EXECUTIVE SUMMARY

INTRODUCTION

The purpose of this study is to provide a comprehensive evaluation of the City's water system with respect to its existing and future needs, identify improvements and associated costs necessary to meet those needs, and provide the City with a framework for the provision of water service through the year 2040.

This executive summary has been prepared to provide a concise overview of the evaluations and recommendations from each chapter of the study. A summary of the capital improvement program costs appears at the end of this section as well as in Chapter 12.

PROJECT OBJECTIVES

This master plan has been developed to provide the City with a guide for short term and long term water system improvements and has been prepared as a reference document to assist the City as it evaluates the impacts of proposed development and land use on the water system.

This master plan accomplishes the following specific objectives:

- Establishes water system design and planning criteria
- Provides an inventory of the existing water system infrastructure
- Identifies and prioritizes current and future water system deficiencies
- Provides specific recommendations to the community and City Council for action
- Provides the City with a water system master plan that addresses the needs of both the City and regulating agencies

BASIS FOR MASTER PLANNING

The City's previous water master plan was completed in 2002; it outlined recommended improvements to the water system components including the distribution, storage, and treatment systems. A number of the major improvements recommended in the previous water master plan have been addressed. The life and planning horizon for a water master planning document is 20 years, with updates typically recommended on 10 year intervals. Accordingly, a new master plan was needed to address water system issues.

STUDY AREA AND PLANNING CONSIDERATIONS (CHAPTER 2)

The City's Comprehensive Plan was adopted in 1982 and recently updated in 2013 and established an urban growth boundary (UGB) encompassing approximately 1,700 acres. The City does not provide water service to all areas of the City. In addition to the water system owned and operated by the City, two other water service districts serve customers within the UGB. The Southwest Lincoln County Water District provides service to large areas in the southern portion of the UGB and the Seal Rock Water District provides service to areas of the UGB located north of Alsea Bay. The City's water system also serves customers outside the UGB as shown in Figure 2-8. The study area for this plan includes all areas within the UGB that

are not served by the two other water districts plus the additional limits of the system defined by the customers outside the UGB.

The planning period for this study extends through 2040. The current population within the City's UGB is approximately 2,095. The population is expected to increase to approximately 2,801 by 2040. Since the area inside the UGB is served by other public water systems, the overall population is not representative of the population served by the City's water system. Therefore, changes in the number of water service connections were used to estimate future water production needs. The City currently serves approximately 1,400 user connections. This value is expected to increase to 1,706 connections by 2040. The average annual increase in the number of water system connections was assumed to be equal to the average annual increase of the population with the UGB (0.9% per year) as published by the Portland State Population Research Center.

The improvements recommended in this plan are based on the development of land within the UGB in its present location and the current zoning designations for these areas. This report evaluates the anticipated water supply, treatment, pumping, and storage needs for the 20 year planning period. Implementation of the recommended improvements will provide an adequate and dependable water system for the City's existing and future customers. Significant expansions of the service area, or changes to the existing zoning areas could change the recommendations of this plan. An update or reevaluation of key planning assumptions should be performed if such changes occur.

REGULATORY REQUIREMENTS (CHAPTER 3)

The US Environmental Protection Agency (EPA) and the State of Oregon Health Authority, Drinking Water Program (ODWP) currently enforce drinking water standards for 91 primary contaminants and 15 secondary contaminants. Primary standards regulate contaminants that pose a serious risk to public health, whereas secondary standards cover aesthetic considerations. Public water systems must sample for primary contaminants routinely to ensure that standards are met and must report the results of such sampling to the regulating agency.

The City's water system operates in compliance with the current regulatory requirements. Regulatory compliance is achieved as a function of the basic water system design, the operational modes selected by the City's licensed operators, as well as the current regulatory structure. Future compliance in light of near-term regulatory changes combined with increasing water demands will require modifications to the design and operation of the City's water system. The long-term success of the City's water system requires an improvement plan that suitably addresses anticipated regulatory needs over the planning period.

For a more detailed discussion of existing and anticipated regulatory requirements please refer to Chapter 3.

EXISTING WATER SYSTEM INVENTORY (CHAPTER 4)

The City operates and maintains the existing water system and delivers water to its consumer base utilizing surface water from Weist and Eckman Creeks, a water treatment plant, three storage reservoirs, and a network of distribution pipes. The City also has water rights on Southworth Creek and the Red River that are currently not in use.

The City's water distribution system includes three transmission lines that feed water from the storage tank to the distribution grid. These pipelines are largely located in undeveloped areas between the storage tank and the developed areas of the City. The distribution grid is predominantly a looped network and is constructed largely in the public road rights-of-way. The distribution system consists of approximately 25 miles of pipe of varying materials and sizes. Approximately 67% of the total pipe length is pipe 6-inches in diameter or larger, and 71% of the piping is PVC.

PRESENT AND FUTURE WATER DEMANDS (CHAPTER 5)

At the most fundamental level, future water demands are a product of per capita water use patterns applied over the anticipated population. The per capita use factors utilized in this report are based on typical historical use rates and do not consider the effects of future conservation programs. The development of a conservation program is encouraged and will provide additional operating margins with regard to supply and capacity.

Water demand is defined as the sum of all water produced and delivered to the City's distribution system. It includes water consumed in all use categories and also includes water loss and unaccounted-for water. Water demand varies across seasonal periods, days of the week, and hours of the day. The establishment of an average day demand rate (ADD) serves as the baseline against which other more intensified demands are measured, such as maximum day demand (MDD), which is defined as the highest production day within the highest production month and peak hour demand (PHD), which is defined as the greatest flow occurring in any one-hour period.

Based on data from 2014 to 2017 a historical ADD of 170 gallons per connection was used in this report. This value is about 65% of the value for a typical City. The difference is likely due to unique demographic factors (e.g., older population with smaller family sizes) or residences that are occupied on a part time basis. For the purpose of developing water demand projections into the future, this report is based on the assumption that the average day demand per connection will remain constant during the planning period. For this to be valid, the proportion of homes that are partially occupied must remain constant and the proportion of commercial/industrial use to residential use must also remain constant. In the coming years, if these assumptions prove to be inaccurate, the City may want to update this plan accordingly. Table 5-4 includes a summary of the projected water demands including estimations of short term peak demands.

WATER SUPPLY EVALUATION (CHAPTER 6)

In Oregon, all water is publicly owned. The Oregon Water Resources Department (OWRD) regulates the use of both surface and groundwater throughout the state. Over the years as greater demands have been placed on limited water resources, OWRD has exercised increasing control over water use. Water rights establish a hierarchy utilized by OWRD to adjudicate water in times of water shortages. Accordingly, it is paramount the City secure and maintain suitable water rights to meet long term municipal needs.

The City holds certificated water rights for the Weist/Eckman Creek system. The amount of water that can be withdrawn under these rights is sufficient to supply the City for many years. However, the possession of documented water rights does not guarantee that the water will be physically present. During dry conditions in the late summer and early fall, the flow in the North

and South Fork of Weist Creek essentially stops and the City is not able to use the Weist Creek diversions. During these conditions all water must be supplied from Eckman Creek. The City's current water rights allow the City to withdraw up to 4 cubic feet per second (CFS) from Eckman Creek. However, during dry conditions, the flow in Eckman Creek may drop below this value. There is no long-term database of flow measurements for Eckman Creek. Therefore, it is unclear how much water the City can reasonably expect to divert from Eckman Creek during dry weather conditions. Based on a cursory review of limited available data, it appears that flows in Eckman Creek should be sufficient to allow the City to divert as much as 2 CFS during dry weather conditions. 2 CFS should be sufficient to meet the City's needs during the current planning period. However, looking beyond the current planning period (i.e., 2040), the City may need to obtain additional water supplies. Some options are discussed in Chapter 6.

Obtaining new water supplies is challenging and time consuming, so the City should begin this process during the next 20 year planning period. In addition to the Weist/Eckman Creek System, the City also holds a permit to divert water from Southworth Creek located several miles east of the City. However, the permit only allows the City to use water if certain minimum flowrates are maintained. During the late summer and fall of 2018, the flows in Southworth Creek dropped below the minimum requirements. Therefore, even if the infrastructure was in place, the City would not have been able to use water from Southworth Creek. However, 2018 was an unusually dry year and the frequency of these low flow events is not known. At some point in the future (beyond the current planning period), the City is going to be faced with decisions about whether or not to invest resources in Southworth Creek or further develop Eckman Creek. There are no historic flow records for these two streams, so it is difficult to accurately assess the reliability of future water supplies from these streams. For this reason, this plan recommends the City start measuring flows on both streams on a regular basis to develop a database that can be used by future planners to determine the availability of water from these sources.

Chapter 6 includes a detailed analysis of the City's water supplies. In addition to some water rights management actions, the recommendations in Chapter 6 also include updating the City's water management and conservation plan, improvements to the Eckman Creek Pump Station, and improvements to the pipeline from the North Weist Creek diversion structure. Chapter 6 also includes an evaluation of an intertie between the Seal Rock Water District and the City's system. The intertie would improve the overall redundancy of the City's water supply by providing another source of water. However, the costs are high and not easily justified if the intertie only serves as an emergency backup. The intertie has the potential to benefit the entire region because it is a missing link in the water distribution piping serving the communities between Newport and Yachats. Therefore, if regional support for the intertie builds, and outside funds can be obtained to offset the City's costs, the project may become more attractive.

WATER TREATMENT EVALUATION (CHAPTER 7)

Improvements to the City's water treatment plant will be required to meet projected demands and to address system reliability issues. Major improvements are recommended as the existing plant currently operates near its design capacity and projected system demands are expected to exceed the capacity of the plant early in the planning period.

The recommended improvements include increasing the pumping capacity of the Eckman Creek Pump Station, adding a third packaged filtration unit, expanding the existing treatment plant

building, and adding a backwash water recycling system. Additional descriptions of the recommended improvements are provided in Chapter 7.

DISTRIBUTION SYSTEM EVALUATION (CHAPTER 8)

The primary purpose of a water distribution system is to deliver the full range of consumer demands and fire flows at pressures suited for the particular use. To accomplish this, the distribution system utilizes a combination of large water mains and networks of smaller distribution mains.

The existing distribution system was evaluated and existing or anticipated deficiencies were identified. In general, the distribution system is sufficient to provide domestic flows, but lacks the capacity to convey flows needed for fire suppression. Chapter 8 includes an evaluation of the distribution system as well as improvement recommendations. Some of the improvements are needed to improve fire flows throughout the City and some are needed to replace piping that is likely to reach the end of its useful life during the planning period. In addition to the various piping improvements, Chapter 8 also recommends an evaluation of the City's pressure reducing valves. It appears that some of the valves may not be properly adjusted and may not be operating efficiently, which limits the amount of water that the distribution system can convey. Correcting these problems has the potential to improve the available fire flow throughout the City.

Table 8-1 is a summary of the recommended distribution improvements. For more details on the particular projects, refer to the discussions in Chapter 8.

WATER STORAGE EVALUATION (CHAPTER 9)

In most municipal distribution systems, the water system service pressure is determined by the elevation of the free water surface in the storage reservoirs serving the system. This is the case for the City of Waldport. Service pressures begin with available static pressure created by the City's 300,000 gallon reservoir and are reduced en route to the consumer by friction losses in the pipe network.

The primary function of water storage is to provide a reserve of water to equalize daily variations between supply and consumer demand, to serve fire-fighting needs, and to meet system demands during an emergency interruption of supply. The overall storage within a system can be divided into several storage categories, including operational storage, equalization storage, standby (emergency) storage, fire suppression storage, and dead storage. The analysis in Chapter 9 identifies the volumes that are currently provided by the existing storage tanks and compares them to the storage needs anticipated during the planning period.

The analysis in Chapter 9 shows the City's existing storage tanks are able to meet the storage requirements for the remainder of the planning period. Therefore, the tanks are sufficient from a capacity standpoint. However, improvements will be needed during the planning period. The interior surfaces of the City's existing 2 million gallon (MG) storage tank need to be recoated. This will require draining the tank and removing it from service for several months. During this time, the only storage tank capable of supplying water for fire suppression is the existing 300,000 gallon tank. This volume is not considered to be sufficient to fight a major fire. As such, this plan recommends the construction of a new 300,000 gallon tank immediately south of the existing 300,000 gallon tank. Prior to starting this project, the City should have discussions with

the local Fire Marshall to verify the minimum storage volume that should be maintained while the 2 MG Tank is out of service. Adjustments to the size of the new tank may be required.

In addition to recoating the 2 MG Tank and constructing a new 300,000 gallon tank, other improvements described in Chapter 8 include seismic retrofit projects for both tanks and recoating the existing 300,000 gallon tank.

SEISMIC RISK ASSESSMENT & MITIGATION PLAN (CHAPTER 10)

OAR 333-061-0060(5)(J) requires communities located in high hazard zones to conduct a seismic risk assessment and mitigation plan as part of a water master planning effort. Chapter 10 includes a description of the analysis and recommended mitigation plan. The critical facilities are identified along with a discussion of the consequences of failure. The recommended capital improvement plan includes structural retrofitting of the critical facilities such as the water treatment plant and storage tanks to improve the overall seismic resiliency of the City's system.

OPERATION AND MAINTENANCE (CHAPTER 11)

Chapter 11 includes a review of the City's operation and maintenance activities as well as general discussion of operation and maintenance activities that City staff should consider.

RECOMMENDED CAPITAL IMPROVEMENT PLAN (CHAPTER 12)

As summarized in the previous sections, the water system has a number of deficiencies, which inhibit the City's ability to provide an adequate level of water service throughout the physical system for the planning period. Some of these deficiencies are more critical than others as they present an immediate effect on the ability to provide adequate service. Other deficiencies will manifest as the City expands and the existing system continues to age.

A prioritizing process was developed to rank the improvement projects since the scope of the proposed improvements is large. Factors utilized in the prioritizing process included several measures of criticality (such as public health concerns, end of useful life, inadequate capacity, and City priority), as well as the cost and benefit of each project.

Priority 1 improvements are recommended to be undertaken as soon as practical. These are projects necessary to resolve existing or near term system deficiencies. Priority 2 projects are needed to adequately serve the water system based on anticipated future growth and development. Priority 3 projects, while important, are not deemed critical at the present time but will eventually be needed to improve system reliability or to supply future demands.

Presented in the table below is a summary of the priority category totals.

Table ES-1|Cost Summary, Capital Improvement Recommendations

Priority Group	Total Estimated Project Cost
Priority 1	$8,942,000
Priority 2	$3,163,000
Priority 3	$5,652,000
Total	$17,757,000

Table ES-2 is a comprehensive listing of the recommended water system improvement projects. The location of many of the prioritized improvements is shown on Figure 12-1 (in the body of the report). The reader is referred to the body of this report for more detailed descriptions of the individual projects.

Work on the Priority 1 improvements should begin as soon as feasible following approval of this plan by the Oregon Health Authority and formal adoption by the City Council. It is anticipated that Priority 2 projects will be required within the planning period in response to population growth or aging infrastructure. Priority 2 projects can begin as finances become available and as the need arises.

In addition to the priority 1 through 3 capital improvement projects, this plan recommends several ongoing annual programs. These are listed in Table ES-3. The first of these programs includes the streamflow measurement work described in Chapter 6. Programs 2 through 4 are recommended to reduce the amount of unaccounted for water in the system. Program 5 is recommended for the periodic updates to the Water Management and Conservation Plan that are required by state rules. It is envisioned that the recommended annual programs will be funded from the City's operation and maintenance budget for the water system.

The City does not currently have the resources nor is the City's existing user fee structure sufficient to fund all of the recommended improvements; therefore, alternative funding sources must be pursued. Several potential funding sources are identified and discussed in the last portion of Chapter 12 of the master plan. All funding options will likely require an increase of the user rates and SDCs.

Table ES-2| Recommended Capital Improvement Priorities (Waldport Water System)

Project Code[1]	Project	Priority	Total Estimated Project Cost[2]
T-1	Water Treatment Plant Improvements (See Chapter 7)	1	$4,766,000
ST-1	New 300,000 gallon Bolted Steel Tank (See Chapter 9)	1	$1,010,000
ST-2	2 Million Gallon Tank Seismic Retrofit and Recoating (See Chapter 9)	1	$1,165,000
S-1	Permit Numbers S-18654 & S-23587 Extension Applications (See Chapter 6)	1	$10,000
S-3	Water Management and Conservation Plan Update (See Chapter 6)	1	$25,000
D-1	Water System Design Standards (See Chapter 8)	1	$5,000
D-2	Pressure Reducing Valve Maintenance & Coordination (See Chapter 8)	1	$40,000
D-3	Hemlock Street Waterline Connection (See Chapter 8)	1	$10,000
D-6	South Transmission Main (See Chapter 8)	1	$1,131,000
D-7	Highway 34 Waterline East of Lint Slough (See Chapter 8)	1	$780,000
	Subtotal Priority 1		$8,942,000
D-4	Waldport Heights Transmission Main (See Chapter 8)	2	$871,000
D-5	Highway 34 Waterline Near Nelson Wayside Drive (See Chapter 8)	2	$257,000
D-8	Norwood Waterline (See Chapter 8)	2	$331,000

Table ES-2| Recommended Capital Improvement Priorities (Waldport Water System)

Project Code[1]	Project	Priority	Total Estimated Project Cost[2]
S-2	Partially Perfect Water Rights Under Permit S-23660 (See Chapter 6)	2	$10,000
S-5	Southwest Lincoln County Water District Intertie Improvements	2	$806,000
S-6	North Weist Creek Raw Water Transmission Pipe (See Chapter 6)	2	$375,000
ST-3	Existing 300,000 Gallon Tank Seismic Retrofit & Recoating (See Chapter 9)	2	$513,000
	Subtotal Priority 2		**$3,163,000**
D-9	Crestline/Cedar Backbone (See Chapter 8)	3	$1,229,000
D-10	Ball Boulevard Waterline (See Chapter 8)	3	$155,000
D-11	Merten Drive Waterline (See Chapter 8)	3	$467,000
D-12	Wedge Drive to Delores Drive Loop (See Chapter 8)	3	$176,000
D-13	Kelsey Lane to Norwood Loop (See Chapter 8)	3	$284,000
S-4	Seal Rock Water District Intertie (See Chapter 6)	3	$3,341,000
	Subtotal Priority 3		**$5,652,000**

[1] Project Code Legend:
S = Water Source/Supply T = Water Treatment ST = Storage
P = Planning Project D = Distribution

[2] See Section 12.3.2 for basis of project cost estimates, December 2018 ENR 20 City Construction Cost Index of 11184

Table ES-3| Recommended Annual Programs

Program Code	Description	Priority	Total Estimated Project Cost
Pgm-1	Eckman and Southworth Creek Stream Gauging (see Section 6.4.3)	1	$26,000
Pgm-2	Water Meter Replacement Program (see section 8.4.2)	1	$35,000
Pgm-3	Non-metered Water Use Tracking System (see section 8.4.2)	1	$1,000
Pgm-4	Leak Detection and Repair Program (see section 8.4.2)	1	$3,500
Pgm-5	Water Management & Conservation Plan Updates (see section 3.10)	1	$5,000
	Subtotal Recurring Annual Programs		**$70,500**