welding.

- Seat belts shall be worn when operating or riding as a passenger in any City vehicle or equipment used in vehicular traffic.

- Learn first aid and CPR skills.

- Know your building evacuation plan to be used in case of fire or other emergency and learn the location and operation of fire extinguishers in your work area.

- Use good judgement in lifting. Keep the weight of lifted objects as close to your body as possible and use your leg muscles to minimize muscle and back strain. If

you're not sure of your ability to lift, get some help and/or use hand-trucks or other aids.

- Make sure all tools are in good condition. Cutting edges should be sharp, clean, and free of nicks; handles should be secure and complete. Use tools only for their intended use; be sure electrical tools are properly grounded.

- Use the safety guards on equipment. Sharp edges and electrical shock are dangerous in the shop and in the office.

- Use a ladder, not a chair, if something is above your reach. Chairs make poor platforms for standing. When using a ladder, be sure the ladder has non-conducting safety feet and is free of cracks, broken rungs, or other defects.

- Use exhaust fans and vents when operating equipment or using substances which cause noxious or toxic fumes. Be sure there is an MSDS (Material Safety Data Sheet) readily available which gives instructions and precautions for handling emergencies such as fumes, spills, or accidental poisonings.

- Watch for slip and trip hazards. Move electrical cords out of the way; keep work areas neat, clean, and tidy. Keep hallways and walkways clear.

- Avoid horseplay. It is too easy to slip or miss and cause injury to yourself and others.

As stated, in addition to these "basic" rules of safety, some jobs or equipment may require additional precautions to ensure accident prevention. The following is a partial list:

Special Safety Rules: Shop and Field Employees

- Trenches and confined spaces: No City of Selah employee is permitted to enter a trench or excavation which does not satisfy the safety standards for construction work established by the Department of Labor and Industries. No City of Selah employee is permitted to enter a confined space without knowing and following the proper procedures outlined by department policy. This includes entering manholes, storage tanks, storm drain lines, or any other confined space where there may be a hazardous gaseous vapor or a lack of oxygen.

- Traffic: Safety vests and hard hats are mandatory whenever the work site is in or adjacent to traffic. All employees must receive training in setting up warning signs, flags, cones, barriers, and lights before they will be allowed to work in traffic areas. These warning devices must always be in place when work sites are in or near vehicular traffic.

- Grinding tools: Grinding wheels must be operated within their rated speeds and must have guards that cover at least 75% of the wheel circumference. Tool rests on power grinders must be 1/8-inch or less from the wheel, and the tongue guard (peripheral) on bench grinders must be 1/4-inch or less from the wheel. Proper eye protection is required.

- Cutting and welding: Only authorized personnel are permitted to do any cutting or welding. Before cutting or welding, the area must be clear of any flammable material or explosive liquid. No cutting or welding is allowed on fuel tanks or oil containers and the area must be properly shielded to protect other employees from arc flashes. When cutting or welding indoors, proper ventilation, prescribed clothing, and eye protection are all required.

- Gas welding equipment must be equipped to prevent the backflow of oxygen into the fuel/gas supply. Prescribed pressure settings must be observed and no lubricants are permitted in assembly of gas welding equipment.

- Compressed air: Compressed air hoses must be handled to ensure that air is directed away from everyone's eyes or face. Compressed air must not be used for cleaning clothing or other services because of the hazards of blowing particles.

- Pneumatic or explosive-activated tools : These tools shall only be used by employees who are knowledgeable in their use. Pressure must always be shut off and air exhausted from any line before disconnecting the line from any tool or other connection. Leaking or defective hoses shall be removed from service immediately.

- Flammable and combustible liquids: Only approved containers and portable tanks are permitted for storage and handling of flammable and combustible liquids such as gasoline and paints. These containers must be stored in approved, closed metal cabinets when not in actual use.

- Spray painting is permitted only in approved spray booths or in areas specifically approved for such use under the Uniform Building Code and Uniform Fire Code as enforced by the City.

- Hazardous material: The production of hazardous waste must be kept to a minimum. If a waste product can be identified as a commodity, it can be recycled. Oils, gasoline, antifreeze and batteries, if pure or undamaged, can all be recycled, but once polluted they become hazardous waste and must be effectively segregated and contained until properly disposed. Other materials such as paints, pesticides, and carburetor cleaners are not a major problem in use, but in disposal. All employees must follow proper disposal procedures for each product. Learn to properly separate and dispose of hazardous waste material. Become familiar with the hazardous materials in your work area and how and where to dispose of each. If you have any questions relating to hazardous material or disposal procedures, check the MSDS on file in your department or ask your supervisor.

- Chemicals/pesticides: All chemicals and pesticides must be properly and safely stored in appropriately composed and adequately sealed containers in safe, secure locations away from such hazards as excess heat, light, or moisture. When using chemicals such as cleaning fluids or solvents, always first check your equipment and wear the appropriate personal safety protection such as gloves or respirators. Only properly certified employees are to handle pesticides. Chemicals come in all forms: gas, liquid, and solid. Always adequately protect yourself against their effects. For information regarding chemicals or pesticides, check the MSDSs on file in your department or consult your supervisor. To minimize hazardous waste

production, chemical wastes must be properly separated and stored. This includes clear, concise, and legible labeling of all containers.

Motor Vehicle Safety: All Employees

In the City of Selah, motor vehicles remain the greatest potential source of injury to employees and citizens alike. Many of us drive a vehicle either occasionally or regularly as part of our job and all of us become part of traffic as a driver, passenger, or pedestrian when going to and from work and leisure activities. The hazards to people and property from motor vehicle accidents are well known. Because of this, we must insist all City of Selah employees remain RESPONSIBLE, COURTEOUS, and SAFE drivers at all times.

To help ensure that you avoid vehicle accidents and injuries on and off the job, remember and practice the following:

- Drive defensively. Look ahead, think ahead. Anticipate situations which my contribute to accidents and take appropriate precautions.
- Wear seat belts at all times. Passengers, as well as drivers, should always wear their seat belts.
- Operate motor vehicles only when you are well rested and fully alert.
- Avoid alcohol use before operating any motor vehicles. Many medications, whether prescription or over-the-counter remedies such as cough medicines or cold capsules, have the same depressing effects as alcohol.
- Avoid smoking when operating vehicles or motor equipment. Recent studies have shown that besides distracting the driver's attention when he/she is handling smoking material, the smoke itself can contribute to drowsiness and delayed reaction times.
- Inspect the vehicle and its safety equipment (brakes, lights, etc.) before operating. Check also for any signs of damage which may have been caused by the operator before you. If any is found, report it to your supervisor or the motor pool coordinator before you use the vehicle.
- Learn how to use the equipment properly. Take training and be sure you are familiar with all the controls and know what to do in emergency situations such as equipment failures.
- Become familiar with the accident reporting procedure located in the Emergency Information Quick Reference section of this manual. Remember, if you are involved in a motor vehicle accident in a City vehicle or in your private vehicle while on official City business, you must make a report immediately regardless of the seriousness of the damages or injuries.

All City employees are responsible for following these safety precautions when operating a vehicle on the job. Employees must also, of course, have the proper Washington State driver's license for

the type of equipment being operated. Failure to adhere to these safety precautions will require corrective action including possible suspension or termination.

When an Accident Does Occur - Initial Response

When an accident occurs, it is important to take a few seconds to check out the situation before taking any action. In this way, you increase the chances that your action will be the most effective and efficient possible. Some things you should immediately determine are:

- Is anyone injured?
- What kind of injuries and how serious are they?
- Is the victim able to move out of the immediate area of the accident to receive first aid or medical treatment?
- If the victim cannot move, can you reach him/her without causing further harm to the victim or yourself?
- Do you need additional help to free the victim and/or give medical attention?

If no one is injured, maintain the accident scene and contact the proper authorities, including your supervisor, as quickly as possible. If this is not practical for safety reasons, secure the scene disturbing as little of the site as necessary, then call the authorities.

Treating Injuries

If the accident involves injury, however, care for the victim(s) is primary. Fortunately, most accidents cause only minor injuries, if any at all. Sometimes the situation is more serious or it is not immediately clear what kinds of injuries or dangers are involved. This is when you need to check out the situation more carefully.

Think before you rush in. Use common sense. Take action that will help, not harm the victim or you. Ask the basic questions:

- Does anyone at the accident scene have obvious injuries - bleeding, bruises, cuts or breaks in the skin, burns, etc.?
- Does the victim report pain or numbness anywhere or difficulty moving some body part such as fingers or toes?

- Is the victim conscious?
- If the victim is unconscious, is he/she:
    1. Breathing?
    2. Have a pulse?
    3. Bleeding?

Administer first aid or CPR only if you are trained, have a current certificate, and can do so safely!

Sometimes an accident victim will be in a place where it is difficult or dangerous for you to reach him/her such as buried in a trench cave-in, trapped in a vehicle, or tangled in live electrical wires. Before you rush in to help, think carefully about what you will do; be sure you are not making the problem worse.

- At a trench cave-in, be sure you will not cause more dirt and rock to cover the victim or that you will not destroy "landmarks" which will help you to remember where you last saw the buried worker.
- Yanking a person out a wrecked vehicle may increase the chances of paralyzing back or neck injuries which could be avoided if some special equipment and techniques were used.
- Touching a person who is in contact with live electrical wires may mean that you will also suffer shock and burns.

Remember that in the City of Selah we have many emergency medical and rescue services that can be at the scene of an accident in minutes. Call for help immediately any time the situation may require expert medical treatment or rescue services.

There are several things you can do to prepare for an injury accident before it takes place:

- Learn the locations of first aid kits in your work area.
- Become familiar with what is in each of these kits.
- Keep your first aid and CPR training current. (If you have never received first aid and CPR training or your certificate is out of date, talk with your supervisor about enrolling in a course.)
- Report to your supervisor any inadequate first aid kits or insufficient supplies.

Supervisors are responsible for checking the contents of all first aid kits in their areas on a frequent and regular basis to ensure proper supplies are available and soiled or used items are replaced.

The City will provide reasonable transportation of any injured employee to medical or hospital care as necessary. An injured employee will be allowed to drive his/her own vehicle or a City Vehicle ONLY when it is clear that he/she can do so safely. When transporting an injured employee to an

emergency room, physician, or other medical care facility in a City vehicle, be sure the employee can be moved safely. If there is any question, ask for assistance from an aid car or medic unit.

Securing the Accident Site

Before leaving the accident site, be sure that no one else will have the same accident. Remove the hazard which caused the accident or clearly mark the hazard with flags, cones, or some other markings which will alert others to use caution.

Remember that if an accident results in a death, the accident site must be kept exactly as is until the State Department of Labor and Industry investigators have completed their on-site investigation. In less serious accidents, the site should be preserved until the supervisor has completed his/her investigation.

Reporting Accidents and Injuries

All work-related injuries and illness must be reported regardless of their seriousness. An injured employee must report each accident to his/her supervisor immediately (or as soon after the accident as he/she is physically able).

Any time an accident causes illness or injury which requires treatment by a physician, the employee must tell his/her supervisor and must complete an accident investigation form.

If You are Involved in an Accident

1. Traffic Accident Procedure:

   - Provide emergency medical aid, if necessary.
   - Call Police Department immediately. If outside the City, call the agency having jurisdiction and report to the Selah Police as soon as possible upon your return.
   - Do not move your vehicle until requested by police, medical, or fire department personnel. Maintain the accident scene.
   - Give only required personal and vehicular information. Avoid making or giving any statements to anyone except the investigating police agency.
   - Call your supervisor as soon as possible and report the incident.
   - Complete an Accident Investigation Report (available through your supervisor).

2. Public Incident/Accident Procedure (private property damage, injured citizen, etc.):

   - Provide emergency medical aid or call for emergency medical aid at 911 if necessary.

- Give only required personal and vehicular information.
- Direct the other party(s) to contact City Hall about filing a claim for damages, if necessary.
- Call your supervisor as soon as possible and report the incident.
- Complete an Accident Report Form (available through your supervisor).

21.
CHLORINE SAFETY PLAN

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH

PUBLIC WORKS DEPARTMENT

CHLORINE SAFETY PLAN

Contents

SECTION A:	Introduction Policy Document Review
SECTION B:	Safety Orientation Chlorine Safety Policy Safety Rules Handling Chlorine Tanks Controlling Leaks
SECTION C:	Management Responsibility Personnel Responsibility Training
SECTION D:	Emergency Procedures Chlorine Exposure Reporting Accidents/Incidents
SECTION E:	Safety Orientation Tour Form Close Call Report Form Time Lost Form Accident Report Form

CITY WATER TREATMENT

CHLORINE SAFETY PLAN

SECTION A

INTRODUCTION

Chlorine is never found free in nature, but exists in abundant quantities in the combined form as chlorides. The most common is table salt.

Free Chlorine is usually produced from sodium chloride by electrolysis (electric current passing through a substance) of brine (salt dissolved in water).

Liquid chlorine is a clear, amber-color liquid and about one and one-half times as heavy as water. The gas is greenish yellow in color and is approximately two and one-half times as heavy as air; it tends to lie close to the ground.

The gas produced must be thoroughly dried, purged of impurities, and then liquified by a combination of compression and refrigeration.

Dissolved in water, chlorine is an oxidizing agent of moderate strength. It is nonexplosive, noncombustible and a nonconductor of electricity. Like oxygen, however, chlorine gas or liquid chlorine is capable of supporting the combustion of certain substances. Many organic chemicals react readily with chlorine, in some cases with explosive violence.

POLICY

It is the policy of the City of Selah to ensure that all personnel are informed of the safety and health hazards of chlorine, all regulations and policies are followed, and the necessary resources (both personnel and financial) are allocated to make this safety program successful.

DOCUMENT REVIEW

The City of Selah has developed a Chlorine Safety Plan concerning the occupational exposure to chlorine.

It is essential that all employees become knowledgeable of the safety rules and policies stated in this document.

All employees shall read the contents of this manual and sign his/her name when completed.

The time limit shall be not more than 10 working days.

Signature _____

Date _____

SECTION B

SAFETY ORIENTATION

During the personnel orientation session, all employees are required to read and sign the Safety Policy Statement.

The City Public Works Department personnel shall be given a Safety Orientation Tour of the facilities which contain or use chlorine within their jurisdiction.

The aim of the tour is to familiarize all employees with the locations, handling and use of chlorine, location and use of safety equipment, accident and incident reporting, and chlorine safety rules and procedures.

The tour shall be given by the Public Works Superintendent.

CHLORINE SAFETY POLICY

The City Water Treatment Facilities has developed a written Chlorine Safety Plan, designed to maintain a safe working environment and to meet local, state, and federal regulations.

All employees will participate in a Safety Orientation Tour of the Chlorine facilities within their jurisdiction and read the Chlorine Safety Plan Manual.

After the tour, and the reading of the manual, the Public Works Superintendent shall question the employees as to the contents of the manual and the tour.

Failure to comply with any part of the Chlorine Safety Plan at any City facilities may result in disciplinary action.

A copy of the Document Review shall be signed by the employees at the end of the Safety Orientation Tour and the reading of the manual. A copy shall be put into the Safety file at City of Selah Public Works Department office.

SAFETY RULES

HANDLING CHLORINE TANKS:

1. DO NOT handle chlorine cylinders roughly.
2. Store cylinders weighing up to 150 lb. upright with chain support around them so they cannot fall.
3. Do not store chlorine cylinders in the feed room.
4. Always keep the protective caps on the cylinders when not in use.
5. Store chlorine cylinders in a cool place.

6. When moving 150 lb. cylinders, use a hand cart and secure the cylinder with a chain or safety clamp.

7. Move 1-ton cylinders with a hoist using a lifting bar.

8. Always tag an empty cylinder so there is no confusion as to which one is full and which one is empty.

9. Do not store cylinders (full or empty) in the direct sun.

10. Do not store cylinders near flammable materials or expose them to dampness.

11. Store the new full cylinders in order, using the oldest cylinder first.

12. Make sure the storage room is well ventilated.

CONTROLLING LEAKS:

1. Immediately attend to a leak, because a small leak can grow rapidly to a large one.

2. Assign two workers to repair a leak.

3. Use self-contained breathing apparatus while repairing leak.

4. On 1-ton cylinders, the valves are always in the vertical position (one above the other).

5. Never tamper with the safety devices on any container.

6. Always open the valves slowly.

7. Never use wrench longer than 6 inches to open valves or to close them.

8. On the 1-ton cylinder, there are six (three on each end) fusible metal plugs designed to soften at 158° F.

9. When a chlorine leak occurs, immediately turn on the ventilation system if installed.

10. Permit only trained personnel equipped with SCBAs to work on chlorine leaks.

11. Always have one person on the outside equipped with SCBA for rescue, if needed.

12. Never apply water to a chlorine leak.

13. Never use grease or oil on chlorine fittings.

14. Always turn on the exhaust system when removing the supply line.

15. Always draw off the pressure on the supply line by using the chlorinator before removing the line.

16. Use approved washers and piping for chlorine hook-ups.

SECTION C

MANAGEMENT RESPONSIBILITY

The Public Works Superintendent has the responsibility for providing and maintaining a safe environment within the scope of activities for his/her personnel and the surrounding community.

The following items are the responsibility of the Public Works Superintendent:

1. Promote safety awareness.
2. Maintain proper attitude toward safety.
3. Provide leadership and direction.
4. Conduct and record periodic inspection of all City-operated facilities using chlorine (except the Wastewater Treatment Plant).
5. Investigate every accident or close-call involving chlorine, completing a report and informing all utility personnel of events.
6. Take proper steps to correct safety deficiencies in a prompt manner.
7. Evaluate the safety program regularly.
8. Conduct safety training sessions.

PERSONNEL RESPONSIBILITY

Everyone working with chlorine shall be responsible for his/her own personal safety and understand that non-compliance with safety regulation for the handling or the use of chlorine may result in disciplinary action.

Individual employees will do the following:

1. Comply with the safety rules and regulations established by the City.
2. Bring chlorine related safety concerns to the attention of the Safety Committee and of City Management.
3. Suggest improvements if needed on the operation of equipment or the handling of chlorine.
4. Attend safety/chlorine related meetings.
5. Promote safety awareness to other employees.
6. Maintain proper attitude toward safety.

7. Be attentive to chlorine hazards.

TRAINING

All personnel are encouraged to maintain a valid First Aid Certificate. Chlorine safety meetings, along with training on the handling of chlorine and its uses, will be conducted every six months.

Training on site shall consist of, but not be limited to, the following:

1. Handling chlorine tanks.
2. Repairing chlorine leaks.
3. Housekeeping.
4. Hazards of chlorine.
5. Instruction on the location and use of protective equipment.

SECTION D

EMERGENCY PROCEDURES

In case of emergency, be calm and size up the situation. If first aid is needed, perform the simplest. If further assistance is needed, for first aid or other types of emergency, call the emergency phone numbers at the bottom of the sheet or those posted at each location of chlorine use.

If chlorine is allowed to come in contact with you, wash it off. If a large amount of chlorine comes in contact with you, go to the nearest shower.

If, for some reason, during an emergency, you feel you need additional help, do not hesitate to ask for it. Your safety and that of others around you always comes first.

Listed below is a group of emergency phone numbers:

Selah Fire Department (business office)	698-7310
Selah Fire Department (emergencies)	911
Medical (emergencies)	911
Selah Police Department (emergencies)	911
Selah Police Department (Business Office)	698-7346
In an EMERGENCY, you can always call	911

CHLORINE EXPOSURE

It is important that everyone working with chlorine be aware of the hazards involved.

Chlorine is a toxic substance and caution must be used when working in its surroundings. Education, the proper use of safety equipment, and good techniques on handling chlorine can prevent or control a dangerous situation.

Exposure by ingestion or inhalation of liquid chlorine or chlorine gas may cause skin and eye burns upon contact with these tissues. If the duration of exposure or the concentration of chlorine is excessive, it will result in general excitement of the person and will be accompanied by restlessness, throat irritation, and sneezing. The symptoms of exposure to high concentrations are retching and vomiting followed by difficulty of breathing. In extreme cases, the difficulty of breathing may increase to the point where death can occur.

Common sense must be used when working with chlorine. If you are not sure about the procedure when working with chlorine, consult a Safety Committee member or your supervisor in your department before proceeding.

REPORTING ACCIDENTS/INCIDENTS

An accident is defined as any action which results in injury to people or damage to equipment. Regardless of severity, all injuries must be reported using the established Accident Report Form.

Close-call incident is defined as any action which results in an interruption of work flow which could have resulted in physical harm. Close-call reports can help in identifying potential harmful situations or procedures. All close-call incidents shall have a form filled out by the individual involved.

An employee has the responsibility to report any accident to his/her immediate supervisor. The supervisor has the responsibility to ensure prompt action in providing corrective action and update of deficiencies. All accident reports must be kept on file for inspection.

Should an accident occur, initiate first aid procedures and determine if professional medical attention is needed. Once an accident victim has been stabilized and is in no danger, complete the appropriate accident report forms. Discuss the accident with all utility personnel to alert them to the hazards, and review procedures to prevent the accident in the future.

22.
HAZARD COMMUNICATION PROGRAM

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH PUBLIC WORKS DEPARTMENT

HAZARD COMMUNICATION PROGRAM

1. City Policy

To ensure that information about the dangers of all hazardous chemicals used by the City of Selah Public Works Department is known by all affected employees, the following Hazard Communication Program has been established. All members of the City of Selah Public Works Department will participate in the Hazard Communication Program. This written program will be available at the Public Works Department and at the City Public Works Shop for review by any interested employee.

2. Container Labeling

The City of Selah Public Works Superintendent will verify that all containers received for use will be clearly labeled as to the contents, note the appropriate hazard warning, and list the name and address of the manufacturer. The City of Selah Public Works Superintendent will ensure that all secondary containers are labeled with either an extra copy of the original manufacturer's label or with labels having the identity and the appropriate hazard warning. The City of Selah Public Works Superintendent will review the City's labeling procedures every year and update as required.

3. Material Safety Data Sheets (MSDS)

The City of Selah Public Works Superintendent is responsible for establishing and monitoring the company MSDS program. He/she will make sure procedures are developed to obtain the necessary MSDSs and will review incoming MSDSs for new or significant health and safety information. He/she will see that any new information is passed on to affected employees. Copies of MSDSs for all hazardous chemicals in use will be kept at the City Shop, at City Public Works Department, and with the Selah Fire Department. MSDSs will be available to all employees during each work shift. If an MSDS is not available, immediately contact the City of Selah Public Works Superintendent or the Public Works Director.

4. Employee Training and Information

The City of Selah Public Works Superintendent is responsible for the Selah Utility Crew employee training program. He/she will ensure all program elements specified below are carried out. Prior to starting work, each new employee of the Selah Utility Crew will attend a health and safety orientation which includes the following information:

- An overview of the requirements contained in the Hazard Communication Standard;
- Hazardous chemicals present at his/her workplace;
- Physical and health risks of the hazardous chemical;
- The symptoms of overexposure;

- How to determine the presence or release of hazardous chemicals in his/her work area;
- How to reduce or prevent exposure to hazardous chemicals through use of control procedures, work practices, and personal protective equipment;
- Steps the City of Selah has taken to reduce or prevent exposure to hazardous chemicals,
- Procedures to follow if employees are overexposed to hazardous chemicals;
- How to read labels and review MSDSs to obtain hazard information; and
- Location of the MSDS file and written hazard communication program.

Prior to introducing a new chemical hazard, each employee of the Utility Crew will be given information and training as outlined above for the new chemical hazard.

5. Hazardous Non-Routine Tasks

Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, each affected employee will be given information by the Public Works Superintendent about the hazardous chemicals he or she may encounter during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps the City is using to reduce the hazards, including ventilation, respirators, presence of another employee, and emergency procedures.

6. List of Hazardous Chemicals

The following is a list of all known hazardous chemicals used by our employees. Further information on each chemical may be obtained by reviewing MSDSs located at the City Public Works Shop.

23.
CONFINED SPACE ENTRY SAFETY PROGRAM

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH

PUBLIC WORKS DEPARTMENT

CONFINED SPACE ENTRY PROGRAM

POLICY

The Selah Public Works Department is committed to providing a safe working environment for its employees. It is the policy of the Selah Public Works Department to ensure that all regulations, policies, and procedures pertaining to safety and health are followed, and that the necessary resources are allocated to make the Confined Space Entry Program successful.

January 10, 1991.

DOCUMENT REVIEW

The Selah Public Works Department has developed a Confined Space Entry Plan establishing minimum standards and procedures for the adequate protection of employees who may be required to enter dangerous confined spaces. It is essential that all employees become knowledgeable of the safety rules and policies stated in this document.

All employees shall read the contents of this manual and sign his/her name when completed. The time limit shall be not more than 15 working days to complete.

NAME: _____

SIGNATURE: _____

DATE: _____

1. POLICY OBJECTIVES, AUTHORITY AND RESPONSIBILITY

To establish minimum standards and procedures that shall be mandatory for the adequate protection of employees who may be required to enter dangerous confined spaces as defined below:

A. Any enclosed and/or confining space which may contain or be subject to the entry of and/or accumulation of toxic gases, flammable gases, and/or have the atmosphere rendered deficient in breathable oxygen.

B. Any work area which has limited room for movement and/or ready access or egress by workmen. In particular, any confining work area or space which requires special equipment and preparations for the safe and injury-free recovery of a workman who becomes disabled.

C. Dangerous confined spaces shall include, but not be limited to, sewer and storm drain pipes, manholes, wet wells, pump stations, vaults, tanks (including fresh water tanks), and similar types of structures.

THIS POLICY SHALL BECOME EFFECTIVE IMMEDIATELY. ALL CITY UTILITY CREW PERSONNEL AND WASTEWATER TREATMENT PLANT PERSONNEL SHALL BE RESPONSIBLE FOR ENFORCEMENT AND COMPLIANCE WITH THESE PROCEDURES.

2. HAZARDOUS CONDITION DEFINITIONS

A. Confined Space. A space defined by the concurrent existence of the following conditions:

1. Existing ventilation is insufficient to remove dangerous air contamination and/or oxygen deficiency which may exist or develop.

2. Ready access or egress for the removal of a suddenly disabled employee is difficult due to the location and/or size of the opening(s).

B. Dangerous Air Contamination. An atmosphere presenting a threat of causing death, injury, acute illness, or disablement due to the presence of flammable and/or explosive, toxic, or otherwise injurious or incapacitating substances.

1. Dangerous air contamination due to the flammability of a gas vapor is defined as an atmosphere containing the gas or vapor at a concentration greater than 20 percent of its lower explosive limit.

2. Dangerous air contamination due to a combustible particulate is defined as a concentration greater than 20 percent of the minimum explosive concentration of the particulate.

3. Dangerous air contamination due to the toxicity of a substance is defined as the atmospheric concentration immediately hazardous to life or health. NOTE: This definition of dangerous air contamination due to the toxicity of a substance does not preclude the requirement to control harmful exposures

to toxic substances at concentrations less than those immediately hazardous to life or health.

C. Oxygen Deficiency. An atmosphere containing oxygen at a concentration of less than 19.5 percent by volume.

3. PROCEDURES - PRE-ENTRY

A. Prior to the entry of any person into any dangerous and/or hazardous space, testing shall be done with a device which shall sound an audible alarm and have a lighted signal to indicate violation of any of the following threshold limit values:

Threshold Limit Values

- Toxic - Greater than 10 ppm Hydrogen Sulfide (H_2S).
- Flammable - Greater than 20% of the explosive level of Methane (CH_4).
- Oxygen Deficiency - Less than 19.5% by volume.

B. Two separate tests shall be made as follows:

1. A pre-opening test wherein a sample is drawn through a hose, attached to the detection device. The hose shall be inserted in the pick hole or small opening of a manhole or the exhaust vent of the confined space.

2. A pre-entry test wherein the probe hose detection device is lowered to the bottom and at various levels inside the confined space.

C. The above test results are to achieve the following determinations:

1. "Safe for Entry" - The testing device did not alarm, indicating that no hazardous conditions above threshold limit values were detected.

2. "Unsafe for Entry" - The testing device had one or more of its alarms activated. No person shall enter any confined space where the required pre-entry testing indicates the space is "Unsafe for Entry." Exceptions to this rule shall be only as prescribed by written permission from the Public Works Director or for the emergency rescue of a disabled fellow employee. In each case, proper self-contained breathing apparatus shall be used. All persons who may participate in functions relative to entry into a confined space shall be fully trained in these procedures and the hazards which may be found in this work.

NOTE: EMPLOYEES HAVE THE RIGHT TO REFUSE TO WORK IN UNSAFE CONDITIONS AND WITH UNTRAINED PERSONNEL.

D. The following rules shall apply to the entry of a workman into any confined space wherein pretesting has shown that the space is "Safe for Entry."

1. The space shall have been previously inspected (without entry) by a competent supervisor or worker who shall have accomplished the following:

   a. Listing and layout of necessary traffic control and warning equipment, when appropriate.

   b. Directed preparation for entry by requiring necessary or desired cleaning or other pre-entry work deemed necessary for safety.

   c. Prepared the safety equipment items required for entry into the confined space.

   d. Prepared the necessary tools and materials covering the demands of the work to be done by the crew at the confined space entry site.

   e. Discussed and provided necessary listing to jobsite lead person and made certain all of the special and general conditions are fully understood.

4. ENTRY PROCEDURES

A. No person shall enter any confined space unless all of the following conditions have been met:

1. In addition to the fully trained workman who will enter the space, not less than one additional fully trained person shall be present. At least one of the persons shall be trained in First Aid and CPR. Exceptions are listed below.

2. One of the persons present shall be designated the Confined Space Attendant and shall never leave the confined space access point while workmen are inside. The Confined Space Attendant shall be in voice or radio contact with the workman inside the confined space at all times.

3. Confined Space Attendant shall keep a written log of all work activities.

4. The Entering Workman shall be suitably attired in desirable clothing for confined space work, which may include but not be limited to:

   - Suitable Coveralls
   - Hard Hat
   - Suitable Gloves

- Rubber Boots
- Safety Harness

5. All pre-entry test and other functions have been properly accomplished.

6. The Entering Workman is properly wearing a proper safety harness.

7. A suitable tripod/winch device is attached to the proper safety harness. This will permit one man to recover the workman from the confined space in the event of difficulties.

8. An atmospheric alarm unit (Gas Detector) is worn by, or accompanies the workman into the confined space.

9. A fresh air supply with an installed or portable ventilation system is available to supply fresh air to the confined space if necessary.

10. Necessary traffic control equipment and required flagmen are in place.

11. Suitable plans for summoning emergency assistance (ambulance, Fire Department, etc.) have been made fully understood by all jobsite employees.

12. Lines which may convey flammable, injurious, or incapacitating substances into the space shall be disconnected, blinded, or blocked off by other positive means to prevent the development of dangerous air contamination and/or oxygen deficiency within the space. The disconnection or blind shall be so located or done in such a manner that inadvertent re-connection of the line or removal of the blind are effectively prevented.

B. All two-man crews shall contact the Public Works Supervisor by radio and do the following:

1. Give time of entry.

2. Check in by radio every 5 minutes.

3. Check in when the job is complete and all personnel have left the confined space.

C. The Public Works Supervisor will do the following:

1. Log in time of entry.

2. Log in check-in time.

3. Log in completion time.

D. If the Public Works Supervisor does not hear from a crew at check-in time, the Public Works Supervisor shall dispatch another unit in the area to check on the crew.

E. While a workman is inside of any confined space, the following shall be rigidly enforced:

1. There shall be no smoking or open flames permitted within ten feet of the confined space or any access points to the confined space while it is occupied.

2. Continuous communication between the confined space attendant and the workman inside of the confined space.

3. Monitoring of the confined space atmosphere shall be continuous during operation. In the event any of the alarms of the atmospheric alarm unit are activated, or any condition of suspected safety develops, the workman shall be brought out of the confined space immediately. Reentry shall not be made until all conditions are deemed to be safe.

F. It shall be the responsibility of the Confined Space Attendant to maintain written records of each function of a confined space entry by a workman. These records shall include, but not be limited to, all of the following notations:

1. Date.

2. Location and type of confined space entered.

3. Purpose of entry.

4. Time and results of pre-opening atmospheric test.

5. Time and results of pre-entry atmospheric test.

6. Names and assignments of confined space entry workforce members.

7. Times of entry of workman into confined space.

8. Times workman was brought out of confined space.

9. Descriptions of any injuries, emergencies, or other notable circumstances with comments on actions taken and results obtained.

5. PROCEDURE OF CONTAMINATED CONFINED SPACES

The following procedures shall apply where pretesting has shown the confined space is "Unsafe for Entry" or it is suspected a space is contaminated or a space becomes contaminated while working in the space.

NOTE: UNLESS IT IS ABSOLUTELY NECESSARY TO WORK IN A CONFINED SPACE, NO EMPLOYEE SHALL ENTER OR CONTINUE TO WORK IN A CONTAMINATED SPACE.

A. No worker shall enter a contaminated confined space without the knowledge or permission of their supervisor or the Public Works Director.

B. The Fire Department shall be notified prior to entry into any contaminated confined space. Representatives of the Fire Department shall be present prior to entering a contaminated confined space.

C. Should the confined space become contaminated, the worker shall evacuate the space.

D. All workers shall evacuate the immediate area - at least 50 feet.

E. Notify your supervisor.

F. If work is to continue, purge the confined space (record time) until it reaches a safe level. Monitor air with atmospheric detection device.

G. Stop purging and monitor space to see how quickly the space re-contaminates. If the space becomes re-contaminated before a worker can safely evacuate the space, DO NOT ENTER.

H. If tests indicate a safe exit time, continuously purge space before and while the worker is in the space.

I. Before worker re-enters the previously contaminated space, the worker shall be wearing the following items:

1. Appropriate protective clothing.
2. Appropriate gloves.
3. Self-contained breathing apparatus where needed.
4. Safety harness attached to a tripod and safety line.
5. Hard hat.
6. Rubber boots.
7. Gas detector.

J. While worker is inside the confined space, the Confined Space Attendant will establish voice contact and maintain communication at regular (not more than 3 minute) intervals.

K. Confined Space Attendant shall fill out a written report.

6. CERTIFIED FIRST AID AND CPR PERSON AT THE JOBSITE

Entry into any confined space shall require that there is at least one person present at the jobsite who holds a current certification in First Aid training and in the administration of CPR.

7. SEWER WORKFORCE IMMUNIZATIONS

All employees who will be required to work in sewer collection system structures and in conjunction with sewage and waste disposal in any way must have current immunization. These will be specified by the Health Department and will require renewal at frequencies as designated by the Health Department.

8. REQUIRED SAFETY EQUIPMENT AT THE JOBSITE

The following items and quantities shall always be present at any jobsite where a workman may be required to enter a confined space.

A. At least one atmospheric detection and alarm unit.

B. At least one proper safety harness including necessary devices for connection to a lifeline. Lifeline shall be 2,000 pounds test.

C. At least one winch device for lifting a person out of a manhole or other confined space.

D. At least two explosion-proof flashlights with one set of fresh spare batteries for each.

E. At least one ventilation blower with hose and hose storage drum. This must include necessary power supply wiring and hook-ups for operation.

F. At least one fully equipped first aid kit.

G. At least one eyewash unit filled with fresh water.

H. Fresh water with soap and paper towels.

I. Suitable lanyards and buckets for supplying tools and other work requirements to the Confined Space Workman.

J. Adequate traffic control safety devices.

K. Other devices and equipment as may be required for the completion of all work in the confined space.

9. WORKFORCE TRAINING

It shall be the responsibility of the Public Works Superintendent and the Treatment Plant Supervisor to oversee the training and individual competence of all employees who may be assigned to a confined space entry workforce. This training shall include complete instruction in all of the subjects listed below:

A. Instruction in the hazards which may be encountered in a confined space.

B. Instruction in the methods of assuring maximum workman protection from these hazards.

C. Instruction in the purpose, functional applications, and proper operation and use of safety equipment.

D. Instruction in standard and emergency procedures at confined space entry jobsite.

E. Instruction in post confined entry procedures for maximum health and protection.

10. SAFETY EQUIPMENT: CARE, INSPECTION, MAINTENANCE, AND TESTING

It shall be the special responsibility of every employee of the City of Selah to continuously be aware of the location and condition of the safety equipment provided for the workforce. This assignment shall include all of the following:

A. Inspection and checking of the condition of snaps, buckles, hardware, straps, seams and stitching of approved safety harnesses, lanyards, ropes, and winch units as are used with confined space entry.

B. Testing, necessary lubrication, and service to the ventilation blower units.

C. Regular testing of the atmospheric testing and alarm units.

D. Inventory and inspection of first aid kits with any required replacements for items missing or not in a condition for suitable use.

E. Inspection, testing, and water replacement as necessary for the eye wash device.

F. Inspection and inventory of traffic safety control equipment with replacement or repair of damaged and missing items.

11. SPECIAL PERMISSION FOR ENTRY INTO DANGEROUS SPACES

Entry into highly dangerous spaces where applications of this document are unable to be fully complied with shall be developed by members of the Public Works Safety Committee and then presented to the Public Works Director for his/her permission. This permission shall be possible only after the following have been provided in writing to the Public Works Director:

A. The type of confined space proposed for entry must be fully described as to the type, use, and location of structure and the anticipated duration of occupancy.

B. A full description of the work to be accomplished by personnel entering the space and verification that no other reasonable economic means of accomplishing this work is available.

C. A complete description of the types and expected severity of the hazards involved in the entry of the structure.

D. A full description of the protective and emergency measures which will be taken to protect the entry personnel, including:

1. Descriptions and details of protective equipment and procedures which will be used.

2. Measures provided for the rescue or removal of any entering personnel who may encounter trouble.

3. Emergency back-up procedures in event rescue efforts are inadequate.

4. Provisions for emergency medical services should such be required.

12. RESCUE PROCEDURES FOR MANHOLES

The Confined Space Attendant shall immediately hoist the worker out of the manhole upon observing the worker is in need of help. If the worker is unable to assist in getting from the manhole opening to the ground, make sure the worker has been hoisted clear of the manhole and is in fresh air. Immediately call for medical assistance, and then call or signal for assistance to get the worker onto the ground.

Once the worker is on the ground away from the manhole opening, the crew member should start any first aid procedures if necessary.

13. FAILURE TO COMPLY - DISCIPLINARY ACTION

Inasmuch as these safety requirements are deemed to be in compliance with existing laws, it is both desirable and mandatory that all employees fully comply with and rigidly follow this policy. Those employees who demonstrate a wanton disregard for these safety requirements intensify the hazards to both themselves and their fellow employees. It is therefore deemed more than justifiable that the failure to follow these safety procedures will meet with disciplinary actions as prescribed in the CITY OF SELAH PERSONNEL RULES AND REGULATIONS.

24.
CROSS-CONNECTION CONTROL POLICY AND PROCEDURES

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH

WATER DIVISION

CROSS CONNECTION AND BACKFLOW POLICY AND PROCEDURES

January, 1998

CONTENTS

PURPOSE 1

DEFINITIONS 1

RESPONSIBILITIES 4

INSPECTION PROGRAM 4

CORRECTIVE MEASURES 6

INSTALLATION, INSPECTION, MAINTENANCE, TESTING OF BACKFLOW PREVENTION DEVICES 11

APPENDIX - FORMS 14

CROSS CONNECTION AND BACKFLOW PREVENTION PROGRAM

PURPOSE:

To protect and maintain the bacteriological, chemical and aesthetic quality of the municipal potable water supply by the elimination and prevention of cross connections between the City of Selah potable water distribution system and other sources of water, liquids or gases for any purpose whatsoever.

GENERAL:

Except where specifically designated herein, all words used in this procedure shall carry their customary meanings. Words used in the present tense include the future, and plural included the singular: The word "shall" is always mandatory, the word "may" denotes the use of discretion in making a decision.

CROSS CONNECTION ABATEMENT:

The installation or maintenance of a cross-connection which will endanger the water quality of the potable water supply of the City of Selah is prohibited. Any such cross-connection now existing or hereafter installed is hereby declared a nuisance and shall be abated. The control or elimination of cross-connections shall be in accordance with the State of Washington Administrative Code (WAC 246-290-490, WAC 296-24-12005) or subsequent revisions, together with any future manuals of standard practice pertaining to cross-connection control approved by the Director of the State of Washington, Department of Social and Health Services. The water supply will be discontinued to any premise for failure to comply with the provisions of this section and will not be re-established until compliance is approved by the Director.

Service from the City of Selah water supply system to any premise upon which a private water supply system is used or operated contrary to the provisions of the rules and regulations of the State Board of Health regarding public water supplies may be discontinued or refused upon order of the Director.

Furnishing of any service shall be contingent upon the installation of a backflow prevention device approved by the State of Washington Department of Social and Health Services for the protection of the city water supply from backflow.

By-pass arrangements, jumper connections, removable sections, swivel or change-over devices and other temporary or permanent devices through which or because of which "backflow" can or may occur, will be considered cross-connections and not allowed.

REFERENCES:

1) City of Selah Cross-Connection Control Ordinance.
2) 1991 Uniform Plumbing Code and all subsequent revisions.
3) Department of Health (DOH) Drinking Water Regulations WAC 246-

290-490, WAC 296-24-12005. (And subsequent revisions)

4) Accepted Procedure and Practice in Cross-Connection Control - Pacific Northwest Section - American Waterworks Association.
5) Manual of Cross-Connection Control, Eighth Edition USC Foundation for Cross-Connection Control and Hydraulic Research.
6) Cross-Connection Control Manual EPA #57019-89-007.

DEFINITIONS:

Director of Public Works: Shall mean the Director of Public Works, City of Selah, Selah, Washington.

Any act in this procedure required or authorized by the "Director of Public Works" may be done on his or her behalf by his or her designee.

Public Health Officer: Shall be duly appointed Public Health Officer of Selah/Yakima County Health Department.

Any act in this procedure required or authorized to be done by the "Public Health Officer" may be done on his or her behalf by an authorized representative of the Health Department.

Cross-Connection Specialist (CCS): Shall be that person or persons who are trained and certified by the State of Washington to carry-out a cross-connection program. This includes but is not limited to how to set up a cross-connection program, the component parts, operation, installation, disassembly, repair and testing; how to make inspections and correctly determine the proper method or assemblies for either eliminating or properly protecting potable water from contamination by cross-connections.

Backflow Assembly Tester(BAT): Shall be a person or persons trained and certified by the State of Washington to test and repair backflow prevention assemblies, recognize proper installations, by-passes, and can fill out test report forms.

Cross-Connection: The term "cross connection" shall mean any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture or other device which contains, or may contain, contaminated water, sewage, or other waste or liquid or gas of unknown or unsafe quality which may be capable of imparting contamination to the public water supply as a result of backflow.

Public Water Supply: The system of water supply intended or used for human consumption or other domestic use, including source, treatment, storage, transmission and distribution facilities where water is furnished by the Water Department, City of Selah to the residences of the City of Selah and the immediate surrounding area.

Auxiliary Supply: Shall mean any water supply on or available to the premises other than the public water supply.

Customer: Any person, persons, firm or corporation that is furnished potable water from the public water supply through a legal service connection to the public water supply distribution system.

Service Connection: A connection between the public water supply distribution system and the customer's system. Except, when the customer's system distributes to more than one family dwelling, each dwelling shall be considered as a service connection.

Industrial Fluids: Shall mean any fluid or solution which could be chemically, biologically or otherwise contaminated or polluted in a form or concentration which might constitute a health or plumbing hazard if introduced into a potable water supply. This may include but is not limited to all types of processed waters originating from the public water supply or auxiliary supply which may deteriorate in sanitary quality; chemicals in fluid form; plating acids and alkalies; circulated cooling waters that are chemically or biologically treated or stabilized with toxic substance;

contaminated natural waters such as from wells, springs, streams or ponds.

Liquids: The term liquid shall mean any substance that flows readily but does not expand indefinitely, such as water and industrial fluids.

Air Gap Separation (A.G.): Shall mean the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other device and the flood level rim of the receptacle. All air gap separations shall be at least double the diameter of the supply pipe measured vertically above the flood level rim of the vessel, but never less than one (1) inch.

Backflow: Shall mean the flow other than in the intended direction of flow, of any foreign liquids, gases or other substances into the distribution system of the public water supply.
Back Pressure: Shall mean any back flow caused by a pump, elevated tank, boiler, or other means that could create pressure within the system greater than the supply pressure.

Back Siphonage: Shall mean a form of back flow due to a negative or sub-atmospheric pressure within a water system.

Approved Backflow Prevention Device: Shall mean any device to counteract back pressure or back siphonage, that has been approved for use by the Director, Washington State Division of Health, Department of Social and Health Services.
Approved devices shall be those that have successfully passed performance tests of the University of Southern California Engineering Center or other testing laboratories approved by the Washington State Division of Health, Department of Social and Health Services.

Atmospheric Vacuum Breaker (AVB): Shall mean a backflow preventive device which is operated by atmospheric pressure in combination with the force of gravity. The unit is so designed to work on a vertical plane only. The moving part consists of a poppet valve which must be carefully sized to slide in a guided chamber and effectively shut off the reverse flow of water when a negative pressure exists in the supply system.

Pressure Vacuum Breaker (PVB): Shall mean a vacuum breaker similar to an atmospheric vacuum breaker except that the checking unit "poppet valve" is activated by a spring. This type of vacuum breaker does not require a negative pressure to react and can be used on the pressure side of a valve.

Double Check Valve Assembly (DCVA): Shall mean an assembly composed of two (2) single, independently acting, "approved check valves", including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water-tightness of each check valve.

Reduced Pressure Principal Backflow Prevention Device (RPBD): Shall mean a device containing a minimum of two (2) independently acting, approved check valves, together with an automatically

operated pressure differential relief valve located between the two check valves. During normal flow, the pressure between these two checks shall be less than the upstream (supply) pressure. In case of leakage of either check valve, the differential relief valve, by discharging to the atmosphere, shall operate to maintain the pressure between the checks at less than the supply pressure. The unit must include tightly closing shut-off valves located at each end of the device, and each device shall be fitted with properly located test cocks.

Degree of Hazard: Shall express the results of an evaluation of a health, system, or plumbing hazard.

Health Hazard: Shall mean any condition, device, or practice in a water supply system and/or its operation that creates or may create a danger to the health and well-being of a customer.

Plumbing Hazard: Shall mean a cross-connection in a customer's potable water system that may permit back siphonage in the event of a negative pressure in the supply line.

System Hazard: Shall mean a threat to the physical properties of the public or the customer's potable water system by a material not dangerous to health but aesthetically objectionable that would have a degrading effect on the quality of the potable water in the system.

Temporary Usage Connection: Any vehicle to which a tank or container is affixed for containing water and/or chemicals, materials, or any temporary use of water for construction, testing, cooling, or other non-domestic purposes which are capable of imparting contamination or pollution to the public water supply through a cross-connection between such points of usage and the water supply via a fire hydrant or other temporary connection.

Code Authority and Enforcement: The enforcement of this cross-connection program in the area served by the Water Department, City of Selah, will be in accordance with the Uniform Plumbing Code, 1991 edition as amended by the City of Selah "Water Regulations", Official Code of the City of Selah and WAC 248-290-490, WAC 296-24-12005, Rules and Regulations of the State Board of Health relating to public water supplies.

General Policy: It is the intention of this policy to provide for the permanent abatement or control of all cross-connections. Where it is physically and economically unfeasible to find or to permanently eliminate all cross-connections of the customer' water system, and when it is deemed necessary by the appropriate inspector, there shall be installed at the service connection a suitable backflow prevention device commensurate with the degree of hazard to the public water supply.

Responsibilities:

1) City of Selah

   a. The City of Selah Water Division shall prevent contamination of the water distribution system and maximize protection of on-property water consumers by maintaining surveillance over new and existing plumbing within buildings to meet the requirements of the State Regulations in Cross Connection Control.

2) Water Customer

   a. The water customer shall be responsible for eliminating cross-connections or controlling them through the installation, regular testing and maintenance of approved backflow prevention assemblies.

   b. The water customer shall be responsible for providing the necessary information, obtaining the required permits and providing entry and access to inspection.

   c. The water customer is responsible for notifying the department of any assemblies which the customer believes are no longer required.

   d. The water customer is responsible for providing signs at all water take-off points downstream of backflow prevention assemblies.

   e. The water customer is responsible for all costs associated with installing and maintaining backflow prevention assemblies.

INSPECTION PROGRAM:

The City of Selah Water Division is required to protect the water system from contamination due to cross connections (WAC 248-290-490) and a systematic program for inspection of all new and existing buildings and grounds is established.

The systematic program of inspection shall establish priorities on the basis of risk to public health and shall be conducted as outlined on the following section:

New and Proposed Construction:

1) Upon application for a building permit, the City shall require a detailed plan and specification for the plumbing installation.

2) The City shall review these plans and specifications to determine the probability of cross-connections, the availability of auxiliary water supply, the handling of substances which, if introduced into the water supply, would constitute a health, plumbing, or system hazard. If upon review it is determined that any of these conditions will exist, the City shall advise the builder/owner of solutions to either eliminate or protect the cross-connection.

3) During the construction phase of any new building, structure, or ground installation, the City will perform the on-site cross-connection control inspection. Upon completion of the inspection, but prior to the establishment of a water service connection it shall be certified in writing that subject cross-connection control inspection has been made and that backflow prevention is or is not required.

4) Upon receipt of an application for new water service, but prior to installation of such new service, a cross-connection inspection shall be made by the City and required backflow prevention devices installed at the time the new service is installed.

Existing Buildings, Structures And Grounds:

1) An initial inspection of premises determined to have the potential for cross connections shall be inspected by the City on the basis of relative hazard.

2) The initial inspection shall proceed according to the following steps:

   a) If the existing building has never been inspected or has new owners, the City will contact the owner/manager by phone or letter to explain the necessity of a cross-connection program. The City will discuss the owners responsibilities/liabilities and answer any questions the owners may have.

   b) Approximately ten (10) days notice will be given to the customer when requesting an appointment for inspection. This will be done either by phone or letter. The City will request a person knowledgeable with their water system to be present at the time of inspection. The City will request any blueprints or drawings on the "in plant" system that are available.

c) On the scheduled date, the City along with the building owner/representative, if one is assigned, will make a complete physical survey of all exposed piping, the underground system is to be checked as accurately as possible. An "as-built" drawing will be requested.

d) Upon completion of the survey, the inspection team will orally brief the owner/manager of their findings, if desired by the owner/manager.

e) The inspection team will prepare a written report using a standard form (see attached appendix CC-1, CC-2 & CC-3). The report will include but is not limited to the following:

1. Complete the identifying information contained in heading.

2. List all cross-connections found, location, and optional methods of control.

3. List all industrial fluids, chemicals or other contaminating liquids used or pumped under pressure, their use and probability of cross-connection.

4. Any applicable drawings, sketches, blue-prints, photographs, etc., to support the inspection.

5. A summary of findings.

6. Recommendations.

f) The Director of Public Works or his or her CCS, upon completion of the review of the report, shall prepare a letter to the prospective customer outlining the findings of the report, the corrective action required and establishing a time (normally 45 days) which corrective action must be completed. A copy of the letter and report will be sent to the customer and one copy placed in a suspense file by date corrective action is to be completed.

If a high health hazard cross-connection is found, the Director of Public Works will be notified to decide if the water service should be disconnected at that time.

g) On the corrective action completion date, the CCS of the Water Department shall take the suspense file copy and make a reinspection of the indicated items that required correction.

h) Upon completion of the reinspection, the CCS shall report in writing on the standard inspection form (see attached) the results of his reinspection to the Director of Public Works.

i) When all required actions have been completed, the file copy of the completed actions shall be placed in the cross-connection control file.

j) Reinspection of each premises found to be subject to this procedure shall be accomplished annually or more often if the degree of hazard so indicates.

k) Non-Compliance - If upon completion of the second inspection or correction date, the cross-connection has not been eliminated or protected with a backflow assembly, the following steps shall be taken:

1) The legal department of the City of Selah shall be notified of the non-compliance.
2) The customer will then be sent a letter of intent to terminate their water supply in five (5) days.
3) Customers will be given those five (5) days to explain special circumstances or justify their non compliance.
4) After five (5) days, the water will be terminated and meter locked off.

3. Moving or Removing Devices :

a) The City of Selah shall be notified when moving a device to a new location or when substituting one device for another.

b) If the customer feels, because of plumbing changes, a

device is no longer necessary, the City shall be notified before the device is removed.

CORRECTIVE MEASURERS:

The following lists have been prepared to establish a guide to the corrective measures at the meter and "implant" to correct or isolate plumbing defects.

Code: The following are the abbreviations for devices or methods used to prevent or eliminate cross-connections:

1. Air Gap . . . . . A.G.
2. Reduced pressure backflow preventor . . . . . R.P.B.D.
3. Double check valve assembly . . . . . D.C.V.A.
4. Pressure vacuum breaker . . . . . P.V.B.
5. Atmospheric vacuum breaker . . . . . A.V.B.
6. Not allowed . . . . . N.A.

The following list summarizes the type of cross-connections which can be anticipated in various buildings and structures, and the recommended corrective measures:

I MORGUES, HOSPITALS, CONVALESCENT AND RETIREMENT HOMES

		DEVICE TYPE
1.	Autopsy, operating rooms and laboratories	
	A. Aspirators	A.G. or A.V.B.
	B. Flushing floor drains	A.G. or A.V.B.
	C. Wash-up sinks	A.G.
	D. Stills	A.G. or RPBD
	E. Sterilizers	A.G. or A.V.B.
	F. Toilets or bidets	A.G. or A.V.B.
	G. Wash-down or flushing hoses	A.V.B.
	H. Pipet washers	A.G. or A.V.B.
2.	Bed pan washers	A.G. or A.V.B.
3.	Toilets, urinals or bidets	A.G. or A.V.B.
4.	Fire sprinkler drains	A.G. *
5.	Water operated equipment such as elevators, presses or other similar equipment	A.G. or A.V.B.
6.	Drinking fountains required angle stream with mouth guard	A.G.
7.	Orthopedic baths	A.G. or A.V.B.
8.	Colon irrigators or douche attachment	A.G. or A.V.B.
9.	Water used for heating or cooling agent	A.G. or R.P.B.D.
10.	Mop, service or slop sink with hose faucet	A.V.B.
11.	Compound boiler	A.G. or R.P.B.D.
12.	Hose faucets in areas where possible contamination exists	A.V.B.
13.	Foot bath	A.G.
14.	Sitz bath	A.G.
15.	Bath tub	A.G.

Bath tub with hose attachment . . . . . A.V.B.
16. Potable waterline directly connected to sewer . . . . . N.A

II. INDUSTRIAL OR COMMERCIAL INSTALLATIONS:

1. Dip tanks or vats . . . . . A.G. or A.V.B.
2. Water operated presses, elevators, or other similar equipment . . . . . A.G. or A.V.B.
3. Water used for cooling or heating agent . . . . A.G. or R.P.B.D.
4. Fire sprinkler drains . . . . . A.G. *
   Salt water fire system . . . . . A.G.
5. Toilets or urinals . . . . . A.G. or A.V.B.
6. Sinks and basins . . . . . A.G.
   Sinks with hose connection . . . . . A.V.B.
7. Hose faucets in areas where a hose could possibly be left submerged in any container or sump or pit A.G. or A.V.B.
8. Dual water supply source . . . . . A.G.
9. Pump primers . . . . . A.G.
10. Flushing floor drains . . . . . A.G. or A.V.B.
11. Potable waterline directly connected to sewer . . . . . N.A.
12. Water operated ejectors . . . . . N.A.
13. Drinking fountains require angle stream with mouth guard . . . . . A.G.
    Drinking fountains with water supply in waste pipe . . . . . N.A.
14. Fomite stations . . . . . Quick Connection & R.P.B.D.
15. Water supply outlets in pits, tanks, trenches, or any other place that could become flooded with contaminated liquids . . . . . A.V.B.

		DEVICE TYPE
16.	Compound boilers	A.G. or R.P.B.D.
17.	Commercial car washing installations with cross-connection	R.P.B.D.
18.	Shampoo basin hose rinse	A.V.B.

* No antifreeze permitted in fire sprinkler systems

III IRRIGATION SYSTEMS

1.	Sprinkler systems	D.C.V.A, A.G. or P.V.B.
2.	Sprinkler systems supplied with potable water and interconnected with other sources of non-potable water such as ponds, creeks & lakes, etc	N.A.
3.	Fungicides, pesticides or soil conditioners introduced in a sprinkler system protected from backflow by vacuum breakers	N.A.
4.	Hose faucets in areas where possible contamination exists	A.V.B.
5.	Hose faucets submerged below surface of surrounding ground	A.G. or A.V.B.

IV EDUCATIONAL INSTITUTIONS

1.	Laboratories	A.G.,A.V.B. or R.P.B.D.
2.	Dishwashing machine	A.G. or A.V.B.
3.	Garbage disposers	A.G. or A.V.B.
4.	Sinks	A.G.
5.	Sinks with hose faucets	A.V.B.
6.	Toilets and urinals	A.G. or A.V.B.
7.	Drinking fountains require angle stream with mouth guard	A.G.
	Drinking fountains with water supply in waste pipe	N.A.
8.	Fire sprinkler drains *	A.G.
9.	Compound boilers	A.G. or R.P.B.D.
10.	Hose faucets in areas where possible pollution exists	A.V.B.

V MARINE MOORAGE

1.	Hose faucets in areas where possible pollution exists	A.V.B.
2.	Hose faucets serving boat moorages	A.V.B.
3.	Toilets and urinals	A.G. or A.V.B.
4.	Lavatories	A.G. or A.V.B.
5.	Permanent hose or flex connections must be properly supported to keep its entire length	

	above water at all times	A.V.B. or R.P.B.D.
6.	Drinking fountains require angle stream with mouth guard	A.G.
	Drinking fountain with supply in waste pipe	N.A.
7.	Swimming pool water supply	A.G.
8.	Water operated presses, elevators, or other similar equipment	A.G. or A.V.B.
9.	Fire sprinkler drains *	A.G.
10.	Compound boilers	A.G. or R.P.B.D.

* No antifreeze permitted in fire sprinkler systems

		DEVICE TYPE
VI	MULTIPLE HOUSING	
1.	Toilets and bidets	A.G. or A.V.B.
2.	Lavatories	A.G.
3.	Bathtubs	A.G.
	Bathtubs with hose attachments	A.V.B.
4.	Fire sprinkler drains*	A.G.
5.	Compound boilers	A.G. or R.P.B.D.
6.	Mop service, or slop sink with hose faucets	A.V.B.
7.	Drinking fountains require angle stream with mouth guard	A.G.
	Drinking fountain with water supply in waste pipe	N.A.
8.	Swimming pool water supply	A.G.
VII	PLACES OF PUBLIC ASSEMBLY	
1.	Toilets	A.G. or A.V.B.
2.	Lavatories	A.G.
3.	Bathtubs	A.G.
4.	Swimming pool water supply	A.G.
5.	Fire Sprinkler drains *	A.G.
6.	Mop, service or slop sinks with hose faucet	V.B.
7.	Drinking fountains require angle stream with mouth guard	A.G.
	Drinking fountain with water supply in waste pipe	N.A.
8.	Compound boilers	A.G. or R.P.B.D.
9.	Swimming pools	A.G.
10.	Mop, service, or slop sinks with hose faucets	A.V.B.
11.	Hose faucets in areas where possible pollution exists	A.V.B.
VIII	OFFICE BUILDINGS	
1.	Toilets or bidets	A.G. or A.V.B.
2.	Lavatories	A.G.

3.	Drinking fountains require angle stream with mouth guard	A.G.
	Drinking fountain with water supply in waste pipe	N.A.
4.	Bathtubs	A.G.
5.	Fire sprinkler drains *	A.G.
6.	Compound boilers	A.G. or R.P.B.D.
7.	Mop, service, or slop sinks with hose faucets	A.V.B.
8.	Medical equipment with potable water supply	A.G. or A.V.B.
9.	Potable water connection to film developing tanks	A.G. or A.V.B.
10.	Water operated presses, elevators, or other similar equipment	A.G. or A.V.B.
11.	Hose connections in areas where possible contamination exists	A.V.B.

IX FIRE SPRINKLER SYSTEMS

1.	High Hazard Fire Systems. Foam filled, chemicals, antifreeze, or air pressurized	N.A.
2.	Low Hazard Fire Systems. Stand pipe connection	D.C.V.A. or DDCVA
3.	Residential Fire Systems. Potable water and approved water line material	None Needed

Backflow prevention devices may be required at the meter where, in the opinion of the Director of Public Works and the Cross Connection Control Specialist, the municipal water system should be isolated due to a potential or existing cross-connection in the customer's piping system. The following list is a guide to the degree of protection required for a number of commercial and industrial establishments:

The following methods of cross-connection control are considered minimum protection at the service connection:

1) The public water supply to a premises having an auxiliary water supply with no known cross-connections may be required to install a reduced pressure principle device at the service connection at the City's discretion if a high health hazard is involved.

2) The public water supply to a premises on which is handled a substance that is objectionable (not a health hazard) in a manner constituting a potential cross-connection shall require a double check valve assembly at the service connection.

3) The public water supply to a premises on which there is an auxiliary water supply and having internal cross-connections that are not correctable or intricate plumbing arrangements which make it impractical to ascertain whether or not cross-connections exist, shall require a reduced pressure type backflow prevention device at the service connection.

4) The public water supply to a premises on which material dangerous to health or toxic substances are handled shall have installed a reduced pressure backflow prevention device at the service connection.

5) The public water supply to a premise where entry is restricted so that inspection for cross-connection cannot be made with sufficient frequency or at sufficient short notice to assure that cross-connections do not exist shall have installed a reduced pressure back flow prevention device at the service connection.

6) The public water supply to a premise on which any substance is handled under pressure so as to permit entry into the public water supply, or where a cross-connection could reasonably be expected to occur, shall have installed a reduced pressure principle device at the service connection.

7) The public water supply to a premise having a repeated history of cross-connections being established or re-established, shall have installed a reduced pressure principle device at the service connection.

Plant Or Facility	DEVICE TYPE
1. Aircraft and Missile Plants	A.G. or R.P.B.D.
2. Automotive Plants	A.G. or R.P.B.D.

		DEVICE TYPE
3.	Auxiliary Water Systems	
	a. Unapproved source	A.G. or R.P.B.D.
	b. Approved but not chlorinated source	D.C.V.A.
	c. Approved source	None
4.	Beverage, Bottling Plants and Breweries	
	a. With steam boiler	A.G. or R.P.B.D.
	b. Without steam boiler	D.C.V.A.
5.	Buildings, or other structures	
	a. Health hazard exists	A.G. or R.P.B.D.
	b. No health hazard	D.C.V.A.
6.	Canneries, Packing Houses and Reduction Plants	A.G. or R.P.B.D.
7.	Chemical Plants - Manufacturing, Processing, Compounding or Treatment	A.G. or R.P.B.D.
8.	Chemically Contaminated Water System	A.G. or R.P.B.D.
9.	Civil Works	
	a. Health hazard exists	A.G. or R.P.B.D.
	b. No health hazard	D.C.V.A.
10.	Dairies and Cold Storage Plants	A.G. or R.P.B.D.
	a. Health hazard exists	D.C.V.A.
	b. No health hazard	D.C.V.A.
11.	Film Laboratories	A.G. or R.P.B.D.
12.	Dockside Watering Facilities	D.C.V.A.
13.	Hospitals, Medical Buildings, Sanitariums, Morgues, Mortuaries, Autopsy Facilities	A.G. or R.P.B.D.
	a. Nursing and Convalescent Homes and Clinic (single story)	D.C.V.A.
14.	Irrigation systems - Premises having separate, such as Parks, Playgrounds, Cemeteries, Golf Courses, Schools, Estates, Ranches, etc	A.G. or R.P.B.D.
15.	Laundries and Dye Works	A.G. or R.P.B.D.
16.	Metal Manufacturing, Cleaning, Processing and Fabricating Plants	
	a. Health hazard exists	A.G. or R.P.B.D.
	b. No health hazard	D.C.V.A.
17.	Oil and Gas Production - Storage or Transmission Properties	A.G. or R.P.B.D.
18.	Paper and Paper Products Plants	A.G. or R.P.B.D.
19.	Power Plant	A.G. or R.P.B.D.
20.	Plating Plants	A.G. or R.P.B.D.
21.	Radioactive Materials or Substances - Plants or Facilities Handling	A.G. or R.P.B.D.*
22.	Restricted, Classified or other Closed Facilities	A.G. or R.B.P.D.*
23.	Sand and Gravel Plants	A.G. or R.P.B.D.
24.	Schools and Colleges	A.G. or R.P.B.D.

25. Sewage and Storm Drain Facilities . . . . . A.G. or R.P.B.D.
26. Waterfront Facilities and Industries
    a. Health hazard exists . . . . . A.G. or R.P.B.D
    b. No health hazard . . . . . D.C.V.A.

Installation, Inspection, Maintenance and Testing of Backflow Prevention Devices.

General Installation Requirements

A. Any backflow prevention assembly required herein shall be model and size approved by the City's cross-connection department. The term "approved" shall mean an assembly that has been manufactured in full conformance with the standards established by the American Water Works Association. Each model must have passed the laboratory and field performance specifications of the foundation for cross-connection control and Hydraulic Research of the University of Southern California. New or replacement devices shall be chosen from the Washington State Department of Health Drinking Water Programs approved assemblies list.

B. Devices shall be accessible for testing and maintenance.

C. Devices shall be protected against freezing, flooding and mechanical damage.

D. Reduced pressure principle devices shall be located in an area where water spillage is not objectionable. A drain capable of handling the maximum flow from the relief valve shall be provided when the device i located within a building. A reduced pressure principle device may no be installed in a vault below ground level.

Vacuum Breakers

1. Initial Installation

   a. All required cross connection control devices shall be installed in accordance with the uniform plumbing code.
   b. Vacuum breaker shall be installed as specified in the Uniform Building Code, 1991 addition, and/or the following table, whichever is more restrictive.

Fixtures or Equipment	Method of Installation
Aspirators and ejectors	C-L at least 6" above flood level of receptacle served.
Dental units	On models without built in vacuum breakers C-L at least 6" above flood rim of bowl.
Dishwashing machines	C-L at least 6" above flood level of machine. Install on both hot and cold water supply lines.
Flushometers (closet & urinal)	C-L at least 6" top of fixture supply.
Garbage can cleaning machine	C-L at least 6" above flood level of machine. Install on both hot and cold water supply lines.
Hose outlets	C-L at least 6" above highest point on hose line.
Laundry machines	C-L at least 6" above flood level of machine. Install on both hot and cold water supply lines.
Lawn sprinklers	C-L at least 12" above highest sprinkler discharge outlet.
Steam tables	C-L at least 6" above flood level.

Tanks and vats	C-L at least 6" above flood level rim.
Trough urinals	C-L at least 30" above perforated flush pipe.
Flush tanks	Equipment with approved ball and cock. Where ballcocks touch tank water, equipment with vacuum breaker at least 1" above overflow outlets. Where ballcock does not touch tank water, install ballcock outlet at least 1" above overflow outlet or provide vacuum breaker as specified above.

Hose bibs (where aspirators or ejectors could be connected)	C-L at least 6" above flood level of receptacle served.

C-L, critical level is defined as the level to which the backflow preventor (vacuum breaker) may be submerged before backflow will occur. The bottom of the device shall be taken as the C-L.

2. Testing And Maintenance:

   a. Since there are a large number of atmospheric backflow prevention devices (vacuum breakers) installed in the system a continuous program of inspection is determined to not be economically feasible. Field inspection will, however, be carried on, by the City by periodic spot checking of various premises in which they have installed.

   b. When a defective atmospheric backflow prevention device (vacuum breaker) is reported and/or discovered the owner shall take immediate action to have subject device repaired or replaced at his expense by a qualified and licensed plumber.

Pressurized Vacuum Breakers (PVB), Double Check Valve Assemblies (DCVA), Reduced Pressure Principle Device (RPPD)

1) Initial Installation And Inspection:

   a. When a backflow device is required either at the service connection or on the implant plumbing or both; the property owner will complete an application for backflow device installation. Applications may be found at City Hall in the Finance Department on the first floor or the Department of Public Works on the third floor.

   b. After the application has been reviewed and accepted, the property owner/manager may install the approved backflow device. Installation will be done by a licensed and qualified plumber. The device will be tested by a BAT or CCS and if it passes, the results shall be sent to City Hall for inspection and tagging. The full cost of installation, testing, repair and re-testing will be at the expense of the property owner.

   c. Upon completion of installation, testing, repairs if needed, and retesting, the City of Selah's Cross Connection Control Specialist will inspect and tag the device.

2) Yearly Testing

a. All premises with backflow prevention devices (except atmospheric vacuum breakers) will be tested not less than once yearly.

b. (1) The City of Selah Cross Connection Department will contact the property owner/manager of the month which devices and premises are to be tested.

(2) If the device fails any part of the test, the device will be placed in the suspense file until repaired or replaced.

c. Repair, replacement and retesting is the responsibility of the customer and must be done immediately following the original test failure.

CITY OF SELAH

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

e Owner:_____ Customer File No:_____

Service Address:_____

Location of Assembly:_____

Assembly:
DEVICE SERIAL NO. MANUFACTURER MODEL SIZE TYPE DEVICE

Line Pressure at Time of Test:_____LBS.

	Reduced Pressure Assemblies			Pressure Vacuum Breaker	
	Double Check Assemblies		Relief Valve	Air Inlet	Check Valve
	1st Check	2nd Check		Opened at _____ psid	_____ psid
Initial Test	☐DC-closed tight RP-____psid ☐Leaked	☐Closed tight ☐Leaked	Opened at _____ psid ☐Did not open	☐Did not open	☐Leaked
Repairs d Materials Used	☐Cleaned Replaced ☐Disc ☐Spring ☐Guide ☐Pin Retainer ☐Hinge Pin ☐SeatDiaphragm ☐Other ☐Describe	☐Cleaned Replaced ☐Disc ☐Spring ☐Guide ☐Pin Retainer ☐Hinge Pin ☐SeatDiaphragm ☐Other ☐Describe	☐Cleaned Replaced ☐Disc ☐ Upper ☐ Lower ☐Spring Diaphragm ☐ Large Upper ☐ Large Lower ☐ Small ☐Seat Upper ☐Seat Lower ☐Lower Spacer ☐Other Describe	Check Valve Held at ____ psid ☐Leaked ☐Cleaned Replaced Air Inlet ☐ Disc ☐Check Disc Air Inlet ☐ Spring ☐Check Spring ☐Other Describe	Check Valve Held at ____ psid ☐Leaked ☐Cleaned Replaced Air Inlet ☐ Disc ☐Check Disc Air Inlet ☐ Spring ☐Check Spring ☐Other Describe
Final Test	☐DC-closed tight RP-_____ psid	☐Closed tight	Opened at ____ psid	Opened at ____ psid	Air Check____psid Valve____psid

The above report is certified to be true.

Initial Test By:_____Certification NO.:_____Date:_____
Pass ☐ Fail ☐
Repaired By:_____Date:_____

Final Test Performed By:_____ Certification No.:_____Date:___

Firm Name:_____ Phone No.:_____
Firm Address:_____ City_____ State_____

Water Service Restored Yes ☐ No ☐ _____
Customer's Signature

25.
CROSS-CONNECTION CONTROL PROGRAM SUMMARY REPORT

HLA
Engineering and Land Surveying, Inc.

Cross-Connection Control Activities (Blue)
Annual Summary Report (ASR) for 2019

PWS ID: **774006** PWS Name: **SELAH, CITY OF** County: **YAKIMA**

Part 1: Designated Cross-Connection Control Specialist (CCS) Information

CCS Name	D. Ty Jones	CCS Phone	509-698-7365	CCS Cert. #	5285	BAT Cert. #	
CCS is: PWS owner or employee							

Part 2: Status of Cross-Connection Control (CCC) Program at End of 2019

Provide information about the status of your CCC Program at the end of the reporting year.

PWS has:	**A written CCC Program Plan**[1] ◉ Yes ○ No **CCC implementation activities**[2] ◉ Yes ○ No	**Program Plan Last Updated**[3] 03/14/2016

[1] Enter "Yes" if PWS has **any** type of written CCC Program Plan, policies, or procedures. Written CCC Program Plan must be part of a Water System Plan (WSP) or Small Water System Management Program (SWSMP).
[2] Enter "Yes" if PWS implemented **any** CCC Program activities during the reporting year, such as establishing legal authority, conducting hazard evaluations, requiring installation of backflow assemblies to protect the PWS, requiring assembly testing, maintaining CCC records, or enforcing the PWS's or CCC Program requirements.
[3] PWS can update the CCC Program Plan at any time (independent of WSP or SWSMP update).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is:	
		Included in Written Program Plan	Being Implemented or Is Completed
1	**Legal Authority Established**	◉ Yes ○ No	◉ Yes ○ No
2	**Hazard Evaluation Procedures and Schedules**	◉ Yes ○ No	◉ Yes ○ No
3	**Procedures/Schedules for Ensuring Installation of Backflow Preventers**	◉ Yes ○ No	◉ Yes ○ No
4	**Certified CCS Provided**	◉ Yes ○ No	◉ Yes ○ No
5	**Backflow Preventer Inspection and Testing**	◉ Yes ○ No	◉ Yes ○ No
6	**Assembly Testing Quality Assurance/Quality Control (QA/QC) Program**	◉ Yes ○ No	◉ Yes ○ No
7	**Backflow Incident Response Procedures**	◉ Yes ○ No	◉ Yes ○ No
8	**Public Education Program**	◉ Yes ○ No	◉ Yes ○ No
9	**CCC Records**	◉ Yes ○ No	◉ Yes ○ No
10	**Reclaimed Water Permit**	○ Yes ◉ No ○ N/A	○ Yes ○ No ◉ N/A

Part 3A: PWS Characteristics at End of 2019

Enter the number of connections (new and existing) served by the PWS by type.

Type of Service Connection	Number
Residential (As defined by PWS)	2453
All Other (include dedicated fire lines, dedicated irrigation lines, and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	309
Total Number of Connections	2762

Part 3B: Cross-Connection Control for Severe and High-Hazard Premises and High-Hazard Dedicated Lines Served by the PWS

Answer the following questions carefully. These answers control your access to pages 2 and 3 for data entry.

1. Does your PWS serve any severe or high-hazard premises or any high-hazard dedicated fire or irrigation lines? ◉ Yes ○ No

2. Does PWS serve any high-hazard medical premises? ◉ Yes ○ No

- If you answer Yes to both questions, you must enter data in at least one row on page 2 and one row on page 3.
- If you answer Yes to Question 1 and No to Question 2, you must enter data on page 2 only.
- If you answer No to both questions, pages 2 and 3 will be grayed out to prevent data entry.

- Count only premises PWS serves water to.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information.**

Type of Severe or High-Hazard Premises or Dedicated Lines [WAC 246-290-490(4)(b)]	Number of Connections at end of 2019			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Agricultural (farms and dairies)				
Beverage bottling plants (including breweries)	2	2	2	0
Car washes	2	2	2	0
Chemical plants				
Commercial laundries and dry cleaners	1	0	0	0
Both reclaimed water and potable water provided				
Film processing facilities				
Dedicated fire lines with chemical addition or using unapproved auxiliary supplies				
Food processing plants (including canneries, slaughter houses, rendering plants)				
Hospitals, medical centers, medical, dental and veterinary clinics, mortuaries, nursing homes, etc., reported on Part 3C page 3 (totals imported from page 3)	21	16	7	0
Dedicated irrigation systems using purveyor's water supply and chemical addition[4]				
Laboratories	1	1	1	0
Metal plating industries				
Petroleum processing or storage plants				
Piers and docks				
Radioactive material processing plants or nuclear reactors				
Survey access denied or restricted				
Wastewater lift/pump stations (non-residential only)				
Wastewater treatment plants	2	2	2	
Unapproved auxiliary water supply interconnected with potable water supply				
Totals	29	23	14	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections whose premises isolation preventers were inspected (AGs) or tested (RPs) during the reporting year.

[4] For example, dedicated irrigation lines to parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RP), such as aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, for example:"Other manufacturing" or "Other commercial".

Part 3C: Cross-Connection Control for High-Hazard Medical Premises Served by the PWS

- Count only medical premises PWS serves water to.
- Don't count the same premises more than once. If you serve different medical category premises through a single connection, count the connection under the medical category you consider to pose the highest hazard to PWS.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information**

Type of High-Hazard Medical Premises [WAC 246-290-490(4)(b)]	Number of Connections at end of 2019			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)				
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers				
Out-patient clinics and offices				
Alternative health out-patient clinics and offices	2	2	2	0
Psychiatric out-patient clinics and offices				
Chiropractors with water-connected X-ray equipment	2	2	2	0
Hospice care centers				
Childbirth centers				
Kidney dialysis centers				
Blood centers				
Dental clinics and offices	2	2	2	0
Facilities for Housing Patients				
Nursing homes	1	0	0	0
Assisted Living Facilities (formerly Boarding Homes)	1	0	0	0
Residential treatment centers	12	9	0	0
Other Medical-Related Facilities				
Mortuaries with embalming equipment				
Morgues and autopsy facilities (not in hospitals)				
Veterinarian offices, clinics and hospitals	1	1	1	0
Totals	21	16	7	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises backflow preventers only or connections with premises isolation DCVAs or DCDAs isolation.

Part 4A: Backflow Preventer Inventory and Testing Information for 2019

- Complete all fields. Enter **zero (0)**, if no backflow preventers in a specific category.
- Count only backflow preventers relied on to protect the PWS.
- Count AVBs on *irrigation systems only*. Select No to AVB question above Table 2 if PWS doesn't track AVBs.
- Count multiple tests (or failures) for the same backflow preventer as one test (or failure) for that backflow preventer.
- For multiple service connections or parallel installations, count each assembly separately.
- Count RPDAs and DCDAs as ***single*** assemblies. Count the tests of the mainline assembly and bypass assembly as ***one test***. Count the failure of either the mainline or bypass assembly (or the failure of both) as ***one failure***. Count an entire detector assembly taken out of service as ***one assembly removed from service***.
- Count assemblies installed on dedicated fire or irrigation lines as **Premises Isolation Assemblies** in Table 1.

	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Table 1: Premises Isolation Preventers (include preventers isolating PWS-owned facilities)									
Existing Premises Isolation Backflow Preventers									
1	In service at beginning of 2019	2	2	0	0	0			
2	Inspected and/or tested in 2019[1]	0	0	0	0	0			
3	Failed inspection or test in 2019	0	0	0	0	0			
New Premises Isolation Backflow Preventers									
4	Installed in 2019[2]	0	0	0	0	0			
5	Inspected and/or tested in 2019[1]	0	0	0	0	0			
6	Failed inspection or test in 2019	0	0	0	0	0			
Premises Isolation Backflow Preventers (existing or new)									
7	Removed from service in 2019[3]	0	0	0	0	0			
Total Premises Isolation Preventers at End of 2019		**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**

Does PWS track AVBs on irrigation systems? ○ Yes ◉ No

	Table 2: In-Premises Preventers (include preventers within PWS-owned facilities)								
Existing In-Premises Backflow Preventers									
8	In service at beginning of 2019	0	60	0	766	7	17	0	unk
9	Inspected and/or tested in 2019[1]	0	14	0	335	1	3	0	unk
10	Failed inspection or test in 2019	0	1	0	16	0	3	0	unk
New In-Premises Backflow Preventers									
11	Installed in 2019[2]	0	0	0	3	0	0	0	unk
12	Inspected and/or tested in 2019[1]	0	0	0	3	0	0	0	unk
13	Failed inspection or test in 2019	0	0	0	0	0	0	0	unk
In-Premises Backflow Preventers (existing or new)									
14	Removed from service in 2019[3]	0	0	0	0	0	0	0	unk
Total In-Premises Preventers at End of 2019[4]		**0**	**60**	**0**	**769**	**7**	**17**	**0**	**0**
Grand Totals at End of 2019		**2**	**62**	**0**	**769**	**7**	**17**	**0**	**0**

[1] Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only, using DOH-approved USC field test procedures).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of the reporting year. Replacement preventers may be of a different type than the originals.

[3] Existing or new preventers taken out of service, whether or not they were replaced by the same or a different type of preventer.

Part 4B: Other Implementation Activities in 2019

Complete all cells. Enter zero if not applicable.

Water Use Questionnaires	
Did your PWS send any water use questionnaires to customers during 2019?	○ Yes ◉ No

On-site Hazard Surveys				
Did your CCS conduct any on-site hazard surveys during 2019?				◉ Yes ○ No
	Service Connection Type			
	New	**Existing**	**Total**	
1. Number of connections surveyed for cross-connection hazards to PWS.	3	0	3	
2. Number of connections requiring backflow prevention to protect PWS.[1,2]	3	0	3	

New Exceptions to Premises Isolation	
Did your CCS grant any new premises isolation exceptions in 2019 to high-hazard premises?[3]	○ Yes ◉ No

CCC Enforcement Actions	
Did your PWS take any enforcement actions during 2019?[4]	○ Yes ◉ No

[1] Include services where either premises isolation or in-premises preventers were required to protect the PWS.
[2] Include existing services that need new, additional or higher level backflow prevention.
[3] Submit a completed DOH Exception Form (green) for each new exception granted in the reporting year.
[4] "Enforcement actions" means actions taken by the PWS (such as water shut-off, PWS installation or testing of backflow preventer, assessment of fines, etc.) when the customer fails to comply with the PWS's CCC requirements.

Part 5: Backflow Incidents and "Off-Normal" Events in 2019

	Backflow Incidents, Risk Factors, and Indicators during 2019	Number
Backflow Incidents during 2019		
1	Backflow incidents that contaminated the PWS[5].	0
2	Backflow incidents that contaminated the customer's drinking water system ***only***[5].	0
Risk Factors for Backflow during 2019		
3	Distribution main breaks per 100 miles of pipe.	5.00
4	Low pressure events (<20 psi in PWS distribution system).	3
5	Water outage events.	1
Indicators of Possible Backflow during 2019		
6	Total health-related complaints received by PWS.[6]	2
7	Received during BWA or PN events.[7]	0
8	Received during low pressure or water outage events.	0
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).	6
10	Received during BWA or PN events.[7]	0
11	Number of these complaints received during low pressure or water outage events.	2

[5] Purveyors must submit a Backflow Incident Report form for each backflow incident known to have contaminated the public water system. DOH is also interested in receiving incident report forms for backflow incidents that contaminated the customer's drinking water system only.
[6] Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.
[7] **"BWA"** means **Boil Water Advisory** and **"PN"** means **Public Notification** for water quality reasons.

Part 6: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe challenges faced or accomplishments made in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

No Comments

Part 7: Report Certification and Contact Information

I, Daniel Ty Jones , certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	03/20/2020	**All ASR Forms Certified/Submitted**	03/20/2020

Designated CCS/CCC Program Manager[1]

Name	D. Ty Jones	**Title**	Public Works Supervisor	**CCS Cert #**	5285
Email Address	ty.jones@selahwa.gov	**Phone**	509-698-7365	**Phone Ext**	

PWS Manager[2]

Name	Joseph K Henne	**Title**	Public Works Director	**Operator Cert #**	
Email Address	joe.henne@selahwa.gov	**Phone**	506-698-7365	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Cross-Connection Control Program Summary (Cream)
Annual Summary Report (ASR) for 2019

PWS ID: **774006** PWS Name: **SELAH, CITY OF** County: **YAKIMA**

Describe the characteristics of the PWS's Cross-Connection Control (CCC) Program at the end of 2019.

Part 1: CCC Program Characteristics

A. Type of Program Implemented

Type of Program	Check One
Premises isolation only.	○
Combination program: reliance on both premises isolation and in-premises prevention.	◉
In transition from a combination program to a premises isolation only program.	○

B. Coordination with Authority Having Jurisdiction (AHJ) on CCC Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code at the local level. The AHJ is usually your county or city building department. Don't list DOH as an AHJ.

AHJ #	Name of AHJ (City or County Building Department)[1]	PWS		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	City of Selah building dept/PW	Yes ◉ No ○	Yes ◉ No ○	Yes ○ No ○

[1] Do not enter an individual's name.

C. Corrective/Enforcement Actions Available to the Purveyor

Type of Corrective Action/Enforcement Action	Indicate Whether Available	Most Often Used (Check One)
Purveyor denies or discontinues water service.	Yes ◉ No ○	◉
Purveyor installs backflow assembly and bills customer.	Yes ○ No ◉	○
Purveyor assesses fines (in addition to eliminating or controlling cross connection).	Yes ○ No ◉	○
Purveyor tests backflow assembly and bills customer.	Yes ○ No ◉	○

[1] Enter detailed description of other enforcement actions available to PWS. Don't enter "None", "Not Applicable", or "Not Available."

D. CCC Program Responsibilities
Do not include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	○	◉
Backflow preventer (BP) ownership	◉	○
BP installation	◉	○
BP *initial* inspection (for proper installation - all BPs)	○	◉
BP *initial* test (for testable assemblies)	◉	○
BP *annual* inspection (Air Gaps and AVBs)	◉	○
BP *annual* test (for testable assemblies)	◉	○
BP maintenance and repair	◉	○

E. Backflow Prevention for Fire Protection Systems
Please remember to enter number of days allowed if you require retrofitting.

PWS coordinates with *AHJ* on CCC issues for fire sprinkler systems (FSSs)	Yes ◉ No ○ N/A ○
PWS coordinates with *local Fire Marshal* on CCC issues for FSSs.	Yes ◉ No ○ N/A ○
PWS ensures backflow prevention is installed before serving *new* connections with FSSs.	Yes ◉ No ○
PWS requires retrofits to *high*-hazard FSSs.	Yes ○ No. of days allowed: No ◉ N/A ○
PWS requires retrofits to *low*-hazard FSSs.	Yes ○ No. of days allowed: No ◉ N/A ○

F. Backflow Prevention for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems *without* chemical addition.	Not Addressed ○ AVB ◉ PV/SVBA ○ DCVA ○ RPBA ○
PWS currently inspects AVBs upon *initial* installation.	Yes ◉ No ○ N/A ○
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Yes ◉ No ○ N/A ○

G. Used Water

Does PWS prohibit, by ordinance, rules, policy, by-laws or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system?	Yes ◉ No ○
If not prohibited at present, date plan to prohibit use.	N/A
Current number of service connections returning used water to distribution system.	0

H. Backflow Prevention for Unapproved Auxiliary Water Supplies[1] NOT Interconnected with PWS
Show the **minimum** backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies *when they are NOT interconnected to the PWS.*

***Existing* service connections.**	None ◉ DCVA ○ RPBA ○ AG ○
Type of protection required.	N/A ◉ In-premises prevention ○ Premises isolation ○
***New* service connections.**	None ◉ DCVA ○ RPBA ○ AG ○
Type of protection required.	N/A ◉ In-premises prevention ○ Premises isolation ○

[1] An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.

I. Backflow Prevention for Tanker Trucks and Temporary Water Connections

Minimum **level of backflow prevention (installed on or associated with the truck) required for tanker trucks taking water from PWS.**	AG ◉ DCVA ○ RPBA ○ Not Specified ○ Tanker trucks not allowed ○
PWS requires tanker trucks to obtain water at designated fill sites each equipped with permanently installed backflow preventer(s).	Yes ◉ (Minimum preventer: DCVA ◉ RPBA ○) No ○ N/A ○ No sites provided ○
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Yes ○ No ◉ N/A ○
Minimum **level of backflow prevention required for temporary water connections (e.g., for construction sites).**	AG ○ DCVA ◉ RPBA ○ Not specified ○ Temp. connections not allowed ○
PWS provides approved backflow preventer for temporary connections.	Yes ◉ No ○ N/A ○ (Temp. connections not allowed)
PWS requires testing each time the temporary connection backflow preventer is relocated.	Yes ◉ No ○ N/A ○ (Temp. connections not allowed)

J. Backflow Prevention for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow prevention required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Prevention Required
Commercial	Yes ◉ No ○	Not Required ◉ DCVA ○ RPBA ○
Industrial	Yes ◉ No ○	Not Required ◉ DCVA ○ RPBA ○
Institutional	Yes ◉ No ○	Not Required ◉ DCVA ○ RPBA ○

K. Backflow Prevention for Wholesale Customers

Indicate whether the PWS requires backflow prevention at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has Customers of this Type	Minimum Backflow Prevention Required (if prevention is required, indicate minimum level).	
Existing	Yes ○ No ◉	Not specified / Not required ◉ Always required ○ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ○ RPBA ○
New	Yes ○ No ◉	Not specified / Not required ◉ Always required ○ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ○ RPBA ○

L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan *allows* system to grant exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii)	Yes ○ No ◉ Doesn't Address ○
PWS currently grants new Exceptions.	Yes ○ No ◉
PWS granted Exceptions in past reporting years.	Yes ○ No ◉

Part 2: CCC Program Record-Keeping Software

Indicate the type or name of computer software the PWS uses to track CCC records.

BPMS ○	**Cross-Track (BMI)** ◉	**Tokay** ○	**XC2** ○	**Custom developed for or by PWS**[1] ○
Other non-CCC software (e.g. Excel) ○	**Other commercial CCC software (specify)** ○	**None Used** ○		

[1] Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

Part 3: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe accomplishments made in this reporting year.
  - Identify challenges faced in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

No Comments

Part 4: Report Certification and Contact Information

I,Daniel Ty Jones, certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	03/20/2020	**All ASR Forms Certified/Submitted**	03/20/2020

Designated CCS/CCC Program Manager[1]

Name	D. Ty Jones	**Title**	Public Works Supervisor	**CCS Cert #**	5285
Email Address	ty.jones@selahwa.gov	**Phone**	509-698-7365	**Phone Ext**	

PWS Manager[2]

Name	Joseph K Henne	**Title**	Public Works Director	**Operator Cert #**	
Email Address	joe.henne@selahwa.gov	**Phone**	506-698-7365	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Backflow Prevention for Severe Health Hazard Facilities (Gray)
Annual Summary Report (ASR) for 2019

PWS ID: **774006** PWS Name: **SELAH, CITY OF** County: **YAKIMA**

Part 1: Backflow Prevention Status

- Describe the backflow prevention status at the end of the reporting year for each wastewater treatment plant and nuclear facility your system serves.
- If you serve more than one severe health hazard facility, click the "Add Facility" button to display another facility data entry box.
- If you serve more than one connection to the same facility, click the "Add Connection" button to display another connection row for that facility.
- You may add as many facilities and connections as needed.
- To update this form, you may delete facilities and connections which are no longer served.

Facility 1 of 2

Facility Name	Selah Wate Water Treatment Plant
Physical Address	226 S Railroad Ave
City	Selah
Zip	98942
NPDES Permit#	WA000211032E
Facility Type	Wastewater Treatment Plant (WWTP)
Facility Comments	

Facility 1 Connection 1 of 1

Connection Name	Selah Waste Water treatment Plant
Backflow Prevention Status	Premises Isolation RP and In-Plant Air Gap
Connection Comments	

Facility 2 of 2

Facility Name	Selah Biosolids Facility
Physical Address	226 S Rushmore Rd
City	Selah
Zip	98942
NPDES Permit#	WA00211032E
Facility Type	Wastewater Treatment Plant (WWTP)
Facility Comments	

Facility 2 Connection 1 of 1

Connection Name	Selah Biosolids facility
Backflow Prevention Status	Premises Isolation RP and In-Plant Air Gap
Connection Comments	

Part 2: Report Certification and Contact Information

I,Daniel Ty Jones, certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	03/20/2020	**All ASR Forms Certified/Submitted**	03/20/2020

Designated CCS/CCC Program Manager[1]

Name	D. Ty Jones	**Title**	Public Works Supervisor	**CCS Cert #**	5285
Email Address	ty.jones@selahwa.gov	**Phone**	509-698-7365	**Phone Ext**	

PWS Manager[2]

Name	Joseph K Henne	**Title**	Public Works Director	**Operator Cert #**	

Email Address	joe.henne@selahwa.gov	Phone	506-698-7365	Phone Ext	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

26.
CONSUMER CONFIDENCE REPORT

HLA
Engineering and Land Surveying, Inc.

City of Selah
Consumer Confidence Report
Water Quality 2020

YOU ARE RECEIVING THIS REPORT AS PART OF A FEDERAL REPORTING REQUIREMENT FOR MUNICIPAL WATER SYSTEMS

The City of Selah Water Department is pleased to present to you Selah's 2020 Annual Water Quality Report (2019 reporting year). This report is designed to inform you about the quality and services the City delivers. The City's goal is to provide a safe and dependable supply of drinking water. We are committed to making improvements to the water quality process to protect our water resources, and ensure the quality of our water.

Public Participation Opportunities

The public is encouraged to attend and provide comment on the water system plan at the City Council meetings held on the second and fourth Tuesday of each month in the City Council Chambers, 115 W. Naches Ave. An agenda for each meeting is available at City Hall, on the web page (www.selahwa.gov/council/agenda-minutes) and at the meeting.

Any comments on how to make this report more informative, easier to read or ways to protect and conserve water are greatly appreciated.

Drinking Water Definitions

- Action Level (AL): The concentration of a contaminant, which if exceeded, triggers treatment or other requirements which a water system must follow.
- Non-Detectable (ND): Laboratory analysis indicated that the constituent is not present.
- Maximum Contaminant Level Goal (MCLG): The highest level of contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- Part per million (ppm): one part per million or one milligram per liter (mg/L) is analogous to one penny in $10,000.
- Part per billion (ppb): One part per billion or one microgram per liter is analogous to one penny in $10,000,000.
- State Reporting Level (SRL): Indicated the minimum reporting level required by Washington State Department of Health.
- Variance and Exemption: State or EPA permission not to meet an MCL, AL or a TT under certain conditions.

Important Contacts

City of Selah Public Works

222 S. Rushmore Rd

(509) 698-7365

https://selahwa.gov/public-works/

WA State Department of Health

Office of Drinking Water

(509) 329-2100

www.doh.wa.gov

U.S. Environmental Protection Agency

Safe Drinking Water Act Hotline

(800) 426-4791

www.epa.gov/sdwa

The Facts About Water

Description of the City's Water System

The City of Selah's water sources come from deep wells, which are collectively capable of producing 7.5 million gallons per day. Water is yielded from the Ellensburg and Wanapum aquifers. The pumping capacity of the City's primary wells are 5,200GPM (gallons per minute).

The City's water reservoirs are capable of holding 3.4 million gallons of water. The existing distribution system is primarily looped and consists of mainly 8 inch or larger ductile or cast-iron water lines.

Quality Monitoring

The Department of Health regulates the testing and scheduling requirements for water quality. The City has historically provided high quality drinking water and continues to strive to maintain those standards. In October 2014, the water department experienced a return of unsatisfactory Coliform sample. By following the repeat sampling requirements, we tested one sample within five connections upstream, five connections downstream and source samples for any wells running at that time of the unsatisfactory sample. All samples came back negative.

The City's wells are tested for volatile organic compounds and inorganic chemicals, nitrates and radium. Coliform bacteria are tested ten times per month or one hundred twenty times per year. Lead and copper are tested at thirty sampling sites throughout the water distribution system. In 2017 of 30 samples that were taken, no sources exceeding the action level for copper at 1.3 mg/L or lead with an AL of .015 mg/L were found. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children.

Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

When your water has been sitting for several hours in your house plumbing you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking and cooking.

If you are concerned about lead in your water you may wish to have your water tested. Information regarding testing methods, and steps you can take to minimize lead exposure in drinking water, can be found from the Safe Drinking Water hotline, (800) 426-4791.

Fluoride: The wells listed below pump into the water distribution system. They do not all run at the same time so fluoride levels may vary throughout the system. The SRL for fluoride is 0.5 mg/L with a trigger level or 2.0 mg/L and a MCL of 4.0 mg/L

Well	Mg/L
#5	.3
#6	.26
#7	N/D
#8	N/D

Water Use Efficiency

An abundant supply of drinking water has always been readily available and is a basic life necessity that we are fortunate enough to enjoy. Water is an important and precious resource that everyone should help conserve. The City of Selah would like to improve and reduce the current residential use per capita by 2 gallons per household per day over the next 2-year period and to keep unaccounted for water below 10%. The City will achieve this with public outreach education, encouraging residents to practice conservation techniques, and by adding consumption history to residents' utility billing information.

How much water does the City of Selah **PRODUCE AND SALE?**

- In 2019 the City produced 863,110,000 million gallons and sold 836,798,216 gallons of water with 3.0% unaccounted for.
- In 2018 the City produced 849,812,000 million gallons and sold 835,017,826 million gallons of water with 1.7% unaccounted for.
- In 2017 the City produced 890,418,000 million gallons and sold 851,895,456 million gallons of water with 4.3% unaccounted for.
- The three year average of unaccounted for water is 3.0%.

What can residents do to help the City to reduce and conserve water usage?

Nearly 60% of a person's household water footprint is comprised of water for lawn and garden maintenance.

- A timed sprinkler system, lawn aeration and lawn fertelizers can help improve your lawn while conserving water.
- Using a water efficient dishwasher with full loads.
- It takes about 70 gallons of water to fill a bathtub, so showers are generally the more water efficient way to bathe.
- Repair water leaks in and outside of the home.
- Replace leaky toilets, faucets and other bathroom fixtures with new water efficient fixtures.

Translations

This report contains important information about your drinking water. You may wish to have this information translated.

Este informe contiene informacion importante sobre su agua potable. Es possible que desee tener esta informacion traducida

General Health Effects

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised individuals, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders and some elderly and infant, can be particularly at risk of infections. These individuals should seek advice about drinking water from their health care providers. The EPA/Center for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection are available from the Safe Drinking Water Act Hotline.

Water Quality Protection

High quality, clean, safe and aesthetically pleasing water is the City's commitment to you. We have adopted the following to ensure the drinking water consistently meets or exceeds all State and Federal regulations. The City of Selah has a Well head Protection Program and Cross Connection Program. These programs are designed to prevent contamination of groundwater before and after pumping. If you would like more information on these programs, please contacts Selah's Public Works office.

(509) 698-7365

Ty Jones, Public Works Supervisor

27.
WATER QUALITY MONITORING SCHEDULE

HLA
Engineering and Land Surveying, Inc.

Water Quality Monitoring Schedule

System: SELAH CITY OF **PWS ID: 77400 6** **Region: EASTERN**
Contact: Daniel T Jones **Group: A - Comm** **County: YAKIMA**

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021
Coliform Monitoring Population	11868	11868	11868	8038	8038	11868	11868	11868	11868	11868	11868	11868
Number of Routine Samples Required	10	10	10	9	9	10	10	10	10	10	10	10

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Lead and Copper	30	Jan 2018 - Dec 2020	standard - 3 year	09/19/2017	***Jun 2020***	
Asbestos	0	Jan 2020 - Dec 2028	waiver - 9 year			
Total Trihalomethane (THM)	2	Jan 2020 - Dec 2020	reduced - 1 year	07/25/2019	***Jul 2020***	
Halo-Acetic Acids (HAA5)	2	Jan 2020 - Dec 2020	reduced - 1 year	07/25/2019	***Jul 2020***	

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S03 *Well #5 - AFK982* *Well* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2020 - Dec 2020	standard - 1 year	10/08/2019	***Oct 2020***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	08/29/2016	Aug 2025
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	07/26/2016	Jul 2022
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/24/2018	
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/24/2018	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year	06/13/2001	
Gross Alpha	1	Jan 2020 - Dec 2022	standard - 3 year	05/10/2017	***May 2020***
Radium 228	1	Jan 2020 - Dec 2022	standard - 3 year	05/10/2017	***May 2020***

Source S04 *Well #6 - ABR091* *Well* *Use - Permanent* *Susceptility - High*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2020 - Dec 2020	standard - 1 year	10/24/2019	***Oct 2020***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/24/2015	Sep 2024
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	07/26/2016	Jul 2022

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S04	*Well #6 - ABR091*	*Well*	*Use - Permanent*	*Susceptility - High*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/08/2018	
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/08/2018	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Radium 226 + 228	1	Jan 2014 - Dec 2022	Baseline - 9 year	04/27/2015	
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	03/11/2015	Mar 2021

Source S05	*WF/A(S01,S02)*	*Well Field*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2020 - Dec 2020	standard - 1 year	03/18/2020	
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/28/2015	Sep 2024
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	07/26/2016	Jul 2022
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/24/2018	
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/24/2018	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	07/16/2014	***Jun 2020***
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	06/18/2014	***Jun 2020***

Source S06	*Well #7 - AFK967*	*Well*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2020 - Dec 2020	standard - 1 year	08/07/2019	***Aug 2020***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	08/29/2016	Aug 2025

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S06 *Well #7 - AFK967* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Iron	1	Jan 2020 - Dec 2022	standard - 3 year	06/18/2019	Mar 2021
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	06/01/2016	Jun 2022
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/24/2018	
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/24/2018	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2022	standard - 3 year	11/10/2016	***May 2020***
Radium 228	1	Jan 2020 - Dec 2022	standard - 3 year	11/10/2016	***May 2020***

Source S07 *Well #8 - AAS171* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Nitrate	1	Jan 2020 - Dec 2020	standard - 1 year	03/26/2019	***Jun 2020***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/27/2016	Sep 2025
Arsenic	1	Jan 2020 - Dec 2022	standard - 3 year	08/05/2019	Mar 2021
Iron	1	Jan 2020 - Dec 2022	standard - 3 year	06/18/2019	Mar 2021
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	09/28/2017	Sep 2023
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	09/27/2016	
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	09/27/2016	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	11/10/2016	Nov 2022
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	11/10/2016	Nov 2022

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2020
Submit CCR certification form to ODW (Community systems only):	10/01/2020
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2020
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Eastern Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Stan Hoffman: (509) 329-2132: or Stan.Hoffman@doh.wa.gov
For questions regarding DBPs:	Stan Hoffman: (509) 329-2132 or Stan.Hoffman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Joseph Perkins: (509) 329-2134 or Joseph.Perkins@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

28.
SOURCE SAMPLE CHEMICAL ANALYSIS RESULTS (IOC, NITRATE, VOC, SOC, AND RADIONUCLIDE)

HLA
Engineering and Land Surveying, Inc.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
1		151	6001	3/20/2018	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1		151	32524	10/24/2017	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
1		81	78716	9/17/2001	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
1		81	72620	9/27/2000	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
1		14	6567	11/16/1993	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
1		81	12290	9/28/1993	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
1		54	2219	6/12/1990	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
2		151	6001	3/20/2018	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2		151	32524	10/24/2017	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
2		81	78716	9/17/2001	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
2		81	72620	9/27/2000	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
2		81	12290	9/28/1993	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
2		54	2219	6/12/1990	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
3	39G012	151	33220	10/8/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	151	26451	8/7/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	151	24366	8/8/2018	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	89	86286	5/24/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
3	39G012	89	86286	5/24/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
3	39G012	151	25238	8/24/2017	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	28	53630	5/10/2017	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	105	25660	8/29/2016	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	39G012	89	76196	7/26/2016	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	151	32597	10/20/2015	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	151	26526	10/8/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	151	26074	10/24/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	105	27828	12/19/2012	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	151	7847	5/11/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	28	43150	5/1/2011	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	28	42447	11/16/2010	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	28	42272	10/12/2010	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	125	44490	7/21/2010	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	153	51901	5/19/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	89	88042	5/14/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
3	39G012	89	88042	5/14/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
3	39G012	151	8125	5/14/2009	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	105	13950	8/6/2008	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	105	13287	8/2/2007	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	39G012	28	35472	8/1/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	28	2401	3/20/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	151	13528	8/3/2006	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	89	73342	7/6/2006	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	151	13176	8/2/2005	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	28	3969	11/9/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	28	26689	8/10/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	105	13639	8/9/2004	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	105	8727	7/9/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	149	2538	4/16/2003	MICRO	MICROBIOLOGICAL	COLI_NUM	NUMERIC COLI COUNT	No
3	39G012	149	1923	3/5/2003	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	14	46833	7/23/2002	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	14	41912	9/17/2001	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	23	68607	7/17/2001	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
3	39G012	81	76814	6/13/2001	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No
3	39G012	81	72621	9/27/2000	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	39G012	14	35448	9/27/2000	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	81	61225	3/23/1999	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	81	57952	10/21/1998	SOC	SYNTHETIC ORGANIC CONTAMINANTS	FUMIGANT	SOIL FUMIGANTS	No
3	39G012	14	22434	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	81	57101	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	14	16071	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	39G012	81	48310	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	39G012	14	12501	6/10/1996	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	81	38012	6/10/1996	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	66	14738	8/1/1995	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	14	9391	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	14	9390	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	14	9392	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	81	26349	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	81	26350	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	81	26351	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
3	39G012	81	19074	5/9/1994	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
3	39G012	14	6568	11/16/1993	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
3	39G012	81	12288	9/28/1993	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	54	3665	4/23/1991	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	54	3068	1/15/1991	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	54	2220	6/12/1990	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	54	2047	4/10/1990	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	54	1499	9/25/1989	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
3	39G012	54	548	8/8/1988	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
3	39G012	51	10631	3/23/1988	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
3	39G012	52	9816	1/11/1984	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
3	39G012	52	9815	1/10/1984	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
3	39G012	52	9814	1/9/1984	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
3	39G012	33	471	1/24/1979	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
4	39G013	151	34538	10/24/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
4	39G013	151	31910	10/3/2018	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	89	86583	8/8/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
4	39G013	89	86583	8/8/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
4	39G013	151	32525	10/24/2017	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	151	32616	10/26/2016	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	89	76197	7/26/2016	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	151	32598	10/20/2015	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	105	29420	9/24/2015	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
4	39G013	28	49564	4/27/2015	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
4	39G013	28	49372	3/11/2015	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
4	39G013	151	26527	10/8/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	151	26075	10/24/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	105	23308	10/15/2012	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	151	26006	12/12/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	151	17461	9/1/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	151	9911	6/8/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	151	3800	3/8/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	151	24512	11/30/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	153	81001	8/10/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	125	44491	7/21/2010	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	89	88442	8/6/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
4	39G013	89	88442	8/6/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
4	39G013	105	14557	8/6/2009	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	28	40223	8/6/2009	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
4	39G013	105	18497	9/23/2008	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	105	18930	10/4/2007	IOC	INORGANIC CONTAMINANTS	AR	ARSENIC	No
4	39G013	151	16390	9/11/2007	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	105	15161	9/6/2006	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
4	39G013	105	16107	9/6/2006	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
4	39G013	89	73341	7/6/2006	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	151	13177	8/2/2005	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	28	39610	11/9/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
4	39G013	28	26669	8/10/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
4	39G013	105	13278	8/3/2004	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	105	8724	7/9/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	149	1922	3/5/2003	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	14	46834	7/23/2002	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	14	41913	9/17/2001	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	23	68609	7/17/2001	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
4	39G013	14	35635	9/27/2000	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	81	61226	3/23/1999	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	81	60995	3/11/1999	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	81	57099	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	14	22432	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	14	16073	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
4	39G013	81	48312	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
4	39G013	14	12502	6/10/1996	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	81	38013	6/10/1996	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	81	26349	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	14	9391	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	81	26350	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	14	9392	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	14	9390	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	81	26351	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
4	39G013	91	19075	5/9/1994	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
4	39G013	81	19075	5/9/1994	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
4	39G013	14	6569	11/16/1993	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
4	39G013	81	12289	9/28/1993	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	51	13124	2/20/1991	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
4	39G013	54	2048	4/10/1990	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
4	39G013	54	548	8/8/1988	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
4	39G013	51	6022	9/28/1982	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
4	39G013	33	472	1/24/1979	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
5	39G048	151	5287	3/18/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	151	6707	3/26/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	89	86283	5/24/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
5	39G048	89	86283	5/24/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
5	39G048	151	29407	9/27/2016	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	89	76198	7/26/2016	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
5	39G048	105	29782	9/28/2015	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
5	39G048	151	22565	9/4/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	28	48483	7/16/2014	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	28	48368	6/18/2014	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	28	48282	5/28/2014	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	151	22738	9/18/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	105	21571	9/25/2012	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	151	17462	9/1/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	151	24511	11/30/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	125	44492	7/21/2010	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
5	39G048	89	88055	5/21/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
5	39G048	89	88055	5/21/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
5	39G048	151	8626	5/21/2009	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	28	39753	5/21/2009	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	105	13951	8/6/2008	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
5	39G048	105	13288	8/2/2007	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
5	39G048	28	35471	8/1/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	28	2402	3/20/2007	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	151	13529	8/3/2006	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	89	73343	7/6/2006	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
5	39G048	151	13179	8/2/2005	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	28	39611	11/9/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	105	13416	8/2/2004	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
5	39G048	28	26583	8/2/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	105	8726	7/9/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	14	46835	7/23/2002	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	23	68608	7/17/2001	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
5	39G048	81	61224	3/23/1999	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
5	39G048	81	60997	3/11/1999	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	14	22433	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	81	57100	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	14	16072	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
5	39G048	81	48311	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
5	39G048	14	12500	6/10/1996	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	81	38011	6/10/1996	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
5	39G048	14	9390	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	81	26349	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	14	9392	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	81	26350	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	81	26351	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	14	9391	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
5	39G048	81	19073	5/9/1994	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
5	39G048	51	6023	9/28/1982	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
5	39G048	33	473	1/24/1979	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
6		151	26452	8/7/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		105	17666	6/18/2019	IOC	INORGANIC CONTAMINANTS	IOC_SHORT	INORGANIC SHORT FORM	No
6		151	24367	8/8/2018	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		89	86284	5/24/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
6		89	86284	5/24/2018	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
6		151	25239	8/24/2017	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		28	52485	11/10/2016	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
6		105	25661	8/29/2016	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		105	14575	6/1/2016	IOC	INORGANIC CONTAMINANTS	IOC_SHORT	INORGANIC SHORT FORM	No
6		89	76010	6/1/2016	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		151	23424	8/11/2015	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		151	20767	8/20/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		151	18436	8/12/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		105	16107	8/7/2012	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		151	15223	8/9/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		105	16428	8/19/2010	IOC	INORGANIC CONTAMINANTS	IOC_SHORT	INORGANIC SHORT FORM	No
6		153	51902	5/19/2010	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		89	88005	5/7/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
6		89	88005	5/7/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
6		151	7598	5/7/2009	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		28	39614	5/7/2009	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
6		89	77785	5/7/2009	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		105	13952	8/6/2008	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		105	13289	8/2/2007	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		151	13527	8/3/2006	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		89	72917	4/13/2006	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		151	13178	8/2/2005	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		28	39612	11/9/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
6		28	26679	8/10/2004	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
6		105	13277	8/3/2004	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		105	8725	7/9/2003	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		28	23378	7/9/2003	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
6		149	1449	2/11/2003	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		14	46836	7/23/2002	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	82077	3/26/2002	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		81	79097	10/9/2001	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		14	41914	9/17/2001	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	77621	7/17/2001	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		81	75704	4/19/2001	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		14	35636	9/27/2000	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	67331	1/19/2000	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		81	61227	3/23/1999	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		81	60994	3/11/1999	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	60996	3/11/1999	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	57098	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		14	22431	9/22/1998	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	57161	9/22/1998	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		81	50105	11/24/1997	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		81	48313	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		14	16074	9/3/1997	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		14	13645	11/13/1996	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		81	41677	11/13/1996	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		81	41676	11/13/1996	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		81	39631	8/13/1996	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		14	12962	8/13/1996	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
6		81	39632	8/13/1996	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		14	12503	6/10/1996	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		81	38014	6/10/1996	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		81	38015	6/10/1996	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		**81**	**35647**	**2/13/1996**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
6		14	11705	2/13/1996	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
6		81	35646	2/13/1996	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
6		101	5116	7/18/1995	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
6		14	9390	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	26350	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	26351	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		14	9391	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		81	26349	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		14	9392	2/9/1995	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
6		**81**	**25246**	**12/14/1994**	**IOC**	**INORGANIC CONTAMINANTS**	**IOC**	**COMPLETE INORGANIC ANALYSIS**	**Yes**
6		81	25247	12/14/1994	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC2	PRE II/V VOLATILE ORGANICS	No
6		**51**	**6024**	**9/28/1982**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
6		33	474	1/24/1979	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
7		151	11557	6/10/2020	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
7		105	26352	8/5/2019	IOC	INORGANIC CONTAMINANTS	AR	ARSENIC	No
7		105	17665	6/18/2019	IOC	INORGANIC CONTAMINANTS	IOC_SHORT	INORGANIC SHORT FORM	No
7		151	6708	3/26/2019	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
7		151	6000	3/20/2018	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
7		89	77331	9/28/2017	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
7		28	52484	11/10/2016	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
7		89	85304	9/27/2016	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
7		105	29293	9/27/2016	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
7		89	85304	9/27/2016	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
7		151	28027	9/15/2015	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
7		151	22566	9/4/2014	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
7		151	22739	9/18/2013	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
7		105	21323	9/25/2012	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
7		89	70921	9/7/2011	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
7		28	43276	6/8/2011	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
7		89	70589	6/8/2011	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
7		151	5079	3/28/2011	IOC	INORGANIC CONTAMINANTS	NIT	NITRATE SUITE	No
7		89	70433	3/28/2011	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
7		46	6113	11/30/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	INSECT1	CARBAMATE INSECTICIDES	No
7		46	6113	11/30/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	HERB1	CHLOROPHENOXY HERBICIDES	No
7		153	6113	11/30/2009	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
7		46	6113	11/30/2009	IOC	INORGANIC CONTAMINANTS	IOC	COMPLETE INORGANIC ANALYSIS	No
7		46	6113	11/30/2009	SOC	SYNTHETIC ORGANIC CONTAMINANTS	PEST1	GENERAL PESTICIDE SUITE	No
7		156	6113	11/30/2009	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No
7		46	6113	11/30/2009	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

29. DISTRIBUTION SYSTEM CHEMICAL ANALYSIS RESULTS (BACTERIOLOGICAL, DISINFECTION BYPRODUCTS, LEAD AND COPPER)

HLA
Engineering and Land Surveying, Inc.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		151	10829	6/3/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	10827	6/3/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	10828	6/3/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9539	5/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9541	5/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9540	5/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9039	5/11/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9038	5/11/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	9040	5/11/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	8599	5/5/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	8598	5/5/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	8379	5/4/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	8380	5/4/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6776	4/8/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6584	4/7/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6400	4/6/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6396	4/6/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6395	4/6/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6398	4/6/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6399	4/6/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6397	4/6/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6144	4/1/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	6143	4/1/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	5248	3/17/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	5247	3/17/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	5143	3/16/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	5142	3/16/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	4701	3/10/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	4702	3/10/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	4703	3/10/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	4338	3/4/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	4157	3/3/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	4158	3/3/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	3411	2/19/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	3412	2/19/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	3283	2/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	3282	2/18/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2768	2/11/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2769	2/11/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2653	2/10/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2273	2/5/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2133	2/4/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	2132	2/4/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1382	1/22/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1381	1/22/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1247	1/21/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1248	1/21/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1099	1/15/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	1098	1/15/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	809	1/13/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	508	1/8/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	509	1/8/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	391	1/7/2020	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37718	12/10/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37717	12/10/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37645	12/9/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37646	12/9/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37338	12/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37337	12/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37211	12/3/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37210	12/3/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37035	12/2/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	37036	12/2/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36530	11/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36531	11/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36409	11/19/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36408	11/19/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36289	11/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	36290	11/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	35806	11/12/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	35412	11/6/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	35195	11/5/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		151	35049	11/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	29507	10/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	29407	10/21/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28907	10/16/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28806	10/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28713	10/14/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28206	10/9/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28130	10/8/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	27512	10/2/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28006	10/1/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	27413	10/1/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26701	9/24/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		230	26102	9/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26005	9/17/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	25908	9/16/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26613	9/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	25418	9/11/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	25413	9/11/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	25327	9/10/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	24712	9/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	24711	9/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	23916	8/27/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	23807	8/26/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	23305	8/21/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	23206	8/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	23205	8/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	22622	8/14/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	22504	8/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	22405	8/12/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	21916	8/7/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	21812	8/6/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	21702	8/5/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		46	54213	7/25/2019	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		46	54212	7/25/2019	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		46	54212	7/25/2019	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		46	54213	7/25/2019	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		230	20504	7/24/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	20408	7/23/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		89	7879	7/23/2019	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	7880	7/23/2019	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	7879	7/23/2019	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	7880	7/23/2019	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		230	20304	7/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19805	7/17/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19704	7/16/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19607	7/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19102	7/10/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19011	7/9/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	18907	7/8/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	18214	7/1/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	17602	6/25/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	17507	6/24/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	17018	6/19/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	16912	6/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	16804	6/17/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	16231	6/11/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	16118	6/10/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	15609	6/5/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	15512	6/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	15402	6/3/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	14217	5/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	14106	5/21/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	14021	5/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	13524	5/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	13418	5/14/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	13306	5/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	12808	5/8/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	12713	5/7/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	12620	5/6/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	12112	5/1/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	11309	4/23/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	10727	4/17/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	10603	4/16/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	10506	4/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	10005	4/10/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	9902	4/8/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	9816	4/8/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	9305	4/3/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	9205	4/2/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	9115	4/1/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	7903	3/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	7803	3/19/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	7705	3/18/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	7306	3/14/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	7202	3/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	7105	3/12/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	7008	3/11/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	6512	3/6/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	6407	3/5/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	6331	3/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	5706	2/26/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	5605	2/25/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	5113	2/20/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	5002	2/19/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	4406	2/13/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	4303	2/12/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		230	4205	2/11/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	3703	2/6/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	3602	2/5/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	3512	2/4/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	2804	1/28/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	2307	1/23/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	2205	1/22/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	1604	1/16/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	1506	1/15/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	1402	1/14/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	905	1/9/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	805	1/8/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	708	1/7/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	208	1/2/2019	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	35302	12/19/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	35303	12/19/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	35202	12/18/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	35102	12/17/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	34603	12/12/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	34507	12/11/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	34403	12/10/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	33933	12/5/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	33809	12/4/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	33717	12/3/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	33205	11/28/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	33108	11/27/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	33003	11/26/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	32410	11/20/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	32307	11/19/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	31823	11/14/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	31824	11/14/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	31101	11/7/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	31001	11/6/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	30903	11/5/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	29515	10/22/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	29002	10/17/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28910	10/16/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28806	10/15/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28306	10/10/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28204	10/9/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	28102	10/8/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	27604	10/3/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	27506	10/2/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	27414	10/1/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26804	9/25/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26703	9/24/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26223	9/19/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26110	9/18/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	26013	9/17/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	25526	9/12/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	25405	9/11/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	25305	9/10/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	24820	9/5/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	24738	9/4/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	23319	8/21/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	23209	8/20/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	22704	8/15/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	22619	8/14/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	22505	8/13/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	22026	8/8/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	21915	8/7/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	21405	8/2/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	21311	8/1/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	20502	7/24/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	20407	7/23/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19906	7/18/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19805	7/17/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19705	7/16/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		89	86436	7/12/2018	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	86435	7/12/2018	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	77819	7/12/2018	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	77822	7/12/2018	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		230	19202	7/11/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19203	7/11/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	19123	7/10/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	18441	7/3/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	18317	7/2/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	17812	6/27/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	17701	6/26/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	17611	6/25/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		230	17013	6/19/2018	MICRO	MICROBIOLOGICAL	COLI_AP	ABSENCE / PRESENCE	No
Dist		105	29138	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29144	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29135	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		105	29120	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29133	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29128	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29136	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29137	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29134	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29123	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29130	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29116	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29139	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29125	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29122	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29115	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29129	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29132	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29118	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29121	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29142	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29143	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29131	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29140	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29127	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29141	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29117	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29119	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29126	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	29124	9/19/2017	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		89	85651	7/11/2017	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	85653	7/11/2017	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	77022	7/11/2017	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	77020	7/11/2017	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	85204	8/22/2016	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	85203	8/22/2016	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	76357	8/22/2016	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	76356	8/22/2016	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	84316	7/9/2015	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	84314	7/9/2015	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	75140	7/9/2015	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	75141	7/9/2015	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		105	23663	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23655	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23668	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23662	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23670	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23648	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23672	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23671	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23654	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23666	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23673	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23649	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23676	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23656	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23669	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23664	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23665	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23667	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23657	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23674	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23658	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23653	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23652	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23661	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23660	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23645	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23651	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23675	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23647	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23659	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23646	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	23650	9/11/2014	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		89	83258	7/15/2014	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	83257	7/15/2014	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	73786	7/15/2014	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	73787	7/15/2014	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	82319	7/15/2013	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	82318	7/15/2013	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	72638	7/15/2013	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	72637	7/15/2013	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	82306	7/10/2013	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	82305	7/10/2013	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	72613	7/10/2013	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	72606	7/10/2013	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	81392	7/10/2012	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		89	81393	7/10/2012	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	81390	7/10/2012	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	81391	7/10/2012	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	71590	7/10/2012	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	71592	7/10/2012	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	71591	7/10/2012	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	71593	7/10/2012	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		105	19081	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19076	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19070	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19067	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19071	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19069	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19093	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19079	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19087	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19084	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19088	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19090	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19089	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19080	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19085	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19078	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19075	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19066	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19065	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19064	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19074	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19062	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19073	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19077	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19063	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19086	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19072	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19082	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19083	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19091	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19068	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	19092	9/13/2011	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		89	80575	7/13/2011	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	80572	7/13/2011	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	80573	7/13/2011	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	80574	7/13/2011	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	70686	7/13/2011	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	70685	7/13/2011	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	70687	7/13/2011	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	70688	7/13/2011	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	89890	8/18/2010	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	79740	8/18/2010	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	89889	8/17/2010	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	89887	8/17/2010	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	89888	8/17/2010	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	79741	8/17/2010	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	79742	8/17/2010	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	79739	8/17/2010	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		125	44921	7/29/2010	VOC	VOLATILE ORGANIC CONTAMINANTS	VOC1	VOLATILE ORGANIC	No
Dist		105	18125	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18127	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18140	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18139	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18129	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18137	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18134	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18123	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18138	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18142	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18124	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18135	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18131	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18126	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18133	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18130	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18132	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18128	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18136	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	18141	9/17/2008	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		89	85791	8/7/2007	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	85787	8/7/2007	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	85789	8/7/2007	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	85790	8/7/2007	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	75081	8/7/2007	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	75083	8/7/2007	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	75080	8/7/2007	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	75082	8/7/2007	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		89	84752	8/8/2006	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	84750	8/8/2006	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	84749	8/8/2006	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	84751	8/8/2006	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	73559	8/8/2006	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	73561	8/8/2006	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	73556	8/8/2006	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	73557	8/8/2006	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	84146	12/6/2005	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	84149	12/6/2005	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	84147	12/6/2005	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	84148	12/6/2005	DBP	DISINFECTION BY PRODUCTS	HAA5	HALO-ACETIC ACIDS	No
Dist		89	72623	12/6/2005	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	72622	12/6/2005	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	72624	12/6/2005	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		89	72621	12/6/2005	DBP	DISINFECTION BY PRODUCTS	THM	TOTAL TRIHALOMETHANE	No
Dist		105	21749	11/15/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21235	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21222	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21227	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21225	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21228	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21220	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21229	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21223	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21234	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21236	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21218	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21231	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21232	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21226	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21219	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21224	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21233	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21221	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		105	21230	11/9/2005	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83209	5/22/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83217	5/22/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83212	5/22/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83205	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83201	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83211	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83198	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83200	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83216	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83202	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83207	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83199	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83213	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83210	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83203	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83204	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83215	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83206	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83214	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	83208	5/21/2002	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55780	7/28/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55778	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55768	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55770	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55774	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55775	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55761	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55777	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55764	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55762	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55776	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55767	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55763	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55771	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55773	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55765	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55769	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55772	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55779	7/23/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	55766	7/22/1998	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48701	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48706	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48696	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48693	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48692	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48688	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48694	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48704	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

DOH Source No.	Src DOE Id	Lab No.	Sample No.	Sample Collection Date	Analyte Group Code	Analyte Group Name	Test Panel Code	Test Panel Name	Exceed.
Dist		81	48700	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48691	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48698	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48690	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48703	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48699	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48702	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48689	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48705	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48687	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48695	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		81	48697	9/24/1997	IOC	INORGANIC CONTAMINANTS	LCR	LEAD COPPER	No
Dist		**51**	**10632**	**3/23/1988**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
Dist		51	8346	7/29/1985	IOC	INORGANIC CONTAMINANTS	ICHEM	PRE II/V INORGANIC ANALYSIS	No
Dist		**51**	**6021**	**9/28/1982**	**IOC**	**INORGANIC CONTAMINANTS**	**ICHEM**	**PRE II/V INORGANIC ANALYSIS**	**Yes**
Dist		101	275	1/7/1981	RAD	RADIONUCLIDES	RAD	RADIONUCLIDES	No

*Sample data summary extracted from WSDOH Sentry Internet. Individual results can be viewed at: https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx.
Bold emphasis of exceedances added for clarity.

30.
DEPARTMENT OF HEALTH SANITARY SURVEY

HLA
Engineering and Land Surveying, Inc.

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
EASTERN DRINKING WATER REGIONAL OPERATIONS
16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830
TDD Relay 1-800-833-6388

September 21, 2016

Daniel "Ty" Jones, Foreman
City of Selah
220 South Rushmore Road
Selah, Washington 98942

RE: City of Selah Water System; PWS ID # 77400 6; Yakima County
Group A-Community –Routine Sanitary Survey

Dear Mr. Jones:

I would like to thank you for your time and help with the Department of Health (DOH) Routine Sanitary Survey on August 19, 2016. I documented our discussion and observations in the enclosed report, which includes photographs.

Significant Deficiencies
We inspected the sources; S05 (wellfield with S01 and S02), S03, S04, S06, and S07; the booster stations, and the base of the reservoirs, for the city. During the survey, we did observe several Significant Deficiencies that I noted on Page 1 of the enclosed report. They are listed on the report so the system will have a record and rationale for what and why these were considered Significant Deficiencies. Thank you for submitting the photographs showing how these deficiencies were corrected.

Please note, we did not climb up on top of the reservoirs to inspect whether any potential entry points for contaminants, birds, and so on, existed on the hatch, vents, and roof.

We must receive documentation that you inspected and corrected any observed Significant Deficiencies within **45 days** of the date of this letter. Your response must reach our office no later than **November 9, 2016**. Attach or enclose your photographs in an email or letter. Let us know if any additional time is necessary to correct any observed deficiencies. Emails can sent to ero.sanitarysurveys@doh.wa.gov, or our address located above in our letterhead for standard mail. Please adequately label the photographs provided.

1. Reservoirs– Inspect roofs, the vent and the hatch; including the framed section, underside, gasket, hinges, and locking mechanism. The enclosed report has the checklist to complete for your reference. Focus on the questions with a yellow highlighted Unk, on pages 11, 12, and 13 in the report.

We logged the completion date and deficiency into our survey database. Our office will take enforcement action, if we do not receive a response by the deadline listed above.

Survey Fee

Our office schedules a water system's survey once every five years. DOH established a fee to help recover the costs of the survey, authorized by WAC 246-290-990. We contact each system before their next survey, and include a fee schedule to help prepare and calculate for the cost of the survey. We have enclosed an itemized bill for **$714.00**.

Discussion Items

I enclosed information on the topics listed below, which identify some changes since the last survey. These are a few of the topics we had discussed.

A. **Revised Total Coliform Rule (RTCR)**. General information on the rule and change in the requirements for Routine Coliform Sampling.

   * Review the enclosed information packet on the RTCR. Note the new requirements for Level 1 and 2 Assessments, as well as, Repeat and Follow-up sampling requirements.

B. **Groundwater Rule (GWR)**. General information on the rule and additional requirements triggered when a coliform sample tests positive for coliform.

   * DOH will use the raw water source samples to evaluate whether additional samples or a more robust source treatment is necessary.

C. **Lead and copper monitoring**. General information on the changes and the forms required to be submitted to our office. Changes to the public notification requirement for your sample sites selected, included:

   * Requirement to notify these residents about lead and copper sample results and general information / language about the contaminants.

   * Certification form to report / document the public notice provided to residents.

D. **Water Use Efficiency**. General information on the rule and the forms required to be submitted to our office.

Do not hesitate to call me at (509) 329-2120 if you require additional information or assistance, with the survey or the enclosed information.

Sincerely,

Andres R. Cervantes, PE
Regional Engineer
Environmental Health Programs, Office of Drinking Water

Enclosures

cc: Yakima County Health Department
ERO Sanitary Survey Program Manager

31.
COMPUTER PRINTOUT OF HYDRAULIC ANALYSIS RESULTS

HLA
Engineering and Land Surveying, Inc.

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
129	J-1	1,205.0	Zone-1	7.70	1,303.7	42.7
130	J-2	1,190.0	Zone-1	5.50	1,303.7	49.2
131	J-3	1,167.0	Zone-1	17.60	1,303.8	59.2
132	J-4	1,200.0	Zone-1	9.90	1,303.7	44.9
443	J-5	1,120.0	Zone-1	0.00	1,307.0	80.9
133	J-6	1,165.0	Zone-1	5.50	1,303.8	60.0
134	J-7	1,150.0	Zone-1	9.90	1,303.8	66.5
135	J-8	1,200.0	Zone-1	7.70	1,303.8	44.9
136	J-9	1,200.0	Zone-1	6.60	1,303.8	44.9
137	J-10	1,140.0	Zone-1	18.70	1,303.8	70.9
138	J-11	1,185.0	Zone-1	13.20	1,303.7	51.4
140	J-12	1,130.0	Zone-1	7.70	1,303.8	75.2
139	J-13	1,163.0	Zone-1	0.00	1,303.7	60.9
141	J-14	1,118.0	Zone-1	2.20	1,303.8	80.4
142	J-15	1,120.0	Zone-1	6.60	1,303.8	79.5
444	J-16	1,126.0	Zone-1	-350.00	1,307.3	78.5
143	J-17	1,112.0	Zone-1	14.00	1,303.9	83.0
144	J-18	1,097.0	Zone-1	0.00	1,303.9	89.5
145	J-19	1,088.0	Zone-1	0.00	1,303.9	93.4
146	J-20	1,084.0	Zone-1	93.10	1,303.6	95.0
1179	J-21	1,280.0	Zone-2C	6.60	1,394.1	49.4
148	J-22	1,095.0	Zone-1	31.20	1,303.9	90.4
149	J-23	1,097.0	Zone-1	4.20	1,303.9	89.5
1181	J-24	1,300.0	Zone-2C	0.00	1,394.1	40.7
1183	J-25	1,318.0	Zone-2C	7.70	1,394.1	32.9
151	J-26	1,115.0	Zone-1	11.80	1,304.0	81.8
152	J-27	1,112.0	Zone-1	25.30	1,304.0	83.1
153	J-28	1,112.0	Zone-1	17.30	1,303.9	83.0
154	J-29	1,100.0	Zone-1	6.70	1,304.0	88.3
155	J-30	1,098.0	Zone-1	0.00	1,303.9	89.1
156	J-31	1,120.0	Zone-1	5.20	1,304.5	79.8
157	J-32	1,120.0	Zone-1	16.50	1,304.5	79.8
1185	J-33	1,345.0	Zone-3A	14.30	1,491.8	63.5
158	J-34	1,115.0	Zone-1	25.80	1,304.5	82.0
159	J-35	1,102.0	Zone-1	48.90	1,304.2	87.5
160	J-36	1,097.0	Zone-1	7.80	1,304.2	89.6
161	J-37	1,098.0	Zone-1	7.50	1,304.1	89.2
162	J-38	1,120.0	Zone-1	40.80	1,304.5	79.8
163	J-39	1,108.0	Zone-1	7.40	1,304.4	85.0
164	J-40	1,105.0	Zone-1	27.50	1,304.3	86.2
165	J-41	1,104.0	Zone-1	5.20	1,304.3	86.6
166	J-42	1,102.0	Zone-1	10.90	1,304.3	87.5
167	J-43	1,098.0	Zone-1	8.40	1,304.2	89.2
169	J-45	1,280.0	Zone-Off	0.00	1,304.6	10.7
170	J-46	1,125.0	Zone-1	0.00	1,304.6	77.7
171	J-47	1,122.0	Zone-1	16.50	1,305.5	79.4
172	J-48	1,115.0	Zone-1	23.50	1,304.5	82.0
173	J-49	1,104.0	Zone-1	9.70	1,304.3	86.7

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1263	J-50	1,103.0	Zone-1	0.00	1,304.3	87.1
176	J-52	1,104.0	Zone-1	0.00	1,304.3	86.7
177	J-53	1,100.0	Zone-1	0.00	1,304.2	88.4
178	J-54	1,096.0	Zone-1	5.60	1,304.2	90.1
179	J-55	1,096.0	Zone-1	5.60	1,304.2	90.1
180	J-56	1,095.0	Zone-1	0.00	1,304.2	90.5
181	J-57	1,096.0	Zone-1	0.00	1,304.2	90.1
182	J-58	1,097.0	Zone-1	9.82	1,304.2	89.7
183	J-59	1,098.0	Zone-1	9.82	1,304.2	89.2
184	J-60	1,096.0	Zone-1	49.10	1,304.2	90.1
185	J-61	1,097.0	Zone-1	0.00	1,304.2	89.7
186	J-62	1,096.0	Zone-1	49.10	1,304.2	90.1
187	J-63	1,104.0	Zone-1	0.00	1,304.3	86.7
188	J-64	1,105.0	Zone-1	5.60	1,304.3	86.2
189	J-65	1,105.0	Zone-1	4.20	1,304.3	86.2
190	J-66	1,102.0	Zone-1	11.80	1,304.2	87.5
191	J-67	1,105.0	Zone-1	9.70	1,304.3	86.2
192	J-68	1,110.0	Zone-1	13.60	1,304.3	84.1
193	J-69	1,110.0	Zone-1	23.00	1,304.3	84.1
194	J-70	1,110.0	Zone-1	7.80	1,304.3	84.1
195	J-71	1,099.0	Zone-1	49.10	1,304.3	88.8
196	J-72	1,099.0	Zone-1	0.00	1,304.3	88.8
197	J-73	1,098.0	Zone-1	49.10	1,304.2	89.2
198	J-74	1,123.0	Zone-1	90.60	1,305.9	79.1
199	J-75	1,124.0	Zone-1	0.00	1,306.0	78.7
200	J-76	1,125.0	Zone-1	0.00	1,307.0	78.7
201	J-77	1,138.0	Zone-1	0.00	1,304.8	72.2
202	J-78	1,145.0	Zone-1	7.70	1,303.6	68.6
203	J-79	1,126.0	Zone-1	11.00	1,304.3	77.1
204	J-80	1,130.0	Zone-1	4.90	1,303.5	75.1
205	J-81	1,118.0	Zone-1	14.30	1,304.3	80.6
206	J-82	1,116.0	Zone-1	8.00	1,304.4	81.5
207	J-83	1,112.0	Zone-1	0.00	1,304.3	83.2
208	J-84	1,115.0	Zone-1	20.60	1,304.3	81.9
209	J-85	1,122.0	Zone-1	0.00	1,304.3	78.9
210	J-86	1,120.0	Zone-1	8.40	1,304.3	79.7
211	J-87	1,118.0	Zone-1	53.20	1,304.4	80.6
212	J-88	1,115.0	Zone-1	6.40	1,304.4	82.0
1188	J-89	1,335.0	Zone-3A	0.00	1,491.8	67.8
214	J-90	1,102.0	Zone-1	1.40	1,304.3	87.5
215	J-91	1,108.0	Zone-1	9.80	1,304.9	85.2
216	J-92	1,102.0	Zone-1	0.00	1,306.1	88.3
218	J-94	1,112.0	Zone-1	20.50	1,304.4	83.2
219	J-95	1,102.0	Zone-1	87.85	1,304.3	87.5
220	J-96	1,100.0	Zone-1	24.55	1,304.3	88.4
221	J-97	1,100.0	Zone-1	24.55	1,304.2	88.4
222	J-98	1,200.0	Zone-1	8.80	1,302.9	44.5
223	J-99	1,190.0	Zone-1	9.90	1,302.7	48.8

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
224	J-100	1,180.0	Zone-1	11.00	1,302.6	53.0
225	J-101	1,160.0	Zone-1	20.80	1,302.7	61.8
226	J-102	1,175.0	Zone-1	11.00	1,302.7	55.3
227	J-103	1,210.0	Zone-2C	6.60	1,394.1	79.6
228	J-104	1,178.0	Zone-1	16.50	1,302.5	53.9
229	J-105	1,178.0	Zone-1	7.70	1,302.5	53.9
230	J-106	1,155.0	Zone-1	7.70	1,302.8	64.0
231	J-107	1,200.0	Zone-1	22.00	1,302.4	44.3
232	J-108	1,200.0	Zone-1	18.70	1,302.4	44.3
233	J-109	1,172.0	Zone-1	6.60	1,302.5	56.4
234	J-110	1,198.0	Zone-1	14.30	1,302.4	45.2
235	J-111	1,175.0	Zone-1	18.70	1,302.4	55.1
236	J-112	1,175.0	Zone-1	14.30	1,302.4	55.1
237	J-113	1,170.0	Zone-1	25.30	1,302.5	57.3
238	J-114	1,188.0	Zone-1	12.10	1,302.8	49.7
239	J-115	1,165.0	Zone-1	0.00	1,302.8	59.6
240	J-116	1,140.0	Zone-1	13.20	1,303.2	70.6
241	J-117	1,150.0	Zone-1	9.90	1,303.1	66.2
242	J-118	1,138.0	Zone-1	44.30	1,303.3	71.5
243	J-119	1,138.0	Zone-1	9.10	1,303.8	71.7
244	J-120	1,123.0	Zone-1	11.10	1,304.4	78.5
245	J-121	1,116.0	Zone-1	0.00	1,304.4	81.5
246	J-122	1,112.0	Zone-1	24.60	1,304.4	83.2
247	J-123	1,125.0	Zone-1	23.70	1,304.5	77.6
248	J-124	1,108.0	Zone-1	11.30	1,304.5	85.0
249	J-125	1,108.0	Zone-1	9.90	1,304.6	85.1
250	J-126	1,104.0	Zone-1	0.00	1,304.7	86.8
251	J-127	1,102.0	Zone-1	147.30	1,304.7	87.7
252	J-128	1,100.0	Zone-1	0.00	1,304.5	88.5
253	J-129	1,100.0	Zone-1	245.50	1,304.3	88.4
254	J-130	1,100.0	Zone-1	98.20	1,304.3	88.4
255	J-131	1,102.0	Zone-1	0.00	1,304.3	87.5
256	J-132	1,150.0	Zone-1	11.00	1,303.1	66.2
257	J-133	1,200.0	Zone-2B	13.20	1,403.3	88.0
259	J-135	1,125.0	Zone-1	28.60	1,304.5	77.7
260	J-136	1,120.0	Zone-1	0.00	1,304.6	79.9
261	J-137	1,125.0	Zone-1	9.10	1,304.5	77.7
262	J-138	1,112.0	Zone-1	15.40	1,305.3	83.6
258	J-139	1,140.0	Zone-1	12.10	1,303.7	70.8
263	J-140	1,107.0	Zone-1	10.50	1,305.6	85.9
264	J-141	1,107.0	Zone-1	7.70	1,305.3	85.8
1192	J-142	1,107.0	Zone-1	3.30	1,304.4	85.4
265	J-143	1,104.0	Zone-1	0.00	1,305.3	87.1
266	J-144	1,103.0	Zone-1	49.10	1,305.3	87.5
267	J-145	1,102.0	Zone-1	0.00	1,305.3	88.0
268	J-146	1,105.0	Zone-1	49.10	1,306.5	87.2
269	J-147	1,112.0	Zone-1	49.10	1,307.8	84.7
270	J-148	1,120.0	Zone-1	0.00	1,309.3	81.9

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
271	J-149	1,119.0	Zone-1	0.00	1,309.3	82.3
272	J-150	1,118.0	Zone-1	15.40	1,309.3	82.7
273	J-151	1,121.0	Zone-1	4.20	1,309.6	81.6
274	J-152	1,122.0	Zone-1	2.80	1,309.8	81.3
275	J-153	1,125.0	Zone-1	9.90	1,309.8	80.0
276	J-154	1,128.0	Zone-1	17.60	1,309.8	78.6
277	J-155	1,130.0	Zone-1	15.40	1,309.8	77.8
278	J-156	1,130.0	Zone-1	9.90	1,309.8	77.8
279	J-157	1,130.0	Zone-1	18.50	1,309.8	77.8
280	J-158	1,120.0	Zone-1	2.80	1,310.7	82.5
281	J-159	1,120.0	Zone-1	0.00	1,311.1	82.7
282	J-160	1,118.0	Zone-1	1.40	1,312.8	84.3
283	J-161	1,112.0	Zone-1	0.00	1,308.0	84.8
284	J-162	1,120.0	Zone-1	-2,000.00	1,313.8	83.8
285	J-163	1,121.0	Zone-1	1.40	1,313.6	83.3
286	J-164	1,124.0	Zone-1	17.70	1,312.4	81.5
287	J-165	1,178.0	Zone-1	0.00	1,311.3	57.7
288	J-166	1,170.0	Zone-1	0.00	1,310.8	60.9
289	J-167	1,170.0	Zone-1	1.10	1,310.5	60.8
290	J-168	1,178.0	Zone-1	5.50	1,310.1	57.1
291	J-169	1,185.0	Zone-1	6.60	1,310.4	54.3
292	J-170	1,188.0	Zone-1	15.40	1,311.2	53.3
293	J-171	1,190.0	Zone-1	7.70	1,310.4	52.1
294	J-172	1,195.0	Zone-2A	9.90	1,420.0	97.4
295	J-173	1,125.0	Zone-1	12.00	1,304.6	77.7
296	J-174	1,122.0	Zone-1	4.40	1,304.6	79.0
298	J-176	1,122.0	Zone-1	0.00	1,304.6	79.0
299	J-177	1,125.0	Zone-1	0.00	1,304.6	77.7
1194	J-179	1,298.0	Zone-3A	13.20	1,491.3	83.6
302	J-180	1,115.0	Zone-1	14.70	1,312.0	85.2
303	J-181	1,150.0	Zone-1	5.50	1,305.2	67.2
304	J-182	1,140.0	Zone-1	40.80	1,305.2	71.5
305	J-183	1,155.0	Zone-1	7.70	1,306.4	65.5
306	J-184	1,150.0	Zone-1	4.40	1,304.5	66.9
307	J-185	1,165.0	Zone-1	6.60	1,304.5	60.4
308	J-186	1,170.0	Zone-1	2.20	1,306.0	58.9
309	J-187	1,200.0	Zone-1	21.90	1,305.6	45.7
310	J-188	1,195.0	Zone-1	7.70	1,305.0	47.6
311	J-189	1,188.0	Zone-1	6.60	1,304.8	50.5
312	J-190	1,180.0	Zone-1	5.50	1,304.4	53.8
313	J-191	1,215.0	Zone-2B	5.50	1,403.3	81.5
314	J-192	1,100.0	Zone-1	24.55	1,304.2	88.4
315	J-193	1,098.0	Zone-1	0.00	1,304.2	89.2
316	J-194	1,096.0	Zone-1	3.30	1,304.2	90.1
317	J-195	1,100.0	Zone-1	24.55	1,304.1	88.3
442	J-196	1,160.0	Zone-1	-1,650.00	1,303.0	61.9
445	J-197	1,110.0	Zone-1	-700.00	1,306.7	85.1
449	J-198	1,165.0	Zone-1	1.40	1,308.8	62.2

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1015	J-199	1,118.0	Zone-1	7.70	1,303.8	80.4
1021	J-201	1,130.0	Zone-1	40.70	1,303.8	75.2
1031	J-202	1,130.0	Zone-1	0.00	1,303.8	75.2
1025	J-203	1,130.0	Zone-1	0.00	1,303.8	75.2
1037	J-205	1,118.0	Zone-1	0.00	1,303.8	80.4
1039	J-206	1,112.0	Zone-1	0.00	1,303.9	83.0
1043	J-207	1,098.0	Zone-1	6.50	1,303.9	89.1
1047	J-208	1,470.0	Zone-4B	3.30	1,563.4	40.4
1051	J-209	1,436.0	Zone-6A	0.00	1,750.9	136.3
1053	J-210	1,490.0	Zone-6A	0.00	1,749.7	112.4
1055	J-211	1,640.0	Zone-6B	0.00	1,748.5	46.9
1057	J-212	1,622.0	Zone-6B	0.00	1,747.7	54.4
1059	J-213	1,680.0	Zone-6B	0.00	1,747.5	29.2
1061	J-214	1,472.0	Zone-4B	4.40	1,563.4	39.6
1066	J-215	1,470.0	Zone-4B	7.70	1,563.4	40.4
1069	J-216	1,440.0	Zone-4B	7.70	1,563.3	53.4
1071	J-217	1,410.0	Zone-4B	4.40	1,563.3	66.3
1073	J-218	1,340.0	Zone-4B	8.80	1,563.3	96.6
1075	J-219	1,300.0	Zone-3B	14.30	1,488.2	81.4
1077	J-220	1,430.0	Zone-4B	11.00	1,563.4	57.7
1083	J-221	1,290.0	Zone-2C	0.00	1,394.1	45.0
1196	J-222	1,302.0	Zone-3A	2.40	1,491.3	81.9
1093	J-223	1,393.0	Zone-4B	20.90	1,562.8	73.5
1095	J-224	1,450.0	Zone-4B	15.40	1,562.8	48.8
1097	J-225	1,475.0	Zone-4B	6.60	1,562.8	38.0
1099	J-226	1,472.0	Zone-4B	5.50	1,562.8	39.3
1101	J-227	1,472.0	Zone-4B	0.00	1,562.8	39.3
1103	J-228	1,448.0	Zone-4B	5.50	1,562.8	49.7
1106	J-229	1,460.0	Zone-4B	5.50	1,562.8	44.5
1108	J-230	1,412.0	Zone-4B	8.80	1,562.8	65.2
1111	J-231	1,425.0	Zone-4B	5.50	1,562.8	59.6
1116	J-232	1,402.0	Zone-4B	24.20	1,562.8	69.6
1122	J-233	1,140.0	Zone-1	8.50	1,303.2	70.6
1125	J-234	1,155.0	Zone-1	25.20	1,302.8	64.0
1131	J-235	1,100.0	Zone-1	0.00	1,304.2	88.4
1133	J-236	1,100.0	Zone-1	0.00	1,304.2	88.4
1137	J-237	1,100.0	Zone-1	49.10	1,304.2	88.4
1139	J-238	1,094.0	Zone-1	0.00	1,304.2	90.9
1198	J-239	1,290.0	Zone-3A	0.00	1,491.3	87.1
1176	J-240	1,308.0	Zone-3A	0.00	1,490.9	79.2
1149	J-241	1,100.0	Zone-1	24.55	1,304.3	88.4
1152	J-242	1,100.0	Zone-1	24.55	1,304.2	88.3
1156	J-243	1,104.0	Zone-1	26.00	1,305.3	87.1
1159	J-244	1,125.0	Zone-1	11.60	1,309.8	79.9
1162	J-245	1,171.0	Zone-1	0.00	1,311.3	60.7
1165	J-246	1,153.0	Zone-1	4.40	1,311.3	68.5
1167	J-247	1,208.0	Zone-2C	16.50	1,394.0	80.5
1170	J-248	1,224.0	Zone-2C	11.00	1,394.0	73.5

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1172	J-249	1,224.0	Zone-2C	14.30	1,394.0	73.6
451	J-250	1,095.0	Zone-1	0.00	1,304.2	90.5
452	J-251	1,095.0	Zone-1	49.10	1,304.2	90.5
453	J-252	1,094.0	Zone-1	0.00	1,304.2	90.9
454	J-253	1,093.0	Zone-1	0.00	1,304.2	91.4
455	J-254	1,094.0	Zone-1	0.00	1,304.2	90.9
1200	J-255	1,293.0	Zone-3A	28.90	1,491.3	85.8
1202	J-256	1,308.0	Zone-3A	7.20	1,491.3	79.3
1204	J-257	1,290.0	Zone-3A	0.00	1,491.3	87.1
1211	J-258	1,272.0	Zone-3A	0.00	1,496.9	97.3
1212	J-259	1,273.0	Zone-3A	0.00	1,496.9	96.9
1213	J-260	1,275.0	Zone-3A	0.00	1,497.0	96.0
471	J-261	1,096.0	Zone-1	9.82	1,304.2	90.1
472	J-262	1,096.0	Zone-1	9.82	1,304.2	90.1
473	J-263	1,080.0	Zone-1	0.00	1,303.6	96.7
474	J-264	1,080.0	Zone-1	50.40	1,303.5	96.7
1214	J-265	1,240.0	Zone-3A	0.00	1,497.0	111.2
1215	J-266	1,280.0	Zone-3A	0.00	1,497.0	93.9
1216	J-267	1,230.0	Zone-3A	0.00	1,497.3	115.7
1217	J-268	1,210.0	Zone-3A	0.00	1,497.4	124.3
1218	J-269	1,210.0	Zone-3A	0.00	1,497.4	124.3
1219	J-270	1,245.0	Zone-3A	0.00	1,497.8	109.4
1220	J-271	1,245.0	Zone-3A	0.00	1,497.8	109.4
1222	J-272	1,262.0	Zone-3A	0.00	1,497.8	102.0
1236	J-273	1,248.0	Zone-3A	0.00	1,497.8	108.1
1238	J-274	1,308.0	Zone-3A	4.40	1,492.2	79.7
1240	J-275	1,320.0	Zone-3A	5.50	1,492.2	74.5
1242	J-276	1,360.0	Zone-3A	0.00	1,492.2	57.2
1247	J-277	1,300.0	Zone-6A	0.00	1,759.7	198.9
1250	J-278	1,471.0	Zone-6A	0.00	1,763.1	126.4
1190	J-279	1,318.0	Zone-3A	15.40	1,491.4	75.0
1275	J-280	1,500.0	Zone-5A	12.10	1,662.2	70.2
1277	J-281	1,500.0	Zone-5A	8.80	1,662.2	70.2
1279	J-282	1,580.0	Zone-6A	2.20	1,863.8	122.8
1282	J-283	1,450.0	Zone-4A	3.30	1,662.6	92.0
1285	J-284	1,410.0	Zone-4A	11.00	1,563.3	66.3
1287	J-285	1,450.0	Zone-4B	2.20	1,563.3	49.0
1310	J-290	1,635.0	Zone-Off	0.00	1,660.0	10.8
1319	J-291	1,250.0	Zone-2A	(N/A)	(N/A)	(N/A)
1321	J-292	1,270.0	Zone-2A	(N/A)	(N/A)	(N/A)
1323	J-293	1,285.0	Zone-2A	(N/A)	(N/A)	(N/A)
1325	J-294	1,320.0	Zone-3A	(N/A)	(N/A)	(N/A)
1327	J-295	1,370.0	Zone-3A	(N/A)	(N/A)	(N/A)
217	J-296	1,102.0	Zone-1	24.55	1,305.7	88.1
1351	J-301	1,231.0	Zone-2C	4.40	1,394.0	70.5
1353	J-302	1,232.0	Zone-2C	9.90	1,394.0	70.1
1355	J-303	1,212.0	Zone-1	(N/A)	(N/A)	(N/A)
1367	J-308	1,248.0	Zone-2C	5.20	1,394.0	63.1

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1383	J-310	1,165.0	Zone-3A	0.00	1,524.2	155.4
1395	J-312	1,210.0	Zone-1	8.80	1,303.7	40.6
1398	J-313	1,093.0	Zone-1	28.40	1,304.2	91.4
1400	J-314	1,093.0	Zone-1	(N/A)	(N/A)	(N/A)
1410	J-315	1,122.0	Zone-1	0.00	1,304.6	79.0
1412	J-316	1,122.0	Zone-1	4.40	1,304.6	79.0
1425	J-319	1,104.5	Zone-1	0.00	1,306.0	87.2
1428	J-320	1,106.0	Zone-1	21.00	1,306.0	86.5
1430	J-321	1,112.0	Zone-1	5.60	1,307.5	84.6
1432	J-322	1,113.0	Zone-1	143.00	1,311.6	85.9
1435	J-323	1,097.0	Zone-1	0.00	1,304.2	89.7
1441	J-325	1,099.3	Zone-1	1.40	1,304.2	88.7
1445	J-326	1,157.9	Zone-1	5.50	1,304.5	63.4
1462	J-327	1,120.0	Zone-1	-800.00	1,308.4	81.5
1486	J-329	1,080.0	Zone-1	19.10	1,303.5	96.7
1497	J-330	1,114.9	Zone-1	0.00	1,310.4	84.6
434	J-332	1,097.0	Zone-1	9.82	1,304.2	89.7
1504	J-332	1,093.3	Zone-1	0.00	1,304.1	91.2
1511	J-333	1,196.0	Zone-1	7.70	1,311.5	50.0
1512	J-334	1,165.1	Zone-1	2.20	1,311.6	63.4
1516	J-335	1,181.0	Zone-1	5.50	1,311.5	56.5
1517	J-336	1,174.9	Zone-1	8.80	1,311.5	59.1
1521	J-337	1,186.0	Zone-1	7.70	1,311.5	54.3
1522	J-338	1,183.5	Zone-1	5.50	1,311.5	55.4
1526	J-339	1,189.0	Zone-1	8.80	1,311.5	53.0
1531	J-340	1,400.0	Zone-3A	16.50	1,492.2	39.9
1534	J-342	1,410.0	Zone-4A	25.30	1,563.3	66.3
1537	J-343	1,410.0	Zone-4A	4.40	1,563.3	66.3
1539	J-344	1,400.0	Zone-4A	23.10	1,563.3	70.6
1544	J-345	1,220.0	Zone-1	0.00	1,303.7	36.2
1560	J-349	1,596.2	Zone-6A	0.00	1,863.8	115.8
1561	J-350	1,597.0	Zone-5A	0.00	1,660.8	27.6
1566	J-351	1,600.0	Zone-6A	0.00	1,863.8	114.1
1569	J-352	1,629.0	Zone-6A	8.80	1,863.8	101.6
1571	J-353	1,618.0	Zone-6A	7.70	1,863.8	106.3
1574	J-354	1,635.0	Zone-6A	14.30	1,863.8	99.0
1593	J-355	1,282.5	Zone-3A	0.00	1,489.4	89.5
1596	J-356	1,300.0	Zone-3B	0.00	1,489.4	82.0
1603	J-360	1,340.0	Zone-3A	0.00	1,489.4	64.6
1605	J-361	1,320.0	Zone-3A	0.00	1,489.4	73.3
1609	J-362	1,610.0	Zone-6A	8.80	1,863.8	109.8
1616	J-366	1,610.0	Zone-6A	0.00	1,863.8	109.8
1622	J-369	1,600.0	Zone-6A	15.40	1,863.8	114.1
1638	J-375	1,589.8	Zone-6A	5.50	1,863.8	118.5
1641	J-376	1,514.0	Zone-5A	6.60	1,662.0	64.0
1654	J-377	1,140.0	Zone-1	0.00	1,305.2	71.5
1659	J-379	1,250.0	Zone-2A	0.00	1,420.0	73.6
1661	J-380	1,250.0	Zone-2A	0.00	1,420.0	73.6

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1664	J-381	1,424.0	Zone-4B	0.00	1,562.8	60.0
1667	J-382	1,440.0	Zone-4B	0.00	1,562.8	53.1
1669	J-383	1,630.9	Zone-6A	5.50	1,863.8	100.8
1672	J-384	1,630.0	Zone-6A	0.00	1,863.8	101.1
1674	J-385	1,432.4	Zone-4B	0.00	1,563.3	56.6
1677	J-386	1,401.5	Zone-4B	0.00	1,563.3	70.0
1680	J-387	1,372.0	Zone-4B	0.00	1,563.3	82.8
1683	J-388	1,703.9	<None>	0.00	1,747.3	18.7
1688	J-389	1,370.0	Zone-3A	(N/A)	(N/A)	(N/A)
1690	J-390	1,380.0	Zone-3A	(N/A)	(N/A)	(N/A)
1692	J-391	1,360.0	Zone-3A	(N/A)	(N/A)	(N/A)
1694	J-392	1,360.0	Zone-3A	(N/A)	(N/A)	(N/A)
1696	J-393	1,313.0	Zone-3A	(N/A)	(N/A)	(N/A)
1698	J-394	1,325.0	Zone-3A	(N/A)	(N/A)	(N/A)
1702	J-396	0.0	Zone-2A	(N/A)	(N/A)	(N/A)
1704	J-397	1,290.0	Zone-2A	(N/A)	(N/A)	(N/A)
1706	J-398	1,264.6	Zone-2A	(N/A)	(N/A)	(N/A)
1713	J-399	1,310.0	Zone-3A	(N/A)	(N/A)	(N/A)
1719	J-400	1,440.0	Zone-4A	(N/A)	(N/A)	(N/A)
318	J-401	1,275.0	Zone-2D	13.20	1,413.9	60.1
319	J-402	1,265.0	Zone-2D	6.60	1,413.9	64.4
320	J-403	1,245.0	Zone-2D	8.80	1,413.9	73.1
321	J-404	1,230.0	Zone-2D	7.70	1,413.9	79.5
322	J-405	1,200.0	Zone-2D	6.60	1,413.9	92.5
323	J-406	1,238.0	Zone-2D	6.60	1,414.0	76.1
324	J-407	1,255.0	Zone-2D	6.60	1,414.0	68.8
325	J-408	1,225.0	Zone-2D	13.20	1,413.9	81.7
326	J-409	1,210.0	Zone-1	8.80	1,302.9	40.2
327	J-410	1,220.0	Zone-2C	0.00	1,394.0	75.3
328	J-411	1,210.0	Zone-2C	11.00	1,394.0	79.6
329	J-412	1,230.0	Zone-2C	0.00	1,394.0	70.9
330	J-413	1,262.0	Zone-2C	5.50	1,394.0	57.1
331	J-414	1,245.0	Zone-2C	17.60	1,394.0	64.5
332	J-415	1,226.0	Zone-2C	20.60	1,394.1	72.7
333	J-416	1,210.0	Zone-2C	16.50	1,394.1	79.6
334	J-417	1,215.0	Zone-2C	11.00	1,394.1	77.5
335	J-418	1,262.0	Zone-2C	3.30	1,394.0	57.1
336	J-419	1,300.0	Zone-3B	12.10	1,489.4	81.9
337	J-420	1,240.0	Zone-2C	18.70	1,394.1	66.7
338	J-421	1,278.0	Zone-3B	14.30	1,489.4	91.5
339	J-422	1,275.0	Zone-2C	9.90	1,394.0	51.5
340	J-423	1,275.0	Zone-2C	14.30	1,394.0	51.5
341	J-424	1,230.0	Zone-2C	14.30	1,394.3	71.1
342	J-425	1,222.0	Zone-2C	14.00	1,394.3	74.5
343	J-427	1,230.0	Zone-2C	0.00	1,394.4	71.1
344	J-428	1,238.0	Zone-2C	9.90	1,394.4	67.7
345	J-429	1,250.0	Zone-2C	0.00	1,394.7	62.6
346	J-430	1,252.0	Zone-2C	19.80	1,394.9	61.8

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
347	J-431	1,228.0	Zone-2C	6.60	1,394.2	71.9
348	J-432	1,222.0	Zone-2C	19.80	1,394.2	74.5
349	J-433	1,212.0	Zone-2C	24.20	1,394.2	78.8
350	J-434	1,212.0	Zone-2C	16.50	1,394.0	78.7
351	J-435	1,200.0	Zone-2C	7.70	1,394.0	83.9
352	J-436	1,195.0	Zone-2C	8.80	1,394.0	86.1
353	J-437	1,190.0	Zone-2C	0.00	1,394.0	88.3
354	J-438	1,188.0	Zone-2C	2.20	1,394.0	89.1
355	J-439	1,185.0	Zone-2C	0.00	1,394.0	90.4
356	J-440	1,188.0	Zone-2C	4.40	1,394.0	89.1
357	J-441	1,200.0	Zone-2C	4.40	1,394.0	83.9
358	J-442	1,245.0	Zone-2C	20.90	1,394.2	64.5
359	J-443	1,250.0	Zone-2C	8.80	1,394.1	62.4
360	J-444	1,275.0	Zone-2C	12.10	1,394.1	51.5
361	J-445	1,245.0	Zone-2C	50.40	1,394.0	64.5
362	J-446	1,265.0	Zone-2C	0.00	1,395.1	56.3
363	J-447	1,270.0	Zone-2C	19.10	1,395.5	54.3
364	J-448	1,295.0	Zone-2C	0.00	1,395.8	43.6
365	J-449	1,290.0	Zone-2C	0.00	1,396.2	46.0
366	J-450	1,215.0	Zone-2A	6.60	1,420.0	88.7
367	J-451	1,230.0	Zone-2A	10.40	1,420.0	82.2
368	J-452	1,240.0	Zone-2A	41.90	1,420.0	77.9
369	J-453	1,248.0	Zone-2A	4.40	1,420.0	74.4
370	J-454	1,265.0	Zone-2A	5.50	1,420.0	67.1
371	J-455	1,275.0	Zone-2A	4.40	1,420.1	62.8
372	J-456	1,230.0	Zone-2A	13.80	1,420.1	82.2
373	J-457	1,218.0	Zone-2A	5.50	1,420.1	87.4
374	J-458	1,240.0	Zone-2A	12.10	1,420.0	77.9
375	J-459	1,220.0	Zone-2A	18.70	1,420.0	86.5
376	J-460	1,252.0	Zone-2A	5.50	1,420.0	72.7
377	J-461	1,288.0	Zone-3A	13.20	1,492.2	88.3
446	J-485	1,225.0	Zone-2B	5.50	1,403.3	77.2
435	J-486	1,225.0	Zone-2B	0.00	1,403.4	77.2
436	J-487	1,250.0	Zone-2B	6.60	1,403.3	66.3
437	J-488	1,220.0	Zone-2B	5.50	1,403.3	79.3
438	J-489	1,220.0	Zone-2B	9.90	1,403.3	79.3
439	J-490	1,275.0	Zone-2D	7.70	1,413.9	60.1
467	J-491	1,200.0	Zone-2C	6.60	1,394.0	83.9
448	J-506	1,216.0	Zone-2D	0.00	1,413.9	85.6
450	J-515	1,240.0	Zone-2C	4.40	1,394.0	66.6
456	J-521	1,250.0	Zone-2A	11.00	1,420.0	73.6
457	J-522	1,280.0	Zone-2A	24.20	1,420.0	60.6
458	J-523	1,375.0	Zone-3A	4.90	1,491.4	50.4
459	J-524	1,325.0	Zone-3A	14.80	1,491.4	72.0
460	J-525	1,305.0	Zone-3A	6.60	1,491.3	80.6
461	J-526	1,300.0	Zone-3A	6.60	1,491.3	82.8
462	J-527	1,318.0	Zone-3A	12.10	1,491.3	75.0
463	J-528	1,235.0	Zone-2C	7.70	1,394.3	68.9

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
464	J-529	1,250.0	Zone-2C	14.30	1,394.2	62.4
465	J-530	1,300.0	Zone-2C	20.90	1,394.2	40.7
466	J-531	1,145.0	Zone-1	9.30	1,304.9	69.2
378	J-601	1,350.0	Zone-3A	19.80	1,490.9	61.0
379	J-602	1,350.0	Zone-3A	9.90	1,491.1	61.0
380	J-603	1,325.0	Zone-3A	8.80	1,491.2	71.9
381	J-604	1,325.0	Zone-3A	7.70	1,490.9	71.8
382	J-605	1,305.0	Zone-3A	32.30	1,491.4	80.6
383	J-606	1,300.0	Zone-3A	4.40	1,490.9	82.6
384	J-607	1,275.0	Zone-3A	6.60	1,490.9	93.4
385	J-608	1,250.0	Zone-3A	6.60	1,490.5	104.1
386	J-609	1,235.0	Zone-3A	3.30	1,490.4	110.5
387	J-610	1,300.0	Zone-3A	25.30	1,489.1	81.8
388	J-611	1,455.0	Zone-Off	0.00	1,488.3	14.4
389	J-612	1,471.0	Zone-Off	0.00	1,487.9	7.3
390	J-613	1,453.0	Zone-Off	0.00	1,488.1	15.2
391	J-614	1,410.0	Zone-3B	4.40	1,488.3	33.9
392	J-615	1,415.0	Zone-3B	0.00	1,488.6	31.9
393	J-616	1,350.0	Zone-3B	8.80	1,489.0	60.1
394	J-617	1,295.0	Zone-3B	9.90	1,489.4	84.1
395	J-618	1,310.0	Zone-3B	12.10	1,489.4	77.6
396	J-619	1,322.0	Zone-3B	0.00	1,488.2	71.9
397	J-620	1,352.0	Zone-3B	7.70	1,488.3	59.0
398	J-621	1,355.0	Zone-3A	9.90	1,489.0	58.0
399	J-622	1,302.0	Zone-3B	11.00	1,489.0	80.9
400	J-623	1,302.0	Zone-3B	0.00	1,489.0	80.9
401	J-624	1,355.0	Zone-3B	0.00	1,488.9	57.9
402	J-625	1,350.0	Zone-3B	18.70	1,488.9	60.1
403	J-626	1,330.0	Zone-3B	0.00	1,488.9	68.8
404	J-627	1,330.0	Zone-3B	17.60	1,488.9	68.8
405	J-628	1,305.0	Zone-3B	16.50	1,488.9	79.6
406	J-629	1,305.0	Zone-3B	0.00	1,489.0	79.6
407	J-630	1,375.0	Zone-3B	5.50	1,488.9	49.3
408	J-631	1,375.0	Zone-3B	6.60	1,488.9	49.3
409	J-632	1,340.0	Zone-3B	18.70	1,488.9	64.4
410	J-633	1,340.0	Zone-3B	0.00	1,488.9	64.4
411	J-634	1,258.0	Zone-3A	0.00	1,491.4	101.0
412	J-635	1,232.0	Zone-3A	0.00	1,493.4	113.1
413	J-636	1,242.0	Zone-3A	0.00	1,495.0	109.4
414	J-637	1,235.0	Zone-3A	0.00	1,495.5	112.7
415	J-638	1,310.0	Zone-3A	8.80	1,493.4	79.3
416	J-639	1,460.0	Zone-Off	0.00	1,490.0	13.0
417	J-640	1,410.0	Zone-3A	0.00	1,490.5	34.8
418	J-641	1,380.0	Zone-3A	18.70	1,491.0	48.0
419	J-642	1,350.0	Zone-3A	12.10	1,490.8	60.9
420	J-643	1,320.0	Zone-3A	0.00	1,492.2	74.5
421	J-644	1,305.0	Zone-3A	0.00	1,492.5	81.1
422	J-645	1,225.0	Zone-3A	0.00	1,496.6	117.5

FlexTable: Junction Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
423	J-646	1,240.0	Zone-3A	0.00	1,497.1	111.2
424	J-647	1,275.0	Zone-Off	0.00	1,302.8	12.0
425	J-648	1,400.0	Zone-4A	12.10	1,562.8	70.4
426	J-649	1,400.0	Zone-4A	5.50	1,562.7	70.4
427	J-650	1,405.0	Zone-4A	8.80	1,562.5	68.1
428	J-651	1,460.0	Zone-4A	9.20	1,562.4	44.3
429	J-652	1,450.0	Zone-4B	8.80	1,563.3	49.0
430	J-653	1,462.0	Zone-4B	13.70	1,563.3	43.8
431	J-654	1,425.0	Zone-4B	8.80	1,563.0	59.7
432	J-655	1,435.0	Zone-4B	8.80	1,563.0	55.4
433	J-656	1,401.0	Zone-4B	0.00	1,562.9	70.0
440	J-658	1,280.0	Zone-3A	0.00	1,491.9	91.7
441	J-659	1,280.0	Zone-3A	5.50	1,491.3	91.4
468	J-720	1,094.0	Zone-1	0.00	1,304.2	90.9
469	J-721	1,094.0	Zone-1	0.00	1,304.2	90.9
470	J-722	1,095.0	Zone-1	0.00	1,304.2	90.5
485	J-810	1,260.0	Zone-2C	4.40	1,394.0	58.0
486	J-811	1,245.0	Zone-2C	0.00	1,394.0	64.5
487	J-812	1,287.0	Zone-2C	12.10	1,394.0	46.3

FlexTable: Pipe Table

Active Scenario: Base Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
515	P-1	540	J-1	J-2	6.0	Ductile Iron	-10.58	0.12	0.000	522
516	P-2	256	J-2	J-3	6.0	Ductile Iron	-16.08	0.18	0.000	261
517	P-3	743	J-3	J-4	6.0	Ductile Iron	12.96	0.15	0.000	528
518	P-4	298	J-3	J-6	8.0	Ductile Iron	-32.75	0.21	0.000	280
918	P-5	115	J-76	J-5	8.0	Ductile Iron	0.00	0.00	0.000	50
519	P-6	261	J-6	J-7	8.0	Ductile Iron	13.77	0.09	0.000	261
520	P-7	472	J-7	J-8	8.0	Ductile Iron	3.87	0.02	0.000	466
521	P-8	261	J-8	J-9	8.0	Ductile Iron	-3.83	0.02	0.000	258
522	P-9	472	J-9	J-6	8.0	Ductile Iron	-10.43	0.07	0.000	472
523	P-10	369	J-3	J-10	6.0	Ductile Iron	-13.90	0.16	0.000	373
524	P-11	780	J-10	J-11	6.0	Ductile Iron	16.06	0.18	0.000	584
1191	P-12	206	J-524	J-279	8.0	Ductile Iron	15.40	0.10	0.000	0
1193	P-13	340	J-122	J-142	6.0	Ductile Iron	3.30	0.04	0.000	0
527	P-14	369	J-12	J-14	6.0	Ductile Iron	-10.25	0.12	0.000	367
1017	P-15	222	J-199	J-15	8.0	Ductile Iron	69.05	0.44	0.000	247
529	P-16	319	J-15	J-6	8.0	Ductile Iron	62.45	0.40	0.000	323
530	P-17	316	J-14	J-17	6.0	Ductile Iron	-24.51	0.28	0.000	311
1195	P-18	434	J-526	J-179	8.0	Ductile Iron	13.20	0.08	0.000	0
919	P-19	120	J-76	J-16	8.0	Ductile Iron	-350.00	2.23	0.003	50
532	P-20	886	J-19	J-20	10.0	Ductile Iron	162.60	0.66	0.000	836
1197	P-21	489	J-527	J-222	12.0	Ductile Iron	38.50	0.11	0.000	0
533	P-22	201	J-18	J-22	10.0	Ductile Iron	71.45	0.29	0.000	196
534	P-23	456	J-22	J-19	10.0	Ductile Iron	36.05	0.15	0.000	504
535	P-24	382	J-22	J-23	8.0	Ductile Iron	4.20	0.03	0.000	376
1199	P-25	608	J-222	J-239	12.0	Ductile Iron	36.10	0.10	0.000	0
1201	P-26	687	J-239	J-255	12.0	Ductile Iron	36.10	0.10	0.000	0
538	P-27	364	J-26	J-27	8.0	Ductile Iron	-11.80	0.08	0.000	358
539	P-28	400	J-27	J-28	12.0	Ductile Iron	209.71	0.59	0.000	356
540	P-29	364	J-28	J-17	12.0	Ductile Iron	192.41	0.55	0.000	370
541	P-30	654	J-27	J-29	8.0	Ductile Iron	0.36	0.00	0.000	642
542	P-31	384	J-29	J-30	8.0	Ductile Iron	75.54	0.48	0.000	358
543	P-32	394	J-30	J-18	8.0	Ductile Iron	75.54	0.48	0.000	382
1203	P-33	390	J-255	J-256	12.0	Ductile Iron	7.20	0.02	0.000	0
545	P-34	61	J-31	J-32	12.0	Ductile Iron	-5.20	0.01	0.000	82
1205	P-35	386	J-255	J-257	12.0	Ductile Iron	0.00	0.00	0.000	0
546	P-36	303	J-32	J-34	12.0	Ductile Iron	-21.70	0.06	0.000	308
547	P-37	649	J-34	J-35	8.0	Ductile Iron	122.29	0.78	0.000	636
548	P-38	636	J-35	J-27	12.0	Ductile Iron	247.17	0.70	0.000	671
549	P-39	651	J-35	J-36	8.0	Ductile Iron	31.79	0.20	0.000	639
550	P-40	320	J-36	J-37	8.0	Ductile Iron	89.38	0.57	0.000	323
551	P-41	313	J-37	J-29	8.0	Ductile Iron	81.88	0.52	0.000	321
552	P-42	646	J-34	J-38	12.0	Ductile Iron	-169.79	0.48	0.000	658
553	P-43	341	J-38	J-39	12.0	Ductile Iron	323.73	0.92	0.000	318
554	P-44	309	J-39	J-40	12.0	Ductile Iron	316.33	0.90	0.000	318
555	P-45	650	J-40	J-35	12.0	Ductile Iron	205.57	0.58	0.000	653
556	P-46	325	J-40	J-41	12.0	Ductile Iron	132.68	0.38	0.000	323
557	P-47	310	J-41	J-42	12.0	Ductile Iron	127.48	0.36	0.000	315
558	P-48	326	J-42	J-43	8.0	Ductile Iron	73.79	0.47	0.000	335
559	P-49	332	J-43	J-36	8.0	Ductile Iron	65.39	0.42	0.000	318
1225	P-50	124	J-272	J-270	8.0	Ductile Iron	145.06	0.93	0.001	0
1209	P-51	773	J-45	J-46	12.0	Ductile Iron	148.03	0.42	0.000	0
561	P-52	45	J-45	T-Palm	12.0	Ductile Iron	-745.26	2.11	0.002	108

FlexTable: Pipe Table

Active Scenario: Base Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
562	P-53	357	J-38	J-46	12.0	Ductile Iron	-148.03	0.42	0.000	396
1210	P-54	1,038	J-45	J-38	8.0	Ductile Iron	53.35	0.34	0.000	0
564	P-55	648	J-38	J-47	6.0	Ductile Iron	-101.40	1.15	0.001	615
565	P-56	624	J-47	J-48	8.0	Ductile Iron	238.63	1.52	0.001	650
566	P-57	639	J-48	J-40	6.0	Ductile Iron	49.42	0.56	0.000	630
567	P-58	618	J-48	J-49	8.0	Ductile Iron	103.72	0.66	0.000	613
970	P-59	670	J-47	J-38	8.0	Ductile Iron	231.53	1.48	0.001	642
1264	P-60	195	J-63	J-50	8.0	Ductile Iron	44.22	0.28	0.000	493
1265	P-61	281	J-50	J-42	8.0	Ductile Iron	44.22	0.28	0.000	493
1266	P-62	241	J-42	J-53	12.0	Ductile Iron	87.01	0.25	0.000	0
571	P-63	46	J-52	J-49	8.0	Ductile Iron	7.28	0.05	0.000	48
573	P-65	523	J-53	J-54	8.0	Ductile Iron	11.20	0.07	0.000	500
574	P-66	197	J-54	J-55	6.0	Ductile Iron	5.60	0.06	0.000	186
576	P-68	336	J-56	J-57	10.0	Ductile Iron	-111.94	0.46	0.000	360
577	P-69	142	J-57	J-58	12.0	Ductile Iron	-80.13	0.23	0.000	342
578	P-70	310	J-58	J-59	12.0	Ductile Iron	-109.59	0.31	0.000	120
580	P-72	222	J-57	J-60	12.0	Ductile Iron	-31.81	0.09	0.000	214
581	P-73	419	J-60	J-61	12.0	Ductile Iron	-80.91	0.23	0.000	462
582	P-74	255	J-61	J-62	10.0	Ductile Iron	49.10	0.20	0.000	334
583	P-75	154	J-49	J-63	8.0	Ductile Iron	101.31	0.65	0.000	135
585	P-77	240	J-63	J-64	8.0	Ductile Iron	57.09	0.36	0.000	237
586	P-78	478	J-64	J-53	8.0	Ductile Iron	33.83	0.22	0.000	499
587	P-79	150	J-64	J-65	8.0	Ductile Iron	17.66	0.11	0.000	143
588	P-80	356	J-65	J-66	6.0	Ductile Iron	13.68	0.16	0.000	350
589	P-81	553	J-66	J-67	6.0	Ductile Iron	-19.11	0.22	0.000	550
932	P-82	559	J-70	J-65	1.0	Ductile Iron	0.22	0.09	0.000	550
590	P-83	228	J-68	J-69	8.0	Ductile Iron	10.05	0.06	0.000	231
591	P-84	321	J-69	J-52	8.0	Ductile Iron	7.28	0.05	0.000	326
592	P-85	341	J-67	J-70	8.0	Ductile Iron	-55.67	0.36	0.000	362
593	P-86	200	J-70	J-68	8.0	Ductile Iron	-63.69	0.41	0.000	188
594	P-87	520	J-67	J-71	8.0	Ductile Iron	26.86	0.17	0.000	511
595	P-88	52	J-71	J-72	8.0	Ductile Iron	-22.24	0.14	0.000	59
596	P-89	209	J-72	J-73	12.0	Ductile Iron	179.11	0.51	0.000	195
597	P-90	401	J-73	J-61	12.0	Ductile Iron	130.01	0.37	0.000	347
598	P-91	203	J-47	J-74	8.0	Ductile Iron	-290.49	1.85	0.002	202
599	P-92	25	J-74	J-75	10.0	Ductile Iron	-497.78	2.03	0.002	57
600	P-93	110	J-75	J-76	10.0	Ductile Iron	-1,150.00	4.70	0.009	105
601	P-94	565	J-74	J-77	6.0	Ductile Iron	116.69	1.32	0.002	573
602	P-95	670	J-77	J-78	6.0	Ductile Iron	116.69	1.32	0.002	674
1226	P-96	354	J-270	J-271	8.0	Ductile Iron	0.00	0.00	0.000	0
603	P-97	320	J-78	J-80	6.0	Ductile Iron	34.43	0.39	0.000	334
604	P-98	187	J-80	J-79	6.0	Ductile Iron	-176.84	2.01	0.004	179
605	P-99	627	J-79	J-81	6.0	Ductile Iron	-8.97	0.10	0.000	627
606	P-100	383	J-81	J-82	6.0	Ductile Iron	-33.75	0.38	0.000	374
607	P-101	317	J-82	J-48	6.0	Ductile Iron	-61.98	0.70	0.001	322
1684	P-102	337	J-213	J-388	16.0	Ductile Iron	928.17	1.48	0.001	0
1685	P-103	418	J-388	T-Lookout	16.0	Ductile Iron	928.17	1.48	0.001	0
608	P-105	482	J-82	J-83	8.0	Ductile Iron	20.24	0.13	0.000	491
609	P-106	190	J-83	J-69	8.0	Ductile Iron	20.24	0.13	0.000	168
610	P-107	323	J-81	J-84	6.0	Ductile Iron	10.47	0.12	0.000	327
612	P-109	322	J-79	J-85	8.0	Ductile Iron	-49.83	0.32	0.000	325
613	P-110	160	J-85	J-86	6.0	Ductile Iron	18.53	0.21	0.000	175

FlexTable: Pipe Table

Active Scenario: Base Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
614	P-111	460	J-86	J-84	6.0	Ductile Iron	10.13	0.11	0.000	449
615	P-112	354	J-85	J-87	8.0	Ductile Iron	-68.36	0.44	0.000	363
616	P-113	399	J-87	J-88	8.0	Ductile Iron	-81.48	0.52	0.000	399
617	P-114	372	J-88	J-68	8.0	Ductile Iron	87.34	0.56	0.000	367
1223	P-115	343	J-646	J-272	12.0	Ductile Iron	-843.01	2.39	0.002	331
1224	P-116	140	J-272	PMP-1	12.0	Ductile Iron	-988.07	2.80	0.003	331
620	P-117	538	J-88	J-91	8.0	Ductile Iron	-175.22	1.12	0.001	536
621	P-118	589	J-91	J-92	8.0	Ductile Iron	-288.66	1.84	0.002	577
622	P-119	102	J-92	J-296	8.0	Ductile Iron	411.34	2.63	0.004	141
623	P-120	396	J-296	J-72	8.0	Ductile Iron	386.79	2.47	0.004	411
624	P-121	52	J-197	J-92	8.0	Ductile Iron	700.00	4.47	0.011	157
625	P-122	515	J-87	J-94	8.0	Ductile Iron	-28.04	0.18	0.000	520
626	P-123	402	J-94	J-91	6.0	Ductile Iron	-103.65	1.18	0.001	395
627	P-124	815	J-94	J-95	8.0	Ductile Iron	64.90	0.41	0.000	796
628	P-125	445	J-95	J-90	12.0	Ductile Iron	-37.65	0.11	0.000	483
1227	P-126	596	J-270	J-268	8.0	Ductile Iron	145.06	0.93	0.001	0
630	P-127	380	J-96	J-97	10.0	Ductile Iron	83.23	0.34	0.000	423
631	P-128	79	J-96	J-72	12.0	Ductile Iron	-185.43	0.53	0.000	86
632	P-129	835	J-78	J-98	6.0	Ductile Iron	74.56	0.85	0.001	782
633	P-130	321	J-98	J-99	6.0	Ductile Iron	56.96	0.65	0.001	344
634	P-131	364	J-99	J-100	6.0	Ductile Iron	49.35	0.56	0.000	347
635	P-132	668	J-100	J-101	4.0	Ductile Iron	-12.79	0.33	0.000	645
636	P-133	327	J-101	J-102	6.0	Ductile Iron	13.29	0.15	0.000	347
637	P-134	688	J-102	J-99	6.0	Ductile Iron	2.29	0.03	0.000	650
638	P-135	516	J-100	J-103	6.0	Ductile Iron	0.00	0.00	0.000	527
639	P-136	106	J-100	J-104	6.0	Ductile Iron	51.14	0.58	0.000	123
640	P-137	228	J-104	J-105	6.0	Ductile Iron	34.64	0.39	0.000	213
1128	P-138	653	J-234	J-105	4.0	Ductile Iron	19.74	0.50	0.001	0
642	P-139	299	J-106	J-101	6.0	Ductile Iron	46.88	0.53	0.000	329
643	P-140	663	J-105	J-107	6.0	Ductile Iron	22.70	0.26	0.000	670
644	P-141	329	J-107	J-108	6.0	Ductile Iron	0.70	0.01	0.000	344
645	P-142	667	J-108	J-109	8.0	Ductile Iron	-31.43	0.20	0.000	663
646	P-143	328	J-109	J-105	6.0	Ductile Iron	-23.99	0.27	0.000	339
647	P-144	337	J-108	J-110	6.0	Ductile Iron	13.43	0.15	0.000	312
648	P-145	601	J-110	J-111	8.0	Ductile Iron	-0.87	0.01	0.000	549
649	P-146	199	J-111	J-112	8.0	Ductile Iron	-19.57	0.12	0.000	226
650	P-147	210	J-112	J-113	6.0	Ductile Iron	-33.87	0.38	0.000	202
651	P-148	501	J-113	J-109	8.0	Ductile Iron	14.04	0.09	0.000	487
652	P-149	404	J-113	J-114	6.0	Ductile Iron	-73.21	0.83	0.001	411
653	P-150	304	J-114	J-115	8.0	Ductile Iron	-48.20	0.31	0.000	316
1180	P-151	138	J-444	J-21	8.0	Ductile Iron	14.30	0.09	0.000	0
917	P-152	30	J-115	J-196	12.0	Ductile Iron	-1,650.00	4.68	0.007	50
1182	P-153	285	J-21	J-24	8.0	Ductile Iron	7.70	0.05	0.000	0
656	P-154	167	J-116	J-117	8.0	Ductile Iron	171.49	1.09	0.001	168
657	P-155	424	J-117	J-106	8.0	Ductile Iron	150.59	0.96	0.001	453
658	P-156	185	J-116	J-118	12.0	Ductile Iron	-379.94	1.08	0.000	170
659	P-157	353	J-118	J-119	8.0	Ductile Iron	-232.36	1.48	0.001	342
660	P-158	352	J-119	J-79	8.0	Ductile Iron	-216.31	1.38	0.001	343
661	P-159	662	J-119	J-120	4.0	Ductile Iron	-25.16	0.64	0.001	681
662	P-160	360	J-120	J-121	4.0	Ductile Iron	-3.19	0.08	0.000	352
663	P-161	317	J-121	J-122	4.0	Ductile Iron	-3.19	0.08	0.000	301
664	P-162	379	J-122	J-94	6.0	Ductile Iron	9.79	0.11	0.000	361

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
665	P-163	670	J-118	J-123	6.0	Ductile Iron	-110.22	1.25	0.002	658
666	P-164	819	J-123	J-124	6.0	Ductile Iron	1.20	0.01	0.000	819
667	P-165	371	J-124	J-122	6.0	Ductile Iron	40.87	0.46	0.000	355
668	P-166	390	J-124	J-125	6.0	Ductile Iron	-50.98	0.58	0.000	409
669	P-167	452	J-125	J-126	12.0	Ductile Iron	-103.08	0.29	0.000	446
670	P-168	202	J-126	J-127	12.0	Ductile Iron	-103.08	0.29	0.000	196
671	P-169	245	J-127	J-128	12.0	Ductile Iron	474.43	1.35	0.001	291
672	P-170	223	J-128	J-129	12.0	Ductile Iron	474.43	1.35	0.001	220
673	P-171	129	J-129	J-130	12.0	Ductile Iron	228.93	0.65	0.000	132
674	P-172	499	J-130	J-131	12.0	Ductile Iron	130.73	0.37	0.000	409
675	P-173	123	J-131	J-95	12.0	Ductile Iron	15.04	0.04	0.000	150
676	P-174	645	J-117	J-132	6.0	Ductile Iron	11.00	0.12	0.000	654
677	P-175	253	J-132	J-133	6.0	Ductile Iron	0.00	0.00	0.000	247
678	P-176	347	J-118	J-139	6.0	Ductile Iron	-81.66	0.93	0.001	366
679	P-177	669	J-139	J-135	6.0	Ductile Iron	-93.76	1.06	0.001	658
680	P-178	346	J-135	J-123	12.0	Ductile Iron	180.23	0.51	0.000	362
681	P-179	516	J-135	J-136	12.0	Ductile Iron	-161.59	0.46	0.000	520
682	P-180	468	J-136	J-125	12.0	Ductile Iron	-161.59	0.46	0.000	455
683	P-181	373	J-135	J-137	12.0	Ductile Iron	-141.00	0.40	0.000	354
684	P-182	736	J-137	J-138	4.0	Ductile Iron	-28.53	0.73	0.001	686
1184	P-183	204	J-24	J-25	8.0	Ductile Iron	7.70	0.05	0.000	0
1186	P-184	275	J-523	J-33	12.0	Ductile Iron	-714.06	2.03	0.002	537
1187	P-185	257	J-33	J-643	12.0	Ductile Iron	-728.36	2.07	0.002	537
685	P-186	346	J-125	J-141	6.0	Ductile Iron	-119.39	1.35	0.002	372
686	P-187	394	J-127	J-143	12.0	Ductile Iron	-724.81	2.06	0.002	380
687	P-188	157	J-143	J-144	12.0	Ductile Iron	49.10	0.14	0.000	162
688	P-189	271	J-144	J-145	12.0	Ductile Iron	0.00	0.00	0.000	270
689	P-190	701	J-146	J-147	12.0	Ductile Iron	-756.87	2.15	0.002	721
690	P-191	1,142	J-147	J-148	12.0	Ductile Iron	-652.35	1.85	0.001	1,179
691	P-192	293	J-148	J-149	6.0	Ductile Iron	15.40	0.17	0.000	278
692	P-193	360	J-149	J-150	6.0	Ductile Iron	15.40	0.17	0.000	382
693	P-194	212	J-148	J-151	12.0	Ductile Iron	-667.75	1.89	0.001	216
694	P-195	167	J-151	J-152	12.0	Ductile Iron	-671.95	1.91	0.001	181
695	P-196	340	J-152	J-153	8.0	Ductile Iron	41.93	0.27	0.000	313
696	P-197	320	J-153	J-154	8.0	Ductile Iron	32.03	0.20	0.000	328
697	P-198	253	J-154	J-155	8.0	Ductile Iron	14.43	0.09	0.000	358
698	P-199	246	J-155	J-156	8.0	Ductile Iron	-0.97	0.01	0.000	299
699	P-200	431	J-156	J-157	8.0	Ductile Iron	30.10	0.19	0.000	263
700	P-201	483	J-152	J-158	12.0	Ductile Iron	-757.65	2.15	0.002	485
701	P-202	237	J-158	J-159	12.0	Ductile Iron	-760.45	2.16	0.002	234
702	P-203	138	J-159	J-160	8.0	Ductile Iron	-760.45	4.85	0.013	159
704	P-205	378	J-161	J-147	8.0	Ductile Iron	153.62	0.98	0.001	364
705	P-206	219	J-160	J-162	12.0	Ductile Iron	-1,215.73	3.45	0.004	214
706	P-207	101	J-162	J-163	12.0	Ductile Iron	784.27	2.22	0.002	108
707	P-208	629	J-163	J-164	12.0	Ductile Iron	782.87	2.22	0.002	676
1189	P-210	403	J-33	J-89	8.0	Ductile Iron	0.00	0.00	0.000	0
710	P-211	207	J-166	J-167	8.0	Ductile Iron	234.85	1.50	0.001	200
711	P-212	310	J-167	J-168	8.0	Ductile Iron	233.75	1.49	0.001	311
712	P-213	166	J-168	J-169	8.0	Ductile Iron	-292.32	1.87	0.002	160
713	P-214	314	J-169	J-170	8.0	Ductile Iron	-306.62	1.96	0.002	316
714	P-215	456	J-170	J-165	12.0	Ductile Iron	-322.02	0.91	0.000	436
715	P-216	276	J-169	J-171	6.0	Ductile Iron	7.70	0.09	0.000	258

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
716	P-217	251	J-171	J-172	6.0	Ductile Iron	0.00	0.00	0.000	232
717	P-218	365	PRV-1	J-170	12.0	Ductile Iron	0.00	0.00	0.000	358
718	P-219	331	J-137	J-173	12.0	Ductile Iron	-121.57	0.34	0.000	341
722	P-223	250	J-176	J-177	8.0	Ductile Iron	-14.31	0.09	0.000	247
723	P-224	331	J-177	J-173	12.0	Ductile Iron	128.06	0.36	0.000	332
1228	P-226	185	J-268	J-269	8.0	Ductile Iron	0.00	0.00	0.000	0
1229	P-227	164	J-268	J-267	8.0	Ductile Iron	145.06	0.93	0.001	0
726	P-228	375	J-177	J-181	8.0	Ductile Iron	-254.34	1.62	0.002	383
727	P-229	409	J-181	J-182	8.0	Ductile Iron	40.80	0.26	0.000	415
728	P-230	516	J-181	J-183	8.0	Ductile Iron	-300.65	1.92	0.002	513
729	P-231	388	J-183	J-198	8.0	Ductile Iron	-519.17	3.31	0.006	342
730	P-232	193	J-198	J-168	8.0	Ductile Iron	-520.57	3.32	0.006	254
731	P-233	181	J-177	J-184	8.0	Ductile Iron	111.97	0.71	0.000	223
733	P-235	203	J-185	J-186	2.0	Ductile Iron	-12.42	1.27	0.008	204
734	P-236	252	J-186	J-183	8.0	Ductile Iron	-210.83	1.35	0.001	243
735	P-237	406	J-186	J-187	8.0	Ductile Iron	196.21	1.25	0.001	398
736	P-238	649	J-187	J-188	8.0	Ductile Iron	174.31	1.11	0.001	659
737	P-239	179	J-188	J-189	8.0	Ductile Iron	166.61	1.06	0.001	179
738	P-240	132	J-189	J-190	6.0	Ductile Iron	160.01	1.82	0.003	121
739	P-241	411	J-184	J-190	8.0	Ductile Iron	107.89	0.69	0.000	353
740	P-242	244	J-189	J-191	8.0	Ductile Iron	0.00	0.00	0.000	242
1230	P-243	451	J-267	J-266	8.0	Ductile Iron	145.06	0.93	0.001	0
1231	P-244	89	J-266	J-260	8.0	Ductile Iron	145.06	0.93	0.001	0
741	P-245	320	J-131	J-192	12.0	Ductile Iron	115.69	0.33	0.000	285
1232	P-246	486	J-260	J-265	8.0	Ductile Iron	0.00	0.00	0.000	0
743	P-247	309	J-193	J-194	6.0	Ductile Iron	7.60	0.09	0.000	314
1233	P-248	126	J-260	J-258	8.0	Ductile Iron	145.06	0.93	0.001	0
745	P-249	299	J-195	J-192	4.0	Ductile Iron	-16.98	0.43	0.000	338
926	P-250	151	J-193	J-250	8.0	Ductile Iron	58.07	0.37	0.000	156
927	P-251	371	J-250	J-251	8.0	Ductile Iron	58.07	0.37	0.000	371
928	P-252	385	J-251	J-252	8.0	Ductile Iron	8.97	0.06	0.000	395
929	P-253	312	J-252	J-253	8.0	Ductile Iron	-34.04	0.22	0.000	309
930	P-254	283	J-253	J-254	8.0	Ductile Iron	-34.04	0.22	0.000	443
931	P-255	763	J-254	J-194	8.0	Ductile Iron	-34.04	0.22	0.000	636
933	P-256	574	J-164	J-180	8.0	Ductile Iron	157.70	1.01	0.001	575
1234	P-257	103	J-258	J-259	8.0	Ductile Iron	0.00	0.00	0.000	0
1235	P-258	604	J-258	J-645	8.0	Ductile Iron	145.06	0.93	0.001	0
1237	P-259	127	J-271	J-273	8.0	Ductile Iron	0.00	0.00	0.000	0
1239	P-260	243	J-461	J-274	8.0	Ductile Iron	26.40	0.17	0.000	0
1241	P-261	361	J-274	J-275	8.0	Ductile Iron	22.00	0.14	0.000	0
979	P-262	341	J-261	J-262	6.0	Ductile Iron	9.82	0.11	0.000	379
982	P-265	346	J-123	J-120	6.0	Ductile Iron	45.12	0.51	0.000	337
983	P-266	314	J-13	J-11	8.0	Ductile Iron	0.00	0.00	0.000	268
984	P-267	267	J-11	J-4	8.0	Ductile Iron	2.86	0.02	0.000	293
986	P-269	612	J-20	J-263	10.0	Ductile Iron	69.50	0.28	0.000	621
1243	P-270	267	J-275	J-276	8.0	Ductile Iron	16.50	0.11	0.000	0
988	P-271	142	J-263	J-264	6.0	Ductile Iron	69.50	0.79	0.001	1,550
1016	P-272	41	J-14	J-199	8.0	Ductile Iron	12.06	0.08	0.000	247
1034	P-276	17	J-201	J-202	12.0	Ductile Iron	-36.09	0.10	0.000	0
1027	P-278	17	J-203	J-12	6.0	Ductile Iron	-4.61	0.05	0.000	603
1030	P-280	21	J-201	J-203	12.0	Ductile Iron	-4.61	0.01	0.000	0
1032	P-281	21	J-12	J-202	6.0	Ductile Iron	-2.06	0.02	0.000	183

FlexTable: Pipe Table

Active Scenario: Base Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1033	P-282	169	J-202	J-10	6.0	Ductile Iron	48.65	0.55	0.000	183
1038	P-283	385	J-202	J-205	12.0	Ductile Iron	-86.80	0.25	0.000	0
1040	P-284	300	J-205	J-206	12.0	Ductile Iron	-151.49	0.43	0.000	0
1041	P-285	36	J-205	J-199	8.0	Ductile Iron	64.69	0.41	0.000	0
1042	P-286	22	J-206	J-17	12.0	Ductile Iron	-149.97	0.43	0.000	0
1044	P-287	541	J-17	J-207	6.0	Ductile Iron	3.93	0.04	0.000	622
1045	P-288	88	J-207	J-18	10.0	Ductile Iron	-4.09	0.02	0.000	622
1046	P-289	586	J-206	J-207	12.0	Ductile Iron	-1.52	0.00	0.000	0
1252	P-290	1,345	J-278	J-277	12.0	Ductile Iron	928.17	2.63	0.003	0
1049	P-291	288	J-208	J-652	8.0	Ductile Iron	119.59	0.76	0.000	339
1251	P-292	51	PMP-8	J-278	8.0	Ductile Iron	557.28	3.56	0.007	0
1249	P-293	3,407	J-277	J-209	12.0	Ductile Iron	928.17	2.63	0.003	0
1054	P-294	1,912	J-209	J-210	16.0	Ductile Iron	928.17	1.48	0.001	0
1056	P-295	1,966	J-210	J-211	16.0	Ductile Iron	928.17	1.48	0.001	0
1257	P-296	157	J-612	PMP-9	10.0	Ductile Iron	556.19	2.27	0.002	0
1258	P-297	100	PMP-9	J-278	8.0	Ductile Iron	556.19	3.55	0.007	0
1062	P-298	263	J-208	J-214	12.0	Ductile Iron	4.40	0.01	0.000	0
1068	P-299	527	J-215	J-208	8.0	Ductile Iron	-58.01	0.37	0.000	0
1070	P-300	349	J-215	J-216	8.0	Ductile Iron	39.31	0.25	0.000	0
1072	P-301	439	J-216	J-217	8.0	Ductile Iron	31.61	0.20	0.000	0
1074	P-302	458	J-217	J-218	8.0	Ductile Iron	27.21	0.17	0.000	0
1076	P-303	374	J-218	J-219	8.0	Ductile Iron	0.00	0.00	0.000	0
1078	P-304	601	J-215	J-220	8.0	Ductile Iron	11.00	0.07	0.000	0
1081	P-306	72	PRV-20	J-208	8.0	Ductile Iron	0.00	0.00	0.000	339
1088	P-307	315	J-619	J-219	8.0	Ductile Iron	56.18	0.36	0.000	0
1084	P-308	179	J-221	J-423	6.0	Ductile Iron	41.88	0.48	0.000	0
1089	P-309	47	J-219	PRV-13	6.0	Ductile Iron	0.00	0.00	0.000	0
1090	P-310	100	J-219	PRV-14	6.0	Ductile Iron	41.88	0.48	0.000	0
1091	P-311	43	PRV-13	J-221	6.0	Ductile Iron	0.00	0.00	0.000	0
1092	P-312	92	PRV-14	J-221	6.0	Ductile Iron	41.88	0.48	0.000	0
1126	P-313	166	J-115	J-234	8.0	Ductile Iron	-51.07	0.33	0.000	170
1096	P-314	363	J-223	J-224	8.0	Ductile Iron	4.35	0.03	0.000	0
1098	P-315	272	J-224	J-225	8.0	Ductile Iron	13.06	0.08	0.000	0
1100	P-316	490	J-225	J-226	8.0	Ductile Iron	6.46	0.04	0.000	0
1102	P-317	337	J-226	J-227	8.0	Ductile Iron	0.00	0.00	0.000	0
1104	P-318	278	J-226	J-228	8.0	Ductile Iron	0.96	0.01	0.000	0
1105	P-319	495	J-228	J-224	8.0	Ductile Iron	-11.75	0.07	0.000	0
1107	P-320	336	J-228	J-229	8.0	Ductile Iron	5.50	0.04	0.000	0
1109	P-321	287	J-228	J-230	8.0	Ductile Iron	1.71	0.01	0.000	0
1110	P-322	493	J-230	J-223	8.0	Ductile Iron	-12.59	0.08	0.000	0
1112	P-323	332	J-231	J-230	8.0	Ductile Iron	-5.50	0.04	0.000	0
1115	P-325	67	PRV-21	J-208	8.0	Ductile Iron	185.30	1.18	0.001	0
1117	P-326	356	J-656	J-232	8.0	Ductile Iron	97.90	0.62	0.000	0
1118	P-327	512	J-232	J-223	12.0	Ductile Iron	37.84	0.11	0.000	0
1120	P-328	136	J-230	PRV-17	8.0	Ductile Iron	0.00	0.00	0.000	0
1121	P-329	163	PRV-17	J-630	8.0	Ductile Iron	0.00	0.00	0.000	0
1123	P-330	700	J-80	J-233	10.0	Ductile Iron	206.37	0.84	0.000	684
1124	P-331	24	J-233	J-116	12.0	Ductile Iron	-195.25	0.55	0.000	684
892	P-332	418	J-59	J-332	6.0	Ductile Iron	9.82	0.11	0.000	407
1127	P-333	50	J-234	J-106	8.0	Ductile Iron	-96.01	0.61	0.000	170
1129	P-334	707	J-647	J-115	12.0	Ductile Iron	-37.36	0.11	0.000	0
1130	P-335	823	J-115	J-233	12.0	Ductile Iron	-393.12	1.12	0.001	0

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1132	P-336	446	J-95	J-235	8.0	Ductile Iron	29.74	0.19	0.000	0
1134	P-337	128	J-192	J-236	12.0	Ductile Iron	74.16	0.21	0.000	344
1135	P-338	224	J-236	J-193	12.0	Ductile Iron	65.67	0.19	0.000	344
1136	P-339	1,052	J-236	J-97	12.0	Ductile Iron	8.49	0.02	0.000	0
1138	P-340	146	J-97	J-237	10.0	Ductile Iron	49.10	0.20	0.000	0
1140	P-341	191	J-721	J-238	8.0	Ductile Iron	0.00	0.00	0.000	0
1253	P-342	58	J-278	PRV-20	8.0	Ductile Iron	0.00	0.00	0.000	0
1254	P-343	71	J-278	PRV-21	8.0	Ductile Iron	185.30	1.18	0.001	0
1058	P-344	1,301	J-211	J-212	16.0	Ductile Iron	928.17	1.48	0.001	0
1060	P-345	310	J-212	J-213	16.0	Ductile Iron	928.17	1.48	0.001	0
1260	P-346	359	J-87	J-120	6.0	Ductile Iron	-12.04	0.14	0.000	0
1150	P-348	204	J-90	J-241	12.0	Ductile Iron	-39.05	0.11	0.000	245
1151	P-349	78	J-241	J-96	12.0	Ductile Iron	-77.65	0.22	0.000	245
1153	P-350	191	J-97	J-242	4.0	Ductile Iron	18.07	0.46	0.000	517
1154	P-351	337	J-242	J-195	4.0	Ductile Iron	7.57	0.19	0.000	517
1155	P-352	397	J-241	J-242	4.0	Ductile Iron	14.06	0.36	0.000	0
1157	P-353	495	J-141	J-243	8.0	Ductile Iron	27.59	0.18	0.000	0
1158	P-354	385	J-58	J-261	8.0	Ductile Iron	19.64	0.13	0.000	0
1160	P-355	348	J-157	J-244	12.0	Ductile Iron	11.60	0.03	0.000	0
1161	P-356	594	J-156	J-152	8.0	Ductile Iron	-40.97	0.26	0.000	0
1163	P-357	50	J-165	J-245	8.0	Ductile Iron	239.25	1.53	0.001	363
1164	P-358	311	J-245	J-166	8.0	Ductile Iron	234.85	1.50	0.001	363
1166	P-359	304	J-245	J-246	8.0	Ductile Iron	4.40	0.03	0.000	0
1168	P-360	262	J-437	J-247	6.0	Ductile Iron	7.05	0.08	0.000	0
1169	P-361	212	J-247	J-438	6.0	Ductile Iron	-9.45	0.11	0.000	0
1171	P-362	296	J-436	J-248	8.0	Ductile Iron	11.00	0.07	0.000	0
1173	P-363	390	J-434	J-249	8.0	Ductile Iron	-20.50	0.13	0.000	0
1177	P-366	313	J-605	J-240	4.0	Ductile Iron	32.70	0.83	0.001	697
1178	P-367	413	J-240	J-606	8.0	Ductile Iron	32.70	0.21	0.000	697
1274	P-368	75	J-639	PMP-10	8.0	Ductile Iron	677.42	4.32	0.010	0
1278	P-370	407	J-280	J-281	12.0	Ductile Iron	8.80	0.02	0.000	0
1642	P-371	210	J-280	J-376	12.0	Ductile Iron	551.61	1.56	0.001	0
1283	P-373	96	PMP-10	J-283	12.0	Ductile Iron	677.42	1.92	0.001	0
1284	P-374	407	J-283	J-280	12.0	Ductile Iron	572.51	1.62	0.001	0
1288	P-376	388	J-285	J-284	12.0	Ductile Iron	99.40	0.28	0.000	0
1291	P-378	368	J-284	J-648	4.0	Ductile Iron	35.60	0.91	0.001	0
1305	P-387	113	J-283	PRV-22	12.0	Ductile Iron	0.00	0.00	0.000	0
1306	P-388	94	PRV-22	J-285	12.0	Ductile Iron	0.00	0.00	0.000	0
1308	P-389	143	J-283	PRV-23	12.0	Ductile Iron	101.60	0.29	0.000	0
1309	P-390	114	PRV-23	J-285	12.0	Ductile Iron	101.60	0.29	0.000	0
1639	P-391	427	J-282	J-375	12.0	Ductile Iron	-2.20	0.01	0.000	0
1312	P-392	87	T-Valhalla 1	J-290	12.0	Ductile Iron	-280.69	0.80	0.000	0
1314	P-393	169	T-Valhalla 2	J-290	12.0	Ductile Iron	-196.12	0.56	0.000	0
1316	P-394	118	J-115	PMP-11	12.0	Ductile Iron	1,004.28	2.85	0.003	0
1320	P-397	603	J-445	J-291	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1707	P-398	547	J-291	J-398	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1324	P-399	567	J-292	J-293	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1326	P-400	1,147	J-293	J-294	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1328	P-401	382	J-294	J-295	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
746	P-402	599	J-402	J-403	6.0	Ductile Iron	12.31	0.14	0.000	601
747	P-403	212	J-403	J-404	6.0	Ductile Iron	3.51	0.04	0.000	214

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
748	P-404	748	J-404	J-405	6.0	Ductile Iron	-17.39	0.20	0.000	713
749	P-407	228	J-406	J-407	6.0	Ductile Iron	-30.59	0.35	0.000	212
750	P-408	365	J-407	J-401	6.0	Ductile Iron	39.81	0.45	0.000	368
751	P-409	183	J-407	PRV-15	6.0	Ductile Iron	0.00	0.00	0.000	170
1354	P-409	239	J-301	J-302	10.0	Ductile Iron	-4.40	0.02	0.000	0
752	P-410	275	J-404	J-408	6.0	Ductile Iron	13.20	0.15	0.000	267
753	P-411	319	J-408	PRV-4	6.0	Ductile Iron	0.00	0.00	0.000	321
1357	P-411	358	J-303	J-409	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
754	P-412	131	PRV-4	J-77	6.0	Ductile Iron	0.00	0.00	0.000	125
755	P-413	44	PRV-3	J-99	6.0	Ductile Iron	0.00	0.00	0.000	68
756	P-414	190	J-98	J-409	6.0	Ductile Iron	8.80	0.10	0.000	172
757	P-415	141	J-409	J-410	6.0	Ductile Iron	0.00	0.00	0.000	173
758	P-416	337	J-410	J-411	6.0	Ductile Iron	-10.36	0.12	0.000	344
759	P-417	285	J-411	PRV-3	8.0	Ductile Iron	0.00	0.00	0.000	262
1370	P-418	120	J-308	J-515	10.0	Ductile Iron	-5.20	0.02	0.000	0
761	P-420	367	J-413	J-414	6.0	Ductile Iron	-17.68	0.20	0.000	357
762	P-421	687	J-414	J-411	6.0	Ductile Iron	21.36	0.24	0.000	680
763	P-422	490	J-103	J-415	6.0	Ductile Iron	-6.60	0.07	0.000	492
764	P-423	345	J-415	J-414	8.0	Ductile Iron	60.12	0.38	0.000	338
765	P-424	28	J-110	PRV-2	6.0	Ductile Iron	0.00	0.00	0.000	55
1384	P-424	154	PMP-11	J-310	12.0	Ductile Iron	1,004.28	2.85	0.003	0
1385	P-425	2,680	J-310	J-637	12.0	Ductile Iron	2,008.63	5.70	0.011	0
766	P-426	604	J-416	J-417	6.0	Ductile Iron	10.61	0.12	0.000	600
1387	P-426	125	J-115	PMP-12	12.0	Ductile Iron	1,004.35	2.85	0.003	0
767	P-427	376	J-417	J-415	6.0	Ductile Iron	-0.39	0.00	0.000	385
1388	P-427	140	PMP-12	J-310	12.0	Ductile Iron	1,004.35	2.85	0.003	0
768	P-428	301	J-414	J-418	6.0	Ductile Iron	3.47	0.04	0.000	349
1391	P-428	552	J-249	J-445	8.0	Ductile Iron	-34.80	0.22	0.000	0
769	P-429	484	J-418	J-419	6.0	Ductile Iron	0.00	0.00	0.000	432
770	P-430	366	J-415	J-420	8.0	Ductile Iron	-87.70	0.56	0.000	363
1396	P-431	251	J-4	J-312	8.0	Ductile Iron	5.92	0.04	0.000	0
772	P-432	298	J-413	J-422	6.0	Ductile Iron	9.73	0.11	0.000	323
1397	P-432	225	J-312	J-1	8.0	Ductile Iron	-2.88	0.02	0.000	0
773	P-433	340	J-422	J-418	1.0	Ductile Iron	-0.17	0.07	0.000	353
1399	P-433	847	J-720	J-313	10.0	Ductile Iron	28.40	0.12	0.000	0
774	P-434	257	J-413	J-423	6.0	Ductile Iron	-27.58	0.31	0.000	247
1401	P-434	242	J-313	J-314	10.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1402	P-435	340	J-314	J-254	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
776	P-436	569	J-420	J-424	8.0	Ductile Iron	-106.40	0.68	0.000	592
1411	P-436	316	J-176	J-315	6.0	Ductile Iron	14.31	0.16	0.000	0
777	P-437	409	J-424	J-425	8.0	Ductile Iron	70.64	0.45	0.000	408
1413	P-437	130	J-315	J-316	6.0	Ductile Iron	14.31	0.16	0.000	0
778	P-438	348	J-425	J-416	6.0	Ductile Iron	61.04	0.69	0.001	347
779	P-441	401	J-425	J-427	8.0	Ductile Iron	-84.82	0.54	0.000	402
780	P-442	289	J-427	J-428	8.0	Ductile Iron	-84.82	0.54	0.000	284
781	P-443	341	J-424	J-429	8.0	Ductile Iron	-191.34	1.22	0.001	333
1421	P-443	438	J-174	J-173	6.0	Ductile Iron	5.51	0.06	0.000	0
782	P-444	268	J-429	J-430	8.0	Ductile Iron	-191.34	1.22	0.001	168
1426	P-444	337	J-146	J-319	12.0	Ductile Iron	707.77	2.01	0.002	724
783	P-445	30	J-430	PRV-12	8.0	Ductile Iron	0.00	0.00	0.000	112
1427	P-445	392	J-319	J-143	12.0	Ductile Iron	772.31	2.19	0.002	724
784	P-446	270	J-428	J-430	8.0	Ductile Iron	-272.77	1.74	0.002	286

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1429	P-446	399	J-319	J-320	12.0	Ductile Iron	-64.54	0.18	0.000	0
1431	P-447	755	J-320	J-321	8.0	Ductile Iron	-294.65	1.88	0.002	0
785	P-448	70	J-431	PRV-11	8.0	Ductile Iron	0.00	0.00	0.000	20
1433	P-448	785	J-180	J-322	8.0	Ductile Iron	143.00	0.91	0.000	0
786	P-449	336	J-431	J-432	8.0	Ductile Iron	-12.74	0.08	0.000	302
787	P-450	311	J-432	J-433	8.0	Ductile Iron	-32.54	0.21	0.000	307
1436	P-450	434	J-235	J-323	8.0	Ductile Iron	29.74	0.19	0.000	0
788	P-451	338	J-433	J-425	8.0	Ductile Iron	-80.42	0.51	0.000	339
1437	P-451	469	J-323	J-194	12.0	Ductile Iron	29.74	0.08	0.000	0
789	P-452	348	J-433	J-434	4.0	Ductile Iron	23.67	0.60	0.001	352
790	P-453	501	J-434	J-435	8.0	Ductile Iron	27.68	0.18	0.000	501
791	P-454	207	J-435	J-436	8.0	Ductile Iron	19.98	0.13	0.000	382
1442	P-454	183	J-59	J-325	12.0	Ductile Iron	-129.23	0.37	0.000	281
792	P-455	321	J-436	J-437	8.0	Ductile Iron	0.18	0.00	0.000	161
1443	P-455	107	J-325	J-53	12.0	Ductile Iron	-109.64	0.31	0.000	281
793	P-456	241	J-437	J-438	8.0	Ductile Iron	-6.88	0.04	0.000	265
1444	P-456	693	J-325	J-66	8.0	Ductile Iron	-20.99	0.13	0.000	0
794	P-457	261	J-438	J-439	8.0	Ductile Iron	-18.52	0.12	0.000	291
1446	P-457	374	J-184	J-326	8.0	Ductile Iron	-0.32	0.00	0.000	689
795	P-458	290	J-439	J-440	8.0	Ductile Iron	-18.52	0.12	0.000	273
1447	P-458	338	J-326	J-185	8.0	Ductile Iron	-5.82	0.04	0.000	689
1448	P-459	331	J-316	J-174	6.0	Ductile Iron	9.91	0.11	0.000	0
796	P-460	322	J-440	J-441	8.0	Ductile Iron	2.38	0.02	0.000	331
1460	P-460	60	J-410	J-302	6.0	Ductile Iron	5.18	0.06	0.000	0
797	P-461	342	J-441	J-416	2.0	Ductile Iron	-2.02	0.21	0.000	327
1461	P-461	204	J-302	J-412	6.0	Ductile Iron	-1.97	0.02	0.000	0
798	P-462	205	J-442	J-443	8.0	Ductile Iron	66.36	0.42	0.000	204
1463	P-462	116	J-327	J-76	8.0	Ductile Iron	800.00	5.11	0.012	0
799	P-463	519	J-443	J-444	8.0	Ductile Iron	26.40	0.17	0.000	507
1465	P-463	377	J-140	J-320	8.0	Ductile Iron	-209.12	1.33	0.001	0
800	P-464	490	J-443	J-445	8.0	Ductile Iron	85.20	0.54	0.000	487
1466	P-464	285	J-321	J-161	8.0	Ductile Iron	-300.25	1.92	0.002	0
801	P-465	144	J-431	J-442	8.0	Ductile Iron	87.26	0.56	0.000	172
1467	P-465	204	J-412	J-302	6.0	Ductile Iron	1.97	0.02	0.000	0
802	P-466	263	J-430	J-446	12.0	Ductile Iron	-483.92	1.37	0.001	352
1468	P-466	60	J-410	J-302	6.0	Ductile Iron	5.18	0.06	0.000	0
803	P-467	522	J-446	J-447	12.0	Ductile Iron	-483.92	1.37	0.001	523
804	P-468	366	J-447	J-448	12.0	Ductile Iron	-503.02	1.43	0.001	366
1477	P-468	76	J-623	PRV-9	10.0	Ductile Iron	0.00	0.00	0.000	0
805	P-469	442	J-448	J-449	12.0	Ductile Iron	-503.02	1.43	0.001	441
1487	P-469	1,725	J-264	J-329	8.0	Ductile Iron	19.10	0.12	0.000	0
806	P-470	76	J-449	PRV-9	10.0	Ductile Iron	0.00	0.00	0.000	89
1496	P-470	138	J-243	J-143	8.0	Ductile Iron	1.59	0.01	0.000	0
807	P-471	300	J-187	J-450	8.0	Ductile Iron	0.00	0.00	0.000	308
1498	P-471	503	J-160	J-330	8.0	Ductile Iron	453.88	2.90	0.005	1,024
808	P-472	247	J-450	J-451	8.0	Ductile Iron	-6.60	0.04	0.000	240
1499	P-472	482	J-330	J-161	8.0	Ductile Iron	453.88	2.90	0.005	1,024
809	P-473	640	J-451	J-452	8.0	Ductile Iron	-17.00	0.11	0.000	623
1500	P-473	359	J-150	J-330	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
810	P-474	233	J-452	J-453	8.0	Ductile Iron	-58.90	0.38	0.000	224
811	P-475	262	J-453	J-454	8.0	Ductile Iron	-68.80	0.44	0.000	263
1503	P-475	594	J-332	J-55	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

FlexTable: Pipe Table

Active Scenario: Base Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
812	P-476	149	J-454	J-455	8.0	Ductile Iron	-91.30	0.58	0.000	145
1505	P-476	1,508	J-19	J-332	10.0	Ductile Iron	-126.55	0.52	0.000	2,119
813	P-477	647	J-455	J-456	12.0	Ductile Iron	78.20	0.22	0.000	640
1506	P-477	500	J-332	J-56	10.0	Ductile Iron	-126.55	0.52	0.000	2,119
814	P-478	305	J-456	J-457	12.0	Ductile Iron	29.20	0.08	0.000	318
1507	P-478	148	J-262	J-332	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
815	P-479	152	J-457	PRV-1	12.0	Ductile Iron	0.00	0.00	0.000	153
1508	P-479	813	J-142	J-129	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
816	P-480	259	J-457	J-172	6.0	Ductile Iron	23.70	0.27	0.000	257
1513	P-480	727	J-164	J-334	12.0	Ductile Iron	607.47	1.72	0.001	900
817	P-481	286	J-454	J-458	6.0	Ductile Iron	17.00	0.19	0.000	291
1514	P-481	228	J-334	J-165	12.0	Ductile Iron	561.27	1.59	0.001	900
818	P-482	409	J-458	J-459	6.0	Ductile Iron	4.90	0.06	0.000	410
819	P-483	306	J-459	J-172	6.0	Ductile Iron	-13.80	0.16	0.000	316
820	P-484	188	J-453	J-460	8.0	Ductile Iron	5.50	0.04	0.000	189
1519	P-484	180	J-336	J-334	8.0	Ductile Iron	-44.00	0.28	0.000	0
821	P-485	339	J-460	J-461	8.0	Ductile Iron	0.00	0.00	0.000	336
1520	P-485	254	J-335	J-336	8.0	Ductile Iron	-5.50	0.04	0.000	0
893	P-486	485	J-133	J-485	6.0	Ductile Iron	-13.20	0.15	0.000	338
1523	P-486	230	J-333	J-338	8.0	Ductile Iron	-16.50	0.11	0.000	0
1524	P-487	160	J-338	J-336	8.0	Ductile Iron	-29.70	0.19	0.000	0
894	P-488	125	J-485	J-487	8.0	Ductile Iron	-18.70	0.12	0.000	285
1525	P-488	258	J-337	J-338	8.0	Ductile Iron	-7.70	0.05	0.000	0
895	P-489	628	J-487	J-486	8.0	Ductile Iron	-46.20	0.29	0.000	548
1527	P-489	260	J-339	J-333	8.0	Ductile Iron	-8.80	0.06	0.000	0
896	P-490	242	J-487	J-488	8.0	Ductile Iron	20.90	0.13	0.000	196
897	P-491	415	J-488	J-489	8.0	Ductile Iron	9.90	0.06	0.000	393
898	P-492	32	J-488	J-191	6.0	Ductile Iron	5.50	0.06	0.000	80
1533	P-492	356	J-276	J-340	8.0	Ductile Iron	16.50	0.11	0.000	0
899	P-493	44	J-646	PRV-7	6.0	Ductile Iron	0.00	0.00	0.000	59
1535	P-493	155	J-342	PRV-18	8.0	Ductile Iron	0.00	0.00	0.000	0
900	P-494	43	PRV-7	J-486	6.0	Ductile Iron	0.00	0.00	0.000	61
1536	P-494	162	PRV-18	J-340	8.0	Ductile Iron	0.00	0.00	0.000	0
901	P-495	194	J-407	PRV-16	6.0	Ductile Iron	-77.00	0.87	0.001	186
1538	P-495	154	J-284	J-343	8.0	Ductile Iron	32.59	0.21	0.000	0
902	P-496	142	PRV-16	J-608	10.0	Ductile Iron	-77.00	0.31	0.000	153
1540	P-496	491	J-343	J-344	8.0	Ductile Iron	14.35	0.09	0.000	0
1541	P-497	367	J-344	J-342	8.0	Ductile Iron	11.46	0.07	0.000	0
906	P-498	76	PRV-10	J-449	10.0	Ductile Iron	503.02	2.05	0.002	92
1542	P-498	784	J-342	J-343	8.0	Ductile Iron	-13.84	0.09	0.000	0
911	P-499	51	J-401	J-490	6.0	Ductile Iron	26.61	0.30	0.000	76
1543	P-499	634	J-284	J-344	8.0	Ductile Iron	20.21	0.13	0.000	0
912	P-500	200	J-490	J-402	6.0	Ductile Iron	18.91	0.21	0.000	182
1545	P-500	506	J-4	J-345	8.0	Ductile Iron	0.00	0.00	0.000	0
959	P-502	99	J-612	PMP-8	10.0	Ductile Iron	557.28	2.28	0.002	50
960	P-503	29	PRV-2	J-491	6.0	Ductile Iron	0.00	0.00	0.000	57
961	P-504	262	J-491	J-416	6.0	Ductile Iron	-31.90	0.36	0.000	263
962	P-505	393	J-440	J-491	6.0	Ductile Iron	-25.30	0.29	0.000	333
923	P-506	174	J-405	J-506	6.0	Ductile Iron	-23.99	0.27	0.000	236
924	P-507	350	J-506	J-406	6.0	Ductile Iron	-23.99	0.27	0.000	379
963	P-508	410	J-138	J-141	8.0	Ductile Iron	-43.93	0.28	0.000	418
964	P-509	306	J-141	J-140	8.0	Ductile Iron	-198.62	1.27	0.001	276

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1589	P-509	113	J-350	VSPB-1	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1590	P-510	129	VSPB-1	J-351	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1598	P-512	357	J-356	J-360	10.0	Ductile Iron	0.00	0.00	0.000	0
925	P-515	235	J-412	J-515	6.0	Ductile Iron	9.79	0.11	0.000	230
1606	P-516	376	J-360	J-361	8.0	Ductile Iron	0.00	0.00	0.000	0
1607	P-517	337	J-361	J-356	8.0	Ductile Iron	0.00	0.00	0.000	0
1608	P-518	136	J-356	J-355	10.0	Ductile Iron	0.00	0.00	0.000	0
934	P-524	871	J-456	J-521	12.0	Ductile Iron	35.20	0.10	0.000	831
935	P-525	599	J-521	J-522	12.0	Ductile Iron	14.17	0.04	0.000	603
1623	P-525	288	J-351	J-369	8.0	Ductile Iron	13.95	0.09	0.000	0
936	P-526	365	J-641	J-523	12.0	Ductile Iron	-601.96	1.71	0.001	356
938	P-528	482	J-523	J-524	12.0	Ductile Iron	107.20	0.30	0.000	479
939	P-529	616	J-524	J-525	12.0	Ductile Iron	77.00	0.22	0.000	657
1644	P-529	375	J-369	J-366	8.0	Ductile Iron	-1.45	0.01	0.000	0
940	P-530	264	J-525	J-526	8.0	Ductile Iron	19.80	0.13	0.000	272
1645	P-530	311	J-366	J-362	8.0	Ductile Iron	-1.45	0.01	0.000	0
941	P-531	485	J-525	J-527	12.0	Ductile Iron	50.60	0.14	0.000	473
1646	P-531	255	J-362	J-375	8.0	Ductile Iron	-10.25	0.07	0.000	0
942	P-532	188	J-428	J-528	8.0	Ductile Iron	178.06	1.14	0.001	205
943	P-533	344	J-528	J-431	8.0	Ductile Iron	81.11	0.52	0.000	352
1652	P-533	217	J-350	PMP-16	12.0	Ductile Iron	68.20	0.19	0.000	0
944	P-534	382	J-528	J-529	8.0	Ductile Iron	89.24	0.57	0.000	366
1653	P-534	233	PMP-16	J-351	12.0	Ductile Iron	68.20	0.19	0.000	0
945	P-535	550	J-529	J-530	8.0	Ductile Iron	11.93	0.08	0.000	552
1655	P-535	445	J-182	J-377	8.0	Ductile Iron	0.00	0.00	0.000	0
946	P-536	932	J-530	J-529	8.0	Ductile Iron	-8.97	0.06	0.000	933
1660	P-536	598	J-521	J-379	12.0	Ductile Iron	10.03	0.03	0.000	0
947	P-537	412	J-529	J-443	8.0	Ductile Iron	54.04	0.34	0.000	412
1662	P-537	451	J-379	J-380	12.0	Ductile Iron	10.03	0.03	0.000	0
948	P-538	120	T-North	J-647	12.0	Ductile Iron	725.42	2.06	0.002	161
1663	P-538	269	J-380	J-522	12.0	Ductile Iron	10.03	0.03	0.000	0
949	P-539	73	T-North off	J-647	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	176
1665	P-539	343	J-232	J-381	12.0	Ductile Iron	35.86	0.10	0.000	0
950	P-540	394	J-647	J-114	8.0	Ductile Iron	37.11	0.24	0.000	532
1666	P-540	374	J-381	J-224	12.0	Ductile Iron	35.86	0.10	0.000	0
1668	P-541	154	J-381	J-382	12.0	Ductile Iron	0.00	0.00	0.000	0
1673	P-542	187	J-383	J-384	6.0	Ductile Iron	0.00	0.00	0.000	0
953	P-543	334	PMP-1	J-647	10.0	Ductile Iron	-988.07	4.04	0.007	334
1687	P-543	1,186	J-225	J-214	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
954	P-544	1,027	J-75	J-531	10.0	Ductile Iron	354.64	1.45	0.001	1,049
1689	P-544	808	J-639	J-389	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
955	P-545	610	J-531	J-79	10.0	Ductile Iron	345.34	1.41	0.001	609
1691	P-545	619	J-389	J-390	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1693	P-546	201	J-390	J-391	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
956	P-547	25	J-45	PMP-2	8.0	Ductile Iron	543.88	3.47	0.007	83
1695	P-547	589	J-391	J-392	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
957	P-548	55	PMP-2	J-658	8.0	Ductile Iron	543.88	3.47	0.007	90
1697	P-548	256	J-391	J-393	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
958	P-549	885	J-647	J-190	8.0	Ductile Iron	-262.40	1.67	0.002	767
1699	P-550	624	J-393	J-394	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1714	P-551	100	J-393	J-399	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1705	P-552	563	J-396	J-397	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1709	P-553	272	J-396	J-398	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1717	P-554	109	J-399	PRV-28	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1718	P-555	61	PRV-28	J-396	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1720	P-556	521	J-285	J-400	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1721	P-557	221	J-389	J-392	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1722	P-558	208	J-392	J-394	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
822	P-601	820	J-601	J-602	6.0	Ductile Iron	-34.37	0.39	0.000	872
823	P-602	248	J-602	J-603	6.0	Ductile Iron	-44.27	0.50	0.000	254
824	P-603	779	J-603	J-604	4.0	Ductile Iron	15.12	0.39	0.000	738
825	P-604	253	J-603	J-605	6.0	Ductile Iron	-68.19	0.77	0.001	200
827	P-609	230	J-607	J-608	10.0	Ductile Iron	448.87	1.83	0.002	230
828	P-610	146	J-608	J-609	10.0	Ductile Iron	365.27	1.49	0.001	136
1594	P-611	878	J-609	J-355	10.0	Ductile Iron	361.97	1.48	0.001	1,195
830	P-612	801	J-610	J-611	10.0	Ductile Iron	336.67	1.38	0.001	805
831	P-613	391	J-611	J-612	10.0	Ductile Iron	336.67	1.38	0.001	354
832	P-614	71	J-612	T-Brader	10.0	Ductile Iron	-542.63	2.22	0.002	167
833	P-615	299	J-612	J-613	10.0	Ductile Iron	-234.17	0.96	0.000	274
834	P-616	546	J-613	J-614	10.0	Ductile Iron	-234.17	0.96	0.000	548
835	P-617	350	J-614	J-615	10.0	Ductile Iron	-302.46	1.24	0.001	352
836	P-618	465	J-615	J-616	10.0	Ductile Iron	-302.46	1.24	0.001	459
837	P-619	488	J-616	J-617	10.0	Ductile Iron	-318.77	1.30	0.001	457
838	P-620	276	J-617	J-421	10.0	Ductile Iron	38.50	0.16	0.000	260
839	P-621	339	J-421	J-419	6.0	Ductile Iron	24.20	0.27	0.000	338
840	P-622	274	J-419	J-618	6.0	Ductile Iron	12.10	0.14	0.000	270
842	P-624	382	J-619	J-620	8.0	Ductile Iron	-56.18	0.36	0.000	376
843	P-625	487	J-620	J-614	8.0	Ductile Iron	-63.88	0.41	0.000	472
844	P-626	374	J-616	J-621	6.0	Ductile Iron	7.51	0.09	0.000	397
845	P-627	550	J-621	J-622	8.0	Ductile Iron	-29.70	0.19	0.000	538
846	P-628	215	J-622	J-623	10.0	Ductile Iron	-96.99	0.40	0.000	237
847	P-629	139	J-623	J-617	10.0	Ductile Iron	-600.00	2.45	0.003	138
849	P-631	419	J-621	J-624	6.0	Ductile Iron	27.31	0.31	0.000	405
850	P-632	428	J-624	J-625	8.0	Ductile Iron	27.31	0.17	0.000	427
851	P-633	250	J-625	J-626	8.0	Ductile Iron	-7.17	0.05	0.000	251
852	P-634	428	J-626	J-627	8.0	Ductile Iron	17.60	0.11	0.000	429
853	P-635	347	J-626	J-628	8.0	Ductile Iron	-39.79	0.25	0.000	335
854	P-636	443	J-628	J-629	8.0	Ductile Iron	-56.29	0.36	0.000	443
855	P-637	282	J-629	J-622	10.0	Ductile Iron	-56.29	0.23	0.000	281
856	P-638	502	J-625	J-630	8.0	Ductile Iron	15.78	0.10	0.000	494
857	P-639	252	J-630	J-631	8.0	Ductile Iron	10.28	0.07	0.000	256
858	P-640	234	J-631	J-632	8.0	Ductile Iron	3.68	0.02	0.000	244
859	P-641	416	J-632	J-633	8.0	Ductile Iron	-15.02	0.10	0.000	412
860	P-642	339	J-633	J-626	8.0	Ductile Iron	-15.02	0.10	0.000	339
861	P-643	722	J-617	J-634	12.0	Ductile Iron	-967.17	2.74	0.003	769
862	P-644	741	J-634	J-635	12.0	Ductile Iron	-967.17	2.74	0.003	705
863	P-645	546	J-635	J-636	12.0	Ductile Iron	-967.18	2.74	0.003	638
864	P-646	214	J-636	J-637	12.0	Ductile Iron	-967.18	2.74	0.003	196
865	P-647	682	J-637	J-638	12.0	Ductile Iron	1,041.46	2.95	0.003	680
866	P-648	1,098	J-638	J-639	12.0	Ductile Iron	1,032.66	2.93	0.003	1,151
867	P-649	62	J-639	T-Goodlander	12.0	Ductile Iron	926.40	2.63	0.003	169
868	P-650	539	J-639	J-640	12.0	Ductile Iron	-571.16	1.62	0.001	503
869	P-651	422	J-640	J-641	12.0	Ductile Iron	-571.16	1.62	0.001	439

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
870	P-652	755	J-641	J-642	4.0	Ductile Iron	12.10	0.31	0.000	752
871	P-654	518	J-643	J-461	8.0	Ductile Iron	39.60	0.25	0.000	517
872	P-655	185	J-455	PRV-5	8.0	Ductile Iron	0.00	0.00	0.000	50
873	P-656	169	J-643	J-644	12.0	Ductile Iron	-767.96	2.18	0.002	141
874	P-657	160	J-644	PRV-5	8.0	Ductile Iron	0.00	0.00	0.000	50
875	P-658	1,529	J-644	J-645	12.0	Ductile Iron	-941.86	2.67	0.003	1,545
876	P-659	276	J-645	J-646	12.0	Ductile Iron	-796.81	2.26	0.002	298
879	P-664	194	J-648	J-649	4.0	Ductile Iron	23.50	0.60	0.001	182
880	P-665	425	J-649	J-650	4.0	Ductile Iron	18.00	0.46	0.000	431
881	P-666	425	J-650	J-651	4.0	Ductile Iron	9.20	0.23	0.000	469
882	P-667	397	J-649	PRV-FUT	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	404
883	P-668	217	PRV-FUT	J-642	4.0	Ductile Iron	(N/A)	(N/A)	(N/A)	251
885	P-670	284	J-652	J-653	8.0	Ductile Iron	13.70	0.09	0.000	273
886	P-671	734	J-652	J-654	8.0	Ductile Iron	115.50	0.74	0.000	728
887	P-672	362	J-654	J-655	8.0	Ductile Iron	8.80	0.06	0.000	337
888	P-673	454	J-654	J-656	8.0	Ductile Iron	97.90	0.62	0.000	457
889	P-674	44	J-635	PRV-11	8.0	Ductile Iron	0.00	0.00	0.000	20
890	P-675	146	PRV-15	J-608	6.0	Ductile Iron	0.00	0.00	0.000	148
891	P-676	50	J-634	PRV-12	8.0	Ductile Iron	0.00	0.00	0.000	108
905	P-679	76	J-623	PRV-10	10.0	Ductile Iron	503.02	2.05	0.002	93
907	P-680	193	J-455	PRV-6	8.0	Ductile Iron	-173.90	1.11	0.001	50
908	P-681	168	PRV-6	J-644	8.0	Ductile Iron	-173.90	1.11	0.001	50
909	P-682	77	J-646	PRV-8	6.0	Ductile Iron	46.20	0.52	0.000	104
910	P-683	71	PRV-8	J-486	6.0	Ductile Iron	46.20	0.52	0.000	93
913	P-684	210	J-605	J-658	6.0	Ductile Iron	-133.19	1.51	0.002	292
914	P-685	229	J-658	J-401	6.0	Ductile Iron	0.00	0.00	0.000	190
915	P-686	374	J-658	J-659	10.0	Ductile Iron	410.69	1.68	0.001	331
916	P-687	324	J-659	J-607	10.0	Ductile Iron	405.19	1.66	0.001	367
771	P-688	528	J-420	J-421	8.0	Ductile Iron	0.00	0.00	0.000	503
969	P-705	216	J-75	J-47	8.0	Ductile Iron	297.58	1.90	0.002	249
971	P-707	223	J-607	J-606	8.0	Ductile Iron	-50.29	0.32	0.000	245
972	P-708	252	J-606	J-604	8.0	Ductile Iron	-21.99	0.14	0.000	221
973	P-709	247	J-604	J-601	8.0	Ductile Iron	-14.57	0.09	0.000	291
974	P-720	160	J-252	J-720	10.0	Ductile Iron	43.01	0.18	0.000	349
975	P-721	527	J-720	J-721	10.0	Ductile Iron	14.61	0.06	0.000	427
976	P-722	595	J-721	J-722	10.0	Ductile Iron	14.61	0.06	0.000	362
977	P-723	293	J-722	J-56	10.0	Ductile Iron	14.61	0.06	0.000	228
1005	P-816	199	J-515	J-810	8.0	Ductile Iron	0.19	0.00	0.000	214
1006	P-817	199	J-412	J-811	6.0	Ductile Iron	-13.73	0.16	0.000	224
1007	P-818	229	J-811	J-413	6.0	Ductile Iron	-30.04	0.34	0.000	217
1008	P-819	236	J-810	J-811	6.0	Ductile Iron	-16.31	0.19	0.000	240
1009	P-820	374	J-810	J-812	8.0	Ductile Iron	12.10	0.08	0.000	378
1643	P-821	1,244	J-376	J-350	12.0	Ductile Iron	545.01	1.55	0.001	0
1640	P-822	281	J-375	J-349	12.0	Ductile Iron	-17.95	0.05	0.000	0
1627	P-823	241	J-349	J-351	12.0	Ductile Iron	-17.95	0.05	0.000	0
1628	P-824	1,055	J-350	J-290	12.0	Ductile Iron	476.81	1.35	0.001	0
1572	P-825	166	J-351	J-353	12.0	Ductile Iron	36.30	0.10	0.000	0
1575	P-826	351	J-353	J-354	12.0	Ductile Iron	28.60	0.08	0.000	0
1670	P-827	675	J-354	J-383	12.0	Ductile Iron	14.30	0.04	0.000	0
1671	P-828	325	J-383	J-352	12.0	Ductile Iron	8.80	0.02	0.000	0
1649	P-829	185	J-342	PRV-19	6.0	Ductile Iron	0.00	0.00	0.000	0
1650	P-830	155	PRV-19	J-340	6.0	Ductile Iron	0.00	0.00	0.000	0

FlexTable: Pipe Table

Active Scenario: Base Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1595	P-831	324	J-355	J-610	10.0	Ductile Iron	361.97	1.48	0.001	1,195
1675	P-832	241	J-652	J-385	8.0	Ductile Iron	-18.41	0.12	0.000	0
1678	P-833	422	J-385	J-386	8.0	Ductile Iron	-18.41	0.12	0.000	0
1681	P-834	403	J-386	J-387	8.0	Ductile Iron	-18.41	0.12	0.000	0
1682	P-835	369	J-387	J-218	8.0	Ductile Iron	-18.41	0.12	0.000	0
1708	P-836	203	J-398	J-292	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1715	P-837	97	J-399	PRV-27	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1712	P-838	81	PRV-27	J-396	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

FlexTable: PRV Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
497	PRV-1	1,210.0	12.0	1,307.0	42.0	0.00	1,420.1	1,311.2	0.00
501	PRV-2	1,198.0	4.0	1,295.0	42.0	0.00	1,394.0	1,302.4	0.00
500	PRV-3	1,190.0	6.0	1,275.5	37.0	0.00	1,394.0	1,302.7	0.00
499	PRV-4	1,138.0	4.0	1,295.0	68.0	0.00	1,413.9	1,304.8	0.00
506	PRV-5	1,300.0	8.0	1,408.6	47.0	0.00	1,492.5	1,420.1	0.00
512	PRV-6	1,300.0	3.0	1,420.1	52.0	173.90	1,492.4	1,420.2	72.16
508	PRV-7	1,230.0	6.0	1,391.7	70.0	0.00	1,497.1	1,403.4	0.00
513	PRV-8	1,230.0	2.0	1,403.3	75.0	46.20	1,497.1	1,403.4	93.65
505	PRV-9	1,290.0	10.0	1,380.1	39.0	0.00	1,489.0	1,396.2	0.00
511	PRV-10	1,290.0	3.0	1,396.3	46.0	503.02	1,488.9	1,396.4	92.51
504	PRV-11	1,229.0	6.0	1,379.2	65.0	0.00	1,493.4	1,394.2	0.00
503	PRV-12	1,255.0	3.0	1,389.0	58.0	0.00	1,491.4	1,394.9	0.00
502	PRV-13	1,297.0	6.0	1,382.5	37.0	0.00	1,488.2	1,394.1	0.00
510	PRV-14	1,297.0	2.0	1,394.0	42.0	41.88	1,488.2	1,394.1	94.07
498	PRV-15	1,250.0	6.0	1,402.5	66.0	0.00	1,490.5	1,414.0	0.00
509	PRV-16	1,250.0	2.0	1,414.0	71.0	77.00	1,490.5	1,414.2	76.37
1119	PRV-17	1,390.0	6.0	1,482.4	40.0	0.00	1,562.8	1,488.9	0.00
1528	PRV-18	1,389.0	6.0	1,492.4	40.0	0.00	1,563.3	1,492.2	0.00
1648	PRV-19	1,389.0	2.0	1,481.4	40.0	0.00	1,563.3	1,492.2	0.00
1079	PRV-20	1,471.0	8.0	1,551.9	35.0	0.00	1,763.1	1,563.4	0.00
1113	PRV-21	1,471.0	2.0	1,563.4	40.0	185.30	1,763.0	1,563.5	199.55
1304	PRV-22	1,450.0	6.0	1,551.7	44.0	0.00	1,662.6	1,563.3	0.00
1307	PRV-23	1,450.0	2.0	1,563.2	49.0	101.60	1,662.6	1,563.3	99.33
1710	PRV-27	1,295.0	6.0	1,387.4	40.0	(N/A)	(N/A)	(N/A)	(N/A)
1716	PRV-28	1,295.0	2.0	1,387.4	40.0	(N/A)	(N/A)	(N/A)	(N/A)
507	PRV-FUT	1,350.0	6.0	1,470.1	0.0	(N/A)	(N/A)	(N/A)	(N/A)

FlexTable: Pump Table

Active Scenario: Base Pk Hr

ID	Label	Elevation (ft)	Pump Definition	Pump Status	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
495	PMP-1	1,275.0	PMP-1	On	1,300.5	1,498.2	988.07	197.76
496	PMP-2	1,280.0	PMP-2	On	1,304.5	1,492.2	543.88	187.79
494	PMP-8	1,471.0	PMP-8	On	1,487.7	1,763.5	557.28	275.77
1256	PMP-9	1,471.0	PMP-8	On	1,487.6	1,763.8	556.19	276.26
1273	PMP-10	1,450.0	PMP-10	On	1,489.2	1,662.8	677.42	173.58
1315	PMP-11	1,165.0	PMP-11	On	1,302.5	1,524.7	1,004.28	222.21
1386	PMP-12	1,165.0	PMP-11	On	1,302.4	1,524.6	1,004.35	222.19
1651	PMP-16	1,600.0	PMP-Valhalla Fire	On	1,660.8	1,863.8	68.20	202.98

FlexTable: Tank Table

Active Scenario: Base Pk Hr

ID	Label	Zone	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Initial) (ft)	Elevation (Maximum) (ft)	Volume (Inactive) (gal)	Diameter (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
491	T-Brader	Zone-3A	1,471.1	1,471.1	1,488.1	1,489.1	200,000.00	41.50	542.63	1,488.1
492	T-Goodlander	Zone-3A	1,459.8	1,459.8	1,489.8	1,491.8	1,000,000.00	73.00	-926.40	1,489.8
1206	T-Lookout	Zone-6A	1,729.5	1,729.5	1,747.0	1,749.5	1,192,000.00	102.00	-928.17	1,747.0
490	T-North	Zone-1	1,283.9	1,283.9	1,303.0	1,305.4	396,000.00	56.00	725.42	1,303.0
489	T-North off	Zone-1	1,283.9	1,283.9	1,305.1	1,305.4	164,000.00	36.00	(N/A)	(N/A)
488	T-Palm	Zone-1	1,287.7	1,287.7	1,304.7	1,305.7	462,000.00	66.00	745.26	1,304.7
1272	T-Valhalla 1	Zone-5A	1,635.0	1,635.0	1,660.0	1,666.0	158,500.00	30.00	-280.69	1,660.0
1313	T-Valhalla 2	Zone-5A	1,635.0	1,635.0	1,660.0	1,666.0	158,500.00	30.00	-196.12	1,660.0

FlexTable: Pipe Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
515	P-1	540	J-1	J-2	6.0	Ductile Iron	-6.41	0.07	0.000	522
516	P-2	256	J-2	J-3	6.0	Ductile Iron	-9.75	0.11	0.000	261
517	P-3	743	J-3	J-4	6.0	Ductile Iron	7.86	0.09	0.000	528
518	P-4	298	J-3	J-6	8.0	Ductile Iron	-19.84	0.13	0.000	280
918	P-5	115	J-76	J-5	8.0	Ductile Iron	0.00	0.00	0.000	50
519	P-6	261	J-6	J-7	8.0	Ductile Iron	8.35	0.05	0.000	261
520	P-7	472	J-7	J-8	8.0	Ductile Iron	2.35	0.01	0.000	466
521	P-8	261	J-8	J-9	8.0	Ductile Iron	-2.32	0.01	0.000	258
522	P-9	472	J-9	J-6	8.0	Ductile Iron	-6.32	0.04	0.000	472
523	P-10	369	J-3	J-10	6.0	Ductile Iron	-8.43	0.10	0.000	373
524	P-11	780	J-10	J-11	6.0	Ductile Iron	9.73	0.11	0.000	584
1191	P-12	206	J-524	J-279	8.0	Ductile Iron	9.33	0.06	0.000	0
1193	P-13	340	J-122	J-142	6.0	Ductile Iron	2.00	0.02	0.000	0
527	P-14	369	J-12	J-14	6.0	Ductile Iron	-6.18	0.07	0.000	367
1017	P-15	222	J-199	J-15	8.0	Ductile Iron	41.84	0.27	0.000	247
529	P-16	319	J-15	J-6	8.0	Ductile Iron	37.84	0.24	0.000	323
530	P-17	316	J-14	J-17	6.0	Ductile Iron	-14.51	0.16	0.000	311
1195	P-18	434	J-526	J-179	8.0	Ductile Iron	8.00	0.05	0.000	0
919	P-19	120	J-76	J-16	8.0	Ductile Iron	-350.00	2.23	0.003	50
532	P-20	886	J-19	J-20	10.0	Ductile Iron	98.55	0.40	0.000	836
1197	P-21	489	J-527	J-222	12.0	Ductile Iron	23.33	0.07	0.000	0
533	P-22	201	J-18	J-22	10.0	Ductile Iron	-58.94	0.24	0.000	196
534	P-23	456	J-22	J-19	10.0	Ductile Iron	-80.40	0.33	0.000	504
535	P-24	382	J-22	J-23	8.0	Ductile Iron	2.55	0.02	0.000	376
1199	P-25	608	J-222	J-239	12.0	Ductile Iron	21.88	0.06	0.000	0
1201	P-26	687	J-239	J-255	12.0	Ductile Iron	21.88	0.06	0.000	0
538	P-27	364	J-26	J-27	8.0	Ductile Iron	-7.15	0.05	0.000	358
539	P-28	400	J-27	J-28	12.0	Ductile Iron	51.91	0.15	0.000	356
540	P-29	364	J-28	J-17	12.0	Ductile Iron	41.42	0.12	0.000	370
541	P-30	654	J-27	J-29	8.0	Ductile Iron	-26.97	0.17	0.000	642
542	P-31	384	J-29	J-30	8.0	Ductile Iron	18.73	0.12	0.000	358
543	P-32	394	J-30	J-18	8.0	Ductile Iron	18.73	0.12	0.000	382
1203	P-33	390	J-255	J-256	12.0	Ductile Iron	4.36	0.01	0.000	0
545	P-34	61	J-31	J-32	12.0	Ductile Iron	-3.15	0.01	0.000	82
1205	P-35	386	J-255	J-257	12.0	Ductile Iron	0.00	0.00	0.000	0
546	P-36	303	J-32	J-34	12.0	Ductile Iron	-13.15	0.04	0.000	308
547	P-37	649	J-34	J-35	8.0	Ductile Iron	-95.67	0.61	0.000	636
548	P-38	636	J-35	J-27	12.0	Ductile Iron	47.42	0.13	0.000	671
549	P-39	651	J-35	J-36	8.0	Ductile Iron	-55.80	0.36	0.000	639
550	P-40	320	J-36	J-37	8.0	Ductile Iron	54.31	0.35	0.000	323
551	P-41	313	J-37	J-29	8.0	Ductile Iron	49.76	0.32	0.000	321
552	P-42	646	J-34	J-38	12.0	Ductile Iron	66.88	0.19	0.000	658
553	P-43	341	J-38	J-39	12.0	Ductile Iron	-318.86	0.90	0.000	318
554	P-44	309	J-39	J-40	12.0	Ductile Iron	-323.35	0.92	0.000	318
555	P-45	650	J-40	J-35	12.0	Ductile Iron	116.92	0.33	0.000	653
556	P-46	325	J-40	J-41	12.0	Ductile Iron	-362.57	1.03	0.000	323
557	P-47	310	J-41	J-42	12.0	Ductile Iron	-365.72	1.04	0.000	315
558	P-48	326	J-42	J-43	8.0	Ductile Iron	119.93	0.77	0.000	335
559	P-49	332	J-43	J-36	8.0	Ductile Iron	114.84	0.73	0.000	318
1225	P-50	124	J-272	J-270	8.0	Ductile Iron	146.29	0.93	0.001	0
1209	P-51	773	J-45	J-46	12.0	Ductile Iron	-604.27	1.71	0.001	0
561	P-52	45	J-45	T-Palm	12.0	Ductile Iron	282.47	0.80	0.000	108

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
562	P-53	357	J-38	J-46	12.0	Ductile Iron	604.27	1.71	0.001	396
1210	P-54	1,038	J-45	J-38	8.0	Ductile Iron	-217.77	1.39	0.001	0
564	P-55	648	J-38	J-47	6.0	Ductile Iron	-140.41	1.59	0.003	615
565	P-56	624	J-47	J-48	8.0	Ductile Iron	201.13	1.28	0.001	650
566	P-57	639	J-48	J-40	6.0	Ductile Iron	94.37	1.07	0.001	630
567	P-58	618	J-48	J-49	8.0	Ductile Iron	81.52	0.52	0.000	613
970	P-59	670	J-47	J-38	8.0	Ductile Iron	320.61	2.05	0.003	642
1264	P-60	195	J-63	J-50	8.0	Ductile Iron	119.37	0.76	0.000	493
1265	P-61	281	J-50	J-42	8.0	Ductile Iron	119.37	0.76	0.000	493
1266	P-62	241	J-42	J-53	12.0	Ductile Iron	-372.89	1.06	0.000	0
571	P-63	46	J-52	J-49	8.0	Ductile Iron	110.80	0.71	0.000	48
573	P-65	523	J-53	J-54	8.0	Ductile Iron	6.79	0.04	0.000	500
574	P-66	197	J-54	J-55	6.0	Ductile Iron	3.39	0.04	0.000	186
576	P-68	336	J-56	J-57	10.0	Ductile Iron	-37.31	0.15	0.000	360
577	P-69	142	J-57	J-58	12.0	Ductile Iron	279.67	0.79	0.000	342
578	P-70	310	J-58	J-59	12.0	Ductile Iron	261.82	0.74	0.000	120
580	P-72	222	J-57	J-60	12.0	Ductile Iron	-316.98	0.90	0.000	214
581	P-73	419	J-60	J-61	12.0	Ductile Iron	-346.74	0.98	0.000	462
582	P-74	255	J-61	J-62	10.0	Ductile Iron	29.76	0.12	0.000	334
583	P-75	154	J-49	J-63	8.0	Ductile Iron	186.44	1.19	0.001	135
585	P-77	240	J-63	J-64	8.0	Ductile Iron	67.07	0.43	0.000	237
586	P-78	478	J-64	J-53	8.0	Ductile Iron	74.77	0.48	0.000	499
587	P-79	150	J-64	J-65	8.0	Ductile Iron	-11.09	0.07	0.000	143
588	P-80	356	J-65	J-66	6.0	Ductile Iron	-12.96	0.15	0.000	350
589	P-81	553	J-66	J-67	6.0	Ductile Iron	-75.95	0.86	0.001	550
932	P-82	559	J-70	J-65	1.0	Ductile Iron	0.68	0.28	0.001	550
590	P-83	228	J-68	J-69	8.0	Ductile Iron	148.19	0.95	0.001	231
591	P-84	321	J-69	J-52	8.0	Ductile Iron	110.80	0.71	0.000	326
592	P-85	341	J-67	J-70	8.0	Ductile Iron	19.46	0.12	0.000	362
593	P-86	200	J-70	J-68	8.0	Ductile Iron	14.05	0.09	0.000	188
594	P-87	520	J-67	J-71	8.0	Ductile Iron	-101.28	0.65	0.000	511
595	P-88	52	J-71	J-72	8.0	Ductile Iron	-131.04	0.84	0.000	59
596	P-89	209	J-72	J-73	12.0	Ductile Iron	406.25	1.15	0.001	195
597	P-90	401	J-73	J-61	12.0	Ductile Iron	376.50	1.07	0.000	347
598	P-91	203	J-47	J-74	8.0	Ductile Iron	-334.51	2.14	0.003	202
599	P-92	25	J-74	J-75	10.0	Ductile Iron	-484.60	1.98	0.002	57
600	P-93	110	J-75	J-76	10.0	Ductile Iron	-1,150.00	4.70	0.009	105
601	P-94	565	J-74	J-77	6.0	Ductile Iron	95.17	1.08	0.001	573
602	P-95	670	J-77	J-78	6.0	Ductile Iron	134.93	1.53	0.002	674
1226	P-96	354	J-270	J-271	8.0	Ductile Iron	0.00	0.00	0.000	0
603	P-97	320	J-78	J-80	6.0	Ductile Iron	69.42	0.79	0.001	334
604	P-98	187	J-80	J-79	6.0	Ductile Iron	-226.12	2.57	0.006	179
605	P-99	627	J-79	J-81	6.0	Ductile Iron	-32.21	0.37	0.000	627
606	P-100	383	J-81	J-82	6.0	Ductile Iron	-29.60	0.34	0.000	374
607	P-101	317	J-82	J-48	6.0	Ductile Iron	-11.00	0.12	0.000	322
1684	P-102	337	J-213	J-388	16.0	Ductile Iron	597.91	0.95	0.000	0
1685	P-103	418	J-388	T-Lookout	16.0	Ductile Iron	597.91	0.95	0.000	0
608	P-105	482	J-82	J-83	8.0	Ductile Iron	-23.45	0.15	0.000	491
609	P-106	190	J-83	J-69	8.0	Ductile Iron	-23.45	0.15	0.000	168
610	P-107	323	J-81	J-84	6.0	Ductile Iron	-11.28	0.13	0.000	327
612	P-109	322	J-79	J-85	8.0	Ductile Iron	-148.29	0.95	0.001	325
613	P-110	160	J-85	J-86	6.0	Ductile Iron	28.85	0.33	0.000	175

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
614	P-111	460	J-86	J-84	6.0	Ductile Iron	23.76	0.27	0.000	449
615	P-112	354	J-85	J-87	8.0	Ductile Iron	-177.14	1.13	0.001	363
616	P-113	399	J-87	J-88	8.0	Ductile Iron	-48.38	0.31	0.000	399
617	P-114	372	J-88	J-68	8.0	Ductile Iron	142.38	0.91	0.001	367
1223	P-115	343	J-646	J-272	12.0	Ductile Iron	-842.03	2.39	0.002	331
1224	P-116	140	J-272	PMP-1	12.0	Ductile Iron	-988.31	2.80	0.003	331
620	P-117	538	J-88	J-91	8.0	Ductile Iron	-194.64	1.24	0.001	536
621	P-118	589	J-91	J-92	8.0	Ductile Iron	-294.95	1.88	0.002	577
622	P-119	102	J-92	J-296	8.0	Ductile Iron	405.05	2.59	0.004	141
623	P-120	396	J-296	J-72	8.0	Ductile Iron	390.17	2.49	0.004	411
624	P-121	52	J-197	J-92	8.0	Ductile Iron	700.00	4.47	0.011	157
625	P-122	515	J-87	J-94	8.0	Ductile Iron	-96.76	0.62	0.000	520
626	P-123	402	J-94	J-91	6.0	Ductile Iron	-94.37	1.07	0.001	395
627	P-124	815	J-94	J-95	8.0	Ductile Iron	42.94	0.27	0.000	796
628	P-125	445	J-95	J-90	12.0	Ductile Iron	170.54	0.48	0.000	483
1227	P-126	596	J-270	J-268	8.0	Ductile Iron	146.29	0.93	0.001	0
630	P-127	380	J-96	J-97	10.0	Ductile Iron	-14.41	0.06	0.000	423
631	P-128	79	J-96	J-72	12.0	Ductile Iron	147.13	0.42	0.000	86
632	P-129	835	J-78	J-98	6.0	Ductile Iron	60.85	0.69	0.001	782
633	P-130	321	J-98	J-99	6.0	Ductile Iron	50.18	0.57	0.000	344
634	P-131	364	J-99	J-100	6.0	Ductile Iron	-19.26	0.22	0.000	347
635	P-132	668	J-100	J-101	4.0	Ductile Iron	27.07	0.69	0.001	645
636	P-133	327	J-101	J-102	6.0	Ductile Iron	-56.77	0.64	0.000	347
637	P-134	688	J-102	J-99	6.0	Ductile Iron	-63.44	0.72	0.001	650
638	P-135	516	J-100	J-103	6.0	Ductile Iron	0.00	0.00	0.000	527
639	P-136	106	J-100	J-104	6.0	Ductile Iron	-52.99	0.60	0.000	123
640	P-137	228	J-104	J-105	6.0	Ductile Iron	-62.99	0.71	0.001	213
1128	P-138	653	J-234	J-105	4.0	Ductile Iron	-37.97	0.97	0.002	0
642	P-139	299	J-106	J-101	6.0	Ductile Iron	-71.23	0.81	0.001	329
643	P-140	663	J-105	J-107	6.0	Ductile Iron	-46.08	0.52	0.000	670
644	P-141	329	J-107	J-108	6.0	Ductile Iron	-59.41	0.67	0.001	344
645	P-142	667	J-108	J-109	8.0	Ductile Iron	97.81	0.62	0.000	663
646	P-143	328	J-109	J-105	6.0	Ductile Iron	59.55	0.68	0.001	339
647	P-144	337	J-108	J-110	6.0	Ductile Iron	-168.56	1.91	0.004	312
648	P-145	601	J-110	J-111	8.0	Ductile Iron	179.21	1.14	0.001	549
649	P-146	199	J-111	J-112	8.0	Ductile Iron	167.88	1.07	0.001	226
650	P-147	210	J-112	J-113	6.0	Ductile Iron	159.21	1.81	0.003	202
651	P-148	501	J-113	J-109	8.0	Ductile Iron	-34.26	0.22	0.000	487
652	P-149	404	J-113	J-114	6.0	Ductile Iron	178.14	2.02	0.004	411
653	P-150	304	J-114	J-115	8.0	Ductile Iron	-68.15	0.44	0.000	316
1180	P-151	138	J-444	J-21	8.0	Ductile Iron	8.67	0.06	0.000	0
917	P-152	30	J-115	J-196	12.0	Ductile Iron	-1,650.00	4.68	0.007	50
1182	P-153	285	J-21	J-24	8.0	Ductile Iron	4.67	0.03	0.000	0
656	P-154	167	J-116	J-117	8.0	Ductile Iron	215.95	1.38	0.001	168
657	P-155	424	J-117	J-106	8.0	Ductile Iron	203.29	1.30	0.001	453
658	P-156	185	J-116	J-118	12.0	Ductile Iron	-596.40	1.69	0.001	170
659	P-157	353	J-118	J-119	8.0	Ductile Iron	-306.78	1.96	0.002	342
660	P-158	352	J-119	J-79	8.0	Ductile Iron	-269.84	1.72	0.002	343
661	P-159	662	J-119	J-120	4.0	Ductile Iron	-42.45	1.08	0.002	681
662	P-160	360	J-120	J-121	4.0	Ductile Iron	-10.90	0.28	0.000	352
663	P-161	317	J-121	J-122	4.0	Ductile Iron	-10.90	0.28	0.000	301
664	P-162	379	J-122	J-94	6.0	Ductile Iron	57.75	0.66	0.001	361

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
665	P-163	670	J-118	J-123	6.0	Ductile Iron	-176.97	2.01	0.004	658
666	P-164	819	J-123	J-124	6.0	Ductile Iron	5.69	0.06	0.000	819
667	P-165	371	J-124	J-122	6.0	Ductile Iron	85.56	0.97	0.001	355
668	P-166	390	J-124	J-125	6.0	Ductile Iron	-86.72	0.98	0.001	409
669	P-167	452	J-125	J-126	12.0	Ductile Iron	-203.96	0.58	0.000	446
670	P-168	202	J-126	J-127	12.0	Ductile Iron	-203.96	0.58	0.000	196
671	P-169	245	J-127	J-128	12.0	Ductile Iron	676.21	1.92	0.001	291
672	P-170	223	J-128	J-129	12.0	Ductile Iron	676.21	1.92	0.001	220
673	P-171	129	J-129	J-130	12.0	Ductile Iron	527.42	1.50	0.001	132
674	P-172	499	J-130	J-131	12.0	Ductile Iron	467.91	1.33	0.001	409
675	P-173	123	J-131	J-95	12.0	Ductile Iron	238.20	0.68	0.000	150
676	P-174	645	J-117	J-132	6.0	Ductile Iron	6.67	0.08	0.000	654
677	P-175	253	J-132	J-133	6.0	Ductile Iron	0.00	0.00	0.000	247
678	P-176	347	J-118	J-139	6.0	Ductile Iron	-139.49	1.58	0.003	366
679	P-177	669	J-139	J-135	6.0	Ductile Iron	-146.82	1.67	0.003	658
680	P-178	346	J-135	J-123	12.0	Ductile Iron	299.56	0.85	0.000	362
681	P-179	516	J-135	J-136	12.0	Ductile Iron	-274.83	0.78	0.000	520
682	P-180	468	J-136	J-125	12.0	Ductile Iron	-274.83	0.78	0.000	455
683	P-181	373	J-135	J-137	12.0	Ductile Iron	-188.89	0.54	0.000	354
684	P-182	736	J-137	J-138	4.0	Ductile Iron	-40.97	1.05	0.002	686
1184	P-183	204	J-24	J-25	8.0	Ductile Iron	4.67	0.03	0.000	0
1186	P-184	275	J-523	J-33	12.0	Ductile Iron	-772.83	2.19	0.002	537
1187	P-185	257	J-33	J-643	12.0	Ductile Iron	-781.50	2.22	0.002	537
685	P-186	346	J-125	J-141	6.0	Ductile Iron	-163.58	1.86	0.004	372
686	P-187	394	J-127	J-143	12.0	Ductile Iron	-969.44	2.75	0.003	380
687	P-188	157	J-143	J-144	12.0	Ductile Iron	29.76	0.08	0.000	162
688	P-189	271	J-144	J-145	12.0	Ductile Iron	0.00	0.00	0.000	270
689	P-190	701	J-146	J-147	12.0	Ductile Iron	-923.70	2.62	0.003	721
690	P-191	1,142	J-147	J-148	12.0	Ductile Iron	-788.51	2.24	0.002	1,179
691	P-192	293	J-148	J-149	6.0	Ductile Iron	9.33	0.11	0.000	278
692	P-193	360	J-149	J-150	6.0	Ductile Iron	9.33	0.11	0.000	382
693	P-194	212	J-148	J-151	12.0	Ductile Iron	-797.85	2.26	0.002	216
694	P-195	167	J-151	J-152	12.0	Ductile Iron	-800.39	2.27	0.002	181
695	P-196	340	J-152	J-153	8.0	Ductile Iron	25.41	0.16	0.000	313
696	P-197	320	J-153	J-154	8.0	Ductile Iron	19.41	0.12	0.000	328
697	P-198	253	J-154	J-155	8.0	Ductile Iron	8.74	0.06	0.000	358
698	P-199	246	J-155	J-156	8.0	Ductile Iron	-0.59	0.00	0.000	299
699	P-200	431	J-156	J-157	8.0	Ductile Iron	18.24	0.12	0.000	263
700	P-201	483	J-152	J-158	12.0	Ductile Iron	-852.33	2.42	0.002	485
701	P-202	237	J-158	J-159	12.0	Ductile Iron	-854.03	2.42	0.002	234
702	P-203	138	J-159	J-160	8.0	Ductile Iron	-854.03	5.45	0.016	159
704	P-205	378	J-161	J-147	8.0	Ductile Iron	164.94	1.05	0.001	364
705	P-206	219	J-160	J-162	12.0	Ductile Iron	-1,381.87	3.92	0.005	214
706	P-207	101	J-162	J-163	12.0	Ductile Iron	618.13	1.75	0.001	108
707	P-208	629	J-163	J-164	12.0	Ductile Iron	617.28	1.75	0.001	676
1189	P-210	403	J-33	J-89	8.0	Ductile Iron	0.00	0.00	0.000	0
710	P-211	207	J-166	J-167	8.0	Ductile Iron	294.17	1.88	0.002	200
711	P-212	310	J-167	J-168	8.0	Ductile Iron	293.51	1.87	0.002	311
712	P-213	166	J-168	J-169	8.0	Ductile Iron	-394.93	2.52	0.004	160
713	P-214	314	J-169	J-170	8.0	Ductile Iron	-403.60	2.58	0.004	316
714	P-215	456	J-170	J-165	12.0	Ductile Iron	-186.13	0.53	0.000	436
715	P-216	276	J-169	J-171	6.0	Ductile Iron	4.67	0.05	0.000	258

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
716	P-217	251	J-171	J-172	6.0	Ductile Iron	0.00	0.00	0.000	232
717	P-218	365	PRV-1	J-170	12.0	Ductile Iron	226.80	0.64	0.000	358
718	P-219	331	J-137	J-173	12.0	Ductile Iron	-153.44	0.44	0.000	341
722	P-223	250	J-176	J-177	8.0	Ductile Iron	-15.02	0.10	0.000	247
723	P-224	331	J-177	J-173	12.0	Ductile Iron	151.02	0.43	0.000	332
1228	P-226	185	J-268	J-269	8.0	Ductile Iron	0.00	0.00	0.000	0
1229	P-227	164	J-268	J-267	8.0	Ductile Iron	146.28	0.93	0.001	0
726	P-228	375	J-177	J-181	8.0	Ductile Iron	-368.20	2.35	0.003	383
727	P-229	409	J-181	J-182	8.0	Ductile Iron	24.73	0.16	0.000	415
728	P-230	516	J-181	J-183	8.0	Ductile Iron	-396.26	2.53	0.004	513
729	P-231	388	J-183	J-198	8.0	Ductile Iron	-684.26	4.37	0.010	342
730	P-232	193	J-198	J-168	8.0	Ductile Iron	-685.10	4.37	0.011	254
731	P-233	181	J-177	J-184	8.0	Ductile Iron	202.16	1.29	0.001	223
733	P-235	203	J-185	J-186	2.0	Ductile Iron	-17.26	1.76	0.014	204
734	P-236	252	J-186	J-183	8.0	Ductile Iron	-283.33	1.81	0.002	243
735	P-237	406	J-186	J-187	8.0	Ductile Iron	264.73	1.69	0.002	398
736	P-238	649	J-187	J-188	8.0	Ductile Iron	251.46	1.61	0.002	659
737	P-239	179	J-188	J-189	8.0	Ductile Iron	246.79	1.58	0.002	179
738	P-240	132	J-189	J-190	6.0	Ductile Iron	242.79	2.76	0.007	121
739	P-241	411	J-184	J-190	8.0	Ductile Iron	209.42	1.34	0.001	353
740	P-242	244	J-189	J-191	8.0	Ductile Iron	0.00	0.00	0.000	242
1230	P-243	451	J-267	J-266	8.0	Ductile Iron	146.28	0.93	0.001	0
1231	P-244	89	J-266	J-260	8.0	Ductile Iron	146.28	0.93	0.001	0
741	P-245	320	J-131	J-192	12.0	Ductile Iron	229.71	0.65	0.000	285
1232	P-246	486	J-260	J-265	8.0	Ductile Iron	0.00	0.00	0.000	0
743	P-247	309	J-193	J-194	6.0	Ductile Iron	21.52	0.24	0.000	314
1233	P-248	126	J-260	J-258	8.0	Ductile Iron	146.28	0.93	0.001	0
745	P-249	299	J-195	J-192	4.0	Ductile Iron	-12.91	0.33	0.000	338
926	P-250	151	J-193	J-250	8.0	Ductile Iron	111.72	0.71	0.000	156
927	P-251	371	J-250	J-251	8.0	Ductile Iron	111.72	0.71	0.000	371
928	P-252	385	J-251	J-252	8.0	Ductile Iron	81.97	0.52	0.000	395
929	P-253	312	J-252	J-253	8.0	Ductile Iron	-76.88	0.49	0.000	309
930	P-254	283	J-253	J-254	8.0	Ductile Iron	-76.88	0.49	0.000	443
931	P-255	763	J-254	J-194	8.0	Ductile Iron	-76.88	0.49	0.000	636
933	P-256	574	J-164	J-180	8.0	Ductile Iron	95.58	0.61	0.000	575
1234	P-257	103	J-258	J-259	8.0	Ductile Iron	0.00	0.00	0.000	0
1235	P-258	604	J-258	J-645	8.0	Ductile Iron	146.28	0.93	0.001	0
1237	P-259	127	J-271	J-273	8.0	Ductile Iron	0.00	0.00	0.000	0
1239	P-260	243	J-461	J-274	8.0	Ductile Iron	-161.38	1.03	0.001	0
1241	P-261	361	J-274	J-275	8.0	Ductile Iron	-164.04	1.05	0.001	0
979	P-262	341	J-261	J-262	6.0	Ductile Iron	5.95	0.07	0.000	379
982	P-265	346	J-123	J-120	6.0	Ductile Iron	102.53	1.16	0.001	337
983	P-266	314	J-13	J-11	8.0	Ductile Iron	0.00	0.00	0.000	268
984	P-267	267	J-11	J-4	8.0	Ductile Iron	1.73	0.01	0.000	293
986	P-269	612	J-20	J-263	10.0	Ductile Iron	42.12	0.17	0.000	621
1243	P-270	267	J-275	J-276	8.0	Ductile Iron	-167.38	1.07	0.001	0
988	P-271	142	J-263	J-264	6.0	Ductile Iron	42.12	0.48	0.000	1,550
1016	P-272	41	J-14	J-199	8.0	Ductile Iron	6.99	0.04	0.000	247
1034	P-276	17	J-201	J-202	12.0	Ductile Iron	-21.88	0.06	0.000	0
1027	P-278	17	J-203	J-12	6.0	Ductile Iron	-2.78	0.03	0.000	603
1030	P-280	21	J-201	J-203	12.0	Ductile Iron	-2.78	0.01	0.000	0
1032	P-281	21	J-12	J-202	6.0	Ductile Iron	-1.27	0.01	0.000	183

FlexTable: Pipe Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1033	P-282	169	J-202	J-10	6.0	Ductile Iron	29.49	0.33	0.000	183
1038	P-283	385	J-202	J-205	12.0	Ductile Iron	-52.64	0.15	0.000	0
1040	P-284	300	J-205	J-206	12.0	Ductile Iron	-92.16	0.26	0.000	0
1041	P-285	36	J-205	J-199	8.0	Ductile Iron	39.51	0.25	0.000	0
1042	P-286	22	J-206	J-17	12.0	Ductile Iron	-28.26	0.08	0.000	0
1044	P-287	541	J-17	J-207	6.0	Ductile Iron	-9.83	0.11	0.000	622
1045	P-288	88	J-207	J-18	10.0	Ductile Iron	-77.67	0.32	0.000	622
1046	P-289	586	J-206	J-207	12.0	Ductile Iron	-63.90	0.18	0.000	0
1252	P-290	1,345	J-278	J-277	12.0	Ductile Iron	597.91	1.70	0.001	0
1049	P-291	288	J-208	J-652	8.0	Ductile Iron	387.88	2.48	0.004	339
1251	P-292	51	PMP-8	J-278	8.0	Ductile Iron	558.57	3.57	0.007	0
1249	P-293	3,407	J-277	J-209	12.0	Ductile Iron	597.91	1.70	0.001	0
1054	P-294	1,912	J-209	J-210	16.0	Ductile Iron	597.91	0.95	0.000	0
1056	P-295	1,966	J-210	J-211	16.0	Ductile Iron	597.91	0.95	0.000	0
1257	P-296	157	J-612	PMP-9	10.0	Ductile Iron	557.47	2.28	0.002	0
1258	P-297	100	PMP-9	J-278	8.0	Ductile Iron	557.47	3.56	0.007	0
1062	P-298	263	J-208	J-214	12.0	Ductile Iron	2.67	0.01	0.000	0
1068	P-299	527	J-215	J-208	8.0	Ductile Iron	-125.30	0.80	0.000	0
1070	P-300	349	J-215	J-216	8.0	Ductile Iron	113.96	0.73	0.000	0
1072	P-301	439	J-216	J-217	8.0	Ductile Iron	109.30	0.70	0.000	0
1074	P-302	458	J-217	J-218	8.0	Ductile Iron	106.63	0.68	0.000	0
1076	P-303	374	J-218	J-219	8.0	Ductile Iron	0.00	0.00	0.000	0
1078	P-304	601	J-215	J-220	8.0	Ductile Iron	6.67	0.04	0.000	0
1081	P-306	72	PRV-20	J-208	8.0	Ductile Iron	0.00	0.00	0.000	339
1088	P-307	315	J-619	J-219	8.0	Ductile Iron	104.01	0.66	0.000	0
1084	P-308	179	J-221	J-423	6.0	Ductile Iron	95.35	1.08	0.001	0
1089	P-309	47	J-219	PRV-13	6.0	Ductile Iron	0.00	0.00	0.000	0
1090	P-310	100	J-219	PRV-14	6.0	Ductile Iron	95.35	1.08	0.001	0
1091	P-311	43	PRV-13	J-221	6.0	Ductile Iron	0.00	0.00	0.000	0
1092	P-312	92	PRV-14	J-221	6.0	Ductile Iron	95.35	1.08	0.001	0
1126	P-313	166	J-115	J-234	8.0	Ductile Iron	-292.55	1.87	0.002	170
1096	P-314	363	J-223	J-224	8.0	Ductile Iron	14.37	0.09	0.000	0
1098	P-315	272	J-224	J-225	8.0	Ductile Iron	90.69	0.58	0.000	0
1100	P-316	490	J-225	J-226	8.0	Ductile Iron	86.69	0.55	0.000	0
1102	P-317	337	J-226	J-227	8.0	Ductile Iron	0.00	0.00	0.000	0
1104	P-318	278	J-226	J-228	8.0	Ductile Iron	83.36	0.53	0.000	0
1105	P-319	495	J-228	J-224	8.0	Ductile Iron	-129.73	0.83	0.000	0
1107	P-320	336	J-228	J-229	8.0	Ductile Iron	3.33	0.02	0.000	0
1109	P-321	287	J-228	J-230	8.0	Ductile Iron	206.42	1.32	0.001	0
1110	P-322	493	J-230	J-223	8.0	Ductile Iron	-207.78	1.33	0.001	0
1112	P-323	332	J-231	J-230	8.0	Ductile Iron	-3.33	0.02	0.000	0
1115	P-325	67	PRV-21	J-208	8.0	Ductile Iron	517.84	3.31	0.006	0
1117	P-326	356	J-656	J-232	8.0	Ductile Iron	464.87	2.97	0.005	0
1118	P-327	512	J-232	J-223	12.0	Ductile Iron	234.82	0.67	0.000	0
1120	P-328	136	J-230	PRV-17	8.0	Ductile Iron	405.54	2.59	0.004	0
1121	P-329	163	PRV-17	J-630	8.0	Ductile Iron	405.54	2.59	0.004	0
1123	P-330	700	J-80	J-233	10.0	Ductile Iron	292.57	1.20	0.001	684
1124	P-331	24	J-233	J-116	12.0	Ductile Iron	-372.45	1.06	0.000	684
892	P-332	418	J-59	J-332	6.0	Ductile Iron	5.95	0.07	0.000	407
1127	P-333	50	J-234	J-106	8.0	Ductile Iron	-269.86	1.72	0.002	170
1129	P-334	707	J-647	J-115	12.0	Ductile Iron	-526.56	1.49	0.001	0
1130	P-335	823	J-115	J-233	12.0	Ductile Iron	-659.86	1.87	0.001	0

FlexTable: Pipe Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1132	P-336	446	J-95	J-235	8.0	Ductile Iron	57.36	0.37	0.000	0
1134	P-337	128	J-192	J-236	12.0	Ductile Iron	201.91	0.57	0.000	344
1135	P-338	224	J-236	J-193	12.0	Ductile Iron	133.24	0.38	0.000	344
1136	P-339	1,052	J-236	J-97	12.0	Ductile Iron	68.67	0.19	0.000	0
1138	P-340	146	J-97	J-237	10.0	Ductile Iron	29.76	0.12	0.000	0
1140	P-341	191	J-721	J-238	8.0	Ductile Iron	0.00	0.00	0.000	0
1253	P-342	58	J-278	PRV-20	8.0	Ductile Iron	0.00	0.00	0.000	0
1254	P-343	71	J-278	PRV-21	8.0	Ductile Iron	518.12	3.31	0.006	0
1058	P-344	1,301	J-211	J-212	16.0	Ductile Iron	597.91	0.95	0.000	0
1060	P-345	310	J-212	J-213	16.0	Ductile Iron	597.91	0.95	0.000	0
1260	P-346	359	J-87	J-120	6.0	Ductile Iron	-64.25	0.73	0.001	0
1150	P-348	204	J-90	J-241	12.0	Ductile Iron	169.69	0.48	0.000	245
1151	P-349	78	J-241	J-96	12.0	Ductile Iron	147.60	0.42	0.000	245
1153	P-350	191	J-97	J-242	4.0	Ductile Iron	9.63	0.25	0.000	517
1154	P-351	337	J-242	J-195	4.0	Ductile Iron	1.96	0.05	0.000	517
1155	P-352	397	J-241	J-242	4.0	Ductile Iron	7.21	0.18	0.000	0
1157	P-353	495	J-141	J-243	8.0	Ductile Iron	36.36	0.23	0.000	0
1158	P-354	385	J-58	J-261	8.0	Ductile Iron	11.90	0.08	0.000	0
1160	P-355	348	J-157	J-244	12.0	Ductile Iron	7.03	0.02	0.000	0
1161	P-356	594	J-156	J-152	8.0	Ductile Iron	-24.83	0.16	0.000	0
1163	P-357	50	J-165	J-245	8.0	Ductile Iron	296.84	1.89	0.002	363
1164	P-358	311	J-245	J-166	8.0	Ductile Iron	294.17	1.88	0.002	363
1166	P-359	304	J-245	J-246	8.0	Ductile Iron	2.67	0.02	0.000	0
1168	P-360	262	J-437	J-247	6.0	Ductile Iron	36.52	0.41	0.000	0
1169	P-361	212	J-247	J-438	6.0	Ductile Iron	26.52	0.30	0.000	0
1171	P-362	296	J-436	J-248	8.0	Ductile Iron	6.67	0.04	0.000	0
1173	P-363	390	J-434	J-249	8.0	Ductile Iron	-119.11	0.76	0.000	0
1177	P-366	313	J-605	J-240	4.0	Ductile Iron	35.65	0.91	0.002	697
1178	P-367	413	J-240	J-606	8.0	Ductile Iron	35.65	0.23	0.000	697
1274	P-368	75	J-639	PMP-10	8.0	Ductile Iron	683.66	4.36	0.010	0
1278	P-370	407	J-280	J-281	12.0	Ductile Iron	5.33	0.02	0.000	0
1642	P-371	210	J-280	J-376	12.0	Ductile Iron	430.06	1.22	0.001	0
1283	P-373	96	PMP-10	J-283	12.0	Ductile Iron	683.66	1.94	0.001	0
1284	P-374	407	J-283	J-280	12.0	Ductile Iron	442.72	1.26	0.001	0
1288	P-376	388	J-285	J-284	12.0	Ductile Iron	237.62	0.67	0.000	0
1291	P-378	368	J-284	J-648	4.0	Ductile Iron	21.58	0.55	0.001	0
1305	P-387	113	J-283	PRV-22	12.0	Ductile Iron	0.00	0.00	0.000	0
1306	P-388	94	PRV-22	J-285	12.0	Ductile Iron	0.00	0.00	0.000	0
1308	P-389	143	J-283	PRV-23	12.0	Ductile Iron	238.94	0.68	0.000	0
1309	P-390	114	PRV-23	J-285	12.0	Ductile Iron	238.95	0.68	0.000	0
1639	P-391	427	J-282	J-375	12.0	Ductile Iron	-1.33	0.00	0.000	0
1312	P-392	87	T-Valhalla 1	J-290	12.0	Ductile Iron	-226.48	0.64	0.000	0
1314	P-393	169	T-Valhalla 2	J-290	12.0	Ductile Iron	-158.24	0.45	0.000	0
1316	P-394	118	J-115	PMP-11	12.0	Ductile Iron	1,003.82	2.85	0.003	0
1320	P-397	603	J-445	J-291	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1707	P-398	547	J-291	J-398	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1324	P-399	567	J-292	J-293	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1326	P-400	1,147	J-293	J-294	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1328	P-401	382	J-294	J-295	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
746	P-402	599	J-402	J-403	6.0	Ductile Iron	28.17	0.32	0.000	601
747	P-403	212	J-403	J-404	6.0	Ductile Iron	22.84	0.26	0.000	214

FlexTable: Pipe Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
748	P-404	748	J-404	J-405	6.0	Ductile Iron	-29.58	0.34	0.000	713
749	P-407	228	J-406	J-407	6.0	Ductile Iron	-37.58	0.43	0.000	212
750	P-408	365	J-407	J-401	6.0	Ductile Iron	44.84	0.51	0.000	368
751	P-409	183	J-407	PRV-15	6.0	Ductile Iron	0.00	0.00	0.000	170
1354	P-409	239	J-301	J-302	10.0	Ductile Iron	-2.67	0.01	0.000	0
752	P-410	275	J-404	J-408	6.0	Ductile Iron	47.76	0.54	0.000	267
753	P-411	319	J-408	PRV-4	6.0	Ductile Iron	39.76	0.45	0.000	321
1357	P-411	358	J-303	J-409	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
754	P-412	131	PRV-4	J-77	6.0	Ductile Iron	39.76	0.45	0.000	125
755	P-413	44	PRV-3	J-99	6.0	Ductile Iron	0.00	0.00	0.000	68
756	P-414	190	J-98	J-409	6.0	Ductile Iron	5.33	0.06	0.000	172
757	P-415	141	J-409	J-410	6.0	Ductile Iron	0.00	0.00	0.000	173
758	P-416	337	J-410	J-411	6.0	Ductile Iron	13.50	0.15	0.000	344
759	P-417	285	J-411	PRV-3	8.0	Ductile Iron	0.00	0.00	0.000	262
1370	P-418	120	J-308	J-515	10.0	Ductile Iron	-3.15	0.01	0.000	0
761	P-420	367	J-413	J-414	6.0	Ductile Iron	39.03	0.44	0.000	357
762	P-421	687	J-414	J-411	6.0	Ductile Iron	-6.84	0.08	0.000	680
763	P-422	490	J-103	J-415	6.0	Ductile Iron	-4.00	0.05	0.000	492
764	P-423	345	J-415	J-414	8.0	Ductile Iron	-33.53	0.21	0.000	338
765	P-424	28	J-110	PRV-2	6.0	Ductile Iron	-356.44	4.04	0.015	55
1384	P-424	154	PMP-11	J-310	12.0	Ductile Iron	1,003.82	2.85	0.003	0
1385	P-425	2,680	J-310	J-637	12.0	Ductile Iron	2,007.70	5.70	0.011	0
766	P-426	604	J-416	J-417	6.0	Ductile Iron	-87.44	0.99	0.001	600
1387	P-426	125	J-115	PMP-12	12.0	Ductile Iron	1,003.89	2.85	0.003	0
767	P-427	376	J-417	J-415	6.0	Ductile Iron	-94.10	1.07	0.001	385
1388	P-427	140	PMP-12	J-310	12.0	Ductile Iron	1,003.89	2.85	0.003	0
768	P-428	301	J-414	J-418	6.0	Ductile Iron	1.67	0.02	0.000	349
1391	P-428	552	J-249	J-445	8.0	Ductile Iron	-127.78	0.82	0.000	0
769	P-429	484	J-418	J-419	6.0	Ductile Iron	0.00	0.00	0.000	432
770	P-430	366	J-415	J-420	8.0	Ductile Iron	-77.06	0.49	0.000	363
1396	P-431	251	J-4	J-312	8.0	Ductile Iron	3.59	0.02	0.000	0
772	P-432	298	J-413	J-422	6.0	Ductile Iron	6.33	0.07	0.000	323
1397	P-432	225	J-312	J-1	8.0	Ductile Iron	-1.75	0.01	0.000	0
773	P-433	340	J-422	J-418	1.0	Ductile Iron	0.33	0.13	0.000	353
1399	P-433	847	J-720	J-313	10.0	Ductile Iron	17.21	0.07	0.000	0
774	P-434	257	J-413	J-423	6.0	Ductile Iron	-86.68	0.98	0.001	247
1401	P-434	242	J-313	J-314	10.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1402	P-435	340	J-314	J-254	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
776	P-436	569	J-420	J-424	8.0	Ductile Iron	-88.39	0.56	0.000	592
1411	P-436	316	J-176	J-315	6.0	Ductile Iron	15.02	0.17	0.000	0
777	P-437	409	J-424	J-425	8.0	Ductile Iron	131.80	0.84	0.000	408
1413	P-437	130	J-315	J-316	6.0	Ductile Iron	15.02	0.17	0.000	0
778	P-438	348	J-425	J-416	6.0	Ductile Iron	157.41	1.79	0.003	347
779	P-441	401	J-425	J-427	8.0	Ductile Iron	-116.48	0.74	0.000	402
780	P-442	289	J-427	J-428	8.0	Ductile Iron	-116.48	0.74	0.000	284
781	P-443	341	J-424	J-429	8.0	Ductile Iron	-228.86	1.46	0.001	333
1421	P-443	438	J-174	J-173	6.0	Ductile Iron	9.69	0.11	0.000	0
782	P-444	268	J-429	J-430	8.0	Ductile Iron	-228.86	1.46	0.001	168
1426	P-444	337	J-146	J-319	12.0	Ductile Iron	893.94	2.54	0.002	724
783	P-445	30	J-430	PRV-12	8.0	Ductile Iron	0.00	0.00	0.000	112
1427	P-445	392	J-319	J-143	12.0	Ductile Iron	978.60	2.78	0.003	724
784	P-446	270	J-428	J-430	8.0	Ductile Iron	-338.90	2.16	0.003	286

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1429	P-446	399	J-319	J-320	12.0	Ductile Iron	-84.66	0.24	0.000	0
1431	P-447	755	J-320	J-321	8.0	Ductile Iron	-358.66	2.29	0.003	0
785	P-448	70	J-431	PRV-11	8.0	Ductile Iron	0.00	0.00	0.000	20
1433	P-448	785	J-180	J-322	8.0	Ductile Iron	86.67	0.55	0.000	0
786	P-449	336	J-431	J-432	8.0	Ductile Iron	-5.90	0.04	0.000	302
787	P-450	311	J-432	J-433	8.0	Ductile Iron	-17.90	0.11	0.000	307
1436	P-450	434	J-235	J-323	8.0	Ductile Iron	57.36	0.37	0.000	0
788	P-451	338	J-433	J-425	8.0	Ductile Iron	-82.38	0.53	0.000	339
1437	P-451	469	J-323	J-194	12.0	Ductile Iron	57.36	0.16	0.000	0
789	P-452	348	J-433	J-434	4.0	Ductile Iron	49.81	1.27	0.002	352
790	P-453	501	J-434	J-435	8.0	Ductile Iron	158.92	1.01	0.001	501
791	P-454	207	J-435	J-436	8.0	Ductile Iron	154.25	0.98	0.001	382
1442	P-454	183	J-59	J-325	12.0	Ductile Iron	249.91	0.71	0.000	281
792	P-455	321	J-436	J-437	8.0	Ductile Iron	142.25	0.91	0.001	161
1443	P-455	107	J-325	J-53	12.0	Ductile Iron	304.90	0.86	0.000	281
793	P-456	241	J-437	J-438	8.0	Ductile Iron	105.73	0.67	0.000	265
1444	P-456	693	J-325	J-66	8.0	Ductile Iron	-55.84	0.36	0.000	0
794	P-457	261	J-438	J-439	8.0	Ductile Iron	130.92	0.84	0.000	291
1446	P-457	374	J-184	J-326	8.0	Ductile Iron	-9.93	0.06	0.000	689
795	P-458	290	J-439	J-440	8.0	Ductile Iron	130.92	0.84	0.000	273
1447	P-458	338	J-326	J-185	8.0	Ductile Iron	-13.26	0.08	0.000	689
1448	P-459	331	J-316	J-174	6.0	Ductile Iron	12.35	0.14	0.000	0
796	P-460	322	J-440	J-441	8.0	Ductile Iron	-3.87	0.02	0.000	331
1460	P-460	60	J-410	J-302	6.0	Ductile Iron	-6.75	0.08	0.000	0
797	P-461	342	J-441	J-416	2.0	Ductile Iron	-6.53	0.67	0.002	327
1461	P-461	204	J-302	J-412	6.0	Ductile Iron	-11.08	0.13	0.000	0
798	P-462	205	J-442	J-443	8.0	Ductile Iron	94.81	0.61	0.000	204
1463	P-462	116	J-327	J-76	8.0	Ductile Iron	800.00	5.11	0.012	0
799	P-463	519	J-443	J-444	8.0	Ductile Iron	16.00	0.10	0.000	507
1465	P-463	377	J-140	J-320	8.0	Ductile Iron	-261.27	1.67	0.002	0
800	P-464	490	J-443	J-445	8.0	Ductile Iron	158.32	1.01	0.001	487
1466	P-464	285	J-321	J-161	8.0	Ductile Iron	-362.05	2.31	0.003	0
801	P-465	144	J-431	J-442	8.0	Ductile Iron	107.48	0.69	0.000	172
1467	P-465	204	J-412	J-302	6.0	Ductile Iron	11.08	0.13	0.000	0
802	P-466	263	J-430	J-446	12.0	Ductile Iron	-579.76	1.64	0.001	352
1468	P-466	60	J-410	J-302	6.0	Ductile Iron	-6.75	0.08	0.000	0
803	P-467	522	J-446	J-447	12.0	Ductile Iron	-579.76	1.64	0.001	523
804	P-468	366	J-447	J-448	12.0	Ductile Iron	-591.33	1.68	0.001	366
1477	P-468	76	J-623	PRV-9	10.0	Ductile Iron	0.00	0.00	0.000	0
805	P-469	442	J-448	J-449	12.0	Ductile Iron	-591.33	1.68	0.001	441
1487	P-469	1,725	J-264	J-329	8.0	Ductile Iron	11.58	0.07	0.000	0
806	P-470	76	J-449	PRV-9	10.0	Ductile Iron	0.00	0.00	0.000	89
1496	P-470	138	J-243	J-143	8.0	Ductile Iron	20.60	0.13	0.000	0
807	P-471	300	J-187	J-450	8.0	Ductile Iron	0.00	0.00	0.000	308
1498	P-471	503	J-160	J-330	8.0	Ductile Iron	527.00	3.36	0.006	1,024
808	P-472	247	J-450	J-451	8.0	Ductile Iron	-4.00	0.03	0.000	240
1499	P-472	482	J-330	J-161	8.0	Ductile Iron	527.00	3.36	0.006	1,024
809	P-473	640	J-451	J-452	8.0	Ductile Iron	-10.30	0.07	0.000	623
1500	P-473	359	J-150	J-330	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
810	P-474	233	J-452	J-453	8.0	Ductile Iron	-35.70	0.23	0.000	224
811	P-475	262	J-453	J-454	8.0	Ductile Iron	-41.70	0.27	0.000	263
1503	P-475	594	J-332	J-55	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
812	P-476	149	J-454	J-455	8.0	Ductile Iron	-83.12	0.53	0.000	145
1505	P-476	1,508	J-19	J-332	10.0	Ductile Iron	-178.94	0.73	0.000	2,119
813	P-477	647	J-455	J-456	12.0	Ductile Iron	246.40	0.70	0.000	640
1506	P-477	500	J-332	J-56	10.0	Ductile Iron	-178.94	0.73	0.000	2,119
814	P-478	305	J-456	J-457	12.0	Ductile Iron	216.70	0.61	0.000	318
1507	P-478	148	J-262	J-332	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
815	P-479	152	J-457	PRV-1	12.0	Ductile Iron	226.80	0.64	0.000	153
1508	P-479	813	J-142	J-129	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
816	P-480	259	J-457	J-172	6.0	Ductile Iron	-13.43	0.15	0.000	257
1513	P-480	727	J-164	J-334	12.0	Ductile Iron	510.98	1.45	0.001	900
817	P-481	286	J-454	J-458	6.0	Ductile Iron	38.09	0.43	0.000	291
1514	P-481	228	J-334	J-165	12.0	Ductile Iron	482.98	1.37	0.001	900
818	P-482	409	J-458	J-459	6.0	Ductile Iron	30.76	0.35	0.000	410
819	P-483	306	J-459	J-172	6.0	Ductile Iron	19.43	0.22	0.000	316
820	P-484	188	J-453	J-460	8.0	Ductile Iron	3.33	0.02	0.000	189
1519	P-484	180	J-336	J-334	8.0	Ductile Iron	-26.67	0.17	0.000	0
821	P-485	339	J-460	J-461	8.0	Ductile Iron	0.00	0.00	0.000	336
1520	P-485	254	J-335	J-336	8.0	Ductile Iron	-3.33	0.02	0.000	0
893	P-486	485	J-133	J-485	6.0	Ductile Iron	-8.00	0.09	0.000	338
1523	P-486	230	J-333	J-338	8.0	Ductile Iron	-10.00	0.06	0.000	0
1524	P-487	160	J-338	J-336	8.0	Ductile Iron	-18.00	0.11	0.000	0
894	P-488	125	J-485	J-487	8.0	Ductile Iron	-11.33	0.07	0.000	285
1525	P-488	258	J-337	J-338	8.0	Ductile Iron	-4.67	0.03	0.000	0
895	P-489	628	J-487	J-486	8.0	Ductile Iron	-28.00	0.18	0.000	548
1527	P-489	260	J-339	J-333	8.0	Ductile Iron	-5.33	0.03	0.000	0
896	P-490	242	J-487	J-488	8.0	Ductile Iron	12.67	0.08	0.000	196
897	P-491	415	J-488	J-489	8.0	Ductile Iron	6.00	0.04	0.000	393
898	P-492	32	J-488	J-191	6.0	Ductile Iron	3.33	0.04	0.000	80
1533	P-492	356	J-276	J-340	8.0	Ductile Iron	-167.38	1.07	0.001	0
899	P-493	44	J-646	PRV-7	6.0	Ductile Iron	0.00	0.00	0.000	59
1535	P-493	155	J-342	PRV-18	8.0	Ductile Iron	119.80	0.76	0.000	0
900	P-494	43	PRV-7	J-486	6.0	Ductile Iron	0.00	0.00	0.000	61
1536	P-494	162	PRV-18	J-340	8.0	Ductile Iron	119.80	0.76	0.000	0
901	P-495	194	J-407	PRV-16	6.0	Ductile Iron	-86.42	0.98	0.001	186
1538	P-495	154	J-284	J-343	8.0	Ductile Iron	133.09	0.85	0.000	0
902	P-496	142	PRV-16	J-608	10.0	Ductile Iron	-86.42	0.35	0.000	153
1540	P-496	491	J-343	J-344	8.0	Ductile Iron	47.27	0.30	0.000	0
1541	P-497	367	J-344	J-342	8.0	Ductile Iron	109.55	0.70	0.000	0
906	P-498	76	PRV-10	J-449	10.0	Ductile Iron	591.33	2.42	0.003	92
1542	P-498	784	J-342	J-343	8.0	Ductile Iron	-83.16	0.53	0.000	0
911	P-499	51	J-401	J-490	6.0	Ductile Iron	36.84	0.42	0.000	76
1543	P-499	634	J-284	J-344	8.0	Ductile Iron	76.29	0.49	0.000	0
912	P-500	200	J-490	J-402	6.0	Ductile Iron	32.17	0.37	0.000	182
1545	P-500	506	J-4	J-345	8.0	Ductile Iron	0.00	0.00	0.000	0
959	P-502	99	J-612	PMP-8	10.0	Ductile Iron	558.57	2.28	0.002	50
960	P-503	29	PRV-2	J-491	6.0	Ductile Iron	-356.44	4.04	0.015	57
961	P-504	262	J-491	J-416	6.0	Ductile Iron	-228.31	2.59	0.007	263
962	P-505	393	J-440	J-491	6.0	Ductile Iron	132.12	1.50	0.002	333
923	P-506	174	J-405	J-506	6.0	Ductile Iron	-33.58	0.38	0.000	236
924	P-507	350	J-506	J-406	6.0	Ductile Iron	-33.58	0.38	0.000	379
963	P-508	410	J-138	J-141	8.0	Ductile Iron	-50.30	0.32	0.000	418
964	P-509	306	J-141	J-140	8.0	Ductile Iron	-254.91	1.63	0.002	276

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1589	P-509	113	J-350	VSPB-1	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1590	P-510	129	VSPB-1	J-351	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1598	P-512	357	J-356	J-360	10.0	Ductile Iron	0.00	0.00	0.000	0
925	P-515	235	J-412	J-515	6.0	Ductile Iron	-2.02	0.02	0.000	230
1606	P-516	376	J-360	J-361	8.0	Ductile Iron	0.00	0.00	0.000	0
1607	P-517	337	J-361	J-356	8.0	Ductile Iron	0.00	0.00	0.000	0
1608	P-518	136	J-356	J-355	10.0	Ductile Iron	0.00	0.00	0.000	0
934	P-524	871	J-456	J-521	12.0	Ductile Iron	21.33	0.06	0.000	831
935	P-525	599	J-521	J-522	12.0	Ductile Iron	8.59	0.02	0.000	603
1623	P-525	288	J-351	J-369	8.0	Ductile Iron	8.46	0.05	0.000	0
936	P-526	365	J-641	J-523	12.0	Ductile Iron	-704.89	2.00	0.002	356
938	P-528	482	J-523	J-524	12.0	Ductile Iron	64.97	0.18	0.000	479
939	P-529	616	J-524	J-525	12.0	Ductile Iron	46.67	0.13	0.000	657
1644	P-529	375	J-369	J-366	8.0	Ductile Iron	-0.88	0.01	0.000	0
940	P-530	264	J-525	J-526	8.0	Ductile Iron	12.00	0.08	0.000	272
1645	P-530	311	J-366	J-362	8.0	Ductile Iron	-0.88	0.01	0.000	0
941	P-531	485	J-525	J-527	12.0	Ductile Iron	30.67	0.09	0.000	473
1646	P-531	255	J-362	J-375	8.0	Ductile Iron	-6.21	0.04	0.000	0
942	P-532	188	J-428	J-528	8.0	Ductile Iron	216.42	1.38	0.001	205
943	P-533	344	J-528	J-431	8.0	Ductile Iron	105.58	0.67	0.000	352
1652	P-533	217	J-350	PMP-16	12.0	Ductile Iron	41.33	0.12	0.000	0
944	P-534	382	J-528	J-529	8.0	Ductile Iron	106.18	0.68	0.000	366
1653	P-534	233	PMP-16	J-351	12.0	Ductile Iron	41.33	0.12	0.000	0
945	P-535	550	J-529	J-530	8.0	Ductile Iron	7.23	0.05	0.000	552
1655	P-535	445	J-182	J-377	8.0	Ductile Iron	0.00	0.00	0.000	0
946	P-536	932	J-530	J-529	8.0	Ductile Iron	-5.44	0.03	0.000	933
1660	P-536	598	J-521	J-379	12.0	Ductile Iron	6.08	0.02	0.000	0
947	P-537	412	J-529	J-443	8.0	Ductile Iron	84.84	0.54	0.000	412
1662	P-537	451	J-379	J-380	12.0	Ductile Iron	6.08	0.02	0.000	0
948	P-538	120	T-North	J-647	12.0	Ductile Iron	-226.09	0.64	0.000	161
1663	P-538	269	J-380	J-522	12.0	Ductile Iron	6.08	0.02	0.000	0
949	P-539	73	T-North off	J-647	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	176
1665	P-539	343	J-232	J-381	12.0	Ductile Iron	215.39	0.61	0.000	0
950	P-540	394	J-647	J-114	8.0	Ductile Iron	-238.96	1.53	0.001	532
1666	P-540	374	J-381	J-224	12.0	Ductile Iron	215.39	0.61	0.000	0
1668	P-541	154	J-381	J-382	12.0	Ductile Iron	0.00	0.00	0.000	0
1673	P-542	187	J-383	J-384	6.0	Ductile Iron	0.00	0.00	0.000	0
953	P-543	334	PMP-1	J-647	10.0	Ductile Iron	-988.31	4.04	0.007	334
1687	P-543	1,186	J-225	J-214	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
954	P-544	1,027	J-75	J-531	10.0	Ductile Iron	327.77	1.34	0.001	1,049
1689	P-544	808	J-639	J-389	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
955	P-545	610	J-531	J-79	10.0	Ductile Iron	322.13	1.32	0.001	609
1691	P-545	619	J-389	J-390	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1693	P-546	201	J-390	J-391	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
956	P-547	25	J-45	PMP-2	8.0	Ductile Iron	539.58	3.44	0.007	83
1695	P-547	589	J-391	J-392	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
957	P-548	55	PMP-2	J-658	8.0	Ductile Iron	539.58	3.44	0.007	90
1697	P-548	256	J-391	J-393	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
958	P-549	885	J-647	J-190	8.0	Ductile Iron	-448.88	2.87	0.005	767
1699	P-550	624	J-393	J-394	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1714	P-551	100	J-393	J-399	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1705	P-552	563	J-396	J-397	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1709	P-553	272	J-396	J-398	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1717	P-554	109	J-399	PRV-28	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1718	P-555	61	PRV-28	J-396	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1720	P-556	521	J-285	J-400	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1721	P-557	221	J-389	J-392	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1722	P-558	208	J-392	J-394	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
822	P-601	820	J-601	J-602	6.0	Ductile Iron	-39.97	0.45	0.000	872
823	P-602	248	J-602	J-603	6.0	Ductile Iron	-45.97	0.52	0.000	254
824	P-603	779	J-603	J-604	4.0	Ductile Iron	17.13	0.44	0.000	738
825	P-604	253	J-603	J-605	6.0	Ductile Iron	-68.43	0.78	0.001	200
827	P-609	230	J-607	J-608	10.0	Ductile Iron	482.00	1.97	0.002	230
828	P-610	146	J-608	J-609	10.0	Ductile Iron	391.57	1.60	0.001	136
1594	P-611	878	J-609	J-355	10.0	Ductile Iron	389.57	1.59	0.001	1,195
830	P-612	801	J-610	J-611	10.0	Ductile Iron	374.24	1.53	0.001	805
831	P-613	391	J-611	J-612	10.0	Ductile Iron	374.24	1.53	0.001	354
832	P-614	71	J-612	T-Brader	10.0	Ductile Iron	-320.53	1.31	0.001	167
833	P-615	299	J-612	J-613	10.0	Ductile Iron	-421.26	1.72	0.001	274
834	P-616	546	J-613	J-614	10.0	Ductile Iron	-421.26	1.72	0.001	548
835	P-617	350	J-614	J-615	10.0	Ductile Iron	-532.61	2.18	0.002	352
836	P-618	465	J-615	J-616	10.0	Ductile Iron	-532.61	2.18	0.002	459
837	P-619	488	J-616	J-617	10.0	Ductile Iron	-417.87	1.71	0.001	457
838	P-620	276	J-617	J-421	10.0	Ductile Iron	23.33	0.10	0.000	260
839	P-621	339	J-421	J-419	6.0	Ductile Iron	14.67	0.17	0.000	338
840	P-622	274	J-419	J-618	6.0	Ductile Iron	7.33	0.08	0.000	270
842	P-624	382	J-619	J-620	8.0	Ductile Iron	-104.01	0.66	0.000	376
843	P-625	487	J-620	J-614	8.0	Ductile Iron	-108.68	0.69	0.000	472
844	P-626	374	J-616	J-621	6.0	Ductile Iron	-120.07	1.36	0.002	397
845	P-627	550	J-621	J-622	8.0	Ductile Iron	13.79	0.09	0.000	538
846	P-628	215	J-622	J-623	10.0	Ductile Iron	222.14	0.91	0.000	237
847	P-629	139	J-623	J-617	10.0	Ductile Iron	-369.20	1.51	0.001	138
849	P-631	419	J-621	J-624	6.0	Ductile Iron	-139.86	1.59	0.002	405
850	P-632	428	J-624	J-625	8.0	Ductile Iron	-139.86	0.89	0.001	427
851	P-633	250	J-625	J-626	8.0	Ductile Iron	88.14	0.56	0.000	251
852	P-634	428	J-626	J-627	8.0	Ductile Iron	10.67	0.07	0.000	429
853	P-635	347	J-626	J-628	8.0	Ductile Iron	225.02	1.44	0.001	335
854	P-636	443	J-628	J-629	8.0	Ductile Iron	215.02	1.37	0.001	443
855	P-637	282	J-629	J-622	10.0	Ductile Iron	215.02	0.88	0.000	281
856	P-638	502	J-625	J-630	8.0	Ductile Iron	-239.34	1.53	0.001	494
857	P-639	252	J-630	J-631	8.0	Ductile Iron	162.87	1.04	0.001	256
858	P-640	234	J-631	J-632	8.0	Ductile Iron	158.87	1.01	0.001	244
859	P-641	416	J-632	J-633	8.0	Ductile Iron	147.54	0.94	0.001	412
860	P-642	339	J-633	J-626	8.0	Ductile Iron	147.54	0.94	0.001	339
861	P-643	722	J-617	J-634	12.0	Ductile Iron	-816.40	2.32	0.002	769
862	P-644	741	J-634	J-635	12.0	Ductile Iron	-816.40	2.32	0.002	705
863	P-645	546	J-635	J-636	12.0	Ductile Iron	-816.40	2.32	0.002	638
864	P-646	214	J-636	J-637	12.0	Ductile Iron	-816.40	2.32	0.002	196
865	P-647	682	J-637	J-638	12.0	Ductile Iron	1,191.30	3.38	0.004	680
866	P-648	1,098	J-638	J-639	12.0	Ductile Iron	1,185.97	3.36	0.004	1,151
867	P-649	62	J-639	T-Goodlander	12.0	Ductile Iron	1,188.53	3.37	0.004	169
868	P-650	539	J-639	J-640	12.0	Ductile Iron	-686.22	1.95	0.001	503
869	P-651	422	J-640	J-641	12.0	Ductile Iron	-686.22	1.95	0.001	439

FlexTable: Pipe Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
870	P-652	755	J-641	J-642	4.0	Ductile Iron	7.33	0.19	0.000	752
871	P-654	518	J-643	J-461	8.0	Ductile Iron	-153.38	0.98	0.001	517
872	P-655	185	J-455	PRV-5	8.0	Ductile Iron	0.00	0.00	0.000	50
873	P-656	169	J-643	J-644	12.0	Ductile Iron	-628.12	1.78	0.001	141
874	P-657	160	J-644	PRV-5	8.0	Ductile Iron	0.00	0.00	0.000	50
875	P-658	1,529	J-644	J-645	12.0	Ductile Iron	-960.31	2.72	0.003	1,545
876	P-659	276	J-645	J-646	12.0	Ductile Iron	-814.03	2.31	0.002	298
879	P-664	194	J-648	J-649	4.0	Ductile Iron	14.24	0.36	0.000	182
880	P-665	425	J-649	J-650	4.0	Ductile Iron	10.91	0.28	0.000	431
881	P-666	425	J-650	J-651	4.0	Ductile Iron	5.58	0.14	0.000	469
882	P-667	397	J-649	PRV-FUT	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	404
883	P-668	217	PRV-FUT	J-642	4.0	Ductile Iron	(N/A)	(N/A)	(N/A)	251
885	P-670	284	J-652	J-653	8.0	Ductile Iron	8.30	0.05	0.000	273
886	P-671	734	J-652	J-654	8.0	Ductile Iron	475.54	3.04	0.005	728
887	P-672	362	J-654	J-655	8.0	Ductile Iron	5.33	0.03	0.000	337
888	P-673	454	J-654	J-656	8.0	Ductile Iron	464.87	2.97	0.005	457
889	P-674	44	J-635	PRV-11	8.0	Ductile Iron	0.00	0.00	0.000	20
890	P-675	146	PRV-15	J-608	6.0	Ductile Iron	0.00	0.00	0.000	148
891	P-676	50	J-634	PRV-12	8.0	Ductile Iron	0.00	0.00	0.000	108
905	P-679	76	J-623	PRV-10	10.0	Ductile Iron	591.33	2.42	0.003	93
907	P-680	193	J-455	PRV-6	8.0	Ductile Iron	-332.19	2.12	0.003	50
908	P-681	168	PRV-6	J-644	8.0	Ductile Iron	-332.19	2.12	0.003	50
909	P-682	77	J-646	PRV-8	6.0	Ductile Iron	28.00	0.32	0.000	104
910	P-683	71	PRV-8	J-486	6.0	Ductile Iron	28.00	0.32	0.000	93
913	P-684	210	J-605	J-658	6.0	Ductile Iron	-123.66	1.40	0.002	292
914	P-685	229	J-658	J-401	6.0	Ductile Iron	0.00	0.00	0.000	190
915	P-686	374	J-658	J-659	10.0	Ductile Iron	415.92	1.70	0.001	331
916	P-687	324	J-659	J-607	10.0	Ductile Iron	412.59	1.69	0.001	367
771	P-688	528	J-420	J-421	8.0	Ductile Iron	0.00	0.00	0.000	503
969	P-705	216	J-75	J-47	8.0	Ductile Iron	337.64	2.16	0.003	249
971	P-707	223	J-607	J-606	8.0	Ductile Iron	-73.41	0.47	0.000	245
972	P-708	252	J-606	J-604	8.0	Ductile Iron	-40.43	0.26	0.000	221
973	P-709	247	J-604	J-601	8.0	Ductile Iron	-27.97	0.18	0.000	291
974	P-720	160	J-252	J-720	10.0	Ductile Iron	158.84	0.65	0.000	349
975	P-721	527	J-720	J-721	10.0	Ductile Iron	141.63	0.58	0.000	427
976	P-722	595	J-721	J-722	10.0	Ductile Iron	141.63	0.58	0.000	362
977	P-723	293	J-722	J-56	10.0	Ductile Iron	141.63	0.58	0.000	228
1005	P-816	199	J-515	J-810	8.0	Ductile Iron	-7.84	0.05	0.000	214
1006	P-817	199	J-412	J-811	6.0	Ductile Iron	-20.15	0.23	0.000	224
1007	P-818	229	J-811	J-413	6.0	Ductile Iron	-37.99	0.43	0.000	217
1008	P-819	236	J-810	J-811	6.0	Ductile Iron	-17.84	0.20	0.000	240
1009	P-820	374	J-810	J-812	8.0	Ductile Iron	7.33	0.05	0.000	378
1643	P-821	1,244	J-376	J-350	12.0	Ductile Iron	426.06	1.21	0.001	0
1640	P-822	281	J-375	J-349	12.0	Ductile Iron	-10.88	0.03	0.000	0
1627	P-823	241	J-349	J-351	12.0	Ductile Iron	-10.88	0.03	0.000	0
1628	P-824	1,055	J-350	J-290	12.0	Ductile Iron	384.72	1.09	0.001	0
1572	P-825	166	J-351	J-353	12.0	Ductile Iron	22.00	0.06	0.000	0
1575	P-826	351	J-353	J-354	12.0	Ductile Iron	17.33	0.05	0.000	0
1670	P-827	675	J-354	J-383	12.0	Ductile Iron	8.67	0.02	0.000	0
1671	P-828	325	J-383	J-352	12.0	Ductile Iron	5.33	0.02	0.000	0
1649	P-829	185	J-342	PRV-19	6.0	Ductile Iron	57.57	0.65	0.000	0
1650	P-830	155	PRV-19	J-340	6.0	Ductile Iron	57.57	0.65	0.000	0

FlexTable: Pipe Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1595	P-831	324	J-355	J-610	10.0	Ductile Iron	389.57	1.59	0.001	1,195
1675	P-832	241	J-652	J-385	8.0	Ductile Iron	-101.30	0.65	0.000	0
1678	P-833	422	J-385	J-386	8.0	Ductile Iron	-101.30	0.65	0.000	0
1681	P-834	403	J-386	J-387	8.0	Ductile Iron	-101.30	0.65	0.000	0
1682	P-835	369	J-387	J-218	8.0	Ductile Iron	-101.30	0.65	0.000	0
1708	P-836	203	J-398	J-292	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1715	P-837	97	J-399	PRV-27	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1712	P-838	81	PRV-27	J-396	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

FlexTable: Junction Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
129	J-1	1,205.0	Zone-1	4.67	1,293.6	38.3
130	J-2	1,190.0	Zone-1	3.33	1,293.6	44.8
131	J-3	1,167.0	Zone-1	10.67	1,293.6	54.8
132	J-4	1,200.0	Zone-1	6.00	1,293.6	40.5
443	J-5	1,120.0	Zone-1	0.00	1,296.9	76.5
133	J-6	1,165.0	Zone-1	3.33	1,293.7	55.7
134	J-7	1,150.0	Zone-1	6.00	1,293.7	62.2
135	J-8	1,200.0	Zone-1	4.67	1,293.7	40.5
136	J-9	1,200.0	Zone-1	4.00	1,293.7	40.5
137	J-10	1,140.0	Zone-1	11.33	1,293.7	66.5
138	J-11	1,185.0	Zone-1	8.00	1,293.6	47.0
140	J-12	1,130.0	Zone-1	4.67	1,293.7	70.8
139	J-13	1,163.0	Zone-1	0.00	1,293.6	56.5
141	J-14	1,118.0	Zone-1	1.33	1,293.7	76.0
142	J-15	1,120.0	Zone-1	4.00	1,293.7	75.1
444	J-16	1,126.0	Zone-1	-350.00	1,297.2	74.1
143	J-17	1,112.0	Zone-1	8.48	1,293.7	78.6
144	J-18	1,097.0	Zone-1	0.00	1,293.7	85.1
145	J-19	1,088.0	Zone-1	0.00	1,293.7	89.0
146	J-20	1,084.0	Zone-1	56.42	1,293.7	90.7
1179	J-21	1,280.0	Zone-2C	4.00	1,393.2	49.0
148	J-22	1,095.0	Zone-1	18.91	1,293.7	86.0
149	J-23	1,097.0	Zone-1	2.55	1,293.7	85.1
1181	J-24	1,300.0	Zone-2C	0.00	1,393.2	40.3
1183	J-25	1,318.0	Zone-2C	4.67	1,393.2	32.5
151	J-26	1,115.0	Zone-1	7.15	1,293.7	77.3
152	J-27	1,112.0	Zone-1	15.33	1,293.7	78.6
153	J-28	1,112.0	Zone-1	10.48	1,293.7	78.6
154	J-29	1,100.0	Zone-1	4.06	1,293.7	83.8
155	J-30	1,098.0	Zone-1	0.00	1,293.7	84.7
156	J-31	1,120.0	Zone-1	3.15	1,293.5	75.1
157	J-32	1,120.0	Zone-1	10.00	1,293.5	75.1
1185	J-33	1,345.0	Zone-3A	8.67	1,479.7	58.3
158	J-34	1,115.0	Zone-1	15.64	1,293.5	77.2
159	J-35	1,102.0	Zone-1	29.64	1,293.7	82.9
160	J-36	1,097.0	Zone-1	4.73	1,293.8	85.1
161	J-37	1,098.0	Zone-1	4.55	1,293.7	84.7
162	J-38	1,120.0	Zone-1	24.73	1,293.5	75.1
163	J-39	1,108.0	Zone-1	4.48	1,293.6	80.3
164	J-40	1,105.0	Zone-1	16.67	1,293.8	81.7
165	J-41	1,104.0	Zone-1	3.15	1,293.9	82.2
166	J-42	1,102.0	Zone-1	6.61	1,294.0	83.1
167	J-43	1,098.0	Zone-1	5.09	1,293.9	84.8
169	J-45	1,280.0	Zone-Off	0.00	1,292.2	5.3
170	J-46	1,125.0	Zone-1	0.00	1,293.1	72.7
171	J-47	1,122.0	Zone-1	10.00	1,295.2	75.0
172	J-48	1,115.0	Zone-1	14.24	1,294.6	77.7
173	J-49	1,104.0	Zone-1	5.88	1,294.4	82.4
1263	J-50	1,103.0	Zone-1	0.00	1,294.2	82.7
176	J-52	1,104.0	Zone-1	0.00	1,294.5	82.4
177	J-53	1,100.0	Zone-1	0.00	1,294.2	84.0
178	J-54	1,096.0	Zone-1	3.39	1,294.2	85.7
179	J-55	1,096.0	Zone-1	3.39	1,294.2	85.7
180	J-56	1,095.0	Zone-1	0.00	1,294.3	86.2

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
181	J-57	1,096.0	Zone-1	0.00	1,294.3	85.8
182	J-58	1,097.0	Zone-1	5.95	1,294.3	85.4
183	J-59	1,098.0	Zone-1	5.95	1,294.2	84.9
184	J-60	1,096.0	Zone-1	29.76	1,294.4	85.8
185	J-61	1,097.0	Zone-1	0.00	1,294.6	85.5
186	J-62	1,096.0	Zone-1	29.76	1,294.6	85.9
187	J-63	1,104.0	Zone-1	0.00	1,294.3	82.3
188	J-64	1,105.0	Zone-1	3.39	1,294.2	81.9
189	J-65	1,105.0	Zone-1	2.55	1,294.2	81.9
190	J-66	1,102.0	Zone-1	7.15	1,294.2	83.2
191	J-67	1,105.0	Zone-1	5.88	1,294.7	82.1
192	J-68	1,110.0	Zone-1	8.24	1,294.7	79.9
193	J-69	1,110.0	Zone-1	13.94	1,294.6	79.9
194	J-70	1,110.0	Zone-1	4.73	1,294.7	79.9
195	J-71	1,099.0	Zone-1	29.76	1,294.9	84.7
196	J-72	1,099.0	Zone-1	0.00	1,294.9	84.8
197	J-73	1,098.0	Zone-1	29.76	1,294.8	85.1
198	J-74	1,123.0	Zone-1	54.91	1,295.8	74.8
199	J-75	1,124.0	Zone-1	0.00	1,295.9	74.4
200	J-76	1,125.0	Zone-1	0.00	1,296.9	74.4
201	J-77	1,138.0	Zone-1	0.00	1,295.1	68.0
202	J-78	1,145.0	Zone-1	4.67	1,293.4	64.2
203	J-79	1,126.0	Zone-1	6.67	1,294.4	72.9
204	J-80	1,130.0	Zone-1	2.97	1,293.2	70.6
205	J-81	1,118.0	Zone-1	8.67	1,294.5	76.4
206	J-82	1,116.0	Zone-1	4.85	1,294.6	77.3
207	J-83	1,112.0	Zone-1	0.00	1,294.6	79.0
208	J-84	1,115.0	Zone-1	12.48	1,294.5	77.7
209	J-85	1,122.0	Zone-1	0.00	1,294.6	74.7
210	J-86	1,120.0	Zone-1	5.09	1,294.6	75.5
211	J-87	1,118.0	Zone-1	32.24	1,294.9	76.5
212	J-88	1,115.0	Zone-1	3.88	1,294.9	77.8
1188	J-89	1,335.0	Zone-3A	0.00	1,479.7	62.6
214	J-90	1,102.0	Zone-1	0.85	1,294.9	83.5
215	J-91	1,108.0	Zone-1	5.94	1,295.5	81.1
216	J-92	1,102.0	Zone-1	0.00	1,296.8	84.3
218	J-94	1,112.0	Zone-1	12.42	1,295.0	79.2
219	J-95	1,102.0	Zone-1	53.24	1,295.0	83.5
220	J-96	1,100.0	Zone-1	14.88	1,294.9	84.3
221	J-97	1,100.0	Zone-1	14.88	1,294.9	84.3
222	J-98	1,200.0	Zone-1	5.33	1,292.9	40.2
223	J-99	1,190.0	Zone-1	6.00	1,292.8	44.5
224	J-100	1,180.0	Zone-1	6.67	1,292.8	48.8
225	J-101	1,160.0	Zone-1	12.61	1,292.2	57.2
226	J-102	1,175.0	Zone-1	6.67	1,292.4	50.8
227	J-103	1,210.0	Zone-2C	4.00	1,393.4	79.3
228	J-104	1,178.0	Zone-1	10.00	1,292.9	49.7
229	J-105	1,178.0	Zone-1	4.67	1,293.0	49.8
230	J-106	1,155.0	Zone-1	4.67	1,292.0	59.3
231	J-107	1,200.0	Zone-1	13.33	1,293.3	40.3
232	J-108	1,200.0	Zone-1	11.33	1,293.4	40.4
233	J-109	1,172.0	Zone-1	4.00	1,293.2	52.4
234	J-110	1,198.0	Zone-1	8.67	1,294.7	41.8
235	J-111	1,175.0	Zone-1	11.33	1,294.1	51.5

FlexTable: Junction Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
236	J-112	1,175.0	Zone-1	8.67	1,293.9	51.4
237	J-113	1,170.0	Zone-1	15.33	1,293.2	53.3
238	J-114	1,188.0	Zone-1	7.33	1,291.5	44.8
239	J-115	1,165.0	Zone-1	0.00	1,291.6	54.8
240	J-116	1,140.0	Zone-1	8.00	1,292.7	66.1
241	J-117	1,150.0	Zone-1	6.00	1,292.5	61.6
242	J-118	1,138.0	Zone-1	26.85	1,292.9	67.0
243	J-119	1,138.0	Zone-1	5.52	1,293.7	67.4
244	J-120	1,123.0	Zone-1	6.73	1,295.1	74.5
245	J-121	1,116.0	Zone-1	0.00	1,295.2	77.5
246	J-122	1,112.0	Zone-1	14.91	1,295.2	79.3
247	J-123	1,125.0	Zone-1	14.36	1,295.6	73.8
248	J-124	1,108.0	Zone-1	6.85	1,295.6	81.2
249	J-125	1,108.0	Zone-1	6.00	1,296.1	81.4
250	J-126	1,104.0	Zone-1	0.00	1,296.1	83.1
251	J-127	1,102.0	Zone-1	89.27	1,296.2	84.0
252	J-128	1,100.0	Zone-1	0.00	1,295.8	84.7
253	J-129	1,100.0	Zone-1	148.79	1,295.5	84.6
254	J-130	1,100.0	Zone-1	59.52	1,295.4	84.5
255	J-131	1,102.0	Zone-1	0.00	1,295.0	83.5
256	J-132	1,150.0	Zone-1	6.67	1,292.5	61.6
257	J-133	1,200.0	Zone-2B	8.00	1,403.4	88.0
259	J-135	1,125.0	Zone-1	17.33	1,295.7	73.9
260	J-136	1,120.0	Zone-1	0.00	1,295.9	76.1
261	J-137	1,125.0	Zone-1	5.52	1,295.8	73.9
262	J-138	1,112.0	Zone-1	9.33	1,297.2	80.1
258	J-139	1,140.0	Zone-1	7.33	1,293.8	66.5
263	J-140	1,107.0	Zone-1	6.36	1,297.8	82.5
264	J-141	1,107.0	Zone-1	4.67	1,297.3	82.3
1192	J-142	1,107.0	Zone-1	2.00	1,295.2	81.4
265	J-143	1,104.0	Zone-1	0.00	1,297.3	83.6
266	J-144	1,103.0	Zone-1	29.76	1,297.3	84.0
267	J-145	1,102.0	Zone-1	0.00	1,297.3	84.5
268	J-146	1,105.0	Zone-1	29.76	1,299.2	84.0
269	J-147	1,112.0	Zone-1	29.76	1,300.9	81.7
270	J-148	1,120.0	Zone-1	0.00	1,303.1	79.2
271	J-149	1,119.0	Zone-1	0.00	1,303.1	79.7
272	J-150	1,118.0	Zone-1	9.33	1,303.1	80.1
273	J-151	1,121.0	Zone-1	2.55	1,303.5	79.0
274	J-152	1,122.0	Zone-1	1.70	1,303.8	78.7
275	J-153	1,125.0	Zone-1	6.00	1,303.8	77.4
276	J-154	1,128.0	Zone-1	10.67	1,303.8	76.1
277	J-155	1,130.0	Zone-1	9.33	1,303.8	75.2
278	J-156	1,130.0	Zone-1	6.00	1,303.8	75.2
279	J-157	1,130.0	Zone-1	11.21	1,303.8	75.2
280	J-158	1,120.0	Zone-1	1.70	1,304.9	80.0
281	J-159	1,120.0	Zone-1	0.00	1,305.4	80.2
282	J-160	1,118.0	Zone-1	0.85	1,307.6	82.0
283	J-161	1,112.0	Zone-1	0.00	1,301.2	81.9
284	J-162	1,120.0	Zone-1	-2,000.00	1,308.8	81.7
285	J-163	1,121.0	Zone-1	0.85	1,308.6	81.2
286	J-164	1,124.0	Zone-1	10.73	1,307.9	79.6
287	J-165	1,178.0	Zone-1	0.00	1,307.1	55.9
288	J-166	1,170.0	Zone-1	0.00	1,306.3	59.0

FlexTable: Junction Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
289	J-167	1,170.0	Zone-1	0.67	1,305.9	58.8
290	J-168	1,178.0	Zone-1	3.33	1,305.2	55.0
291	J-169	1,185.0	Zone-1	4.00	1,305.8	52.3
292	J-170	1,188.0	Zone-1	9.33	1,307.0	51.5
293	J-171	1,190.0	Zone-1	4.67	1,305.8	50.1
294	J-172	1,195.0	Zone-2A	6.00	1,419.5	97.1
295	J-173	1,125.0	Zone-1	7.27	1,295.8	73.9
296	J-174	1,122.0	Zone-1	2.67	1,295.8	75.2
298	J-176	1,122.0	Zone-1	0.00	1,295.9	75.2
299	J-177	1,125.0	Zone-1	0.00	1,295.9	73.9
1194	J-179	1,298.0	Zone-3A	8.00	1,479.2	78.4
302	J-180	1,115.0	Zone-1	8.91	1,307.7	83.4
303	J-181	1,150.0	Zone-1	3.33	1,297.1	63.6
304	J-182	1,140.0	Zone-1	24.73	1,297.1	68.0
305	J-183	1,155.0	Zone-1	4.67	1,299.1	62.3
306	J-184	1,150.0	Zone-1	2.67	1,295.7	63.0
307	J-185	1,165.0	Zone-1	4.00	1,295.7	56.5
308	J-186	1,170.0	Zone-1	1.33	1,298.5	55.6
309	J-187	1,200.0	Zone-1	13.27	1,297.7	42.3
310	J-188	1,195.0	Zone-1	4.67	1,296.5	43.9
311	J-189	1,188.0	Zone-1	4.00	1,296.1	46.8
312	J-190	1,180.0	Zone-1	3.33	1,295.2	49.8
313	J-191	1,215.0	Zone-2B	3.33	1,403.4	81.5
314	J-192	1,100.0	Zone-1	14.88	1,295.0	84.3
315	J-193	1,098.0	Zone-1	0.00	1,294.9	85.2
316	J-194	1,096.0	Zone-1	2.00	1,294.9	86.1
317	J-195	1,100.0	Zone-1	14.88	1,294.9	84.3
442	J-196	1,160.0	Zone-1	-1,650.00	1,291.8	57.0
445	J-197	1,110.0	Zone-1	-700.00	1,297.3	81.1
449	J-198	1,165.0	Zone-1	0.85	1,303.1	59.8
1015	J-199	1,118.0	Zone-1	4.67	1,293.7	76.0
1021	J-201	1,130.0	Zone-1	24.67	1,293.7	70.8
1031	J-202	1,130.0	Zone-1	0.00	1,293.7	70.8
1025	J-203	1,130.0	Zone-1	0.00	1,293.7	70.8
1037	J-205	1,118.0	Zone-1	0.00	1,293.7	76.0
1039	J-206	1,112.0	Zone-1	0.00	1,293.7	78.6
1043	J-207	1,098.0	Zone-1	3.94	1,293.7	84.7
1047	J-208	1,470.0	Zone-4B	2.00	1,563.1	40.3
1051	J-209	1,436.0	Zone-6A	0.00	1,745.4	133.9
1053	J-210	1,490.0	Zone-6A	0.00	1,744.9	110.3
1055	J-211	1,640.0	Zone-6B	0.00	1,744.4	45.2
1057	J-212	1,622.0	Zone-6B	0.00	1,744.0	52.8
1059	J-213	1,680.0	Zone-6B	0.00	1,743.9	27.7
1061	J-214	1,472.0	Zone-4B	2.67	1,563.1	39.4
1066	J-215	1,470.0	Zone-4B	4.67	1,562.8	40.2
1069	J-216	1,440.0	Zone-4B	4.67	1,562.7	53.1
1071	J-217	1,410.0	Zone-4B	2.67	1,562.5	66.0
1073	J-218	1,340.0	Zone-4B	5.33	1,562.4	96.2
1075	J-219	1,300.0	Zone-3B	8.67	1,477.1	76.6
1077	J-220	1,430.0	Zone-4B	6.67	1,562.8	57.5
1083	J-221	1,290.0	Zone-2C	0.00	1,394.0	45.0
1196	J-222	1,302.0	Zone-3A	1.45	1,479.2	76.7
1093	J-223	1,393.0	Zone-4B	12.67	1,553.8	69.6
1095	J-224	1,450.0	Zone-4B	9.33	1,553.8	44.9

FlexTable: Junction Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1097	J-225	1,475.0	Zone-4B	4.00	1,553.8	34.1
1099	J-226	1,472.0	Zone-4B	3.33	1,553.6	35.3
1101	J-227	1,472.0	Zone-4B	0.00	1,553.6	35.3
1103	J-228	1,448.0	Zone-4B	3.33	1,553.6	45.7
1106	J-229	1,460.0	Zone-4B	3.33	1,553.6	40.5
1108	J-230	1,412.0	Zone-4B	5.33	1,553.3	61.1
1111	J-231	1,425.0	Zone-4B	3.33	1,553.3	55.5
1116	J-232	1,402.0	Zone-4B	14.67	1,553.9	65.7
1122	J-233	1,140.0	Zone-1	5.15	1,292.7	66.1
1125	J-234	1,155.0	Zone-1	15.27	1,291.9	59.2
1131	J-235	1,100.0	Zone-1	0.00	1,294.9	84.3
1133	J-236	1,100.0	Zone-1	0.00	1,294.9	84.3
1137	J-237	1,100.0	Zone-1	29.76	1,294.9	84.3
1139	J-238	1,094.0	Zone-1	0.00	1,294.5	86.8
1198	J-239	1,290.0	Zone-3A	0.00	1,479.2	81.9
1176	J-240	1,308.0	Zone-3A	0.00	1,479.8	74.3
1149	J-241	1,100.0	Zone-1	14.88	1,294.9	84.3
1152	J-242	1,100.0	Zone-1	14.88	1,294.9	84.3
1156	J-243	1,104.0	Zone-1	15.76	1,297.3	83.6
1159	J-244	1,125.0	Zone-1	7.03	1,303.8	77.4
1162	J-245	1,171.0	Zone-1	0.00	1,307.0	58.8
1165	J-246	1,153.0	Zone-1	2.67	1,307.0	66.6
1167	J-247	1,208.0	Zone-2C	10.00	1,391.7	79.5
1170	J-248	1,224.0	Zone-2C	6.67	1,392.0	72.7
1172	J-249	1,224.0	Zone-2C	8.67	1,392.6	73.0
451	J-250	1,095.0	Zone-1	0.00	1,294.9	86.5
452	J-251	1,095.0	Zone-1	29.76	1,294.7	86.4
453	J-252	1,094.0	Zone-1	0.00	1,294.6	86.8
454	J-253	1,093.0	Zone-1	0.00	1,294.7	87.3
455	J-254	1,094.0	Zone-1	0.00	1,294.8	86.9
1200	J-255	1,293.0	Zone-3A	17.52	1,479.2	80.6
1202	J-256	1,308.0	Zone-3A	4.36	1,479.2	74.1
1204	J-257	1,290.0	Zone-3A	0.00	1,479.2	81.9
1211	J-258	1,272.0	Zone-3A	0.00	1,484.9	92.1
1212	J-259	1,273.0	Zone-3A	0.00	1,484.9	91.7
1213	J-260	1,275.0	Zone-3A	0.00	1,485.0	90.9
471	J-261	1,096.0	Zone-1	5.95	1,294.3	85.8
472	J-262	1,096.0	Zone-1	5.95	1,294.3	85.8
473	J-263	1,080.0	Zone-1	0.00	1,293.6	92.4
474	J-264	1,080.0	Zone-1	30.55	1,293.6	92.4
1214	J-265	1,240.0	Zone-3A	0.00	1,485.0	106.0
1215	J-266	1,280.0	Zone-3A	0.00	1,485.1	88.7
1216	J-267	1,230.0	Zone-3A	0.00	1,485.3	110.5
1217	J-268	1,210.0	Zone-3A	0.00	1,485.4	119.2
1218	J-269	1,210.0	Zone-3A	0.00	1,485.4	119.2
1219	J-270	1,245.0	Zone-3A	0.00	1,485.8	104.2
1220	J-271	1,245.0	Zone-3A	0.00	1,485.8	104.2
1222	J-272	1,262.0	Zone-3A	0.00	1,485.9	96.9
1236	J-273	1,248.0	Zone-3A	0.00	1,485.8	102.9
1238	J-274	1,308.0	Zone-3A	2.67	1,480.7	74.7
1240	J-275	1,320.0	Zone-3A	3.33	1,481.0	69.7
1242	J-276	1,360.0	Zone-3A	0.00	1,481.2	52.4
1247	J-277	1,300.0	Zone-6A	0.00	1,749.3	194.4
1250	J-278	1,471.0	Zone-6A	0.00	1,750.8	121.1

FlexTable: Junction Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1190	J-279	1,318.0	Zone-3A	9.33	1,479.2	69.7
1275	J-280	1,500.0	Zone-5A	7.33	1,646.3	63.3
1277	J-281	1,500.0	Zone-5A	5.33	1,646.3	63.3
1279	J-282	1,580.0	Zone-6A	1.33	1,850.1	116.8
1282	J-283	1,450.0	Zone-4A	2.00	1,646.6	85.1
1285	J-284	1,410.0	Zone-4A	6.67	1,563.2	66.3
1287	J-285	1,450.0	Zone-4B	1.33	1,563.3	49.0
1310	J-290	1,635.0	Zone-Off	0.00	1,644.9	4.3
1319	J-291	1,250.0	Zone-2A	(N/A)	(N/A)	(N/A)
1321	J-292	1,270.0	Zone-2A	(N/A)	(N/A)	(N/A)
1323	J-293	1,285.0	Zone-2A	(N/A)	(N/A)	(N/A)
1325	J-294	1,320.0	Zone-3A	(N/A)	(N/A)	(N/A)
1327	J-295	1,370.0	Zone-3A	(N/A)	(N/A)	(N/A)
217	J-296	1,102.0	Zone-1	14.88	1,296.4	84.1
1351	J-301	1,231.0	Zone-2C	2.67	1,393.4	70.3
1353	J-302	1,232.0	Zone-2C	6.00	1,393.4	69.8
1355	J-303	1,212.0	Zone-1	(N/A)	(N/A)	(N/A)
1367	J-308	1,248.0	Zone-2C	3.15	1,393.4	62.9
1383	J-310	1,165.0	Zone-3A	0.00	1,513.1	150.6
1395	J-312	1,210.0	Zone-1	5.33	1,293.6	36.2
1398	J-313	1,093.0	Zone-1	17.21	1,294.6	87.2
1400	J-314	1,093.0	Zone-1	(N/A)	(N/A)	(N/A)
1410	J-315	1,122.0	Zone-1	0.00	1,295.8	75.2
1412	J-316	1,122.0	Zone-1	2.67	1,295.8	75.2
1425	J-319	1,104.5	Zone-1	0.00	1,298.4	83.9
1428	J-320	1,106.0	Zone-1	12.73	1,298.4	83.2
1430	J-321	1,112.0	Zone-1	3.39	1,300.4	81.5
1432	J-322	1,113.0	Zone-1	86.67	1,307.6	84.2
1435	J-323	1,097.0	Zone-1	0.00	1,294.9	85.6
1441	J-325	1,099.3	Zone-1	0.85	1,294.2	84.3
1445	J-326	1,157.9	Zone-1	3.33	1,295.7	59.6
1462	J-327	1,120.0	Zone-1	-800.00	1,298.3	77.1
1486	J-329	1,080.0	Zone-1	11.58	1,293.6	92.4
1497	J-330	1,114.9	Zone-1	0.00	1,304.3	81.9
434	J-332	1,097.0	Zone-1	5.95	1,294.2	85.3
1504	J-332	1,093.3	Zone-1	0.00	1,294.2	86.9
1511	J-333	1,196.0	Zone-1	4.67	1,307.3	48.1
1512	J-334	1,165.1	Zone-1	1.33	1,307.3	61.5
1516	J-335	1,181.0	Zone-1	3.33	1,307.3	54.6
1517	J-336	1,174.9	Zone-1	5.33	1,307.3	57.3
1521	J-337	1,186.0	Zone-1	4.67	1,307.3	52.5
1522	J-338	1,183.5	Zone-1	3.33	1,307.3	53.5
1526	J-339	1,189.0	Zone-1	5.33	1,307.3	51.2
1531	J-340	1,400.0	Zone-3A	10.00	1,481.4	35.2
1534	J-342	1,410.0	Zone-4A	15.33	1,563.0	66.2
1537	J-343	1,410.0	Zone-4A	2.67	1,563.1	66.2
1539	J-344	1,400.0	Zone-4A	14.00	1,563.1	70.6
1544	J-345	1,220.0	Zone-1	0.00	1,293.6	31.9
1560	J-349	1,596.2	Zone-6A	0.00	1,850.1	109.8
1561	J-350	1,597.0	Zone-5A	0.00	1,645.4	21.0
1566	J-351	1,600.0	Zone-6A	0.00	1,850.1	108.2
1569	J-352	1,629.0	Zone-6A	5.33	1,850.1	95.6
1571	J-353	1,618.0	Zone-6A	4.67	1,850.1	100.4
1574	J-354	1,635.0	Zone-6A	8.67	1,850.1	93.0

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1593	J-355	1,282.5	Zone-3A	0.00	1,478.0	84.6
1596	J-356	1,300.0	Zone-3B	0.00	1,478.0	77.0
1603	J-360	1,340.0	Zone-3A	0.00	1,478.0	59.7
1605	J-361	1,320.0	Zone-3A	0.00	1,478.0	68.4
1609	J-362	1,610.0	Zone-6A	5.33	1,850.1	103.9
1616	J-366	1,610.0	Zone-6A	0.00	1,850.1	103.9
1622	J-369	1,600.0	Zone-6A	9.33	1,850.1	108.2
1638	J-375	1,589.8	Zone-6A	3.33	1,850.1	112.6
1641	J-376	1,514.0	Zone-5A	4.00	1,646.2	57.2
1654	J-377	1,140.0	Zone-1	0.00	1,297.1	68.0
1659	J-379	1,250.0	Zone-2A	0.00	1,419.6	73.4
1661	J-380	1,250.0	Zone-2A	0.00	1,419.6	73.4
1664	J-381	1,424.0	Zone-4B	0.00	1,553.9	56.2
1667	J-382	1,440.0	Zone-4B	0.00	1,553.9	49.3
1669	J-383	1,630.9	Zone-6A	3.33	1,850.1	94.8
1672	J-384	1,630.0	Zone-6A	0.00	1,850.1	95.2
1674	J-385	1,432.4	Zone-4B	0.00	1,562.1	56.1
1677	J-386	1,401.5	Zone-4B	0.00	1,562.2	69.5
1680	J-387	1,372.0	Zone-4B	0.00	1,562.3	82.3
1683	J-388	1,703.9	<None>	0.00	1,743.8	17.3
1688	J-389	1,370.0	Zone-3A	(N/A)	(N/A)	(N/A)
1690	J-390	1,380.0	Zone-3A	(N/A)	(N/A)	(N/A)
1692	J-391	1,360.0	Zone-3A	(N/A)	(N/A)	(N/A)
1694	J-392	1,360.0	Zone-3A	(N/A)	(N/A)	(N/A)
1696	J-393	1,313.0	Zone-3A	(N/A)	(N/A)	(N/A)
1698	J-394	1,325.0	Zone-3A	(N/A)	(N/A)	(N/A)
1702	J-396	0.0	Zone-2A	(N/A)	(N/A)	(N/A)
1704	J-397	1,290.0	Zone-2A	(N/A)	(N/A)	(N/A)
1706	J-398	1,264.6	Zone-2A	(N/A)	(N/A)	(N/A)
1713	J-399	1,310.0	Zone-3A	(N/A)	(N/A)	(N/A)
1719	J-400	1,440.0	Zone-4A	(N/A)	(N/A)	(N/A)
318	J-401	1,275.0	Zone-2D	8.00	1,413.8	60.1
319	J-402	1,265.0	Zone-2D	4.00	1,413.8	64.4
320	J-403	1,245.0	Zone-2D	5.33	1,413.7	73.0
321	J-404	1,230.0	Zone-2D	4.67	1,413.7	79.5
322	J-405	1,200.0	Zone-2D	4.00	1,413.8	92.5
323	J-406	1,238.0	Zone-2D	4.00	1,413.9	76.1
324	J-407	1,255.0	Zone-2D	4.00	1,414.0	68.8
325	J-408	1,225.0	Zone-2D	8.00	1,413.6	81.6
326	J-409	1,210.0	Zone-1	5.33	1,292.9	35.9
327	J-410	1,220.0	Zone-2C	0.00	1,393.4	75.0
328	J-411	1,210.0	Zone-2C	6.67	1,393.4	79.3
329	J-412	1,230.0	Zone-2C	0.00	1,393.4	70.7
330	J-413	1,262.0	Zone-2C	3.33	1,393.5	56.9
331	J-414	1,245.0	Zone-2C	10.67	1,393.4	64.2
332	J-415	1,226.0	Zone-2C	12.48	1,393.4	72.4
333	J-416	1,210.0	Zone-2C	10.00	1,392.2	78.8
334	J-417	1,215.0	Zone-2C	6.67	1,392.9	77.0
335	J-418	1,262.0	Zone-2C	2.00	1,393.4	56.8
336	J-419	1,300.0	Zone-3B	7.33	1,479.9	77.9
337	J-420	1,240.0	Zone-2C	11.33	1,393.4	66.4
338	J-421	1,278.0	Zone-3B	8.67	1,480.0	87.4
339	J-422	1,275.0	Zone-2C	6.00	1,393.5	51.3
340	J-423	1,275.0	Zone-2C	8.67	1,393.8	51.4

FlexTable: Junction Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
341	J-424	1,230.0	Zone-2C	8.67	1,393.6	70.8
342	J-425	1,222.0	Zone-2C	8.48	1,393.4	74.1
343	J-427	1,230.0	Zone-2C	0.00	1,393.5	70.8
344	J-428	1,238.0	Zone-2C	6.00	1,393.6	67.3
345	J-429	1,250.0	Zone-2C	0.00	1,394.0	62.3
346	J-430	1,252.0	Zone-2C	12.00	1,394.4	61.6
347	J-431	1,228.0	Zone-2C	4.00	1,393.3	71.5
348	J-432	1,222.0	Zone-2C	12.00	1,393.3	74.1
349	J-433	1,212.0	Zone-2C	14.67	1,393.3	78.4
350	J-434	1,212.0	Zone-2C	10.00	1,392.5	78.1
351	J-435	1,200.0	Zone-2C	4.67	1,392.1	83.1
352	J-436	1,195.0	Zone-2C	5.33	1,392.0	85.2
353	J-437	1,190.0	Zone-2C	0.00	1,391.8	87.3
354	J-438	1,188.0	Zone-2C	1.33	1,391.7	88.1
355	J-439	1,185.0	Zone-2C	0.00	1,391.6	89.4
356	J-440	1,188.0	Zone-2C	2.67	1,391.4	88.0
357	J-441	1,200.0	Zone-2C	2.67	1,391.4	82.8
358	J-442	1,245.0	Zone-2C	12.67	1,393.2	64.1
359	J-443	1,250.0	Zone-2C	5.33	1,393.2	62.0
360	J-444	1,275.0	Zone-2C	7.33	1,393.2	51.1
361	J-445	1,245.0	Zone-2C	30.55	1,392.9	64.0
362	J-446	1,265.0	Zone-2C	0.00	1,394.7	56.1
363	J-447	1,270.0	Zone-2C	11.58	1,395.3	54.2
364	J-448	1,295.0	Zone-2C	0.00	1,395.7	43.6
365	J-449	1,290.0	Zone-2C	0.00	1,396.2	45.9
366	J-450	1,215.0	Zone-2A	4.00	1,419.6	88.5
367	J-451	1,230.0	Zone-2A	6.30	1,419.6	82.0
368	J-452	1,240.0	Zone-2A	25.39	1,419.6	77.7
369	J-453	1,248.0	Zone-2A	2.67	1,419.7	74.3
370	J-454	1,265.0	Zone-2A	3.33	1,419.7	66.9
371	J-455	1,275.0	Zone-2A	2.67	1,419.7	62.6
372	J-456	1,230.0	Zone-2A	8.36	1,419.6	82.0
373	J-457	1,218.0	Zone-2A	3.33	1,419.5	87.2
374	J-458	1,240.0	Zone-2A	7.33	1,419.6	77.7
375	J-459	1,220.0	Zone-2A	11.33	1,419.5	86.3
376	J-460	1,252.0	Zone-2A	3.33	1,419.7	72.5
377	J-461	1,288.0	Zone-3A	8.00	1,480.5	83.3
446	J-485	1,225.0	Zone-2B	3.33	1,403.4	77.2
435	J-486	1,225.0	Zone-2B	0.00	1,403.4	77.2
436	J-487	1,250.0	Zone-2B	4.00	1,403.4	66.4
437	J-488	1,220.0	Zone-2B	3.33	1,403.4	79.3
438	J-489	1,220.0	Zone-2B	6.00	1,403.4	79.3
439	J-490	1,275.0	Zone-2D	4.67	1,413.8	60.1
467	J-491	1,200.0	Zone-2C	4.00	1,390.5	82.4
448	J-506	1,216.0	Zone-2D	0.00	1,413.8	85.6
450	J-515	1,240.0	Zone-2C	2.67	1,393.4	66.4
456	J-521	1,250.0	Zone-2A	6.67	1,419.6	73.4
457	J-522	1,280.0	Zone-2A	14.67	1,419.6	60.4
458	J-523	1,375.0	Zone-3A	2.97	1,479.2	45.1
459	J-524	1,325.0	Zone-3A	8.97	1,479.2	66.7
460	J-525	1,305.0	Zone-3A	4.00	1,479.2	75.4
461	J-526	1,300.0	Zone-3A	4.00	1,479.2	77.5
462	J-527	1,318.0	Zone-3A	7.33	1,479.2	69.7
463	J-528	1,235.0	Zone-2C	4.67	1,393.4	68.5

FlexTable: Junction Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
464	J-529	1,250.0	Zone-2C	8.67	1,393.3	62.0
465	J-530	1,300.0	Zone-2C	12.67	1,393.3	40.4
466	J-531	1,145.0	Zone-1	5.64	1,294.9	64.9
378	J-601	1,350.0	Zone-3A	12.00	1,479.8	56.2
379	J-602	1,350.0	Zone-3A	6.00	1,480.0	56.2
380	J-603	1,325.0	Zone-3A	5.33	1,480.1	67.1
381	J-604	1,325.0	Zone-3A	4.67	1,479.8	67.0
382	J-605	1,305.0	Zone-3A	19.58	1,480.3	75.8
383	J-606	1,300.0	Zone-3A	2.67	1,479.8	77.8
384	J-607	1,275.0	Zone-3A	4.00	1,479.7	88.6
385	J-608	1,250.0	Zone-3A	4.00	1,479.3	99.2
386	J-609	1,235.0	Zone-3A	2.00	1,479.1	105.6
387	J-610	1,300.0	Zone-3A	15.33	1,477.6	76.8
388	J-611	1,455.0	Zone-Off	0.00	1,476.7	9.4
389	J-612	1,471.0	Zone-Off	0.00	1,476.2	2.3
390	J-613	1,453.0	Zone-Off	0.00	1,476.7	10.2
391	J-614	1,410.0	Zone-3B	2.67	1,477.5	29.2
392	J-615	1,415.0	Zone-3B	0.00	1,478.2	27.4
393	J-616	1,350.0	Zone-3B	5.33	1,479.3	55.9
394	J-617	1,295.0	Zone-3B	6.00	1,480.0	80.0
395	J-618	1,310.0	Zone-3B	7.33	1,479.9	73.5
396	J-619	1,322.0	Zone-3B	0.00	1,477.2	67.1
397	J-620	1,352.0	Zone-3B	4.67	1,477.3	54.2
398	J-621	1,355.0	Zone-3A	6.00	1,479.9	54.0
399	J-622	1,302.0	Zone-3B	6.67	1,479.9	77.0
400	J-623	1,302.0	Zone-3B	0.00	1,479.8	76.9
401	J-624	1,355.0	Zone-3B	0.00	1,480.8	54.4
402	J-625	1,350.0	Zone-3B	11.33	1,481.1	56.7
403	J-626	1,330.0	Zone-3B	0.00	1,481.0	65.3
404	J-627	1,330.0	Zone-3B	10.67	1,481.0	65.3
405	J-628	1,305.0	Zone-3B	10.00	1,480.6	76.0
406	J-629	1,305.0	Zone-3B	0.00	1,480.0	75.7
407	J-630	1,375.0	Zone-3B	3.33	1,481.8	46.2
408	J-631	1,375.0	Zone-3B	4.00	1,481.7	46.1
409	J-632	1,340.0	Zone-3B	11.33	1,481.5	61.2
410	J-633	1,340.0	Zone-3B	0.00	1,481.2	61.1
411	J-634	1,258.0	Zone-3A	0.00	1,481.4	96.7
412	J-635	1,232.0	Zone-3A	0.00	1,482.9	108.6
413	J-636	1,242.0	Zone-3A	0.00	1,484.0	104.7
414	J-637	1,235.0	Zone-3A	0.00	1,484.4	107.9
415	J-638	1,310.0	Zone-3A	5.33	1,481.7	74.3
416	J-639	1,460.0	Zone-Off	0.00	1,477.3	7.5
417	J-640	1,410.0	Zone-3A	0.00	1,478.0	29.4
418	J-641	1,380.0	Zone-3A	11.33	1,478.7	42.7
419	J-642	1,350.0	Zone-3A	7.33	1,478.6	55.6
420	J-643	1,320.0	Zone-3A	0.00	1,480.2	69.3
421	J-644	1,305.0	Zone-3A	0.00	1,480.4	75.9
422	J-645	1,225.0	Zone-3A	0.00	1,484.6	112.3
423	J-646	1,240.0	Zone-3A	0.00	1,485.1	106.1
424	J-647	1,275.0	Zone-Off	0.00	1,290.9	6.9
425	J-648	1,400.0	Zone-4A	7.33	1,563.0	70.5
426	J-649	1,400.0	Zone-4A	3.33	1,563.0	70.5
427	J-650	1,405.0	Zone-4A	5.33	1,562.9	68.3
428	J-651	1,460.0	Zone-4A	5.58	1,562.9	44.5

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
429	J-652	1,450.0	Zone-4B	5.33	1,562.0	48.5
430	J-653	1,462.0	Zone-4B	8.30	1,562.0	43.3
431	J-654	1,425.0	Zone-4B	5.33	1,558.1	57.6
432	J-655	1,435.0	Zone-4B	5.33	1,558.1	53.3
433	J-656	1,401.0	Zone-4B	0.00	1,555.8	67.0
440	J-658	1,280.0	Zone-3A	0.00	1,480.7	86.8
441	J-659	1,280.0	Zone-3A	3.33	1,480.2	86.6
468	J-720	1,094.0	Zone-1	0.00	1,294.6	86.8
469	J-721	1,094.0	Zone-1	0.00	1,294.5	86.8
470	J-722	1,095.0	Zone-1	0.00	1,294.4	86.3
485	J-810	1,260.0	Zone-2C	2.67	1,393.4	57.7
486	J-811	1,245.0	Zone-2C	0.00	1,393.4	64.2
487	J-812	1,287.0	Zone-2C	7.33	1,393.4	46.0

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-1	Zone-1	6	True	500.00	1,182.65	504.67	1,187.31	20.0	24.0
J-2	Zone-1	6	True	500.00	1,462.70	503.33	1,466.03	20.0	24.8
J-3	Zone-1	7	True	500.00	1,647.87	510.67	1,658.54	20.0	42.3
J-4	Zone-1	21	True	500.00	1,126.86	506.00	1,132.86	20.0	28.7
J-5	Zone-1	5	True	500.00	6,226.52	500.00	6,226.52	20.0	20.0
J-6	Zone-1	7	True	500.00	1,846.87	503.33	1,850.20	20.0	42.1
J-7	Zone-1	8	True	500.00	1,846.81	506.00	1,852.81	20.0	44.8
J-8	Zone-1	6	True	500.00	1,846.86	504.67	1,851.53	20.0	21.1
J-9	Zone-1	6	True	500.00	1,846.86	504.00	1,850.86	20.0	21.7
J-10	Zone-1	7	True	500.00	1,841.96	511.33	1,853.30	20.0	51.4
J-11	Zone-1	21	True	500.00	1,161.02	508.00	1,169.02	20.0	33.8
J-12	Zone-1	7	True	500.00	2,707.94	504.67	2,712.61	20.0	56.9
J-13	Zone-1	21	True	500.00	1,160.99	500.00	1,160.99	20.0	39.5
J-14	Zone-1	7	True	500.00	2,779.04	501.33	2,780.37	20.0	62.6
J-15	Zone-1	7	True	500.00	2,197.28	504.00	2,201.28	20.0	61.4
J-16	Zone-1	5	True	500.00	6,189.85	150.00	5,839.85	20.0	20.0
J-17	Zone-1	7	True	500.00	3,226.58	508.48	3,235.06	20.0	66.7
J-18	Zone-1	7	True	500.00	3,504.33	500.00	3,504.33	20.0	71.1
J-19	Zone-1	7	True	500.00	4,011.31	500.00	4,011.31	20.0	65.4
J-20	Zone-1	6	True	500.00	4,011.29	556.42	4,067.71	20.0	29.6
J-21	Zone-2C	18	True	500.00	998.16	504.00	1,002.16	20.0	36.4
J-22	Zone-1	7	True	500.00	3,665.22	518.91	3,684.13	20.0	68.8
J-23	Zone-1	6	True	500.00	3,665.28	502.55	3,667.83	20.0	29.1
J-24	Zone-2C	8	True	500.00	873.36	500.00	873.36	20.0	27.8
J-25	Zone-2C	4	True	500.00	807.35	504.67	812.02	20.0	20.0
J-26	Zone-1	6	True	500.00	3,965.54	507.15	3,972.69	20.0	21.6
J-27	Zone-1	16	True	500.00	3,965.55	515.33	3,980.88	20.0	65.9
J-28	Zone-1	7	True	500.00	3,510.57	510.48	3,521.05	20.0	66.0
J-29	Zone-1	6	True	500.00	4,270.04	504.06	4,274.10	20.0	60.5
J-30	Zone-1	7	True	500.00	3,897.94	500.00	3,897.94	20.0	58.8
J-31	Zone-1	6	True	500.00	7,718.56	503.15	7,721.71	20.0	21.9
J-32	Zone-1	6	True	500.00	7,718.57	510.00	7,728.57	20.0	25.3
J-33	Zone-3A	9	True	500.00	5,814.55	508.67	5,823.22	20.0	32.0
J-34	Zone-1	5	True	500.00	7,718.72	515.64	7,734.36	20.0	44.5
J-35	Zone-1	22	True	500.00	5,161.55	529.64	5,191.19	20.0	70.0
J-36	Zone-1	6	True	500.00	5,368.24	504.73	5,372.97	20.0	56.0
J-37	Zone-1	6	True	500.00	4,770.91	504.55	4,775.46	20.0	51.6
J-38	Zone-1	5	True	500.00	8,583.88	524.73	8,608.61	20.0	60.2
J-39	Zone-1	23	True	500.00	7,594.59	504.48	7,599.08	20.0	63.5
J-40	Zone-1	6	True	500.00	6,814.32	516.67	6,830.98	20.0	67.7
J-41	Zone-1	6	True	500.00	6,827.87	503.15	6,831.02	20.0	65.3
J-42	Zone-1	6	True	500.00	7,017.28	506.61	7,023.88	20.0	66.1
J-43	Zone-1	23	True	500.00	6,074.89	505.09	6,079.98	20.0	44.2
J-45	Zone-Off	1	False	500.00	0.00	500.00	0.00	20.0	5.3
J-46	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	50.7
J-47	Zone-1	5	True	500.00	9,990.54	510.00	10,000.54	20.0	31.2
J-48	Zone-1	4	True	500.00	8,617.25	514.24	8,631.49	20.0	20.0
J-49	Zone-1	6	True	500.00	8,028.05	505.88	8,033.93	20.0	39.6
J-50	Zone-1	6	True	500.00	7,332.44	500.00	7,332.44	20.0	34.5
J-52	Zone-1	6	True	500.00	8,080.56	500.00	8,080.56	20.0	33.9
J-53	Zone-1	22	True	500.00	7,067.31	500.00	7,067.31	20.0	65.8
J-54	Zone-1	4	True	500.00	3,885.55	503.39	3,888.95	20.0	20.0

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-55	Zone-1	15	True	500.00	2,301.52	503.39	2,304.91	20.0	20.0
J-56	Zone-1	6	True	500.00	6,650.42	500.00	6,650.42	20.0	59.0
J-57	Zone-1	22	True	500.00	7,238.72	500.00	7,238.72	20.0	64.6
J-58	Zone-1	22	True	500.00	7,205.33	505.95	7,211.28	20.0	63.8
J-59	Zone-1	22	True	500.00	7,130.24	505.95	7,136.19	20.0	64.3
J-60	Zone-1	23	True	500.00	7,461.83	529.76	7,491.58	20.0	61.0
J-61	Zone-1	5	True	500.00	7,790.75	500.00	7,790.75	20.0	57.1
J-62	Zone-1	6	True	500.00	7,790.65	529.76	7,820.40	20.0	21.9
J-63	Zone-1	5	True	500.00	7,557.20	500.00	7,557.20	20.0	45.8
J-64	Zone-1	6	True	500.00	7,336.80	503.39	7,340.20	20.0	38.0
J-65	Zone-1	4	True	500.00	6,811.60	502.55	6,814.15	20.0	20.0
J-66	Zone-1	4	True	500.00	6,548.84	507.15	6,555.99	20.0	20.0
J-67	Zone-1	4	True	500.00	7,757.70	505.88	7,763.58	20.0	20.0
J-68	Zone-1	6	True	500.00	8,418.30	508.24	8,426.54	20.0	30.7
J-69	Zone-1	6	True	500.00	8,408.67	513.94	8,422.61	20.0	28.3
J-70	Zone-1	4	True	500.00	7,547.89	504.73	7,552.62	20.0	20.0
J-71	Zone-1	5	True	500.00	8,182.07	529.76	8,211.83	20.0	47.8
J-72	Zone-1	5	True	500.00	8,218.76	500.00	8,218.76	20.0	60.6
J-73	Zone-1	5	True	500.00	8,036.81	529.76	8,066.57	20.0	58.1
J-74	Zone-1	3	True	500.00	10,000.00	554.91	10,054.91	20.0	26.3
J-75	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	26.8
J-76	Zone-1	8	True	500.00	8,997.55	500.00	8,997.55	20.0	20.3
J-77	Zone-1	4	True	500.00	3,918.10	500.00	3,918.10	20.0	20.0
J-78	Zone-1	7	True	500.00	3,417.61	504.67	3,422.28	20.0	27.0
J-79	Zone-1	3	True	500.00	10,000.00	506.67	10,006.67	20.0	30.9
J-80	Zone-1	5	True	500.00	8,430.77	502.97	8,433.74	20.0	20.0
J-81	Zone-1	17	True	500.00	4,161.73	508.67	4,170.40	20.0	20.0
J-82	Zone-1	4	True	500.00	6,085.86	504.85	6,090.71	20.0	20.0
J-83	Zone-1	4	True	500.00	6,956.49	500.00	6,956.49	20.0	20.0
J-84	Zone-1	4	True	500.00	3,007.02	512.48	3,019.50	20.0	20.0
J-85	Zone-1	4	True	500.00	8,256.33	500.00	8,256.33	20.0	20.0
J-86	Zone-1	3	True	500.00	3,611.83	505.09	3,616.92	20.0	20.0
J-87	Zone-1	5	True	500.00	9,783.22	532.24	9,815.46	20.0	20.0
J-88	Zone-1	5	True	500.00	8,920.48	503.88	8,924.35	20.0	20.0
J-89	Zone-3A	4	True	500.00	3,313.50	500.00	3,313.50	20.0	20.0
J-90	Zone-1	5	True	500.00	8,492.97	500.85	8,493.82	20.0	53.8
J-91	Zone-1	5	True	500.00	7,429.58	505.94	7,435.52	20.0	20.0
J-92	Zone-1	7	True	500.00	6,881.67	500.00	6,881.67	20.0	23.2
J-94	Zone-1	4	True	500.00	8,521.80	512.42	8,534.23	20.0	20.0
J-95	Zone-1	5	True	500.00	8,700.13	553.24	8,753.37	20.0	56.1
J-96	Zone-1	5	True	500.00	8,303.57	514.88	8,318.45	20.0	59.4
J-97	Zone-1	5	True	500.00	8,479.16	514.88	8,494.04	20.0	43.0
J-98	Zone-1	16	True	500.00	1,332.30	505.33	1,337.63	20.0	24.3
J-99	Zone-1	9	True	500.00	3,832.89	506.00	3,838.89	20.0	23.6
J-100	Zone-1	14	True	500.00	2,588.85	506.67	2,595.52	20.0	20.0
J-101	Zone-1	4	True	500.00	2,804.09	512.61	2,816.70	20.0	20.0
J-102	Zone-1	12	True	500.00	1,970.05	506.67	1,976.72	20.0	20.0
J-103	Zone-2C	4	True	500.00	1,547.83	504.00	1,551.83	20.0	20.0
J-104	Zone-1	13	True	500.00	2,544.12	510.00	2,554.12	20.0	20.0
J-105	Zone-1	13	True	500.00	3,036.14	504.67	3,040.81	20.0	20.0
J-106	Zone-1	4	True	500.00	7,955.09	504.67	7,959.75	20.0	20.0
J-107	Zone-1	4	True	500.00	1,658.79	513.33	1,672.12	20.0	20.0

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-108	Zone-1	4	True	500.00	2,690.51	511.33	2,701.84	20.0	20.0
J-109	Zone-1	7	True	500.00	3,674.39	504.00	3,678.39	20.0	22.5
J-110	Zone-1	5	True	500.00	3,946.81	508.67	3,955.48	20.0	20.0
J-111	Zone-1	5	True	500.00	3,381.76	511.33	3,393.09	20.0	20.0
J-112	Zone-1	5	True	500.00	3,317.47	508.67	3,326.14	20.0	20.0
J-113	Zone-1	4	True	500.00	4,187.51	515.33	4,202.85	20.0	20.0
J-114	Zone-1	4	True	500.00	6,581.64	507.33	6,588.97	20.0	20.0
J-115	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	36.1
J-116	Zone-1	3	True	500.00	10,000.00	508.00	10,008.00	20.0	40.4
J-117	Zone-1	5	True	500.00	7,618.82	506.00	7,624.82	20.0	20.0
J-118	Zone-1	3	True	500.00	10,000.00	526.85	10,026.85	20.0	36.4
J-119	Zone-1	4	True	500.00	7,616.65	505.52	7,622.17	20.0	20.0
J-120	Zone-1	4	True	500.00	4,637.04	506.73	4,643.77	20.0	20.0
J-121	Zone-1	3	True	500.00	1,385.00	500.00	1,385.00	20.0	20.0
J-122	Zone-1	4	True	500.00	3,942.95	514.91	3,957.86	20.0	20.0
J-123	Zone-1	3	True	500.00	10,000.00	514.36	10,014.36	20.0	25.4
J-124	Zone-1	4	True	500.00	4,620.15	506.85	4,627.00	20.0	20.0
J-125	Zone-1	3	True	500.00	10,000.00	506.00	10,006.00	20.0	42.3
J-126	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	45.0
J-127	Zone-1	3	True	500.00	10,000.00	589.27	10,089.27	20.0	49.6
J-128	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	46.6
J-129	Zone-1	3	True	500.00	10,000.00	648.79	10,148.79	20.0	44.8
J-130	Zone-1	5	True	500.00	9,781.63	559.52	9,841.14	20.0	46.3
J-131	Zone-1	5	True	500.00	8,810.65	500.00	8,810.65	20.0	56.1
J-132	Zone-1	12	True	500.00	1,199.05	506.67	1,205.72	20.0	20.0
J-133	Zone-2B	4	True	500.00	1,497.33	508.00	1,505.33	20.0	20.0
J-135	Zone-1	3	True	500.00	10,000.00	517.33	10,017.33	20.0	36.0
J-136	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	31.9
J-137	Zone-1	4	True	500.00	9,986.43	505.52	9,991.94	20.0	27.3
J-138	Zone-1	4	True	500.00	3,925.27	509.33	3,934.60	20.0	20.0
J-139	Zone-1	4	True	500.00	3,029.24	507.33	3,036.57	20.0	20.0
J-140	Zone-1	5	True	500.00	7,292.60	506.36	7,298.96	20.0	20.0
J-141	Zone-1	7	True	500.00	7,724.33	504.67	7,729.00	20.0	21.3
J-142	Zone-1	4	True	500.00	1,841.98	502.00	1,843.98	20.0	20.0
J-143	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	42.0
J-144	Zone-1	3	True	500.00	10,000.00	529.76	10,029.76	20.0	28.1
J-145	Zone-1	5	True	500.00	8,892.45	500.00	8,892.45	20.0	20.0
J-146	Zone-1	3	True	500.00	10,000.00	529.76	10,029.76	20.0	27.9
J-147	Zone-1	3	True	500.00	10,000.00	529.76	10,029.76	20.0	20.5
J-148	Zone-1	5	True	500.00	8,422.15	500.00	8,422.15	20.0	20.0
J-149	Zone-1	11	True	500.00	2,160.11	500.00	2,160.11	20.0	20.0
J-150	Zone-1	4	True	500.00	1,427.64	509.33	1,436.97	20.0	20.0
J-151	Zone-1	7	True	500.00	8,259.06	502.55	8,261.60	20.0	21.0
J-152	Zone-1	7	True	500.00	8,033.48	501.70	8,035.18	20.0	23.5
J-153	Zone-1	5	True	500.00	5,213.81	506.00	5,219.81	20.0	20.0
J-154	Zone-1	4	True	500.00	4,623.69	510.67	4,634.35	20.0	20.0
J-155	Zone-1	4	True	500.00	4,505.71	509.33	4,515.04	20.0	20.0
J-156	Zone-1	4	True	500.00	4,640.50	506.00	4,646.50	20.0	20.0
J-157	Zone-1	11	True	500.00	2,976.97	511.21	2,988.18	20.0	20.0
J-158	Zone-1	5	True	500.00	8,489.48	501.70	8,491.18	20.0	20.0
J-159	Zone-1	5	True	500.00	8,658.01	500.00	8,658.01	20.0	20.0
J-160	Zone-1	3	True	500.00	10,000.00	500.85	10,000.85	20.0	26.5

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-161	Zone-1	5	True	500.00	8,022.03	500.00	8,022.03	20.0	20.0
J-162	Zone-1	2	True	500.00	10,000.00	-1,500.00	8,000.00	20.0	28.8
J-163	Zone-1	3	True	500.00	10,000.00	500.85	10,000.85	20.0	28.2
J-164	Zone-1	3	True	500.00	10,000.00	510.73	10,010.73	20.0	29.8
J-165	Zone-1	13	True	500.00	9,430.75	500.00	9,430.75	20.0	25.7
J-166	Zone-1	15	True	500.00	5,775.25	500.00	5,775.25	20.0	20.0
J-167	Zone-1	14	True	500.00	5,623.57	500.67	5,624.24	20.0	20.0
J-168	Zone-1	5	True	500.00	6,612.67	503.33	6,616.00	20.0	20.0
J-169	Zone-1	7	True	500.00	5,876.14	504.00	5,880.14	20.0	22.2
J-170	Zone-1	3	True	500.00	10,000.00	509.33	10,009.33	20.0	20.9
J-171	Zone-1	4	True	500.00	1,505.00	504.67	1,509.66	20.0	20.0
J-172	Zone-2A	4	True	500.00	3,706.52	506.00	3,712.52	20.0	20.0
J-173	Zone-1	7	True	500.00	8,896.52	507.27	8,903.79	20.0	30.9
J-174	Zone-1	4	True	500.00	3,304.00	502.67	3,306.67	20.0	20.0
J-176	Zone-1	4	True	500.00	5,487.13	500.00	5,487.13	20.0	20.0
J-177	Zone-1	9	True	500.00	8,188.13	500.00	8,188.13	20.0	34.2
J-179	Zone-3A	4	True	500.00	2,796.31	508.00	2,804.31	20.0	20.0
J-180	Zone-1	4	True	500.00	3,446.71	508.91	3,455.61	20.0	20.0
J-181	Zone-1	4	True	500.00	5,550.22	503.33	5,553.56	20.0	20.0
J-182	Zone-1	4	True	500.00	3,166.03	524.73	3,190.76	20.0	20.0
J-183	Zone-1	24	True	500.00	4,821.36	504.67	4,826.03	20.0	33.5
J-184	Zone-1	7	True	500.00	5,993.45	502.67	5,996.12	20.0	26.4
J-185	Zone-1	4	True	500.00	2,206.63	504.00	2,210.63	20.0	20.0
J-186	Zone-1	6	True	500.00	3,490.42	501.33	3,491.76	20.0	29.2
J-187	Zone-1	4	True	500.00	2,707.98	513.27	2,721.26	20.0	20.0
J-188	Zone-1	4	True	500.00	2,747.92	504.67	2,752.58	20.0	20.0
J-189	Zone-1	6	True	500.00	3,038.45	504.00	3,042.45	20.0	20.2
J-190	Zone-1	4	True	500.00	5,062.26	503.33	5,065.59	20.0	20.0
J-191	Zone-2B	12	True	500.00	2,388.80	503.33	2,392.14	20.0	20.0
J-192	Zone-1	5	True	500.00	8,577.96	514.88	8,592.84	20.0	52.2
J-193	Zone-1	5	True	500.00	8,428.12	500.00	8,428.12	20.0	46.4
J-194	Zone-1	4	True	500.00	6,846.28	502.00	6,848.28	20.0	20.0
J-195	Zone-1	3	True	500.00	1,460.73	514.88	1,475.61	20.0	20.0
J-196	Zone-1	2	True	500.00	10,000.00	-1,150.00	8,350.00	20.0	36.3
J-197	Zone-1	4	True	500.00	6,200.19	-200.00	5,500.19	20.0	20.0
J-198	Zone-1	4	True	500.00	5,879.85	500.85	5,880.70	20.0	20.0
J-199	Zone-1	7	True	500.00	2,747.90	504.67	2,752.57	20.0	63.8
J-201	Zone-1	7	True	500.00	2,701.55	524.67	2,726.22	20.0	57.9
J-202	Zone-1	7	True	500.00	2,701.37	500.00	2,701.37	20.0	58.0
J-203	Zone-1	7	True	500.00	2,701.73	500.00	2,701.73	20.0	57.8
J-205	Zone-1	7	True	500.00	2,851.90	500.00	2,851.90	20.0	64.1
J-206	Zone-1	7	True	500.00	3,214.55	500.00	3,214.55	20.0	66.7
J-207	Zone-1	7	True	500.00	3,408.43	503.94	3,412.37	20.0	71.3
J-208	Zone-4B	13	True	500.00	4,841.95	502.00	4,843.95	20.0	26.4
J-209	Zone-6A	3	True	500.00	10,000.00	500.00	10,000.00	20.0	26.7
J-210	Zone-6A	3	True	500.00	10,000.00	500.00	10,000.00	20.0	33.1
J-211	Zone-6B	7	True	500.00	7,295.25	500.00	7,295.25	20.0	21.2
J-212	Zone-6B	5	True	500.00	7,190.99	500.00	7,190.99	20.0	42.0
J-213	Zone-6B	5	True	500.00	7,163.72	500.00	7,163.72	20.0	20.0
J-214	Zone-4B	17	True	500.00	4,824.13	502.67	4,826.80	20.0	20.0
J-215	Zone-4B	4	True	500.00	2,559.79	504.67	2,564.46	20.0	20.0
J-216	Zone-4B	23	True	500.00	2,855.99	504.67	2,860.65	20.0	22.9

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-217	Zone-4B	32	True	500.00	3,234.92	502.67	3,237.59	20.0	23.5
J-218	Zone-4B	12	True	500.00	2,982.10	505.33	2,987.43	20.0	57.7
J-219	Zone-3B	4	True	500.00	2,305.97	508.67	2,314.63	20.0	20.0
J-220	Zone-4B	4	True	500.00	2,141.30	506.67	2,147.97	20.0	20.0
J-221	Zone-2C	5	True	500.00	2,938.41	500.00	2,938.41	20.0	20.0
J-222	Zone-3A	6	True	500.00	4,352.98	501.45	4,354.43	20.0	22.6
J-223	Zone-4B	19	True	500.00	578.12	512.67	590.79	20.0	55.4
J-224	Zone-4B	13	True	500.00	574.07	509.33	583.40	20.0	30.9
J-225	Zone-4B	3	True	500.00	559.41	504.00	563.41	20.0	20.0
J-226	Zone-4B	6	True	500.00	567.72	503.33	571.05	20.0	20.8
J-227	Zone-4B	3	True	500.00	559.61	500.00	559.61	20.0	20.0
J-228	Zone-4B	13	True	500.00	570.51	503.33	573.84	20.0	31.2
J-229	Zone-4B	8	True	500.00	571.11	503.33	574.45	20.0	24.9
J-230	Zone-4B	21	True	500.00	573.67	505.33	579.00	20.0	46.2
J-231	Zone-4B	11	True	500.00	573.65	503.33	576.98	20.0	39.5
J-232	Zone-4B	23	True	500.00	581.89	514.67	596.56	20.0	51.7
J-233	Zone-1	3	True	500.00	10,000.00	505.15	10,005.15	20.0	40.7
J-234	Zone-1	4	True	500.00	8,351.11	515.27	8,366.38	20.0	20.0
J-235	Zone-1	19	True	500.00	6,611.75	500.00	6,611.75	20.0	20.0
J-236	Zone-1	5	True	500.00	8,513.70	500.00	8,513.70	20.0	51.7
J-237	Zone-1	4	True	500.00	8,424.97	529.76	8,454.73	20.0	20.0
J-238	Zone-1	4	True	500.00	5,076.96	500.00	5,076.96	20.0	20.0
J-239	Zone-3A	6	True	500.00	3,912.94	500.00	3,912.94	20.0	27.8
J-240	Zone-3A	6	True	500.00	2,460.73	500.00	2,460.73	20.0	21.2
J-241	Zone-1	5	True	500.00	8,366.46	514.88	8,381.34	20.0	57.7
J-242	Zone-1	4	True	500.00	2,201.21	514.88	2,216.09	20.0	20.0
J-243	Zone-1	5	True	500.00	8,766.90	515.76	8,782.66	20.0	20.0
J-244	Zone-1	11	True	500.00	2,942.93	507.03	2,949.96	20.0	20.0
J-245	Zone-1	6	True	500.00	8,778.11	500.00	8,778.11	20.0	20.0
J-246	Zone-1	4	True	500.00	3,986.92	502.67	3,989.59	20.0	20.0
J-247	Zone-2C	4	True	500.00	2,407.67	510.00	2,417.67	20.0	20.0
J-248	Zone-2C	4	True	500.00	2,296.91	506.67	2,303.58	20.0	20.0
J-249	Zone-2C	7	True	500.00	3,294.88	508.67	3,303.54	20.0	26.4
J-250	Zone-1	4	True	500.00	8,058.71	500.00	8,058.71	20.0	20.0
J-251	Zone-1	3	True	500.00	6,678.48	529.76	6,708.24	20.0	20.0
J-252	Zone-1	4	True	500.00	7,695.51	500.00	7,695.51	20.0	20.0
J-253	Zone-1	4	True	500.00	6,033.45	500.00	6,033.45	20.0	20.0
J-254	Zone-1	4	True	500.00	5,598.82	500.00	5,598.82	20.0	20.0
J-255	Zone-3A	6	True	500.00	3,541.15	517.52	3,558.67	20.0	26.5
J-256	Zone-3A	4	True	500.00	3,371.50	504.36	3,375.86	20.0	20.0
J-257	Zone-3A	5	True	500.00	3,540.72	500.00	3,540.72	20.0	22.7
J-258	Zone-3A	7	True	500.00	4,375.10	500.00	4,375.10	20.0	20.4
J-259	Zone-3A	5	True	500.00	3,973.75	500.00	3,973.75	20.0	20.0
J-260	Zone-3A	5	True	500.00	4,255.10	500.00	4,255.10	20.0	20.0
J-261	Zone-1	4	True	500.00	4,464.29	505.95	4,470.24	20.0	20.0
J-262	Zone-1	14	True	500.00	2,075.81	505.95	2,081.76	20.0	20.0
J-263	Zone-1	22	True	500.00	3,635.13	500.00	3,635.13	20.0	20.0
J-264	Zone-1	4	True	500.00	2,614.56	530.55	2,645.10	20.0	20.0
J-265	Zone-3A	4	True	500.00	3,340.31	500.00	3,340.31	20.0	20.0
J-266	Zone-3A	5	True	500.00	4,142.70	500.00	4,142.70	20.0	20.0
J-267	Zone-3A	7	True	500.00	4,587.81	500.00	4,587.81	20.0	25.7
J-268	Zone-3A	7	True	500.00	4,764.94	500.00	4,764.94	20.0	30.8

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-269	Zone-3A	5	True	500.00	4,331.55	500.00	4,331.55	20.0	20.0
J-270	Zone-3A	7	True	500.00	5,656.56	500.00	5,656.56	20.0	21.6
J-271	Zone-3A	7	True	500.00	3,969.01	500.00	3,969.01	20.0	21.3
J-272	Zone-3A	7	True	500.00	5,932.07	500.00	5,932.07	20.0	22.0
J-273	Zone-3A	5	True	500.00	3,638.39	500.00	3,638.39	20.0	20.0
J-274	Zone-3A	4	True	500.00	5,317.35	502.67	5,320.02	20.0	20.0
J-275	Zone-3A	4	True	500.00	5,314.07	503.33	5,317.40	20.0	20.0
J-276	Zone-3A	4	True	500.00	4,902.82	500.00	4,902.82	20.0	20.0
J-277	Zone-6A	9	True	500.00	5,833.12	500.00	5,833.12	20.0	91.0
J-278	Zone-6A	5	True	500.00	5,224.14	500.00	5,224.14	20.0	20.0
J-279	Zone-3A	4	True	500.00	4,265.10	509.33	4,274.43	20.0	20.0
J-280	Zone-5A	8	True	500.00	1,098.87	507.33	1,106.20	20.0	61.1
J-281	Zone-5A	8	True	500.00	1,098.88	505.33	1,104.22	20.0	60.5
J-282	Zone-6A	10	True	500.00	3,908.16	501.33	3,909.49	20.0	31.4
J-283	Zone-4A	6	True	500.00	5,095.14	502.00	5,097.14	20.0	24.5
J-284	Zone-4A	10	True	500.00	4,611.55	506.67	4,618.21	20.0	41.8
J-285	Zone-4B	6	True	500.00	5,208.86	501.33	5,210.19	20.0	20.0
J-290	Zone-Off	1	False	500.00	0.00	500.00	0.00	20.0	4.3
J-291	Zone-2A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-292	Zone-2A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-293	Zone-2A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-294	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-295	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-296	Zone-1	5	True	500.00	7,233.68	514.88	7,248.56	20.0	20.0
J-301	Zone-2C	6	True	500.00	1,610.54	502.67	1,613.21	20.0	38.6
J-302	Zone-2C	6	True	500.00	1,610.52	506.00	1,616.52	20.0	39.9
J-303	Zone-1	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-308	Zone-2C	6	True	500.00	1,405.46	503.15	1,408.61	20.0	35.3
J-310	Zone-3A	5	True	500.00	9,324.30	500.00	9,324.30	20.0	20.0
J-312	Zone-1	6	True	500.00	1,157.38	505.33	1,162.71	20.0	22.9
J-313	Zone-1	4	True	500.00	4,678.32	517.21	4,695.54	20.0	20.0
J-314	Zone-1	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-315	Zone-1	4	True	500.00	3,383.69	500.00	3,383.69	20.0	20.0
J-316	Zone-1	4	True	500.00	3,220.66	502.67	3,223.32	20.0	20.0
J-319	Zone-1	3	True	500.00	10,000.00	500.00	10,000.00	20.0	37.2
J-320	Zone-1	3	True	500.00	10,000.00	512.73	10,012.73	20.0	25.6
J-321	Zone-1	5	True	500.00	6,729.67	503.39	6,733.06	20.0	20.0
J-322	Zone-1	4	True	500.00	2,336.05	586.67	2,422.72	20.0	20.0
J-323	Zone-1	4	True	500.00	6,678.17	500.00	6,678.17	20.0	20.0
J-325	Zone-1	22	True	500.00	7,097.00	500.85	7,097.85	20.0	65.4
J-326	Zone-1	6	True	500.00	2,887.50	503.33	2,890.83	20.0	23.0
J-327	Zone-1	4	True	500.00	6,845.53	-300.00	6,045.53	20.0	20.0
J-329	Zone-1	4	True	500.00	1,726.06	511.58	1,737.63	20.0	20.0
J-330	Zone-1	5	True	500.00	6,486.36	500.00	6,486.36	20.0	20.0
J-332	Zone-1	14	True	500.00	1,944.83	505.95	1,950.79	20.0	20.0
J-332	Zone-1	14	True	500.00	5,545.48	500.00	5,545.48	20.0	53.2
J-333	Zone-1	4	True	500.00	2,450.95	504.67	2,455.62	20.0	20.0
J-334	Zone-1	7	True	500.00	8,712.45	501.33	8,713.78	20.0	33.4
J-335	Zone-1	4	True	500.00	3,133.16	503.33	3,136.49	20.0	20.0
J-336	Zone-1	8	True	500.00	4,067.73	505.33	4,073.06	20.0	29.1
J-337	Zone-1	4	True	500.00	2,596.84	504.67	2,601.51	20.0	20.0
J-338	Zone-1	6	True	500.00	3,107.56	503.33	3,110.89	20.0	25.4

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-339	Zone-1	4	True	500.00	2,164.88	505.33	2,170.22	20.0	20.0
J-340	Zone-3A	6	True	500.00	4,919.96	510.00	4,929.96	20.0	20.0
J-342	Zone-4A	5	True	500.00	4,485.55	515.33	4,500.88	20.0	20.0
J-343	Zone-4A	15	True	500.00	4,611.22	502.67	4,613.88	20.0	29.9
J-344	Zone-4A	8	True	500.00	4,791.68	514.00	4,805.68	20.0	27.5
J-345	Zone-1	4	True	500.00	920.49	500.00	920.49	20.0	20.0
J-349	Zone-6A	10	True	500.00	3,908.24	500.00	3,908.24	20.0	33.8
J-350	Zone-5A	4	True	500.00	1,093.62	500.00	1,093.62	20.0	20.0
J-351	Zone-6A	16	True	500.00	3,907.59	500.00	3,907.59	20.0	35.2
J-352	Zone-6A	6	True	500.00	3,291.81	505.33	3,297.15	20.0	20.0
J-353	Zone-6A	10	True	500.00	3,803.67	504.67	3,808.33	20.0	27.4
J-354	Zone-6A	6	True	500.00	3,610.49	508.67	3,619.15	20.0	20.0
J-355	Zone-3A	6	True	500.00	3,539.63	500.00	3,539.63	20.0	47.4
J-356	Zone-3B	4	True	500.00	4,209.59	500.00	4,209.59	20.0	20.0
J-360	Zone-3A	3	True	500.00	3,265.40	500.00	3,265.40	20.0	20.0
J-361	Zone-3A	6	True	500.00	3,389.74	500.00	3,389.74	20.0	22.2
J-362	Zone-6A	6	True	500.00	3,769.87	505.33	3,775.20	20.0	20.0
J-366	Zone-6A	6	True	500.00	3,660.88	500.00	3,660.88	20.0	20.0
J-369	Zone-6A	8	True	500.00	3,908.01	509.33	3,917.34	20.0	21.7
J-375	Zone-6A	10	True	500.00	3,908.22	503.33	3,911.56	20.0	33.9
J-376	Zone-5A	8	True	500.00	1,098.12	504.00	1,102.12	20.0	55.2
J-377	Zone-1	10	True	500.00	2,427.78	500.00	2,427.78	20.0	20.0
J-379	Zone-2A	8	True	500.00	4,257.87	500.00	4,257.87	20.0	31.0
J-380	Zone-2A	13	True	500.00	4,189.43	500.00	4,189.43	20.0	31.8
J-381	Zone-4B	21	True	500.00	578.05	500.00	578.05	20.0	42.1
J-382	Zone-4B	14	True	500.00	577.73	500.00	577.73	20.0	35.1
J-383	Zone-6A	6	True	500.00	3,382.30	503.33	3,385.63	20.0	20.0
J-384	Zone-6A	5	True	500.00	2,289.04	500.00	2,289.04	20.0	20.0
J-385	Zone-4B	9	True	500.00	2,340.48	500.00	2,340.48	20.0	37.5
J-386	Zone-4B	19	True	500.00	2,517.62	500.00	2,517.62	20.0	43.7
J-387	Zone-4B	18	True	500.00	2,735.19	500.00	2,735.19	20.0	49.9
J-388	<None>	1	False	500.00	0.00	500.00	0.00	20.0	17.3
J-389	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-390	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-391	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-392	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-393	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-394	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-396	Zone-2A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-397	Zone-2A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-398	Zone-2A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-399	Zone-3A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-400	Zone-4A	(N/A)	False	500.00	(N/A)	(N/A)	(N/A)	20.0	(N/A)
J-401	Zone-2D	4	True	500.00	1,838.20	508.00	1,846.20	20.0	20.0
J-402	Zone-2D	4	True	500.00	1,677.87	504.00	1,681.88	20.0	20.0
J-403	Zone-2D	4	True	500.00	1,604.45	505.33	1,609.78	20.0	20.0
J-404	Zone-2D	5	True	500.00	1,733.91	504.67	1,738.58	20.0	20.0
J-405	Zone-2D	6	True	500.00	2,148.65	504.00	2,152.65	20.0	20.0
J-406	Zone-2D	5	True	500.00	2,525.95	504.00	2,529.95	20.0	20.0
J-407	Zone-2D	8	True	500.00	3,065.53	504.00	3,069.53	20.0	28.7
J-408	Zone-2D	5	True	500.00	1,371.50	508.00	1,379.50	20.0	20.0
J-409	Zone-1	3	True	500.00	927.44	505.33	932.77	20.0	20.0

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-410	Zone-2C	6	True	500.00	1,618.78	500.00	1,618.78	20.0	44.6
J-411	Zone-2C	6	True	500.00	1,845.42	506.67	1,852.09	20.0	37.2
J-412	Zone-2C	6	True	500.00	1,581.61	500.00	1,581.61	20.0	42.6
J-413	Zone-2C	13	True	500.00	2,246.13	503.33	2,249.46	20.0	29.1
J-414	Zone-2C	8	True	500.00	2,766.90	510.67	2,777.57	20.0	32.2
J-415	Zone-2C	8	True	500.00	3,377.54	512.48	3,390.02	20.0	37.4
J-416	Zone-2C	6	True	500.00	3,919.21	510.00	3,929.21	20.0	20.0
J-417	Zone-2C	4	True	500.00	2,782.17	506.67	2,788.84	20.0	20.0
J-418	Zone-2C	4	True	500.00	1,433.32	502.00	1,435.32	20.0	20.0
J-419	Zone-3B	5	True	500.00	1,846.90	507.33	1,854.23	20.0	24.3
J-420	Zone-2C	7	True	500.00	4,063.39	511.33	4,074.72	20.0	23.4
J-421	Zone-3B	9	True	500.00	3,907.22	508.67	3,915.89	20.0	64.4
J-422	Zone-2C	4	True	500.00	1,270.86	506.00	1,276.86	20.0	20.0
J-423	Zone-2C	6	True	500.00	2,773.90	508.67	2,782.57	20.0	20.0
J-424	Zone-2C	7	True	500.00	7,278.61	508.67	7,287.28	20.0	20.4
J-425	Zone-2C	9	True	500.00	7,169.34	508.48	7,177.82	20.0	33.8
J-427	Zone-2C	7	True	500.00	6,505.30	500.00	6,505.30	20.0	25.2
J-428	Zone-2C	18	True	500.00	6,604.98	506.00	6,610.98	20.0	43.7
J-429	Zone-2C	5	True	500.00	6,877.35	500.00	6,877.35	20.0	20.0
J-430	Zone-2C	8	True	500.00	9,542.20	512.00	9,554.20	20.0	38.6
J-431	Zone-2C	7	True	500.00	5,887.27	504.00	5,891.27	20.0	57.9
J-432	Zone-2C	7	True	500.00	6,323.79	512.00	6,335.79	20.0	26.8
J-433	Zone-2C	7	True	500.00	6,582.86	514.67	6,597.53	20.0	27.2
J-434	Zone-2C	7	True	500.00	3,569.96	510.00	3,579.96	20.0	20.2
J-435	Zone-2C	7	True	500.00	2,924.68	504.67	2,929.35	20.0	28.9
J-436	Zone-2C	7	True	500.00	2,748.57	505.33	2,753.90	20.0	32.6
J-437	Zone-2C	7	True	500.00	2,844.06	500.00	2,844.06	20.0	27.0
J-438	Zone-2C	9	True	500.00	2,812.59	501.33	2,813.92	20.0	27.1
J-439	Zone-2C	8	True	500.00	2,929.57	500.00	2,929.57	20.0	22.8
J-440	Zone-2C	9	True	500.00	2,770.89	502.67	2,773.55	20.0	25.2
J-441	Zone-2C	5	True	500.00	2,356.52	502.67	2,359.19	20.0	20.0
J-442	Zone-2C	8	True	500.00	3,400.45	512.67	3,413.12	20.0	49.6
J-443	Zone-2C	8	True	500.00	2,509.30	505.33	2,514.63	20.0	49.4
J-444	Zone-2C	19	True	500.00	1,081.47	507.33	1,088.80	20.0	38.6
J-445	Zone-2C	8	True	500.00	2,960.18	530.55	2,990.72	20.0	33.0
J-446	Zone-2C	8	True	500.00	9,716.40	500.00	9,716.40	20.0	24.1
J-447	Zone-2C	10	True	500.00	9,181.33	511.58	9,192.90	20.0	22.9
J-448	Zone-2C	7	True	500.00	8,567.46	500.00	8,567.46	20.0	20.0
J-449	Zone-2C	6	True	500.00	9,477.10	500.00	9,477.10	20.0	20.0
J-450	Zone-2A	11	True	500.00	2,250.36	504.00	2,254.36	20.0	20.0
J-451	Zone-2A	12	True	500.00	2,332.88	506.30	2,339.18	20.0	20.0
J-452	Zone-2A	13	True	500.00	3,216.42	525.39	3,241.82	20.0	20.0
J-453	Zone-2A	6	True	500.00	3,848.80	502.67	3,851.47	20.0	21.7
J-454	Zone-2A	5	True	500.00	5,285.01	503.33	5,288.35	20.0	20.0
J-455	Zone-2A	8	True	500.00	6,232.05	502.67	6,234.72	20.0	22.2
J-456	Zone-2A	8	True	500.00	5,335.91	508.36	5,344.27	20.0	41.6
J-457	Zone-2A	10	True	500.00	5,364.14	503.33	5,367.47	20.0	39.2
J-458	Zone-2A	13	True	500.00	3,061.50	507.33	3,068.83	20.0	20.0
J-459	Zone-2A	12	True	500.00	2,936.47	511.33	2,947.80	20.0	20.0
J-460	Zone-2A	13	True	500.00	3,172.69	503.33	3,176.02	20.0	20.0
J-461	Zone-3A	4	True	500.00	5,932.29	508.00	5,940.29	20.0	20.0
J-485	Zone-2B	14	True	500.00	2,560.60	503.33	2,563.93	20.0	23.1

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-486	Zone-2B	7	True	500.00	5,146.43	500.00	5,146.43	20.0	30.8
J-487	Zone-2B	13	True	500.00	2,560.16	504.00	2,564.16	20.0	20.0
J-488	Zone-2B	12	True	500.00	2,510.83	503.33	2,514.16	20.0	20.0
J-489	Zone-2B	4	True	500.00	2,056.53	506.00	2,062.53	20.0	20.0
J-490	Zone-2D	4	True	500.00	1,775.05	504.67	1,779.71	20.0	20.0
J-491	Zone-2C	5	True	500.00	3,021.12	504.00	3,025.12	20.0	20.0
J-506	Zone-2D	4	True	500.00	2,147.40	500.00	2,147.40	20.0	20.0
J-515	Zone-2C	6	True	500.00	1,405.41	502.67	1,408.07	20.0	39.4
J-521	Zone-2A	15	True	500.00	4,362.59	506.67	4,369.26	20.0	33.0
J-522	Zone-2A	4	True	500.00	4,141.55	514.67	4,156.22	20.0	20.0
J-523	Zone-3A	7	True	500.00	5,642.44	502.97	5,645.41	20.0	23.1
J-524	Zone-3A	9	True	500.00	5,642.42	508.97	5,651.39	20.0	29.3
J-525	Zone-3A	6	True	500.00	5,247.74	504.00	5,251.74	20.0	25.6
J-526	Zone-3A	4	True	500.00	3,858.90	504.00	3,862.90	20.0	20.0
J-527	Zone-3A	4	True	500.00	4,619.36	507.33	4,626.69	20.0	20.0
J-528	Zone-2C	12	True	500.00	5,190.30	504.67	5,194.96	20.0	48.9
J-529	Zone-2C	7	True	500.00	3,349.08	508.67	3,357.75	20.0	41.6
J-530	Zone-2C	5	True	500.00	2,226.32	512.67	2,238.99	20.0	20.0
J-531	Zone-1	5	True	500.00	7,741.75	505.64	7,747.39	20.0	20.0
J-601	Zone-3A	4	True	500.00	2,047.41	512.00	2,059.41	20.0	20.0
J-602	Zone-3A	4	True	500.00	1,652.55	506.00	1,658.55	20.0	20.0
J-603	Zone-3A	6	True	500.00	1,926.89	505.33	1,932.22	20.0	26.9
J-604	Zone-3A	6	True	500.00	2,218.81	504.67	2,223.48	20.0	30.6
J-605	Zone-3A	6	True	500.00	2,275.29	519.58	2,294.86	20.0	33.2
J-606	Zone-3A	6	True	500.00	2,438.07	502.67	2,440.74	20.0	41.3
J-607	Zone-3A	6	True	500.00	2,708.74	504.00	2,712.74	20.0	52.4
J-608	Zone-3A	6	True	500.00	2,810.84	504.00	2,814.84	20.0	62.8
J-609	Zone-3A	7	True	500.00	2,886.13	502.00	2,888.13	20.0	69.1
J-610	Zone-3A	6	True	500.00	3,941.09	515.33	3,956.43	20.0	39.4
J-611	Zone-Off	1	False	500.00	0.00	500.00	0.00	20.0	9.4
J-612	Zone-Off	1	False	500.00	0.00	500.00	0.00	20.0	2.3
J-613	Zone-Off	1	False	500.00	0.00	500.00	0.00	20.0	10.2
J-614	Zone-3B	19	True	500.00	3,016.67	502.67	3,019.34	20.0	20.2
J-615	Zone-3B	5	True	500.00	2,568.46	500.00	2,568.46	20.0	20.0
J-616	Zone-3B	8	True	500.00	3,135.43	505.33	3,140.76	20.0	46.2
J-617	Zone-3B	8	True	500.00	3,907.22	506.00	3,913.22	20.0	67.8
J-618	Zone-3B	14	True	500.00	1,377.81	507.33	1,385.14	20.0	20.0
J-619	Zone-3B	5	True	500.00	2,423.89	500.00	2,423.89	20.0	20.0
J-620	Zone-3B	4	True	500.00	2,562.16	504.67	2,566.82	20.0	20.0
J-621	Zone-3A	5	True	500.00	4,273.62	506.00	4,279.62	20.0	20.0
J-622	Zone-3B	24	True	500.00	3,843.40	506.67	3,850.07	20.0	60.7
J-623	Zone-3B	8	True	500.00	3,853.04	500.00	3,853.04	20.0	62.4
J-624	Zone-3B	5	True	500.00	3,383.48	500.00	3,383.48	20.0	20.0
J-625	Zone-3B	17	True	500.00	3,980.41	511.33	3,991.74	20.0	23.3
J-626	Zone-3B	8	True	500.00	4,011.27	500.00	4,011.27	20.0	32.5
J-627	Zone-3B	4	True	500.00	2,929.99	510.67	2,940.65	20.0	20.0
J-628	Zone-3B	11	True	500.00	3,994.33	510.00	4,004.33	20.0	42.2
J-629	Zone-3B	8	True	500.00	3,885.14	500.00	3,885.14	20.0	54.1
J-630	Zone-3B	4	True	500.00	3,507.81	503.33	3,511.14	20.0	20.0
J-631	Zone-3B	5	True	500.00	3,102.83	504.00	3,106.83	20.0	20.0
J-632	Zone-3B	6	True	500.00	3,291.47	511.33	3,302.80	20.0	28.4
J-633	Zone-3B	19	True	500.00	3,589.74	500.00	3,589.74	20.0	23.9

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Base Max Day Fire Flow

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-634	Zone-3A	6	True	500.00	8,402.77	500.00	8,402.77	20.0	46.2
J-635	Zone-3A	5	True	500.00	9,902.30	500.00	9,902.30	20.0	47.5
J-636	Zone-3A	3	True	500.00	10,000.00	500.00	10,000.00	20.0	53.5
J-637	Zone-3A	3	True	500.00	10,000.00	500.00	10,000.00	20.0	62.8
J-638	Zone-3A	3	True	500.00	10,000.00	505.33	10,005.33	20.0	35.7
J-639	Zone-Off	1	False	500.00	0.00	500.00	0.00	20.0	7.5
J-640	Zone-3A	5	True	500.00	5,107.63	500.00	5,107.63	20.0	20.0
J-641	Zone-3A	7	True	500.00	5,405.00	511.33	5,416.34	20.0	26.5
J-642	Zone-3A	3	False	500.00	349.17	507.33	356.50	20.0	20.0
J-643	Zone-3A	9	True	500.00	5,974.54	500.00	5,974.54	20.0	39.1
J-644	Zone-3A	9	True	500.00	6,001.89	500.00	6,001.89	20.0	41.1
J-645	Zone-3A	7	True	500.00	6,061.29	500.00	6,061.29	20.0	43.4
J-646	Zone-3A	7	True	500.00	6,003.62	500.00	6,003.62	20.0	33.7
J-647	Zone-Off	1	False	500.00	0.00	500.00	0.00	20.0	6.9
J-648	Zone-4A	5	False	500.00	447.67	507.33	455.00	20.0	46.0
J-649	Zone-4A	5	False	500.00	343.76	503.33	347.10	20.0	46.0
J-650	Zone-4A	5	False	500.00	246.36	505.33	251.69	20.0	43.8
J-651	Zone-4A	3	False	500.00	201.46	505.58	207.03	20.0	20.0
J-652	Zone-4B	9	True	500.00	2,228.05	505.33	2,233.38	20.0	34.4
J-653	Zone-4B	4	True	500.00	2,106.05	508.30	2,114.36	20.0	20.0
J-654	Zone-4B	19	True	500.00	899.47	505.33	904.81	20.0	43.5
J-655	Zone-4B	13	True	500.00	898.81	505.33	904.14	20.0	36.4
J-656	Zone-4B	19	True	500.00	685.68	500.00	685.68	20.0	52.9
J-658	Zone-3A	6	True	500.00	2,655.48	500.00	2,655.48	20.0	47.8
J-659	Zone-3A	6	True	500.00	2,689.88	503.33	2,693.22	20.0	48.3
J-720	Zone-1	4	True	500.00	7,587.42	500.00	7,587.42	20.0	20.0
J-721	Zone-1	6	True	500.00	7,349.48	500.00	7,349.48	20.0	25.2
J-722	Zone-1	23	True	500.00	6,943.20	500.00	6,943.20	20.0	44.1
J-810	Zone-2C	6	True	500.00	1,378.48	502.67	1,381.15	20.0	31.7
J-811	Zone-2C	6	True	500.00	1,607.82	500.00	1,607.82	20.0	37.8
J-812	Zone-2C	4	True	500.00	1,213.60	507.33	1,220.93	20.0	20.0

FlexTable: PRV Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
497	PRV-1	1,210.0	12.0	1,307.0	42.0	226.80	1,419.5	1,307.1	112.37
501	PRV-2	1,198.0	4.0	1,295.0	42.0	356.44	1,390.1	1,295.1	94.96
500	PRV-3	1,190.0	6.0	1,275.5	37.0	0.00	1,393.4	1,292.8	0.00
499	PRV-4	1,138.0	4.0	1,295.0	68.0	39.76	1,413.5	1,295.1	118.40
506	PRV-5	1,300.0	8.0	1,408.6	47.0	0.00	1,480.4	1,419.7	0.00
512	PRV-6	1,300.0	3.0	1,420.1	52.0	332.19	1,479.9	1,420.2	59.71
508	PRV-7	1,230.0	6.0	1,391.7	70.0	0.00	1,485.1	1,403.4	0.00
513	PRV-8	1,230.0	2.0	1,403.3	75.0	28.00	1,485.1	1,403.4	81.71
505	PRV-9	1,290.0	10.0	1,380.1	39.0	0.00	1,479.8	1,396.2	0.00
511	PRV-10	1,290.0	3.0	1,396.3	46.0	591.33	1,479.6	1,396.4	83.24
504	PRV-11	1,229.0	6.0	1,379.2	65.0	0.00	1,482.9	1,393.3	0.00
503	PRV-12	1,255.0	3.0	1,389.0	58.0	0.00	1,481.4	1,394.4	0.00
502	PRV-13	1,297.0	6.0	1,382.5	37.0	0.00	1,477.1	1,394.0	0.00
510	PRV-14	1,297.0	2.0	1,394.0	42.0	95.35	1,476.9	1,394.1	82.82
498	PRV-15	1,250.0	6.0	1,402.5	66.0	0.00	1,479.3	1,414.0	0.00
509	PRV-16	1,250.0	2.0	1,414.0	71.0	86.42	1,479.3	1,414.2	65.12
1119	PRV-17	1,390.0	6.0	1,482.4	40.0	405.54	1,552.7	1,482.5	70.23
1528	PRV-18	1,389.0	6.0	1,481.4	40.0	119.80	1,562.9	1,481.5	81.44
1648	PRV-19	1,389.0	2.0	1,481.4	40.0	57.57	1,562.9	1,481.5	81.43
1079	PRV-20	1,471.0	8.0	1,551.9	35.0	0.00	1,750.8	1,563.1	0.00
1113	PRV-21	1,471.0	2.0	1,563.4	40.0	518.12	1,750.4	1,563.5	186.90
1304	PRV-22	1,450.0	6.0	1,551.7	44.0	0.00	1,646.6	1,563.3	0.00
1307	PRV-23	1,450.0	2.0	1,563.2	49.0	238.94	1,646.6	1,563.3	83.27
1710	PRV-27	1,295.0	6.0	1,387.4	40.0	(N/A)	(N/A)	(N/A)	(N/A)
1716	PRV-28	1,295.0	2.0	1,387.4	40.0	(N/A)	(N/A)	(N/A)	(N/A)
507	PRV-FUT	1,350.0	6.0	1,470.1	0.0	(N/A)	(N/A)	(N/A)	(N/A)

FlexTable: Pump Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Elevation (ft)	Pump Definition	Pump Status	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
495	PMP-1	1,275.0	PMP-1	On	1,288.6	1,486.3	988.31	197.68
496	PMP-2	1,280.0	PMP-2	On	1,292.0	1,481.1	539.58	189.03
494	PMP-8	1,471.0	PMP-8	On	1,476.0	1,751.2	558.57	275.20
1256	PMP-9	1,471.0	PMP-8	On	1,475.9	1,751.6	557.47	275.69
1273	PMP-10	1,450.0	PMP-10	On	1,476.5	1,646.7	683.66	170.27
1315	PMP-11	1,165.0	PMP-11	On	1,291.2	1,513.5	1,003.82	222.34
1386	PMP-12	1,165.0	PMP-11	On	1,291.2	1,513.5	1,003.89	222.32
1651	PMP-16	1,600.0	PMP-Valhalla Fire	On	1,645.4	1,850.1	41.33	204.63

FlexTable: Tank Table

Active Scenario: Base Max Day Fire Flow

ID	Label	Zone	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Initial) (ft)	Elevation (Maximum) (ft)	Volume (Inactive) (gal)	Diameter (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
491	T-Brader	Zone-3A	1,471.1	1,471.1	1,476.3	1,489.1	200,000.00	41.50	320.53	1,476.3
492	T-Goodlander	Zone-3A	1,459.8	1,459.8	1,477.0	1,491.8	1,000,000.00	73.00	-1,188.53	1,477.0
1206	T-Lookout	Zone-6A	1,729.5	1,729.5	1,743.7	1,749.5	1,192,000.00	102.00	-597.91	1,743.7
490	T-North	Zone-1	1,283.9	1,283.9	1,290.9	1,305.4	396,000.00	56.00	-226.09	1,290.9
489	T-North off	Zone-1	1,283.9	1,283.9	1,305.1	1,305.4	164,000.00	36.00	(N/A)	(N/A)
488	T-Palm	Zone-1	1,287.7	1,287.7	1,292.2	1,305.7	462,000.00	66.00	-282.47	1,292.2
1272	T-Valhalla 1	Zone-5A	1,635.0	1,635.0	1,644.9	1,666.0	158,500.00	30.00	-226.48	1,644.9
1313	T-Valhalla 2	Zone-5A	1,635.0	1,635.0	1,644.9	1,666.0	158,500.00	30.00	-158.24	1,644.9

FlexTable: Junction Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
129	J-1	1,205.0	Zone-1	7.70	1,303.1	42.4
130	J-2	1,190.0	Zone-1	5.50	1,303.1	48.9
131	J-3	1,167.0	Zone-1	17.60	1,303.1	58.9
132	J-4	1,200.0	Zone-1	9.90	1,303.1	44.6
443	J-5	1,120.0	Zone-1	0.00	1,306.5	80.7
133	J-6	1,165.0	Zone-1	5.50	1,303.1	59.8
134	J-7	1,150.0	Zone-1	9.90	1,303.1	66.3
135	J-8	1,200.0	Zone-1	7.70	1,303.1	44.6
136	J-9	1,200.0	Zone-1	6.60	1,303.1	44.6
137	J-10	1,140.0	Zone-1	18.70	1,303.1	70.6
138	J-11	1,185.0	Zone-1	13.20	1,303.1	51.1
140	J-12	1,130.0	Zone-1	7.70	1,303.2	74.9
139	J-13	1,163.0	Zone-1	0.00	1,303.1	60.6
141	J-14	1,118.0	Zone-1	2.20	1,303.2	80.1
142	J-15	1,120.0	Zone-1	6.60	1,303.2	79.2
444	J-16	1,126.0	Zone-1	-350.00	1,306.9	78.3
143	J-17	1,112.0	Zone-1	14.00	1,303.2	82.7
144	J-18	1,097.0	Zone-1	0.00	1,303.2	89.2
145	J-19	1,088.0	Zone-1	0.00	1,303.2	93.1
146	J-20	1,084.0	Zone-1	115.50	1,302.8	94.7
1179	J-21	1,280.0	Zone-2C	22.00	1,393.8	49.2
148	J-22	1,095.0	Zone-1	34.00	1,303.2	90.1
149	J-23	1,097.0	Zone-1	4.20	1,303.2	89.2
1181	J-24	1,300.0	Zone-2C	0.00	1,393.8	40.6
1183	J-25	1,318.0	Zone-2C	7.70	1,393.8	32.8
151	J-26	1,115.0	Zone-1	11.80	1,303.4	81.5
152	J-27	1,112.0	Zone-1	25.30	1,303.4	82.8
153	J-28	1,112.0	Zone-1	15.40	1,303.3	82.8
154	J-29	1,100.0	Zone-1	12.30	1,303.4	88.0
155	J-30	1,098.0	Zone-1	0.00	1,303.3	88.8
156	J-31	1,120.0	Zone-1	10.40	1,304.1	79.7
157	J-32	1,120.0	Zone-1	16.50	1,304.1	79.7
1185	J-33	1,345.0	Zone-3A	14.30	1,490.8	63.1
158	J-34	1,115.0	Zone-1	31.00	1,304.1	81.8
159	J-35	1,102.0	Zone-1	49.70	1,303.6	87.2
160	J-36	1,097.0	Zone-1	7.80	1,303.6	89.4
161	J-37	1,098.0	Zone-1	13.10	1,303.5	88.9
162	J-38	1,120.0	Zone-1	40.80	1,304.2	79.7
163	J-39	1,108.0	Zone-1	7.40	1,304.0	84.8
164	J-40	1,105.0	Zone-1	27.50	1,303.8	86.0
165	J-41	1,104.0	Zone-1	10.40	1,303.7	86.4
166	J-42	1,102.0	Zone-1	10.90	1,303.7	87.2
167	J-43	1,098.0	Zone-1	8.40	1,303.6	89.0
169	J-45	1,280.0	Zone-Off	0.00	1,304.6	10.6
170	J-46	1,125.0	Zone-1	0.00	1,304.3	77.6
171	J-47	1,122.0	Zone-1	16.50	1,305.0	79.2
172	J-48	1,115.0	Zone-1	57.40	1,303.9	81.7
173	J-49	1,104.0	Zone-1	12.50	1,303.7	86.4
1263	J-50	1,103.0	Zone-1	0.00	1,303.7	86.8
176	J-52	1,104.0	Zone-1	0.00	1,303.7	86.4
177	J-53	1,100.0	Zone-1	0.00	1,303.6	88.1
178	J-54	1,096.0	Zone-1	8.40	1,303.6	89.8
179	J-55	1,096.0	Zone-1	5.60	1,303.6	89.8
180	J-56	1,095.0	Zone-1	0.00	1,303.5	90.2

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
181	J-57	1,096.0	Zone-1	0.00	1,303.5	89.8
182	J-58	1,097.0	Zone-1	9.82	1,303.5	89.4
183	J-59	1,098.0	Zone-1	9.82	1,303.6	88.9
184	J-60	1,096.0	Zone-1	147.30	1,303.5	89.8
185	J-61	1,097.0	Zone-1	0.00	1,303.5	89.4
186	J-62	1,096.0	Zone-1	49.10	1,303.5	89.8
187	J-63	1,104.0	Zone-1	0.00	1,303.7	86.4
188	J-64	1,105.0	Zone-1	11.20	1,303.6	85.9
189	J-65	1,105.0	Zone-1	7.00	1,303.6	85.9
190	J-66	1,102.0	Zone-1	11.80	1,303.6	87.2
191	J-67	1,105.0	Zone-1	9.70	1,303.6	85.9
192	J-68	1,110.0	Zone-1	13.60	1,303.7	83.8
193	J-69	1,110.0	Zone-1	25.80	1,303.7	83.8
194	J-70	1,110.0	Zone-1	7.80	1,303.7	83.8
195	J-71	1,099.0	Zone-1	49.10	1,303.6	88.5
196	J-72	1,099.0	Zone-1	0.00	1,303.6	88.5
197	J-73	1,098.0	Zone-1	49.10	1,303.6	88.9
198	J-74	1,123.0	Zone-1	90.60	1,305.5	79.0
199	J-75	1,124.0	Zone-1	0.00	1,305.5	78.5
200	J-76	1,125.0	Zone-1	0.00	1,306.5	78.5
201	J-77	1,138.0	Zone-1	0.00	1,304.5	72.1
202	J-78	1,145.0	Zone-1	7.70	1,303.4	68.6
203	J-79	1,126.0	Zone-1	11.00	1,303.8	76.9
204	J-80	1,130.0	Zone-1	4.90	1,303.4	75.0
205	J-81	1,118.0	Zone-1	29.00	1,303.7	80.4
206	J-82	1,116.0	Zone-1	8.00	1,303.8	81.2
207	J-83	1,112.0	Zone-1	0.00	1,303.7	83.0
208	J-84	1,115.0	Zone-1	20.60	1,303.7	81.7
209	J-85	1,122.0	Zone-1	14.20	1,303.8	78.6
210	J-86	1,120.0	Zone-1	8.40	1,303.7	79.5
211	J-87	1,118.0	Zone-1	53.20	1,303.8	80.4
212	J-88	1,115.0	Zone-1	18.40	1,303.8	81.7
1188	J-89	1,335.0	Zone-3A	0.00	1,490.8	67.4
214	J-90	1,102.0	Zone-1	1.40	1,303.6	87.2
215	J-91	1,108.0	Zone-1	7.00	1,304.3	84.9
216	J-92	1,102.0	Zone-1	0.00	1,305.5	88.0
218	J-94	1,112.0	Zone-1	23.30	1,303.7	83.0
219	J-95	1,102.0	Zone-1	87.85	1,303.6	87.2
220	J-96	1,100.0	Zone-1	24.55	1,303.6	88.1
221	J-97	1,100.0	Zone-1	24.55	1,303.6	88.1
222	J-98	1,200.0	Zone-1	8.80	1,302.9	44.5
223	J-99	1,190.0	Zone-1	9.90	1,302.8	48.8
224	J-100	1,180.0	Zone-1	11.00	1,302.7	53.1
225	J-101	1,160.0	Zone-1	20.80	1,302.9	61.8
226	J-102	1,175.0	Zone-1	11.00	1,302.8	55.3
227	J-103	1,210.0	Zone-2C	6.60	1,393.9	79.6
228	J-104	1,178.0	Zone-1	16.50	1,302.7	53.9
229	J-105	1,178.0	Zone-1	7.70	1,302.7	53.9
230	J-106	1,155.0	Zone-1	7.70	1,303.0	64.0
231	J-107	1,200.0	Zone-1	22.00	1,302.6	44.4
232	J-108	1,200.0	Zone-1	18.70	1,302.6	44.4
233	J-109	1,172.0	Zone-1	6.60	1,302.6	56.5
234	J-110	1,198.0	Zone-1	14.30	1,302.6	45.3
235	J-111	1,175.0	Zone-1	18.70	1,302.6	55.2

FlexTable: Junction Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
236	J-112	1,175.0	Zone-1	14.30	1,302.6	55.2
237	J-113	1,170.0	Zone-1	25.30	1,302.6	57.4
238	J-114	1,188.0	Zone-1	12.10	1,303.0	49.8
239	J-115	1,165.0	Zone-1	0.00	1,303.0	59.7
240	J-116	1,140.0	Zone-1	13.20	1,303.2	70.6
241	J-117	1,150.0	Zone-1	9.90	1,303.1	66.3
242	J-118	1,138.0	Zone-1	47.10	1,303.3	71.5
243	J-119	1,138.0	Zone-1	9.10	1,303.5	71.6
244	J-120	1,123.0	Zone-1	12.50	1,303.8	78.2
245	J-121	1,116.0	Zone-1	0.00	1,303.7	81.2
246	J-122	1,112.0	Zone-1	24.90	1,303.7	82.9
247	J-123	1,125.0	Zone-1	23.70	1,303.8	77.4
248	J-124	1,108.0	Zone-1	14.10	1,303.8	84.7
249	J-125	1,108.0	Zone-1	9.90	1,303.9	84.8
250	J-126	1,104.0	Zone-1	0.00	1,303.9	86.5
251	J-127	1,102.0	Zone-1	147.30	1,303.9	87.4
252	J-128	1,100.0	Zone-1	0.00	1,303.8	88.2
253	J-129	1,100.0	Zone-1	245.50	1,303.6	88.1
254	J-130	1,100.0	Zone-1	98.20	1,303.6	88.1
255	J-131	1,102.0	Zone-1	7.00	1,303.6	87.2
256	J-132	1,150.0	Zone-1	11.00	1,303.1	66.2
257	J-133	1,200.0	Zone-2B	13.20	1,403.3	88.0
259	J-135	1,125.0	Zone-1	28.60	1,303.9	77.4
260	J-136	1,120.0	Zone-1	0.00	1,303.9	79.6
261	J-137	1,125.0	Zone-1	16.80	1,303.9	77.4
262	J-138	1,112.0	Zone-1	15.40	1,304.3	83.2
258	J-139	1,140.0	Zone-1	12.10	1,303.4	70.7
263	J-140	1,107.0	Zone-1	10.50	1,304.6	85.5
264	J-141	1,107.0	Zone-1	7.70	1,304.4	85.4
1192	J-142	1,107.0	Zone-1	3.30	1,303.6	85.1
265	J-143	1,104.0	Zone-1	0.00	1,304.3	86.7
266	J-144	1,103.0	Zone-1	49.10	1,304.3	87.1
267	J-145	1,102.0	Zone-1	0.00	1,304.3	87.5
268	J-146	1,105.0	Zone-1	49.10	1,305.4	86.7
269	J-147	1,112.0	Zone-1	49.10	1,306.8	84.3
270	J-148	1,120.0	Zone-1	0.00	1,308.6	81.6
271	J-149	1,119.0	Zone-1	0.00	1,308.7	82.1
272	J-150	1,118.0	Zone-1	15.40	1,308.9	82.6
273	J-151	1,121.0	Zone-1	4.20	1,308.9	81.3
274	J-152	1,122.0	Zone-1	2.80	1,309.1	81.0
275	J-153	1,125.0	Zone-1	9.90	1,309.1	79.7
276	J-154	1,128.0	Zone-1	17.60	1,309.1	78.4
277	J-155	1,130.0	Zone-1	15.40	1,309.1	77.5
278	J-156	1,130.0	Zone-1	9.90	1,309.1	77.5
279	J-157	1,130.0	Zone-1	0.00	1,309.1	77.5
280	J-158	1,120.0	Zone-1	2.80	1,309.9	82.2
281	J-159	1,120.0	Zone-1	0.00	1,310.3	82.4
282	J-160	1,118.0	Zone-1	1.40	1,312.0	83.9
283	J-161	1,112.0	Zone-1	0.00	1,307.0	84.3
284	J-162	1,120.0	Zone-1	-2,000.00	1,313.0	83.5
285	J-163	1,121.0	Zone-1	15.60	1,312.8	83.0
286	J-164	1,124.0	Zone-1	17.70	1,311.7	81.2
287	J-165	1,178.0	Zone-1	0.00	1,310.6	57.4
288	J-166	1,170.0	Zone-1	0.00	1,310.1	60.6

FlexTable: Junction Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
289	J-167	1,170.0	Zone-1	6.00	1,309.8	60.5
290	J-168	1,178.0	Zone-1	5.50	1,309.4	56.8
291	J-169	1,185.0	Zone-1	6.60	1,309.7	54.0
292	J-170	1,188.0	Zone-1	15.40	1,310.5	53.0
293	J-171	1,190.0	Zone-1	7.70	1,309.7	51.8
294	J-172	1,195.0	Zone-2A	9.90	1,419.8	97.3
295	J-173	1,125.0	Zone-1	16.40	1,303.9	77.4
296	J-174	1,122.0	Zone-1	4.40	1,303.9	78.7
298	J-176	1,122.0	Zone-1	0.00	1,304.0	78.7
299	J-177	1,125.0	Zone-1	0.00	1,304.0	77.4
1194	J-179	1,298.0	Zone-3A	13.20	1,490.5	83.3
302	J-180	1,115.0	Zone-1	14.70	1,311.5	85.0
303	J-181	1,150.0	Zone-1	5.50	1,304.6	66.9
304	J-182	1,140.0	Zone-1	40.80	1,304.6	71.2
305	J-183	1,155.0	Zone-1	7.70	1,305.8	65.2
306	J-184	1,150.0	Zone-1	4.40	1,304.0	66.6
307	J-185	1,165.0	Zone-1	6.60	1,304.0	60.1
308	J-186	1,170.0	Zone-1	2.20	1,305.4	58.6
309	J-187	1,200.0	Zone-1	31.70	1,305.0	45.4
310	J-188	1,195.0	Zone-1	7.70	1,304.4	47.4
311	J-189	1,188.0	Zone-1	6.60	1,304.3	50.3
312	J-190	1,180.0	Zone-1	5.50	1,303.9	53.6
313	J-191	1,215.0	Zone-2B	5.50	1,403.3	81.5
314	J-192	1,100.0	Zone-1	24.55	1,303.6	88.1
315	J-193	1,098.0	Zone-1	0.00	1,303.6	88.9
316	J-194	1,096.0	Zone-1	3.30	1,303.5	89.8
317	J-195	1,100.0	Zone-1	24.55	1,303.6	88.1
442	J-196	1,160.0	Zone-1	-1,650.00	1,303.2	62.0
445	J-197	1,110.0	Zone-1	-700.00	1,306.1	84.8
449	J-198	1,165.0	Zone-1	1.40	1,308.2	61.9
1015	J-199	1,118.0	Zone-1	7.70	1,303.2	80.1
1021	J-201	1,130.0	Zone-1	40.70	1,303.2	74.9
1031	J-202	1,130.0	Zone-1	0.00	1,303.2	74.9
1025	J-203	1,130.0	Zone-1	0.00	1,303.2	74.9
1037	J-205	1,118.0	Zone-1	0.00	1,303.2	80.1
1039	J-206	1,112.0	Zone-1	0.00	1,303.2	82.7
1043	J-207	1,098.0	Zone-1	6.50	1,303.2	88.8
1047	J-208	1,470.0	Zone-4B	3.30	1,563.4	40.4
1051	J-209	1,436.0	Zone-4B	0.00	1,745.1	133.7
1053	J-210	1,490.0	Zone-5B	60.50	1,744.0	109.9
1055	J-211	1,640.0	Zone-6B	55.00	1,743.0	44.6
1057	J-212	1,622.0	Zone-6B	0.00	1,742.5	52.1
1059	J-213	1,680.0	Zone-6B	0.00	1,742.3	27.0
1061	J-214	1,472.0	Zone-4B	40.70	1,563.4	39.5
1066	J-215	1,470.0	Zone-4B	7.70	1,563.3	40.4
1069	J-216	1,440.0	Zone-4B	7.70	1,563.3	53.3
1071	J-217	1,410.0	Zone-4B	6.60	1,563.2	66.3
1073	J-218	1,340.0	Zone-4B	6.60	1,563.2	96.6
1075	J-219	1,300.0	Zone-3B	14.30	1,487.8	81.3
1077	J-220	1,430.0	Zone-4B	11.00	1,563.3	57.7
1083	J-221	1,290.0	Zone-2C	0.00	1,394.1	45.0
1196	J-222	1,302.0	Zone-3A	2.40	1,490.5	81.6
1093	J-223	1,393.0	Zone-4B	20.90	1,562.2	73.2
1095	J-224	1,450.0	Zone-4B	18.70	1,562.2	48.5

FlexTable: Junction Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1097	J-225	1,475.0	Zone-4B	6.60	1,562.1	37.7
1099	J-226	1,472.0	Zone-4B	44.00	1,562.1	39.0
1101	J-227	1,472.0	Zone-4B	0.00	1,562.1	39.0
1103	J-228	1,448.0	Zone-4B	5.50	1,562.1	49.4
1106	J-229	1,460.0	Zone-4B	5.50	1,562.1	44.2
1108	J-230	1,412.0	Zone-4B	8.80	1,562.1	65.0
1111	J-231	1,425.0	Zone-4B	5.50	1,562.1	59.3
1116	J-232	1,402.0	Zone-4B	24.20	1,562.2	69.3
1122	J-233	1,140.0	Zone-1	8.50	1,303.2	70.6
1125	J-234	1,155.0	Zone-1	25.20	1,303.0	64.0
1131	J-235	1,100.0	Zone-1	0.00	1,303.6	88.1
1133	J-236	1,100.0	Zone-1	0.00	1,303.6	88.1
1137	J-237	1,100.0	Zone-1	49.10	1,303.6	88.1
1139	J-238	1,094.0	Zone-1	0.00	1,303.5	90.6
1198	J-239	1,290.0	Zone-3A	13.20	1,490.5	86.7
1176	J-240	1,308.0	Zone-3A	0.00	1,490.9	79.1
1149	J-241	1,100.0	Zone-1	24.55	1,303.6	88.1
1152	J-242	1,100.0	Zone-1	24.55	1,303.6	88.1
1156	J-243	1,104.0	Zone-1	26.00	1,304.3	86.7
1159	J-244	1,125.0	Zone-1	11.60	1,309.1	79.7
1162	J-245	1,171.0	Zone-1	0.00	1,310.6	60.4
1165	J-246	1,153.0	Zone-1	9.30	1,310.6	68.2
1167	J-247	1,208.0	Zone-2C	16.50	1,393.7	80.3
1170	J-248	1,224.0	Zone-2C	17.60	1,393.7	73.4
1172	J-249	1,224.0	Zone-2C	14.30	1,393.7	73.4
451	J-250	1,095.0	Zone-1	0.00	1,303.5	90.2
452	J-251	1,095.0	Zone-1	49.10	1,303.5	90.2
453	J-252	1,094.0	Zone-1	0.00	1,303.5	90.6
454	J-253	1,093.0	Zone-1	0.00	1,303.5	91.1
455	J-254	1,094.0	Zone-1	0.00	1,303.5	90.6
1200	J-255	1,293.0	Zone-3A	28.90	1,490.5	85.4
1202	J-256	1,308.0	Zone-3A	10.80	1,490.5	79.0
1204	J-257	1,290.0	Zone-3A	0.00	1,490.5	86.7
1211	J-258	1,272.0	Zone-3A	0.00	1,495.7	96.8
1212	J-259	1,273.0	Zone-3A	0.00	1,495.7	96.4
1213	J-260	1,275.0	Zone-3A	0.00	1,495.8	95.5
471	J-261	1,096.0	Zone-1	9.82	1,303.5	89.8
472	J-262	1,096.0	Zone-1	9.82	1,303.4	89.8
473	J-263	1,080.0	Zone-1	0.00	1,302.8	96.4
474	J-264	1,080.0	Zone-1	70.00	1,302.7	96.3
1214	J-265	1,240.0	Zone-3A	0.00	1,495.8	110.7
1215	J-266	1,280.0	Zone-3A	0.00	1,495.9	93.4
1216	J-267	1,230.0	Zone-3A	0.00	1,496.1	115.1
1217	J-268	1,210.0	Zone-3A	0.00	1,496.2	123.8
1218	J-269	1,210.0	Zone-3A	0.00	1,496.2	123.8
1219	J-270	1,245.0	Zone-3A	0.00	1,496.6	108.9
1220	J-271	1,245.0	Zone-3A	0.00	1,496.6	108.9
1222	J-272	1,262.0	Zone-3A	0.00	1,496.7	101.5
1236	J-273	1,248.0	Zone-3A	0.00	1,496.6	107.6
1238	J-274	1,308.0	Zone-3A	4.40	1,490.8	79.1
1240	J-275	1,320.0	Zone-3A	5.50	1,490.7	73.8
1242	J-276	1,360.0	Zone-3A	83.40	1,490.6	56.5
1247	J-277	1,300.0	Zone-6A	0.00	1,752.9	196.0
1250	J-278	1,471.0	Zone-6A	0.00	1,756.0	123.3

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1190	J-279	1,318.0	Zone-3A	15.40	1,490.5	74.6
1275	J-280	1,500.0	Zone-5A	12.10	1,661.1	69.7
1277	J-281	1,500.0	Zone-5A	91.30	1,661.1	69.7
1279	J-282	1,580.0	Zone-6A	11.00	1,859.2	120.8
1282	J-283	1,450.0	Zone-4A	3.30	1,661.5	91.5
1285	J-284	1,410.0	Zone-4A	62.70	1,563.3	66.3
1287	J-285	1,450.0	Zone-4A	2.20	1,563.3	49.0
1310	J-290	1,635.0	<None>	0.00	1,660.0	10.8
1319	J-291	1,265.0	Zone-2A	(N/A)	(N/A)	(N/A)
1321	J-292	1,270.0	Zone-2A	(N/A)	(N/A)	(N/A)
1323	J-293	1,285.0	Zone-2A	(N/A)	(N/A)	(N/A)
1325	J-294	1,320.0	Zone-3A	(N/A)	(N/A)	(N/A)
1327	J-295	1,370.0	Zone-3A	(N/A)	(N/A)	(N/A)
217	J-296	1,102.0	Zone-1	24.55	1,305.1	87.9
1351	J-301	1,231.0	Zone-2C	4.40	1,393.8	70.4
1353	J-302	1,232.0	Zone-2C	9.90	1,393.8	70.0
1355	J-303	1,212.0	Zone-1	(N/A)	(N/A)	(N/A)
1367	J-308	1,248.0	Zone-2C	5.20	1,393.8	63.1
1383	J-310	1,165.0	Zone-3A	0.00	1,523.9	155.3
1395	J-312	1,210.0	Zone-1	8.80	1,303.1	40.3
1398	J-313	1,093.0	Zone-1	28.40	1,303.5	91.1
1400	J-314	1,093.0	Zone-1	0.00	1,303.5	91.1
1410	J-315	1,122.0	Zone-1	0.00	1,303.9	78.7
1412	J-316	1,122.0	Zone-1	21.30	1,303.9	78.7
1425	J-319	1,104.5	Zone-1	196.40	1,304.9	86.7
1428	J-320	1,106.0	Zone-1	21.00	1,304.9	86.0
1430	J-321	1,112.0	Zone-1	5.60	1,306.4	84.1
1432	J-322	1,113.0	Zone-1	99.40	1,311.3	85.8
1435	J-323	1,097.0	Zone-1	0.00	1,303.5	89.4
1441	J-325	1,099.3	Zone-1	1.40	1,303.6	88.4
1445	J-326	1,157.9	Zone-1	5.50	1,304.0	63.2
1462	J-327	1,120.0	Zone-1	-800.00	1,307.9	81.3
1486	J-329	1,080.0	Zone-1	19.10	1,302.6	96.3
1497	J-330	1,114.9	Zone-1	0.00	1,309.1	84.0
434	J-332	1,097.0	Zone-1	9.82	1,303.6	89.4
1504	J-332	1,093.3	Zone-1	0.00	1,303.4	90.9
1511	J-333	1,196.0	Zone-1	7.70	1,310.9	49.7
1512	J-334	1,165.1	Zone-1	2.20	1,310.9	63.1
1516	J-335	1,181.0	Zone-1	5.50	1,310.9	56.2
1517	J-336	1,174.9	Zone-1	8.80	1,310.9	58.8
1521	J-337	1,186.0	Zone-1	6.60	1,310.9	54.0
1522	J-338	1,183.5	Zone-1	5.50	1,310.9	55.1
1526	J-339	1,189.0	Zone-1	8.80	1,310.9	52.7
1531	J-340	1,400.0	Zone-3A	16.50	1,490.6	39.2
1534	J-342	1,410.0	Zone-4A	25.30	1,563.2	66.3
1537	J-343	1,410.0	Zone-4A	4.40	1,563.2	66.3
1539	J-344	1,400.0	Zone-4A	23.10	1,563.2	70.6
1544	J-345	1,220.0	Zone-1	0.00	1,303.1	36.0
1560	J-349	1,596.2	<None>	0.00	1,859.2	113.8
1561	J-350	1,597.0	Zone-5A	0.00	1,660.3	27.4
1566	J-351	1,600.0	Zone-6A	0.00	1,859.2	112.2
1569	J-352	1,629.0	Zone-6A	41.80	1,859.2	99.6
1571	J-353	1,618.0	Zone-6A	7.70	1,859.2	104.4
1574	J-354	1,635.0	Zone-6A	47.30	1,859.2	97.0

FlexTable: Junction Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
1593	J-355	1,282.5	Zone-3A	0.00	1,489.4	89.5
1596	J-356	1,300.0	Zone-3B	0.00	1,489.4	81.9
1603	J-360	1,340.0	Zone-3A	0.00	1,489.4	64.6
1605	J-361	1,320.0	Zone-3A	0.00	1,489.4	73.3
1609	J-362	1,610.0	Zone-6A	8.80	1,859.2	107.8
1616	J-366	1,610.0	Zone-6A	0.00	1,859.2	107.8
1622	J-369	1,600.0	Zone-6A	15.40	1,859.2	112.2
1638	J-375	1,589.8	Zone-6A	5.50	1,859.2	116.6
1641	J-376	1,514.0	Zone-5A	6.60	1,661.0	63.6
1654	J-377	1,140.0	Zone-1	0.00	1,304.6	71.2
1659	J-379	1,250.0	Zone-2A	0.00	1,419.8	73.5
1661	J-380	1,250.0	Zone-2A	0.00	1,419.8	73.5
1664	J-381	1,424.0	Zone-4B	0.00	1,562.2	59.8
1667	J-382	1,440.0	Zone-4B	0.00	1,562.2	52.9
1669	J-383	1,630.9	Zone-6A	5.50	1,859.2	98.8
1672	J-384	1,630.0	Zone-6A	0.00	1,859.2	99.2
1674	J-385	1,432.4	Zone-4B	0.00	1,563.2	56.6
1677	J-386	1,401.5	Zone-4B	0.00	1,563.2	69.9
1680	J-387	1,372.0	Zone-4B	0.00	1,563.2	82.7
1683	J-388	1,703.9	Zone-7	5.50	1,742.2	16.5
1688	J-389	1,370.0	Zone-3A	(N/A)	(N/A)	(N/A)
1690	J-390	1,380.0	Zone-3A	(N/A)	(N/A)	(N/A)
1692	J-391	1,360.0	Zone-3A	(N/A)	(N/A)	(N/A)
1694	J-392	1,360.0	Zone-3A	(N/A)	(N/A)	(N/A)
1696	J-393	1,313.0	Zone-3A	(N/A)	(N/A)	(N/A)
1698	J-394	1,325.0	Zone-3A	(N/A)	(N/A)	(N/A)
1702	J-396	0.0	Zone-2A	(N/A)	(N/A)	(N/A)
1704	J-397	1,290.0	Zone-2A	(N/A)	(N/A)	(N/A)
1706	J-398	1,268.6	<None>	(N/A)	(N/A)	(N/A)
1713	J-399	1,310.0	Zone-3A	(N/A)	(N/A)	(N/A)
1719	J-400	1,440.0	Zone-4A	(N/A)	(N/A)	(N/A)
318	J-401	1,275.0	Zone-2D	13.20	1,413.8	60.0
319	J-402	1,265.0	Zone-2D	6.60	1,413.8	64.4
320	J-403	1,245.0	Zone-2D	8.80	1,413.7	73.0
321	J-404	1,230.0	Zone-2D	7.70	1,413.7	79.5
322	J-405	1,200.0	Zone-2D	24.80	1,413.7	92.5
323	J-406	1,238.0	Zone-2D	6.60	1,413.8	76.1
324	J-407	1,255.0	Zone-2D	6.60	1,413.9	68.8
325	J-408	1,225.0	Zone-2D	13.20	1,413.7	81.6
326	J-409	1,210.0	Zone-1	8.80	1,302.9	40.2
327	J-410	1,220.0	Zone-2C	0.00	1,393.8	75.2
328	J-411	1,210.0	Zone-2C	11.00	1,393.8	79.5
329	J-412	1,230.0	Zone-2C	0.00	1,393.8	70.9
330	J-413	1,262.0	Zone-2C	5.50	1,393.9	57.1
331	J-414	1,245.0	Zone-2C	17.60	1,393.9	64.4
332	J-415	1,226.0	Zone-2C	20.60	1,393.9	72.6
333	J-416	1,210.0	Zone-2C	16.50	1,393.9	79.6
334	J-417	1,215.0	Zone-2C	11.00	1,393.9	77.4
335	J-418	1,262.0	Zone-2C	3.30	1,393.9	57.1
336	J-419	1,300.0	Zone-3B	12.10	1,488.8	81.7
337	J-420	1,240.0	Zone-2C	18.70	1,394.0	66.6
338	J-421	1,278.0	Zone-3B	14.30	1,488.9	91.2
339	J-422	1,275.0	Zone-2C	9.90	1,393.9	51.4
340	J-423	1,275.0	Zone-2C	14.30	1,394.0	51.5

FlexTable: Junction Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
341	J-424	1,230.0	Zone-2C	14.30	1,394.1	71.0
342	J-425	1,222.0	Zone-2C	14.00	1,394.1	74.4
343	J-427	1,230.0	Zone-2C	0.00	1,394.1	71.0
344	J-428	1,238.0	Zone-2C	9.90	1,394.2	67.6
345	J-429	1,250.0	Zone-2C	0.00	1,394.5	62.5
346	J-430	1,252.0	Zone-2C	19.80	1,394.8	61.8
347	J-431	1,228.0	Zone-2C	6.60	1,393.9	71.8
348	J-432	1,222.0	Zone-2C	19.80	1,393.9	74.4
349	J-433	1,212.0	Zone-2C	24.20	1,394.0	78.7
350	J-434	1,212.0	Zone-2C	16.50	1,393.7	78.6
351	J-435	1,200.0	Zone-2C	7.70	1,393.7	83.8
352	J-436	1,195.0	Zone-2C	8.80	1,393.7	86.0
353	J-437	1,190.0	Zone-2C	0.00	1,393.7	88.1
354	J-438	1,188.0	Zone-2C	2.20	1,393.7	89.0
355	J-439	1,185.0	Zone-2C	0.00	1,393.7	90.3
356	J-440	1,188.0	Zone-2C	4.40	1,393.7	89.0
357	J-441	1,200.0	Zone-2C	4.40	1,393.7	83.8
358	J-442	1,245.0	Zone-2C	20.90	1,393.9	64.4
359	J-443	1,250.0	Zone-2C	8.80	1,393.8	62.2
360	J-444	1,275.0	Zone-2C	12.10	1,393.8	51.4
361	J-445	1,245.0	Zone-2C	73.30	1,393.7	64.3
362	J-446	1,265.0	Zone-2C	0.00	1,395.0	56.3
363	J-447	1,270.0	Zone-2C	19.10	1,395.5	54.3
364	J-448	1,295.0	Zone-2C	4.90	1,395.8	43.6
365	J-449	1,290.0	Zone-2C	0.00	1,396.2	45.9
366	J-450	1,215.0	Zone-2A	6.60	1,419.7	88.6
367	J-451	1,230.0	Zone-2A	15.30	1,419.7	82.1
368	J-452	1,240.0	Zone-2A	48.80	1,419.7	77.8
369	J-453	1,248.0	Zone-2A	4.40	1,419.8	74.3
370	J-454	1,265.0	Zone-2A	5.50	1,419.8	67.0
371	J-455	1,275.0	Zone-2A	4.40	1,419.9	62.7
372	J-456	1,230.0	Zone-2A	91.00	1,419.8	82.1
373	J-457	1,218.0	Zone-2A	18.70	1,419.8	87.3
374	J-458	1,240.0	Zone-2A	12.10	1,419.8	77.8
375	J-459	1,220.0	Zone-2A	18.70	1,419.8	86.4
376	J-460	1,252.0	Zone-2A	5.50	1,419.8	72.6
377	J-461	1,288.0	Zone-3A	13.20	1,490.9	87.8
446	J-485	1,225.0	Zone-2B	5.50	1,403.3	77.2
435	J-486	1,225.0	Zone-2B	0.00	1,403.4	77.2
436	J-487	1,250.0	Zone-2B	6.60	1,403.3	66.3
437	J-488	1,220.0	Zone-2B	5.50	1,403.3	79.3
438	J-489	1,220.0	Zone-2B	9.90	1,403.3	79.3
439	J-490	1,275.0	Zone-2D	7.70	1,413.8	60.0
467	J-491	1,200.0	Zone-2C	6.60	1,393.8	83.8
448	J-506	1,216.0	Zone-2D	0.00	1,413.8	85.6
450	J-515	1,240.0	Zone-2C	4.40	1,393.8	66.5
456	J-521	1,250.0	Zone-2A	12.10	1,419.8	73.5
457	J-522	1,280.0	Zone-2A	12.10	1,419.8	60.5
458	J-523	1,375.0	Zone-3A	9.80	1,490.6	50.0
459	J-524	1,325.0	Zone-3A	14.80	1,490.5	71.6
460	J-525	1,305.0	Zone-3A	6.60	1,490.5	80.3
461	J-526	1,300.0	Zone-3A	6.60	1,490.5	82.4
462	J-527	1,318.0	Zone-3A	12.10	1,490.5	74.6
463	J-528	1,235.0	Zone-2C	7.70	1,394.0	68.8

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
464	J-529	1,250.0	Zone-2C	14.30	1,393.9	62.3
465	J-530	1,300.0	Zone-2C	20.90	1,393.9	40.6
466	J-531	1,145.0	Zone-1	9.30	1,304.4	69.0
378	J-601	1,350.0	Zone-3A	16.50	1,490.8	60.9
379	J-602	1,350.0	Zone-3A	9.90	1,491.0	61.0
380	J-603	1,325.0	Zone-3A	8.80	1,491.1	71.9
381	J-604	1,325.0	Zone-3A	7.70	1,490.8	71.8
382	J-605	1,305.0	Zone-3A	32.30	1,491.3	80.6
383	J-606	1,300.0	Zone-3A	4.40	1,490.8	82.6
384	J-607	1,275.0	Zone-3A	6.60	1,490.8	93.4
385	J-608	1,250.0	Zone-3A	6.60	1,490.4	104.0
386	J-609	1,235.0	Zone-3A	3.30	1,490.3	110.5
387	J-610	1,300.0	Zone-3A	0.00	1,489.1	81.8
388	J-611	1,455.0	Zone-Off	0.00	1,488.3	14.4
389	J-612	1,471.0	Zone-Off	0.00	1,487.9	7.3
390	J-613	1,453.0	Zone-Off	0.00	1,487.9	15.1
391	J-614	1,410.0	Zone-3B	4.40	1,488.1	33.8
392	J-615	1,415.0	Zone-3B	0.00	1,488.3	31.7
393	J-616	1,350.0	Zone-3B	8.80	1,488.5	59.9
394	J-617	1,295.0	Zone-3B	9.90	1,488.9	83.9
395	J-618	1,310.0	Zone-3B	17.60	1,488.8	77.4
396	J-619	1,322.0	Zone-3B	0.00	1,487.9	71.8
397	J-620	1,352.0	Zone-3B	13.20	1,488.0	58.8
398	J-621	1,355.0	Zone-3A	9.90	1,488.5	57.7
399	J-622	1,302.0	Zone-3B	11.00	1,488.5	80.7
400	J-623	1,302.0	Zone-3B	0.00	1,488.5	80.7
401	J-624	1,355.0	Zone-3B	0.00	1,488.4	57.7
402	J-625	1,350.0	Zone-3B	18.70	1,488.4	59.9
403	J-626	1,330.0	Zone-3B	0.00	1,488.4	68.5
404	J-627	1,330.0	Zone-3B	17.60	1,488.4	68.5
405	J-628	1,305.0	Zone-3B	27.50	1,488.4	79.3
406	J-629	1,305.0	Zone-3B	0.00	1,488.4	79.4
407	J-630	1,375.0	Zone-3B	5.50	1,488.3	49.0
408	J-631	1,375.0	Zone-3B	6.60	1,488.3	49.0
409	J-632	1,340.0	Zone-3B	29.70	1,488.3	64.2
410	J-633	1,340.0	Zone-3B	0.00	1,488.4	64.2
411	J-634	1,258.0	Zone-3A	0.00	1,490.9	100.8
412	J-635	1,232.0	Zone-3A	0.00	1,493.0	112.9
413	J-636	1,242.0	Zone-3A	0.00	1,494.5	109.2
414	J-637	1,235.0	Zone-3A	0.00	1,495.1	112.5
415	J-638	1,310.0	Zone-3A	64.90	1,493.0	79.2
416	J-639	1,460.0	Zone-Off	0.00	1,489.9	12.9
417	J-640	1,410.0	Zone-3A	0.00	1,490.2	34.7
418	J-641	1,380.0	Zone-3A	18.70	1,490.4	47.7
419	J-642	1,350.0	Zone-3A	12.10	1,490.4	60.7
420	J-643	1,320.0	Zone-3A	0.00	1,491.1	74.0
421	J-644	1,305.0	Zone-3A	0.00	1,491.3	80.6
422	J-645	1,225.0	Zone-3A	0.00	1,495.4	117.0
423	J-646	1,240.0	Zone-3A	0.00	1,495.9	110.7
424	J-647	1,275.0	Zone-Off	0.00	1,303.1	12.1
425	J-648	1,400.0	Zone-4A	12.10	1,562.8	70.4
426	J-649	1,400.0	Zone-4A	5.50	1,562.8	70.4
427	J-650	1,405.0	Zone-4A	8.80	1,562.8	68.3
428	J-651	1,460.0	Zone-4A	9.20	1,562.8	44.5

FlexTable: Junction Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
429	J-652	1,450.0	Zone-4B	6.60	1,563.2	49.0
430	J-653	1,462.0	Zone-4B	13.70	1,563.2	43.8
431	J-654	1,425.0	Zone-4B	8.80	1,562.6	59.5
432	J-655	1,435.0	Zone-4B	16.50	1,562.6	55.2
433	J-656	1,401.0	Zone-4B	0.00	1,562.4	69.8
440	J-658	1,280.0	Zone-3A	0.00	1,491.8	91.6
441	J-659	1,280.0	Zone-3A	5.50	1,491.3	91.4
468	J-720	1,094.0	Zone-1	0.00	1,303.5	90.6
469	J-721	1,094.0	Zone-1	0.00	1,303.5	90.6
470	J-722	1,095.0	Zone-1	0.00	1,303.5	90.2
485	J-810	1,260.0	Zone-2C	4.40	1,393.8	57.9
486	J-811	1,245.0	Zone-2C	0.00	1,393.8	64.4
487	J-812	1,287.0	Zone-2C	12.10	1,393.8	46.2

FlexTable: Pipe Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
515	P-1	540	J-1	J-2	6.0	Ductile Iron	-10.58	0.12	0.000	522
516	P-2	256	J-2	J-3	6.0	Ductile Iron	-16.08	0.18	0.000	261
517	P-3	743	J-3	J-4	6.0	Ductile Iron	12.96	0.15	0.000	528
518	P-4	298	J-3	J-6	8.0	Ductile Iron	-32.75	0.21	0.000	280
918	P-5	115	J-76	J-5	8.0	Ductile Iron	0.00	0.00	0.000	50
519	P-6	261	J-6	J-7	8.0	Ductile Iron	13.77	0.09	0.000	261
520	P-7	472	J-7	J-8	8.0	Ductile Iron	3.87	0.02	0.000	466
521	P-8	261	J-8	J-9	8.0	Ductile Iron	-3.83	0.02	0.000	258
522	P-9	472	J-9	J-6	8.0	Ductile Iron	-10.43	0.07	0.000	472
523	P-10	369	J-3	J-10	6.0	Ductile Iron	-13.89	0.16	0.000	373
524	P-11	780	J-10	J-11	6.0	Ductile Iron	16.06	0.18	0.000	584
1191	P-12	206	J-524	J-279	8.0	Ductile Iron	15.40	0.10	0.000	0
1193	P-13	340	J-122	J-142	6.0	Ductile Iron	36.06	0.41	0.000	0
527	P-14	369	J-12	J-14	6.0	Ductile Iron	-10.27	0.12	0.000	367
1017	P-15	222	J-199	J-15	8.0	Ductile Iron	69.05	0.44	0.000	247
529	P-16	319	J-15	J-6	8.0	Ductile Iron	62.45	0.40	0.000	323
530	P-17	316	J-14	J-17	6.0	Ductile Iron	-24.75	0.28	0.000	311
1195	P-18	434	J-526	J-179	8.0	Ductile Iron	13.20	0.08	0.000	0
919	P-19	120	J-76	J-16	8.0	Ductile Iron	-350.00	2.23	0.003	50
532	P-20	886	J-19	J-20	10.0	Ductile Iron	204.60	0.84	0.000	836
1197	P-21	489	J-527	J-222	12.0	Ductile Iron	55.30	0.16	0.000	0
533	P-22	201	J-18	J-22	10.0	Ductile Iron	111.77	0.46	0.000	196
534	P-23	456	J-22	J-19	10.0	Ductile Iron	73.57	0.30	0.000	504
535	P-24	382	J-22	J-23	8.0	Ductile Iron	4.20	0.03	0.000	376
1199	P-25	608	J-222	J-239	12.0	Ductile Iron	52.90	0.15	0.000	0
1201	P-26	687	J-239	J-255	12.0	Ductile Iron	39.70	0.11	0.000	0
538	P-27	364	J-26	J-27	8.0	Ductile Iron	-11.80	0.08	0.000	358
539	P-28	400	J-27	J-28	12.0	Ductile Iron	237.63	0.67	0.000	356
540	P-29	364	J-28	J-17	12.0	Ductile Iron	222.23	0.63	0.000	370
541	P-30	654	J-27	J-29	8.0	Ductile Iron	12.19	0.08	0.000	642
542	P-31	384	J-29	J-30	8.0	Ductile Iron	86.04	0.55	0.000	358
543	P-32	394	J-30	J-18	8.0	Ductile Iron	86.04	0.55	0.000	382
1203	P-33	390	J-255	J-256	12.0	Ductile Iron	10.80	0.03	0.000	0
545	P-34	61	J-31	J-32	12.0	Ductile Iron	-10.40	0.03	0.000	82
1205	P-35	386	J-255	J-257	12.0	Ductile Iron	0.00	0.00	0.000	0
546	P-36	303	J-32	J-34	12.0	Ductile Iron	-26.90	0.08	0.000	308
547	P-37	649	J-34	J-35	8.0	Ductile Iron	162.01	1.03	0.001	636
548	P-38	636	J-35	J-27	12.0	Ductile Iron	286.92	0.81	0.000	671
549	P-39	651	J-35	J-36	8.0	Ductile Iron	51.48	0.33	0.000	639
550	P-40	320	J-36	J-37	8.0	Ductile Iron	99.26	0.63	0.000	323
551	P-41	313	J-37	J-29	8.0	Ductile Iron	86.16	0.55	0.000	321
552	P-42	646	J-34	J-38	12.0	Ductile Iron	-219.91	0.62	0.000	658
553	P-43	341	J-38	J-39	12.0	Ductile Iron	458.44	1.30	0.001	318
554	P-44	309	J-39	J-40	12.0	Ductile Iron	451.04	1.28	0.001	318
555	P-45	650	J-40	J-35	12.0	Ductile Iron	226.09	0.64	0.000	653
556	P-46	325	J-40	J-41	12.0	Ductile Iron	236.21	0.67	0.000	323
557	P-47	310	J-41	J-42	12.0	Ductile Iron	225.81	0.64	0.000	315
558	P-48	326	J-42	J-43	8.0	Ductile Iron	63.98	0.41	0.000	335
559	P-49	332	J-43	J-36	8.0	Ductile Iron	55.58	0.35	0.000	318
1225	P-50	124	J-272	J-270	8.0	Ductile Iron	145.73	0.93	0.001	0
1209	P-51	773	J-45	J-46	12.0	Ductile Iron	301.32	0.85	0.000	0
561	P-52	45	J-45	T-Palm	12.0	Ductile Iron	-953.96	2.71	0.003	108

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
562	P-53	357	J-38	J-46	12.0	Ductile Iron	-301.32	0.85	0.000	396
1210	P-54	1,038	J-45	J-38	8.0	Ductile Iron	108.59	0.69	0.000	0
564	P-55	648	J-38	J-47	6.0	Ductile Iron	-94.18	1.07	0.001	615
565	P-56	624	J-47	J-48	8.0	Ductile Iron	262.64	1.68	0.002	650
566	P-57	639	J-48	J-40	6.0	Ductile Iron	38.76	0.44	0.000	630
567	P-58	618	J-48	J-49	8.0	Ductile Iron	106.42	0.68	0.000	613
970	P-59	670	J-47	J-38	8.0	Ductile Iron	215.05	1.37	0.001	642
1264	P-60	195	J-63	J-50	8.0	Ductile Iron	32.47	0.21	0.000	493
1265	P-61	281	J-50	J-42	8.0	Ductile Iron	32.47	0.21	0.000	493
1266	P-62	241	J-42	J-53	12.0	Ductile Iron	183.40	0.52	0.000	0
571	P-63	46	J-52	J-49	8.0	Ductile Iron	5.75	0.04	0.000	48
573	P-65	523	J-53	J-54	8.0	Ductile Iron	27.34	0.17	0.000	500
574	P-66	197	J-54	J-55	6.0	Ductile Iron	18.94	0.21	0.000	186
576	P-68	336	J-56	J-57	10.0	Ductile Iron	-93.54	0.38	0.000	360
577	P-69	142	J-57	J-58	12.0	Ductile Iron	-144.76	0.41	0.000	342
578	P-70	310	J-58	J-59	12.0	Ductile Iron	-199.45	0.57	0.000	120
580	P-72	222	J-57	J-60	12.0	Ductile Iron	51.22	0.15	0.000	214
581	P-73	419	J-60	J-61	12.0	Ductile Iron	-96.08	0.27	0.000	462
582	P-74	255	J-61	J-62	10.0	Ductile Iron	49.10	0.20	0.000	334
583	P-75	154	J-49	J-63	8.0	Ductile Iron	99.68	0.64	0.000	135
585	P-77	240	J-63	J-64	8.0	Ductile Iron	67.21	0.43	0.000	237
586	P-78	478	J-64	J-53	8.0	Ductile Iron	31.86	0.20	0.000	499
587	P-79	150	J-64	J-65	8.0	Ductile Iron	24.14	0.15	0.000	143
588	P-80	356	J-65	J-66	6.0	Ductile Iron	17.35	0.20	0.000	350
589	P-81	553	J-66	J-67	6.0	Ductile Iron	-13.67	0.16	0.000	550
932	P-82	559	J-70	J-65	1.0	Ductile Iron	0.21	0.09	0.000	550
590	P-83	228	J-68	J-69	8.0	Ductile Iron	-4.85	0.03	0.000	231
591	P-84	321	J-69	J-52	8.0	Ductile Iron	5.75	0.04	0.000	326
592	P-85	341	J-67	J-70	8.0	Ductile Iron	-70.55	0.45	0.000	362
593	P-86	200	J-70	J-68	8.0	Ductile Iron	-78.56	0.50	0.000	188
594	P-87	520	J-67	J-71	8.0	Ductile Iron	47.18	0.30	0.000	511
595	P-88	52	J-71	J-72	8.0	Ductile Iron	-1.92	0.01	0.000	59
596	P-89	209	J-72	J-73	12.0	Ductile Iron	194.28	0.55	0.000	195
597	P-90	401	J-73	J-61	12.0	Ductile Iron	145.18	0.41	0.000	347
598	P-91	203	J-47	J-74	8.0	Ductile Iron	-290.90	1.86	0.002	202
599	P-92	25	J-74	J-75	10.0	Ductile Iron	-489.79	2.00	0.002	57
600	P-93	110	J-75	J-76	10.0	Ductile Iron	-1,150.00	4.70	0.009	105
601	P-94	565	J-74	J-77	6.0	Ductile Iron	108.29	1.23	0.002	573
602	P-95	670	J-77	J-78	6.0	Ductile Iron	108.29	1.23	0.002	674
1226	P-96	354	J-270	J-271	8.0	Ductile Iron	0.00	0.00	0.000	0
603	P-97	320	J-78	J-80	6.0	Ductile Iron	37.73	0.43	0.000	334
604	P-98	187	J-80	J-79	6.0	Ductile Iron	-124.59	1.41	0.002	179
605	P-99	627	J-79	J-81	6.0	Ductile Iron	16.55	0.19	0.000	627
606	P-100	383	J-81	J-82	6.0	Ductile Iron	-15.65	0.18	0.000	374
607	P-101	317	J-82	J-48	6.0	Ductile Iron	-60.06	0.68	0.001	322
1684	P-102	337	J-213	J-388	16.0	Ductile Iron	760.06	1.21	0.000	0
1685	P-103	418	J-388	T-Lookout	16.0	Ductile Iron	754.56	1.20	0.000	0
608	P-105	482	J-82	J-83	8.0	Ductile Iron	36.41	0.23	0.000	491
609	P-106	190	J-83	J-69	8.0	Ductile Iron	36.41	0.23	0.000	168
610	P-107	323	J-81	J-84	8.0	Ductile Iron	3.20	0.02	0.000	327
612	P-109	322	J-79	J-85	8.0	Ductile Iron	41.81	0.27	0.000	325
613	P-110	160	J-85	J-86	8.0	Ductile Iron	25.80	0.16	0.000	175

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
614	P-111	460	J-86	J-84	8.0	Ductile Iron	17.40	0.11	0.000	449
615	P-112	354	J-85	J-87	8.0	Ductile Iron	1.81	0.01	0.000	363
616	P-113	399	J-87	J-88	8.0	Ductile Iron	-69.10	0.44	0.000	399
617	P-114	372	J-88	J-68	8.0	Ductile Iron	87.31	0.56	0.000	367
1223	P-115	343	J-646	J-272	12.0	Ductile Iron	-846.84	2.40	0.002	331
1224	P-116	140	J-272	PMP-1	12.0	Ductile Iron	-992.57	2.82	0.003	331
620	P-117	538	J-88	J-91	8.0	Ductile Iron	-174.81	1.12	0.001	536
621	P-118	589	J-91	J-92	8.0	Ductile Iron	-285.39	1.82	0.002	577
622	P-119	102	J-92	J-296	8.0	Ductile Iron	414.61	2.65	0.004	141
623	P-120	396	J-296	J-72	8.0	Ductile Iron	390.06	2.49	0.004	411
624	P-121	52	J-197	J-92	8.0	Ductile Iron	700.00	4.47	0.011	157
625	P-122	515	J-87	J-94	8.0	Ductile Iron	20.44	0.13	0.000	520
626	P-123	402	J-94	J-91	6.0	Ductile Iron	-103.58	1.18	0.001	395
627	P-124	815	J-94	J-95	8.0	Ductile Iron	82.10	0.52	0.000	796
628	P-125	445	J-95	J-90	12.0	Ductile Iron	-48.56	0.14	0.000	483
1227	P-126	596	J-270	J-268	8.0	Ductile Iron	145.73	0.93	0.001	0
630	P-127	380	J-96	J-97	10.0	Ductile Iron	87.61	0.36	0.000	423
631	P-128	79	J-96	J-72	12.0	Ductile Iron	-193.86	0.55	0.000	86
632	P-129	835	J-78	J-98	6.0	Ductile Iron	62.86	0.71	0.001	782
633	P-130	321	J-98	J-99	6.0	Ductile Iron	45.26	0.51	0.000	344
634	P-131	364	J-99	J-100	6.0	Ductile Iron	44.31	0.50	0.000	347
635	P-132	668	J-100	J-101	4.0	Ductile Iron	-12.68	0.32	0.000	645
636	P-133	327	J-101	J-102	6.0	Ductile Iron	19.95	0.23	0.000	347
637	P-134	688	J-102	J-99	6.0	Ductile Iron	8.95	0.10	0.000	650
638	P-135	516	J-100	J-103	6.0	Ductile Iron	0.00	0.00	0.000	527
639	P-136	106	J-100	J-104	6.0	Ductile Iron	45.99	0.52	0.000	123
640	P-137	228	J-104	J-105	6.0	Ductile Iron	29.49	0.33	0.000	213
1128	P-138	653	J-234	J-105	4.0	Ductile Iron	20.30	0.52	0.001	0
642	P-139	299	J-106	J-101	6.0	Ductile Iron	53.43	0.61	0.000	329
643	P-140	663	J-105	J-107	6.0	Ductile Iron	21.30	0.24	0.000	670
644	P-141	329	J-107	J-108	6.0	Ductile Iron	-0.70	0.01	0.000	344
645	P-142	667	J-108	J-109	8.0	Ductile Iron	-32.00	0.20	0.000	663
646	P-143	328	J-109	J-105	6.0	Ductile Iron	-20.79	0.24	0.000	339
647	P-144	337	J-108	J-110	6.0	Ductile Iron	12.60	0.14	0.000	312
648	P-145	601	J-110	J-111	8.0	Ductile Iron	-1.70	0.01	0.000	549
649	P-146	199	J-111	J-112	8.0	Ductile Iron	-20.40	0.13	0.000	226
650	P-147	210	J-112	J-113	6.0	Ductile Iron	-34.70	0.39	0.000	202
651	P-148	501	J-113	J-109	8.0	Ductile Iron	17.81	0.11	0.000	487
652	P-149	404	J-113	J-114	6.0	Ductile Iron	-77.81	0.88	0.001	411
653	P-150	304	J-114	J-115	8.0	Ductile Iron	-24.65	0.16	0.000	316
1180	P-151	138	J-444	J-21	8.0	Ductile Iron	29.70	0.19	0.000	0
917	P-152	30	J-115	J-196	12.0	Ductile Iron	-1,650.00	4.68	0.007	50
1182	P-153	285	J-21	J-24	8.0	Ductile Iron	7.70	0.05	0.000	0
656	P-154	167	J-116	J-117	8.0	Ductile Iron	122.66	0.78	0.000	168
657	P-155	424	J-117	J-106	8.0	Ductile Iron	101.76	0.65	0.000	453
658	P-156	185	J-116	J-118	12.0	Ductile Iron	-250.30	0.71	0.000	170
659	P-157	353	J-118	J-119	8.0	Ductile Iron	-166.49	1.06	0.001	342
660	P-158	352	J-119	J-79	8.0	Ductile Iron	-159.48	1.02	0.001	343
661	P-159	662	J-119	J-120	4.0	Ductile Iron	-16.10	0.41	0.000	681
662	P-160	360	J-120	J-121	4.0	Ductile Iron	5.54	0.14	0.000	352
663	P-161	317	J-121	J-122	4.0	Ductile Iron	5.54	0.14	0.000	301
664	P-162	379	J-122	J-94	6.0	Ductile Iron	-18.61	0.21	0.000	361

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
665	P-163	670	J-118	J-123	6.0	Ductile Iron	-76.39	0.87	0.001	658
666	P-164	819	J-123	J-124	6.0	Ductile Iron	13.20	0.15	0.000	819
667	P-165	371	J-124	J-122	6.0	Ductile Iron	36.81	0.42	0.000	355
668	P-166	390	J-124	J-125	6.0	Ductile Iron	-37.71	0.43	0.000	409
669	P-167	452	J-125	J-126	12.0	Ductile Iron	-32.60	0.09	0.000	446
670	P-168	202	J-126	J-127	12.0	Ductile Iron	-32.60	0.09	0.000	196
671	P-169	245	J-127	J-128	12.0	Ductile Iron	420.68	1.19	0.001	291
672	P-170	223	J-128	J-129	12.0	Ductile Iron	420.68	1.19	0.001	220
673	P-171	129	J-129	J-130	12.0	Ductile Iron	207.94	0.59	0.000	132
674	P-172	499	J-130	J-131	12.0	Ductile Iron	109.74	0.31	0.000	409
675	P-173	123	J-131	J-95	12.0	Ductile Iron	-13.42	0.04	0.000	150
676	P-174	645	J-117	J-132	6.0	Ductile Iron	11.00	0.12	0.000	654
677	P-175	253	J-132	J-133	6.0	Ductile Iron	0.00	0.00	0.000	247
678	P-176	347	J-118	J-139	6.0	Ductile Iron	-54.53	0.62	0.000	366
679	P-177	669	J-139	J-135	6.0	Ductile Iron	-66.63	0.76	0.001	658
680	P-178	346	J-135	J-123	12.0	Ductile Iron	150.15	0.43	0.000	362
681	P-179	516	J-135	J-136	12.0	Ductile Iron	-82.35	0.23	0.000	520
682	P-180	468	J-136	J-125	12.0	Ductile Iron	-82.35	0.23	0.000	455
683	P-181	373	J-135	J-137	12.0	Ductile Iron	-163.03	0.46	0.000	354
684	P-182	736	J-137	J-138	4.0	Ductile Iron	-21.58	0.55	0.001	686
1184	P-183	204	J-24	J-25	8.0	Ductile Iron	7.70	0.05	0.000	0
1186	P-184	275	J-523	J-33	12.0	Ductile Iron	-543.97	1.54	0.001	537
1187	P-185	257	J-33	J-643	12.0	Ductile Iron	-558.27	1.58	0.001	537
685	P-186	346	J-125	J-141	6.0	Ductile Iron	-97.35	1.10	0.001	372
686	P-187	394	J-127	J-143	12.0	Ductile Iron	-600.58	1.70	0.001	380
687	P-188	157	J-143	J-144	12.0	Ductile Iron	49.10	0.14	0.000	162
688	P-189	271	J-144	J-145	12.0	Ductile Iron	0.00	0.00	0.000	270
689	P-190	701	J-146	J-147	12.0	Ductile Iron	-794.09	2.25	0.002	721
690	P-191	1,142	J-147	J-148	12.0	Ductile Iron	-719.72	2.04	0.002	1,179
691	P-192	293	J-148	J-149	6.0	Ductile Iron	-53.36	0.61	0.000	278
692	P-193	360	J-149	J-150	6.0	Ductile Iron	-53.36	0.61	0.000	382
693	P-194	212	J-148	J-151	12.0	Ductile Iron	-666.36	1.89	0.001	216
694	P-195	167	J-151	J-152	12.0	Ductile Iron	-670.56	1.90	0.001	181
695	P-196	340	J-152	J-153	8.0	Ductile Iron	33.74	0.22	0.000	313
696	P-197	320	J-153	J-154	8.0	Ductile Iron	23.84	0.15	0.000	328
697	P-198	253	J-154	J-155	8.0	Ductile Iron	6.24	0.04	0.000	358
698	P-199	246	J-155	J-156	8.0	Ductile Iron	-9.16	0.06	0.000	299
699	P-200	431	J-156	J-157	8.0	Ductile Iron	11.60	0.07	0.000	263
700	P-201	483	J-152	J-158	12.0	Ductile Iron	-737.76	2.09	0.002	485
701	P-202	237	J-158	J-159	12.0	Ductile Iron	-740.56	2.10	0.002	234
702	P-203	138	J-159	J-160	8.0	Ductile Iron	-740.56	4.73	0.012	159
704	P-205	378	J-161	J-147	8.0	Ductile Iron	123.47	0.79	0.000	364
705	P-206	219	J-160	J-162	12.0	Ductile Iron	-1,240.42	3.52	0.004	214
706	P-207	101	J-162	J-163	12.0	Ductile Iron	759.58	2.15	0.002	108
707	P-208	629	J-163	J-164	12.0	Ductile Iron	743.98	2.11	0.002	676
1189	P-210	403	J-33	J-89	8.0	Ductile Iron	0.00	0.00	0.000	0
710	P-211	207	J-166	J-167	8.0	Ductile Iron	236.05	1.51	0.001	200
711	P-212	310	J-167	J-168	8.0	Ductile Iron	230.05	1.47	0.001	311
712	P-213	166	J-168	J-169	8.0	Ductile Iron	-292.03	1.86	0.002	160
713	P-214	314	J-169	J-170	8.0	Ductile Iron	-306.33	1.96	0.002	316
714	P-215	456	J-170	J-165	12.0	Ductile Iron	-321.73	0.91	0.000	436
715	P-216	276	J-169	J-171	6.0	Ductile Iron	7.70	0.09	0.000	258

FlexTable: Pipe Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
716	P-217	251	J-171	J-172	6.0	Ductile Iron	0.00	0.00	0.000	232
717	P-218	365	PRV-1	J-170	12.0	Ductile Iron	0.00	0.00	0.000	358
718	P-219	331	J-137	J-173	12.0	Ductile Iron	-158.25	0.45	0.000	341
722	P-223	250	J-176	J-177	8.0	Ductile Iron	-24.14	0.15	0.000	247
723	P-224	331	J-177	J-173	12.0	Ductile Iron	176.22	0.50	0.000	332
1228	P-226	185	J-268	J-269	8.0	Ductile Iron	0.00	0.00	0.000	0
1229	P-227	164	J-268	J-267	8.0	Ductile Iron	145.73	0.93	0.001	0
726	P-228	375	J-177	J-181	8.0	Ductile Iron	-252.87	1.61	0.002	383
727	P-229	409	J-181	J-182	8.0	Ductile Iron	40.80	0.26	0.000	415
728	P-230	516	J-181	J-183	8.0	Ductile Iron	-299.17	1.91	0.002	513
729	P-231	388	J-183	J-198	8.0	Ductile Iron	-515.18	3.29	0.006	342
730	P-232	193	J-198	J-168	8.0	Ductile Iron	-516.58	3.30	0.006	254
731	P-233	181	J-177	J-184	8.0	Ductile Iron	52.51	0.34	0.000	223
733	P-235	203	J-185	J-186	2.0	Ductile Iron	-12.15	1.24	0.007	204
734	P-236	252	J-186	J-183	8.0	Ductile Iron	-208.32	1.33	0.001	243
735	P-237	406	J-186	J-187	8.0	Ductile Iron	193.96	1.24	0.001	398
736	P-238	649	J-187	J-188	8.0	Ductile Iron	162.26	1.04	0.001	659
737	P-239	179	J-188	J-189	8.0	Ductile Iron	154.56	0.99	0.001	179
738	P-240	132	J-189	J-190	6.0	Ductile Iron	147.96	1.68	0.003	121
739	P-241	411	J-184	J-190	8.0	Ductile Iron	48.17	0.31	0.000	353
740	P-242	244	J-189	J-191	8.0	Ductile Iron	0.00	0.00	0.000	242
1230	P-243	451	J-267	J-266	8.0	Ductile Iron	145.73	0.93	0.001	0
1231	P-244	89	J-266	J-260	8.0	Ductile Iron	145.73	0.93	0.001	0
741	P-245	320	J-131	J-192	12.0	Ductile Iron	116.16	0.33	0.000	285
1232	P-246	486	J-260	J-265	8.0	Ductile Iron	0.00	0.00	0.000	0
743	P-247	309	J-193	J-194	6.0	Ductile Iron	7.06	0.08	0.000	314
1233	P-248	126	J-260	J-258	8.0	Ductile Iron	145.73	0.93	0.001	0
745	P-249	299	J-195	J-192	8.0	Ductile Iron	-22.09	0.14	0.000	338
926	P-250	151	J-193	J-250	8.0	Ductile Iron	56.60	0.36	0.000	156
927	P-251	371	J-250	J-251	8.0	Ductile Iron	56.60	0.36	0.000	371
928	P-252	385	J-251	J-252	8.0	Ductile Iron	7.50	0.05	0.000	395
929	P-253	312	J-252	J-253	8.0	Ductile Iron	-33.16	0.21	0.000	309
930	P-254	283	J-253	J-254	8.0	Ductile Iron	-33.16	0.21	0.000	443
931	P-255	763	J-254	J-194	8.0	Ductile Iron	-33.16	0.21	0.000	636
933	P-256	574	J-164	J-180	8.0	Ductile Iron	114.10	0.73	0.000	575
1234	P-257	103	J-258	J-259	8.0	Ductile Iron	0.00	0.00	0.000	0
1235	P-258	604	J-258	J-645	8.0	Ductile Iron	145.73	0.93	0.001	0
1237	P-259	127	J-271	J-273	8.0	Ductile Iron	0.00	0.00	0.000	0
1239	P-260	243	J-461	J-274	8.0	Ductile Iron	109.80	0.70	0.000	0
1241	P-261	361	J-274	J-275	8.0	Ductile Iron	105.40	0.67	0.000	0
979	P-262	341	J-261	J-262	6.0	Ductile Iron	35.05	0.40	0.000	379
982	P-265	346	J-123	J-120	6.0	Ductile Iron	36.87	0.42	0.000	337
983	P-266	314	J-13	J-11	8.0	Ductile Iron	0.00	0.00	0.000	268
984	P-267	267	J-11	J-4	8.0	Ductile Iron	2.86	0.02	0.000	293
986	P-269	612	J-20	J-263	10.0	Ductile Iron	89.10	0.36	0.000	621
1243	P-270	267	J-275	J-276	8.0	Ductile Iron	99.90	0.64	0.000	0
988	P-271	142	J-263	J-264	6.0	Ductile Iron	89.10	1.01	0.001	1,550
1016	P-272	41	J-14	J-199	8.0	Ductile Iron	12.27	0.08	0.000	247
1034	P-276	17	J-201	J-202	12.0	Ductile Iron	-36.08	0.10	0.000	0
1027	P-278	17	J-203	J-12	6.0	Ductile Iron	-4.62	0.05	0.000	603
1030	P-280	21	J-201	J-203	12.0	Ductile Iron	-4.62	0.01	0.000	0
1032	P-281	21	J-12	J-202	6.0	Ductile Iron	-2.04	0.02	0.000	183

FlexTable: Pipe Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1033	P-282	169	J-202	J-10	6.0	Ductile Iron	48.65	0.55	0.000	183
1038	P-283	385	J-202	J-205	12.0	Ductile Iron	-86.78	0.25	0.000	0
1040	P-284	300	J-205	J-206	12.0	Ductile Iron	-151.26	0.43	0.000	0
1041	P-285	36	J-205	J-199	8.0	Ductile Iron	64.48	0.41	0.000	0
1042	P-286	22	J-206	J-17	12.0	Ductile Iron	-177.17	0.50	0.000	0
1044	P-287	541	J-17	J-207	6.0	Ductile Iron	6.31	0.07	0.000	622
1045	P-288	88	J-207	J-18	10.0	Ductile Iron	25.73	0.11	0.000	622
1046	P-289	586	J-206	J-207	12.0	Ductile Iron	25.92	0.07	0.000	0
1252	P-290	1,345	J-278	J-277	12.0	Ductile Iron	875.56	2.48	0.002	0
1049	P-291	288	J-208	J-652	8.0	Ductile Iron	155.76	0.99	0.001	339
1251	P-292	51	PMP-8	J-278	8.0	Ductile Iron	572.79	3.66	0.008	0
1249	P-293	3,407	J-277	J-209	12.0	Ductile Iron	875.56	2.48	0.002	0
1054	P-294	1,912	J-209	J-210	16.0	Ductile Iron	875.56	1.40	0.001	0
1056	P-295	1,966	J-210	J-211	16.0	Ductile Iron	815.06	1.30	0.000	0
1257	P-296	157	J-612	PMP-9	10.0	Ductile Iron	571.67	2.34	0.003	0
1258	P-297	100	PMP-9	J-278	8.0	Ductile Iron	571.67	3.65	0.008	0
1062	P-298	263	J-208	J-214	12.0	Ductile Iron	40.70	0.12	0.000	0
1068	P-299	527	J-215	J-208	8.0	Ductile Iron	-69.15	0.44	0.000	0
1070	P-300	349	J-215	J-216	8.0	Ductile Iron	50.45	0.32	0.000	0
1072	P-301	439	J-216	J-217	8.0	Ductile Iron	42.75	0.27	0.000	0
1074	P-302	458	J-217	J-218	8.0	Ductile Iron	36.15	0.23	0.000	0
1076	P-303	374	J-218	J-219	8.0	Ductile Iron	0.00	0.00	0.000	0
1078	P-304	601	J-215	J-220	8.0	Ductile Iron	11.00	0.07	0.000	0
1081	P-306	72	PRV-20	J-208	8.0	Ductile Iron	0.00	0.00	0.000	339
1088	P-307	315	J-619	J-219	8.0	Ductile Iron	75.23	0.48	0.000	0
1084	P-308	179	J-221	J-423	6.0	Ductile Iron	60.93	0.69	0.001	0
1089	P-309	47	J-219	PRV-13	6.0	Ductile Iron	0.00	0.00	0.000	0
1090	P-310	100	J-219	PRV-14	6.0	Ductile Iron	60.93	0.69	0.001	0
1091	P-311	43	PRV-13	J-221	6.0	Ductile Iron	0.00	0.00	0.000	0
1092	P-312	92	PRV-14	J-221	6.0	Ductile Iron	60.93	0.69	0.001	0
1126	P-313	166	J-115	J-234	8.0	Ductile Iron	4.87	0.03	0.000	170
1096	P-314	363	J-223	J-224	8.0	Ductile Iron	11.54	0.07	0.000	0
1098	P-315	272	J-224	J-225	8.0	Ductile Iron	27.65	0.18	0.000	0
1100	P-316	490	J-225	J-226	8.0	Ductile Iron	21.05	0.13	0.000	0
1102	P-317	337	J-226	J-227	8.0	Ductile Iron	0.00	0.00	0.000	0
1104	P-318	278	J-226	J-228	8.0	Ductile Iron	-22.95	0.15	0.000	0
1105	P-319	495	J-228	J-224	8.0	Ductile Iron	-23.66	0.15	0.000	0
1107	P-320	336	J-228	J-229	8.0	Ductile Iron	5.50	0.04	0.000	0
1109	P-321	287	J-228	J-230	8.0	Ductile Iron	-10.29	0.07	0.000	0
1110	P-322	493	J-230	J-223	8.0	Ductile Iron	-24.59	0.16	0.000	0
1112	P-323	332	J-231	J-230	8.0	Ductile Iron	-5.50	0.04	0.000	0
1115	P-325	67	PRV-21	J-208	8.0	Ductile Iron	268.90	1.72	0.002	0
1117	P-326	356	J-656	J-232	8.0	Ductile Iron	139.70	0.89	0.001	0
1118	P-327	512	J-232	J-223	12.0	Ductile Iron	57.03	0.16	0.000	0
1120	P-328	136	J-230	PRV-17	8.0	Ductile Iron	0.00	0.00	0.000	0
1121	P-329	163	PRV-17	J-630	8.0	Ductile Iron	0.00	0.00	0.000	0
1123	P-330	700	J-80	J-233	10.0	Ductile Iron	157.42	0.64	0.000	684
1124	P-331	24	J-233	J-116	12.0	Ductile Iron	-114.43	0.32	0.000	684
892	P-332	418	J-59	J-332	6.0	Ductile Iron	-3.52	0.04	0.000	407
1127	P-333	50	J-234	J-106	8.0	Ductile Iron	-40.63	0.26	0.000	170
1129	P-334	707	J-647	J-115	12.0	Ductile Iron	128.46	0.36	0.000	0
1130	P-335	823	J-115	J-233	12.0	Ductile Iron	-263.36	0.75	0.000	0

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1132	P-336	446	J-95	J-235	8.0	Ductile Iron	29.40	0.19	0.000	0
1134	P-337	128	J-192	J-236	12.0	Ductile Iron	69.52	0.20	0.000	344
1135	P-338	224	J-236	J-193	12.0	Ductile Iron	63.66	0.18	0.000	344
1136	P-339	1,052	J-236	J-97	12.0	Ductile Iron	5.86	0.02	0.000	0
1138	P-340	146	J-97	J-237	10.0	Ductile Iron	49.10	0.20	0.000	0
1140	P-341	191	J-721	J-238	8.0	Ductile Iron	0.00	0.00	0.000	0
1253	P-342	58	J-278	PRV-20	8.0	Ductile Iron	0.00	0.00	0.000	0
1254	P-343	71	J-278	PRV-21	8.0	Ductile Iron	268.90	1.72	0.002	0
1058	P-344	1,301	J-211	J-212	16.0	Ductile Iron	760.06	1.21	0.000	0
1060	P-345	310	J-212	J-213	16.0	Ductile Iron	760.06	1.21	0.000	0
1260	P-346	359	J-87	J-120	6.0	Ductile Iron	-2.72	0.03	0.000	0
1150	P-348	204	J-90	J-241	12.0	Ductile Iron	-49.96	0.14	0.000	245
1151	P-349	78	J-241	J-96	12.0	Ductile Iron	-81.70	0.23	0.000	245
1153	P-350	191	J-97	J-242	8.0	Ductile Iron	19.82	0.13	0.000	517
1154	P-351	337	J-242	J-195	8.0	Ductile Iron	2.46	0.02	0.000	517
1155	P-352	397	J-241	J-242	4.0	Ductile Iron	7.19	0.18	0.000	0
1157	P-353	495	J-141	J-243	8.0	Ductile Iron	25.65	0.16	0.000	0
1158	P-354	385	J-58	J-261	8.0	Ductile Iron	44.87	0.29	0.000	0
1160	P-355	348	J-157	J-244	12.0	Ductile Iron	11.60	0.03	0.000	0
1161	P-356	594	J-156	J-152	8.0	Ductile Iron	-30.66	0.20	0.000	0
1163	P-357	50	J-165	J-245	8.0	Ductile Iron	245.35	1.57	0.002	363
1164	P-358	311	J-245	J-166	8.0	Ductile Iron	236.05	1.51	0.001	363
1166	P-359	304	J-245	J-246	8.0	Ductile Iron	9.30	0.06	0.000	0
1168	P-360	262	J-437	J-247	6.0	Ductile Iron	5.28	0.06	0.000	0
1169	P-361	212	J-247	J-438	6.0	Ductile Iron	-11.22	0.13	0.000	0
1171	P-362	296	J-436	J-248	8.0	Ductile Iron	17.60	0.11	0.000	0
1173	P-363	390	J-434	J-249	8.0	Ductile Iron	-11.06	0.07	0.000	0
1177	P-366	313	J-605	J-240	4.0	Ductile Iron	32.70	0.83	0.001	697
1178	P-367	413	J-240	J-606	8.0	Ductile Iron	32.70	0.21	0.000	697
1274	P-368	75	J-639	PMP-10	8.0	Ductile Iron	679.46	4.34	0.010	0
1278	P-370	407	J-280	J-281	12.0	Ductile Iron	91.30	0.26	0.000	0
1642	P-371	210	J-280	J-376	12.0	Ductile Iron	419.45	1.19	0.001	0
1283	P-373	96	PMP-10	J-283	12.0	Ductile Iron	679.46	1.93	0.001	0
1284	P-374	407	J-283	J-280	12.0	Ductile Iron	522.85	1.48	0.001	0
1288	P-376	388	J-285	J-284	12.0	Ductile Iron	151.10	0.43	0.000	0
1291	P-378	368	J-284	J-648	4.0	Ductile Iron	35.60	0.91	0.001	0
1305	P-387	113	J-283	PRV-22	12.0	Ductile Iron	0.00	0.00	0.000	0
1306	P-388	94	PRV-22	J-285	12.0	Ductile Iron	0.00	0.00	0.000	0
1308	P-389	143	J-283	PRV-23	12.0	Ductile Iron	153.30	0.43	0.000	0
1309	P-390	114	PRV-23	J-285	12.0	Ductile Iron	153.30	0.43	0.000	0
1639	P-391	427	J-282	J-375	12.0	Ductile Iron	-11.00	0.03	0.000	0
1312	P-392	87	T-Valhalla 1	J-290	12.0	Ductile Iron	-158.86	0.45	0.000	0
1314	P-393	169	T-Valhalla 2	J-290	12.0	Ductile Iron	-110.99	0.31	0.000	0
1316	P-394	118	J-115	PMP-11	12.0	Ductile Iron	1,006.12	2.85	0.003	0
1320	P-397	603	J-445	J-291	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1707	P-398	547	J-291	J-398	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1324	P-399	567	J-292	J-293	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1326	P-400	1,147	J-293	J-294	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1328	P-401	382	J-294	J-295	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
746	P-402	599	J-402	J-403	6.0	Ductile Iron	18.63	0.21	0.000	601
747	P-403	212	J-403	J-404	6.0	Ductile Iron	9.83	0.11	0.000	214

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
748	P-404	748	J-404	J-405	6.0	Ductile Iron	-11.07	0.13	0.000	713
749	P-407	228	J-406	J-407	6.0	Ductile Iron	-42.47	0.48	0.000	212
750	P-408	365	J-407	J-401	6.0	Ductile Iron	46.13	0.52	0.000	368
751	P-409	183	J-407	PRV-15	6.0	Ductile Iron	0.00	0.00	0.000	170
1354	P-409	239	J-301	J-302	10.0	Ductile Iron	-4.40	0.02	0.000	0
752	P-410	275	J-404	J-408	6.0	Ductile Iron	13.20	0.15	0.000	267
753	P-411	319	J-408	PRV-4	6.0	Ductile Iron	0.00	0.00	0.000	321
1357	P-411	358	J-303	J-409	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
754	P-412	131	PRV-4	J-77	6.0	Ductile Iron	0.00	0.00	0.000	125
755	P-413	44	PRV-3	J-99	6.0	Ductile Iron	0.00	0.00	0.000	68
756	P-414	190	J-98	J-409	6.0	Ductile Iron	8.80	0.10	0.000	172
757	P-415	141	J-409	J-410	6.0	Ductile Iron	0.00	0.00	0.000	173
758	P-416	337	J-410	J-411	6.0	Ductile Iron	-7.99	0.09	0.000	344
759	P-417	285	J-411	PRV-3	8.0	Ductile Iron	0.00	0.00	0.000	262
1370	P-418	120	J-308	J-515	10.0	Ductile Iron	-5.20	0.02	0.000	0
761	P-420	367	J-413	J-414	6.0	Ductile Iron	-1.11	0.01	0.000	357
762	P-421	687	J-414	J-411	6.0	Ductile Iron	18.99	0.22	0.000	680
763	P-422	490	J-103	J-415	6.0	Ductile Iron	-6.60	0.07	0.000	492
764	P-423	345	J-415	J-414	8.0	Ductile Iron	41.07	0.26	0.000	338
765	P-424	28	J-110	PRV-2	6.0	Ductile Iron	0.00	0.00	0.000	55
1384	P-424	154	PMP-11	J-310	12.0	Ductile Iron	1,006.12	2.85	0.003	0
1385	P-425	2,680	J-310	J-637	12.0	Ductile Iron	2,012.30	5.71	0.011	0
766	P-426	604	J-416	J-417	6.0	Ductile Iron	-3.97	0.05	0.000	600
1387	P-426	125	J-115	PMP-12	12.0	Ductile Iron	1,006.19	2.85	0.003	0
767	P-427	376	J-417	J-415	6.0	Ductile Iron	-14.97	0.17	0.000	385
1388	P-427	140	PMP-12	J-310	12.0	Ductile Iron	1,006.19	2.85	0.003	0
768	P-428	301	J-414	J-418	6.0	Ductile Iron	3.37	0.04	0.000	349
1391	P-428	552	J-249	J-445	8.0	Ductile Iron	-25.36	0.16	0.000	0
769	P-429	484	J-418	J-419	6.0	Ductile Iron	0.00	0.00	0.000	432
770	P-430	366	J-415	J-420	8.0	Ductile Iron	-83.24	0.53	0.000	363
1396	P-431	251	J-4	J-312	8.0	Ductile Iron	5.92	0.04	0.000	0
772	P-432	298	J-413	J-422	6.0	Ductile Iron	9.83	0.11	0.000	323
1397	P-432	225	J-312	J-1	8.0	Ductile Iron	-2.88	0.02	0.000	0
773	P-433	340	J-422	J-418	1.0	Ductile Iron	-0.07	0.03	0.000	353
1399	P-433	847	J-720	J-313	10.0	Ductile Iron	28.40	0.12	0.000	0
774	P-434	257	J-413	J-423	6.0	Ductile Iron	-46.63	0.53	0.000	247
1401	P-434	242	J-313	J-314	10.0	Ductile Iron	0.00	0.00	0.000	0
1402	P-435	340	J-314	J-254	8.0	Ductile Iron	0.00	0.00	0.000	0
776	P-436	569	J-420	J-424	8.0	Ductile Iron	-101.94	0.65	0.000	592
1411	P-436	316	J-176	J-315	6.0	Ductile Iron	24.14	0.27	0.000	0
777	P-437	409	J-424	J-425	8.0	Ductile Iron	82.80	0.53	0.000	408
1413	P-437	130	J-315	J-316	6.0	Ductile Iron	24.14	0.27	0.000	0
778	P-438	348	J-425	J-416	6.0	Ductile Iron	58.88	0.67	0.001	347
779	P-441	401	J-425	J-427	8.0	Ductile Iron	-85.51	0.55	0.000	402
780	P-442	289	J-427	J-428	8.0	Ductile Iron	-85.51	0.55	0.000	284
781	P-443	341	J-424	J-429	8.0	Ductile Iron	-199.04	1.27	0.001	333
1421	P-443	438	J-174	J-173	6.0	Ductile Iron	-1.56	0.02	0.000	0
782	P-444	268	J-429	J-430	8.0	Ductile Iron	-199.04	1.27	0.001	168
1426	P-444	337	J-146	J-319	12.0	Ductile Iron	744.99	2.11	0.002	724
783	P-445	30	J-430	PRV-12	8.0	Ductile Iron	0.00	0.00	0.000	112
1427	P-445	392	J-319	J-143	12.0	Ductile Iron	650.04	1.84	0.001	724
784	P-446	270	J-428	J-430	8.0	Ductile Iron	-290.93	1.86	0.002	286

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1429	P-446	399	J-319	J-320	12.0	Ductile Iron	-101.44	0.29	0.000	0
1431	P-447	755	J-320	J-321	8.0	Ductile Iron	-300.62	1.92	0.002	0
785	P-448	70	J-431	PRV-11	8.0	Ductile Iron	0.00	0.00	0.000	20
1433	P-448	785	J-180	J-322	8.0	Ductile Iron	99.40	0.63	0.000	0
786	P-449	336	J-431	J-432	8.0	Ductile Iron	-24.14	0.15	0.000	302
787	P-450	311	J-432	J-433	8.0	Ductile Iron	-43.94	0.28	0.000	307
1436	P-450	434	J-235	J-323	8.0	Ductile Iron	29.40	0.19	0.000	0
788	P-451	338	J-433	J-425	8.0	Ductile Iron	-95.43	0.61	0.000	339
1437	P-451	469	J-323	J-194	12.0	Ductile Iron	29.40	0.08	0.000	0
789	P-452	348	J-433	J-434	4.0	Ductile Iron	27.29	0.70	0.001	352
790	P-453	501	J-434	J-435	8.0	Ductile Iron	21.85	0.14	0.000	501
791	P-454	207	J-435	J-436	8.0	Ductile Iron	14.15	0.09	0.000	382
1442	P-454	183	J-59	J-325	12.0	Ductile Iron	-205.75	0.58	0.000	281
792	P-455	321	J-436	J-437	8.0	Ductile Iron	-12.25	0.08	0.000	161
1443	P-455	107	J-325	J-53	12.0	Ductile Iron	-187.92	0.53	0.000	281
793	P-456	241	J-437	J-438	8.0	Ductile Iron	-17.53	0.11	0.000	265
1444	P-456	693	J-325	J-66	8.0	Ductile Iron	-19.23	0.12	0.000	0
794	P-457	261	J-438	J-439	8.0	Ductile Iron	-30.95	0.20	0.000	291
1446	P-457	374	J-184	J-326	8.0	Ductile Iron	-0.05	0.00	0.000	689
795	P-458	290	J-439	J-440	8.0	Ductile Iron	-30.95	0.20	0.000	273
1447	P-458	338	J-326	J-185	8.0	Ductile Iron	-5.55	0.04	0.000	689
1448	P-459	331	J-316	J-174	6.0	Ductile Iron	2.84	0.03	0.000	0
796	P-460	322	J-440	J-441	8.0	Ductile Iron	1.55	0.01	0.000	331
1460	P-460	60	J-410	J-302	6.0	Ductile Iron	4.00	0.05	0.000	0
797	P-461	342	J-441	J-416	2.0	Ductile Iron	-2.85	0.29	0.000	327
1461	P-461	204	J-302	J-412	6.0	Ductile Iron	-3.15	0.04	0.000	0
798	P-462	205	J-442	J-443	8.0	Ductile Iron	83.94	0.54	0.000	204
1463	P-462	116	J-327	J-76	8.0	Ductile Iron	800.00	5.11	0.012	0
799	P-463	519	J-443	J-444	8.0	Ductile Iron	41.80	0.27	0.000	507
1465	P-463	377	J-140	J-320	8.0	Ductile Iron	-178.18	1.14	0.001	0
800	P-464	490	J-443	J-445	8.0	Ductile Iron	98.66	0.63	0.000	487
1466	P-464	285	J-321	J-161	8.0	Ductile Iron	-306.22	1.95	0.002	0
801	P-465	144	J-431	J-442	8.0	Ductile Iron	104.84	0.67	0.000	172
1467	P-465	204	J-412	J-302	6.0	Ductile Iron	3.15	0.04	0.000	0
802	P-466	263	J-430	J-446	12.0	Ductile Iron	-509.77	1.45	0.001	352
1468	P-466	60	J-410	J-302	6.0	Ductile Iron	4.00	0.05	0.000	0
803	P-467	522	J-446	J-447	12.0	Ductile Iron	-509.77	1.45	0.001	523
804	P-468	366	J-447	J-448	12.0	Ductile Iron	-528.87	1.50	0.001	366
1477	P-468	76	J-623	PRV-9	10.0	Ductile Iron	0.00	0.00	0.000	0
805	P-469	442	J-448	J-449	12.0	Ductile Iron	-533.77	1.51	0.001	441
1487	P-469	1,725	J-264	J-329	8.0	Ductile Iron	19.10	0.12	0.000	0
806	P-470	76	J-449	PRV-9	10.0	Ductile Iron	0.00	0.00	0.000	89
1496	P-470	138	J-243	J-143	8.0	Ductile Iron	-0.35	0.00	0.000	0
807	P-471	300	J-187	J-450	8.0	Ductile Iron	0.00	0.00	0.000	308
1498	P-471	503	J-160	J-330	8.0	Ductile Iron	498.46	3.18	0.006	1,024
808	P-472	247	J-450	J-451	8.0	Ductile Iron	-6.60	0.04	0.000	240
1499	P-472	482	J-330	J-161	8.0	Ductile Iron	429.69	2.74	0.004	1,024
809	P-473	640	J-451	J-452	8.0	Ductile Iron	-21.90	0.14	0.000	623
1500	P-473	359	J-150	J-330	6.0	Ductile Iron	-68.76	0.78	0.001	0
810	P-474	233	J-452	J-453	8.0	Ductile Iron	-70.70	0.45	0.000	224
811	P-475	262	J-453	J-454	8.0	Ductile Iron	-80.60	0.51	0.000	263
1503	P-475	594	J-332	J-55	6.0	Ductile Iron	-13.34	0.15	0.000	0

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
812	P-476	149	J-454	J-455	8.0	Ductile Iron	-107.84	0.69	0.000	145
1505	P-476	1,508	J-19	J-332	10.0	Ductile Iron	-131.03	0.54	0.000	2,119
813	P-477	647	J-455	J-456	12.0	Ductile Iron	152.86	0.43	0.000	640
1506	P-477	500	J-332	J-56	10.0	Ductile Iron	-105.79	0.43	0.000	2,119
814	P-478	305	J-456	J-457	12.0	Ductile Iron	37.66	0.11	0.000	318
1507	P-478	148	J-262	J-332	6.0	Ductile Iron	25.23	0.29	0.000	0
815	P-479	152	J-457	PRV-1	12.0	Ductile Iron	0.00	0.00	0.000	153
1508	P-479	813	J-142	J-129	8.0	Ductile Iron	32.76	0.21	0.000	0
816	P-480	259	J-457	J-172	6.0	Ductile Iron	18.96	0.22	0.000	257
1513	P-480	727	J-164	J-334	12.0	Ductile Iron	612.18	1.74	0.001	900
817	P-481	286	J-454	J-458	6.0	Ductile Iron	21.74	0.25	0.000	291
1514	P-481	228	J-334	J-165	12.0	Ductile Iron	567.08	1.61	0.001	900
818	P-482	409	J-458	J-459	6.0	Ductile Iron	9.64	0.11	0.000	410
819	P-483	306	J-459	J-172	6.0	Ductile Iron	-9.06	0.10	0.000	316
820	P-484	188	J-453	J-460	8.0	Ductile Iron	5.50	0.04	0.000	189
1519	P-484	180	J-336	J-334	8.0	Ductile Iron	-42.90	0.27	0.000	0
821	P-485	339	J-460	J-461	8.0	Ductile Iron	0.00	0.00	0.000	336
1520	P-485	254	J-335	J-336	8.0	Ductile Iron	-5.50	0.04	0.000	0
893	P-486	485	J-133	J-485	6.0	Ductile Iron	-13.20	0.15	0.000	338
1523	P-486	230	J-333	J-338	8.0	Ductile Iron	-16.50	0.11	0.000	0
1524	P-487	160	J-338	J-336	8.0	Ductile Iron	-28.60	0.18	0.000	0
894	P-488	125	J-485	J-487	8.0	Ductile Iron	-18.70	0.12	0.000	285
1525	P-488	258	J-337	J-338	8.0	Ductile Iron	-6.60	0.04	0.000	0
895	P-489	628	J-487	J-486	8.0	Ductile Iron	-46.20	0.29	0.000	548
1527	P-489	260	J-339	J-333	8.0	Ductile Iron	-8.80	0.06	0.000	0
896	P-490	242	J-487	J-488	8.0	Ductile Iron	20.90	0.13	0.000	196
897	P-491	415	J-488	J-489	8.0	Ductile Iron	9.90	0.06	0.000	393
898	P-492	32	J-488	J-191	6.0	Ductile Iron	5.50	0.06	0.000	80
1533	P-492	356	J-276	J-340	8.0	Ductile Iron	16.50	0.11	0.000	0
899	P-493	44	J-646	PRV-7	6.0	Ductile Iron	0.00	0.00	0.000	59
1535	P-493	155	J-342	PRV-18	8.0	Ductile Iron	0.00	0.00	0.000	0
900	P-494	43	PRV-7	J-486	6.0	Ductile Iron	0.00	0.00	0.000	61
1536	P-494	162	PRV-18	J-340	8.0	Ductile Iron	0.00	0.00	0.000	0
901	P-495	194	J-407	PRV-16	6.0	Ductile Iron	-95.20	1.08	0.001	186
1538	P-495	154	J-284	J-343	8.0	Ductile Iron	32.59	0.21	0.000	0
902	P-496	142	PRV-16	J-608	10.0	Ductile Iron	-95.20	0.39	0.000	153
1540	P-496	491	J-343	J-344	8.0	Ductile Iron	14.35	0.09	0.000	0
1541	P-497	367	J-344	J-342	8.0	Ductile Iron	11.46	0.07	0.000	0
906	P-498	76	PRV-10	J-449	10.0	Ductile Iron	533.77	2.18	0.002	92
1542	P-498	784	J-342	J-343	8.0	Ductile Iron	-13.84	0.09	0.000	0
911	P-499	51	J-401	J-490	6.0	Ductile Iron	32.93	0.37	0.000	76
1543	P-499	634	J-284	J-344	8.0	Ductile Iron	20.21	0.13	0.000	0
912	P-500	200	J-490	J-402	6.0	Ductile Iron	25.23	0.29	0.000	182
1545	P-500	506	J-4	J-345	8.0	Ductile Iron	0.00	0.00	0.000	0
959	P-502	99	J-612	PMP-8	10.0	Ductile Iron	572.79	2.34	0.003	50
960	P-503	29	PRV-2	J-491	6.0	Ductile Iron	0.00	0.00	0.000	57
961	P-504	262	J-491	J-416	6.0	Ductile Iron	-43.50	0.49	0.000	263
962	P-505	393	J-440	J-491	6.0	Ductile Iron	-36.90	0.42	0.000	333
923	P-506	174	J-405	J-506	6.0	Ductile Iron	-35.87	0.41	0.000	236
924	P-507	350	J-506	J-406	6.0	Ductile Iron	-35.87	0.41	0.000	379
963	P-508	410	J-138	J-141	8.0	Ductile Iron	-36.98	0.24	0.000	418
964	P-509	306	J-141	J-140	8.0	Ductile Iron	-167.68	1.07	0.001	276

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1589	P-509	113	J-350	VSPB-1	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1590	P-510	129	VSPB-1	J-351	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1598	P-512	357	J-356	J-360	6.0	Ductile Iron	0.00	0.00	0.000	0
925	P-515	235	J-412	J-515	6.0	Ductile Iron	9.04	0.10	0.000	230
1606	P-516	376	J-360	J-361	6.0	Ductile Iron	0.00	0.00	0.000	0
1607	P-517	337	J-361	J-356	6.0	Ductile Iron	0.00	0.00	0.000	0
1608	P-518	136	J-356	J-355	6.0	Ductile Iron	0.00	0.00	0.000	0
934	P-524	871	J-456	J-521	12.0	Ductile Iron	24.20	0.07	0.000	831
935	P-525	599	J-521	J-522	12.0	Ductile Iron	7.09	0.02	0.000	603
1623	P-525	288	J-351	J-369	6.0	Ductile Iron	10.53	0.12	0.000	0
936	P-526	365	J-641	J-523	12.0	Ductile Iron	-410.17	1.16	0.001	356
938	P-528	482	J-523	J-524	12.0	Ductile Iron	124.00	0.35	0.000	479
939	P-529	616	J-524	J-525	12.0	Ductile Iron	93.80	0.27	0.000	657
1644	P-529	375	J-369	J-366	8.0	Ductile Iron	-4.87	0.03	0.000	0
940	P-530	264	J-525	J-526	8.0	Ductile Iron	19.80	0.13	0.000	272
1645	P-530	311	J-366	J-362	8.0	Ductile Iron	-4.87	0.03	0.000	0
941	P-531	485	J-525	J-527	12.0	Ductile Iron	67.40	0.19	0.000	473
1646	P-531	255	J-362	J-375	8.0	Ductile Iron	-13.67	0.09	0.000	0
942	P-532	188	J-428	J-528	8.0	Ductile Iron	195.52	1.25	0.001	205
943	P-533	344	J-528	J-431	8.0	Ductile Iron	87.30	0.56	0.000	352
1652	P-533	217	J-350	PMP-16	12.0	Ductile Iron	143.00	0.41	0.000	0
944	P-534	382	J-528	J-529	8.0	Ductile Iron	100.52	0.64	0.000	366
1653	P-534	233	PMP-16	J-351	12.0	Ductile Iron	143.00	0.41	0.000	0
945	P-535	550	J-529	J-530	8.0	Ductile Iron	11.93	0.08	0.000	552
1655	P-535	445	J-182	J-377	8.0	Ductile Iron	0.00	0.00	0.000	0
946	P-536	932	J-530	J-529	8.0	Ductile Iron	-8.97	0.06	0.000	933
1660	P-536	598	J-521	J-379	12.0	Ductile Iron	5.01	0.01	0.000	0
947	P-537	412	J-529	J-443	8.0	Ductile Iron	65.32	0.42	0.000	412
1662	P-537	451	J-379	J-380	12.0	Ductile Iron	5.01	0.01	0.000	0
948	P-538	120	T-North	J-647	12.0	Ductile Iron	995.67	2.82	0.003	161
1663	P-538	269	J-380	J-522	12.0	Ductile Iron	5.01	0.01	0.000	0
949	P-539	73	T-North off	J-647	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	176
1665	P-539	343	J-232	J-381	12.0	Ductile Iron	58.48	0.17	0.000	0
950	P-540	394	J-647	J-114	8.0	Ductile Iron	65.26	0.42	0.000	532
1666	P-540	374	J-381	J-224	12.0	Ductile Iron	58.47	0.17	0.000	0
1668	P-541	154	J-381	J-382	12.0	Ductile Iron	0.00	0.00	0.000	0
1673	P-542	187	J-383	J-384	6.0	Ductile Iron	0.00	0.00	0.000	0
953	P-543	334	PMP-1	J-647	10.0	Ductile Iron	-992.57	4.05	0.007	334
1687	P-543	1,186	J-225	J-214	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
954	P-544	1,027	J-75	J-531	10.0	Ductile Iron	362.74	1.48	0.001	1,049
1689	P-544	808	J-639	J-389	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
955	P-545	610	J-531	J-79	10.0	Ductile Iron	353.44	1.44	0.001	609
1691	P-545	619	J-389	J-390	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1693	P-546	201	J-390	J-391	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
956	P-547	25	J-45	PMP-2	8.0	Ductile Iron	544.04	3.47	0.007	83
1695	P-547	589	J-391	J-392	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
957	P-548	55	PMP-2	J-658	8.0	Ductile Iron	544.04	3.47	0.007	90
1697	P-548	256	J-391	J-393	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
958	P-549	885	J-647	J-190	8.0	Ductile Iron	-190.63	1.22	0.001	767
1699	P-550	624	J-393	J-394	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1714	P-551	100	J-393	J-399	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1705	P-552	563	J-396	J-397	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1709	P-553	272	J-396	J-398	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1717	P-554	109	J-399	PRV-28	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1718	P-555	61	PRV-28	J-396	2.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1720	P-556	521	J-285	J-400	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1721	P-557	221	J-389	J-392	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1722	P-558	208	J-392	J-394	8.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
822	P-601	820	J-601	J-602	6.0	Ductile Iron	-34.25	0.39	0.000	872
823	P-602	248	J-602	J-603	6.0	Ductile Iron	-44.15	0.50	0.000	254
824	P-603	779	J-603	J-604	4.0	Ductile Iron	15.10	0.39	0.000	738
825	P-604	253	J-603	J-605	6.0	Ductile Iron	-68.05	0.77	0.001	200
827	P-609	230	J-607	J-608	10.0	Ductile Iron	452.34	1.85	0.002	230
828	P-610	146	J-608	J-609	10.0	Ductile Iron	350.54	1.43	0.001	136
1594	P-611	878	J-609	J-355	10.0	Ductile Iron	347.24	1.42	0.001	1,195
830	P-612	801	J-610	J-611	10.0	Ductile Iron	347.24	1.42	0.001	805
831	P-613	391	J-611	J-612	10.0	Ductile Iron	347.24	1.42	0.001	354
832	P-614	71	J-612	T-Brader	10.0	Ductile Iron	-639.34	2.61	0.003	167
833	P-615	299	J-612	J-613	10.0	Ductile Iron	-157.88	0.64	0.000	274
834	P-616	546	J-613	J-614	10.0	Ductile Iron	-157.88	0.64	0.000	548
835	P-617	350	J-614	J-615	10.0	Ductile Iron	-250.71	1.02	0.001	352
836	P-618	465	J-615	J-616	10.0	Ductile Iron	-250.71	1.02	0.001	459
837	P-619	488	J-616	J-617	10.0	Ductile Iron	-295.84	1.21	0.001	457
838	P-620	276	J-617	J-421	10.0	Ductile Iron	44.00	0.18	0.000	260
839	P-621	339	J-421	J-419	6.0	Ductile Iron	29.70	0.34	0.000	338
840	P-622	274	J-419	J-618	6.0	Ductile Iron	17.60	0.20	0.000	270
842	P-624	382	J-619	J-620	8.0	Ductile Iron	-75.23	0.48	0.000	376
843	P-625	487	J-620	J-614	8.0	Ductile Iron	-88.43	0.56	0.000	472
844	P-626	374	J-616	J-621	6.0	Ductile Iron	36.33	0.41	0.000	397
845	P-627	550	J-621	J-622	8.0	Ductile Iron	-10.18	0.06	0.000	538
846	P-628	215	J-622	J-623	10.0	Ductile Iron	-90.17	0.37	0.000	237
847	P-629	139	J-623	J-617	10.0	Ductile Iron	-623.94	2.55	0.003	138
849	P-631	419	J-621	J-624	6.0	Ductile Iron	36.61	0.42	0.000	405
850	P-632	428	J-624	J-625	8.0	Ductile Iron	36.61	0.23	0.000	427
851	P-633	250	J-625	J-626	8.0	Ductile Iron	-3.38	0.02	0.000	251
852	P-634	428	J-626	J-627	8.0	Ductile Iron	17.60	0.11	0.000	429
853	P-635	347	J-626	J-628	8.0	Ductile Iron	-41.49	0.26	0.000	335
854	P-636	443	J-628	J-629	8.0	Ductile Iron	-68.99	0.44	0.000	443
855	P-637	282	J-629	J-622	10.0	Ductile Iron	-68.99	0.28	0.000	281
856	P-638	502	J-625	J-630	8.0	Ductile Iron	21.29	0.14	0.000	494
857	P-639	252	J-630	J-631	8.0	Ductile Iron	15.79	0.10	0.000	256
858	P-640	234	J-631	J-632	8.0	Ductile Iron	9.19	0.06	0.000	244
859	P-641	416	J-632	J-633	8.0	Ductile Iron	-20.51	0.13	0.000	412
860	P-642	339	J-633	J-626	8.0	Ductile Iron	-20.51	0.13	0.000	339
861	P-643	722	J-617	J-634	12.0	Ductile Iron	-973.68	2.76	0.003	769
862	P-644	741	J-634	J-635	12.0	Ductile Iron	-973.68	2.76	0.003	705
863	P-645	546	J-635	J-636	12.0	Ductile Iron	-973.69	2.76	0.003	638
864	P-646	214	J-636	J-637	12.0	Ductile Iron	-973.69	2.76	0.003	196
865	P-647	682	J-637	J-638	12.0	Ductile Iron	1,038.62	2.95	0.003	680
866	P-648	1,098	J-638	J-639	12.0	Ductile Iron	973.72	2.76	0.003	1,151
867	P-649	62	J-639	T-Goodlander	12.0	Ductile Iron	673.63	1.91	0.001	169
868	P-650	539	J-639	J-640	12.0	Ductile Iron	-379.37	1.08	0.000	503
869	P-651	422	J-640	J-641	12.0	Ductile Iron	-379.37	1.08	0.000	439

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
870	P-652	755	J-641	J-642	8.0	Ductile Iron	12.10	0.08	0.000	752
871	P-654	518	J-643	J-461	8.0	Ductile Iron	123.00	0.79	0.000	517
872	P-655	185	J-455	PRV-5	8.0	Ductile Iron	0.00	0.00	0.000	50
873	P-656	169	J-643	J-644	12.0	Ductile Iron	-681.27	1.93	0.001	141
874	P-657	160	J-644	PRV-5	8.0	Ductile Iron	0.00	0.00	0.000	50
875	P-658	1,529	J-644	J-645	12.0	Ductile Iron	-946.37	2.68	0.003	1,545
876	P-659	276	J-645	J-646	12.0	Ductile Iron	-800.64	2.27	0.002	298
879	P-664	194	J-648	J-649	8.0	Ductile Iron	23.50	0.15	0.000	182
880	P-665	425	J-649	J-650	8.0	Ductile Iron	18.00	0.11	0.000	431
881	P-666	425	J-650	J-651	8.0	Ductile Iron	9.20	0.06	0.000	469
882	P-667	397	J-649	PRV-FUT	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	404
883	P-668	217	PRV-FUT	J-642	4.0	Ductile Iron	(N/A)	(N/A)	(N/A)	251
885	P-670	284	J-652	J-653	8.0	Ductile Iron	13.70	0.09	0.000	273
886	P-671	734	J-652	J-654	8.0	Ductile Iron	165.00	1.05	0.001	728
887	P-672	362	J-654	J-655	8.0	Ductile Iron	16.50	0.11	0.000	337
888	P-673	454	J-654	J-656	8.0	Ductile Iron	139.70	0.89	0.001	457
889	P-674	44	J-635	PRV-11	8.0	Ductile Iron	0.00	0.00	0.000	20
890	P-675	146	PRV-15	J-608	6.0	Ductile Iron	0.00	0.00	0.000	148
891	P-676	50	J-634	PRV-12	8.0	Ductile Iron	0.00	0.00	0.000	108
905	P-679	76	J-623	PRV-10	10.0	Ductile Iron	533.77	2.18	0.002	93
907	P-680	193	J-455	PRV-6	8.0	Ductile Iron	-265.10	1.69	0.002	50
908	P-681	168	PRV-6	J-644	8.0	Ductile Iron	-265.10	1.69	0.002	50
909	P-682	77	J-646	PRV-8	6.0	Ductile Iron	46.20	0.52	0.000	104
910	P-683	71	PRV-8	J-486	6.0	Ductile Iron	46.20	0.52	0.000	93
913	P-684	210	J-605	J-658	6.0	Ductile Iron	-133.05	1.51	0.002	292
914	P-685	229	J-658	J-401	6.0	Ductile Iron	0.00	0.00	0.000	190
915	P-686	374	J-658	J-659	10.0	Ductile Iron	410.99	1.68	0.001	331
916	P-687	324	J-659	J-607	10.0	Ductile Iron	405.49	1.66	0.001	367
771	P-688	528	J-420	J-421	8.0	Ductile Iron	0.00	0.00	0.000	503
969	P-705	216	J-75	J-47	8.0	Ductile Iron	297.47	1.90	0.002	249
971	P-707	223	J-607	J-606	8.0	Ductile Iron	-53.45	0.34	0.000	245
972	P-708	252	J-606	J-604	8.0	Ductile Iron	-25.15	0.16	0.000	221
973	P-709	247	J-604	J-601	8.0	Ductile Iron	-17.75	0.11	0.000	291
974	P-720	160	J-252	J-720	10.0	Ductile Iron	40.66	0.17	0.000	349
975	P-721	527	J-720	J-721	10.0	Ductile Iron	12.26	0.05	0.000	427
976	P-722	595	J-721	J-722	10.0	Ductile Iron	12.25	0.05	0.000	362
977	P-723	293	J-722	J-56	10.0	Ductile Iron	12.25	0.05	0.000	228
1005	P-816	199	J-515	J-810	8.0	Ductile Iron	-0.56	0.00	0.000	214
1006	P-817	199	J-412	J-811	6.0	Ductile Iron	-15.35	0.17	0.000	224
1007	P-818	229	J-811	J-413	6.0	Ductile Iron	-32.41	0.37	0.000	217
1008	P-819	236	J-810	J-811	6.0	Ductile Iron	-17.06	0.19	0.000	240
1009	P-820	374	J-810	J-812	8.0	Ductile Iron	12.10	0.08	0.000	378
1643	P-821	1,244	J-376	J-350	12.0	Ductile Iron	412.85	1.17	0.001	0
1640	P-822	281	J-375	J-349	12.0	Ductile Iron	-30.17	0.09	0.000	0
1627	P-823	241	J-349	J-351	12.0	Ductile Iron	-30.17	0.09	0.000	0
1628	P-824	1,055	J-350	J-290	12.0	Ductile Iron	269.85	0.77	0.000	0
1572	P-825	166	J-351	J-353	12.0	Ductile Iron	102.30	0.29	0.000	0
1575	P-826	351	J-353	J-354	12.0	Ductile Iron	94.60	0.27	0.000	0
1670	P-827	675	J-354	J-383	12.0	Ductile Iron	47.30	0.13	0.000	0
1671	P-828	325	J-383	J-352	12.0	Ductile Iron	41.80	0.12	0.000	0
1649	P-829	185	J-342	PRV-19	6.0	Ductile Iron	0.00	0.00	0.000	0
1650	P-830	155	PRV-19	J-340	6.0	Ductile Iron	0.00	0.00	0.000	0

FlexTable: Pipe Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Length (User Defined) (ft)
1595	P-831	324	J-355	J-610	10.0	Ductile Iron	347.24	1.42	0.001	1,195
1675	P-832	241	J-652	J-385	8.0	Ductile Iron	-29.55	0.19	0.000	0
1678	P-833	422	J-385	J-386	8.0	Ductile Iron	-29.55	0.19	0.000	0
1681	P-834	403	J-386	J-387	8.0	Ductile Iron	-29.55	0.19	0.000	0
1682	P-835	369	J-387	J-218	8.0	Ductile Iron	-29.55	0.19	0.000	0
1708	P-836	203	J-398	J-292	12.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1715	P-837	97	J-399	PRV-27	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0
1712	P-838	81	PRV-27	J-396	6.0	Ductile Iron	(N/A)	(N/A)	(N/A)	0

FlexTable: PRV Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
497	PRV-1	1,210.0	12.0	1,307.0	42.0	0.00	1,419.8	1,310.5	0.00
501	PRV-2	1,198.0	4.0	1,295.0	42.0	0.00	1,393.8	1,302.6	0.00
500	PRV-3	1,190.0	6.0	1,275.5	37.0	0.00	1,393.8	1,302.8	0.00
499	PRV-4	1,138.0	4.0	1,295.0	68.0	0.00	1,413.7	1,304.5	0.00
506	PRV-5	1,300.0	8.0	1,408.6	47.0	0.00	1,491.3	1,419.9	0.00
512	PRV-6	1,300.0	3.0	1,420.1	52.0	265.10	1,491.0	1,420.2	70.79
508	PRV-7	1,230.0	6.0	1,391.7	70.0	0.00	1,495.9	1,403.4	0.00
513	PRV-8	1,230.0	2.0	1,403.3	75.0	46.20	1,495.9	1,403.4	92.48
505	PRV-9	1,290.0	10.0	1,380.1	39.0	0.00	1,488.5	1,396.2	0.00
511	PRV-10	1,290.0	3.0	1,396.3	46.0	533.77	1,488.3	1,396.4	91.95
504	PRV-11	1,229.0	6.0	1,379.2	65.0	0.00	1,493.0	1,393.9	0.00
503	PRV-12	1,255.0	3.0	1,389.0	58.0	0.00	1,490.9	1,394.8	0.00
502	PRV-13	1,297.0	6.0	1,382.5	37.0	0.00	1,487.8	1,394.1	0.00
510	PRV-14	1,297.0	2.0	1,394.0	42.0	60.93	1,487.8	1,394.1	93.67
498	PRV-15	1,250.0	6.0	1,402.5	66.0	0.00	1,490.4	1,413.9	0.00
509	PRV-16	1,250.0	2.0	1,414.0	71.0	95.20	1,490.4	1,414.2	76.26
1119	PRV-17	1,390.0	6.0	1,482.4	40.0	0.00	1,562.1	1,488.3	0.00
1528	PRV-18	1,389.0	6.0	1,492.4	40.0	0.00	1,563.2	1,490.6	0.00
1648	PRV-19	1,389.0	2.0	1,481.4	40.0	0.00	1,563.2	1,490.6	0.00
1079	PRV-20	1,471.0	8.0	1,551.9	35.0	0.00	1,756.0	1,563.4	0.00
1113	PRV-21	1,471.0	2.0	1,563.4	40.0	268.90	1,755.9	1,563.5	192.39
1304	PRV-22	1,450.0	6.0	1,551.7	44.0	0.00	1,661.5	1,563.3	0.00
1307	PRV-23	1,450.0	2.0	1,563.2	49.0	153.30	1,661.5	1,563.3	98.17
1710	PRV-27	1,295.0	6.0	1,387.4	40.0	(N/A)	(N/A)	(N/A)	(N/A)
1716	PRV-28	1,295.0	2.0	1,387.4	40.0	(N/A)	(N/A)	(N/A)	(N/A)
507	PRV-FUT	1,350.0	6.0	1,470.1	0.0	(N/A)	(N/A)	(N/A)	(N/A)

FlexTable: Pump Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Elevation (ft)	Pump Definition	Pump Status	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
495	PMP-1	1,275.0	PMP-1	On	1,300.7	1,497.1	992.57	196.37
496	PMP-2	1,280.0	PMP-2	On	1,304.4	1,492.1	544.04	187.74
494	PMP-8	1,471.0	PMP-8	On	1,487.6	1,756.4	572.79	268.76
1256	PMP-9	1,471.0	PMP-8	On	1,487.5	1,756.8	571.67	269.28
1273	PMP-10	1,450.0	PMP-10	On	1,489.1	1,661.6	679.46	172.50
1315	PMP-11	1,165.0	PMP-11	On	1,302.7	1,524.3	1,006.12	221.68
1386	PMP-12	1,165.0	PMP-11	On	1,302.6	1,524.3	1,006.19	221.66
1651	PMP-16	1,600.0	PMP-Valhalla Fire	On	1,660.3	1,859.2	143.00	198.98

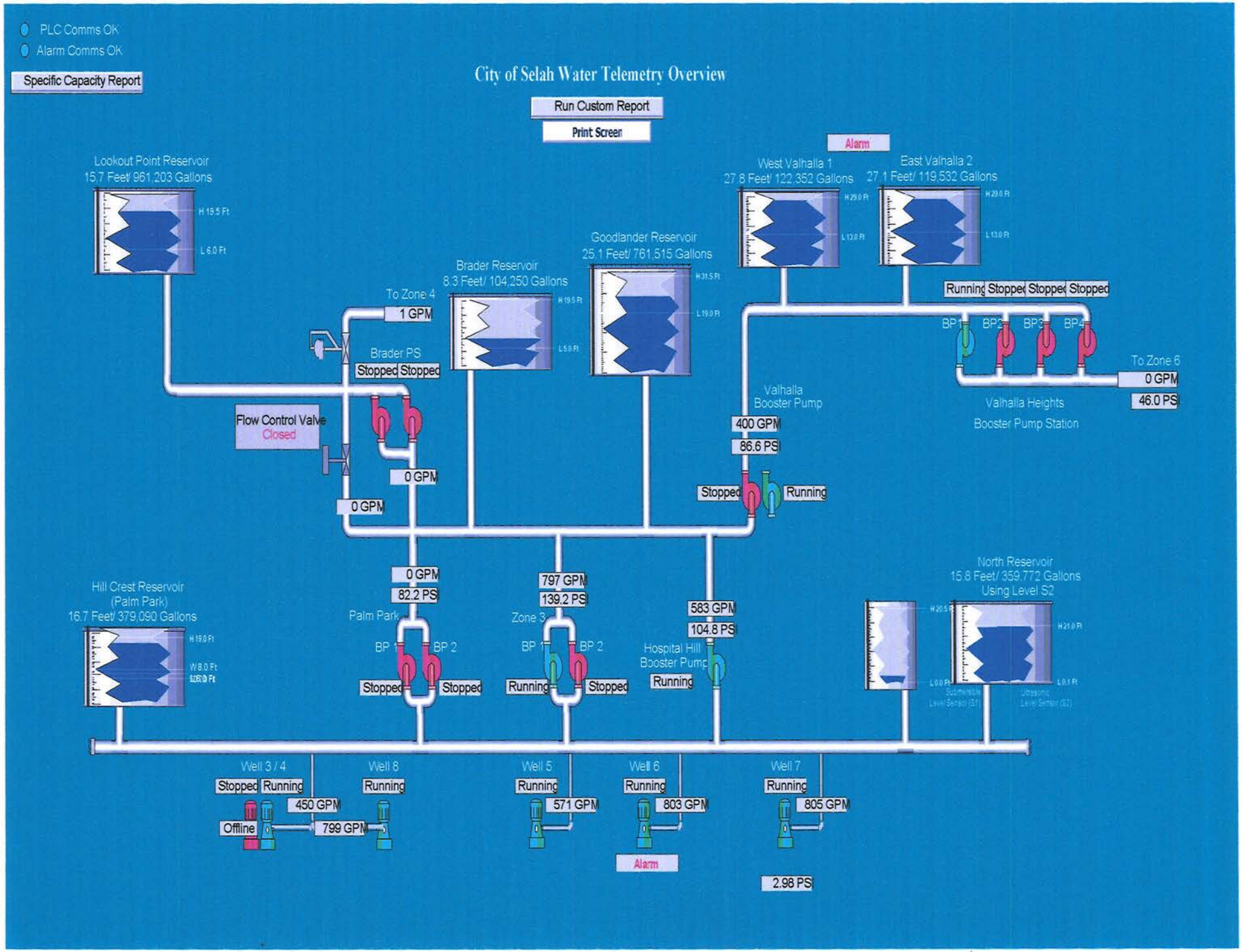
FlexTable: Tank Table

Active Scenario: Year 2041 Pk Hr

ID	Label	Zone	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Initial) (ft)	Elevation (Maximum) (ft)	Volume (Inactive) (gal)	Diameter (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
491	T-Brader	Zone-4A	1,471.1	1,471.1	1,488.1	1,489.1	0.00	41.50	639.34	1,488.1
492	T-Goodlander	Zone-4A	1,459.8	1,459.8	1,489.8	1,491.8	0.00	73.00	-673.63	1,489.8
1206	T-Lookout	Zone-7	1,729.5	1,729.5	1,742.0	1,749.5	0.00	102.00	-754.56	1,742.0
490	T-North	Zone-2A	1,283.9	1,283.9	1,303.4	1,305.4	0.00	56.00	995.67	1,303.4
489	T-North off	Zone-2A	1,283.9	1,283.9	1,305.1	1,305.4	0.00	36.00	(N/A)	(N/A)
488	T-Palm	Zone-2A	1,287.7	1,287.7	1,304.7	1,305.7	0.00	66.00	953.96	1,304.7
1272	T-Valhalla 1	Zone-6A	1,635.0	1,635.0	1,660.0	1,666.0	0.00	30.00	-158.86	1,660.0
1313	T-Valhalla 2	Zone-6A	1,635.0	1,635.0	1,660.0	1,666.0	0.00	30.00	-110.99	1,660.0

32.
TELEMETRY CONTROL SYSTEM SCREEN PRINTOUT

HLA
Engineering and Land Surveying, Inc.


PLC Comms Ok
Alarm Comms Ok
Specific Capacity Report
City of Selah Water Telemetry Overview
Run Custom Report
Print Screen
Alarm
Lookout Point Reservoir
15.7 Feet/ 961,203 Gallons
H 19.5 Ft
L 6.0 Ft
West Valhalla 1
27.8 Feet/ 122,352 Gallons
East Valhalla 2
27.1 Feet/ 119,532 Gallons
Goodlander Reservoir
25.1 Feet/ 761,515 Gallons
Brader Reservoir
8.3 Feet/ 104,250 Gallons
To Zone 4
1 GPM
Brader PS
Stopped Stopped
Running Stopped Stopped Stopped
BP1 BP2 BP3 BP4
To Zone 6
0 GPM
46.0 PS
Valhalla Heights
Booster Pump Station
Flow Control Valve
Closed
Valhalla
Booster Pump
400 GPM
86.6 PS
Stopped Running
0 GPM
0 GPM
Hill Crest Reservoir
(Palm Park)
16.7 Feet/ 379,090 Gallons
0 GPM
82.2 PS
Palm Park
BP 1 BP 2
Stopped Stopped
797 GPM
139.2 PS
Zone 3
BP 1 BP 2
Running Stopped
583 GPM
104.8 PS
Hospital Hill
Booster Pump
Running
North Reservoir
15.8 Feet/ 359,772 Gallons
Using Level S2
Well 3 / 4
Stopped Running
450 GPM
Offline
799 GPM
Well 8
Running
Well 5
Running
571 GPM
Well 6
Running
803 GPM
Alarm
Well 7
Running
805 GPM
2.98 PS

33.
CITY OF SELAH DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS FOR PUBLIC WORKS IMPROVEMENTS

HLA
Engineering and Land Surveying, Inc.

ORDINANCE NO. 2083

AN ORDINANCE CREATING A NEW MUNICIPAL CODE TITLE 13 ENTITLED, "PUBLIC WORKS IMPROVEMENTS"; ADOPTING A NEW MUNICIPAL CODE CHAPTER 13.01 ENTITLED, "CITY OF SELAH DESIGN, CONSTRUCTION STANDARDS, AND SPECIFICATIONS FOR PUBLIC WORKS IMPROVEMENTS"; ADOPTING A UNIFORM DESIGN, CONSTRUCTION STANDARDS, AND SPECIFICATIONS MANUAL FOR PUBLIC WORKS IMPROVEMENTS; PROVIDING FOR SEVERABILITY; AND, ESTABLISHING AN EFFECTIVE DATE

WHEREAS, RCW Chapters 36.70A, and 35.78 authorize municipalities within the State of Washington to; (1) adopt comprehensive plans; (2) development regulations; and (3) public works design and construction standards to provide for the orderly design, construction, and extension of public utilities and development; and,

WHEREAS, the City of Selah Public Works Department has identified that the City of Selah has not updated many of its design, and construction specifications for water, sewer, storm water, and public streets, since the 1970's. Therefore the department is recommending adoption of the City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements, attached as Exhibit "A" to ensure that all new development and public works projects protects the public's health, safety and welfare; and,

WHEREAS, the City Council of the City of Selah has examined and understands the scope and purpose of the codes and regulations adopted under this ordinance, and the amendments and additions thereto, and deems it to be in the public interest and for the general health, safety and welfare of the citizens of the City that such codes and amendments and additions thereto be adopted as the law of the City of Selah: and,

WHEREAS, pursuant to RCW 35A.12.140, a public hearing was held regarding the adoption of this ordinance and that one (1) copy of each code and regulation adopted hereunder together with a copy of this ordinance specifying amendments and additions thereto were filed in the Office of the Clerk-Treasurer ten (10) days prior to the public hearing; and all persons desiring to speak for and against the adoption of this ordinance and the amendments and supplements thereto have been heard as required by law;

NOW THEREFORE THE CITY COUNCIL OF THE CITY OF SELAH, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. New Selah Municipal Code Title 13, Public Works Improvements.

The City of Selah hereby creates and adopts a new Title 13 to its Municipal Code entitled, "Public Works Improvements".

Section 2. New Selah Municipal Code Chapter 13.01 entitled, "City of Selah Design, Construction Standard and Specifications for Public Works Improvements" created.

The City of Selah hereby creates and adopts a new Chapter 13.01 to its Municipal Code entitled, "City of Selah Design, Construction Standards and Specifications for Public Works Improvements".

Section 3. New Selah Municipal Code Section 13.01.010, City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements adopted.

Section 13.01.010 entitled "City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements" is adopted as follows:

> 13.01.010 City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements.
>
> The City adopts and incorporates as if fully set forth herein the City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements, as it now exists or is hereafter amended, as set forth in Exhibit "A", as its standards and specifications for use with public works projects.

Section 4. New Selah Municipal Code Section 13.01.020, Copy of City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements to be Maintained at Public Works adopted.

Section 13.01.020 entitled "Copy of City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements Maintained at Public Works" is adopted as follows:

> 13.01.020 Copy of City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements Maintained at Public Works.
>
> The City of Selah shall maintain a copy of the City of Selah Design, Construction Standards, and Specifications Manual for Public Works Improvements as it exists now or is hereafter amended at its Public Works department and shall make it available for public inspection during regular business hours.

Section 4. Severability. If any section, sentence, clause or phrase of this Ordinance is held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity of constitutionality of any other section, clause or phrase of this Ordinance.

Section 5. Effective Date. This ordinance shall be published in the official newspaper of the City and shall take effect and be in full force five (5) days after the date of publication.

ORDAINED this 9th day of July, 2019.

Sherry Raymond, Mayor

ATTEST:

Dale E. Novobielski, Clerk Treasurer

APPROVED AS TO FORM:

Robert F. Noe, City Attorney

ORDINANCE NO. 2083

CITY OF SELAH

DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS FOR PUBLIC WORKS IMPROVEMENTS

City of Selah
222 Rushmore Road
Selah, WA 98942

(509) 698-7365
FAX (509) 698-7372

JULY 2019

CITY OF SELAH

DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS FOR PUBLIC WORKS IMPROVEMENTS

City of Selah
222 Rushmore Road
Selah, WA 98942

(509) 698-7365
FAX (509) 698-7372

JULY 2019

INDEX

CHAPTER 1 - GENERAL 1
1. ENACTING AUTHORITY 1
2. PURPOSE 1
3. STATE ENVIRONMENT POLICY ACT (SEPA) 1
4. CONFLICTING PROVISIONS 1
5. SEVERANCE 1
6. PROCESS 1
7. ENGINEERING DESIGN PLAN REQUIREMENTS 3
8. PLAN REVIEW AND INSPECTION FEE 3
9. RECORD DRAWINGS 4
10. TRANSFER OF OWNERSHIP 4
11. EASEMENTS 4
12. UTILITIES 5

CHAPTER 2 - GENERAL PLAN REQUIREMENTS 6
GENERAL PLAN FORMAT 6
WATER SYSTEM PLAN REQUIREMENTS 7
SANITARY SEWER SYSTEM PLAN REQUIREMENTS 7
STORMWATER SYSTEM PLAN REQUIREMENTS 8
STREET PLAN REQUIREMENTS 9

CHAPTER 3 - GENERAL REQUIREMENTS FOR ALL PROJECTS 11
FORWARD 11
GENERAL 11
1-01 DEFINITIONS AND TERMS 12
1-04 SCOPE OF THE WORK 13
1-05 CONTROL OF WORK 14
1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC 17
1-08 PROSECUTION AND PROGRESS 20
1-10 TEMPORARY TRAFFIC CONTROL 20

CHAPTER 4 - WATER SYSTEM IMPROVEMENTS 22
GENERAL REQUIREMENTS FOR WATER SYSTEM IMPROVEMENTS 22
SPECIAL PROVISIONS FOR WATER SYSTEM IMPROVEMENTS 23
7-09 WATER MAINS 23
7-12 VALVES FOR WATER MAINS 25
7-14 HYDRANTS 26
7-15 SERVICE CONNECTIONS 27

CHAPTER 5 - SANITARY SEWER SYSTEM IMPROVEMENTS 29
GENERAL REQUIREMENTS FOR SANITARY SEWER SYSTEM IMPROVEMENTS 29
SPECIAL PROVISIONS FOR SANITARY SEWER SYSTEM IMPROVEMENTS 30
7-05 MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS 30
7-08 GENERAL PIPE INSTALLATION REQUIREMENTS 32
7-17 SANITARY SEWERS 32
7-18 SIDE SEWERS 33

CHAPTER 6 - STORMWATER IMPROVEMENTS 34
GENERAL REQUIREMENTS FOR STORMWATER IMPROVEMENTS 34
SPECIAL PROVISIONS FOR STORM SEWERS AND DRAINAGE 40
7-02 CULVERTS 40

7-04 STORM SEWERS 40
7-05 MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS 41
7-08 GENERAL PIPE INSTALLATION REQUIREMENTS 43

CHAPTER 7 - STREET IMPROVEMENTS 44
GENERAL REQUIREMENTS FOR STREETS 44
TRAFFIC STUDIES 44
STREET REQUIREMENTS 44
SPECIAL PROVISIONS FOR STREETS 45
2-03 ROADWAY EXCAVATION AND EMBANKMENT 45
2-07 WATERING 45
5-04 HOT MIX ASPHALT 46
8-04 CURBS, GUTTERS, AND SPILLWAYS 49
8-06 CEMENT CONCRETE DRIVEWAY ENTRANCES 50
8-14 CEMENT CONCRETE SIDEWALKS 50
8-20 ILLUMINATION 50
8-21 PERMANENT SIGNING 53
8-30 CONTROLLED DENSITY FILL 53

APPENDIX A - TRANSFER OF OWNERSHIP FORMS
APPENDIX B - STANDARD DETAILS

CHAPTER 1 – GENERAL

1. ENACTING AUTHORITY

These Design and Construction Standards are enacted by the City of Selah, in accordance with state law, to protect and preserve the public health, safety, and general welfare.

2. PURPOSE

The purpose of these Design Construction Standards is to provide consistent requirements, standards, and specifications for the design and construction of public works infrastructure improvements by the City and by private developers.

3. STATE ENVIRONMENT POLICY ACT (SEPA)

These Design and Construction Standards will not affect any considerations involving issues under the State Environmental Policy Act (SEPA). The City's responsible official will continue to make all necessary SEPA decisions when individual proposals are submitted.

4. CONFLICTING PROVISIONS

The standards, procedures, and requirements of these Design and Construction Standards are the minimum necessary to promote the health, safety, and welfare of the residents of the City of Selah. The City may adopt more rigorous or different standards, procedures, and requirements whenever necessary. If the provisions of these Design and Construction Standards conflict with one another, or if a provision of these Design and Construction conflicts with the provision of the City Code or another Ordinance of the City, the most restrictive provision or the provision imposing the highest standard shall prevail.

5. SEVERANCE

If any provision of these Design and Construction Standards or its application to any person or circumstance is for any reason held to be invalid, the remainder of these Design and Construction Standards or the application of the provisions is not affected.

6. PROCESS

Design Phase

Any person, firm, or corporation (the "Developer") which intends to construct a public works improvement shall apply to the City Public Works Director. The request by the Developer shall include a map showing the area to be served; the number and type of proposed units, or the type and size of the proposed facility and a general layout of the development.

Upon receipt of the design requirements from the Public Works Director, the Developer shall employ a Consulting Engineer to prepare plans and specifications for the public works improvements in accordance with these Design and Construction Standards and the Selah Municipal Code. The Developer or its Consulting Engineer shall submit three (3) paper sets of plans and specifications for review by the City and/or the City's engineer.

The City shall review the initial submittal and indicate corrections or additions or request additional information and return one "red-lined" set to the Developer. The Developer shall make the required corrections and resubmit two (2) paper sets of revised plans and specifications to the City Public Works Department.

When it has been determined the plans and specifications indicate compliance with City of Selah Design and Construction Standards, the Developer shall submit the original plan tracings and specifications for final approval to the City. The cover sheet of the original plans shall contain an "APPROVED FOR CONSTRUCTION BY THE CITY OF SELAH" signature block. The City's responsible official will sign the plans. Such approved plans and specifications shall not be changed, modified, or altered without written authorization from the City Public Works Director. The Developer shall provide the City with a minimum of three (3) copies of the approved plan set and specifications for use by City Inspectors and City Departments as required.

Upon receipt by the Public Works Director of the plan review fee, as discussed in Chapter 1, Section 8, the approved original plans and specifications will be returned to the Developer.

Construction Phase

Before the Developer's Contractor commences any work, he shall be required to attend a Preconstruction Conference with the City Public Works Department, the City's Engineer, and utility companies as determined by the City of Selah. The Contractor will submit his insurance and construction schedule at this meeting. Additionally at the preconstruction meeting, the City will provide the developer with a list of all required inspections and/or tests that shall be conducted by a private consulting engineer, or certified testing firm.

All construction shall be inspected by the City of Selah or its authorized agent. The Contractor shall give ten (10) days minimum prior notice to the Public Works Director the start of any construction activities.

After cleanup by the Contractor and final inspection by the City, the City will calculate the inspection fees and submit them to the Developer. The Developer will pay the inspection fee, as discussed in Section 8, to the Public Works Department.

Inspection Phase

The Developer and his contractor(s) shall coordinate and direct all communications through the City Public Works Department. Under no circumstances shall the Developer or his contractor(s) contact the City's Engineers directly.

Prior to the start of construction within City right-of-way, or an approved project on private property, the Developer shall notify the City Public Works Department in writing at least 10 days in advance of starting work.

The Developer shall give the City timely notice (24 hours) that the work or any part thereof, is ready for inspection, and shall schedule the required inspection for the City's next available inspection time. In no event shall the work or any part thereof, be covered up until the City has completed its inspection and approved the same.

If any work should be covered up without prior inspection and approval by the City, it must, if required by the City, be uncovered for examination at the Developer's expense. The City and its representatives shall at all times have access to the work wherever it is in preparation or progress and the Developer shall provide proper facilities for such access and for such inspection. The Developer is reminded that 7 days advance written notice to the City Public Works Department is required prior to request for cut-ins and the final inspection.

The Developer shall make such reasonable tests of the work, at the Developer's expense, as the City shall request. If the specifications, the City's instruction, laws, ordinances, or any public authority shall require and work to be specially tested or approved, the Developer shall give the City timely notice of its readiness for inspection and, if the inspection is by other authority than the City, the date fixed for such inspection. All inspection by the City will be made with all reasonable promptness but, in not event, shall the lack of prompt inspections be construed to allow the Developer to cover up the work or any portion of it without inspection.

Re-examination of questioned work may be ordered by the City, and, if so ordered, the work must be uncovered by the Developer.

Final Inspection/Acceptance

Before final acceptance of the project by the City, the following conditions shall be met:

a) All materials, completed work, and outside engineer-performed tests, shall be subject to final inspection by the City, with the Developer and his contractor(s) in attendance.
b) All final record drawings shall be submitted to the City by the Developer.
c) All applicable fees, connection charges, and other City costs as required shall be paid in full by the Developer.
d) All testing shall be conducted as determined by the City. The City shall have the right to subject all piping, machinery and equipment and work to such tests as will, in the City's opinion, assist in determining whether the work has been faithfully performed. The City shall have the right to inspect all material and equipment storage sites.

7. ENGINEERING DESIGN PLAN REQUIREMENTS

All improvement plans, specifications, engineering calculations, diagrams, details, and other relevant data shall be designed and prepared by a Civil Engineer licensed by the State of Washington (Consultant), in accordance with Chapter 2 - General Plan Requirements.

8. PLAN REVIEW AND INSPECTION FEE

Plan review and inspection fees are hereby established to defray the administrative expense of plan review and inspection costs incurred by the City of Selah.

The plan review and inspection fee shall be the total actual costs incurred by the City of Selah, its agents, employees, and elected or appointed officials, for review and approval of the plans and specifications and for inspection of construction of the public works improvements. The fee shall include, but not be limited to, initial plan review, subsequent

meetings with the Developer, explanations to the Developer's engineering consultant, reviews of revised plans, construction inspection, re-inspections, and a final inspection prior to the expiration of the maintenance period.

The plan review fee shall be tabulated and sent to the Developer and paid by the Developer in full prior to the City releasing the approved original plans and specifications for construction or the issuance of a Building Permit.

The construction inspection fees shall be calculated at one hundred percent of the direct salary cost, plus thirty-five percent of such cost for overhead and fringe benefits, and any outside consultants retained by the city to evaluate any phase of construction shall be invoiced at actual cost plus fifteen percent. All fees shall be tabulated, sent to the Developer, and paid by the Developer in full prior to the City issuing a Certificate of Occupancy or final acceptance of the public works improvements.

9. RECORD DRAWINGS

The Developer's Consulting Engineer shall prepare and maintain a neatly marked, full-sized print set of record drawings showing the final location and layout of all new construction of the public facilities. Prior to final acceptance by the City of Selah, one (1) set of reproducible Record Drawings and two (2) sets of prints prepared by the Developer's engineer and clearly marked "Record Drawings" shall be delivered to the Public Works Director for review and acceptance.

10. TRANSFER OF OWNERSHIP

The Developer shall complete a Transfer of Ownership Form upon completion of the construction of the public works improvements and pending acceptance by the City. This form may be found in Appendix A.

11. EASEMENTS

Public utility easements shall be established for the location of new and future public improvements serving new land divisions and land developments. Easements shall also be granted across the front of new lots and existing lots to provide future utility access as required.

All easements required shall be prepared by the Developer on the proper form and format for recording at the Yakima County Auditor's Office. The easement legal description shall be prepared by a land surveyor licensed in the State of Washington. The executed and notarized easement document shall be submitted to the Public Works Director for recording.

Eight (8) foot wide utility easements shall be dedicated along the front of each lot in subdivisions and short subdivisions. Easements for new and/or future utility lines shall be a minimum of sixteen (16) feet wide, provided the width of the easements for buried utilities will be at least twice the depth of the planned excavation.

Utility easements shall be continuous and aligned from block to block within a subdivision and with easements in adjoining subdivisions to facilitate the extension and future extension of public utilities.

12. UTILITIES

All utilities shall be placed underground and installed at a depth of not less than three (3) feet.

CHAPTER 2 - GENERAL PLAN REQUIREMENTS

All improvement plans, details, specifications, engineering calculations, diagrams, and other relevant data shall be designed and prepared by a Civil Engineer licensed by the State of Washington.

GENERAL PLAN FORMAT

1. Plan sheets and profile sheets or combined plan and profile sheets and detail sheets shall be on a sheet size of 24" x 36" or 22" x 34".

2. The Cover sheet shall contain the following:
   a. Name, address, and phone number of the owner/developer;
   b. Name, address, and phone number and stamp of the Civil Engineer preparing the plans (Consultant);
   c. "APPROVED FOR CONSTRUCTION BY THE CITY OF SELAH" with signature block for City final approval of the plans;
   d. "APPROVED FOR CONSTRUCTION BY FIRE DISTRICT #____" with signature block for final approval of the plans;
   e. "APPROVED FOR CONSTRUCTION BY _____ IRRIGATION DISTRICT'S" with signature block for final approval of the plans;
   f. Vicinity map showing the project site location;
   g. An overall site plan with contours;
   h. Table of Contents;
   i. Applicable project information; and
   j. The utility locate call # 1-800-424-5555.

3. Each sheet shall contain the following project information:
   a. Project title and City project number, work order number, or LID number, if appropriate;
   b. Quarter section, Section - Township – Range;
   c. Sheet title;
   d. Page (of page) numbering;
   e. Revision block;
   f. Subdivision or short plat name.

4. All plan sheets must have a NORTH arrow preferably pointing to the top of the sheet or to the left, and must indicate the drawing scale. All engineering plans must be drawn to an appropriate engineer's scale. For profiles, the vertical scale shall be 1"=2', 1"=5' or 1"=10'. The horizontal scale shall be the same for both plan and profile and shall normally be 1" = 20'. Plan and profile stationing shall generally read left to right.

5. The Vertical Datum for all plan submittals must be based on the City of Selah datum. The benchmark used shall be referenced on the plans. An assumed datum will not be accepted.

6. Existing features and topography within the project construction limits must be shown on the plans. This shall include existing road width and surfacing, utility poles, existing underground utilities and surface appurtenances, significant trees, landscaping, and other elements that may affect design/construction.

7. Plan sheets shall indicate all adjacent property lines, right-of-way lines, and easements.

8. Plan sheets shall show all horizontal survey control as required to properly locate and tie the improvements in horizontal location.

WATER SYSTEM PLAN REQUIREMENTS

See Chapter 4 for specific design requirements.

1. Show all existing and proposed water system features if known, including but not limited to:
   a. Water mains;
   b. Water valves;
   c. Water meters;
   d. Water service lines;
   e. Fire hydrants;
   f. Blow offs;
   g. Air and vacuum release valve assemblies;
   h. Pressure reducing valves;
   i. Fire sprinkler system lines;
   j. Double check valves;
   k. Post indicator valves;
   l. Thrust blocking.

2. Indicate all easements required for the water main extensions and future extensions.

3. Show the water system and the sanitary sewer system on the same plan and profile view for verification of minimum separation requirements. The design information for each system may be on individual drawings for that system.

4. Show the length, size, and pipe type for all main extensions, fire sprinkler system services, and domestic services where applicable.

5. Identify all joint connections; provide detail of all non-standard joints.

6. Show by station or dimension the location of all fire hydrants, tees, crosses, and services relative to centerline or property lines.

7. A profile view shall be shown for all City water main extensions, aligned if practical with the plan view. Clearly indicate the horizontal and vertical scales.

8. Show the minimum cover and minimum separation on each sheet.

9. In the profile view, show all utilities crossing the proposed water main.

10. When an irrigation system is to be transferred to City ownership, that system design shall meet the plan requirements above.

SANITARY SEWER SYSTEM PLAN REQUIREMENTS

See Chapter 5 for specific design requirements.

1. Show all existing and proposed sanitary sewer system features including, but not limited to, the following:
   a. Sewer lines, gravity and force mains;

b. Side service, proposed locations;
c. Manholes;
d. Clean outs;
e. Pump stations.

2. Indicate all easements required for the sanitary sewer line extensions and laterals.

3. Provide an overall site plan of development with contours, to show that all lots/parcels will be served by the proposed sewer system at design depth for all new development.

4. Show the sanitary sewer system and water system on the same plan and profile for verification of minimum separation requirements. The design information for each may be on individual drawings for that system.

5. Slope, length, size, and pipe type shall be indicated for all lines and side sewers. Pipe length shall be measured from centerline of manholes. The minimum sewer line size allowed will be eight (8) inches in diameter.

6. Provide a profile for each sanitary sewer line extension. Clearly indicate the vertical and horizontal scale. Show the profile on the same sheet with, and aligned underneath, the plan view as practical.

7. The plan and profile must show the location of all existing and proposed gas, water, irrigation, storm drain, and other utility lines and crossings.

8. Generally show all vertical data in the profile view and all horizontal data in the plan view. It is not desirable to repeat the vertical data in the plan view unless it does not show in a profile.

9. Each manhole shall be uniquely numbered and shall be stationed off of a referenced centerline. Indicate rim and invert elevations in and out at all manholes. Indicate the length of each side sewer stub, the centerline stationing for each side sewer, and the size.

STORMWATER SYSTEM PLAN REQUIREMENTS

See Chapter 6 for specific design requirements.

1. Show all existing features if known and all proposed storm sewer (drain) system features, including but not limited to:
   a. Storm drain mains and lines;
   b. Catch basins;
   c. Inlets;
   d. Infiltration trenches;
   e. Retention systems;
   f. Biofiltration swales;
   g. Culverts;
   h. Streams;
   I. Ditches;
   j. Natural drainage swales;
   k. Headwalls;
   l. Oil/water separator assembly;
   m. Other requirements of the Department of Ecology Stormwater Management Manual for Eastern Washington.

2. Indicate all grate, rim, and invert elevations in the profile view.

3. Provide stormwater runoff and drainage facilities sizing calculations as described in Chapter 6.

4. Indicate all easements required for the storm drainage system.

5. The plan shall clearly indicate the location of the storm drainage items stationed from a referenced centerline.

6. Show all horizontal measurements and control in the plan view.

7. Show slope, length, size, and pipe material for all storm drain mains and lines.

8. All catch basins and inlets shall be uniquely numbered and shall be clearly labeled. Stationing and offsets shall be indicated from referenced centerline. Show all proposed storm drain features within the right of way in a profile.

STREET PLAN REQUIREMENTS

See Chapter 7 for specific design requirements.

1. Provide a Plan and Profile of all new public roadways or extensions of existing roadways. Provide topography within the R/W including utilities. Indicate all horizontal and vertical curve data, percent of grade, bearings, centerline stationing every 50 feet, finish grade elevations, and existing ground line. The profile of the existing centerline ground should extend a minimum of 100 feet before the beginning and at the end of the proposed improvements to show the gradient blend.

2. Provide a cross section or typical section of all rights of way indicating right-of-way width, centerline, pavement width, super-elevation or crown, sidewalk, street lights, curb and gutter, pavement, and base thickness of proposed section.

3. Show all existing and proposed roadway improvements, including but not limited to:

    a. Pavement and edge of pavement;
    b. Concrete curb and gutter;
    c. Sidewalk(s);
    d. Utilities (manholes, utility poles, pedestals, valves, water meters, etc.);
    e. Sidewalk ramps;
    f. Signs and Barricades;
    g. Driveways;
    h. Rockery or retaining walls;
    i. Mailboxes;
    j. Monuments;
    k. Streetlights, conduit junction boxes, and service cabinet;
    l. Compliance with ADA requirements.

4. Align the profile view with the plan view, if practical. Clearly indicate the horizontal and the vertical scale.

5. Show all Right-of-Way (R/W) lines, centerlines, and roadway widths for all rights of way.

6. Clearly differentiate between areas of existing pavement, areas of new pavement, and areas to be overlaid.

7. Clearly label all profiles with respective street names and plan sheet reference numbers if drawn on separate sheets.

8. For developments where road work is required on an existing street, development plans are required to include cross section of the existing street and spot elevations at proposed intersections and appurtenances to the project.

CHAPTER 3 - GENERAL REQUIREMENTS FOR ALL PROJECTS

FORWARD

The City of Selah has adopted the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation (WSDOT), and the American Public Works Association (APWA) General Special Provisions (GSP's) for Division One General Requirements as the standard specifications governing all design and construction of public works improvements by the City and by private developers.

All references hereinafter made to the "Standard Specifications" shall refer to the latest edition of the Standard Specifications described above. Except as may be amended, modified, or supplemented hereinafter, each section of the Standard Specifications shall be considered as much a part of these requirements as if they were actually set forth herein.

The Standard Specifications, General and Project Special Provisions, and City Standard Plans and Details contained in these **Design and Construction Standards** shall apply in their entirety to all City of Selah public works projects. These Design and Construction Standards have been prepared to form a compiled document intended to assist and inform developers, consultants, and contractors of the construction requirements to be used on proposed public works improvements.

The Standard Specifications, General and Project Special Provisions, and City Standard Plans and Details shall periodically be amended, revised and updated. It shall be the responsibility of each user of this information to verify that he has the latest revisions prior to submitting any work covered by these specifications and details.

Developers and contractors are encouraged to contact the City of Selah Public Works Department to obtain a copy of these Design and Construction Standards.

GENERAL

All work shall be done in accordance with the approved Plans, the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation, amendments to the Standard Specifications, referenced codes and organizations, and these Special Provisions.

Note: The American Public Works Association (APWA) General Special Provisions (G.S.P.'s) to Division One of the WSDOT Standard Specifications amend Division One of the "Standard Specifications for Road, Bridge, and Municipal Construction." These GSP's are available at www.wsdot.wa.gov/partners/apwa.

All materials incorporated into a proposed public works improvements project shall meet the requirements of Division 9 of the Standard Specifications or City of Selah Design and Construction Standards as shown in the Standard Plans and Details and Special Provisions.

Any Public Works facility improvements or components that are not specifically addressed in these Design and Construction Standards shall be designed by a professional engineer and provided to the City for review by the City Engineer and approval.

1-01 DEFINITIONS AND TERMS

1-01.3 DEFINITIONS

The terms defined in Section 1-01.3 of Division One of the Standard Specifications and the APWA GSP's shall be further described by the following:

Consultant:	Means an engineer licensed in the State of Washington, employed by the Developer to design the improvement and prepare plans and specifications, perform construction staking, or similar services.
Construction Documents:	Means the project plans, specifications, and special provisions prepared by the Developer's Consultant for the public works improvements contemplated and approved by the City.
City:	Means the City of Selah, a municipal corporation, as represented by its authorized officials, employees or agents.
Contractor:	Means the person or firm employed by the Developer or under Contract with the City to do the construction of the public works improvements.
Developer:	Means the person or firm constructing the new development and engaging the services of and employing consultants, and/or contractors and paying for the design and construction of the public works improvements to be transferred to the City.
Drawings:	Means the construction plans prepared by the Developer's Consultant for the public works improvements contemplated. The terms "Construction Documents," "Contract Documents," "Plans," "Engineer's Plans," "Engineer's Drawings," "Working Drawings," and "Project Manual" are synonymous.
Engineer:	Means the appointed City Engineer for the City of Selah or his/her duly authorized agent or representative.
Owner:	Means the City of Selah acting through its legally established officials, boards, commissions, etc., as represented by its authorized officers, employees, or agents.
Public Works Director:	Means the appointed official for the City. Responsible for management of Department of Public Works.
Standard Plans and Details:	Means specific drawings adopted by the City of Selah and revised from time to time which show frequently recurring components of work which have been standardized for use.
Standard Specifications:	The latest edition of Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation, and amendments, and the APWA GSP's for Division One that are, by this reference, made part of the Contract Documents. Except as may be amended, modified, or supplemented hereinafter, each section of the Standard

Specifications shall be considered as much a part of these Construction Documents as if they were actually set forth herein.

Special Provisions: The Special Provisions supplement or modify the Standard Specifications and supersede any conflicting provisions of the Standard Specifications for Road, Bridge, and Municipal Construction and the appended amendments to the Standard Specifications and are made a part of a Construction Document.

Should any conflicts be encountered, the following interrelationships shall govern: The Special Provisions shall supersede the APWA GSP's, which shall supersede the WSDOT Amendments, which shall supersede the Standard Specifications.

1-04 SCOPE OF THE WORK

1-04.4 CHANGES

The provisions of Section 1-04.4 of the Standard Specifications shall be modified as follows:

No changes in the work covered by the approved Construction Documents shall be made without having prior written approval of the Developer and the City.

1-04.11 FINAL CLEANUP

Delete this section and replace it with the following:
The Contractor shall perform final cleanup as provided in this section to the Developer's and City's satisfaction. The date of completion will not be established until this is done. The material sites and all ground the Contractor occupied to do the work shall be left neat and presentable. The Contractor shall:

1. Remove all rubbish, surplus materials, discarded materials, falsework, temporary structures, equipment, and debris, and

2. Deposit in embankments, or remove from the project, all unneeded, oversized rock left from grading, surfacing, or paving.

Partial cleanup shall be done by the Contractor when he feels it is necessary or when, in the opinion of the City or Developer, partial clean-up should be done prior to either major cleanup or final inspection.

1-04.12 WASTE SITE (NEW SECTION)

The following new section shall be added to the Standard Specifications:

Where there is additional waste excavation in excess of that needed for the project and in excess of that needed for compliance with requests of the Developer or City, the Contractor shall secure and operate his own waste site at his own expense. The Contractor shall also be required to secure and operate his own waste site at his own expense for the disposal of all unsuitable material, asphalt, concrete, debris, waste material, and any other objectionable material which is directed to waste.

The Contractor shall comply with the State of Washington's regulations regarding disposal of waste material as outlined in WAC 173-304, Subchapter 461.

1-05 CONTROL OF WORK

1-05.1 AUTHORITY OF THE ENGINEER

This section is supplemented with the following:

Unless otherwise expressly provided in the approved Construction Drawings, Specifications and Addenda, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Consultant and the City's right to reject the means and methods proposed by the Contractor which (1) will constitute or create a hazard to the work, or to persons or property; or (2) will not produce finished work in accordance with the terms of the approved Construction Documents. Approval of the Contractor's means and methods of construction or his failure to exercise his right to reject such means or methods shall not relieve the Contractor of the obligation to accomplish the result intended by the Construction Documents; nor shall the exercise of such right to reject create a cause for action for damages.

1-05.3(1) Project As-Built Drawings (New Section)

The following new section shall be added to the Standard Specifications:

The Contractor shall maintain a neatly marked, full-size set of as-built drawings showing the final location and layout of all new construction. Drawings shall be kept current weekly, with all field instruction, change orders, and construction adjustment.

As-built Drawings shall be subject to the inspection of the Developer and the City at all times. Prior to acceptance of the work, the Contractor shall deliver to the Developer one set of neatly marked as-built drawings showing the information required above. The Developer shall prepared and delivered to the City of Selah the neatly marked Record Drawings in accordance with Section 9 of Chapter 1 - General.

1-05.5 CONSTRUCTION STAKING (NEW SECTION)

The following new section shall be added to the Standard Specifications:

The Consultant retained by the Developer will establish the line and grade of proposed construction by offset stakes. The Consultant will establish the centerline for minor structures and establish bench marks at convenient locations for use by the Contractor. The Contractor shall establish grades from the Consultant's stakes at suitable intervals in accordance with good practice and acceptable to the City. Where new construction adjoins existing construction, the Contractor shall make such adjustments in grade as are necessary.

1-05.6(1) Testing (New Section)

The following new section shall be added to the Standard Specifications:

The Contractor/Developer shall be responsible for scheduling and paying for all material and compaction testing required by these Design and Construction Standards for new public works Improvements. All testing services shall be performed by an independent,

certified testing firm and/or laboratory meeting the approval of the Engineer or the City. The Contractor shall submit information relating to the qualifications of the proposed testing firm to the Engineer or City for review and approval prior to the preconstruction conference. The testing service shall provide copies of all test results to the Engineer or City within 24 hours after completion of any test. Test reports shall become the property of the City. The testing frequencies listed below may be modified to assure compliance with the Specifications.

Trench Backfill

Copies of moisture-density curves for each type of material encountered and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency and at depths sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for each 100 linear feet of mainline pipeline trench and one (1) test for each street crossing. At alternating 100-foot locations along the main trench line, tests shall be taken at 1-foot, 2-foot, and 3-foot depths below finish grade.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required trench backfill densities.

All trenches shall be backfilled and compacted to at least 95 percent of maximum density as determined by ASTM D 698 (Standard Proctor).

Roadway Subgrade (Embankment and Excavation Sections)

Copies of the moisture density curves for each type of material encountered and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of subgrade.

The Engineer or City may request additional tests be performed at the Contractor's expense, if test results do not meet the required subgrade densities. Subgrade compaction shall be as specified for Roadway Embankment in Section 2-03.3(14) Method "C."

Ballast and Crushed Surfacing

Copies of the moisture density curves and gradation for each type of material incorporated into the project and copies of all test results shall be provided to the Engineer or City as construction progresses.

Compaction tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of surface area for each lift of ballast or crushed surfacing.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required subgrade densities.
Compaction of ballast and crushed surfacing shall be as specified in SECTION 4-04.3(5).

Asphalt Paving

Copies of the reference maximum density test for each class of Hot Mix Asphalt pavement and copies of all test results shall be provided to the Engineer or City as construction progresses.

Density tests shall be taken at a frequency sufficient to document that the required density has been achieved. At a minimum, one (1) compaction test shall be taken for every 5,000 square feet of surface area for each lift of asphalt concrete pavement.

The Engineer or City may request additional tests be performed at the Contractor's/Developer's expense, if test results do not meet the required subgrade densities.

Compaction of Hot Mix Asphalt pavement shall be as specified in SECTION 5-04.3(10)B.

Cement Concrete Curb, Gutter, and Sidewalk

A copy of the cement concrete design mix or certification from the concrete supplier that the concrete provided has been prepared to the strength requirement as specified elsewhere in these specifications.

Concrete strength cylinders shall be taken and tested for each truck load of concrete delivered to the job. All testing procedures shall be conducted in accordance with applicable Sections of Division 6-02 of the Standard Specifications.

Copies of all test results shall be provided to the Engineer or City as construction progresses.

1-05.10 GUARANTEES

Delete this section and replace it with the following:

If, within two years (2) after the date of Final Acceptance of the Work, defective and unauthorized materials or work is discovered, the Contractor shall promptly, upon written request, return and in accordance with the instructions either correct such work, or if such work has been rejected, remove it from the Project Site and replace it with non-defective and authorized work, all without cost to the City. If the Contractor does not promptly comply with the written request to correct defective and unauthorized work, or if an emergency exists, the City reserves the right to have defective and unauthorized work corrected or rejected, removed, and replaced pursuant to the provisions of Section 1-05.7 of the APWA Division I GSP's of the Standard Specifications.

The Contractor agrees the above two-year limitation shall not exclude nor diminish any rights under any law to obtain damages and recover costs resulting from defective and unauthorized work discovered after two years.

1-05.16 WATER AND POWER

Water shall be furnished and applied in accordance with the provisions of Sections 1-05.16 of the APWA Division One GSP's and 2-07 of the Standard Specifications modified as follows:

Water Supply: Water for use on the projects may be obtained/purchased from the City of Selah and the Contractor shall arrange for and convey the water from the nearest convenient hydrant or other source at his own expense. The hydrants shall be used in accordance with the City of Selah Water Department regulations.

The City reserves the right to deny the use of fire hydrants where deemed inappropriate by the City.

1-07 LEGAL RELATION AND RESPONSIBILITIES TO THE PUBLIC

1-07.1 LAWS TO BE OBSERVED

Amend the second sentence of the first paragraph to read:

The Contractor/Developer shall indemnify and save harmless the City of Selah (including any agents, officers, employees, and representatives) against any claims that may arise because the Contractor (or any employee of the Contractor or subcontractor or materialman) violated a legal requirement.

1-07.5(3) State Department of Ecology

This Section is supplemented with the following:

9) Comply with the requirements and special general conditions of the "General Permit for Storm Water Discharge Associated with Construction Activities" issued by the Washington State Department of Ecology to the Developer/Contractor for this project.

1-07.5(4) Air Quality

In addition to the requirements of Section 1-07.5(4), the Contractor shall comply with the environmental provisions of local air pollution authorities, Yakima County Clean Air Authority.

A method of dust control during construction shall be submitted to, and approved by, the Yakima County Clean Air Authority. A written copy of their approval shall be submitted to the Public Works Director prior to commencement of construction. The Contractor/Developer shall designate a project coordinator for contact during construction regarding alleged air quality violations and other complaints.

1-07.13 CONTRACTOR'S RESPONSIBILITY FOR WORK

The following shall be added to this section of the Standard Specifications:

The Contractor is responsible for constructing and completing all work included in the approved Construction Documents and any other work directed by the Developer in a professional manner with first-class workmanship.

The Contractor shall keep the City of Selah, the Developer, and the Consultant informed in writing of the address to which official correspondence is to be directed, the address and phone number of the person in charge of his field personnel, and the address and telephone number of the Contractor's representative who will be responsible and available outside of normal working hours for emergency repairs and the maintenance of traffic control and safety devices.

The Developer shall be responsible for the satisfactory operation and condition of all public improvements for a period of two (2) years following final inspection and acceptance in accordance with the Selah Municipal Code.

1-07.17 UTILITIES AND SIMILAR FACILITIES

Section 1-07.17 is supplemented by the following:

It shall be the Contractor's responsibility to investigate and verify the presence and location of all utilities prior to construction.

The Contractor/Developer shall call for field location, not less than two nor more than ten business days before the scheduled date for commencement of excavation which may affect underground utility facilities, unless otherwise agreed upon by the parties involved. A business day is defined as any day other than Saturday, Sunday, or a legal local, state, or federal holiday. **The phone number for the Northwest Utility Notification Center for Selah is 1-800-424-5555**. If no one-number locator service is available, notice shall be provided individually by the Contractor to those owners known to or suspected of having underground facilities within the area of proposed excavation.

The Contractor/Developer is alerted to the existence of Chapter 19.122 RCW, a law relating to underground utilities. Any cost to the Contractor/Developer incurred as a result of this law shall be at the Contractor's/Developer's expense.

No excavation shall begin until all known facilities, in the vicinity of the excavation area, have been located and marked.

1-07.18 PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE

The Contractor shall obtain and maintain in full force and effect during the duration of this Contract public liability and property damage insurance in accordance with Section 1-07.18 of the APWA Division One GSP's and as modified herein.

Prior to start of construction, the Contractor/Developer shall furnish the City of Selah a Certificate of Insurance and the additional insured endorsements as evidence of compliance with these requirements. This certificate shall name **the City of Selah, its employees, agents, elected and appointed officials, engineering consultant, and all subcontractors** as "additional insureds" and shall stipulate that the policies named

thereon cannot be canceled unless at least forty-five (45) days written notice has been given to the City of Selah. The certificate shall not contain the following or similar wording regarding cancellation notification: **"Failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents, or representatives."**

1-07.23 PUBLIC CONVENIENCE AND SAFETY

The provisions of Section 1-07.23 of the Standard Specifications are supplemented as follows:

At entrances to business properties and other private roads, driveways, bridges, or other such means as to provide access shall be provided by the Contractor. The Contractor shall maintain vehicular and pedestrian access to businesses at all times that businesses are open for business.

Upon failure of the Contractor to provide immediately and maintain adequate suitable access, when ordered to do so, the City shall be at liberty, without further notice to the Contractor or the Surety, to provide the same and request payment for providing proper access, and the City assumes no liability connected therewith.

Any traffic restriction must have prior approval of the City of Selah. Appropriate traffic control measures and signing are required during such temporary road closures.

It shall be the responsibility of the Contractor to secure the approval of and notify the Developer, City of Selah, and the Police and Fire Departments at least 24 hours prior to closing any street, in addition to correlating the proposed closures with the City of Selah to ensure proper detouring of traffic. When the street is re-opened, it shall again be the responsibility of the Contractor to notify the above named departments and persons.

1-07.23(3) Notifying Property Owners (New Section)

The following new section shall be added to the Standard Specifications:

When construction activities will affect ingress and egress to a property along the project alignment, the Contractor shall be responsible for notifying the occupant/occupants of the property 24 hours prior to the construction activity beginning. If personal contact with the occupant is not possible, the Contractor shall leave written notification.

1-07.28 SAFETY STANDARDS (NEW SECTION)

The following new section shall be added to the Standard Specifications:

All work shall be performed in accordance with all applicable local, state, and federal health and safety codes, standards, regulations, and/or accepted industry standards. It shall be the responsibility of the Contractor to ensure that his work force and the public are adequately protected against any hazards.

The City of Selah or Developer shall have the authority at all times to issue a stop work order at no penalty if, in their opinion, working conditions present an undue hazard to the public, property, or the work force. Such authority shall not, however, relieve the Contractor of responsibility for the maintenance of safe working conditions or assess any responsibility to the City or Developer for the identification of any or all unsafe conditions.

1-08 PROSECUTION AND PROGRESS

1-08.3 PROGRESS SCHEDULE

The provisions of SECTION 1-08.3 shall be supplemented with the following:

Prior to the commencement of any work, a preconstruction conference shall be held. The Contractor or Developer shall contact the City of Selah and set a date and time for the meeting. It shall be the responsibility of the Contractor/Developer to notify and invite all parties having an interest in the project to the meeting, including the major subcontractors, Fire District and Irrigation District, and private utilities.

At this conference all points of the approved Plans and Specifications will be open to discussion including scope, order and coordination of work, equipment lead time required, means and methods of construction, inspection and reporting procedures, etc. The Contractor should satisfy himself that all provisions and intentions of the work are fully understood.

The Contractor shall prepare and submit to the City and Developer at the Preconstruction Conference a Construction Progress and Completion Schedule using a bar graph format. Items in the Schedule shall be arranged in the order and sequence in which they will be performed. The schedule shall be drawn to a time scale, shown along the base of the diagram, using an appropriate measurement per day with weekends and holidays indicated. The Construction Progress Schedule shall be continuously updated and, if necessary, redrawn upon the first working day of each month or upon issuance of any Change Order which substantially affects the scheduling. Copies (2 prints or 1 reproducible) of newly updated Schedules shall be forwarded to the City and Engineer, as directed, immediately upon preparation.

1-10 TEMPORARY TRAFFIC CONTROL

This section is supplemented with the following:

The provisions of the latest edition of the Manual on Uniform Traffic Control Devices (M.U.T.C.D.) for Streets and Highways and amendments thereto published by the U.S. Department of Transportation, Federal Highway Administration, and WSDOT by this reference are made a part of these Documents.

1-10.2(2) Traffic Control Plans

Delete the entire section and replace with the following:

The Contractor shall prepare a signing plan showing the necessary Class A and B construction signing, barricades, and traffic control devices required for the project and submit it to the Consultant and City for review no later than the preconstruction conference date. When the Class B signing for a particular area will be provided as detailed on one or more of the figures included in the MUTCD without modification, the Contractor may reference the applicable MUTCD figure at the appropriate location on the Plan. When this procedure is used, variable distances such as minimum length of taper must be specified by the Contractor.

The signing plan prepared by the Contractor shall provide for adequate warning within the limits of the project and on all streets, alleys, and driveways entering the project so that

approaching traffic may turn left or right onto existing undisturbed streets before reaching the project. The Plan shall be prepared to create a minimum of inconvenience for pedestrian and vehicle traffic.

All modifications to the accepted signing plans shall be reviewed by the City.

1-10.3(3)A Construction Signs

The first sentence of the first paragraph is revised to read:

All signs, barricades, flashers, cones, traffic safety drums, barricades, and other traffic control devices required by the approved traffic control plan(s), as well as any other appropriate signs prescribed by the City or County, shall be furnished and maintained by the Contractor.

Open trenches shall be provided with proper barricades and at night they shall be distinctly indicated by adequately spaced lights.

CHAPTER 4 - WATER SYSTEM IMPROVEMENTS

GENERAL REQUIREMENTS FOR WATER SYSTEM IMPROVEMENTS

All extensions and additions to the City of Selah's domestic water system shall conform to the Design and Construction Standards of the City of Selah and the Washington State Department of Health (WSDOH) as follows:

All new lots and developments shall be served by a public domestic water supply line to be maintained by the City of Selah and located adjacent to the lot or development site. The water supply line shall be capable of providing sufficient flow and pressure to satisfy the fire flow and domestic service requirements of the proposed lots and development requirements.

Water lines shall be extended by the Developer to the point where the adjoining property owner's responsibility for further extension begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner. In some cases, it will require dedication of an easement and a line extension across the property or extension across two or more sides of the developing property. Extensions will be consistent with and implement the City's adopted Water Comprehensive Plan.

Cover over new watermains shall be a minimum of 48" and a maximum of 72". All new public domestic water mains shall be a minimum diameter of 8 inches. Fire hydrant runs less than 50 feet from the water main to the fire hydrant shall be a minimum of 6 inches.

Larger public water mains may be required depending upon fire flow requirements as determined by the City of Selah's Public Works Director, Fire Chief or City Engineer.

Water main oversizing, above that required for the particular development being submitted, may be required by the City of Selah to be installed for future extension. The cost of the materials only for the oversizing shall be reimbursed to the Developer by the City. The Developer shall submit actual material invoices showing the actual cost of the materials furnished and the cost of the same materials of the size required for the development.

All domestic water mains shall be looped, where possible. Temporary dead-end mains over 300 feet in length will only be allowed where future water main looping via public right of way will be assured. No permanent dead-end water mains over 300 feet in length will be allowed to be part of the City of Selah's public water system.

Maximum valve spacing in public water mains will be 750 linear feet. Valves will be furnished and installed on all legs of new water main intersections. Valve operating nut extensions approved by the engineer will be required on valves where the operating nut is deeper than 36 inches below finished grade.

All new water meters shall be a minimum of 3/4-inch and shall be furnished and installed by the City of Selah. All meter boxes and meter setters and service lines shall be installed by the Contractor. Only one meter shall be served from each main tap. All taps shall be made under the supervision of the Public Works Director or his designee.

All live taps of water mains shall be performed by a City-approved contractor (or City's representative with Public Works Director's approval) using a full circle stainless steel tapping sleeve with gate valve and paid for by the Developer. No cut-in tees will be

allowed.

Minimum 2-inch air and vacuum release valves shall be furnished and installed at high points in the water system.

Fire hydrants shall be spaced at least every 350 feet. Additional hydrants may be required to protect structures as determined by the Fire Chief and Public Works Director. Additional fire hydrants required on a site may require a looped, on-site fire hydrant main. Easements will be provided for all on-site, public, looped water mains, in accordance with Chapter 1, Section 11.

Water and sewer mains shall be separated in accordance with Section C1-9.1 of the Criteria for Sewage Works Design, August 2008, by the Washington State Department of Ecology.

The design of water mains and appurtenances is subject to review and approval by the City of Selah Public Works Director. The Public Works Director may, at his discretion, adjust these Design and Construction Standards as necessary to facilitate installation of water lines and appurtenances for the health, safety, and protection of the general public.

Irrigation Systems

The proposed development, wherever possible (as determined by Public Works Director), shall be served by a separate irrigation water distribution system with an individual service for each lot. The irrigation system shall be designed by a professional and constructed in accordance with the applicable Irrigation District Standards and City of Selah Design and Construction Standards. All irrigation pipelines under roadways shall meet the requirements of Section 9-30.1(5)A (AWWA C900 or C905). Pipe not under the roadway may meet the requirements of Section 9-05.12 (PVC solid wall ASTM D 3034 SDR35) or 9-15.1(2) (ASTM D 1784, 200 psi, SDR21). All irrigation pipe shall be installed with a minimum cover of 30 inches and with a 3-inch wide magnetic marking tape 12 inches above the pipe.

Irrigation services which must use the City's domestic water system shall require a City permit and be installed with a State approved, double check valve assembly. All double detector check valve assemblies shall conform to City of Selah Design and Construction Standards. Initial and annual testing will be required.

SPECIAL PROVISIONS FOR WATER SYSTEMS

The following sections of the WSDOT Standard Specifications have been amended or supplemented as described below and apply to the construction of public works water system improvements within the City of Selah.

7-09 WATER MAINS

7-09.2 MATERIALS

Section 7-09.2 of the Standard Specifications shall be revised as follows:

Water Main pipe shall be:

Ductile Iron, conforming to the requirements of Section 9-30.1(1) of the Standard Specifications, except that it shall be Standard Thickness Class 52. Joints shall be rubber gasket, push-on type (Tyton Joint). Fittings shall be mechanical joint or flanged, as shown on the Plans, and shall conform to Section 9-30.2(1) of the Standard Specifications.

All fittings shall be manufactured in the U.S.A.

Delete entire Aggregates Sub-Section and replace with the following:

Bedding Materials (Rigid Pipes)	9-03.12(3) Gravel Backfill for Pipe Zone Bedding
Imported Select Backfill	9-03.9(3) Crushed Surfacing Base Course

7-09.3(5) Grade and Alignment

The first sentence of the third paragraph is replaced with the following:

The depth of trenching for water mains shall be such to provide a minimum cover of 4 feet and a maximum cover of 6 feet, unless otherwise approved by the Public Works Director.

7-09.3(9) Bedding the Pipe

Supplement this section with the following:

All construction work shall be inspected by the City or its representative before pipe installation and backfilling. Imported pipe zone bedding/backfill for pipes shall be in accordance with Section 7-09.2 above, placed and compacted per the Standard Specifications. Bedding shall be placed under all pipe.

7-09.3(10) Backfilling Trenches

Add the following:

Street crossing trenches, and other locations as directed, shall have the trench backfilled full depth with Imported Select Backfill. The Public Works Director may require the use of Controlled Density Fill (CDF) for trench backfill in certain circumstances. The requirements for CDF are set forth in Chapter 7, Section 8-30 of these Special Provisions.

7-09.3(11) Compaction of Backfill

Mechanical compaction of 95% of maximum density is required on all trenches. The Contractor shall be responsible for scheduling and paying for all testing required.

7-09.3(23) Hydrostatic Pressure Test

Replace the first sentence with the following:

All water mains and appurtenances shall be tested under a hydrostatic pressure of 180 psi for a fifteen (15) minute period.

7-12 VALVES FOR WATER MAINS

7-12.2 MATERIALS

Add the following:

Gate Valves: All valves sizes 2-inch through 10-inch shall be gate valves manufactured in the U.S. and shall conform to the latest revision of AWWA Resilient Seated Gate Valves Standard C509 and AWWA C104.

All gate valves shall have non-rising stems, open counterclockwise, and shall be provided with a 2-inch square AWWA operating nut. Gate valves 4-inch and larger shall have mechanical joint connections.

Butterfly Valves: All valves sizes 12 inches and larger shall be butterfly valves manufactured in the U.S. and suitable for direct burial and shall be rubber seated and conform to the latest revision of AWWA Standard C504 Class 150B and C104.

Valve operators shall be worm gear type, sealed, gasketed, and lubricated for underground service. All valves shall open counterclockwise and shall be provided with a 2-inch square AWWA operating nut.

Tapping Sleeve and Valve Assemblies: Tapping sleeves shall be full circle, Romac Stainless Steel Tapping Sleeve (SST) with Ductile Iron Flanged Outlet, or approved equal, conforming to the latest AWWA Standard C223.

Valve Boxes shall be two piece adjustable. The top section shall be similar to Olympic Foundry Model 940-B, or equal, 18-inches high. The bottom section shall be Olympic Foundry Model R-36, or equal, 36-inches high. Extension sections shall be Olympic Foundry Model 044, or equal, 12-inches high.

7-12.3 CONSTRUCTION REQUIREMENTS

Supplement this section with the following:

Tapping Sleeve and Valve Assemblies: The Contractor or Subcontractor completing the work shall have at least five (5) years' experience with a minimum of ten (10) water main taps of pipes with diameters equal to or larger than specified in this project. Contractor shall notify City at least 72 hours prior to all proposed taps and provide work experience references if requested. Work to complete the tap shall not commence without City's written approval. If the Contractor or Subcontractor does not have sufficient experience in the sole opinion of the City, a qualified Subcontractor as approved by the City, shall be used to complete the tap at no additional cost.

Valves: Upon completion of all work in connection with this Contract, the Developer/Contractor shall contact the City of Selah Public Works for opening water valves. Valves shall only be operated by City Public Works staff.

Valve Boxes: Valve boxes should be set to position during backfilling operations so they will be in a vertically centered alignment to the valve operating stem. The top of the box will be at final grade.

The Contractor shall adjust all water valve boxes to the final grade of the surrounding area including new concrete sidewalk, asphalt paving, gravel surfacing, or topsoil surfacing, in accordance with the details shown on the Drawings. Valve box cover shall be rotated such that lugs are in-line with pipe alignment.

The Contractor shall keep the valve boxes free from debris caused by the construction activities. All valve boxes will be inspected during final walk-thru to verify that the valve box is plumb and that the valve wrench can be placed on the operating nut.

7-14 HYDRANTS

7-14.2 MATERIALS

Replace the entire Section with the following:

The City of Selah accepts fire hydrants of the following manufacturers, providing the hydrants conform to the City's technical specifications for fire hydrants:

Mueller Super Centurion 250
M & H 129S

All hydrants shall have a Main Valve Opening (MVO) of 5-1/4" and one port with a 5" Storz Quick Coupling and two (2) 2-½" diameter ports. Threads on all ports shall be National Standard Thread.

7-14.3(1) Setting Hydrants

Add the following:

The hydrant shall be set to the correct elevation on a concrete block base measuring 12" x 12" x 6" thick, which has been placed on undisturbed earth. Around the base of the hydrant, the Contractor shall place 0.50 cubic yards of washed drain rock ranging in size from 3/4" to 1 ½" to allow free drainage of the hydrant. The drain rock shall be completely covered with construction geotextile fabric as directed by the City.

The Contractor shall be responsible for verifying the hydrant flange elevations and shall provide additional depth-of-bury hydrants or hydrant extensions to achieve a flange elevation of 3" above the back of curb, sidewalk, or finished grade, as shown on the City's Standard Detail.

The hydrants will be painted in a color approved by the City.

7-14.3(2) Hydrant Connections

Add the following:

Hydrant runs of less than 50 feet shall be connected to the main with 6-inch minimum diameter water main. Each hydrant lateral shall include an auxiliary gate valve and valve box.

7-14.3(2)A Hydrant Restraint

Add the following:

The Contractor shall securely connect the hydrant to the water main as indicated on the Standard Detail.

7-14.3(2)C Hydrant Guard Posts

Replace this section with the following:

The Public Works Director may determine that four (4) 6-inch diameter Sch. 40 steel guard posts be installed at a hydrant location. The posts will be painted the same color as the hydrants.

7-15 SERVICE CONNECTIONS

7-15.1 DESCRIPTION

Replace this section with the following:

This work consists of the relocation of existing water meters, meter setters, and water meter boxes, where necessary, and the installation of new saddles, corp stops, service pipe, water meter box, meter setter, and meter stops as shown on the Plans.

7-15.2 MATERIALS

SECTION 7-15.2 of the Standard Specifications shall be revised as follows:

Saddle: New service tapping saddles shall be Romac D.I. service saddle with double stainless steel straps or approved equal.

Corporation Stop: New corp stops shall be Mueller, Ford 1001 or approved equal.

Service Line: New service pipe shall be Copper Tubing Type K.

Meter Box: New meter boxes shall be Carson HW Model 1527BCF-18 (for ¾" and 1" meters) and 1730BCF-18 (for 2" and larger meters).

Pipe Bedding and Select Backfill: The imported pipe bedding and select backfill to be utilized for trench backfill as directed by the Engineer or Public Works Director shall be in accordance with SECTION 7-09 of these Special Provisions.

All fittings shall be manufactured in the U.S.A.

7-15.3 CONSTRUCTION REQUIREMENTS

Add the following:

The Contractor shall set the water meter box to the finished grade of the area. The Contractor will be required to reset the meter box if it is not at finished grade at the completion of the project. The completed water service shall be tested at system operating pressure by the Contractor and must show no signs of leakage.

Future water services shall be marked with an 18" long section of #4 rebar buried vertically with the top of the rebar set 6" below the finish surface and a 6-foot 2x4 post.

CHAPTER 5 - SANITARY SEWER SYSTEM IMPROVEMENTS

GENERAL REQUIREMENTS FOR SANITARY SEWER SYSTEM IMPROVEMENTS

All extensions and additions to the City's sanitary sewer system shall conform to the Design and Construction Standards of the City of Selah, the Washington State Department of Ecology, and be designed by a licensed professional Engineer as follows:

All new lots and developments shall be served by a public sanitary sewer line adjacent to the lot or development site.

Sewer lines shall be extended by the Developer to the point where the adjoining property owner's responsibility for further extension begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner. In some cases, it will require dedication of an easement and a line extension across the property or extension across two or more sides of the developing property. Extensions will be consistent with and implement the City's adopted Sewer Comprehensive Plan.

Sewer lines shall be located in streets to serve abutting properties. When necessary, sewer lines may be located within public easements. Lines located in streets will be offset from the street centerline and not located within a vehicle wheel path. Sewer lines located in easements shall generally be located in the center of the easement, but may, with the approval of the Public Works Director, be offset to accommodate the installation of other utilities or to satisfy special circumstances.

Sewer lines shall be designed for gravity flow operation. The minimum size for public sewer lines is eight (8) inches in diameter. The developer's sewer system must provide capacity for the proposed development, but must also provide capacity for future extensions.

Sewer lines shall be terminated with a manhole. In special circumstances, a flush-end (cleanout) may be installed on the end of a sewer main extension, provided the end is no further than 150 feet from the last manhole and the sewer main line and grade will permit further extension.

Manholes shall be installed at intervals of no greater than 400 feet and at all vertical and horizontal angle points in the sewer main.

Each building containing sanitary sewer facilities shall be served by a separate private side sewer line. Branched side sewers serving multiple buildings and properties shall not be permitted. Side sewers serving multi-unit buildings are permitted.

Side sewers shall be installed in accordance with these Construction Standards and as shown on the City Standard Details. Water and sewer lines shall not be laid in the same trench, except if approved materials (those listed in Section 7-17.2 of the *Standard Specifications for Road, Bridge, and Municipal Construction)* are used and the following requirements are met:

1. The bottom of the water pipe shall not be less than 12 inches above the top of the sewer or drain line.
2. The water pipe shall be placed on a solid shelf excavated at one side of the common trench with a clear horizontal distance of not less than 12 inches from the sewer or drain line.

Lift stations and force mains shall be limited to those locations and circumstances where they are consistent with the Comprehensive Sewer Plan and are the only viable solution to serve the proposed development and other properties in the vicinity. Lift stations and force mains shall be designed by a Professional Civil Engineer licensed in the State of Washington in accordance with the direction and requirements given by the City Engineer.

The design of sewer lines and appurtenances is subject to review and approval by the City of Selah Public Works Director. The Public Works Director may, at his discretion, adjust these Design and Construction Standards as necessary to facilitate installation of sewer lines and appurtenances for the health, safety, and protection of the general public.

SPECIAL PROVISIONS FOR SANITARY SEWER SYSTEM IMPROVEMENTS

All construction work shall be performed in accordance with the Standard Specifications and these sections that have been amended or supplemented as described below.

7-05 MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS

7-05.2 MATERIALS

Add the following:

Sanitary Sewer Manholes shall be gasketed and constructed of 48-inch or larger diameter reinforced precast concrete manhole sections in conformance with the requirements of this Section. The base and first barrel section shall be precast monolithically with preformed channels.

Joints in the manhole sections shall be watertight and shall be a rubber ring compression joint complying with ASTM C443, a flexible, plastic gasket, or approved equal.

Manhole frames and covers shall be cast iron and manufactured in the U.S., with a combined weight of not less than 400 pounds and have a clear opening of 24 inches. The frames and covers shall be the manufacturer's stock pattern capable of withstanding, with appropriate margin of safety, an H20 loading. Covers shall have a 1-inch hole only, unless otherwise noted, and the top shall be flat with a non-skid pattern and marked "SEWER." The contact surfaces of the frames and covers shall be machine finished to a common plane or have other adequate provision to prevent rocking.

7-05.3 CONSTRUCTION REQUIREMENTS

Add the following:

The design and construction of all manholes shall provide for a 0.10 foot vertical drop through the manhole.

Manhole coupling adaptors may be precast in the manhole to accept PVC pipe, provided diameters match. No field grouting of pipe into manholes will be allowed. Pipe connections at manholes must be gasketed and must be flexible. "A-Lok" gasket system or approved equal may be used as an alternate to the manhole coupling adapter.

7-05.3(1) Adjusting Manholes and Catch Basins to Grade

Delete and replace with the following:

Manholes, valve boxes and similar utility appurtenances and structures shall not be adjusted until the pavement is completed, **at which time the center of each structure shall be relocated from references previously established by the Contractor**.

The asphalt pavement shall be cut and removed to a neat circle, the diameter of which shall be equal to the outside diameter of frame plus 2 feet. The frame shall be placed on cement concrete blocks or adjustment rings and wedged up to the desired grade. The base materials shall be removed and Class 3000 cement concrete shall be placed within the entire volume of the excavation up to, but not to exceed, 2 inches below the finished pavement surface.

On the following day, the concrete, the edges of the asphalt pavement, and the outer edge of the casting shall be painted with hot liquid asphalt. Class 3/8" HMA shall then be placed and compacted with hand tampers and a patching roller.

The completed patch shall match the existing paved surface for texture, density, and uniformity of grade. The joint between the patch and the existing pavement shall then be painted with hot liquid asphalt or asphalt emulsion and shall be immediately covered with dry paving sand before the HMA solidifies.

7-05.3(2) Abandon Existing Manholes

Replace the entire section with the following:

Where shown on the Plans, existing sanitary sewer manholes shall be abandoned in place after the new sanitary sewer collection system is in place and all side sewers have been transferred to the new sanitary sewer pipeline. The following new section shall be added to the Standard Specifications:

At least the top 3 feet of each manhole, or the top conical section in precast concrete manholes, shall be removed, including the cast iron ring and cover and concrete pad, if any. Debris resulting from breaking of the upper portion of the manhole may be mixed with backfill subject to the approval of the Engineer. Ring and cover will become property of the Contractor and all other surplus material shall be disposed of.

The existing pipe openings shall be plugged watertight with Class 3000 concrete and the manhole bottom slabs shall be broken to promote drainage. The remaining manhole structure shall be backfilled with granular material conforming to SECTION 9-03.9(3) CRUSHED SURFACING BASE COURSE. Place backfill in uniform layers and compact to 95% maximum dry density, as determined by ASTM D 1557 (Modified Proctor).

Excavations resulting from manhole abandonment shall be backfilled with suitable, job-excavated material to top of subgrade. Compact to 95% maximum dry density as determined by ASTM D 698 (Standard Proctor). Restore surface to the condition existing prior to excavation with native material, gravel surfacing, or asphalt concrete pavement, as shown for trench repair on the Plans.

7-08 GENERAL PIPE INSTALLATION REQUIREMENTS

7-08.1 GENERAL

Add the following:

The Contractor shall notify the Utility Notification Center (One Call Center) at least 48 hours prior to start of excavation so that underground utilities may be marked. Telephone number is 1-800-424-5555.

All construction work shall be inspected by the City of Selah prior to backfilling. At least 48 hours notice shall be given to the City Department of Public Works prior to backfilling.

7-08.3(1)C Bedding the Pipe

Add the following:

The imported pipe zone bedding/backfill to be utilized for the trench backfill shall be Crushed Surfacing Top Course in conformance with Section 9-03.9(3), placed and compacted in layers as designated by the Public Works Director.

7-08.3(2)B Pipe Laying - General

Add the following:

All sewer pipe shall be installed with 3-inch wide magnetic marking tape as detailed in the Standard Detail SS-5 and Section 9-15.18.

7-08.3(3) Backfilling

Add the following:

Street crossing trenches and other locations, where directed, shall be backfilled for the full depth of the trench with Imported Select Backfill conforming to Section 9-03.9(3) Crushed Surfacing Base Course. The Public Works Director may require the use of Controlled Density Fill (CDF) for trench backfill in certain circumstances. The requirements for CDF are set forth in Chapter 7, Section 8-30 of these Special Provisions.

Mechanical compaction shall be required for all trenches. The density of the compacted materials shall be at least 95% of the maximum density as determined by ASTM D 698 Test (Standard Proctor). The Contractor shall be responsible for scheduling, conducting, and paying for all testing required.

7-17 SANITARY SEWERS

7-17.2 MATERIALS

Sanitary Sewer Pipe approved for the City of Selah shall be:

PVC Sewer Pipe (Gravity): Polyvinyl Chloride Pipe with flexible gasketed joints shall conform with the requirements of Section 9-05.12 of the Standard Specifications (ASTM D3034, DR 35). Pipe joint type for restrained gasket.

PVC fittings for PVC sewer pipe such as tees, wyes, elbows, plugs, caps, etc., shall be flexible gasket joint fittings acceptable for use and connection to PVC sewer pipe.

Detectable Marker Tape: Marker tape shall be a detectable type and shall be marked "SEWER," and shall conform to Section 9-15.18 of the Standard Specifications.

7-17.3 CONSTRUCTION REQUIREMENTS

7-17.3(2)A General

Delete the first paragraph and replace it with the following:

All sewer pipes and appurtenances shall be cleaned and tested after backfilling. Both infiltration (if applicable) and exfiltration testing of the gravity sewer pipeline will be required. Deflection testing of the pipeline will also be required, 15 days after completion of backfill and compaction. All testing shall be witnessed by the City.

7-18 SIDE SEWERS

7-18.3 CONSTRUCTION REQUIREMENTS

7-18.3(1) General

Add the following:

Side sewers shall be constructed with a minimum of 30 inches of cover. This provision may be waived by the Public Works Director under special circumstances; however, under no circumstances shall the side sewer be laid with less than 18 inches of cover.

Side sewers shall be a minimum of 4 inches in diameter. Larger sizes, if required, will be approved by the Public Works Director on a case-by-case basis.

CHAPTER 6 – STORMWATER IMPROVEMENTS

GENERAL REQUIREMENTS FOR STORMWATER IMPROVEMENTS

All new storm drainage facilities, public or private, shall be designed by a Professional Engineer licensed in the State of Washington. Complete stormwater runoff and drainage facilities sizing calculations shall be submitted to the City Public Works Director for review and comment. Storm sewer facilities and pipelines shall be designed to meet a minimum 25-year storm criteria, and both the long-duration and short-duration storms shall be considered in the design.

All storm drainage improvements shall be planned, designed, permitted, constructed and maintained in accordance with the requirements of the latest edition of the Washington Department of Ecology (Ecology) Stormwater Management Manual for Eastern Washington (SWMMEW).

All storm runoff occurring on all new lots and developments (private property) shall be retained and disposed of on-site. Storm runoff will not be permitted to enter public property or the public storm drainage system. The property owner shall maintain all stormwater Best Management Practices (BMPs) that are installed on private property.

Storm runoff for new public streets shall be designed and constructed as required to the point where the adjoining property owner's responsibility for further extension begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner.

All storm sewer designs for new public streets shall be based upon an engineering analysis that takes into account total drainage areas, runoff rates, pipe and inlet capacities, treatment capacity, and any other factors pertinent to the design.
All subsurface infiltration facilities used for the treatment and disposal of stormwater shall meet the requirements of and be registered with the WDOE Underground Injection Control (UIC) program. The registration process shall be completed prior to project approval.

Inlet spacing shall be designed in accordance with the WSDOT Hydraulics Manual, Chapter 5. Generally, inlet spacing shall not exceed 300 feet. There shall be a manhole or Type II catch basin installed at the intersection of two collector storm sewers. A collector storm sewer is a sewer servicing more than one catch basin.

Small private developments may be designed to accommodate 1.5 inches of precipitation (10-year, 24-hour storm) over the on-site impervious surfaces. Small developments are defined to be 5,000 square feet or less of impervious surface area. Impervious surfaces must be clearly noted and shown on the project site plan.

DESIGN CRITERIA

The *Stormwater Management Manual for Eastern Washington* allows different methodologies to apply design storms to stormwater facility design. For purposes of consistency, specific design storm amounts of precipitation are provided below and summarized in Table 6-1. Precipitation amounts are taken from the figures and calculation methods provided in the *Stormwater Management Manual for Eastern Washington*. Once the rainfall amount is known, hydrographic methods are used to determine the rate and volume of runoff from the selected design storm, and to mathematically route a storm through proposed facilities. Hydrographic methods are discussed below along with their application to different design conditions in Selah.

DESIGN STORMS

Design storms are used to establish the amount of precipitation to be used in calculating the runoff from a parcel or basin. Based on rainfall records and methods outlined in the *Stormwater Management Manual for Eastern Washington*, the storm events described below are applicable to Selah. Note that all 24-hour storm precipitation amounts have been adjusted by a factor of 1.0 for use in the long-duration storm for Eastern Washington Region 2.

Water Quality 3-Hour Storm – 0.28 inches of precipitation. This short-duration water quality storm event is intended to provide treatment for the "first flush" events and is representative of a summer thundershower. The "first flush" can be thought of as the first amount of water that enters the system during a storm, which typically contains the highest concentration of pollutants such as roadway grit, dust and oils.

Water Quality 24-Hour Storm – 0.66 inches of precipitation. This 24-hour water quality storm event is intended to provide treatment for the "first flush" events. All stormwater treatment BMPs should be designed to treat runoff from this 24-hour water quality storm.

2-Year, 24-Hour Storm – 1.00 inches of precipitation. This 24-hour storm has a two-year return frequency, or a 50 percent chance of occurring in any one year. Designing to the 2-year storm is considered necessary for control of nuisance water. The 2-year storm also has other applications for the design of stormwater detention and water quality treatment facilities.

10-Year, 24-Hour Storm – 1.50 inches of precipitation. This 24-hour storm has a 10-year return frequency, or a 10 percent chance of occurring in any one year. Historically, storm drain facilities were designed to carry flows from this storm, but it was found that in Eastern Washington stormwater facilities were better protected if they were designed to carry flows from the summer thunderstorm, which has greater rainfall intensity over a shorter period of time.

25-Year, 3-Hour Storm (Regional Short-Duration Storm) – 0.95 inches of precipitation. This short-duration storm has a 25-year return frequency, or a 4 percent chance of occurring in any one year. This unique storm is representative of the summer thunderstorm where a significant amount of rainfall occurs over a 3-hour period, and should be used for design of flow-based stormwater BMPs.

25-year, 72-Hour Storm (Regional Long-Duration Storm) – 1.80 inches of precipitation (uses 25-year, 24-hour storm intensity. This long-duration storm has a 25-year return frequency, or a 4 percent chance of occurring in any one year. Volume-based BMPs should be designed for this 72-hour, long-duration storm. The intensity of this storm is lower since the rainfall occurs more slowly over an extended time within the 72-hour period. Therefore, the runoff rate is lower, but the volume is greater than the 3-hour storm.

50-Year, 24-hour, Storm – 1.90 inches of precipitation. This 24-hour storm has a 50-year return frequency, or a 2 percent chance of occurring in any one year. The City of Selah has selected this storm as the desired design storm to protect the downstream components of the stormwater collection system. Minor ponding is acceptable during this event, as long as the streets remain passable, and buildings are not flooded.

100-Year, 24-Hour Storm – 2.20 inches of precipitation. This 24-hour storm has a 100-year return frequency, or a 1 percent chance of occurring in any one year. Major structures and critical facilities should be protected from damage by flows from this storm.

TABLE 6-1 PRECIPITATION EVENT INFORMATION	
Storm Event	**Precipitation in Inches**
6-Month, 3-Hour Storm Event	0.28
6-Month, 24-Hour Storm Event	0.66
2-Year, 24-Hour Storm Event	1.00
10-Year, 24-hour Storm Event	1.50
25-Year, 3-Hour Storm Event	0.95
25-Year, 24-Hour Storm Event	1.80
50-Year, 24-Hour Storm Event	1.90
100-Year, 24-Hour Storm Event	2.20
Source: *Stormwater Management Manual for Eastern Washington*, WDOE Note: 24-hour precipitation amounts have been adjusted for use in the long-duration regional storm distribution.	

Hydrologic Analysis

Hydrologic analysis determines the amount of runoff from a given storm for a given drainage area. Though hydrologic studies are backed with considerable science, there is still a certain amount of art in their application. Available methods range from the simple calculations of the Rational Method to complex computer models, requiring significant data input and knowledge of hydrologic effects.

The following hydrographic methods are considered acceptable for the watersheds within Selah and its urban growth area.

- The Santa Barbara Urban Hydrograph (SBUH) method may be used for all analyses regardless of the size of the drainage area. Input parameters shall be as described by WDOE or WSDOT for the design storms described above. Other computer models may also be used with prior approval by the City.

- For drainage areas less than or equal to 20 acres, the rational formula and modified rational method, as described in older WSDOT and Soil Conservation Service publications, may be used for flow-rate-based applications. Inputs shall be as described in those publications, or other engineering texts. The SCS Unit Hydrograph Method may also be used.

- For drainage areas greater than 20 acres, and when it is necessary to route flows through detention facilities, the SCS Unit Hydrograph Method may be used. Inputs shall be as described in WSDOT and Soil Conservation Service publications, or other engineering texts.

The SBUH method uses a hyetograph to depict the intensity (amount) of rainfall versus time. A hyetograph may also be required for routing design storms through some BMPs. Design storm hyetographs applicable to Selah stormwater facilities are as follows:

- Water Quality Volume-Based Treatment BMPs – 24-hour SCS Type 1A storm with a 6-month return frequency.
- Water Quality Flow-Rate-Based Treatment BMPs – 3-hour short-duration storm with a 6-month return frequency.
- Volume-Based BMPs – 72-hour Regional Long-Duration Storm with a 25-year return frequency. Storm intensity is based on the 25-year, 24-hour storm event.
- Flow-Rate-Based BMPs – 3-hour short-duration storm with a 25-year return frequency as described in the SWMMEW.
- Critical facilities required to carry 50- and 100-year storms – 24-hour SCS Type II storm.

Treatment BMP Sizing

The City of Selah is located in the WDOE Region 2 of Eastern Washington. Therefore, all calculations shall be based on Region 2 methods recommended in the WDOE's *Stormwater Management Manual for Eastern Washington* for the sizing of stormwater BMPs. The following are design guidelines for volume-based treatment BMPs and flow-rate-based treatment BMPs.

Volume-based treatment BMPs are sized the same whether they are located upstream or downstream of a detention facility. The volume of runoff predicted for the proposed developed condition of a site will be calculated using the 24-hour SCS Type 1A storm with a 6-month return frequency. (The 0.66-inch water quality design storm.) The BMP will be sized to treat this amount of water, and will also be sized to pass the 25-year short-duration storm, either through or around the BMP, without damaging the BMP or dislodging pollutants from within it.

Flow-rate-based treatment BMPs are sized differently depending on whether they are located upstream or downstream from a detention facility. If the BMP is located upstream of a detention facility, or if there is no detention facility, the runoff flow rate predicted for the proposed developed condition of a site will be calculated using the 3-hour short-duration storm with a 6-month return frequency. (The 0.66-inch water quality design storm.) See Chapter 7 of the *Stormwater Management Manual for Eastern Washington* for design parameters. If the BMP is located downstream of a detention facility, it must be sized for the full 2-year release rate of the detention facility.

Flow Control

The criteria listed below shall apply to control of stormwater runoff flow and the designated design storms shall apply:

- Storm sewer facilities and pipelines shall be designed to carry at minimum the 25-year short-duration design storm described in the *Stormwater Management Manual for Eastern Washington* (0.95 inches of precipitation). Depending on the size of the basin, time of concentration and infiltration rates, some infiltration facilities will also need to be checked using the 25-year, 24-hour storm (1.80 inches of precipitation, SCS Type

1A). At the City's discretion, if the facilities are critical to public health and safety, or significant property damage could occur, they shall be designed to successfully pass the 50-year or 100-year storm.

- Retention and detention basins shall be designed based on the 25-year, 72-hour long-duration storm (1.80 inches of precipitation, Regional Long-Duration). A secondary outlet or emergency spillway shall be provided to pass the 100-year storm (2.20 inches of precipitation, SCS Type II) without damage to the facility.

Street Drainage

Streets represent a large portion of the impervious area within a community. They can be used to convey a significant amount of stormwater; however, they must remain passable during storm events. To that end, streets may be used to convey local runoff to inlets, but stormwater must be removed at specific intervals in order to prevent excessive flooding. Guidance for flow carried within the street is presented below for the design storm (25-year) in Table 6-2, and the major storm (100-year) in Table 6-3. At intersections, the flow carried in one street may flow across the other street. Allowable cross street flow is listed in Table 6-4 for both the design storm and the major storm.

TABLE 6-2 25-YEAR STORMWATER RUNOFF ALLOWABLE STREET USE

Street Classification	Maximum Pavement Encroachment
Residential	No curb overtopping. Flow may spread to crown of street.
Collector, Minor, and Principal Arterials	No curb overtopping. Flow spread must leave at least one lane in each direction free of water.
Freeway	No encroachment is allowed on any traffic lanes.

TABLE 6-3 100-YEAR STORMWATER RUNOFF ALLOWABLE STREET INUNDATION	
Street Classification	**Maximum Pavement Encroachment**
Residential	Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the lowest finished floor elevation unless buildings are flood-proofed. The depth of water over the gutter flowline shall not exceed 12 inches.
Collector, Minor, and Principal Arterials	Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the lowest finished floor elevation unless buildings are flood-proofed. The depth of water at the street crown shall not exceed 6 inches in order to allow operation of emergency vehicles. The depth of water over the gutter flowline shall not exceed 12 inches.
Freeway	No inundation is allowed.

TABLE 6-4 STORMWATER RUNOFF ALLOWABLE CROSS STREET FLOW		
Street Classification	**25-Year Storm Runoff**	**100-Year Storm Runoff**
Residential	6 inches in depth in valley gutter	12 inches in depth in valley gutter
Collector, Minor, and Principal Arterials	None	6 inches or less over crown
Freeway	None	None

In addition to the criteria for street carrying capacity, the following design criteria shall also apply to street drainage:

- The following design storms shall apply:
  - Flow in gutters and ditches shall be evaluated based on the 25-year design storm.
  - Storm drain laterals shall carry the 25-year design storm, or be a minimum of 8-inches in diameter.
  - Storm drain inlets on a slope shall handle the 25-year storm.
  - Storm drain inlets in sag (low-point) shall handle the 50-year storm. (WSDOT design criteria. May be waived at City's discretion.)

- Stormwater runoff for new public streets shall be designed and constructed as required to the point where the adjoining property owner's responsibility for further extension

begins. This typically requires an extension across the entire frontage of the property to the property line of the adjoining owner.

- All storm sewer designs for new public streets shall be based upon an engineering analysis which takes into account total drainage areas, runoff rates, pipe and inlet capacities, and any other factors pertinent to the design.
- All stormwater BMPs installed by the City in the public domain shall be maintained by the City, or by a subcontracted party.
- Inlet spacing shall be designed in accordance with the WSDOT Hydraulics Manual, Chapter 5. Generally, inlet spacing shall not exceed 300 feet. There shall be a manhole or Type II catch basin installed at the intersection of two collector storm sewers. A collector storm sewer is a sewer servicing more than one catch basin.

SPECIAL PROVISIONS FOR STORM SEWERS AND DRAINAGE

The following Sections of the Standard Specifications have been amended or supplemented as described below:

7-02 CULVERTS

7-02.2 MATERIALS

Add the following:

Culvert pipe approved for use on a City project shall be as follows:

Corrugated Aluminum Alloy Culvert Pipe meeting the requirements of SECTION 9-05.5 of the Standard Specifications.

OR

HDPE Pipe: Corrugated High Density Polyethylene (CPE) pipe, couplings, and fittings shall comply with the requirements of SECTION 9-05.19 of the Standard Specifications.

7-04 STORM SEWERS

7-04.2 MATERIALS

Add the following:

The storm sewer (drain) pipe approved for use on a City project shall be as follows:

15-INCH THROUGH 36-INCH PIPE

Corrugated Aluminum Alloy Storm Sewer Pipe: All corrugated aluminum alloy storm sewer pipe shall comply with the requirements specified in SECTION 9-05.11 of the Standard Specifications and shall be 16 gauge with helical corrugations. A protective coating shall not be required. All corrugated metal pipe joints shall be flexible using rubber gasket joints. Gaskets shall be made of 3/8-inch thick by 12-inch minimum width closed cell synthetic sponge rubber, per ASTM D 1056, Grade SCE-43, fabricated in the form of a cylinder with a diameter of approximately

10 percent less than the nominal pipe size. The gasket shall be centered under the band and lapped an equal distance on the ends of the adjoining pipe sections. Coupling bands shall be used and shall conform to the provisions of SECTION 9-05.11(1) of the Standard Specifications. Coupling bands shall be made by the same manufacturer as the pipe and shall be made of the same base material as the pipe which it connects.

PE Pipe: Corrugated High Density Polyethylene (CPE) pipe, couplings, and fittings shall comply with the requirements of SECTION 9-05.20 of the Standard Specifications.

12-INCH AND SMALLER PIPE

PVC Pipe: Polyvinyl chloride (PVC) pipe shall conform with requirements specified in SECTION 9-05.12(1) of the Standard Specifications (ASTM D 3034, DR 35). The pipe joint type shall be restrained gasket.

OR

PE Pipe: Corrugated High Density Polyethylene (CPE) pipe, couplings, and fittings shall comply with all the requirements of Section 9-05.20. Joints shall be water-tight.

Pipe shall be as manufactured by Hancor, Advanced Drainage Systems, Inc., or approved equal.

The perforated underdrain pipe for infiltration trenches approved for use shall be as follows:

PE Pipe: Perforated Corrugated High Density Polyethylene (CPE) underdrain pipe, couplings, and fittings shall comply with all the requirements of SECTION 9-05.2(8) of the Standard Specifications.

DRAIN ROCK: Drain rock for use as backfill for the perforated underdrain pipe in infiltration trenches shall be clean coarse aggregate conforming to the requirements for "Gravel Backfill for Drywells" as specified in SECTION 9-03.12(5) of the Standard Specifications.

7-04.3(1) Cleaning and Testing

7-04.3(1)A General

No infiltration or exfiltration test will be required for the storm drain pipe.

7-05 MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS

7-05.2 MATERIALS

Section 7-05.2 of the Standard Specifications shall be revised as follows:

Drain Rock: Backfill for drywells and infiltration trenches shall be Gravel Backfill for Drywells as specified in Section 9-03.12(5) of the Standard Specifications.

Manhole Metal Castings: All cast iron frames and covers shall be as specified in SECTION

9-05.15(1) of the Standard Specifications. All cast iron frames and covers to be used on this project shall be manufactured in the U.S. and shall be of the type, weight, and size approved by the City of Selah, and shall be furnished by the Contractor. Covers for sanitary sewer shall be stamped "SEWER." Covers for storm drain shall be stamped "STORM."

Precast Concrete Catch Basin: Catch basins shall be WSDOT Type I, IL or II and constructed as shown on the City Standard Details.

Catch Basin Metal Castings: All frames and grates shall be manufactured in the U.S. and capable of withstanding, with a reasonable margin of safety, a concentrated load of 20,000 pounds and shall be as specified in SECTION 9-05.15(2) of the Standard Specifications and Standard Plan B-30.10 and B-30.50. The grate shall be ductile iron and "bicycle safe." The contact surfaces of the frame and grate shall be machine finished to a common plane and shall be so cast as to prevent rocking.

Construction Geotextile: All geotextile fabric for underground drainage applications shall be Moderate Survivability - Class B as specified in Section 9-33.2(1).

Precast Concrete Pretreatment Manhole: Stormwater pretreatment manholes shall be approved by the Washington State Department of Ecology (Ecology) with a General Use Level Designation (GULD), capable of 50% removal of fine (50 micron mean size) and 80% removal of coarse (125 micron mean size) total suspended solids (TSS) for influent concentrations greater than 100 mg/L, but less than 200 mg/L, as required by DOE.

Pretreatment manholes shall be constructed of pre-cast concrete manhole sections, flat top slab, and adjustment sections (similar to WSDOT Catch Basin Type 2, Standard Plan B-10.20-01), with cast iron covers as described above. The pretreatment insert shall be constructed of fiberglass and/or steel materials that are corrosion resistant. Manhole safety steps shall be provided as shown on the Plans and the pretreatment insert shall act as a platform for maintenance purposes.

Approved pretreatment manholes include Contech CDS, Stormceptor, Hydro International Downstream Defender, and Aqua-Swirl Concentrator.

The pretreatment manhole shall be capable of handling the specified water quality flows and shall incorporate a bypass within the unit to handle the specified peak flows. The pretreatment manhole shall be capable of incorporating multiple inlets/outlets, with the inlet and outlet pipes at 90 degrees to each other. Access to pretreatment insert ports and openings for maintenance shall be achieved through the cast iron cover(s).

7-05.3(1) Adjusting Manholes and Catch Basins to Grade

Delete and replace with the following:

Manholes, valve boxes, catch basins, and similar utility appurtenances and structures shall not be adjusted until the pavement is completed, at which time the center of each structure shall be relocated from references previously established by the Contractor.

The asphalt concrete pavement shall be cut and removed to a neat circle, the diameter of which shall be equal to the outside diameter of frame plus two (2) feet. The frame shall be placed on cement concrete blocks or adjustment rings and brought up to the desired grade. The base materials shall be removed and Class 3000 cement concrete shall be

placed within the entire volume of the excavation up to, but not to exceed, 2 inches below the finished pavement surface.

On the following day, a tack coat of asphalt shall be applied to the concrete, the edges of the asphalt concrete pavement, and the outer edge of the casting. HMA Cl. 3/8-Inch asphalt concrete shall then be placed and compacted with hand tampers and a patching roller.

The completed patch shall match the existing paved surface for texture, density, and uniformity of grade. The joint between the patch and the existing pavement shall then be sealed with emulsified asphalt and shall be immediately covered with dry paving sand before the tack has broken.

7-08 GENERAL PIPE INSTALLATION REQUIREMENTS

7-08.1 General

Add the following:

All construction work shall be inspected by the City of Selah prior to backfilling. At least 48 hours notice shall be given to the City Public Works Department prior to backfilling.

The Contractor shall notify the Utility Notification Center (One Call Center) at least 48 hours prior to start of excavation so that underground utilities may be marked. Telephone number is 1-800-424-5555.

7-08.3(1)C Bedding the Pipe

Add the following:

The imported pipe bedding and select backfill to be utilized for the trench backfill shall be crushed gravel, placed and compacted in layers as designated by the Director of Public Works. Crushed gravel shall conform to Section 9-03.9(3) Crushed Surfacing Top Course.

CHAPTER 7 - STREET IMPROVEMENTS

GENERAL REQUIREMENTS FOR STREETS

All new street design and construction must conform to these Design and Construction Standards of the City of Selah, the Selah Municipal Code, and the latest edition of the Standard Specifications.

TRAFFIC STUDIES

In order to provide sufficient information to assess a development's impact on the transportation system and level of service, the Public Works Director may require a traffic study to be completed by the Developer at the Developer's expense. This decision will be based upon the size of the proposed development, existing roadway condition, existing and expected, traffic volumes, accident history, expressed community concern, and other factors relating to transportation. Traffic studies shall be conducted under the direction of a traffic engineer or civil engineer licensed in the State of Washington and possessing special training and experience in traffic engineering. The level of detail and scope of the traffic study may vary with the size, complexity, and location of the proposed development. A traffic study shall, at a minimum, be a thorough review of the immediate and long-range effects of the proposed development on the City's transportation system. Guidelines for the traffic study shall be reviewed by the Public Works Director on a project basis. ADT and peak hour volumes for the development shall be estimated using the trip generators found in the latest edition of the Trip Generation Manual published by ITE.

STREET REQUIREMENTS

Arterial streets serve as the high volume corridors that connect the major traffic generators and shall be designed with a minimum seventy (70) foot-wide Right of Way and forty-four (44) foot-wide roadway surface face of curb to face of curb. Face of curb radius at intersection shall be a minimum of 50 feet and the street centerline radius shall be designed to a minimum 40 mph design speed or as approved by the Public Works Director. Both Arterial and Collector streets shall be designed for a WB-50 vehicle and HS-25 loadings.

Collector streets shall be designed with a minimum sixty (60) foot-wide right of way and a forty (40) foot-wide roadway surface face of curb to face of curb. Face of curb radius at intersection shall be a minimum of forty (40) feet and the street centerline radius shall be designed to a minimum 35 mph design speed or as approved by the Public Works Director.

Local Access (Residential) streets shall be designed with a minimum fifty (50) foot-wide right of way and thirty-two (32) foot-wide roadway surface curb to curb. Face of curb radius at intersection shall be a minimum of twenty-five (25) feet and street centerline radius shall be designed to a minimum of 30 mph design speed or as approved by the Public Works Director.

The maximum length of a cul-de-sac street shall be 600 feet measured along the street centerline from the nearest street intersection to the throat of the cul-de-sac. Where it is not feasible to construct a cul-de-sac turnaround, the City may allow the use of an "L" or "Hammerhead" turnaround upon approval. The minimum cul-de-sac right-of-way is a radius of 55 feet and a curb radius of 45 feet.

A subdivision of 15 or more lots shall have two or more access points. Street intersections shall not be less than 80 degrees. Offset street intersections shall be not less than 200 feet for arterial and collector streets and 100 feet for local access streets. Street grades shall be kept to a minimum and no street grade shall be less than two tenths (0.02) percent or greater than twelve

(12) percent. Vertical curves shall be designed when the grade difference is greater than two (2) percent.

Sidewalks shall be installed on both sides of Arterial and Collector streets. Sidewalks shall be constructed when homes/businesses are constructed and shall be completed prior to occupancy.

Cement concrete traffic curb and gutter and sidewalk(s) shall be installed along all new streets unless otherwise approved by the City of Selah. Mountable curb is allowable for local access interior and dead end streets in subdivisions, except for the corner lot at an intersection, where the curb shall be full height. There shall be a 10-foot long transition from the full height curb to the mountable curb.

Driveways shall be located on the lowest classification of roadway abutting the development. Driveways accessing onto arterial streets are discouraged and shall be limited. Driveway widths and locations are limited to one per lot as approved by the Public Works Director. "Corner" lot driveway shall be located as far as possible from the street intersection.

A street light shall be installed at each street intersection, and at mid block, no more than one hundred seventy-five (175) feet apart, and at ends of culs-de-sac. Street lights shall meet the design and placement requirements of these Design and Construction Standards and the City Public Works Director and the local electric utility.

Installation of monument case with cover caps and monument cases at the centerline of street intersects and at other locations as directed by the Public Works Director is required in new developments.

Traffic control signs and sign posts shall be provided and installed by the developer in accordance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD) and City Design and Construction Standards.

SPECIAL PROVISIONS FOR STREETS

The following sections of the Standard Specifications have been amended or supplemented as described below.

2-03 ROADWAY EXCAVATION AND EMBANKMENT

2-03.3(14)C Compacting Earth Embankments

All embankment construction shall be compacted by Method "C" as specified in the above section.

2-03.3(14)D Compacting and Moisture Control Tests

The contractor shall notify the City and Consultant when the subgrade is ready for in-place density tests and the materials testing firm will be on the site. Placement of aggregate surfacing courses shall not proceed until subgrade density requirements are met.

2-07 WATERING

2-07.1 DESCRIPTION

The Contractor shall be solely responsible for dust control on the Developer's project and shall protect the adjacent property, homes and businesses, orchards, crops and school yards from dust

by whatever means necessary. The Contractor shall be responsible for any claims for damage or dust impacts and shall protect the City and the Developer from all such claims.

When directed by the City, the Contractor shall provide and apply water within two hours of such an order, including on weekends and holidays.

5-04 HOT MIX ASPHALT

5-04.1 Description

Supplement this section with the following:

An asphalt prime coat will not be required, nor will a soil sterilant be required to be applied to the subgrade.

Asphalt concrete surfaces shall be so constructed that the finished pavement will conform to the cross-section, line, and grade as shown on the Plans and in accordance with the referenced Standard Specifications.

5-04.2 Materials

Supplement this section with the following:

The class of hot mix asphalt shall be: HMA Class 1/2"
The grade of asphalt binder shall be: PG 64-28

5-04.3 Construction Requirements

5-04.3(2) Hauling Equipment

Supplement this section with the following:

Sufficient numbers of trucks shall be provided by the Contractor to assure a continuous paving operation at proper HMA mix temperatures. Paving operations shall not proceed until hauling equipment sufficient to assure continuous operations is provided.

5-04.3(3) Hot Mix Asphalt Pavers

Supplement this section with the following:

The HMA paver that is utilized shall be capable of spreading and finishing courses of HMA plant mix material in a width from centerline of the roadway to the edge of the roadway or gutter in a single pass (up to 22-foot width).

5-04.3(5)E Pavement Repair

Supplement this section with the following:

After the completion of trench and patch repairs, the Contractor shall seal all joints with CSS-1 and concrete sand.

5-04.3(7) Preparation of Aggregates

5-04.3(7)A1 General

Supplement this section with the following:

The Contractor may submit for acceptance an approved WSDOT mix design for the class of HMA specified in the contract if the mix design has been approved within the previous 12-month period using aggregate and asphalt binder from the same sources. The Contractor shall provide the mix design to the City at least fifteen (15) working days prior to any paving.

5-04.3(7)A2 Statistical or Nonstatistical Evaluation

Delete this section and replace it with the following:

The Contractor shall be responsible for verification of the mix design.

5-04.3(8)A Acceptance Sampling and Testing – HMA Mixture

5-04.3(8)A1 General

Delete this section and replace it with the following:

Acceptance of HMA shall be as provided under Nonstatistical or Commercial evaluation.

Commercial evaluation will be used for Commercial HMA and for other classes of HMA in the following applications: Sidewalks, road approaches, ditches, slopes, paths, trails, gores and other nonstructural applications as approved by the City. Sampling and testing of HMA accepted by commercial evaluation will be at the option of the City. The proposal quantity of HMA that is accepted by commercial evaluation will be excluded from the quantities used in the determination of Nonstatistical evaluation.

Commercial HMA can be used for patching utility or conduit trenches less than 24 inches in width.

5-04.3(10) Compaction

5-04.3(10)B Control

Delete this section and replace with the following:

HMA used in traffic lanes, including lanes for ramps, truck climbing, weaving, and speed change, and having specified compacted course thickness greater than 0.10 foot, shall be compacted to a specified level relative density. The specified level of relative density shall be a minimum of 91.0 percent of the reference maximum density as determined by WSDOT for AASHTO T 209. The reference maximum density shall be determined as the moving average of the most recent five determinations for the lot of HMA being placed. The specified level of density attained will be determined by five nuclear gauge tests taken in accordance with WAQTC FOP TM8 and WSDOT SOPT 729 on the day the mix is placed (after completion of the finish rolling) at locations determined by the stratified random sampling procedure conforming to WSDOT Test Method 716 within each density lot. The quantity represented by each density lot will be no greater than a single day's

production or approximately 400 tons, whichever is less. The City will furnish the Contractor with a copy of the results of all acceptance testing performed in the field within one working day.

In addition to the randomly selected locations for tests of density, the City may also isolate from a normal lot any area that is suspected of being defective in relative density. Such isolated material will not include an original sample location. A minimum of five (5) randomly located density tests will be taken.

Control lots not meeting the minimum density standard shall be removed and replaced with satisfactory material.

HMA constructed under conditions other than those listed above shall be compacted on the basis of a test point evaluation of the compaction train. The test point evaluation shall be performed in accordance with instructions from the City. The number of passes with an approved compaction train, required to attain the maximum test point density, shall be used on all subsequent paving.

5-04.3(11) Reject Work

Supplement this section with the following:

Delete all references to Combined Pay Factor (CPF). HMA not meeting the quality requirements of the City shall be rejected, including use of HMA Cl. 3/8-Inch.

5-04.3(13) Surface Smoothness

Supplement this section with the following:

Where directed by the City, the Contractor shall feather the HMA pavement in a manner to produce a smooth-riding connection to the existing pavement.

HMA Cl. 3/8-inch shall be utilized in the construction of the feathered connections to existing pavement.

5-04.3(14) Planing Bituminous Pavement

The third paragraph of this section is deleted and replaced with the following:

The ground HMA material resulting from the pavement planing operation shall become the property of the City when so desired.

The Contractor shall haul and stockpile the material at a location as directed by the City.

All other debris resulting from the planing operation shall become the property of the Contractor and be disposed of in accordance with Section 2-03.3(7)C.

5-04.3(17) Paving Under Traffic

Delete the following in the last paragraph:

"except the costs of temporary pavement markings"

5-04.3(19) Sealing of Pavement Surfaces

Revise the first sentence to read:

"The Contractor shall apply a fog seal to all travel lanes and allow it to cure prior to opening the lane to traffic, when the wearing course is placed after October 1 and before April 1."

8-04 CURBS, GUTTERS, AND SPILLWAYS

8-04.3(1) Cement Concrete Curbs, Gutters, and Spillways

This section is supplemented with the following:

Cement concrete traffic curb and gutter shall be as shown on the City's Standard Plans. Full Height or "Barrier" cement concrete traffic curb and gutter as shown shall be used on the roadway as shown on the Plans. Depressed or "Driveway" cement concrete traffic curb and gutter as shown shall be used at all driveway entrances and sidewalk ramp locations as shown on the Plans and as directed in the field by the Engineer. Mountable or "Rolled" curb shall be used on the roadway as shown on the Plans. Cement concrete curb and gutter which does not comply with the City's details shall be removed and replaced at the Contractor's expense.

A template shall be required to be placed at the back of curb for construction of driveway transitions from Barrier to Driveway or Rolled curb and gutter. The template shall extend from the bottom of curb to the top of the curb, and shall have a minimum length of 10 feet, with the 6-foot long transition centered in the template. The Contractor shall also be required to use a template at the back of Driveway/Depressed curb and gutter to ensure a straight and uniform back of curb in conformance with the Standard Plan.

The new concrete curb and gutter shall be cured in accordance with SECTION 5-05.3(13)B of the Standard Specifications. Application of the curing compound shall be in accordance with the manufacturer's recommendations.

First-class workmanship and finish will be required on all portions of concrete curb and gutter work. Quality of workmanship and finish will be evaluated continuously and will be based solely upon the judgment of the Engineer. The Contractor shall be required to construct a minimum 20 linear foot section of curb and gutter which demonstrates quality which is acceptable by the Owner and Engineer. This "model" section will be referenced during construction for comparison to newly poured curb. If at any time it is found that quality is unacceptable, work shall be immediately stopped, and no additional curb and gutter shall be placed. Cement concrete curb and gutter which does not comply with the section details on the Plans, or in the Engineer's opinion does not demonstrate first-class workmanship and finish, shall be removed and replaced at the Contractor's expense. Should the Contractor's equipment or methods be unable to produce curb and gutter meeting the requirements of the Details and Specifications, no further curb and gutter construction will be allowed until corrections have been made to said equipment or methods.

8-06 CEMENT CONCRETE DRIVEWAY ENTRANCES

8-06.3 Construction Requirements

This section is supplemented with the following:

The concrete driveway entrance/sidewalk shall be six (6) inches in thickness.

8-14 CEMENT CONCRETE SIDEWALKS

8-14.3(3) Placing And Finishing Concrete

This section is supplemented with the following:

All sidewalks not located in driveway entrance areas shall be four (4) inches in thickness. All sidewalks and concrete driveway entrances located behind a Depressed curb and gutter section or Rolled Curb section shall be six (6) inches in thickness.

Sidewalks shall be marked across the entire width every five (5) feet and with preformed asphalt impregnated joint fillers 3/8-inch thick every twenty (20) feet. Concrete sidewalk shall be cured in accordance with SECTION 5-05.3(13)A of the Standard Specifications. Application of the curing compound shall be in accordance with the manufacturer's recommendations. Failure to properly secure or seal the cement concrete sidewalk will require the Contractor to remove and replace the sidewalk section at his expense.

Sidewalk ramps, in accordance with the City Standard Plan, shall be constructed at all intersections as shown on the Detail Sheet and at a width shown on the plans. Ramps shall include a detectible warning pattern approved by the City.

First-class workmanship and finish will be required on all portions of cement concrete sidewalk work. Quality of workmanship and finish will be evaluated continuously and will be based solely upon the judgment of the Engineer. If at any time it is found that quality is unacceptable, work shall be immediately stopped, and no additional sidewalk shall be placed. Cement concrete sidewalk which does not comply with the section details on the Plans, or in the Engineer's opinion does not demonstrate first-class workmanship and finish, shall be removed and replaced at the Contractor's expense. Should the Contractor's equipment or methods be unable to produce sidewalk meeting the requirements of the Details and Specifications, no further sidewalk construction will be allowed until corrections have been made to said equipment.

8-20 ILLUMINATION, TRAFFIC SIGNAL SYSTEMS, AND ELECTRICAL

8-20.1 Description

Supplement this section with the following:

All illumination and electrical work shall be coordinated with Pacific Power and the City of Selah.

8-20.2 Materials

Supplement this section with the following:

The provisions of Section 9-29 shall apply, except for the following modifications or additions:

Conduit: Below grade conduit shall be Schedule 40 PVC, conforming to NEMA TC 2. Rigid Steel Conduit and Fittings shall be used for all bends, entrances, and exits of pull boxes and where required by code. Conduit bends shall have no less than 12-Inch radius. "Push-Penny" plugs shall be used at all terminations to keep conduits clean.

A 1/8-Inch braided nylon rope, 450 pounds minimum breaking strength, shall be installed in each conduit run with two (2) feet doubled back at each termination. When the conductors are pulled, a rope shall be re-pulled with the conductor and left for future use. Pull rope shall be installed in all spare conduits.

Light Standards: Poles and arms shall be hot-dipped galvanized over their entire surface per ASTM A-123. Anchor bolts, nuts, and washers shall be hot-dipped galvanized over their entire length per ASTM A-153. All poles, arms and accessories shall be furnished by the same manufacturer.

Luminaire poles shall provide a nominal mounting height of thirty-seven (37) feet and have ten (10) foot arms for Collectors and Arterials, and eight (8) foot arms for Local Access roadways. The pole base shall be of the "fixed" type. Handholes shall be 4 inches by 6-1/2 inches, located 18 inches above the base, turned toward the street. A ½-inch NC ground stud shall be located inside the handhole. Light standards shall be designed to a minimum of 90 MPH wind velocity.

Accessories shall include anchor bolts (each with heavy hex nuts and washers) as sized by the manufacturer, bolt templates, full base covers, and removable pole end caps.

Luminaires: LED luminaires shall be CREE LED XSP2 Series, Version C, Type 3ME (Arterial and Collector) or Type 2ME (Local Access), both w/BLS Distribution, standard 4000k, 139W, 120-277V, without individual photoelectric controls. Luminaires shall be CREE LED XSP2 Series or approved equal.

Electrical Service: Service shall be a 200 AMP post mounted service cabinet, type EUSERC 308 as required by Pacific Power.

8-20.3 Construction Requirements

8-20.3(1) General

Supplement this section with the following:

Prior to installation, the Contractor shall inform the City when the luminaire equipment has arrived on-site. The City will compare the supplied luminaire equipment to these Design and Construction Standards prior to installation and must be present during installation to check for socket settings and luminaire head orientation.

The Contractor is responsible for coordinating with the Department of Labor and Industries, serving electrical utility, and authority having jurisdiction for all required inspections and service.

8-20.3(2) Excavation and Backfill

Delete the first paragraph and replace it with the following:

The excavation required for the installation of conduit, cement concrete anchor bases, and pullboxes shall be performed in such a manner as to cause the least possible injury to streets, sidewalks, and other improvements. Anchor base excavation shall be augered or dug by hand with proper care to avoid damage to other utilities. Excavation shall not be performed until immediately prior to installation of conduit and/or structures. Backfilling shall be as shown on the Plans and shall conform to the provisions specified herein. Compaction of conduit trenches and structure backfill shall be accomplished by a method which will result in backfill compacted to at least 95 percent of maximum density.

8-20.3(4) Foundations

Supplement this section with the following:

The top six inches (anchor base) of the concrete foundation shall be formed and finished 24-inches square with 3/4-Inch chamfer edges, and the top shall be at finish sidewalk grade. The anchor base shall be separated from adjacent concrete surfaces by means of expansion joints. Forms for the anchor bases shall be true to line and grade and the conduit ends and anchor bolts shall be held in proper position and height by means of a temporary template. After standards are plumbed, the Contractor shall grout between the base plate and anchor base as shown on the Plans.

8-20.3(5) Conduit

Supplement this section with the following:

The ends of conduits for future connection shall be marked with an 18" long section of #4 rebar buried vertically with the top of the rebar set 6" below the finished grade.

8-20.3(6) Junction Boxes, Cable Vaults, and Pull boxes

Replace the first paragraph with the following:

The terms "pullbox" and "junction box" are considered interchangeable.

Pullboxes shall be constructed as shown on the Plans and in accordance with Standard Plan J-40.10-03 Type 1. The pullboxes shall be installed true to line and grade. The pullboxes shall be placed where shown on Plans and shall be separated from other concrete surfaces by an expansion joint.

8-20.3(10) Electrical Service

Supplement this section with the following:

A 120/240 V single phase electrical service shall be provided as determined by the City. The Contractor shall coordinate the final location of the service with the local electrical utility company and City. A State electrical permit will be required for the service. All wiring and equipment shall be in conformance with the appropriate electrical codes.

All of the work shall meet the requirements of Pacific Power and the National Electric Code. The Contractor shall provide conduits to the proposed service locations shown on the Plans and shall coordinate the location of the service(s) with Pacific Power.

8-20.3(13)A Light Standards

Supplement this section with the following:

Light standards shall have base flanges requiring four (4) anchor bolts for connection to foundation. Anchor bolt covers shall be provided on all light standards.

8-21 PERMANENT SIGNING

8-21.2 MATERIALS

This section is supplemented with the following:

Sign posts for permanent signing within an approved development shall be Unistrut Telespar 2" x 2" 12 gauge steel tubing or 2" galvanized pipe. Socket sleeves for sign posts shall be 2 1/4" x 2 1/4" x 30" 12 gauge steel tubing.

Reflective background sheeting material shall be Type III for regulatory signs and Type I for all other signs unless otherwise directed by the City.

8-21.3 CONSTRUCTION REQUIREMENTS

This section is supplemented with the following:

Socket sleeves for sign posts shall be set in 12" diameter x 18" deep base of class 3000 concrete at finish grade so that erected signs will be plumb. The Contractor shall correct any misaligned sign posts at his own expense. Signs shall be located 12" behind the sidewalk.

8-30 CONTROLLED DENSITY FILL (NEW SECTION)

The following new section shall be added to the Standard Specifications:

8-30.1 GENERAL

Controlled Density Fill (CDF) may be required for street crossings by the Public Works Director. It shall be a mixture of Portland Cement, fly ash, aggregate, water, and admixtures proportioned to provide a non-segregating, self-consolidating, free-flowing material which will result in a hardened, dense, non-settling fill.

8-30.2 MATERIALS

Materials shall meet the requirements of the following Sections of the Standard Specifications:

Portland Cement	9-01 Type II
Fly Ash	Class F or C
Aggregates	9-03.1
Water	9-25
Admixtures	9-23.6

8-30.3 CONSTRUCTION REQUIREMENTS

8-30.3(1) Construction Materials

The CDF shall be a mixture of Portland Cement, fly ash, aggregate, water, and admixtures which has been batched and mixed in accordance with Section 6-02.3 of the Standard Specifications.

The following table provides a guideline for proportioning the Controlled Density Fill for this project. The final mix provided by the Contractor shall result in a material which is excavatable by machine with a maximum unconfined compressive strength of 300 psi.

Water	50 gals per cubic yard
Cement	50 lbs per cubic yard
Fly Ash	250 lbs per cubic yard
Aggregate	3,200 lbs per cubic yard

The above table provides a guideline for the CDF mixture. The weights shown are only an estimate of the amount to be used per cubic yard of CDF. Actual amounts may vary from those shown as approved by the Engineer or approved mix data from similar projects which provided proper strength, workability, consistency, and density.

8-30.3(7) Placing Controlled Density Fill

The floatable CDF shall be placed in the trench area where directed by the Engineer or Inspector for smaller jobs and brought up uniformly to the elevation directed. In the cases where existing concrete slabs have been undermined by excavation, the Contractor shall ensure that the CDF is flowed completely under the slab.

Mixing and placing may be started if weather conditions are favorable, when the temperature is at least 34° F and rising. At the time of placement, CDF must have a temperature of at least 40° F. Mixing and placing shall stop when the temperature is 38° F and falling. Each filling stage shall be as continuous an operation as practicable. CDF shall not be placed on frozen ground.

The trench section to be filled with CDF shall be contained at either end of trench section by bulkhead or earth fill.

APPENDIX A

TRANSFER OF OWNERSHIP OF PUBLIC WORKS IMPROVEMENTS
(Individual)

_____, the Developer or Owner(s), do(es) hereby transfer(s), deliver(s) and relinquish(es) to the City of Selah, Washington, all right, title and interest in, and ownership of, the following described Public Works Improvement located at:_____

_____

{ Water { Sewer { Stormwater { Streets

_____

_____

_____

_____

_____

_____

The undersigned owner(s) agree (s) and understand(s) that this transfer of ownership of the above described Public Improvement to the City of Selah is subject to the conditions of the 2nd paragraph of **Section 1-05.12 Final Acceptance** of the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation modified as follows:

> "Final acceptance shall not constitute acceptance of any unauthorized or defective work or material. The City shall not be barred from requiring the Contractor to remove, replace, repair, or dispose of any unauthorized or defective work or material or from recovering damages for any such work or material for a period of two (2) years."

This Transfer of Ownership shall be effective only upon the City's final approval and acceptance of the Constructed Improvements and the acceptance of the Project Record Drawings.

_____

PROPERTY OWNER/DEVELOPER DATE

ACCEPTED BY THE City of Selah

_____

AUTHORIZED OFFICIAL DATE

STATE OF WASHINGTON)
) **ss.**
Yakima County)

I certify that I know of and have satisfactory evidence that _____ and (is/are) the person(s) who personally appeared before me and that said person(s) acknowledged that (he/she/they) signed this instrument, and acknowledged it to be (his/her/their) free and voluntary act and for the uses and purposes mentioned in the instrument.

Dated: _____

Given under my hand and official seal the day and year last written.

_____
Notary Public in and for the State of Washington residing at _____

My Commission expires _____

TRANSFER OF OWNERSHIP OF PUBLIC WORKS IMPROVEMENT
(Corporate)

_____, the Developer or Owner(s), do(es) hereby transfer(s), deliver(s) and relinquish(es) to the City of Selah, Washington, all right, title and interest in, and ownership of, the following described Public Works Improvement located at:_____

_____

{ Water { Sewer { Stormwater { Streets

_____

_____

_____

_____

_____

_____

The undersigned owner(s) agree (s) and understand(s) that this transfer of ownership of the above described Public Improvement to the City of Selah is subject to the conditions of the 2nd paragraph of **Section 1-05.12 Final Acceptance** of the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation modified as follows:

> "Final acceptance shall not constitute acceptance of any unauthorized or defective work or material. The City shall not be barred from requiring the Contractor to remove, replace, repair, or dispose of any unauthorized or defective work or material or from recovering damages for any such work or material for a period of two (2) years."

This Transfer of Ownership shall be effective only upon the City's final approval and acceptance of the Constructed Improvements and the acceptance of the Project Record Drawings.

_____

PROPERTY OWNER/DEVELOPER DATE

ACCEPTED BY THE City of Selah

_____

AUTHORIZED OFFICIAL DATE

STATE OF WASHINGTON)
) ss.
Yakima County)

I certify that I know or have satisfactory evidence that _____ Is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument, and acknowledged it as the _____ of _____a _____to be the free voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

Given under my hand and official seal the day and year last written.

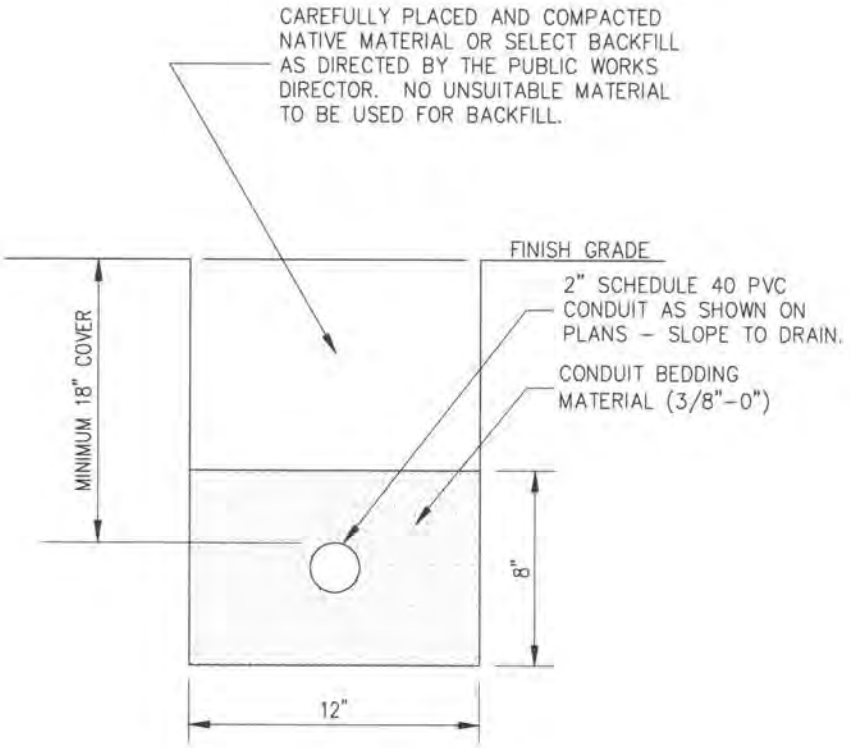
_____
Notary Public in and for the State of Washington residing at _____

My Commission expires _____

APPENDIX B

SELAH STANDARD DETAILS

E-1	Conduit Trench
E-2	Junction Box
E-3	Street Light
E-3A	Street Light – Pacific Power Leased
SD-1	Catch Basin
SD-2	Type 2 Catch Basin
SD-3	Infiltration System
SS-1	Manhole (Type 1)
SS-2	Sanitary Sewer Cleanout
SS-3	Drop Connection
SS-4	Manhole Adjustment Detail
SS-5	Sewer/Storm Trench Section
SS-6	Manhole Safety Step
SS-7	Side Sewer Connection
ST-1	Roadway Section - Arterial
ST-2	Roadway Section - Collector
ST-3	Roadway Section - Local Access (Residential)
ST-4	Concrete Curb & Gutter
ST-5	Concrete Sidewalk Sections
ST-6	Sidewalk Ramp
ST-7	Sidewalk Jointing
ST-8	Residential Driveway Entrance
ST-9	Trench Surfacing Repair
ST-10	Monument
ST-11	Asphalt Sidewalk Ramp
ST-12	Cul-de-Sac Layout
ST-13	Bollard
ST-14	Cement Concrete Commercial Driveway
ST-15	Corner Lot Vision Clearance
W-1	Watermain Trench
W-2	Fire Hydrant Assembly
W-3	Water Service
W-4	Water Meter and Service Replacement
W-5	Water Valve Box
W-6	Air Release/Vacuum Valve
W-7	Blow-Off Assembly
W-8	Irrigation Backflow Preventer
W-9	Typical Thrust Blocking
W-10	Fire Hydrant Guard Posts
W-11	Fire Service



CONDUIT TRENCH SECTION

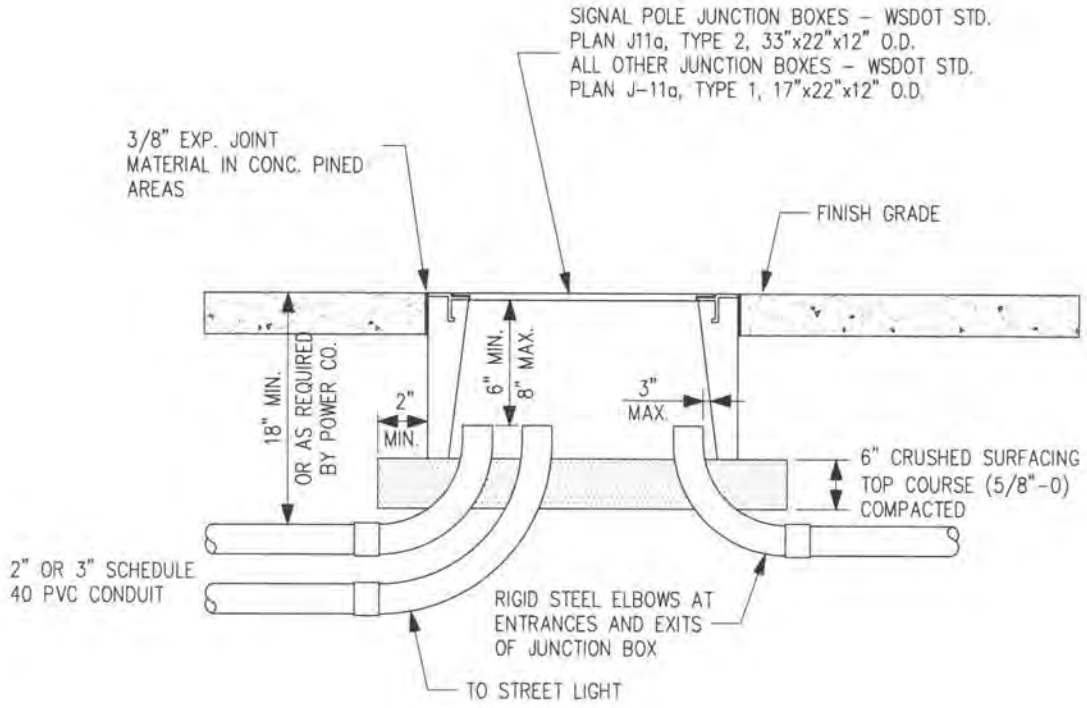
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	CONDUIT TRENCH	E–1



CONDUIT ENTRANCE AT JUNCTION BOX

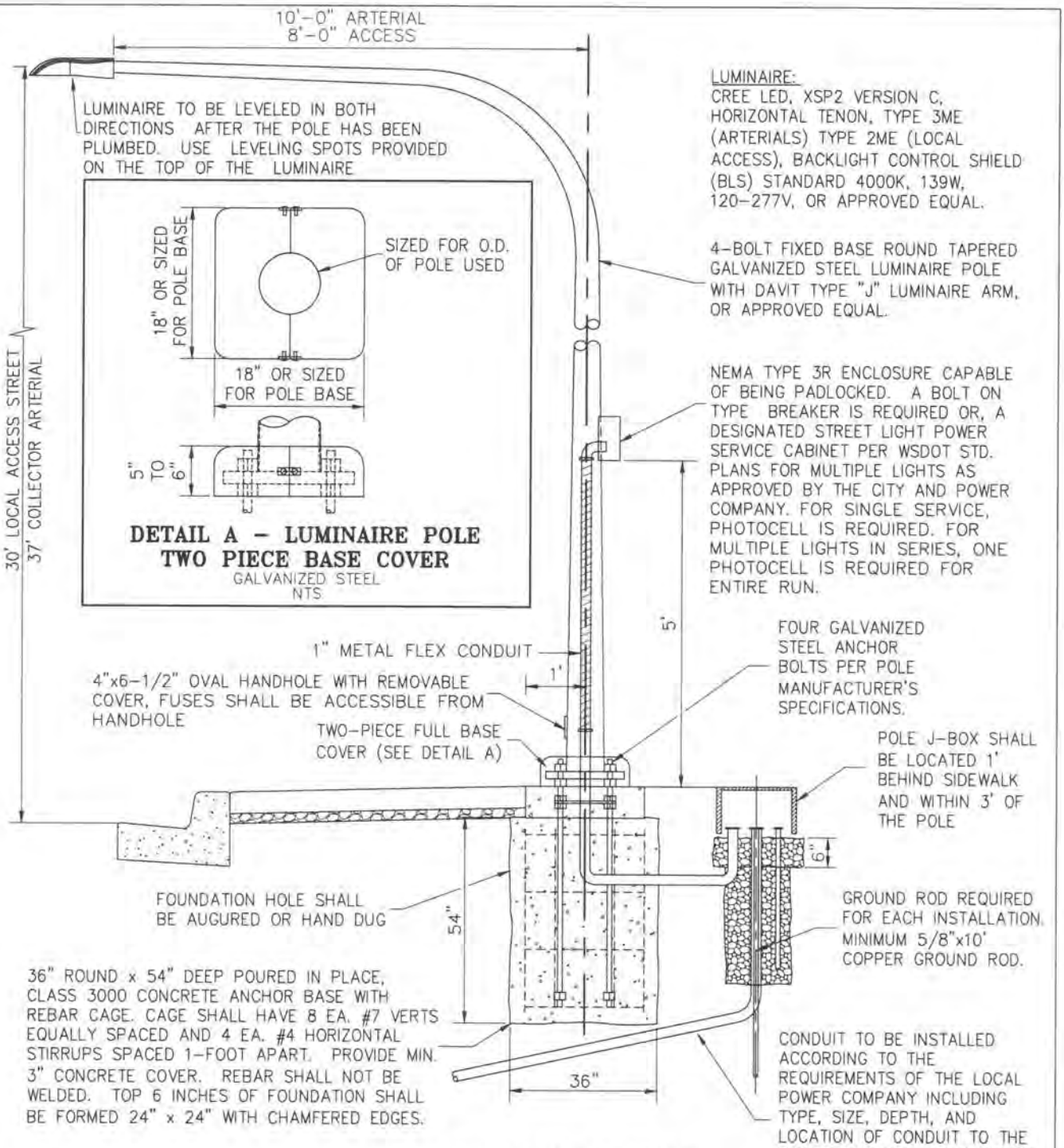
NOT TO SCALE

NOTES:

- GROUND ROD FOR PVC CONDUIT OR NO. 8 AWG BONDING JUMPER FOR METAL CONDUIT (RIGID) REQUIRED AT EACH JUNCTION BOX. SEE PLANS FOR CONDUIT TYPE.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	JUNCTION BOX	E–2



TYPICAL SECTION
NTS

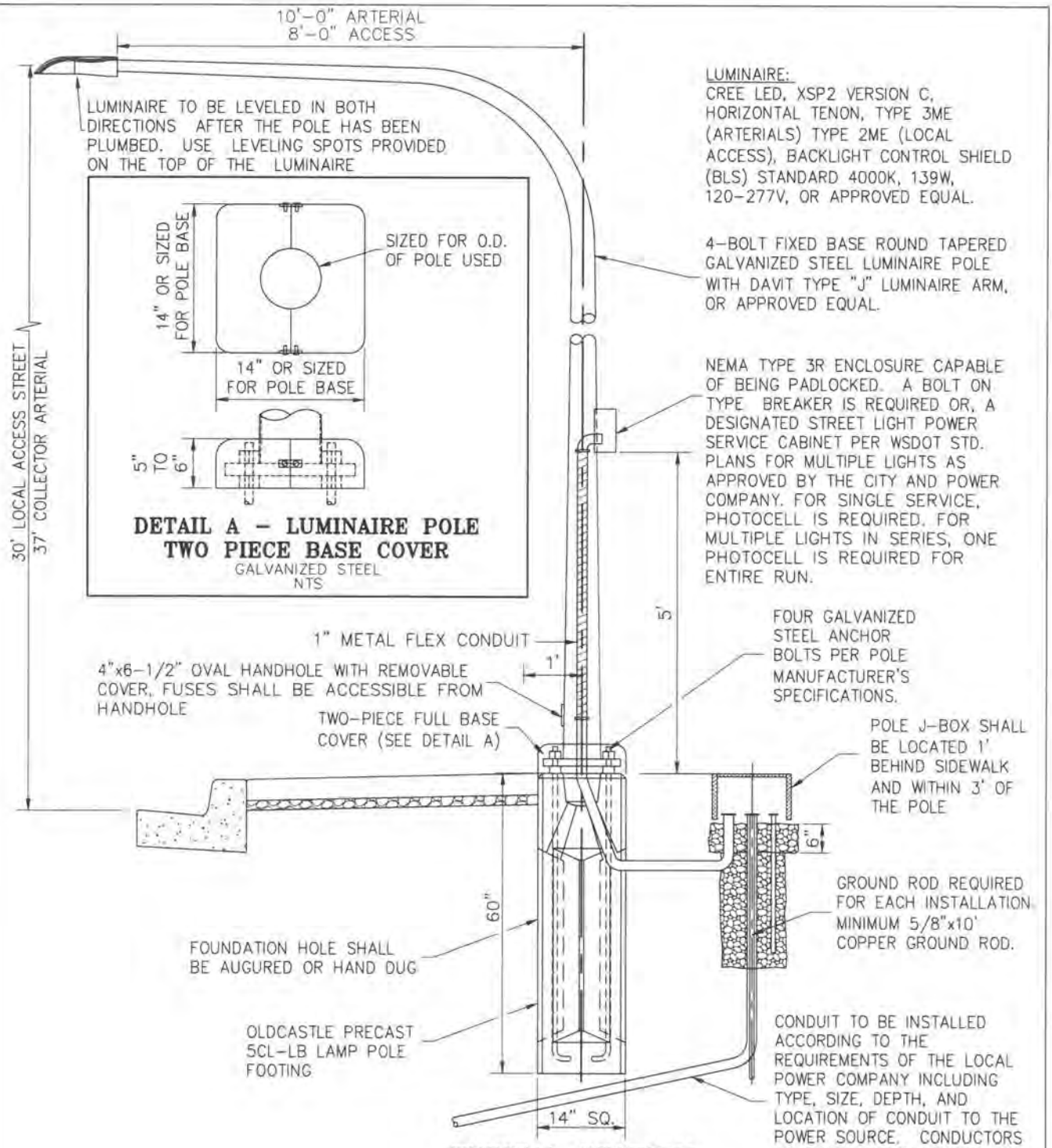
STREET LIGHT DETAIL

NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
	09/15	LED LUMINAIRE	
ORIG.	10/06		



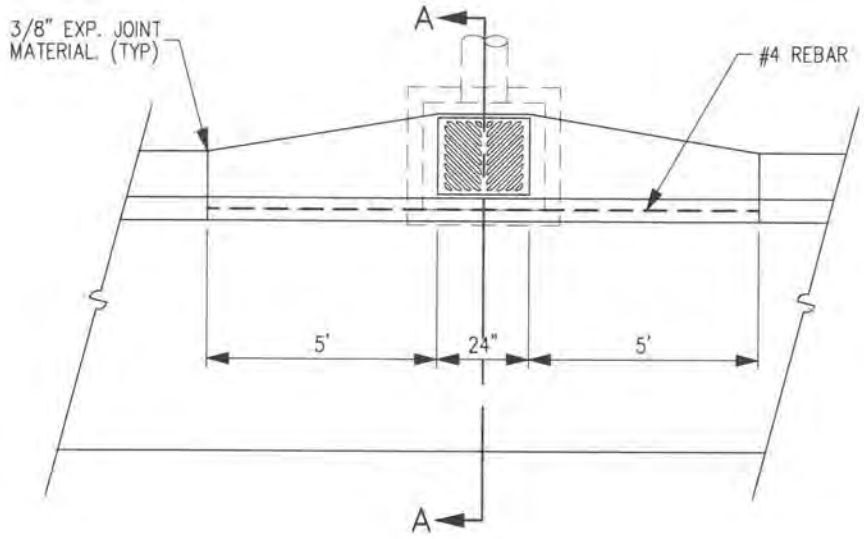
TYPICAL SECTION
NTS

STREET LIGHT DETAIL

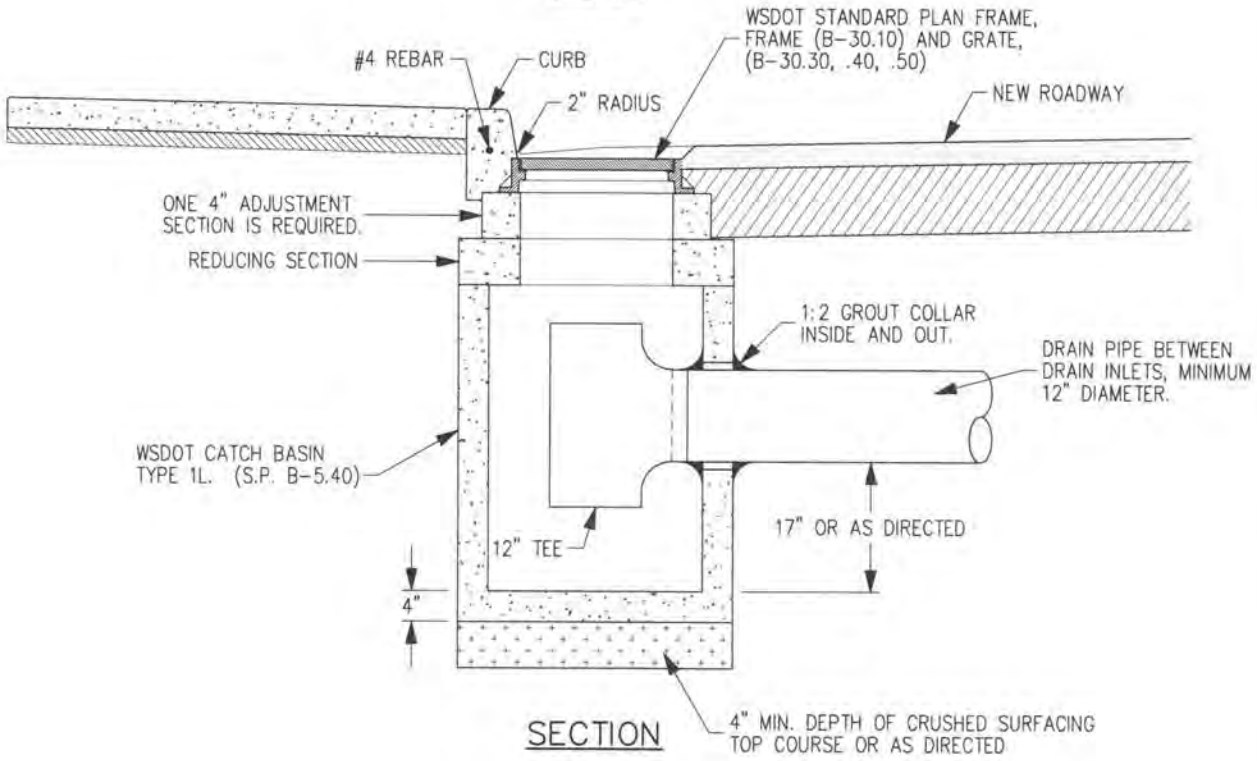
NOT TO SCALE

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
ORIG.	10/06		
	09/15	LED LUMINAIRE	
	04/19	PACIFIC POWER BASE	



PLAN



SECTION

CATCH BASIN DETAIL

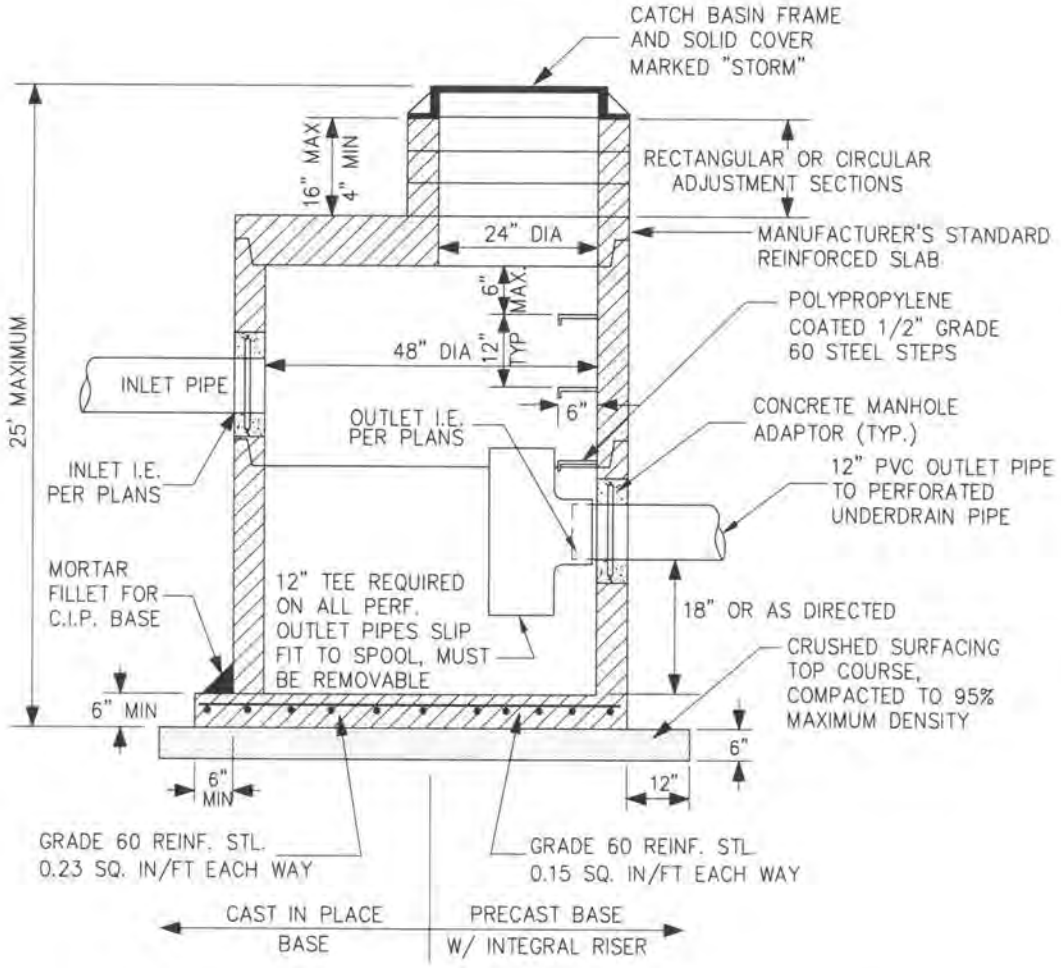
NOT TO SCALE

NOTES:

- USE VANED GRATES WHEN STREET GRADE EXCEEDS 4%.
- FRAMES AND GRATES SHALL BE MANUFACTURED IN THE UNITED STATES.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

REV 1	01/12	CHANGED ELBOW TO TEE	
ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	CATCH BASIN	SD–1



48" DIA. TYPE 2 CATCH BASIN (S.P. B-10.20)

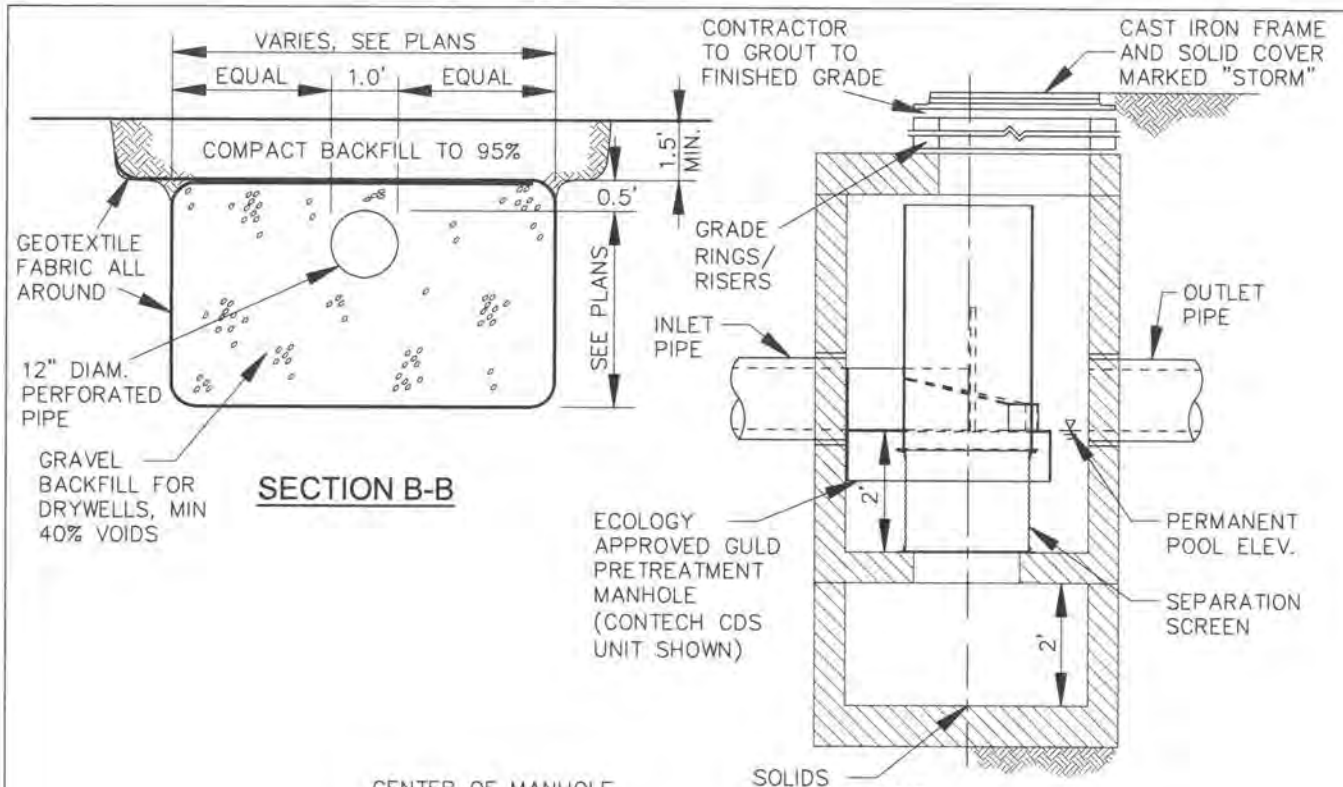
NOT TO SCALE

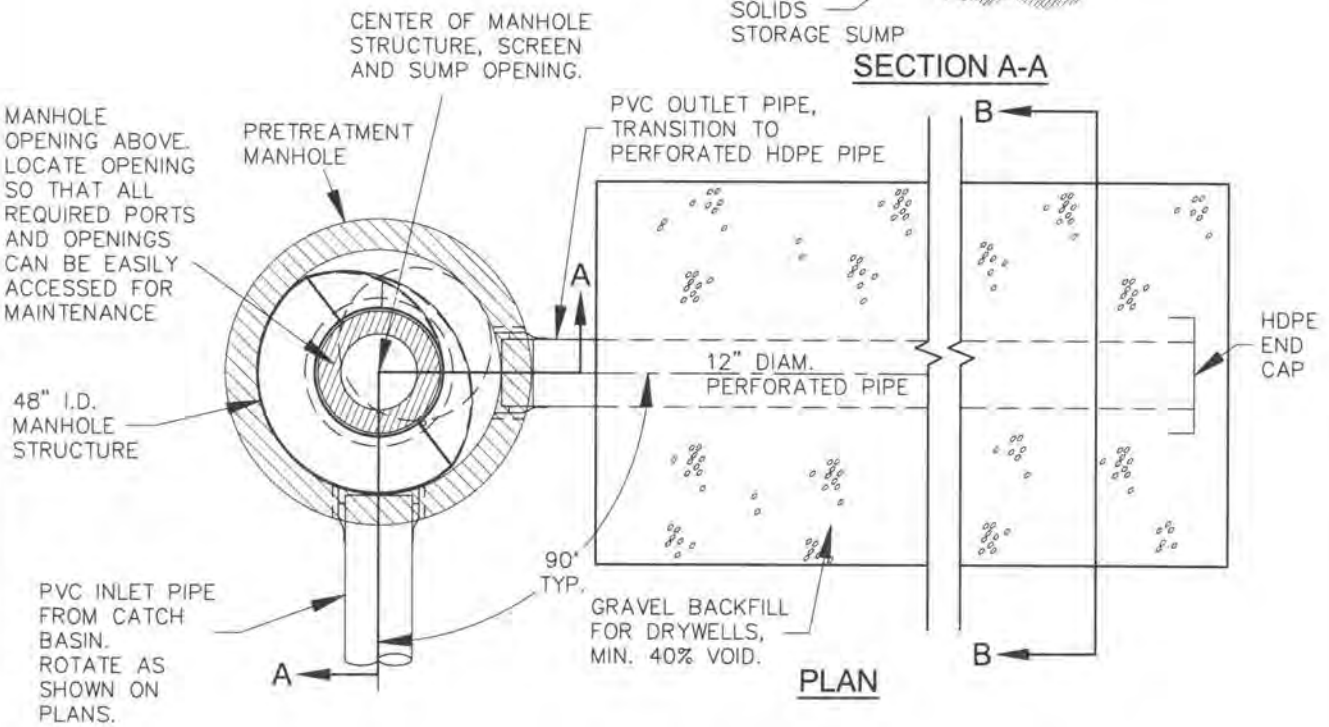
NOTES:

- FRAME AND GRATE SHALL BE MANUFACTURED IN THE UNITED STATES.
- SEE STANDARD DETAIL SS-4 FOR CATCH BASIN FRAME/ COVER ADJUSTMENT.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	TYPE 2 CATCH BASIN	SD-2





INFILTRATION SYSTEM

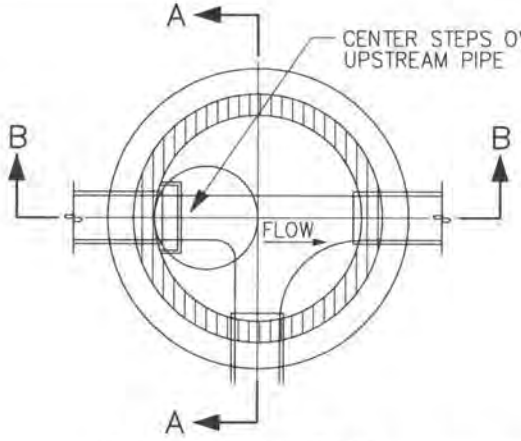
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

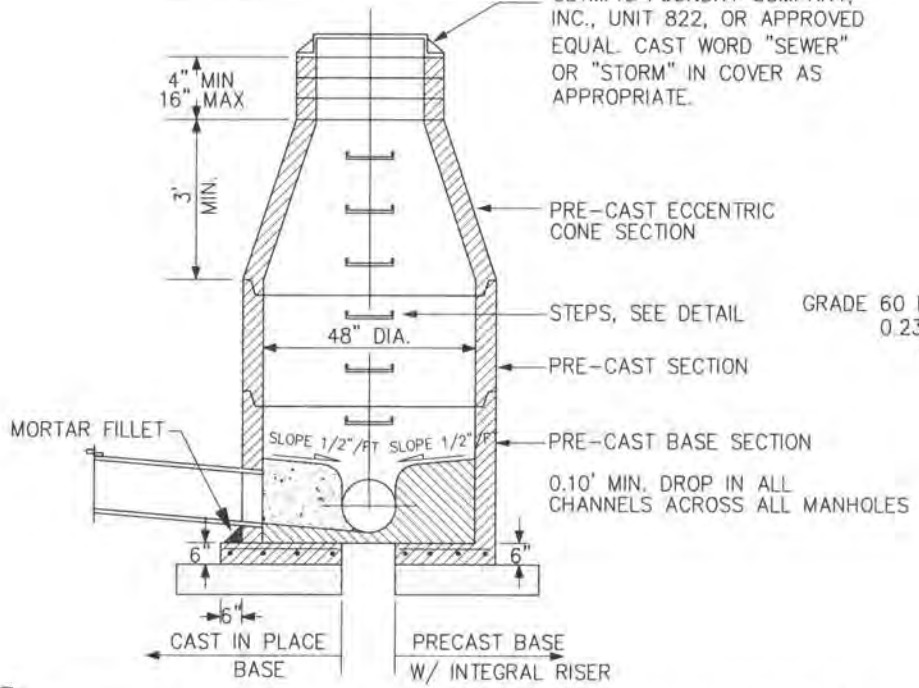
ORIG.	09/15		
Revision	Date	Description	Appr

CITY OF ZILLAH–STANDARD DETAIL	INFILTRATION SYSTEM	SD–3

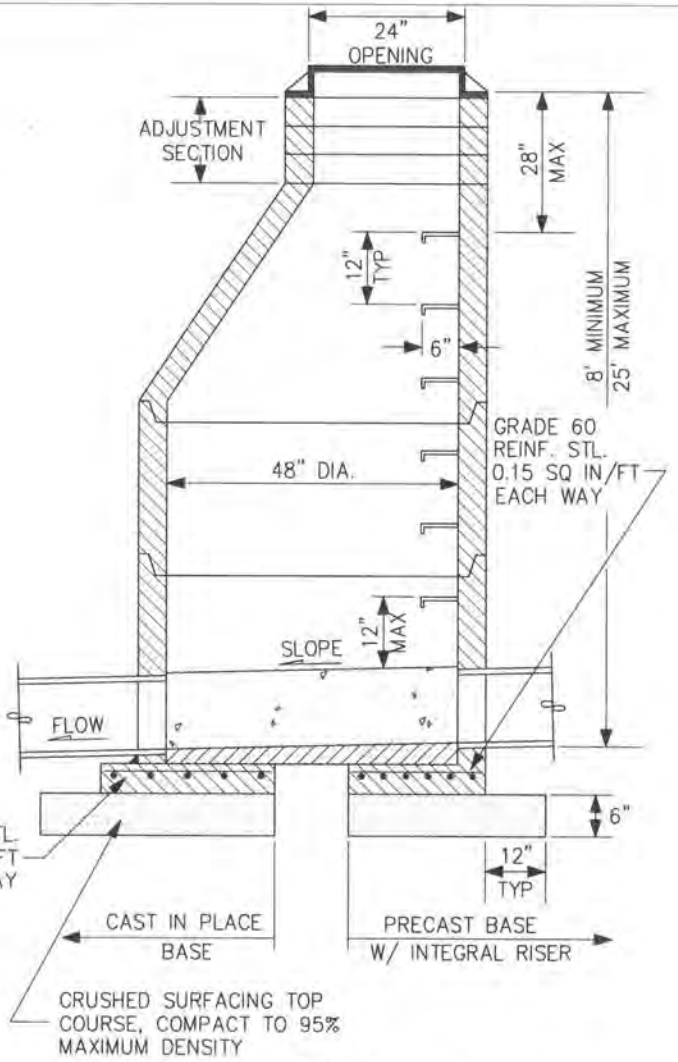


PLAN VIEW

FOR MANHOLES LESS THAN 8' HIGH, USE SHALLOW MANHOLE.



SECTION A-A



SECTION B-B

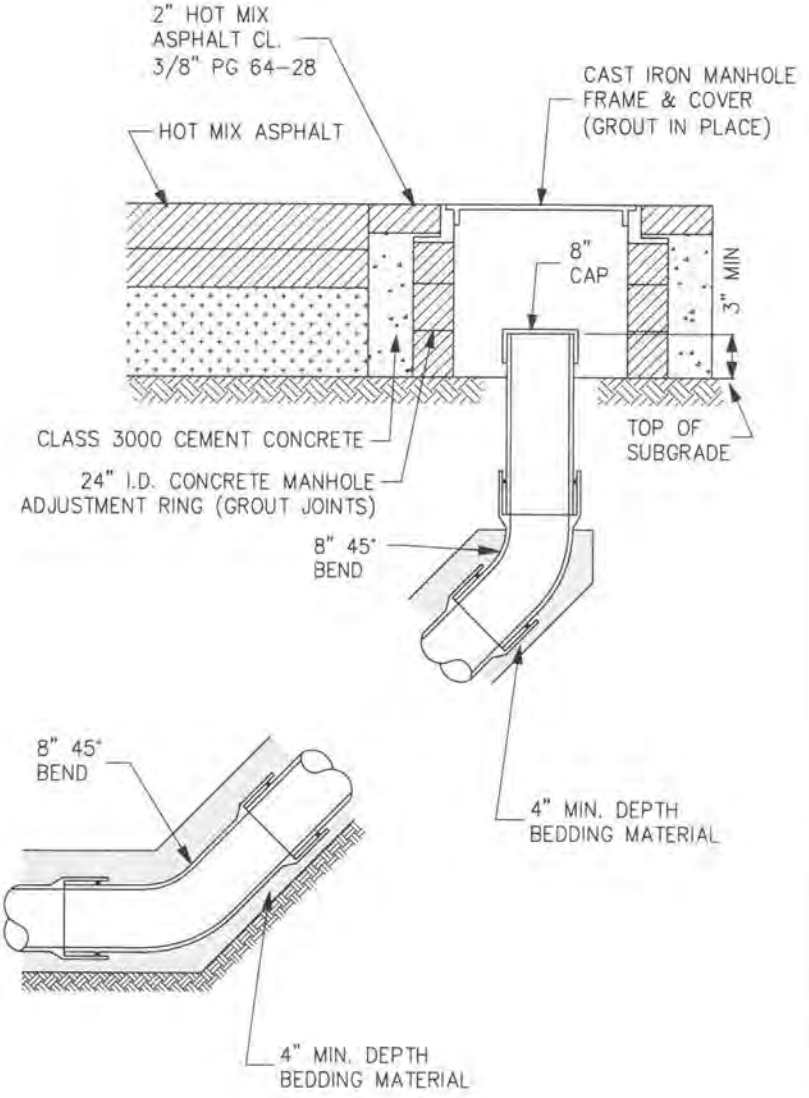
NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	MANHOLE (TYPE 1)	SS-1

NOTES:
1. CAST IRON FRAME & COVER SHALL BE OLYMPIC FOUNDRY COMPANY INC., UNIT 247 OR APPROVED EQUAL.
2. IN UNPAVED AREAS, SET FRAME & COVER FLUSH WITH FINISHED GRADE. EXTEND 12" THICK, 2' DIAMETER, CEMENT CONCRETE RING FLUSH WITH FRAME AND SLOPE OUTWARD AT 1/4"/FT.
3. CLEANOUT PIPE SHALL BE 8" DIA. PVC SEWER PIPE IN ACCORDANCE W/ THE STANDARD SPECIFICATIONS.



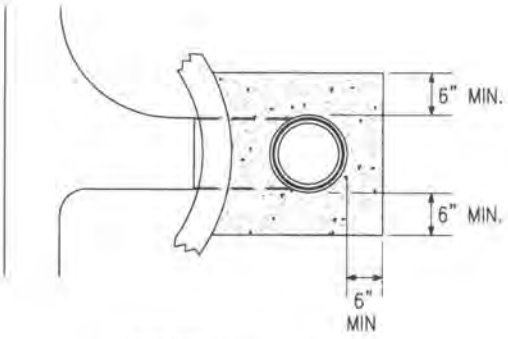
SANITARY SEWER CLEANOUT

NOT TO SCALE

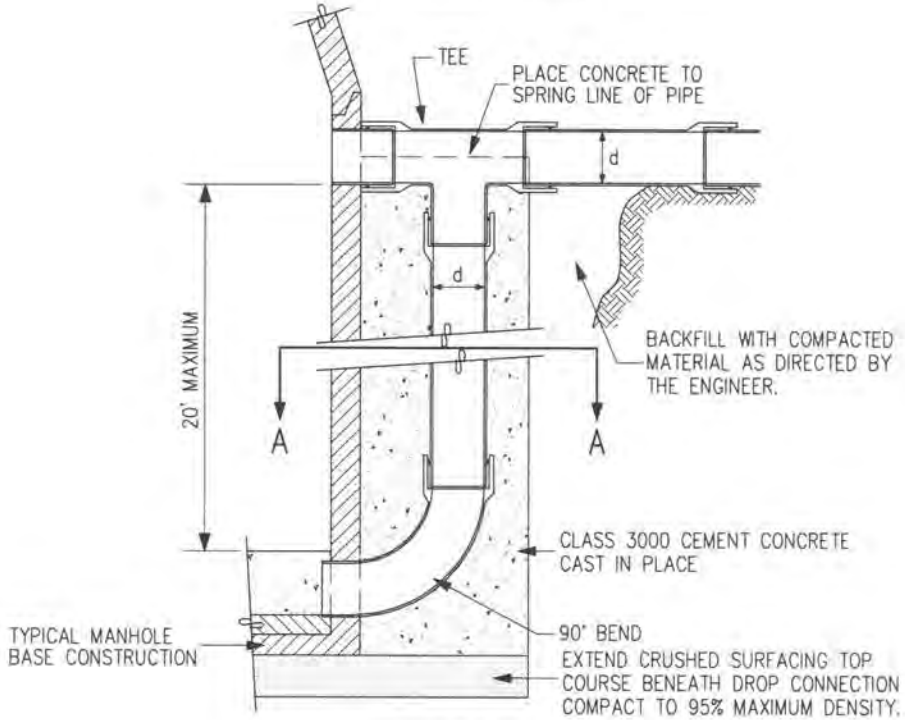
NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
REV.	01/12	ADDED MANHOLE COVER	
ORIG.	10/06		

CITY OF SELAH–STANDARD DETAIL	SANITARY SEWER CLEANOUT	SS-2



SECTION A–A



PROFILE VIEW

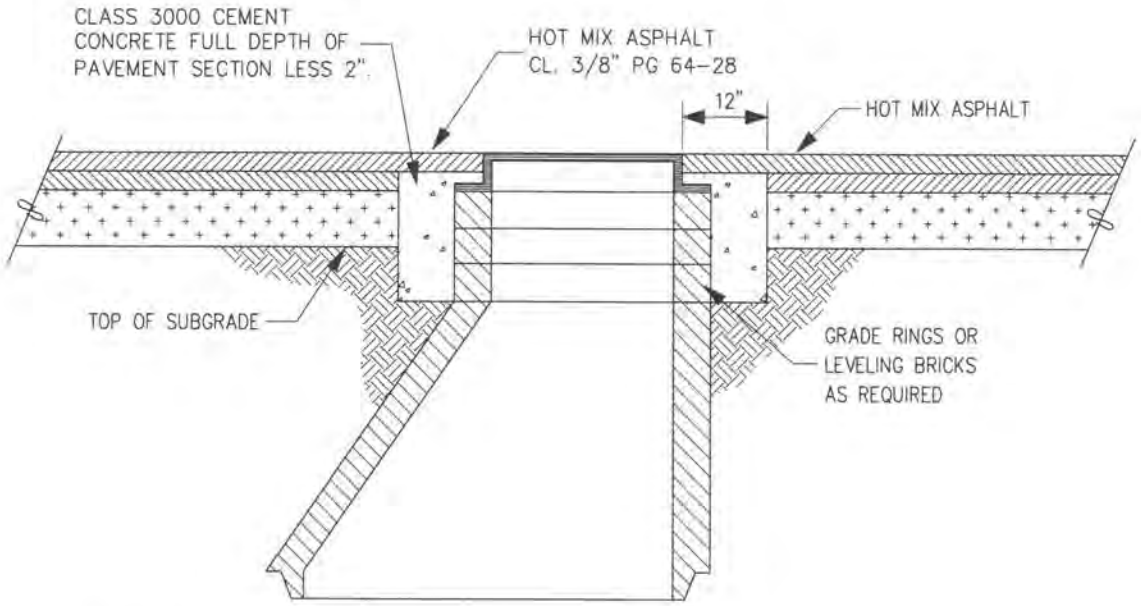
DROP CONNECTION

NOT TO SCALE

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	DROP CONNECTION	SS–3



NOTES:

1. MANHOLES SHALL BE ADJUSTED TO FINISHED GRADE AFTER PLACEMENT OF THE FINAL LIFT OF ASPHALT PAVEMENT.
2. GRADE RINGS AND/OR LEVELING BRICKS SHALL BE GROUTED IN PLACE AND BE WATER TIGHT.
3. IN UNPAVED AREAS, PROVIDE 12" THICK, 5' DIA. CEMENT CONCRETE RING AROUND TOP OF MANHOLE. SET MANHOLE FRAME FLUSH W/ FINISHED GRADE AND SLOPE CONCRETE OUTWARD AT 1/4"/FT.

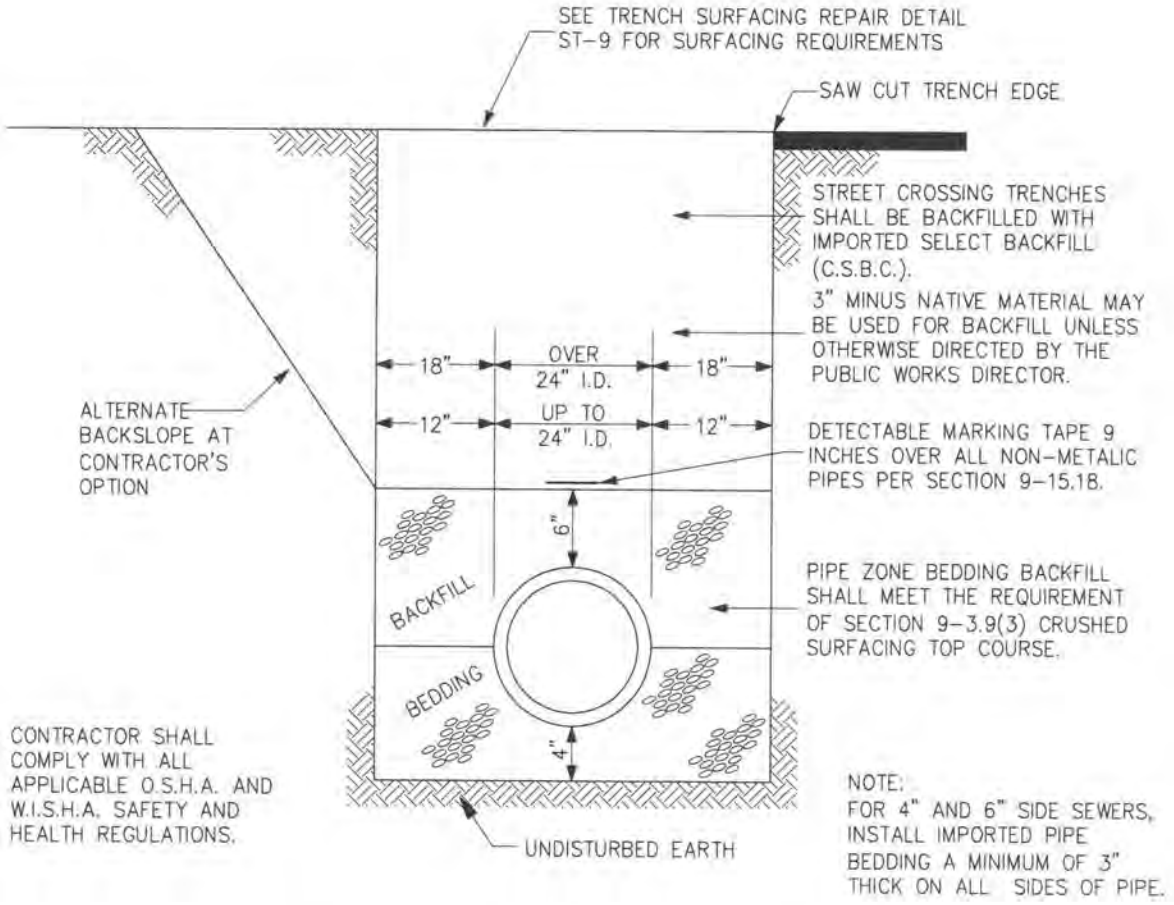
MANHOLE ADJUSTMENT DETAIL

NOT TO SCALE

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	MANHOLE ADJUSTMENT DETAIL	SS-4



TYPICAL TRENCH SECTION FOR SANITARY AND STORM SEWER PIPES

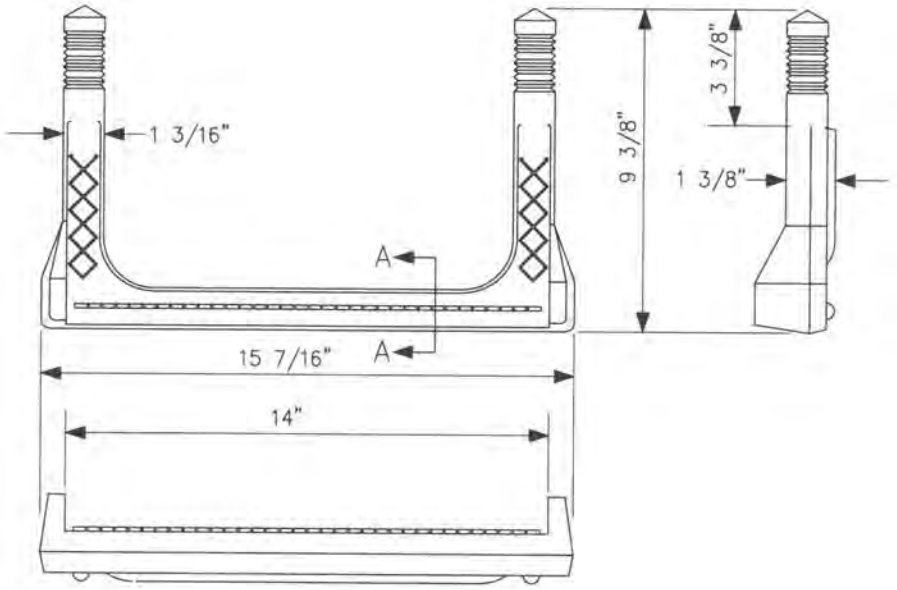
NOT TO SCALE

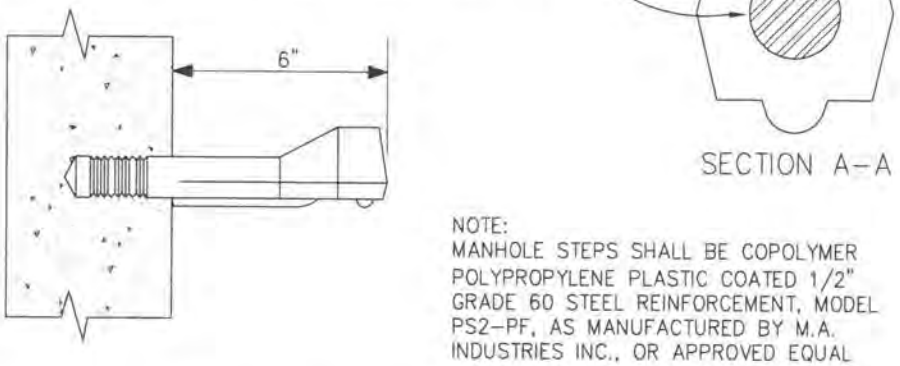
NOTES:

- MECHANICAL TAMPING AND COMPACTION REQUIRED AS DIRECTED BY THE CITY. WATER SETTLING MAY ONLY BE USED OUTSIDE THE ROADWAY PRISM WHEN APPROVED BY THE CITY.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
	6/14	SAWCUT UPDATE	
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	SEWER/STORM TRENCH SECTION	SS-5





NOTE:
MANHOLE STEPS SHALL BE COPOLYMER POLYPROPYLENE PLASTIC COATED 1/2" GRADE 60 STEEL REINFORCEMENT, MODEL PS2-PF, AS MANUFACTURED BY M.A. INDUSTRIES INC., OR APPROVED EQUAL

MANHOLE SAFETY STEP

NOT TO SCALE

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	MANHOLE SAFETY STEP	SS-6

CITY OF SELAH–STANDARD DETAIL

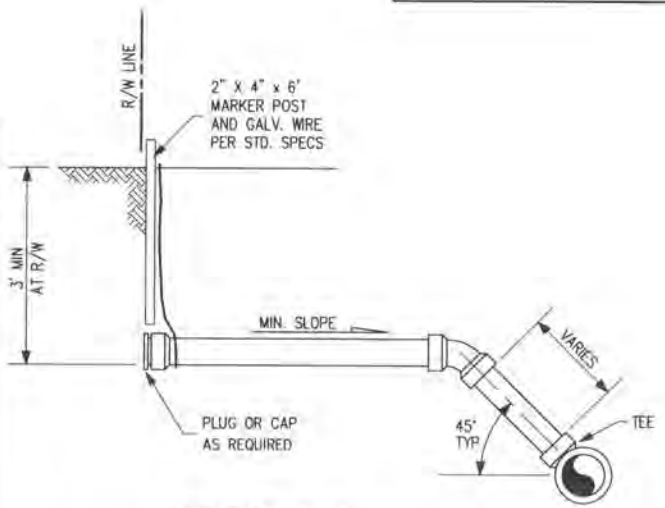
SIDE SEWER CONNECTION

SS-7

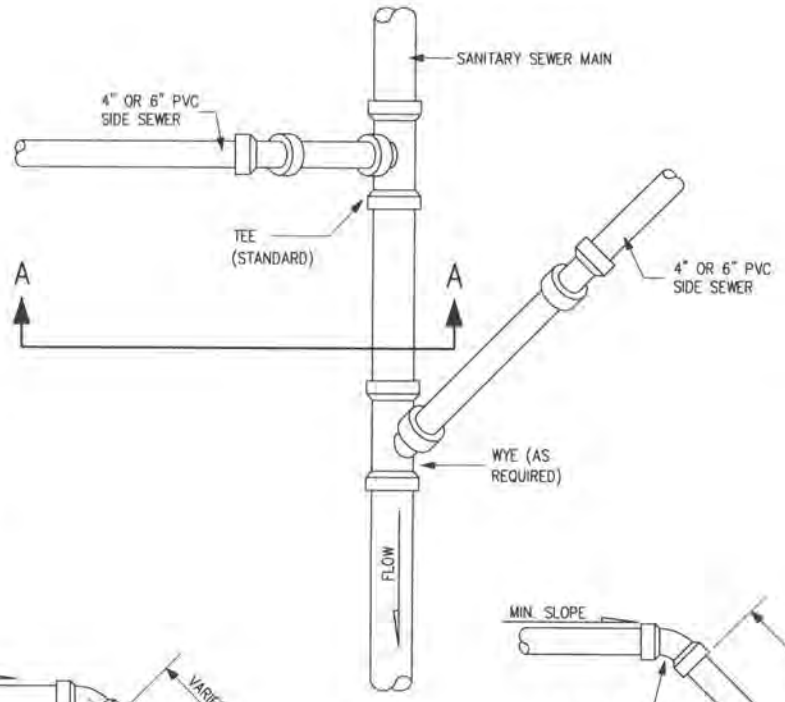
NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
ORIG.	10/06		

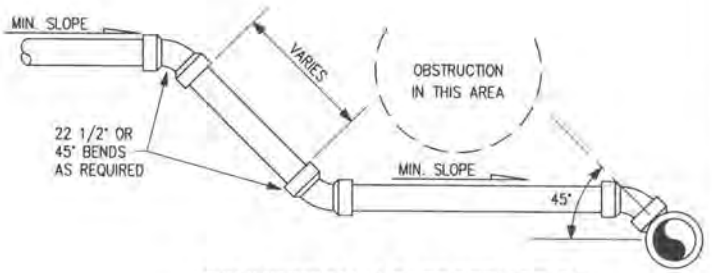
NOTES:
1. SIDE SEWERS SHALL BE INSTALLED IN ACCORDANCE WITH SEC. 7-18 OF THE STANDARD SPECIFICATIONS
2. SERVICE CONNECTIONS 8" OR LARGER MUST BE MADE AT MANHOLE.
3. IF 5' MAXIMUM SLOPED DISTANCE IS INSUFFICIENT FOR SIDE SEWER CONNECTION, INSTALL SIDE SEWER RISER PER DETAIL.
4. ROTATE SANITARY SEWER MAIN TEE OR WYE 45° UPWARD.
5. TEES OR WYES SHALL BE INSTALLED IN NEW SANITARY SEWER MAINS. WHEN INSTALLING SIDE SEWERS IN EXISTING MAINS, CONNECTION SHALL BE MADE BY MACHINE MADE TAP AND APPROVED SADDLE.
6. WHERE DEPTH IS INSUFFICIENT TO ALLOW CONNECTION AS SHOWN, CONNECT SERVICE AS DIRECTED BY THE PUBLIC WORKS DIRECTOR.
7. TERMINATE SIDE SEWER AT R/W LINE UNLESS OTHERWISE DIRECTED BY THE PUBLIC WORKS DIRECTOR OR SHOWN OTHERWISE ON PLANS.
8. ALL SIDE SEWER MATERIALS SHALL BE PVC SEWER PIPE CONFORMING TO THE REQUIREMENTS OF SECTION 9-05.12 OF THE STANDARD SPECIFICATIONS.
9. ALL 4" OR 6" SIDE SEWERS SHALL BE INSTALLED WITH A MINIMUM OF 3" OF IMPORTED CRUSHED ROCK PIPE BEDDING AROUND PIPE.



SECTION A–A



PLAN



CONNECTION AT OBSTRUCTION

SIDE SEWER CONNECTIONS

NOT TO SCALE

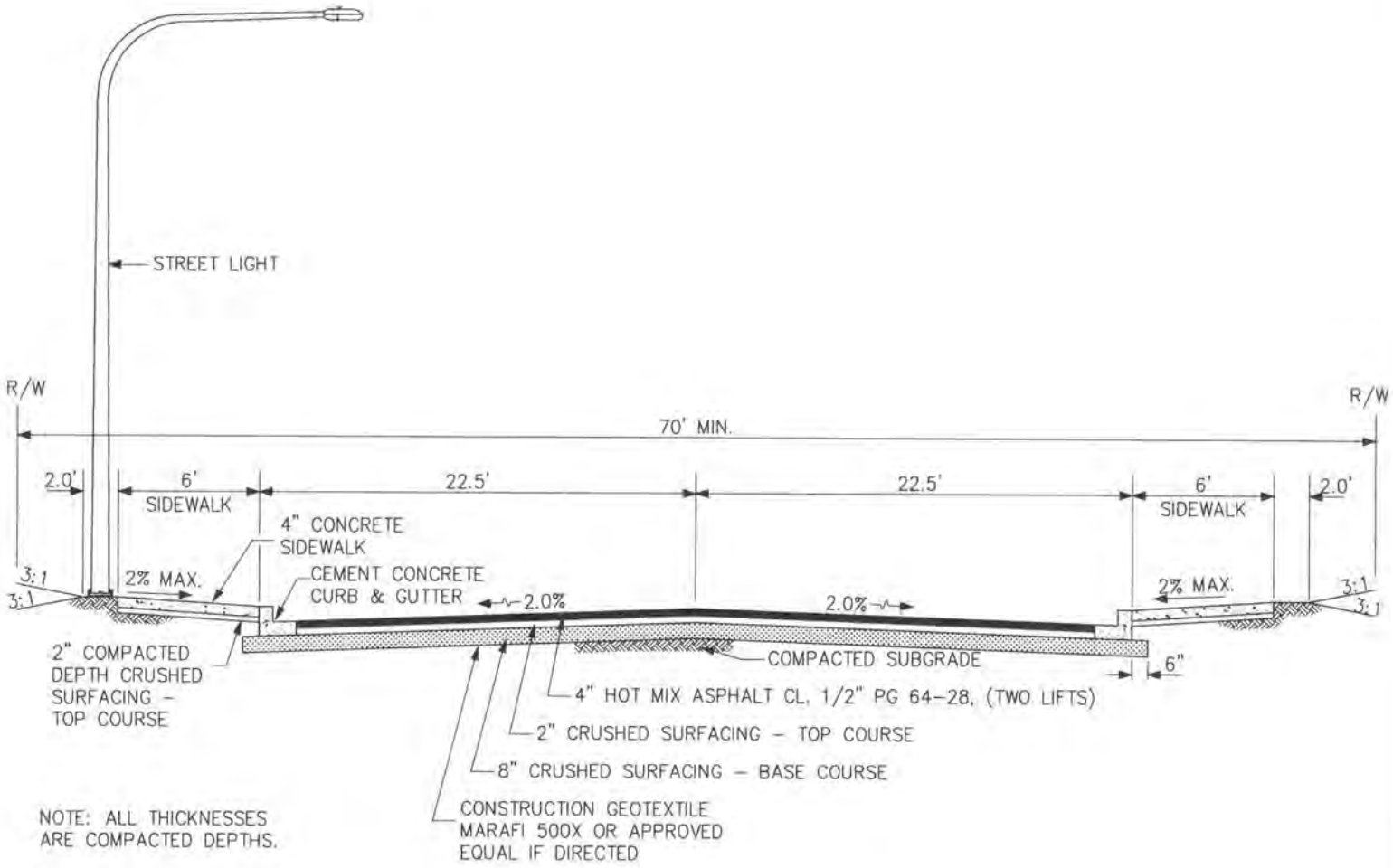
CITY OF SELAH–STANDARD DETAIL

ROADWAY SECTION – ARTERIAL

ST-1

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
REV.	01/12	WIDENED SIDEWALK TO 6'	
ORIG.	10/06		



ROADWAY SECTION – ARTERIAL

NOT TO SCALE

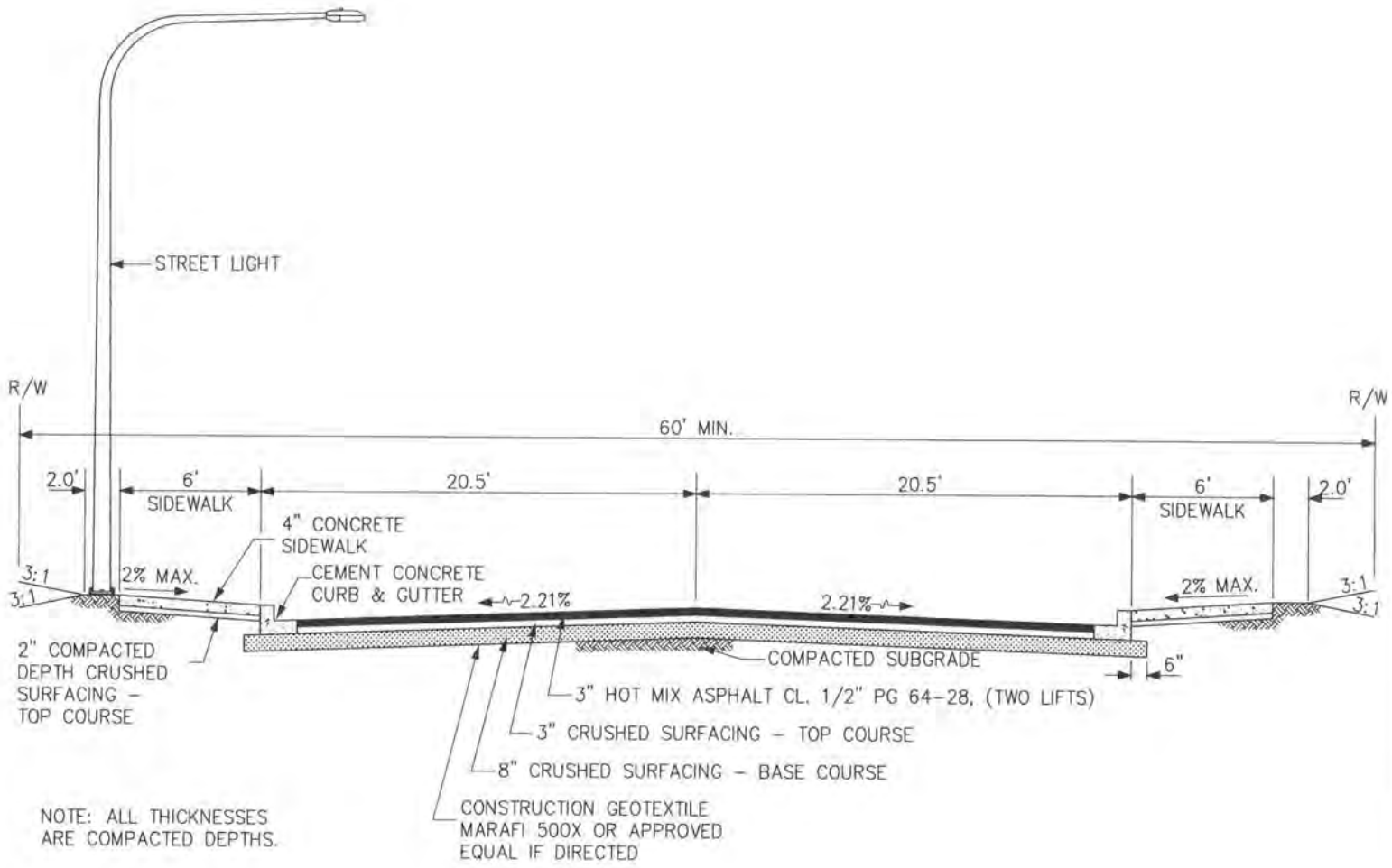
CITY OF SELAH – STANDARD DETAIL

ROADWAY SECTION – COLLECTOR

ST-2

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
REV.	01/12	WIDENED SIDEWALK TO 6'	
ORIG.	10/06		



ROADWAY SECTION – COLLECTOR

NOT TO SCALE

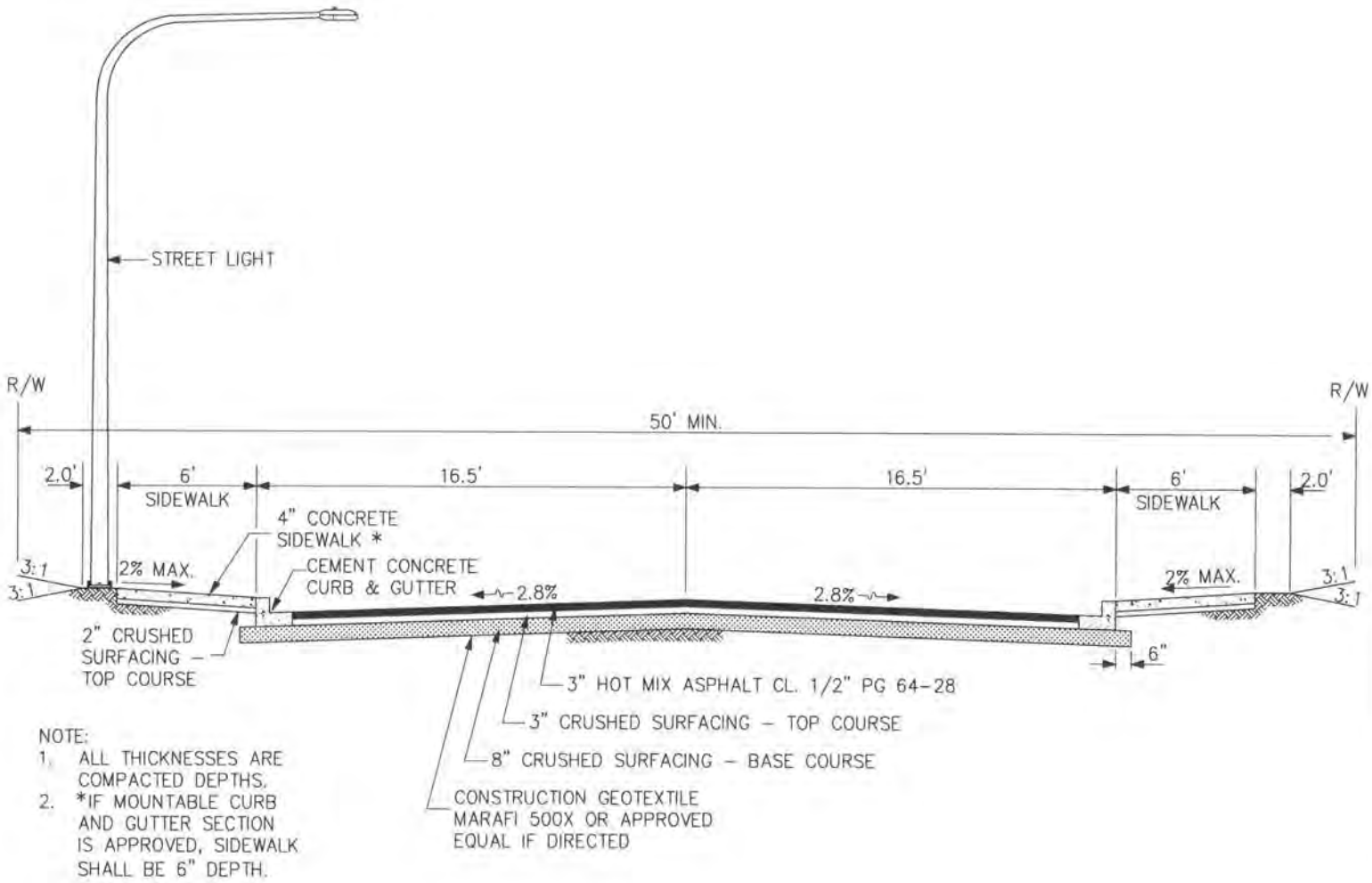
CITY OF SELAH–STANDARD DETAIL

ROADWAY SECTION – LOCAL ACCESS (RESIDENTIAL)

ST–3

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

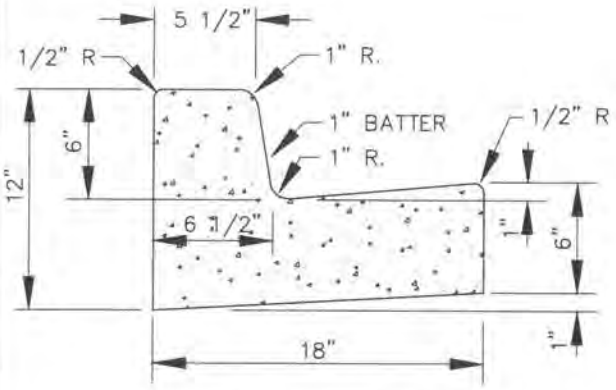
Revision	Date	Description	Appr
REV.	01/12	WIDENED SIDEWALK TO 6'	
ORIG.	10/06		



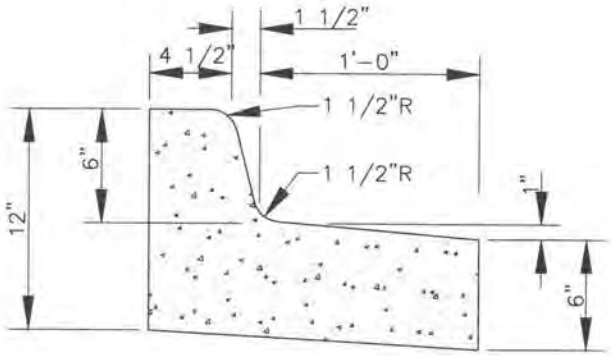
NOTE:
1. ALL THICKNESSES ARE COMPACTED DEPTHS.
2. *IF MOUNTABLE CURB AND GUTTER SECTION IS APPROVED, SIDEWALK SHALL BE 6" DEPTH.

ROADWAY SECTION – LOCAL ACCESS (RESIDENTIAL)

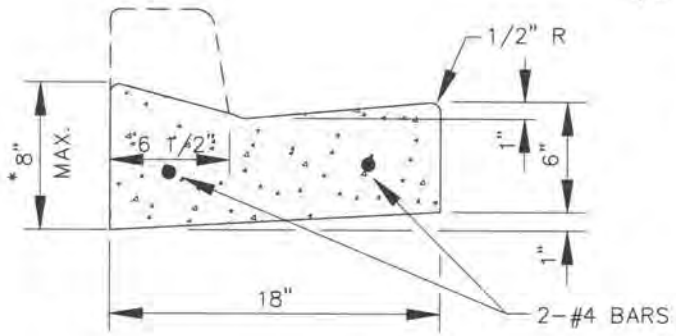
NOT TO SCALE



FULL HEIGHT - BARRIER

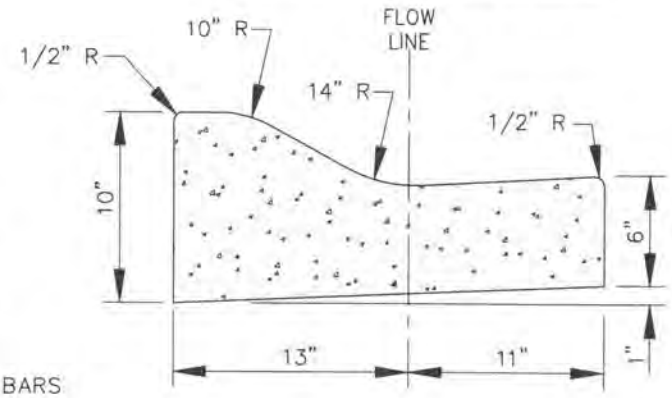


CONCRETE SPILL CURB



DEPRESSED - DRIVEWAYS

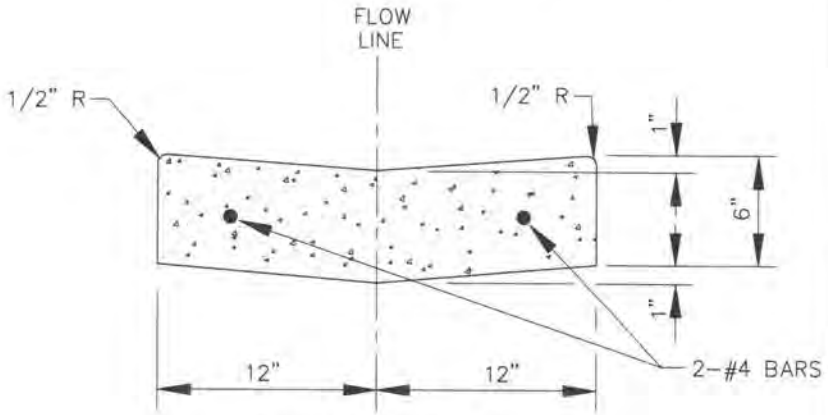
NOTE:
* AS DIRECTED BY ENGINEER. MAY VARY DEPENDING UPON GRADE OF SIDEWALK AND DRIVEWAY BEYOND CURB.



MOUNTABLE - ROLLED CURB

NOTE:
TOP OF CURB ELEVATION SHOWN IS TOP OF FULL HEIGHT CURB. SUBTRACT 0.17' FOR TOP OF ROLLED CURB.

NOTES:
1. AS DIRECTED BY THE PUBLIC WORKS DIRECTOR. MAY VARY DEPENDING UPON GRADE OF SIDEWALK AND DRIVEWAY BEYOND CURB. BACK OF CURB WILL BE 6 1/2" HIGH AT SIDEWALK RAMPS.
2. 3/8" THICK MASTIC EXPANSION JOINT TO BE PLACED AT ALL POINTS OF TANGENCY.
3. FOR STATIONARY FORM CONSTRUCTION STANDARD PLATES AND HALF PLATES TO BE PLACED AT 10'-0" INTERVALS.
4. FOR SLIP-FORM CONSTRUCTION, PROVIDE FULL DEPTH JOINTS AT 10'-0" INTERVALS.
5. BACKFILL BEHIND CURB SHALL EXTEND FROM TOP OF CURB BACK TO A POINT AS DIRECTED BY THE THE PUBLIC WORKS DIRECTOR. THE TOP 4" OF BACKFILL SHALL BE OF A FINE GRADED MATERIAL SUITABLE FOR LAWNS, AND BE DAMPENED AND MECHANICALLY COMPACTED TO OBTAIN A REASONABLE LEVEL OF COMPACTION.

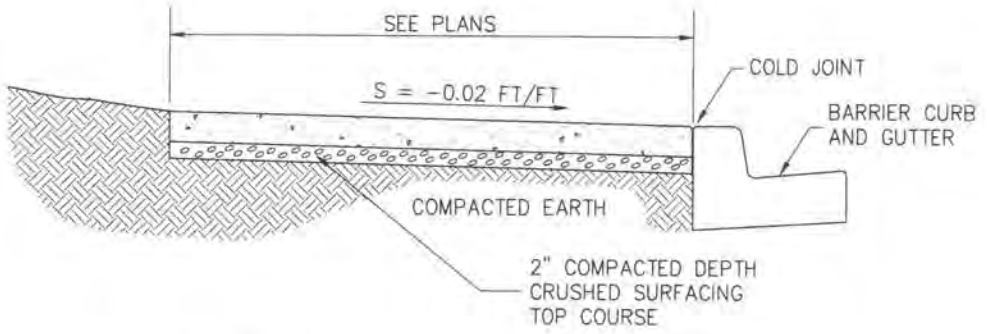


VALLEY GUTTER

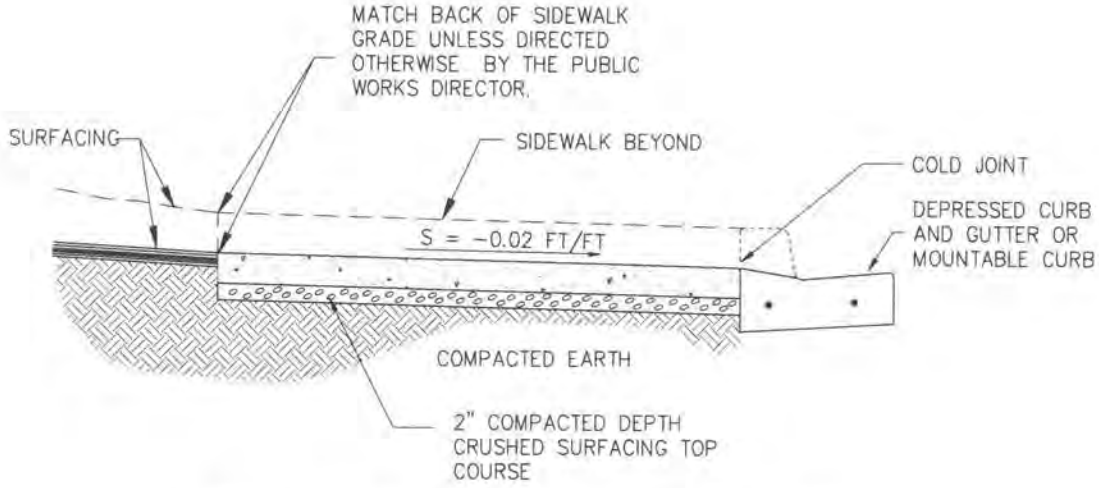
NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
ORIG.	11/15		

CITY OF SELAH-STANDARD DETAIL	CONCRETE CURB & GUTTER	ST-4



4" THICK SIDEWALK SECTION



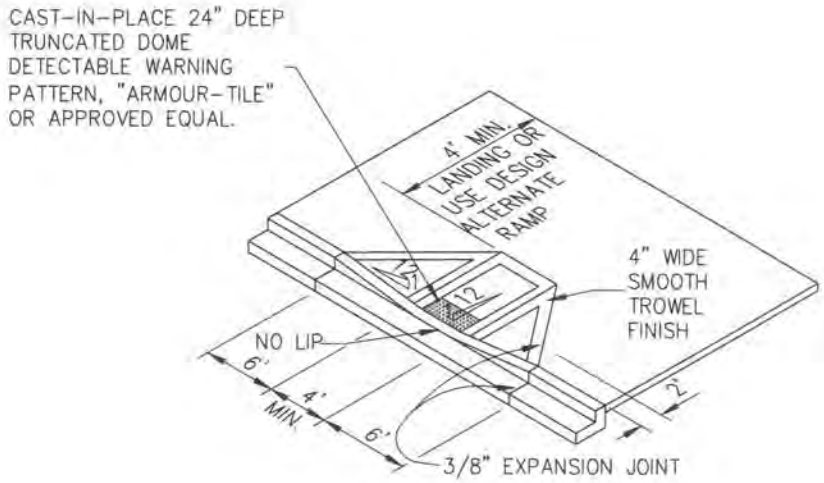
6" THICK SIDEWALK SECTION

NOTE:
6" THICK SIDEWALK SHALL BE CONSTRUCTED AT ALL DRIVEWAY ENTRANCES INCLUDING WINGS/RAMPS UP TO FULL HEIGHT CURB, AND SHALL BE USED ADJACENT TO ALL MOUNTABLE CURBS.

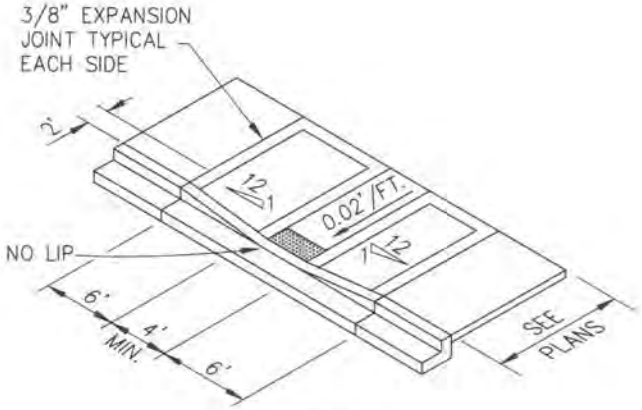
NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

REV.	06/18	UPDATED NOTE	
ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	CONCRETE SIDEWALK SECTIONS	ST-5



STANDARD



ALTERNATE

SIDEWALK RAMP DETAIL

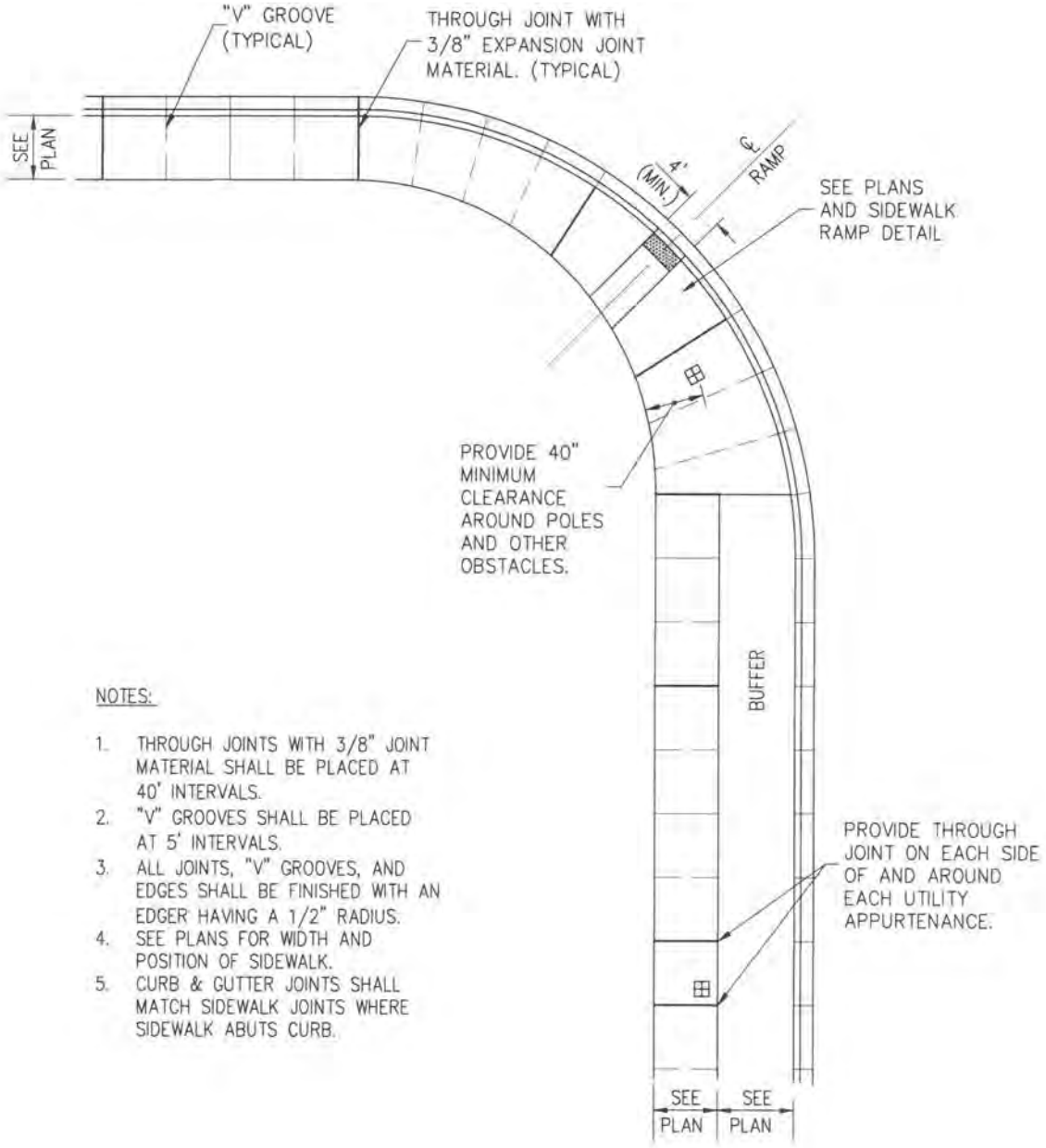
NOT TO SCALE

NOTES:

- SIDEWALK RAMP WILL NOT BE POURED INTEGRAL WITH SIDEWALK OR CURB AND GUTTER AND SHALL BE ISOLATED BY EXPANSION JOINT MATERIAL ON ALL SIDES EXCEPT ADJACENT TO THE CURB.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

REV.	01/12	UPDATED NOTES	
ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	SIDEWALK RAMP	ST-6



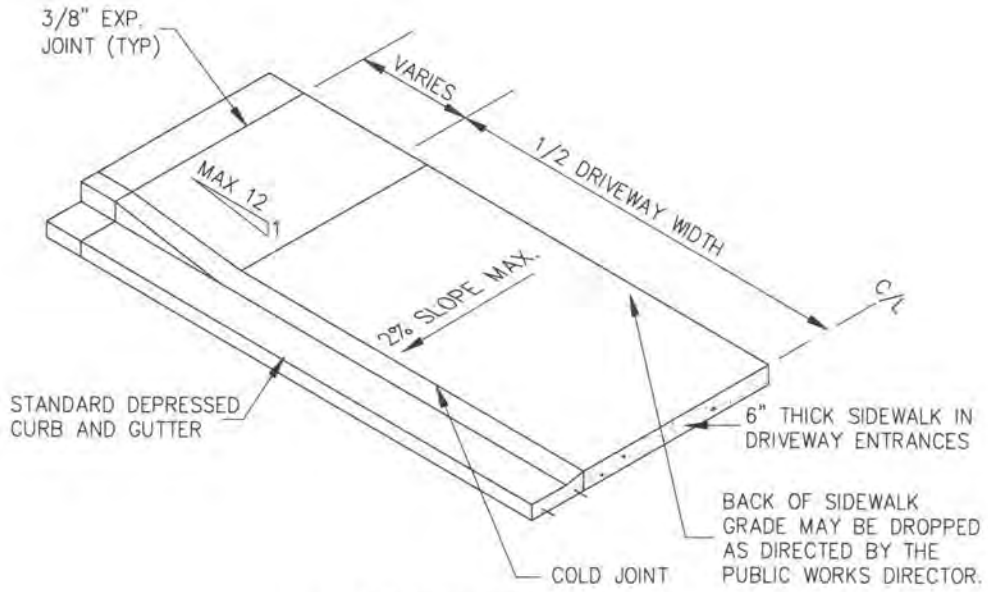
NOTES:

1. THROUGH JOINTS WITH 3/8" JOINT MATERIAL SHALL BE PLACED AT 40' INTERVALS.
2. "V" GROOVES SHALL BE PLACED AT 5' INTERVALS.
3. ALL JOINTS, "V" GROOVES, AND EDGES SHALL BE FINISHED WITH AN EDGER HAVING A 1/2" RADIUS.
4. SEE PLANS FOR WIDTH AND POSITION OF SIDEWALK.
5. CURB & GUTTER JOINTS SHALL MATCH SIDEWALK JOINTS WHERE SIDEWALK ABUTS CURB.

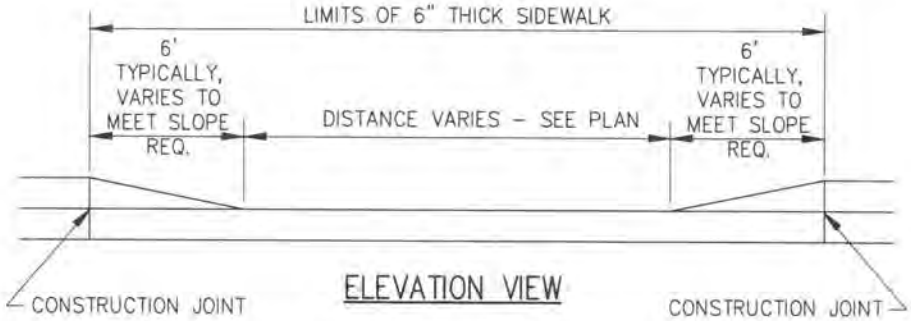
NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	SIDEWALK JOINTING	ST-7



ISOMETRIC VIEW



ELEVATION VIEW

NOTE:
REINFORCEMENT NOT SHOWN FOR CLARITY.
EXTEND REINFORCEMENT TO CONSTRUCTION JOINTS.

RESIDENTIAL DRIVEWAY ENTRANCE

NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

REV.	06/18	MAX SLOPES	
REV.	01/12	LIMITS OF 6" THICKNESS	
ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	RESIDENTIAL DRIVEWAY ENTRANCE	ST-8

CITY OF SELAH–STANDARD DETAIL

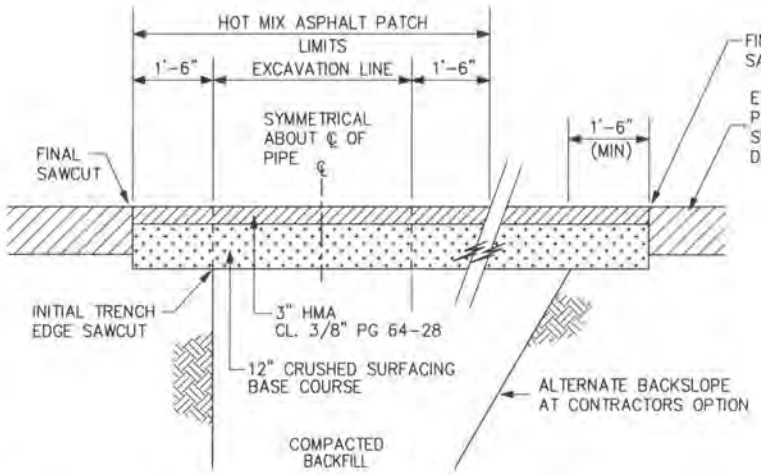
TRENCH SURFACING REPAIR

ST-9

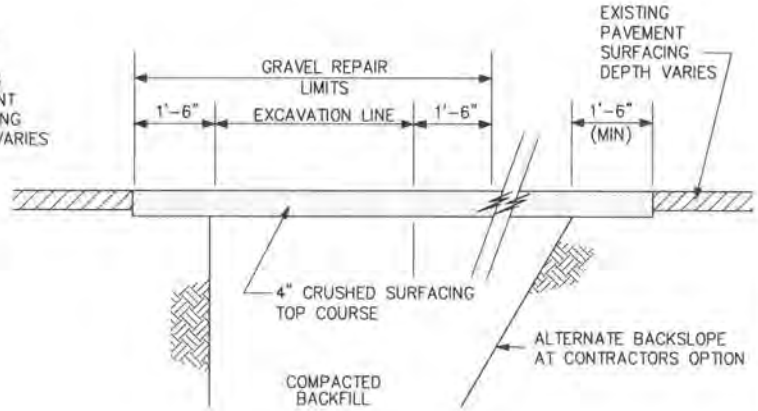
NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

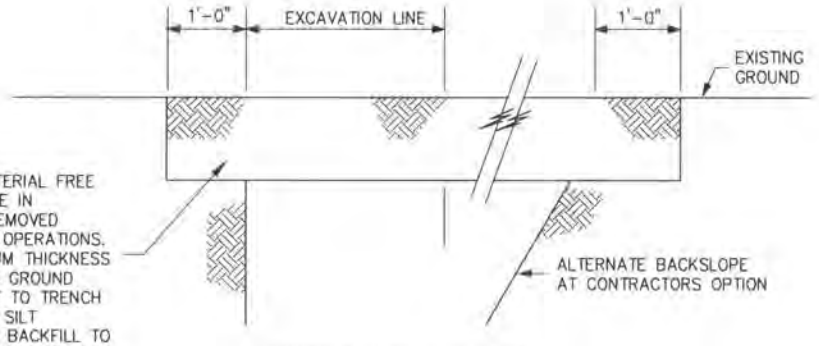
Revision	Date	Description	Appr
ORIG.	10/06		
	6/14	SAWCUT ADJUSTMENT	



ASPHALT PAVEMENT SURFACING



GRAVEL SURFACING



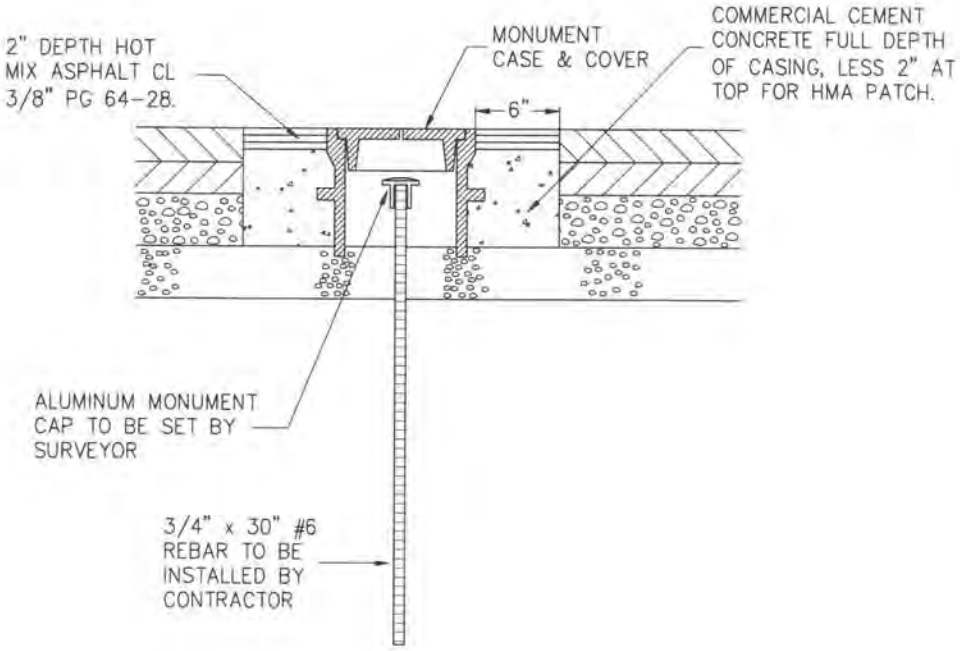
UNSURFACED AREAS

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRENCH SURFACE RESTORATION BEYOND THE PAYMENT LIMITS SHOWN, INCLUDING WIDER TRENCH SECTIONS RESULTING FROM LAYING BACK TRENCH SIDES AT THE CONTRACTORS OPTION. NO MEASUREMENT OR PAYMENT WILL BE MADE FOR SURFACE REPAIR BEYOND THE PAYMENT LIMITS.
2. NO MEASUREMENT OR PAYMENT WILL BE MADE FOR TRENCH SURFACING REPAIR IN UNSURFACED AREAS.
3. HMA PATCHING WILL BE COMPLETED WITHIN THREE DAYS.
4. ALL THICKNESS ARE COMPACTED DEPTH.

TRENCH SURFACING REPAIR

NOT TO SCALE



NOTES:
1. TOP OF MONUMENT CAP SHALL BE 3" BELOW FINISH GRADE
2. MONUMENT, MONUMENT CASE & COVER TO BE PLACED AFTER FINAL LIFT OF HMA.
3. MONUMENT CASE, COVER AND RISERS SHALL BE THE REQUIREMENTS OF SECTION 9-22 AND MANUFACTURED BY OLYMPIC FOUNDARY OR EQUAL.

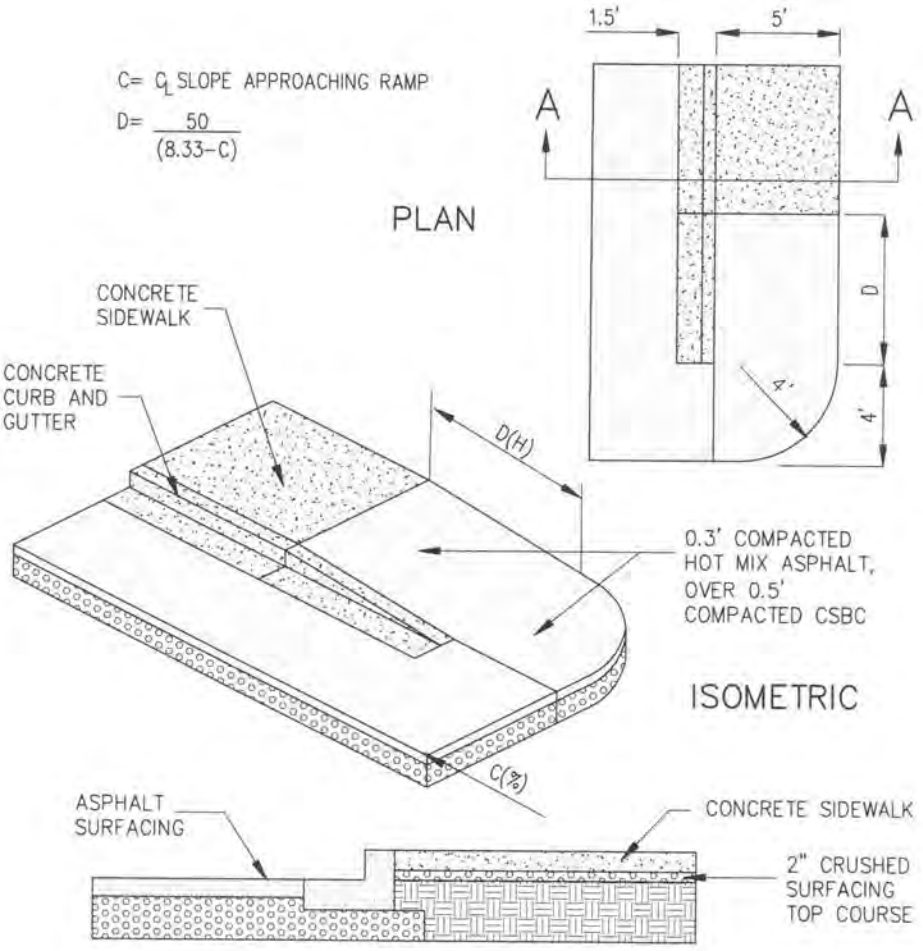
MONUMENT DETAIL

NOT TO SCALE

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	MONUMENT	ST-10



SECTION A−A

ASPHALT SIDEWALK RAMP

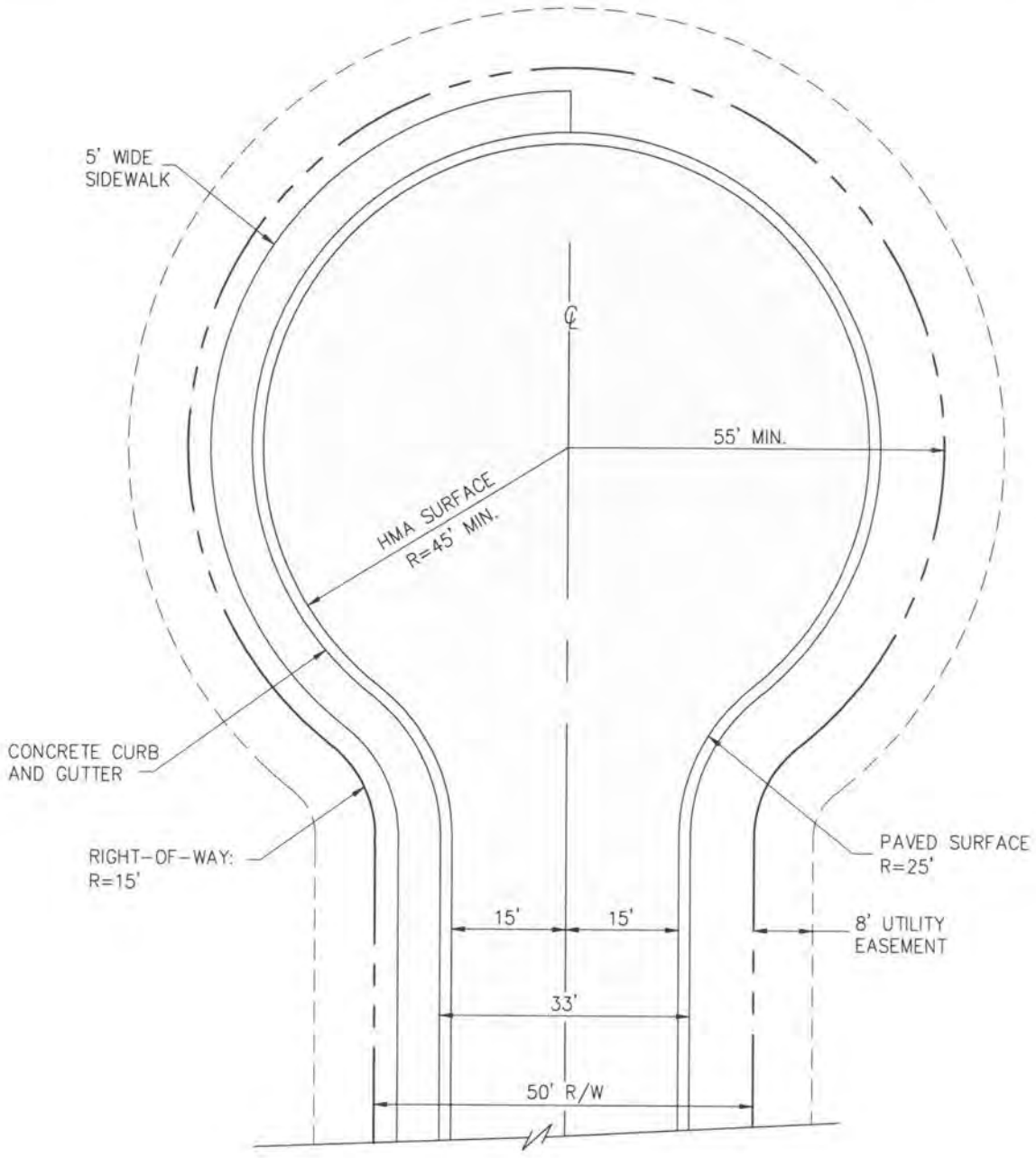
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
ORIG.	09/15	THICKNESS	
ORIG.	10/06		

CITY OF SELAH−STANDARD DETAIL	ASPHALT SIDEWALK RAMP	ST−11

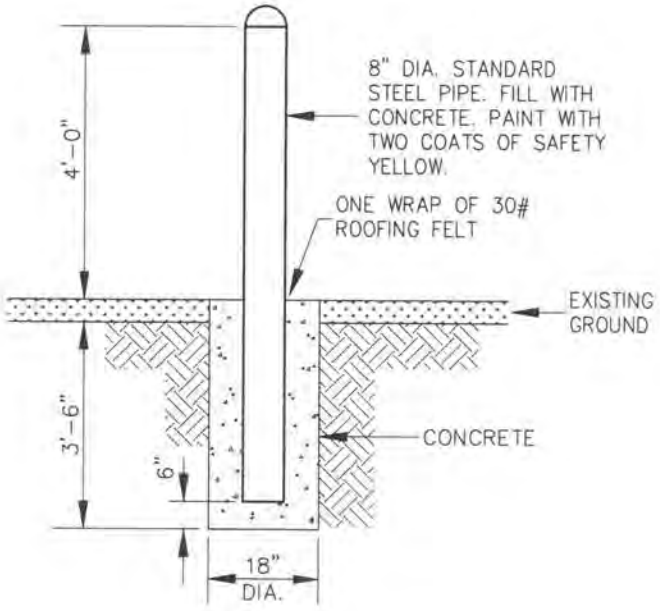


PLAN VIEW
NOT TO SCALE

NOTES:
- CUL-DE-SAC STREETS SHALL BE A MAXIMUM OF 600 FEET IN LENGTH.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
REV.	01/12	CHANGED RADIUS TO 45'	
ORIG.	10/06		

CITY OF SELAH-STANDARD DETAIL	CUL-DE-SAC LAYOUT	ST-12

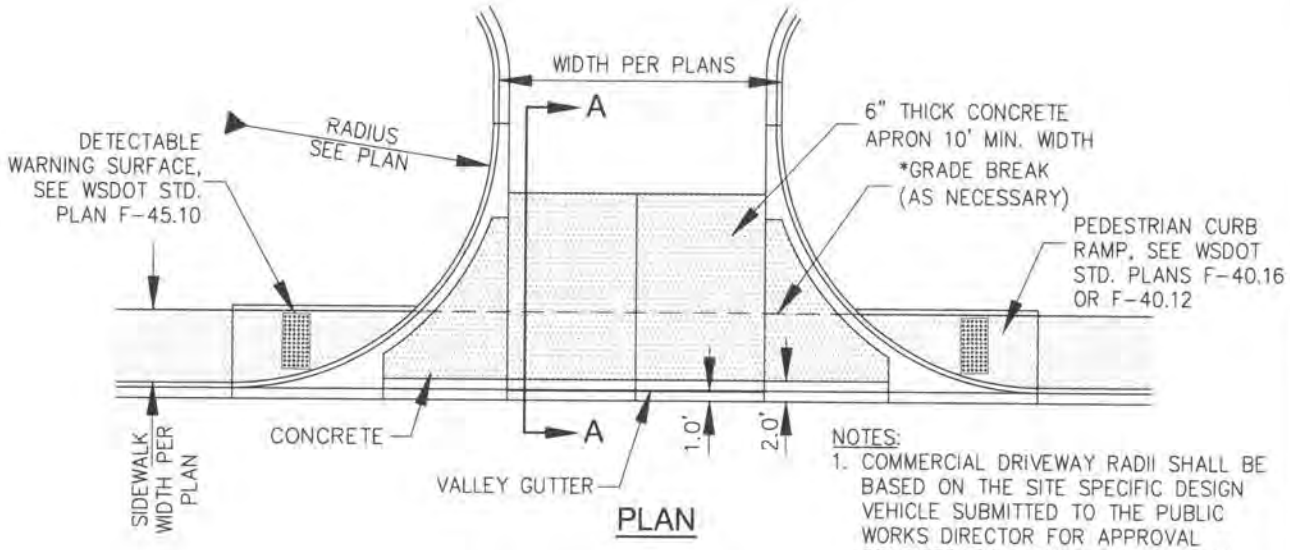


NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
ORIG.	10/06		

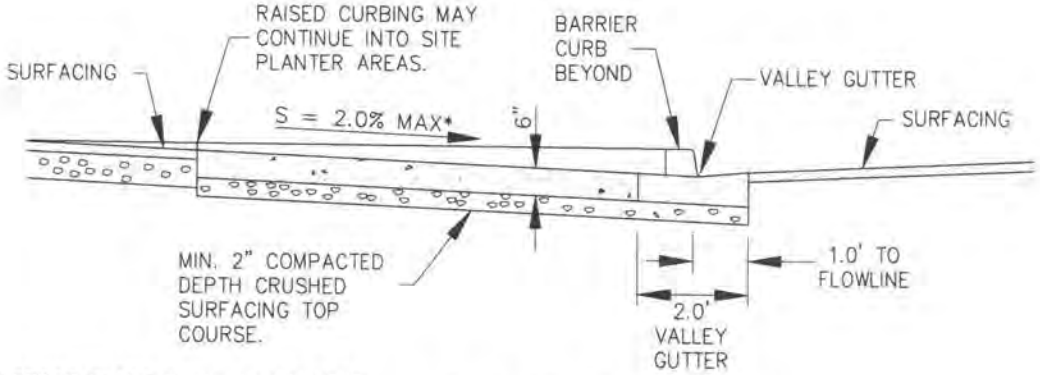
CITY OF SELAH–STANDARD DETAIL	BOLLARD	ST-13



PLAN

NOTES:

1. COMMERCIAL DRIVEWAY RADII SHALL BE BASED ON THE SITE SPECIFIC DESIGN VEHICLE SUBMITTED TO THE PUBLIC WORKS DIRECTOR FOR APPROVAL CONSIDERATION. CURB RAMPS SHALL BE DESIGNED TO MEET ADA STANDARDS AS PRESENTED IN THE REFERENCED WSDOT STD. PLANS.
2. CURB & GUTTER, VALLEY GUTTER, & CONCRETE APPROACH SHALL BE SEPARATED BY EXPANSION JOINT OR SEPARATE POUR.



SECTION A-A

*NOTE:
DRIVEWAY CROSS SLOPE SHALL NOT EXCEED 2.0%, FOR WIDTH OF SIDEWALK ENTERING DRIVEWAY. A GRADE BREAK BEYOND THE SIDEWALK WIDTH IS ACCEPTABLE FOR CROSS SLOPES GREATER THAN 2%.

CEMENT CONCRETE COMMERCIAL DRIVEWAY

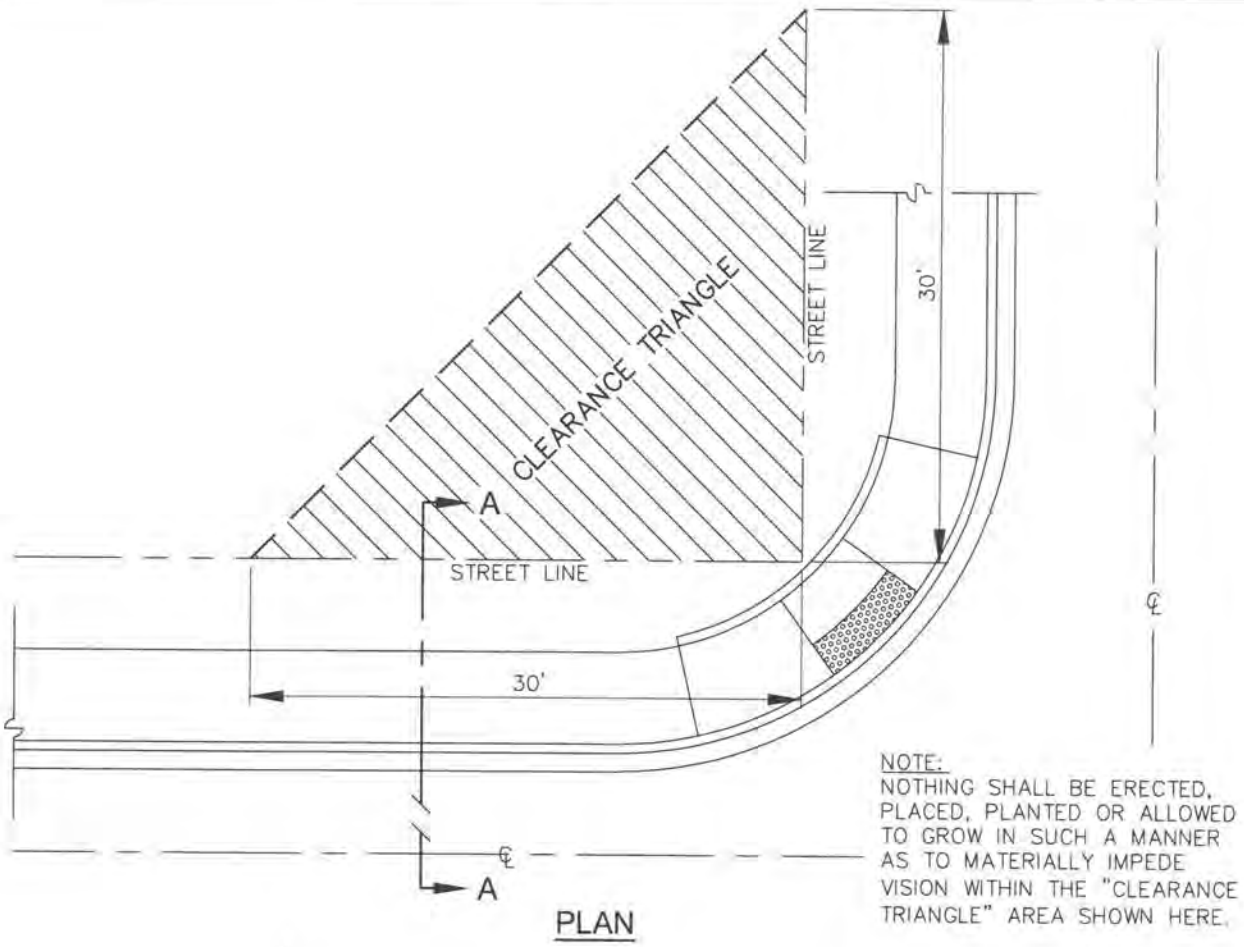
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

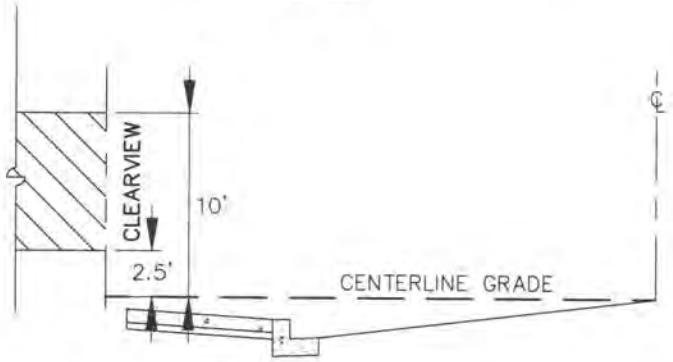
REV.	06/18	RADII AND CURB RAMPS	
ORIG.	11/15		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	CEMENT CONCRETE COMMERCIAL DRIVEWAY	ST-14



NOTE:
NOTHING SHALL BE ERECTED, PLACED, PLANTED OR ALLOWED TO GROW IN SUCH A MANNER AS TO MATERIALLY IMPEDE VISION WITHIN THE "CLEARANCE TRIANGLE" AREA SHOWN HERE.

PLAN



SECTION A-A

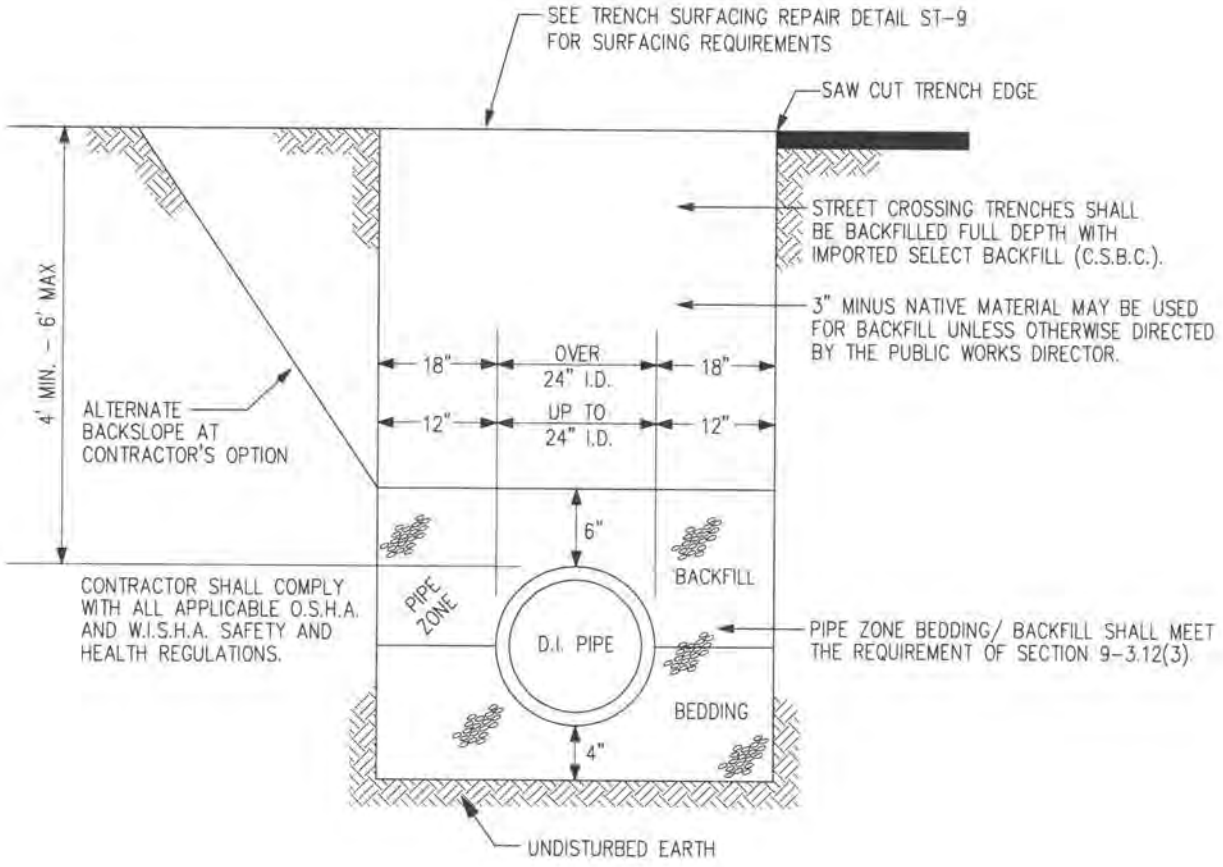
CORNER LOT VISION CLEARANCE

NOT TO SCALE

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
ORIG.	09/15		

CITY OF ZILLAH–STANDARD DETAIL	CORNER LOT VISION CLEARANCE	ST-15



TYPICAL WATERMAIN TRENCH

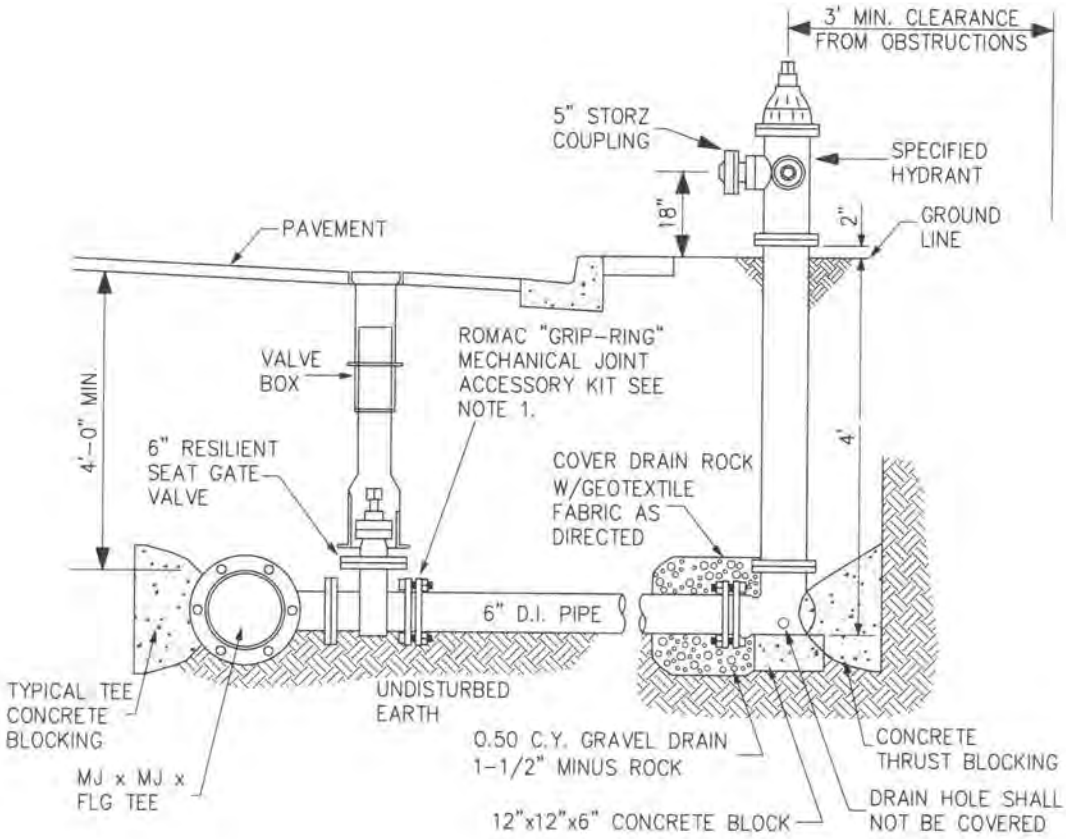
NOT TO SCALE

NOTES:

- FOR WATER SERVICES, INSTALL IMPORTED PIPE BEDDING A MINIMUM OF 3" THICK ON ALL SIDES OF PIPE.
- MECHANICAL TAMPING AND COMPACTION REQUIRED AS DIRECTED BY THE CITY. WATER SETTLING MAY ONLY BE USED OUTSIDE THE ROADWAY PRISM WHEN APPROVED BY THE CITY.
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

REV.	6/14	SAWCUT UPDATE	
REV.	01/12	DELETED PVC OPTION	
ORIG.	11/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	WATERMAIN TRENCH	W–1



TYPICAL FIRE HYDRANT ASSEMBLY

NOT TO SCALE

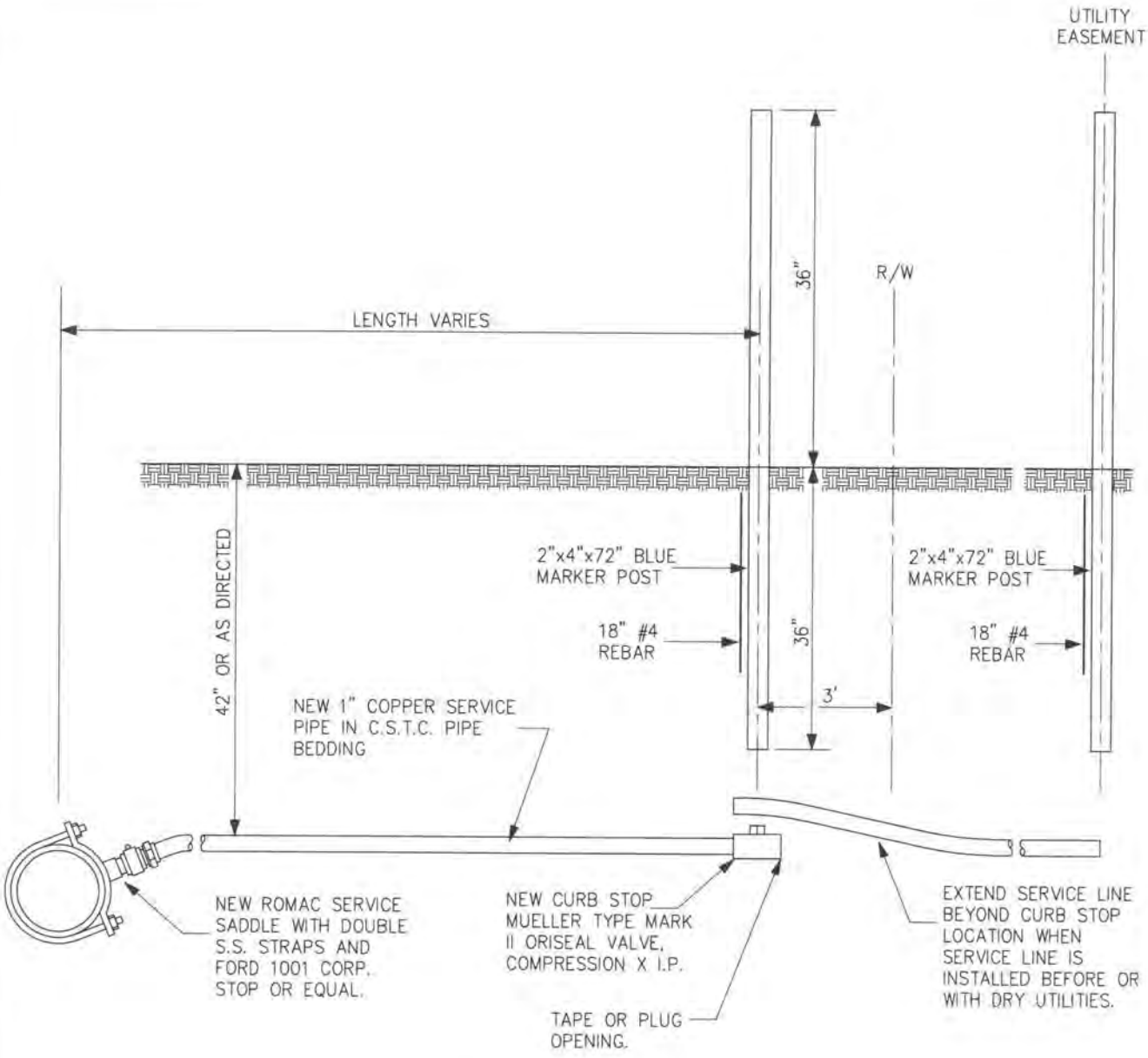
NOTE:

1. ROMAC "GRIP-RING" MECHANICAL JOINT ACCESSORY KITS SHALL BE USED ON ALL MECHANICAL JOINT CONNECTIONS FROM VALVE TO HYDRANT.
2. MINIMUM HYDRANT DEPTH IS 4 FEET.
3. SHACKLE RODS MAY BE USED IN PLACE OF "GRIP-RINGS" OR A THRUST BLOCK WHEN APPROVED BY THE PUBLIC WORKS DIRECTOR.

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
REV.	01/12	ADDED SHACKLE ROD NOTE	
ORIG.	10/06		

CITY OF SELAH-STANDARD DETAIL	FIRE HYDRANT ASSEMBLY	W-2



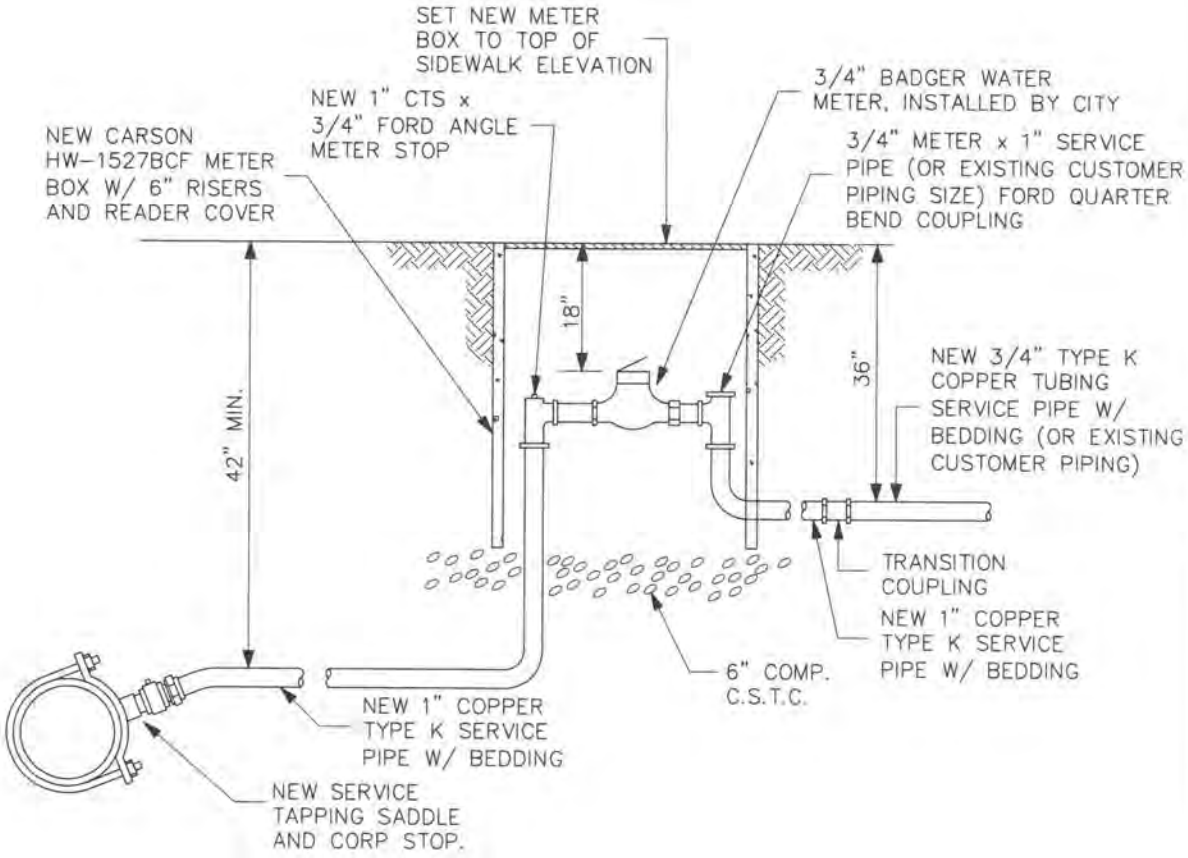
WATER SERVICE

NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.
- WATER SERVICE SHALL BE INSTALLED W/ A MINIMUM OF 3" THICKNESS C.S.T.C. PIPE BEDDING ON ALL SIDES

REV.	01/12	ADDED SERVICE LINE OPTION	
ORIG.	10/06		
Revision	Date	Description	Appr



WATER METER BOX AND SERVICE REPLACEMENT

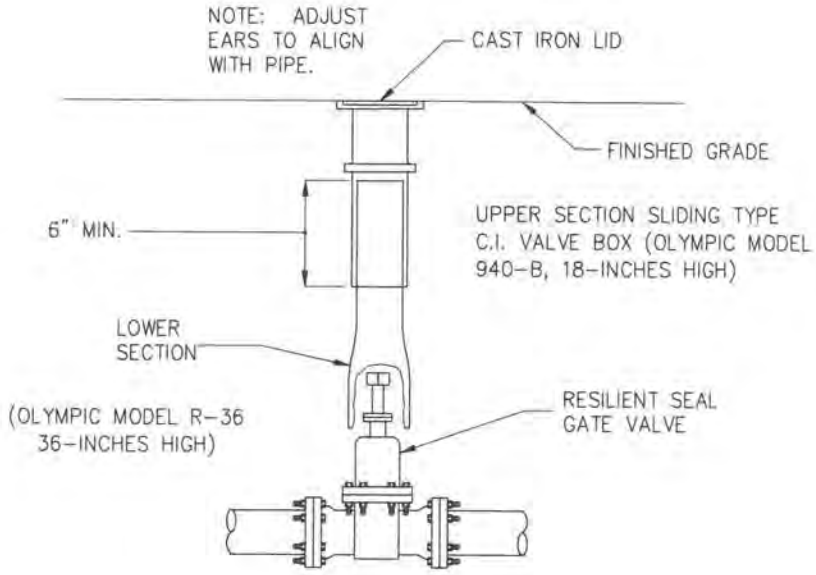
NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

REV.	11/15	FITTINGS	
ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	WATER METER BOX AND SERVICE REPLACEMENT	W–4



VALVE SIZE AND ENDS AS SPECIFIED OR INDICATED ON PLANS. INSTALLATION IS SIMILAR FOR BUTTERFLY VALVE

NOTE:
PROVIDE EXTENSION PIECE WHERE REQUIRED FOR VALVE BOX. (OLYMPIC MODEL 044, 12-INCHES HIGH)

WATER VALVE BOX

NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	WATER VALVE BOX	W-5

CITY OF SELAH–STANDARD DETAIL

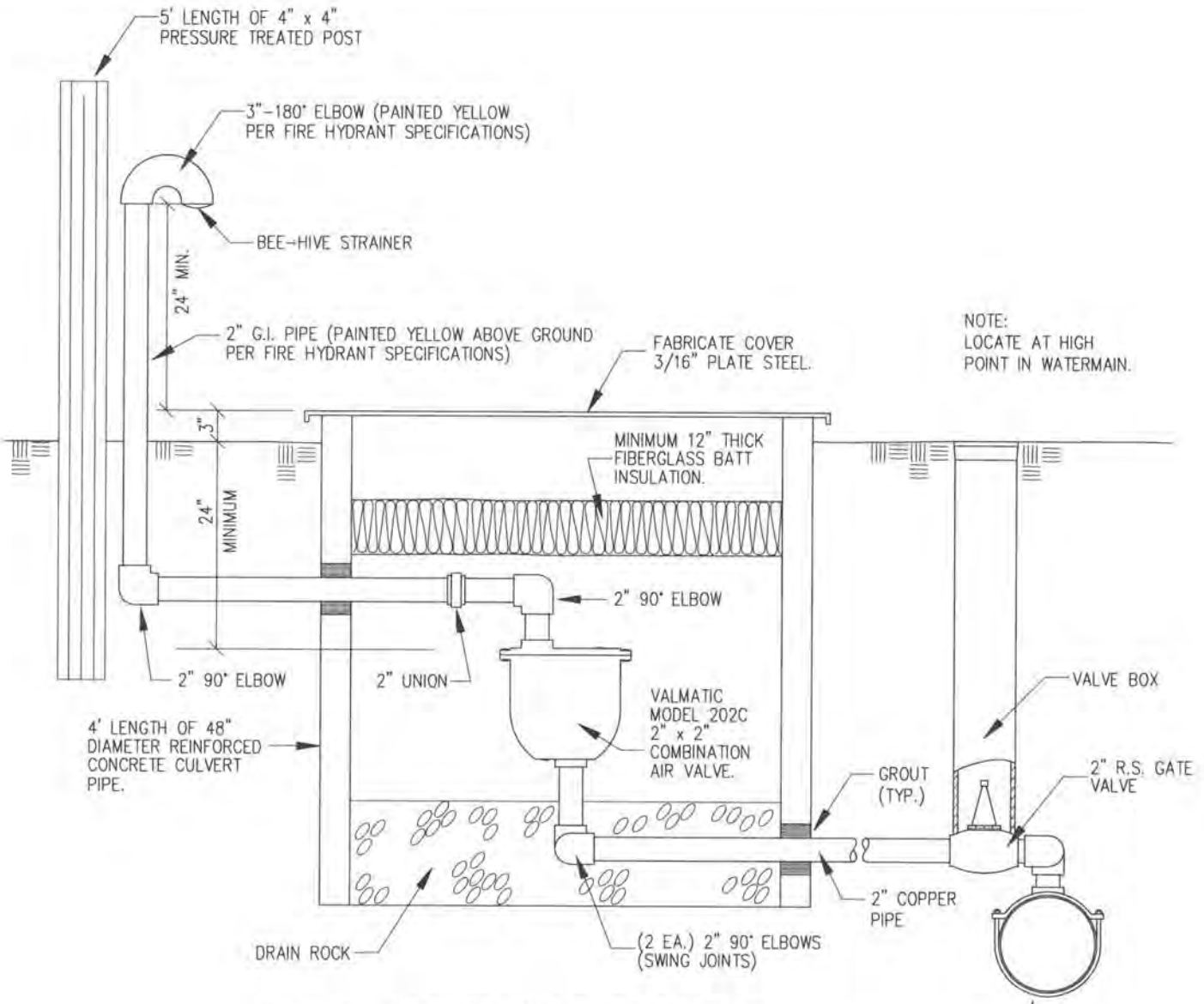
AIR RELEASE/VACUUM VALVE

W-6

NOTES:

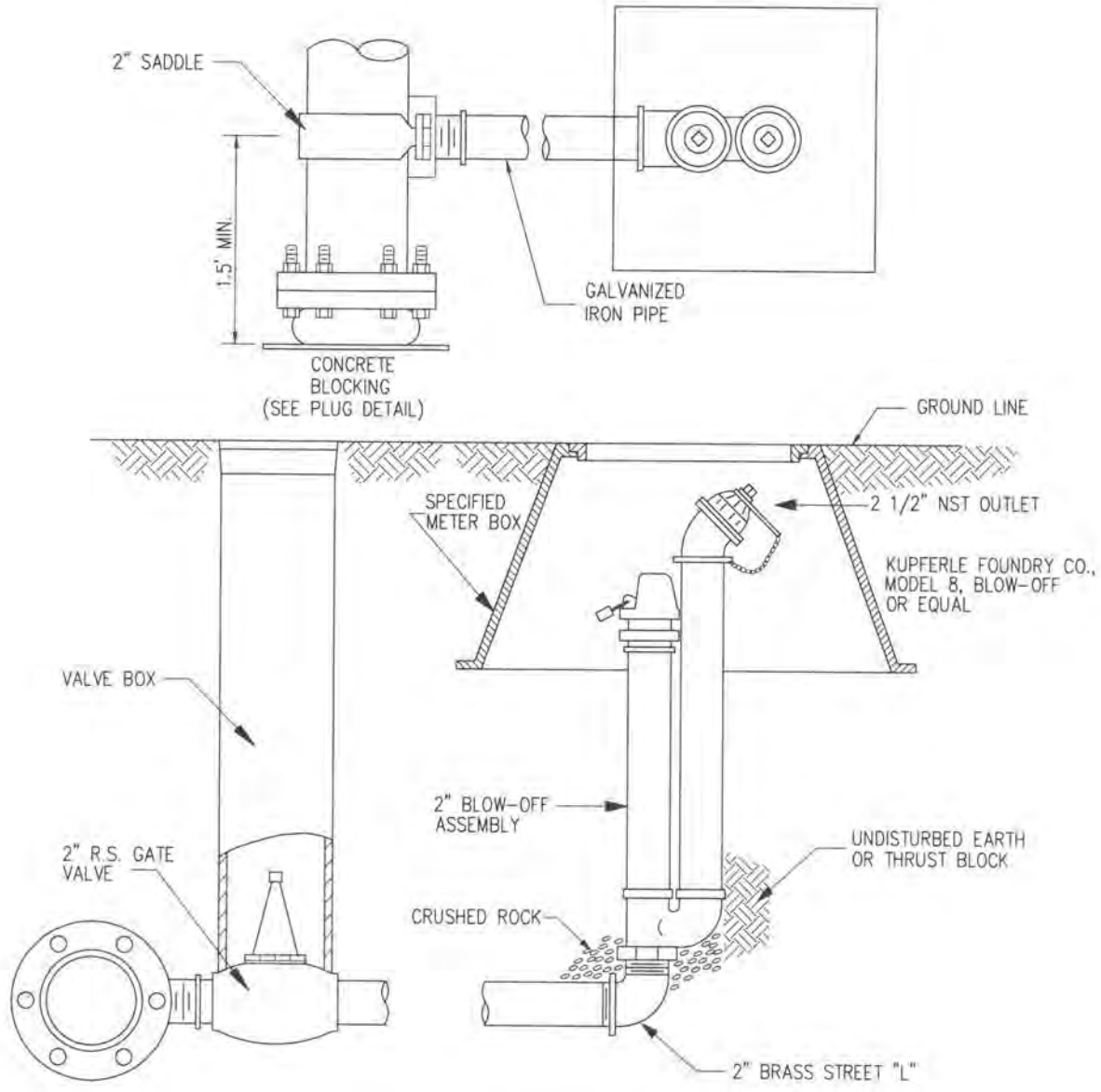
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
REV.	06/18	2" GATE VALVE	
REV.	01/12	SIDE OUTLET, WOOD POST	
ORIG.	10/06		



AIR RELEASE/AIR VACUUM VALVE ASSEMBLY

NOT TO SCALE



BLOW-OFF ASSEMBLY

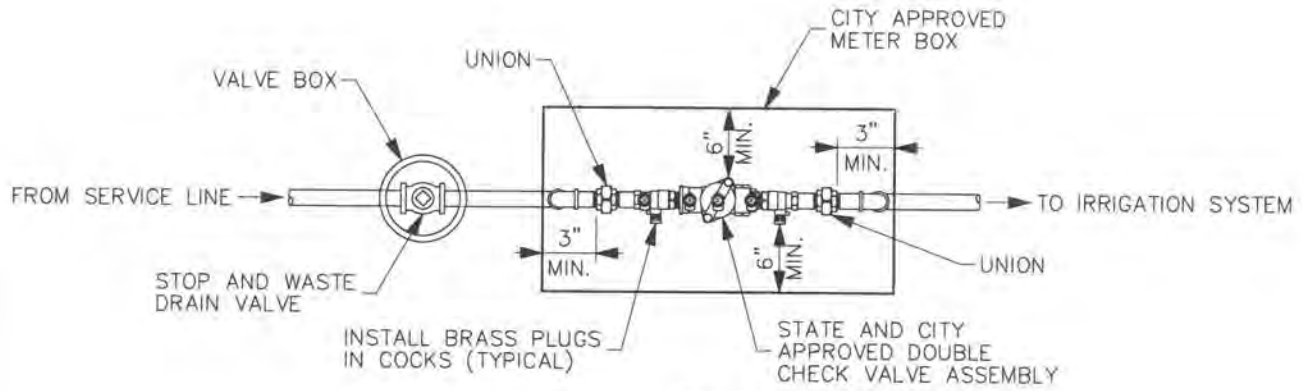
NOT TO SCALE

NOTES:

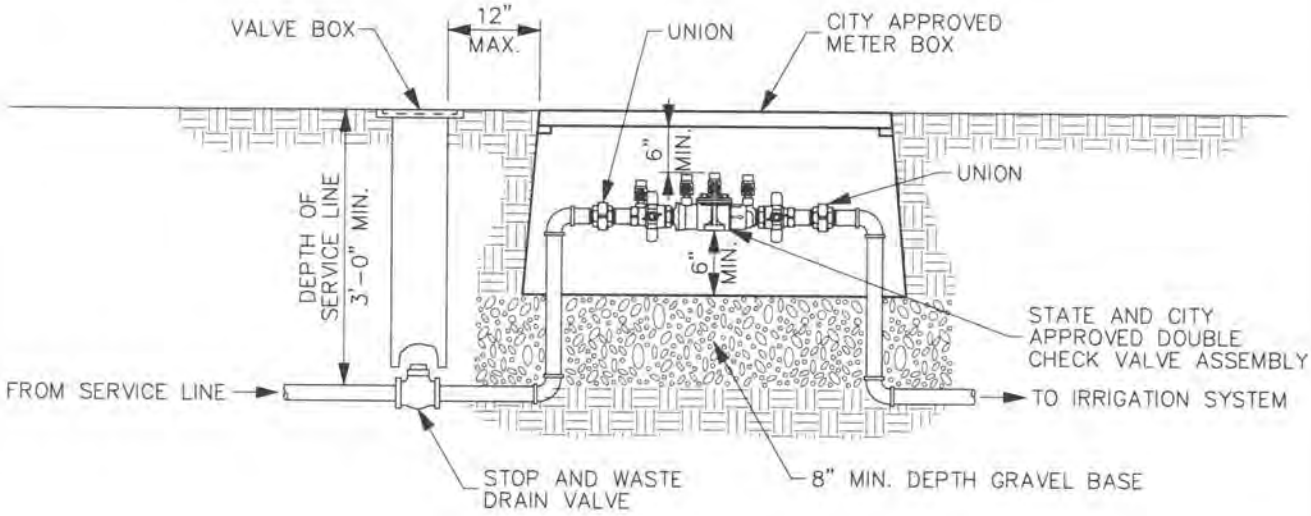
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

REV.	06/18	2" GATE VALVE	
ORIG.	10/06		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	BLOW–OFF ASSEMBLY	W–7



PLAN



ELEVATION

NOTES:

1. DOUBLE CHECK VALVE ASSEMBLY SHALL MEET REQUIREMENTS OF THE AWWA "ACCEPTED PROCEDURE AND PRACTICE IN CROSS-CONNECTION CONTROL" MANUAL.
2. DEVICES MUST BE ON STATE DEPT. OF SOCIAL AND HEALTH SERVICES LIST OF "APPROVED CROSS CONNECTION CONTROL DEVICES".
3. METER BOX SIZE SHOULD BE SIZED TO PROVIDE THE MINIMUM CLEARANCES SHOWN IN THE DETAIL.

TYPICAL IRRIGATION BACKFLOW PREVENTER (3/4" - 2")

NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE CITY DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

ORIG.	12/07		
Revision	Date	Description	Appr

CITY OF SELAH-STANDARD DETAIL	IRRIGATION BACKFLOW PREVENTER	W-8

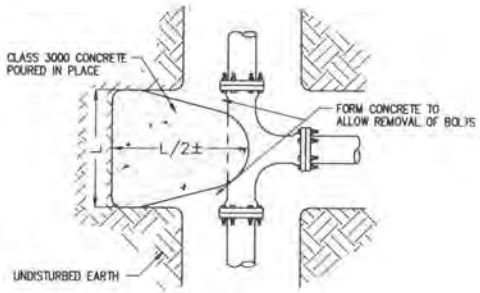
CITY OF SELAH – STANDARD DETAIL

TYPICAL THRUST BLOCKING

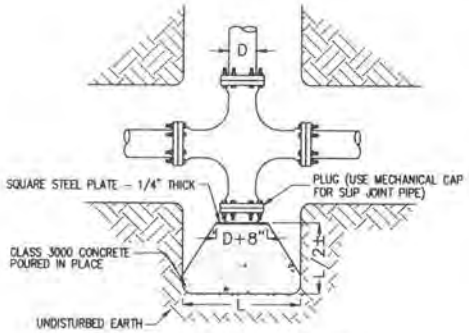
W-9

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

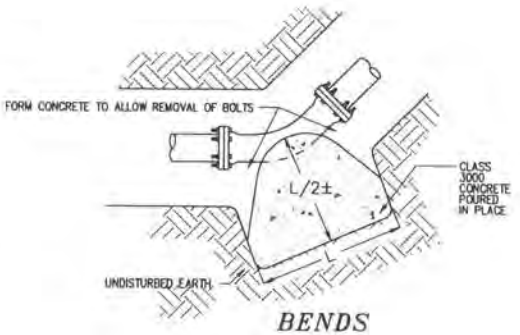
Revision	Date	Description	Appr
ORIG.	10/06		



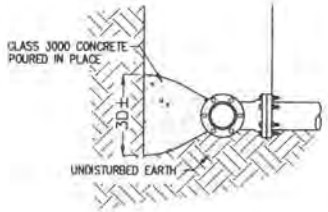
TEES



PLUGS AND CAPS



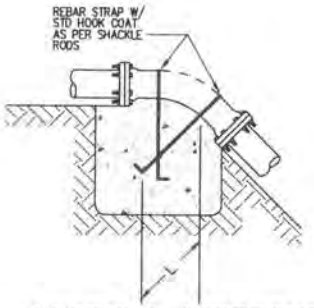
BENDS



SIDE VIEW
THIS VIEW TYPICAL OF ALL BLOCKING

NOTES:

1. D IS APPROXIMATE PIPE DIAMETER. THE ABOVE END AREAS ARE BASED ON AN ALLOWABLE SOIL BEARING PRESSURE OF 1500 PSF AND 250 PSI TEST PRESSURE.
2. DIMENSIONS LISTED DENOTE MINIMUM STANDARDS FOR SOIL AND TEST PRESSURES SHOWN. SHOULD TEST PRESSURE AND/OR SOIL CONDITIONS VARY, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR SPECIAL THRUST BLOCK DESIGN.
3. ALL FITTINGS AND/OR PIPE MAKING DIRECT CONTACT WITH CONCRETE SHALL BE WRAPPED WITH 4 MIL POLYETHYLENE SHEETING PRIOR TO PLACEMENT OF CONCRETE.



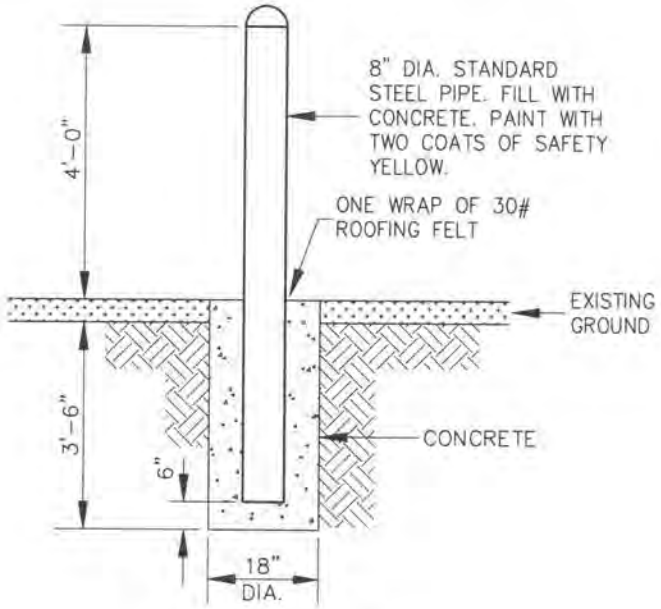
VERTICAL OVERBEND

MINIMUM END AREAS				
PIPE SIZE (D)	TEES & PLUGS	90° BENDS	45° BENDS	11 1/4° AND 22 1/2° BENDS
6"	5.1 SQ FT	7.2 SQ FT	3.9 SQ FT	2.0 SQ FT
8"	8.8 SQ FT	12.4 SQ FT	6.7 SQ FT	3.4 SQ FT
10"	14.3 SQ FT	20.2 SQ FT	11.0 SQ FT	5.6 SQ FT
12"	20.4 SQ FT	28.9 SQ FT	15.7 SQ FT	7.9 SQ FT
14"	27.7 SQ FT	39.2 SQ FT	21.2 SQ FT	10.7 SQ FT
16'	35.8 SQ FT	51.2 SQ FT	27.5 SQ FT	13.9 SQ FT

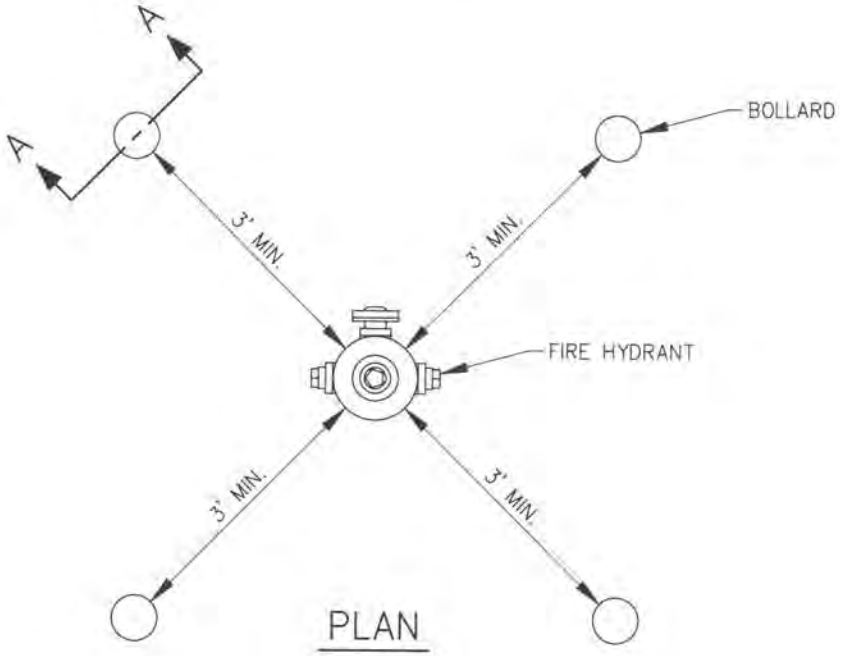
VERTICAL OVERBEND				
PIPE SIZE (D)	22 1/2° BEND	45° BEND	REBAR SIZE	L
6"	20 CU FT	39 CU FT	#5	2.0 FT
8"	34 CU FT	67 CU FT	#5	2.0 FT
10"	56 CU FT	110 CU FT	#5	2.0 FT
12"	79 CU FT	157 CU FT	#6	2.5 FT
14"	107 CU FT	212 CU FT	#7	3.0 FT
16'	139 CU FT	275 CU FT	#9	4.0 FT

TYPICAL THRUST BLOCKING

NOT TO SCALE



SECTION A–A



PLAN

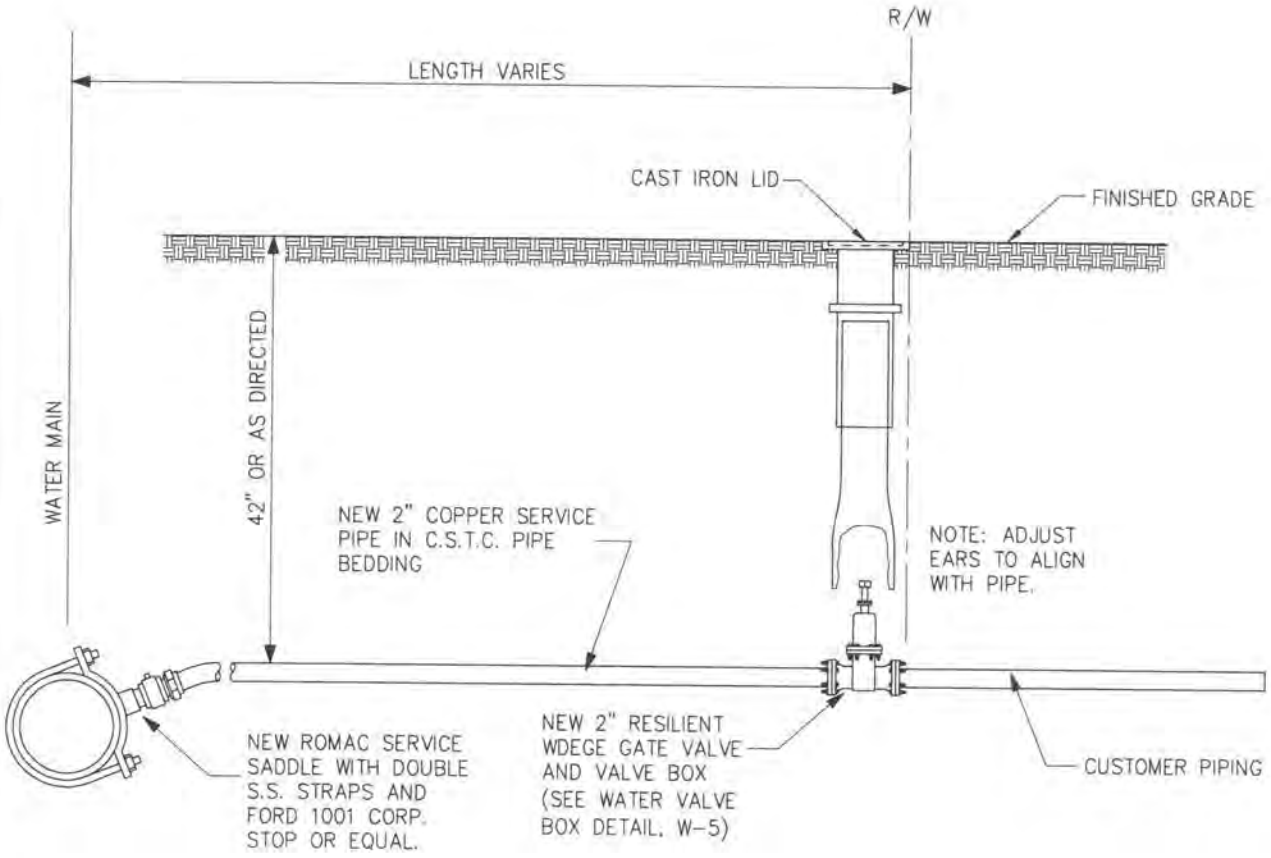
FIRE HYDRANT GUARD POSTS

NOT TO SCALE

NOTES:
- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.

Revision	Date	Description	Appr
REV.	1/12	UPDATED BOLLARD DETAIL	
ORIG.	10/06		

CITY OF SELAH–STANDARD DETAIL	FIRE HYDRANT GUARD POSTS	W–10



FIRE SERVICE

NOT TO SCALE

NOTES:

- ONLY THE LATEST DETAIL, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, SHALL BE USED.
- FIRE SERVICE SHALL BE INSTALLED W/ A MINIMUM OF 3" THICKNESS C.S.T.C. PIPE BEDDING ON ALL SIDES

REV.			
ORIG.	09/14		
Revision	Date	Description	Appr

CITY OF SELAH–STANDARD DETAIL	FIRE SERVICE	W–11

34.
WATER SYSTEM COMPLAINT RESPONSE FORM

HLA
Engineering and Land Surveying, Inc.

CITY OF SELAH
WATER SYSTEM COMPLAINT RESPONSE FORM

Date Received:_____ Date Completed:_____

Complaining Party
Name: _____

Address: _____

Phone: _____

Description and Location of Complaint:

_____
_____
_____
_____
_____

Personnel on Job:
_____
_____
_____

Time on Job:
Started: _____
Finished: _____
Total Hrs:_____

Corrective Action Taken:

_____
_____
_____
_____
_____
_____

Material Used:

_____
_____
_____
_____

Equipment Used:
_____
_____
_____

Hours Used:
_____
_____
_____

Comments:

_____
_____
_____

MAP A

City of Selah

Existing Water System

LEGEND

- EXISTING SERVICE AREA BOUNDARY (CITY LIMITS)
- FUTURE SERVICE AREA BOUNDARY (UGA)
- EXISTING WATERMAIN
- FIRE HYDRANT
- WATER VALVE
- WELL/PUMP STATION
- RESERVOIR

N W E S

0 200 400 800

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

12/11/2020 P:\Projects\2019\19061\WSP-Figures.dwg

MAP B

City of Selah

Water System Hydraulic Analysis Node Map

LEGEND

- EXISTING SERVICE AREA BOUNDARY (CITY LIMITS)
- FUTURE SERVICE AREA BOUNDARY (UGA)
- HYDRAULIC ANALYSIS PIPE
- HYDRAULIC ANALYSIS JUNCTION NODE

HLA Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

6/30/2020 R:\Hydraulic Analysis\Selah\2020 Selah Hydraulic Analysis.dwg