

October 30, 2018

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**Re: City of Cannon Beach (PWS #00164) - Water Master Plan (PR #29-2018)
Concurrence with Master Plan/Need for Seismic Risk Assessment and
Mitigation Plan**

Dear Mr. Vaage:

The Drinking Water Services (DWS) received a copy of the *Water System Master Plan - City of Cannon Beach - Clatsop County, Oregon, December 2017* for the City of Cannon Beach (DWS Plan Review #29-20018) on 2/23/18 and a check to cover this review for \$4,125 on 3/8/18. After reviewing the master plan, I e-mailed preliminary comments to you on 3/29/18, 3/30/18, 4/11/18, and final comments in a letter dated 4/13/18.

On October 9, 2018, you e-mailed a written response to my 4/13/18 letter and provided a link to a revised copy of the master plan, which was dated October 2019. The October 9, 2018 response addressed my comments and acknowledged that efforts were underway to develop the Seismic Risk Assessment and Mitigation Plan.

Upon review of the revised October 2018 Master Plan, it appears the criteria listed in Oregon Administrative Rules (OAR) 333-061-0060(5)(A through H) have been met and we concur with these findings, however, the updated plan did not fully address the seismic risk assessment and mitigation planning requirements under OAR 333-061-0060(5)(J).

Since the seismic considerations provided in the revised October 2018 Master Plan do not meet the requirements in OAR 333-061-0060(5)(J), **a scope of work (or completed document if available) for the seismic risk assessment and mitigation plan must be submitted by January 2, 2019 along with a schedule for when the work will be completed.** I have enclosed a frequently asked questions document to provide some clarity on these requirements.

In summary, the October 2018 Master Plan serves to update information contained in the master plan completed in 2001. The planning represents a 20-year planning horizon to the year 2036. The study area for the Master Plan includes the area within the Cannon Beach Urban Growth Boundary (902 acres), which extends past the City limits in some areas. The purpose of the October 2018 Master Plan was to:

1. Document existing water system service area, sources, treatment and distribution facilities;
2. Estimate future water requirements;
3. Identify deficiencies and recommend water facility improvements that correct deficiencies and provide for growth;
4. Update the City's capital improvement plan (CIP);
5. Evaluate funding options.

The Master Plan included:

1. Planning criteria for fire flow requirements, distribution system pressures, storage needs, and projected future population and related demands for a 20-year period to 2036;
2. An assessment of the water system's ability to meet the planning criteria based on hydraulic modelling;
3. Alternatives of projects to meet the criteria;
4. A list of Capital Improvement Projects (CIPs) and construction schedule recommended for the next 20 years along with costs in 2015 dollars.
5. Evaluation of water rates and other funding options to fund the CIP.

The water system is comprised of:

1. 3 springs (Howell, Haskins, and Main Spring)
2. 1 surface water intake (West Fork Elk/Ecola Creek)
3. 3 potable water storage tanks (Tolovana, North, and Main)
4. 2 booster pump stations (Sunset and Ash Street)
5. 1 slow sand filter plant (2-cells)
6. Distribution piping (2" – 12" diameter typical)

More information about the contents of the master plan is provided on pages 6-17 of this letter.



Figure 3.1.2-1 City of Cannon Beach UGB and City Limits boundary map (courtesy of ODOT)

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Please note that OAR 333-061-0060 and -0050 contains plan submission, review, and construction requirements for all major water system additions or modifications. Construction plans and specifications should be submitted to and approved by DWS before construction begins for new facilities or major modifications of treatment facilities, tanks, and pump stations. The City of Cannon Beach may want to request an exemption from plan review for waterline projects, which needs to be renewed annually. More information for the waterline exemption can be found on our website at:

<http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/PLANREVIEW/Pages/exemption.aspx>

Thank you for your cooperation in the plan review process and if you have any questions or would like this information in an alternate format, please feel free to contact me at any time at 971-673-0419 or via e-mail at: evan.e.hofeld@state.or.us.

Sincerely,

A handwritten signature in blue ink, appearing to read "Evan Hofeld".

Evan Hofeld, Regional Engineer
Oregon Health Authority – Drinking Water Services

cc: Daniel Willyard, City of Cannon Beach

Encl. Seismic Risk Assessment and Mitigation Plan FAQ document



Seismic Risk Assessment and Mitigation Plan

Frequently Asked Questions

Oregon Health Authority Drinking Water Services

1. Why do community water systems with more than 300 connections need to conduct a seismic risk assessment and mitigation plan?

The Oregon Resilience Plan was developed in 2013 and provides the state's road map for earthquake preparedness. The goal is to identify critical infrastructure needed to supply water during an emergency, and identify projects to be completed in the next 50 years to ensure that piped water can be provided in the event of a strong earthquake. The plan and related information can be found at www.oregon.gov/gov/policy/orr. Water supply infrastructure is addressed in Section 8 beginning on page 203.

2. Which systems need to submit a seismic risk assessment and mitigation plan?

Every community water system with more than 300 connections that intends to submit a master plan after January 10, 2018 is required to conduct a seismic risk assessment and mitigation plan if any of their facilities are located in Areas VII through X of Plate 7. Plate 7 is available at <http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/PLANREVIEW/Documents/seismic-map.pdf>.

3. What must be included in a seismic risk assessment?

The seismic risk assessment must identify critical facilities needed to supply key community needs, including at a minimum: fire suppression, essential health care and first aid, emergency response, and drinking water supply points. The result would be a list of infrastructure backbone components including supply, treatment, distribution, and storage elements that are needed in order to continue to supply water for essential community needs immediately after a Cascadia subduction zone earthquake.

The assessment must also evaluate the likelihood and consequences of seismic failures for each facility identified as critical. General information for assessing various facilities by construction date and material can be found in the Oregon Resiliency Plan, which also references the American Lifelines Alliance (2001) Seismic Fragility Formulations for Water Systems, www.americanlifelinesalliance.org.

4. What must be included in the mitigation plan?

Based on the critical facilities identified to form the backbone, the mitigation plan consists of projects that will be completed over the next 50-year time period to upgrade, retrofit, or rebuild these facilities so that they will continue to provide water following a Cascadia subduction zone earthquake. The mitigations would include planned capital improvement projects, upgrades to minimize water loss from each critical facility, or recommendations for further study or analysis. The mitigation plan must also include a schedule as to when these mitigation efforts will be completed, within the 50 year planning horizon.

5. Are other formats of Plate 7 available?

Yes. Labels in pdf files (such as city names) can be turned off on the toolbar on the left hand side of the Adobe Acrobat Reader screen.

GIS files can be downloaded at <http://www.oregongeology.org/pubs/ofr/p-O-13-06.htm>. Under Publication Preview, click on "Download zip file (1.85 GB). Refer to "Read me" file for instructions. Open the Appendix folder. Click on the .rar file (a zip utility such as WinZip is needed to open this GIS data file). The GIS layer for Plate 7 is "Oregon_M_9_Scenario_Site_PGV." This file has the raw data and will need to be classified into the Mercalli rankings as shown on Plate 7. Remember that the Area X category includes the tsunami inundation zone.

6. Is any funding available to assist in development of this assessment and plan?

After July 1, 2018, systems serving 3,300 connections or less will be eligible for up to \$20,000 from the Drinking Water State Revolving Fund to complete the seismic risk assessment and mitigation plan. Funds will be awarded on a first-come, first-serve basis with submittal of a Letter of Interest. Funds cannot be used for mitigation activities (design or construction).

7. Are there additional technical resources to help develop the seismic risk assessment and mitigation plan?

Yes. Technical resources have been compiled in a document located at <http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/PLANREVIEW/Documents/seismic-references.pdf>.

For more information, contact Drinking Water Services at 971-673-0405

Description of Existing Facilities:**Demand Estimates:**

Historical water production data was used to calculate the total water demands for 2015 in order to account for all uses, including non-metered uses. Population forecasts from PSU's Population Resource Center 2015 and 2036 population forecast for Cannon Beach was used, which had a 0.20% average annual growth rate. Due to tourism in the summer, the population of Cannon Beach jumps from around 1,700 to well over 10,000 in some summer months.

Year 2036 demand estimates did not discount for future reductions in water loss and were calculated based on maximum values recorded in 2014 for ADD (237 gpcd @ 19.8% water loss) and in 2015 for MDD (463 gpcd @ 15% water loss) from 2012-2015 data provided by the City. Peak hour demand was calculated using a peaking factor of 3.5 applied to the ADD (PHD = 3.5 x ADD).

Year	Population	ADD	MDD	PHD	MDD Peaking Factor	PHD Peaking Factor
2015	1,709 (2,396 EDUs)	395,285 GPD (231 gpcd, 0.62 cfs)	790,820 GPD (463 gpcd, 1.22 cfs)	1,383,497 GPD (810 gpcd, 2.14 cfs)	2.0	3.5
2036	1,768	418,951 GPD (237 gpcd, 0.65 cfs)	818,121 GPD (462.7 gpcd, 1.27 cfs)	1,466,329 GPD (829.4 gpcd, 2.27 cfs, 1018 gpm)		

Existing Sources and water rights:

The City has 3 spring sources, which are the primary sources supplying 90% of the City's yearly water demand, but only about 80% of the summer demand when conditions are unfavorably dry or demands are unusually high. The springs are chlorinated to maintain a residual in the system. The City also has a surface water intake on Ecola Creek, in which the water drawn from it is treated through slow sand filtration prior to disinfection. All sources combine into a common entry point. Total existing water rights of 4.1 cfs are sufficient to meet 2036 demands of 1.27 cfs. However, the 1.5 cfs water right from Ecola Creek has not yet been perfected, which leaves just 2.6 cfs available from the groundwater sources. Oregon Water Resources Department has a competing 1991 water right (instream) on West Fork Elk Creek (Ecola Creek) to provide minimum stream flows required to support certain species of fish and their habitats, but this is not expected to impact the City's water rights, which has an earlier 1977 water right. Because supply from the springs varies seasonally, the Ecola Creek source is an important part of system reliability. The Master plan notes that source effluent flow meters have exceeded their useful life and should be replaced.

Source	OWRD Description	Use	Estimated yield capability ¹ (gpm)	Water Rights
Main Spring/ Spring #1. (elev. ~218')	Unnamed springs southwest of Haskell Spring	Used year-round as the main source. Can gravity flow to reservoir	380	S-5202 (Application) S-3135 (Permit) 1988 (Certificate #) Permitted rate: 1 cfs (448.8 gpm)
Haskell Spring/Spring #3 (elev. ~192')	Small tributary of South Fork of Elk Creek	Used year-round but contributes a lesser amount. Needs to be pumped to supply reservoir	120	S-14958 (Application) S-10936 (Permit) 11616 (Certificate #) Permitted rate: 0.6 cfs (269 gpm)
Howell Spring/Spring #4 (elev. ~201')	Unnamed spring northwest of Haskell Spring	Used year-round but contribute a lesser amount. Needs to be pumped to supply reservoir	150	S-16524 (Application) S-12321 (Permit) 19540 (Certificate #) Permitted rate: 1 cfs (448.8 gpm)
West Fork Elk Creek/Ecola Creek (elev. ~36', roughly 300-ft upstream of the slow sand filter plant)		Used as needed to supplement springs.		S-55694 (Application) S-41717 (Permit) -- (Certificate #) Permitted rate: 1.5 cfs (673 gpm)
Total	gpm =>			4.1 cfs (1,840 gpm)
	MGD =>			
1 gpm = 0.002228 cfs, 1 cfs = 448.8 gpm				

Existing Treatment:

West Fork Ecola Creek surface water source - The Cannon Beach Water Treatment Plant (WTP) is a slow sand plant with 2 cells constructed in 1995 with a total capacity of 700 gpm (350 gpm per cell). Disinfection is accomplished with sodium hypochlorite. The WTP is only used to supplement the springs if needed during the summer. At 1.0 MGD, the treatment plant is more than sufficient to meet 2036 maximum day demands of 0.83 MGD (expansion of the plant is not necessary). Sand media in the filters needs to be replaced and water treatment plant effluent flow meters have exceeded their useful life and should be replaced.

Spring groundwater sources - Springs only need sodium hypochlorite to maintain a residual in the distribution system and are used year-round.

Existing Sunset Booster Pump Station:

The Sunset Booster pump station serves 28 connections in the Sunset Pressure Zone in an area just southwest of the Main Reservoir. Updates completed in 2009 led to the station housing two 10 hP duty pumps, one 30 hP fire pump, and a backup generator.

Existing Ash Street Booster pump station:

The Ash Street Booster pump station at 7th and Ash St. pumps water to the North Tank to service 23 connections in the Ecola Pressure Zone north of the downtown area near Ecola State Park. The station contains two 5-hP pumps operating in lead-lag mode with each pump with a design capacity of 50 gpm at 160-ft of head.

Pressure Zones:

The City has 3 pressure zones. A majority of the system is fed via gravity (Zone 1). There are two higher elevation areas fed by booster stations: The Ecola Pressure Zone (also known as the "North Zone" or the "Ash Street Pressure Zone") serving 23 connections around Ecola State Park. The Sunset Pressure Zone serves 28 connections with the highest service at an elevation of approximately 216-ft.

Existing Reservoirs:

There are 3 reservoirs with a combined storage volume of 2.63 MG. The Main and the Tolovana reservoirs serve a majority of customers and the North tank serves the North Pressure Zone consisting of roughly 23 services. The concrete reservoir (Main Reservoir) roof hatch is a 4-ft square aluminum hatch with a gutter drain, rather than an overlapping lid-type hatch.

Name	Capacity (MG)	OF Elev. (ft)	Base Elev. (ft)	Diameter (ft)	Type	Year Installed
North Zone Reservoir (North Tank)	0.03	349.5 (19.5-ft WL)	330.00	16.8-ft (interior)/18.3-ft (exterior)	Glass-Fused-To-Steel	2001
Main Reservoir (Mid-Town Tank)	1.00	200.0 (20-ft WL)	180.00	95-ft internal diameter with 12-inch thick walls.	Concrete	1974
Tolovans Reservoir (South Tank)	1.60	200.5 (20.5-ft WL)	180.00	118-ft inside diameter (120-ft outside diameter).	Cor-ten Steel	1986

Total Storage: 2.63 MG

Existing Distribution System:

Distribution consists of about 23 miles of distribution mainline ranging from 1" - 12" diameter line and an additional 7 miles of service line piping ranging from 3/4" to 6" diameter service lines. Roughly 82% of the distribution system is PVC, 3% HDPE, and 15% asbestos cement. GIS data provided by the City's GIS consultant was used to create a hydraulic model using WaterCAD Vi8. Improvements identified for the existing transmission and distribution system were primarily related to:

- Maintaining adequate system pressure for the Sunset Pressure Zone while reducing the number of pump starts for Sunset BPS duty pumps;
- Providing adequate fire hydrant coverage to all areas of the City;
- Providing adequate fire flows, particularly to the North Pressure Zone;
- Replacing PVC pipe from the 1970's;
- Replacing AC pipe; and
- Creating redundant distribution routes, particularly for customers south of Haystack Hill State Park.

A fire flow analysis was completed using WaterCAD and identified that most of the City has adequate hydrant spacing (500-ft between hydrants) and flow (1,000 gpm from each hydrant while maintaining 20 psi pressure), however, there were several pockets that had insufficient fire coverage through public fire hydrants.



Deficiencies:

1. Transmission - None
2. Treatment - None other than needing re-sanding and some process monitoring improvements (see O&M)
3. Pumping Capacity - None
4. Storage - Seismic and condition deficiencies (corrosion, safety concerns with ladder and around hatches, deterioration of roof joints on Main tank, designed prior to current seismic codes and with insufficient freeboard for code-level seismic event, etc.)
5. Distribution - Some areas had inadequate fire hydrant spacing, aging AC pipe, and lacked redundancy
6. Operation and Maintenance (O&M) - Some inefficiencies in Mission Control monitoring and process control capabilities.

Notable Recommendations:

- 1) The Automation Group (TAG) determined that the City would benefit from improved water system monitoring and control capabilities, which could be provided through improvements to the existing Mission Control System, implementation of a new SCADA system, or a combination of the two.
- 2) Improve system metering to ensure all customer connections are metered as well as to upgrade existing metering software to an Advanced Metering Analytics (AMA) software to provide the City with mobile data access capabilities and customers with an improved interface for tracking water consumption and managing their account.
- 3) Perfect water rights for the Ecola Creek source, rather than just continue to file for extensions of the temporary water rights the City has now. Total existing water rights of 4.1 cfs are sufficient to meet 2036 demands of 1.27 cfs. However, the 1.5 cfs water right from Ecola Creek has not yet been perfected, which leaves just 2.6 cfs available from the groundwater sources. Because supply from the springs varies seasonally, the Ecola Creek source is an important part of system reliability.
- 4) Steps to protect source waters from contamination by upstream users should be taken during the 20-year planning period. The source water protection area was delineated by ODEQ in their 2002 Source Water Assessment report, which identified managed forest lands as the primary source for potential contamination within the impact area. The City has been in contact with the owner of surrounding timber lands and plans to purchase up to 400 acres around the existing springs to provide a protected buffer from upstream contamination.
- 5) Develop a plan for providing back-up water supplies capable of meeting reduced water demands during an emergency such as a severe drought or major earthquake.
- 6) Existing spring water, creek water, and WTP effluent flow meters have exceeded their useful life and need to be replaced.
- 7) Filter media in the slow sand filter beds is well past its usable life and needs to be replaced. The existing filter beds were installed in 1995.
- 8) A structural evaluation completed in June 2016 by Peterson Structural Engineering (PSE) identified improvements at each of the three reservoirs needed to bring them into compliance with current seismic codes.
- 9) Improvements identified for existing transmission and distribution systems were related to:
 - Maintaining adequate system pressure for the Sunset Pressure Zone while reducing the number of pump starts for Sunset BPS duty pumps;
 - Providing adequate fire hydrant coverage to all areas of the City;
 - Providing adequate fire flows, particularly to the North Pressure Zone;
 - Replacing PVC pipe from the 1970's;
 - Replacing AC pipe; and
 - Creating redundant distribution routes, particularly for customers south of Haystack Hill State Park.

10) City should evaluate general pipe replacement projects after 3-5 years to verify that materials and associated costs still reflect the City's preference for replacement piping.

11) The City developed a Water Management and Conservation Plan in 2005, which was finalized in 2010 and approved in January 2013. The 2013 plan remains in effect until April 2021. In accordance with requirements of OAR 690-086-0120(4), The City will submit a progress report to the Oregon Water Resources Department by April 1, 2018.

12) The treatment plant lacks a generator inlet plug and manual transfer switch to provide power to the facility using a portable generator should the on-site generator fail. The UPS only provides about 1-hr of stand-alone backup power for the control panel.

13) The concrete reservoir roof hatch is a 4-ft square aluminum hatch with a gutter drain, rather than an overlapping lid-type hatch. This was noted as not meeting "current code".

14) Asbestos cement pipe should be monitored regularly in order to prevent leaks and deterioration as the useful life of AC pipe is approximately 60 years and will likely be approaching its useful life before the other materials. With about 18,081-ft of AC pipe, AC pipe makes up about 15% of the City's distribution system piping.

15) Figure 7.4.5 (possible typo as 7.4.4 is shown) should be used to document future growth, improvements, and replacements in the distribution system.

16) Areas of concern for insufficient fire hydrant coverage and fire flows are addressed in the CIP in Section 8.0, along with recommendations for improving coverage and available flows.

17) Switching to an integrated Supervisory Control and Data Acquisition (SCADA) system could provide a more robust management system for all major components of the water system and could also be used for the wastewater system.

18) In the event that timing of planned radio tower construction at the North Reservoir site and SCADA integration make it a practical option, the City should evaluate connection to utility power to serve the North Reservoir for level monitoring (currently served by PV cells, a charge controller, and a 12-V DC battery for power at night and reporting tank level to the Mission Control system). See page 100.

19) It is recommended that the City initially move forward with work recommended under Project #1 to allow for immediate implementation of necessary system monitoring improvements. Any work not completed under Project #1 would need to be added to the scope of Project #2. In anticipation of future SCADA integration, recommended equipment for Project #1 is compatible with both SCADA and Mission Systems. See page 106.

20) It is recommended that a meter be installed at the Recycle Facility to track usage and reduce the City's overall percentage of unaccounted water. See page 107 (Project #3).

21) An engineering evaluation of the existing system conditions is recommended to refine replacement and retrofit requirements and determine the most cost-effective strategy for implementation of Advanced Metering Analytics (AMA) upgrades. See page 108.

22) As indicated in Section 7.0 of the Master Plan, existing water rights are sufficient for the planning period, therefore there are no recommendations to increase the supply at this time, however, other issues recommended to be addressed include (1) an uncertificated water right, (2) protection of source water from upstream contamination, and (3) emergency water supply planning. As noted in GSI's memorandum, *Certification of Permit S-41717 for the City of Cannon Beach* (included in Appendix D) and Project #5 in Section 8.2.2.1 of the master plan, the recommendation is to retain the services of a Certified Water Rights Examiner to observe/document water usage and sign and seal the relevant section of a Claim of Beneficial Use (COBU) that needs to be developed and submitted to the Oregon Water Resources Department (OWRD) requesting a water right certificate for Permit S-41717 to secure authorized use of the full 1.5 cfs from Ecola Creek without future conditions prior to the current development deadline of October 1, 2021. See page 110.

23) Consideration should be made for development of an emergency water supply plan to ensure that clean water is available during emergencies and/or natural disasters such as an earthquake or severe drought conditions. Planning level costs were developed for renting a mobile water treatment system as well as recommendations to site the intake at the Elementary School.

24) Complete improvements to the tanks as recommended in the PSE structural reports as well as the installation of seismic valves for all the tanks. A detailed structural analysis was recommended prior to undertaking any major seismic upgrades to the Main or Tolovana tank (replacement of the Main tank was recommended rather than upgrading it to current seismic code).

25) Improve pressures by adding a pressure tank for the services served by the Sunset Pump Station.

26) Add a fire pump to the Ash Street pump station to improve fire flows to that area.

27) Various distribution system improvements were detailed in Section 8.

28) CIP should be updated every 3 to 5 years. (Page 171, Section 9.2.2. CIP Updates).

CIP

- CIP costs are indexed to December 2015 ENR CCI of 10035.66.
- Engineering costs are assessed at 20% of estimated total constructions costs.
- Contingency is 20% of construction costs.
- Legal and Management is 5% of construction costs.
- Land acquisition costs were included if known.
- Total cost to complete all projects included in the CIP over the course of the 20-year planning period is estimated to be \$17.3M.
- Annual replacement of old, deteriorated, or problematic pipes assume annual replacement of 800-LF of 8" HDPE, accounting for 2.5% inflation each year.

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- City should evaluate general pipe replacement projects after 3-5 years to verify that materials and associated costs still reflect the City's preference for replacement piping.
- A full rate study was completed in conjunction with the master plan, which outlined options. Based on the information provided in the tables below, an increase of roughly \$43 per EDU per month would be required to fund the entire CIP (priority 1-3 projects), which is "not practical" due to the great burden it would put on the residents of Cannon Beach".

Table 1.4.5-1 Summary of Prioritized CIP Projects

Priority	Summary	Total Estimated Project Costs
1	Projects required to address major issues and secure the City's ability to provide a reliable water source for customers.	\$ 6,985,430.22
2	Projects should be undertaken after year five and completed in the order that will best benefit the City and the customers of the water system.	\$ 4,710,396.75
3	These projects can be inserted whenever is convenient for the City staff and may require prior completion of one or more higher priority projects.	\$ 3,019,856.60
Annual Pipe Replacement	These projects are aimed at continuous distribution system improvement through replacement of problematic or aging pipelines and can be completed at the City's convenience.	\$ 2,627,921.37
CIP Project Total		\$ 17,343,604.94

1.6 Financing

The typical single family, full-time residence uses an average of approximately 4,270 gallons per month (140 gpd), which corresponds to 1 EDU. Based on the total number of EDUs in the Cannon Beach water system (2,396 EDUs), the monthly increase required per EDU to fully fund projects in each priority level are summarized in Table 1.4.5-1 on the following page. This monthly increase represents the worst-case scenario for CIP project funding. The worst-case scenario assumes that no grant funding is available to help fund infrastructure improvements (i.e. CIP projects must be funded solely through loans), and monthly loan payments must be covered by revenues from rate increases.

Table 1.4.5-1 Potential Rate Increase per EDU to Fund Projects for Each CIP Priority Level

Item	Priority 1 Only	Priority 2 Only	Priority 3 Only	Full CIP
Capital Cost	\$ 6,985,430.22	\$ 4,710,396.75	\$ 3,019,856.60	\$ 17,343,604.93
Loan Needed	\$ 6,985,430.22	\$ 4,710,396.75	\$ 3,019,856.60	\$ 17,343,604.93
Interest Rate	2.50%			
Loan Period	20			
Annual Annuity	\$ 448,095.29	\$ 302,158.43	\$ 193,715.13	\$ 1,112,542.46
Monthly Income Required	\$ 37,341.27	\$ 25,179.87	\$ 16,142.93	\$ 92,711.87
Monthly Income Required + 10%	\$ 41,075.40	\$ 27,697.86	\$ 17,757.22	\$ 101,983.06
No. of EDU's at 7,443 gallons	2,396			
Add'l Monthly Cost per EDU	\$ 17.14	\$ 11.56	\$ 7.41	\$ 42.56

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Table 9.2.1-1 Priority 1 CIP Projects

Project No.	Description	Estimated Cost
Data Collection and Management Projects		\$ 44,524.92
1	Improve Existing Mission Control Services Monitoring Capabilities	\$ 78,211.40
3	Flow Meter Installation at Recycle Facility	\$ 1,500.00
Water Supply Projects		\$ 506,000.00
5	Certify Existing Surface Water Right Permit	\$ 6,000.00
6	Source Water Protection - Land Acquisition	\$ 500,000.00
Water Treatment Facility Projects		\$ 55,140.80
8	Sand Filter Bed Media Replacement	\$ 318,268.00
Treated Water Storage Projects		\$ 2,220,515.00
9	Main Reservoir Seismic Resiliency Improvements - Tank Replacement	\$ 2,211,540.00
11	General Reservoir Maintenance, Repairs, and Access Improvements	\$ 8,975.00
Distribution System Projects		\$ 4,159,249.50
<i>System Pressure Improvements</i>		<i>\$ 264,197.50</i>
12	Sunset Pressure Zone Tank	\$ 264,197.50
<i>Fire Flow Improvements</i>		<i>\$ 439,838.00</i>
14	Ash Street Booster Pump Station Fire Pump Installation	\$ 115,710.00
15	New Fire Hydrant Installations on Pipes > 6" Diameter	\$ 324,128.00
<i>Pipe Replacements</i>		<i>\$ 3,395,954.00</i>
17	Spruce Street/Hemlock Street 12" Transmission Main Replacement	\$ 1,822,660.90
18	5th Street PVC Transmission Main Replacement	\$ 596,411.10
19	Ash Street PVC Transmission Main Upsizing	\$ 226,436.00
25	12" AC Transmission Main Replacement Along Hwy 101	\$ 587,946.00
26	Coho Pl. Distribution Line Upsizing	\$ 162,500.00
<i>Redundancy Improvements</i>		<i>\$ 59,260.00</i>
30	Connection of S. Hemlock Street Distribution Main "S-Curve"	\$ 59,260.00
Total Estimated Cost for Priority 1 Projects		\$ 7,283,743.90

Table 9.2.1-2 Priority 2 CIP Projects

Project No.	Description	Estimated Cost
Data Collection and Management Projects		\$ 983,051.75
2	Water System SCADA Integration - Monitoring & Control Capabilities	\$ 368,901.35
4	City-Wide AMA Upgrades	\$ 614,150.40
Water Supply Projects		\$ 523,255.20
7	Emergency Water Supply Planning & Treatment	\$ 523,255.20
Treated Water Storage Projects		\$ 281,848.00
10	Tolovana and North Reservoir Seismic Resiliency Improvements	\$ 281,848.00
Distribution System Projects		\$ 2,922,241.80
<i>Fire Flow Improvements</i>		<i>\$ 589,454.00</i>
16	New Fire Hydrant Installations for Pipes < 6" Diameter	\$ 589,454.00
<i>Pipe Replacements</i>		<i>\$ 1,762,229.80</i>
21	Hemlock Street AC Distribution Main Upsizing	\$ 1,357,729.30
22	S. Pacific Street PVC Distribution Main Replacement	\$ 146,820.50
28	Haystack Heights Service Line Replacements (with PEX)	\$ 257,680.00
<i>Redundancy Improvements</i>		<i>\$ 570,558.00</i>
33	New 12" HDPE Pipeline - Tolovana Reservoir to Haystack Heights	\$ 570,558.00
Total Estimated Cost for Priority 2 Projects		\$ 4,710,396.75

Table 9.2.1-3 Priority 3 CIP Projects

Project No.	Description	Estimated Cost
Distribution System Projects		\$ 3,019,856.60
<i>System Pressure Improvements</i>		<i>\$ 145,086.00</i>
13	Realignment of Poplar Distribution Line	\$ 145,086.00
<i>Pipe Replacements</i>		<i>\$ 2,661,119.60</i>
20	Upsizing of Distribution Piping Along "President" Streets	\$ 632,530.60
23	12" AC Transmission Main Replacement South of Hwy 101: Warren Way to Yukon St.	\$ 878,109.00
24	12" AC Transmission Main Replacement North of Hwy 101: Arbor Ln. to Dawes Ave.	\$ 317,281.00
27	Haystack Heights Distribution Main Upsizing	\$ 833,199.00
<i>Redundancy Improvements</i>		<i>\$ 213,651.00</i>
29	South AC Transmission Main O&M Control Valve Installations	\$ 67,759.00
31	Service Extension to North Cache Site via Old Cannon Beach Rd.	\$ 97,063.00
32	Antler Ave./Elm St. Distribution Line Looping via 6th St.	\$ 48,829.00
Total Estimated Cost for Priority 3 Projects		\$ 3,019,856.60

Table 9.2.1-4 Annual Pipe Replacement Projects

Project No.	Description	Estimated Cost
35	Year 1 - Annual Pipe Replacement	\$ 102,876.00
36	Year 2 - Annual Pipe Replacement	\$ 105,448.70
37	Year 3 - Annual Pipe Replacement	\$ 108,082.74
38	Year 4 - Annual Pipe Replacement	\$ 110,786.24
39	Year 5 - Annual Pipe Replacement	\$ 113,555.32
40	Year 6 - Annual Pipe Replacement	\$ 116,395.15
41	Year 7 - Annual Pipe Replacement	\$ 119,303.93
42	Year 8 - Annual Pipe Replacement	\$ 122,285.88
43	Year 9 - Annual Pipe Replacement	\$ 125,344.25
44	Year 10 - Annual Pipe Replacement	\$ 128,477.33
45	Year 11 - Annual Pipe Replacement	\$ 131,688.44
46	Year 12 - Annual Pipe Replacement	\$ 134,980.92
47	Year 13 - Annual Pipe Replacement	\$ 138,356.17
48	Year 14 - Annual Pipe Replacement	\$ 141,815.60
49	Year 15 - Annual Pipe Replacement	\$ 145,360.67
50	Year 16 - Annual Pipe Replacement	\$ 148,993.86
51	Year 17 - Annual Pipe Replacement	\$ 152,719.70
52	Year 18 - Annual Pipe Replacement	\$ 156,537.77
53	Year 19 - Annual Pipe Replacement	\$ 160,449.67
54	Year 20 - Annual Pipe Replacement	\$ 164,463.03
Total Estimated Costs for Annual Pipe Replacement Projects		\$ 2,627,921.37

9.2.2 CIP Updates

Periodically, the Capital Improvement Plan should be updated and evaluated. It is suggested that every 3 to 5 years the CIP be evaluated and modified as necessary to reflect current development trends, system needs, and prior accomplishments. The City may modify the CIP at any time under ORS 223.309(2).

9.3 CIP Project Costs**9.3.1 CIP Costs**

The total cost to complete all projects included in the CIP over the course of the 20-year planning period is estimated to be \$17.3M, broken down as shown in Table 9.3.1-1 below.

Table 9.3.1-1 CIP Cost Summary for 20-year Planning Period

Category	Priority 1	Priority 2	Priority 3	Total Costs
Data Collection & Management	\$ 79,711.40	\$ 983,051.75	--	\$ 1,062,763.15
Water Supply	\$ 506,000.00	\$ 523,255.20	--	\$ 1,029,255.20
Water Treatment Facility	\$ 318,268.00	--	--	\$ 318,268.00
Treated Water Storage	\$ 2,220,515.00	\$ 281,848.00	--	\$ 2,502,363.00
Water Distribution System	\$ 4,159,249.50	\$ 2,922,241.80	\$ 3,019,856.60	\$ 10,101,347.90
Annual Replacement	--	--	--	\$ 2,627,921.37
Total Project Costs	\$ 7,283,743.90	\$ 4,710,396.75	\$ 3,019,856.60	\$ 17,641,918.62