1. 2:00 P.M. Agenda

   Meeting will be in person and via Zoom.

   Documents:

   2023-02-14 Public Works And Streets Agenda.pdf

2. Meeting Material

   2022-12-Financial-Report-Public-Works

   Documents:

   Yachat PW Report Jan 2023.Pdf
   Water Report 2.1.23.Pdf
   North Monitor January 2023.Pdf
   South Monitor January 2023.Pdf
   Sustainable Water Plan.pdf
   WMP WTP Planning Addenda-NO DRAFT WATERMARK-1-18-2022[5304].Pdf
   Yachats_Final Draft WMCP_Oct-2021.Pdf
   2023-01-10 Meeting Summary Public Works.pdf
   Yachats Water Rate Study2020 - Copy.pdf
   Yachats WW Rate Study 1. 2021 - Copy.pdf

3. Additional Documents Added After Meeting

   Documents:

   Sustainable Water Plan.pdf

3.I. Additional Documents Added After Meeting

   Documents:

   Water Dept. Report.pdf

CITY OF YACHATS

PUBLIC WORKS & STREETS COMMISSION MEETING

Tuesday February 14, 2023, at 2:00pm

To Be Held Via Zoom & In Person Located at:
Commons Bldg., Civic Meeting Room 1
441 Hwy 101 N., Yachats OR 97498

Join Zoom Meeting
https://us02web.zoom.us/j/86437265216
Meeting ID: 864 3726 5216
One tap mobile
+12532158782,,86437265216# US (Tacoma)
+16694449171,,86437265216# US

AGENDA

I. Meeting Called to Order
II. Announcements and Correspondence
  a. Need for another Commissioner
III. Citizens' Concerns (limited to items not on the agenda, 5-minute limitation per person)
IV. Reports (Provided written reports)
  a. Public Works Report
    1. McClung's Water Report to Council
    2. E. 2nd Street out to Bid
    3. Seismic Valve & Backwash Project
  b. Finance Report (Groth)
  c. Emergency Preparedness Report (Cox)
  d. Meeting Summary (Informational)

V. Current Business
  a. Water Conservation Study Final Submittal Status
  b. Sustainable Water Plan – Water Rates (Councilor Scott)
  c. Hwy 101 Delineators (West & McClung)
VI. New Business
  a. Public Works Standards
  b. CIP's for 7/2023 – 6/2024 How can the Commission help?
  c. Street Lighting Study (West)
VII. Other Business
  a. From Commission
  b. From Staff

This meeting is open to the public, and all interested persons are invited to attend. This meeting will be audio taped. All items to be considered by the Commission must be submitted to City Hall no later than one week prior to the meeting. Minutes of all public meetings are available for review on the City website at www.yachatsoregon.org . In accordance with ORS 192.630, City of Yachats will make a good faith effort to provide accommodations for any person desiring to attend a public meeting, if the request is made at least 48 hours in advance of the meeting time. The meeting room is physically accessible to persons with mobility devices; a sign language or foreign language interpreter may be available, with advance notice. Call City Hall at 541- 547-3565 or Oregon Relay 1- 800-735-2900 (TDD) two days in advance.
Posted 02/07/2023 By: Kimmie Jackson, Deputy City Recorder

Date: February 1, 2023

To: Heide Lambert, City Manager

From: Public Works Department

Re: January 2023 Public Works Report

Rainfall at Yachats Public Works:

	Inches			
	2023	**2022**	**2021**	**2020**
January	9.36	5.86	11.31	14.52
Rain year to date:	9.36	5.86	11.31	14.52

Total water produced: **4,462,900 gallons**

Total water accounted for: **3,867,814 gallons** Water loss efficiency: **87%**

Total wastewater treated**:** **10,316,000 gallons**

The following is a list of what was done by Public Works staff in January 2023.

Streets:

- Potholes filled.
- Gravel cleaned from E. 7th St.
- Tsunami sign replaced on Crest View Drive.

Storm Drainage:

- Storm drainage cleaning.

Water Treatment Plant:

- Water systems operations.
- Plant Maintc.
- Cleaned Reedy Creek screen.
- Removed dirt from Salmon Creek Pond.
- Samples to Newport.

Distribution Sys:

- Meter reading.
- Meter maintc.
- Green Hill water main repair and clean-up.
- Cross Connection training for one employee.
- Replaced a 2inch water meter.

Wastewater Treatment Plant:

- Wastewater systems operations.
- Plant maintc. & clean-up.
- Biosolids operations.

Collection Sys:

- Lift station inspections.
- Degreased Lift Stations.
- Lift station maintc.
- Pontiac Lift Station pump repair.
- New portable generator delivered.

Public Works:

- Shop maintc. and clean up.
- Fleet maintc. & repair.
- Equipment maintc. and repair.
- Multiple locates.
- Brush box handling.
- PW administration.
- Piles picked up for Trails crew.
- Christmas lights and banners removed.
- Storm clean-up.
- Commons trash cans emptied.
- Cleaned Commons gutters.
- Removed public Christmas tree.
- Fueled equipment.
- Power outage response.
- Tree clean-up at LLCM.
- Commons generator repair.
- Moved Parks bark to the WWTP.

	7.2022	8.2022	9.2022	10.2022	11.2022	12.2022	1.2023
Gallons of Water Produced							
Water Plant	4,981,200	5,983,000	5,468,700	4,517,000	4,198,200	3,829,500	4,462,900
Total	**4,981,200**	**5,983,000**	**5,468,700**	**4,517,000**	**4,198,200**	**3,829,500**	**4,462,900**
Gallons of Accounted for Water							
Reservoir Level Feet	31.5	26.5	28.2	27.8	29.7	29	24.3
Reservoir +/- Gallons 41,666 per Foot	579,157	208,330	70,832	16,666	83,332	29,166	195,830
Waterline Flushing Gallons	610,000	0	0	0	0	0	0
Gallons Sold	3,502,419	5,267,797	4,206,601	4,327,576	2,554,239	3,103,279	3,671,984
Total Water Accouinted for	**4,691,576**	**5,059,467**	**4,277,433**	**4,310,910**	**2,637,571**	**3,132,445**	**3,867,814**
Final Water Report							
Water Loss Efficiency	94%	85%	78%	95%	63%	81%	87%
Unaccounted Gallons per Month	289,624	923,533	1,191,267	206,090	1,560,629	697,045	595,086
Unaccounted Gallons per Minute	6.7	21.3	27.6	4.7	36	16	13

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Criterion

Start:
01/01/2023 00:00

End:
31/01/2023 13:30

Refresh

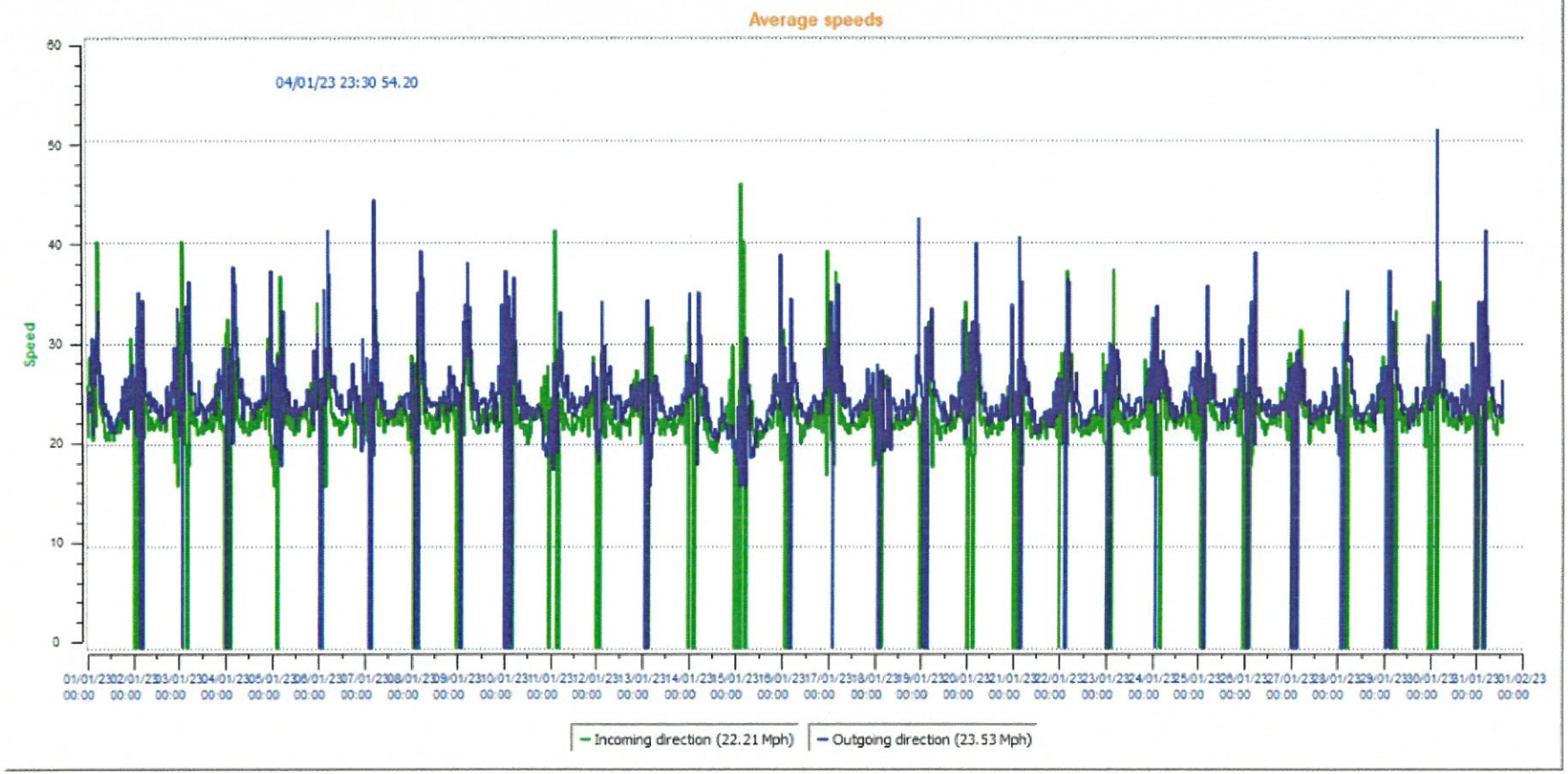
Location:
North January 2023

Comments:

Place:
Freeway urban

Data

Averages | Maximum | Number of vehicles | Distribution | Percentile | Data | Campaigns



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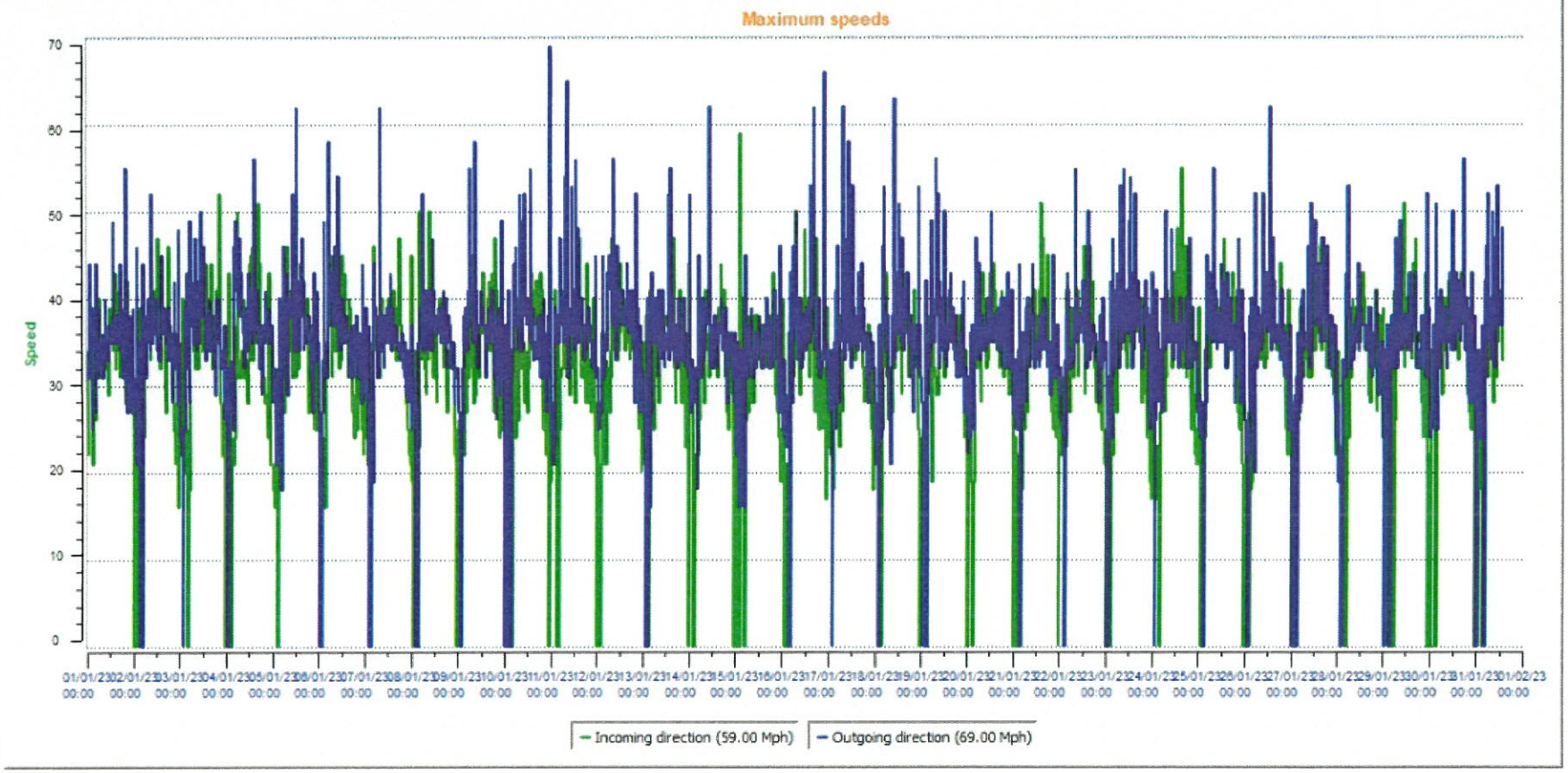

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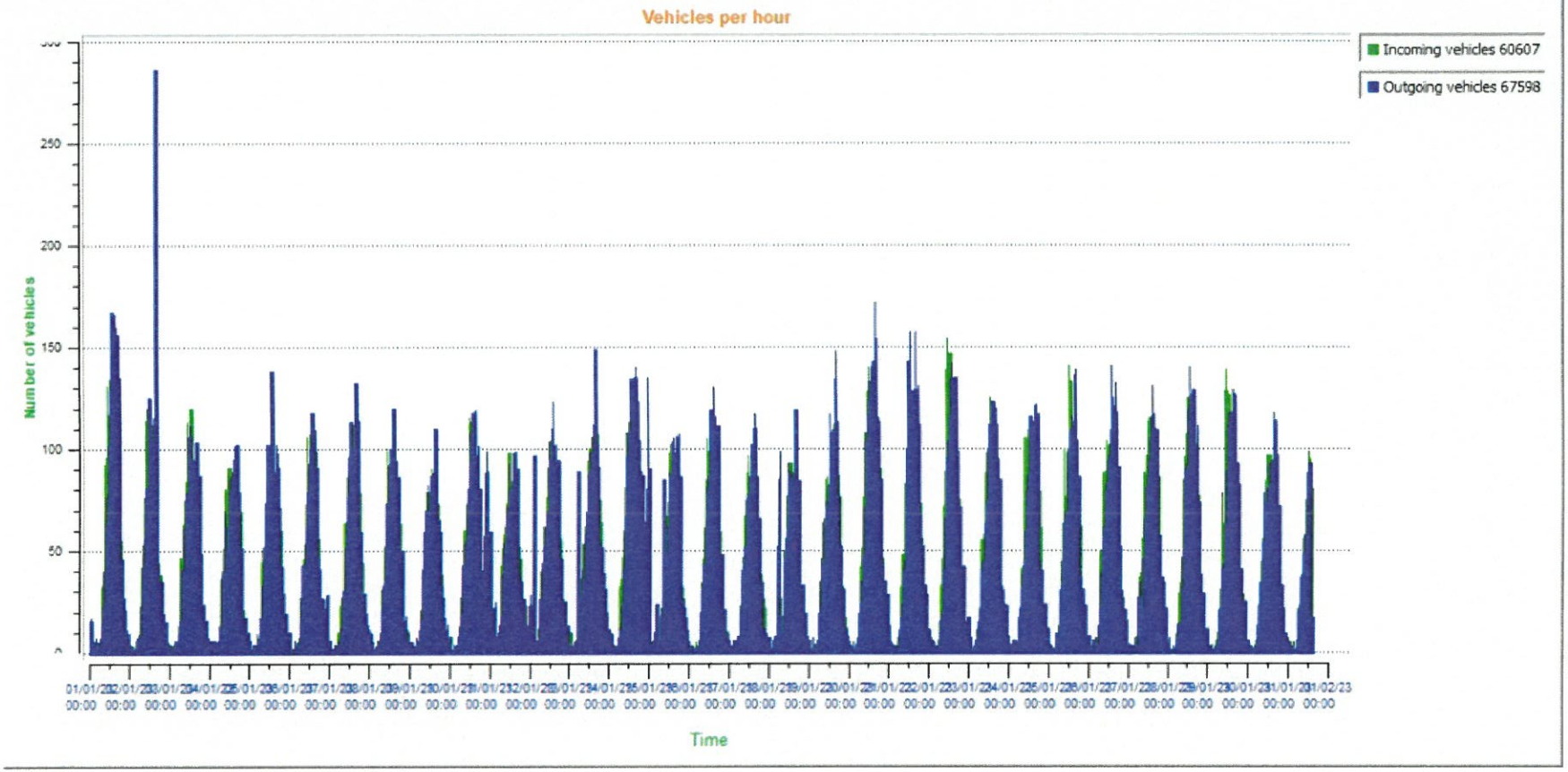

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Vehicles distribution among velocity range

Incoming vehicles

- <= 40 Mph : 60,436 - (99.72 %)
- 41 - 45 Mph : 132 - (0.22 %)
- 46 - 50 Mph : 30 - (0.05 %)
- 51 - 55 Mph : 8 - (0.01 %)
- 56 - 60 Mph : 1 - (0.00 %)
- 61 - 65 Mph : 0 - (0.00 %)
- 66 - 70 Mph : 0 - (0.00 %)
- 71 - 75 Mph (et +) : 0 - (0.00 %)

Outgoing vehicles

- <= 40 Mph : 67,277 - (99.53 %)
- 41 - 45 Mph : 189 - (0.28 %)
- 46 - 50 Mph : 69 - (0.10 %)
- 51 - 55 Mph : 43 - (0.06 %)
- 56 - 60 Mph : 9 - (0.01 %)
- 61 - 65 Mph : 9 - (0.01 %)
- 66 - 70 Mph : 2 - (0.00 %)
- 71 - 75 Mph (et +) : 0 - (0.00 %)

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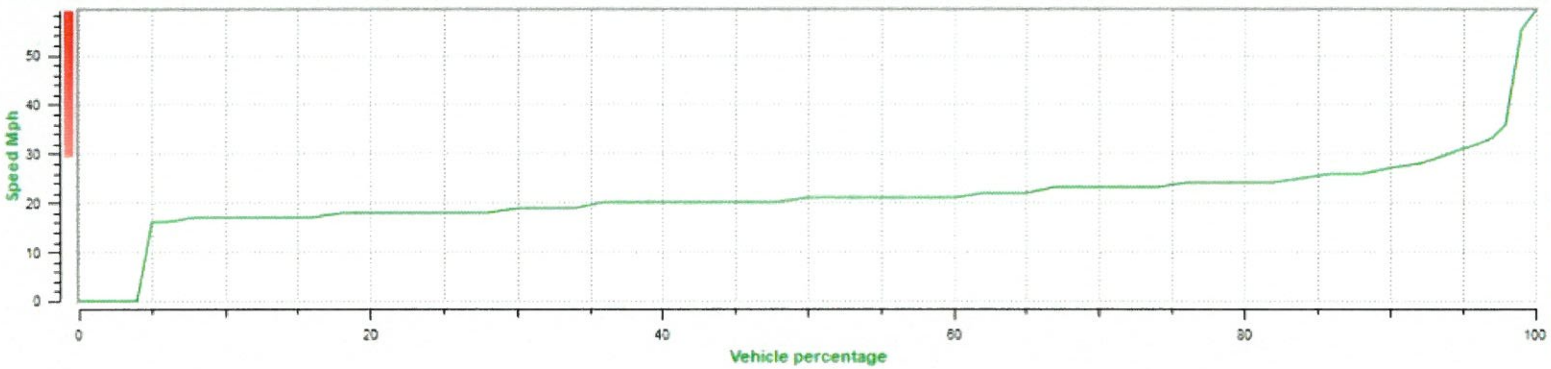
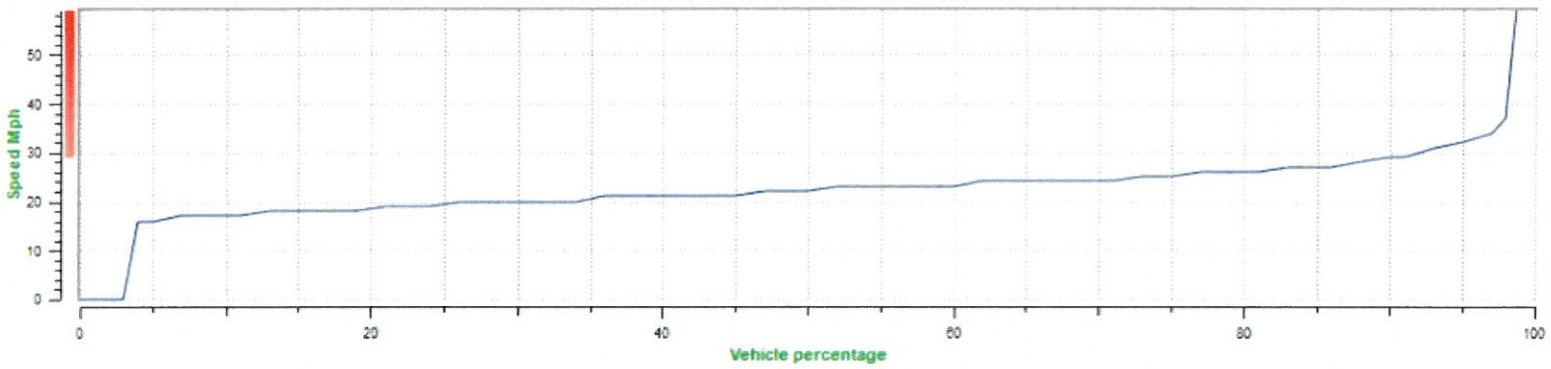


V85 25.00 Mph

V50 21.00 Mph

V30 19.00 Mph

Outgoing vehicles



V85 27.00 Mph

V50 22.00 Mph

V30 20.00 Mph

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End: 31/01/2023 15:00

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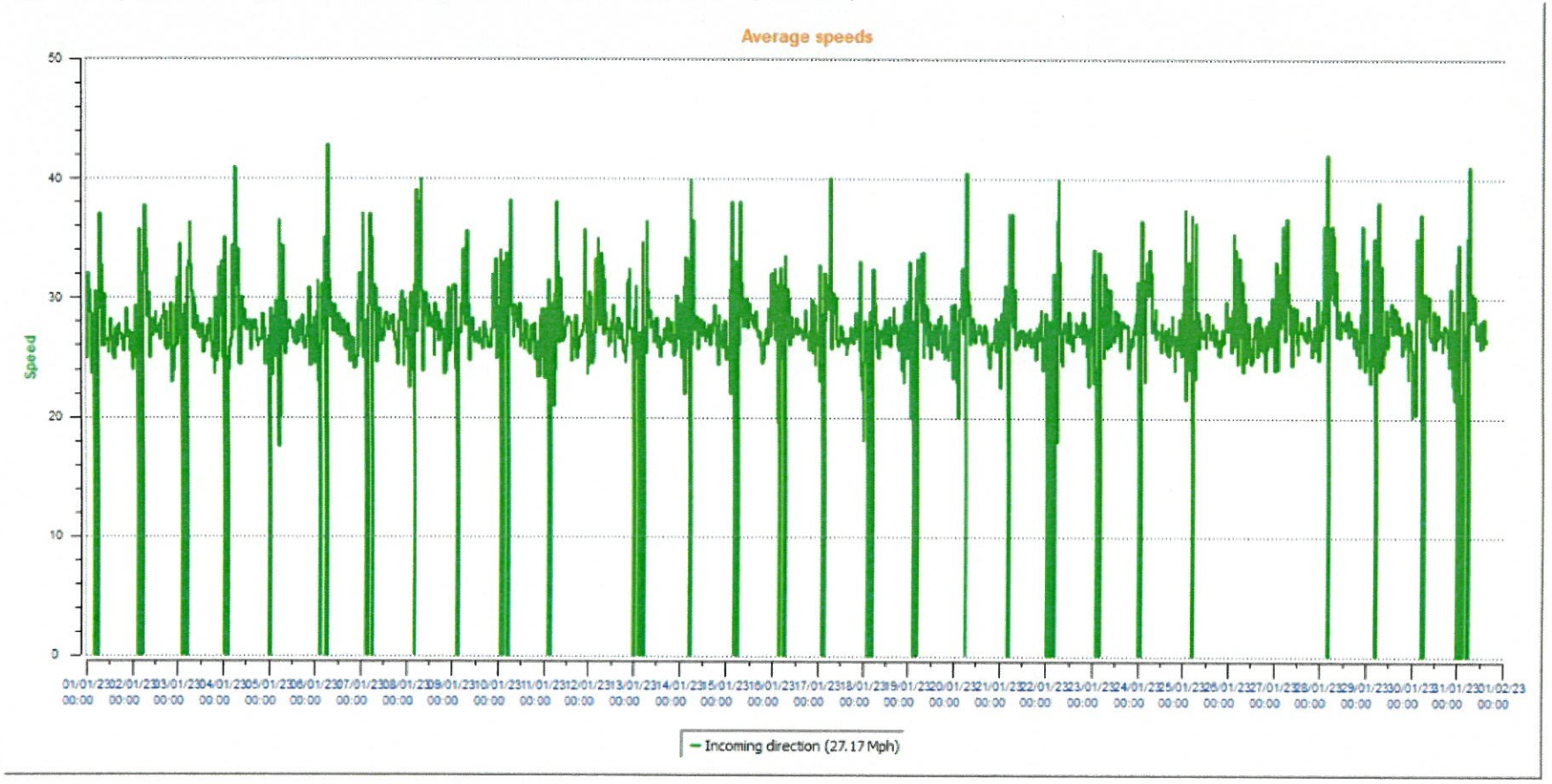
Location: South January 2023

Comments:

Place: Freeway urban

Data

Averages | Maximum | Number of vehicles | Distribution | Percentile | Data | Campaigns



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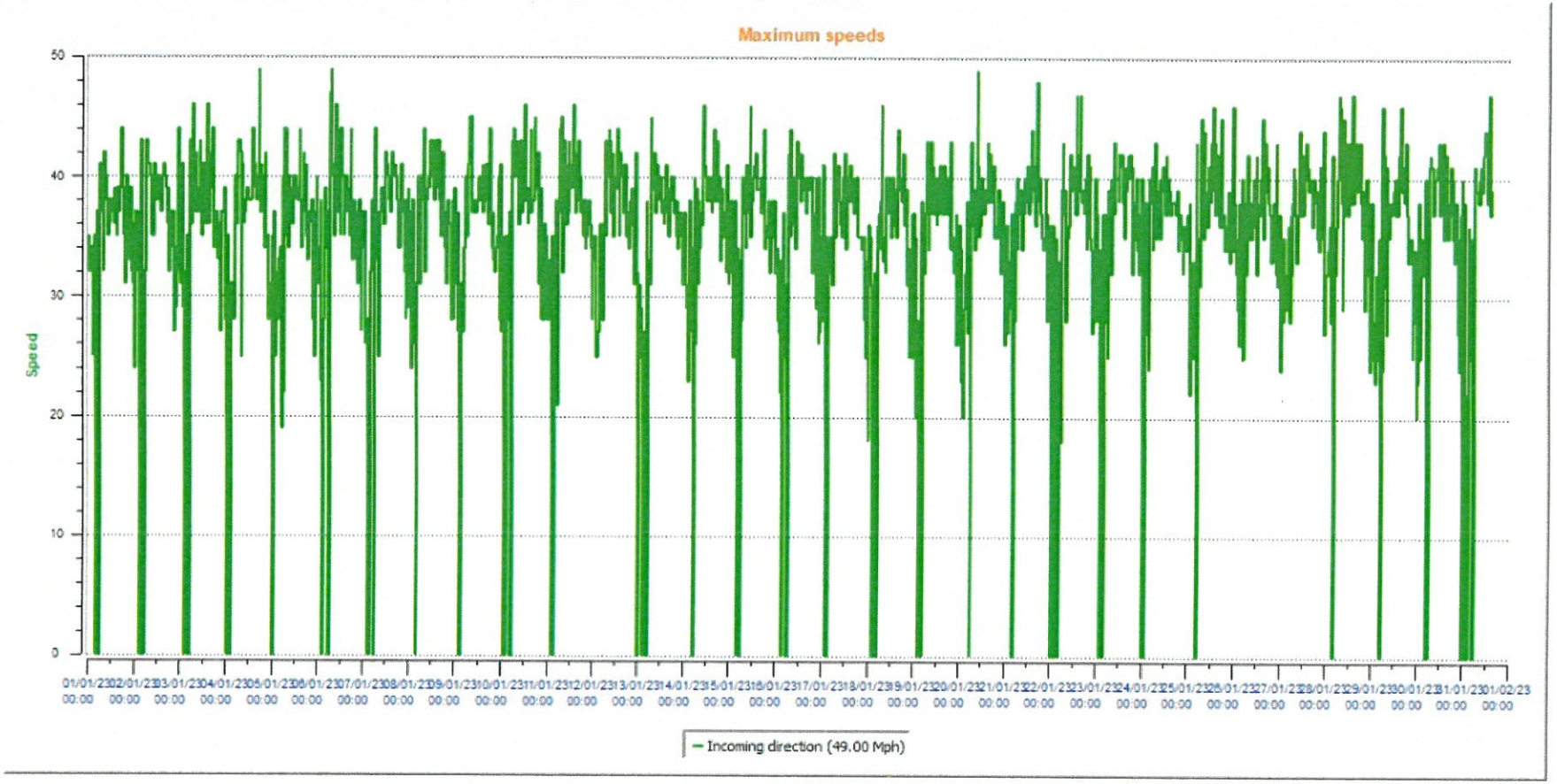

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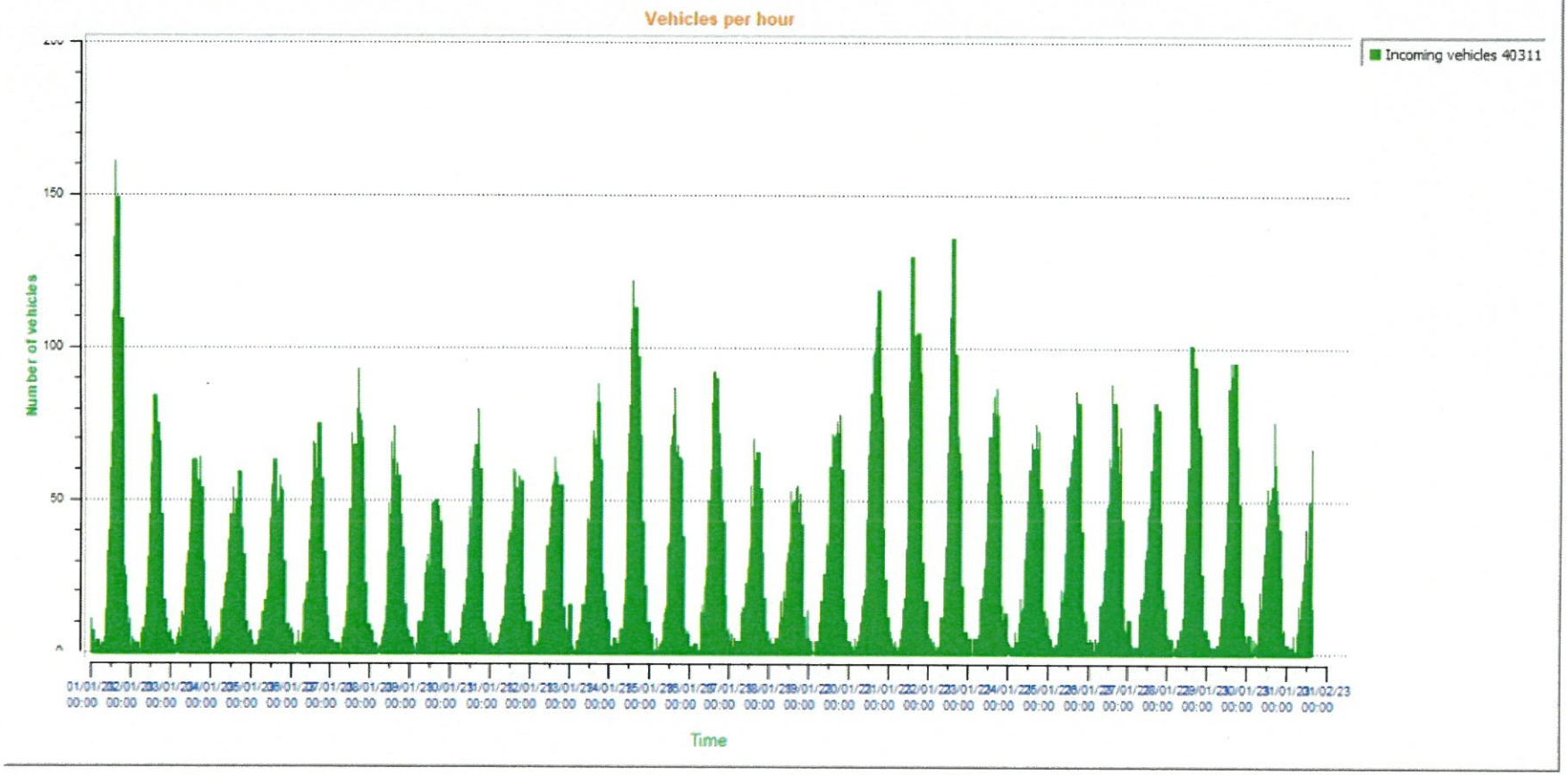

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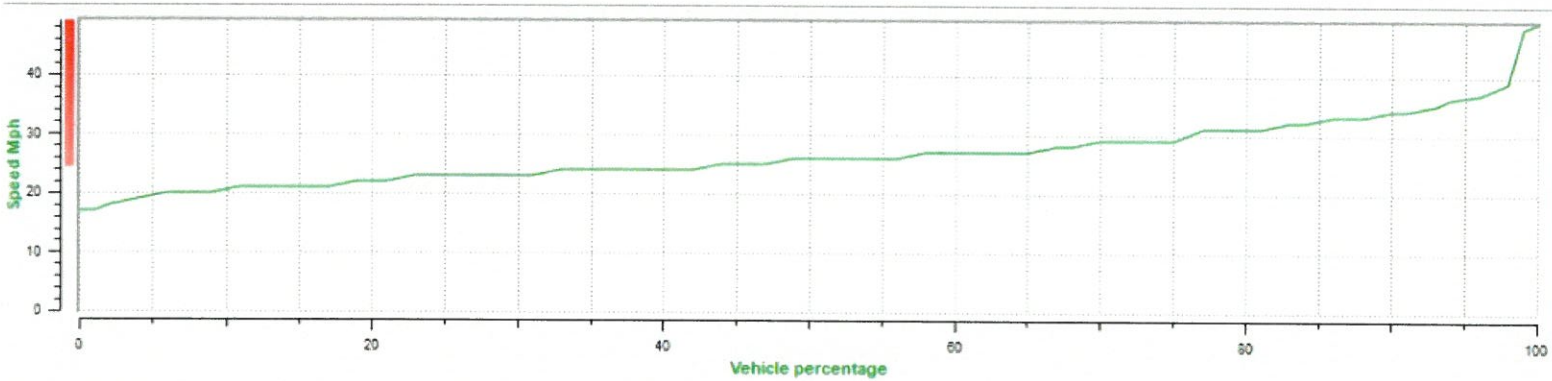

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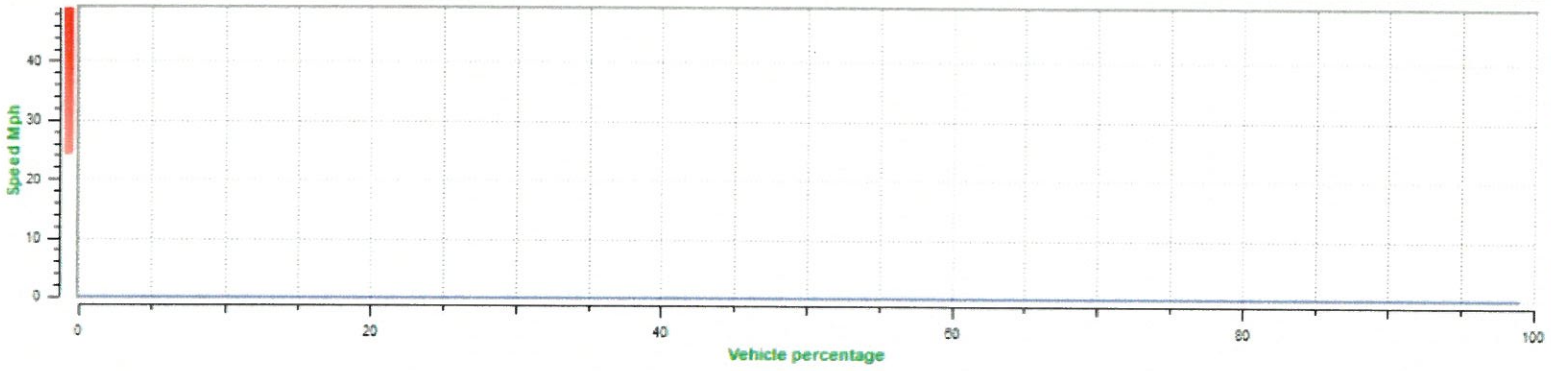

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V50 0.00 Mph

V30 0.00 Mph

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2:29 PM 2/1/2023

Sustainable Water Plan

Goal: To create a plan for a sustainable water system

Options:

Conservation - This is the easiest option. It will buy time while work on a long-term solution can be pursued.

New Water Supply - If we accept the premise that climate change will result in less water falling in the northwest, Yachats needs to look beyond our immediate area for additional water.

This discussion focuses on conservation.
3% of the city's utility accounts consume 48% of the water sold while only contributing 29.5% to the base rate. This rate inequity has been a long-term issue in Yachats. There are two problems that perpetuate this imbalance. To understand the situation, additional background information is needed.

The water / sewer rate structure has two components. The variable rate is based on water consumption. Currently the base rate is based on the meter size. The two problems are a base rate using meter size leaves no option for an incentive to encourage conservation. The second problem is the consultant hired to work on the rate study didn't understand that the base rate at the time was predicated on a single family consumption of 6,400 cu. ft. of water while 71.5% users use 200 cu. ft. or less per month.

When the rate study was discussed in 2005, the Public Works commission recommended starting with a high Yachats Equivalent Unit (YEU) and gradually dropping it down over a series of years. The gradual reduction was never done leaving the existing 2005 rate inequity in place.

Experience has taught us the single greatest motivator for conservation is what people have to pay for water.

2005-06 water rate discussion documents:

Council approved YEU base rate -
https://yachatsoregon2.org/Documents/Download/09-14-06_-_City_Council_Minutes.pdf

Public Works & Streets commission rate base rate discussion -
https://yachatsoregon2.org/Documents/Download/11-01-05PWS.pdf

Council / Commission joint meeting - https://yachatsoregon2.org/Documents/Download/10-17-05_Special_Joint_Meeting_City_Council_and_PWS.pdf

Public Works & Street commission rate base discussion - https://yachatsoregon2.org/Documents/Download/08-02-05PWS.pdf

SW LINCOLN COUNTY WATER

People's Utility District

LINCOLN COUNTY, OREGON

Water Master Plan

Addendum-Water Treatment

December 2021

www.civilwest.com | Willamette Valley | North Coast | South Coast | Rogue Valley

Civil West Engineering Services, Inc.

SW Lincoln County Water

People's Utility District

LINCOLN COUNTY, OREGON

DRAFT-Water Master Plan Addendum-Water Treatment

December 2021

Prepared by:

Civil West Engineering Services, Inc.

O:\CW_Projects\2815 SW Lincoln County Water PUD\2815-004 Water Master Plan Addendum - Water Treatment Plant Evaluaiton\03 Planning\WMP Addenda Document\WMP WTP Planning Addenda.docx

Table of Contents:

LIST OF TABLES:

LIST OF FIGURES:

1 EXECUTIVE SUMMARY

1.1 Introduction and Overview

On June 17, 2021 The SW Lincoln County Water PUD (District) contracted Civil West Engineering Services to develop a Water Master Plan (WMP) Addendum that specifically examined both Blodgett and Dicks Fork Water Treatment Plants. Although this document was intended to be independent of the WMP, it will build upon the evaluations found therein, and will reference the CIP developed within.

The scope of this planning document is defined below:

- Detailed evaluation and analysis of both treatment plants current conditions
- Detailed evaluations of Capacity (Current and Projected)
- Demand vs. Capacity analysis with Focus on the Blodgett Water Treatment Plant (BWTP)
- Cost of constructing a new treatment train at the BWTP
- Final recommendations regarding the need for BWTP capacity expansion

1.2 Existing Treatment Infrastructure

1.2.1 Water Intakes

There are four (4) sources of water, each source from a surface water stream: Dicks Fork, Big Creek, Vingie Creek, and Starr Creek. These creeks have proven to be very reliable water sources. Water rights appear to be sufficient for the needs of the District for the next several years; however, the District is taking proactive steps and currently seeking to acquire additional water rights for Vingie Creek.

1.2.2 Water Treatment Plants

The District operates two water treatment plants (Blodgett Water Treatment Plant and the Dicks Fork Water Treatment Plant) that were both built in 1997 and treat the raw water from the above-mentioned water sources. Both plants process the raw water through a Trident mixed-media adsorption clarifier treatment unit. Both WTPs use large reservoirs located at the WTP site for contact time. The plants use a generator for emergency power and alum, sodium hypochlorite, a polymer, and soda ash for water treatment processes.

The Blodgett Water Treatment Plant provides water to approximately 75% of the District's customers. The Dicks Fork Water Treatment Plant serves the remaining 25%. At this time, both treatment plants are adequate for the near future, although routine maintenance and upkeep is always required.

1.3 Existing and Projected Water Demands

District existing and projected demands were evaluated in addition to the potential demands generated by neighboring water systems.

1.3.1 District Existing Demands

The existing demand was developed using WTP production over the last 3 years. Average daily, max monthly, max daily, and max peak hourly demands were determined using peaking factors 1.0, 1.7, 2.5, and 5 respectively. The calculated values can be seen in Table 1.1

1.3.2 District Future Demands

To determine the demand projections a population growth rate was established by examining local population forecasts. The historical growth rate of the District was also calculated. The final growth rate used to determine demand projections was 1.0%. Table 1.1 displays the projected demands given the established growth rate.

TABLE 1.1 – PROJECTED DISTRICT FUTURE WATER DEMAND (GALLONS/MINUTE)

Demand Paramter	Peak Factor	2021	2026	2031	2041
Average Daily Demand - ADD (gal/min.)	1.0	113	119	125	138
Average Max. Monthly Demand - MMD (gal/min.)	1.7	193	203	213	235
Average Max. Day Demand - MDD (gal/min.)	2.5	283	298	313	346
Average Peak Hourly Demand - PHD (gal/min.)	5.0	567	596	626	691

1.3.3 Waldport and Yachats Water Demands

The District's water system has a tie-in into both the City of Yachats water system, and the City of Waldport's system. Both communities have expressed an interest in buying water from the District. The City of Waldport's need is less urgent, but could still be present under drought conditions. The City of Yachats had a more pressing demand. This need is a result of their primary water sources drying out during summer months. The potential demands from these communities are summarized in Table 1.2.

TABLE 1.2 – DEMAND SUMMARY FOR THE DISTRICT'S WATER SYSTEM

Demand Source	Peak Demand (gpm)	Comments
SWLPUD	346	This demand is based on 2040 demand projections
Industrial Park	106	This is a Waldport development that is within the borders of the
City of Waldport	50	This demand would only be present under extreme drought conditions, or beyond the current WMP planning period (2040)-The demand under these conditions would vary, for this study it was set at 50 gpm
City of Yachats	130	Yachats Source can drop to as low as 180 gpm, projected demand is 200 gpm, and an additional 110 gpm is required to replenish fire flows in a 72 hour period

1.4 Demand Vs. Capacity

1.4.1 Demand Summary

The demand summary was shown in table 1.2

1.4.2 Capacity Summary

To determine the needed improvements, the capacities were also evaluated. A breakdown of the capacities was completed for each water system component. The results are tabulated in Table 1.3.

TABLE 1.3 – CAPACITY SUMMARY FOR THE DISTRICT'S INFRASTRUCTURE

Demand Source	Peak Demand (gpm)	Comments
Blodgett WTP	350	This supply is based on two filter trains operating. Plant was designed to house on more train which would add an additional 175 gpm.
Dicks Fork WTP	180	The WTP capacity is 200 gpm. Water right from Dicks Fork is 180 gpm. This limits the Districts ability to run the WTP at full capacity
City of Waldport Tie-in	225	8" Tie-in with a 2" Bypass-Water can only be conveyed to Waldport from the SWLPUD through the Tie-In due to pressure differentials
City of Yachats Tie-In	300	4" Tie-in. Pump station built at the tie-in pushes water to the City of Yachats. A pressure reducer was installed at the tie-in so water can also be fed from the Yachats system to the SWLPUD
Seabrook Pump Station	160	Yachats Source can drop to as low as 180 gpm, projected demand is 200 gpm, and an additional 110 gpm is required to replenish fire flows in a 72 hour period

1.4.3 Demand vs. Capacity Evaluations

All system components currently have the capacity (this evaluations excludes pipes) to supply the demand stemming from only the needs of its current and projected users. When the demand of Yachats and Waldport is added to the total demand, the two treatment plants capacities are insufficient. To meet that demand an additional train needs to be added at the BWTP. A portion of this supply would need to be conveyed from the lower pressure system to the upper pressure system.

TABLE 1.4 – DEMAND VS. CAPACITY

Demand Sources	Total Capacity vs. Total Demand	Dicks Fork Pressure Zone Capacity vs. Demand	Demand vs. Capacity Comments
District	346/530	87/180	No Improvements are required to meet these demands
District and Yachats	476/530	87/180	No Improvements are required to meet these demands
District, Yachats, and Industrial Park	582/530	193/180	To meet this demand the capacity of the BWTP would need to be increased. For redundancy, and system stability, replacement of the Seabrook pump station would also be recommended. According to Waldport, development of the Industrial Park is not a Priority.
District, Yahcats, Industrial Park, and Waldport	632/530	243/190	To meet this demand the capacity of the BWTP would need to be increased. For redundancy, and system stability, replacement of the Seabrook pump station would also be recommended. According to Waldport, development of the Industrial Park is not a Priority. Also, Waldport demand would only be necessary under extreme drought conditions. Developing infrastructure improvements based on a demand that may never be needed is not recommended.

1.5 Water Treatment Plant Recommendations

There are considerable improvements currently underway at the BWTP. However, very few upgrades or modifications have occurred at the DFWTP. Both WTPs contain the same systems and were built at the same time. For that reason the majority of the improvements currently being done on the BWTP will also need to be done at the DFWTP at some point.

1.5.1 Recommendations Based on Conditions, and Projected District Demands

A list of improvements for both the BWTP and DFWTP are given below:

BWTP Recommendations:

- Replace existing Treated Water Pumps
- Install an additional treated water pump
- Install a magnetic flow meter downstream of the Blodgett Reservoir
- Big Creek, and Starr Creek Settlement Basin Isolation, and Automation Improvement

DFWTP Recommendations:

- Replace existing PLC/SCADA System with Rockwell Systems
- Replace WTP Desktop Computer
- Automate Water Treatment Plant to Have the Capability of Running 24-Hours a Day
- Replacement of Trident Train Underdrains
- Replacement of Trident Train Media (Sand (Silicia), Sand (Garnet), Anthracite)
- Replacement of Trident Train Suction Screen, Media Retainer Grating, and Various Gaskets
- Trident Train Refurbishment (Welding, Surfacing, Painting)
- Replace existing Treated Water Pumps
- Compressor Replacement
- Turbidimeter Replacement
- Install a magnetic flow meter downstream of the Dicks Fork Reservoir
- Dicks Fork Settlement Basin Isolation, and automation Improvement

1.5.2 Recommendations Based on Neighboring Water System Needs

As the District has not finalized whether or not they will be supplying Yachats and Waldport with water on any kind of regular basis, completing the improvements related to their needs is not recommended. However, if in the future that demand is established, the following would be recommended:

- Expansion of the BWTP-Add another 175 gpm treatment train at the WTP
- Replace/Rehab the Seabrook Pump Station.

1.6 5- Year Capital Improvement Plan

1.6.1 Capital Improvement Plan

The various raw water supply, water storage, and water distribution system improvements recommended in the current WMP and this addendum were weighted based on fundability, cost, and system need. A CIP was developed for projects recommended to be designed/constructed within the next 5 years. The 5-year CIP is shown in Table 1.5.

TABLE 1.5 – CAPITAL IMPROVEMENT PLAN 2022-2027

CAPITAL IMPROVEMENT PLAN 2022-2027				
FEMA PROJECTS				
Project Number	**Project Name**	**Pipe Length**	**Project Description**	**Item Cost**
1	Dicks Fork Tank No. 2	--	Add an additional 200,000 gallon Tank at Dicks Fork WTP Site	
2	SW Seabrook Lane	1,800	Waterline from Dick's Fork WTP to Lower Pressure Zone (North)-Primary Waterlline for Seabrook Tank-8" to 12"	
3	SW Wakonds Beach	1,600	Replace 6" Waterline from Dick's Fork WTP to Lower Pressure Zone (South)	
4	SW Tara Lane to SW Forest Lane	1,900	Replaces Aging 6" AC Pipe That Provides Looping and More Reliable Conveyance of Water From Dick's Fork Tank to the Most Northern Section of the Water System	
5	PRV Improvements	--	Fire Flows in the Lower System Can Be Provided by Dick's Fork Tank	
SHOVEL READY PROJECTS				
Project Number	**Project Description**	**Pipe Length**	**Project Description**	**Item Cost**
6	Raw Waterline From Big Creek Settling Basin to Blodgett WTP	4,400	Replace aged 8" AC Raw Waterline	
7	NE Forest Hill to NE Star Creek Dr.	1,500	Replace aged 6" AC Pipe	
8	West Side of HWY 101 -From Fernwood Drive South to Wakeetum Street	2,900	Abandon 6" AC Waterline-Reconnect Service Connections to the 10" Waterline on East Side of Hwy. 101. Relocate Fire Hydrants to the East Side of Hwy. 101	
9	East Side of HWY 101 -From Fernwood Drive North to SW Whitecap Drive	1,900	Abandon 6" AC Waterline-Reconnect Service Connections to the 10" Waterline	
10	Camp One Road	1,300	Replaces aged Pipes-Increases Fire Flow-4" to 6"	
11	NE California Street	1,000	Replaces aged Pipes-Increases Fire Flow-4" to 8"	

1.6.2 Preliminary Engineering Report (PER)

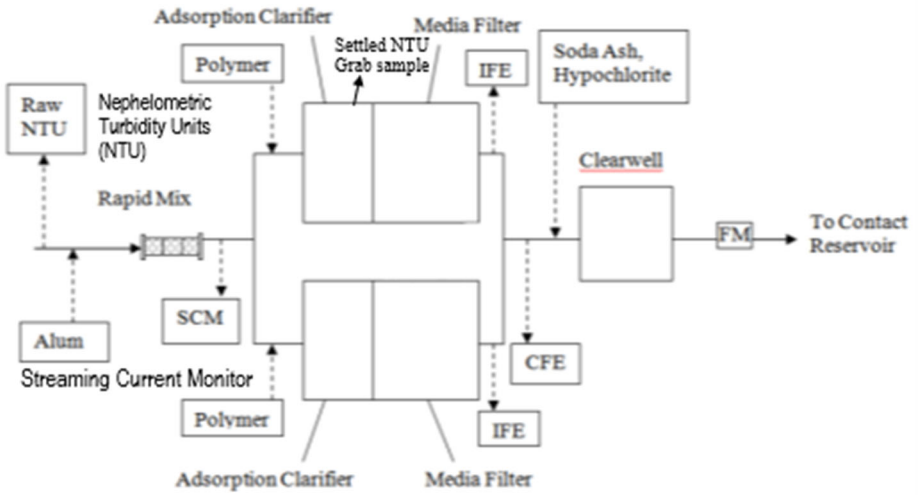
All recommended improvement projects from the WMP and this addendum were weighed based on the priorities previously discussed. This evaluation facilitated the reduction of CIP projects from dozens planned over 20 years to 11 planned over the next 5 years. Further analysis in the form a PER for the shovel ready projects would provide additional information that would help to further refine project priority.

2 EXISTING WATER TREATMENT INFRASTRUCTURE

The District operates two water treatment plants (WTPs), Blodgett Water Treatment Plant and the Dicks Fork Water Treatment Plant, which treat the water from the Big Creek, Starr Creek, Vingie Creek, and Dicks Fork. The Blodgett Water Treatment Plant provides water to approximately 75% of the District's customers and Dicks Fork Water Treatment Plant serves the remaining 25%.

The water treatment plants went on-line in July of 1997. The water treatment plants use treated water during their operation for chemical makeup water and to backwash the filter beds. This usage amounts to less than 3% of the total amount of water treated. The water treatment plants also use untreated water during the backwash process, which amounts to approximately 8% of the diverted amount of water. The actual amount depends upon number of gallons treated and the quality of the raw water. The operational treatment plant schematic shown in Figure 21 is typical of both treatment plants.

FIGURE 2.1 – TYPICAL TREATMENT PLANT SCHEMATIC



The WTPs use conventional treatment techniques (e.g. coagulation, sedimentation, filtration) to treat the water to a level that meets the requirements of the Safe Drinking Water Act and the Oregon Department of Human Services, Public Health Division standards for potable water (OAR 333-061-0030 and 0032). Adjacent to each WTP is a storage tank that provides the primary storage and chlorine contact time for the treated water.

2.1 Blodgett Water Treatment Plant (BWTP)

2.1.1 General

The BWTP is a conventional surface water treatment plant. The adjacent 1,000,000 Steel Reservoir (Blodgett Reservoir) which is effectively a clearwell was constructed at the same time as the WTP (1997). The WTP is over 20 years old and as a result much of the equipment is

reaching the end of its lifecycle or has become obsolete. For this reason, the District has committed resources to improving the BWTP. Some of the improvements have been completed others are being planned for next year. As the existing microfloc control system is outdated the District has contracted a consultant to modernize the BWTP controls. All controls will be incorporated into a new PLC and new Controls will be added to the Human Machine Interface (HMI) setpoints. The BWTP controls will be converted to a Rockwell SCADA/PLC Control System. Upgrades to the instrumentation and controls system, new filter media, and other minor improvements will be completed in 2022. BWTP air compressor and turbdimeters were replaced this year (2021). Original design capacity of the plant was 350 gpm and is expandable to 700 gpm. The WTP site plan is shown in Figure 2.2.

FIGURE 2.2 – BLODGETT RAW WTP SITE PLAN (WILL BE INSERTED)

The plant consists of two side-by-side identical Trident treatment trains sitting on concrete pedestals. The filters, chemical feed systems, supply pumps, backwash pumps, compressor, and the sampling and lab area are all in the same room. The controls are housed in a separate room.

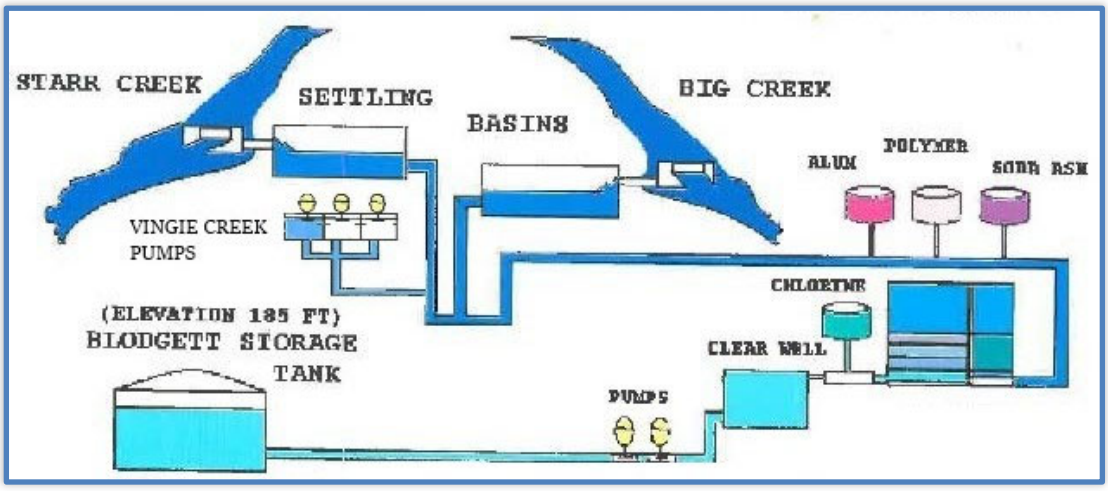
In general, finished water quality is good and the plant functions properly. The average finished water turbidity over the last ten years is around 0.09 NTU. The State of Oregon credits the plant filtration process with 2.5-log removal credit for Giardia. Several components of the plant are past their design life and will eventually require replacement. Various major components of the plant are discussed in following sections.

Turbidity spikes in the raw water during the first large storm of the winter season requires frequent filter backwashes to produce treated water. This significantly limits the ability of the WTP to produce treated water. For this reason the District usually chooses to minimize run time during these events.

2.1.2 WTP Intake Systems

The Blodgett WTP receives water from Starr Creek, Big Creek, and Vingie Creek. Supply sources are shown in Figure 2.3.

FIGURE 2.3 – BLODGETT RAW WATER SOURCES



Starr Creek: Three springs, two at elevation 1400 feet one at 700 feet feed this stream. There are no recently documented sightings of salmon in this stream near the diversion. A portion of the Starr Creek watershed above the District's diversion point was logged in the late 1980's. The current U.S. Forest Service operating plans do not show any logging or other management practices in this watershed, which would affect the water quality for at least 30 years

Starr Creek intake is at an elevation of 238 feet. Water is diverted from the creek into a 120,000 gallon settling basin and then piped by gravity to the Blodgett WTP at elevation 160 feet. Diversion quantity is limited by water right cerficate No. 29023 to 0.3 cfs/135 gpm. This water right certificate is dated 6/8/1945.

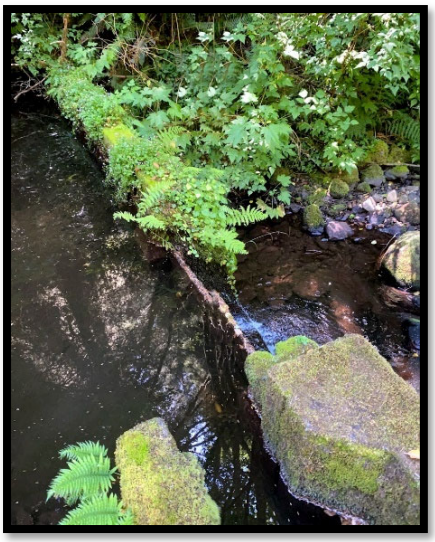


FIGURE 2.4 – STARR CREEK INTAKE AND SETTLING BASIN

Big Creek: This stream is the main stream of three branches, and it begins at three springs located between elevation 1200 feet and 1600 feet. Two other creeks join this stream at about elevation 80 feet and are about the same size as the main stream. There is a small estuary on this stream at about elevation 20 feet. Salmon spawn on the lower reaches of this stream but due to a natural waterfall downstream of the diversion point, the salmon are not able to reach the District's diversion point. A portion of the Big Creek watershed above the District's diversion point was logged in the late 1980's. The current U.S. Forest Service operating plans do not show any logging or other management practices in this watershed which would affect the water quality for at least 30 years.

Big Creek intake and associated pump station is at an elevation of 238 feet. Water is diverted from the creek into a 61,000 gallon settling basin and then piped by gravity to the Blodgett WTP at elevation 160 feet. Diversion quantity is limited by water right certificate No. 29022 to 0.3 cfs/135 gpm. This water right certificate is dated 6/8/1945.

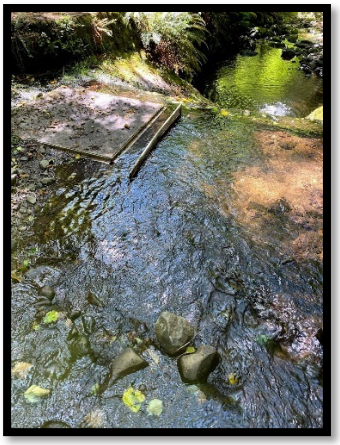



FIGURE 2.5 – BIG CREEK INTAKE AND SETTLING BASIN

Vingie Creek: This stream lies between Starr Creek and Big Creek and has a drainage area similar in size to Big Creek. This stream is fed by two springs located at elevation 1200 feet and 1400 feet. There are no recently documented sightings of salmon in this stream. The current U.S. Forest Service operating plans do not show any logging or other management practices in this watershed which would affect the water quality for at least 30 years. The portion of the watershed in private ownership could be logged within the next 10 to 15 years but is not expected to cause water quality problems except possibly higher turbidity in the winter months. The watershed area upstream from the District's diversion point has not been logged since 1930.

The location of the diversion point is on private land and requires the diverted water be pumped to the treatment plant. This diversion structure is off-stream and able to divert up to 0.9 cfs from the stream. However, being off-stream with no restrictions to the stream flow much less water is captured. There is the potential of diverting more water from this source. This diversion was completed in April 2002.



FIGURE 2.6 – VINGIE CREEK INTAKE AND PUMP PLUMBING

The Vingie Creek source water is diverted into a large manhole (there is a small settling basin between the\creek and the manhole) from which the water is pumped into the raw water line

from Starr Creek. Before Vingie Creek joins with Starr/Big Creek, both individual pipelines pass through Brubaker Vault where both flows are metered. Just downstream of the Vault the flows are joined into a single 10-inch PVC pressure pipeline which continues to Blodgett WTP. Although this pipeline can flow by gravity to the Blodgett WTP, when the Vingie pumps turn on the volume of water through the pipe increases. DISTRICT has two pending certifications, No. S 52498 and No. S 31979 on Vingie Creek. The water rights are 1.0 cfs/449 gpm and 0.3 cfs/135 gpm respectively. Table 2.1 lists BWTP raw water sources and their associated characteristics.

TABLE 2.1 – BLODGETT RAW WATER SOURCE SUMMARY

Water Source	Permitted Use Rate (cfs / gpm)	Permit and Certificate Number	Use and Priority Date
Big Creek	0.3 / 135	Permit No. S 19165, Certificate No. 29022	year-round municipal use; 6/8/1945
	The District has another permit to remove an additional 0.3 cfs for scheduled repairs or emergencies between November 1 and April 30 when stream flows exceed 10 cfs. This permit provides no benefit to the District during timesof high use in the summer months.		
Vingie Creek	0.3 / 135	Permit No. S 31979 (Certification pending)	year-round municipal use; 9/6/1966
	1.0 / 449 (0.6 / 269)	Permit No. S 52498 (Certification pending)	year-round municipal use; 1/13/1989. Use rate of 1.0 cfs for eleven months and a use rate of 0.6 cfs for one month (July)
Starr Creek	0.3 / 135	Permit No. S 16464, Certificate No. 29023	year-round municipal use; 6/8/1945

2.1.3 Chemical Addition

Original plant provisions included injection points for activated carbon for taste and odor control, potassium permanganate for iron and manganese precipitation, alum for primary coagulation, lime for pH and alkalinity adjustment, and polymer (Poly Super Floc c-573) for a coagulant aid. Coagulant addition occurs upstream of an in-line mechanical flash mixer that is situated in the raw water feed line. Provisions for feed points also exist after flocculation. Activated carbon and permanganate are not being used at this time.

Alum dosage at the plant averages 17 mg/L. During periodic storm events dosage is increased as high as 40 mg/L. Liquid alum is stored in a 5,000-gallon fiberglass reinforced plastic tank. A cationic polymer (573C) used as coagulant aid at a dose of 0.1 mg/L.

As with many surface waters in Oregon, the Big Creek, Starr Creek, and Vingie Creek are relatively low in natural alkalinity and supplemental alkalinity is required to allow proper alum coagulation. Approximately 45 pounds per day of lime is used during the summer and 20 pounds per day during the winter to adjust the raw water alkalinity to allow proper alum coagulation. Lime is dosed with adjustable dry hopper and the solution is fed downstream of the rapid mix and alum feed point.

Soda Ash is added to the final filtered water for pH adjustment and corrosion control. An average of 30 to 70 pounds per day of Soda Ash is required with dosages ranging from 4 to 8 mg/L and averaging about 5 mg/L.

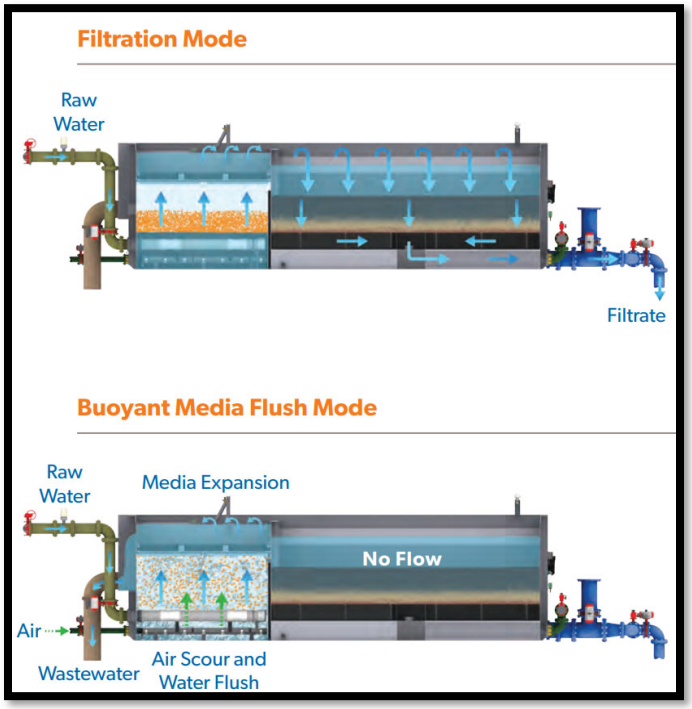
Sodium hypochlorite is added for final disinfection. Prechlorination provisions are not currently used but may be used in the future as needed.

2.1.4 Adsorption Clarifier

Following chemical addition and rapid mixing, raw water enters the adsorption clarifier at the bottom of the unit. Water follows an upward path through a bed of buoyant plastic media, where the tortuous path causes mixing and collisions of coagulated particles. The buoyant clarifier media adsorbs the coagulated particles, eliminating the need for settling.

The Adsorption Clarifier is cleaned periodically using water at process flow rates combined with a small amount of air. The media bed becomes completely fluidized, creating a vigorous mixing environment allowing captured solids to be effectively removed. The adsorption filtration and flush modes are shown in Figure 2.8.

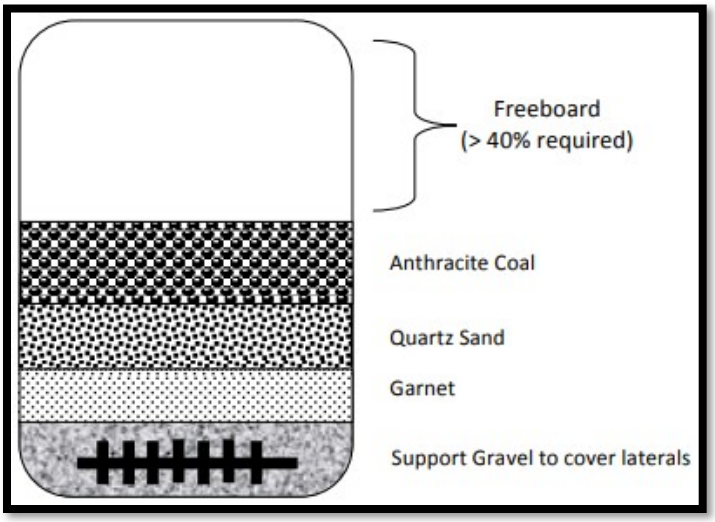
FIGURE 2.8 – ADSORPTION CLARIFIER SCHEMATIC



The air for this process is provided by a 5 HP compressor located along the inside wall of the WTP. The same compressor is used for multiple functions throughout the WTP, and was recently replaced.

Current Trident adsorption clarifiers are designed to process 10 gpm per square foot of clarifier area. The area of each clarifier at the WTP is 20 square feet, and provides a processing capacity of 200 gpm under ideal circumstances.

FIGURE 2.9 – MIXED MEDIA LAYERING



2.1.5 Filtration

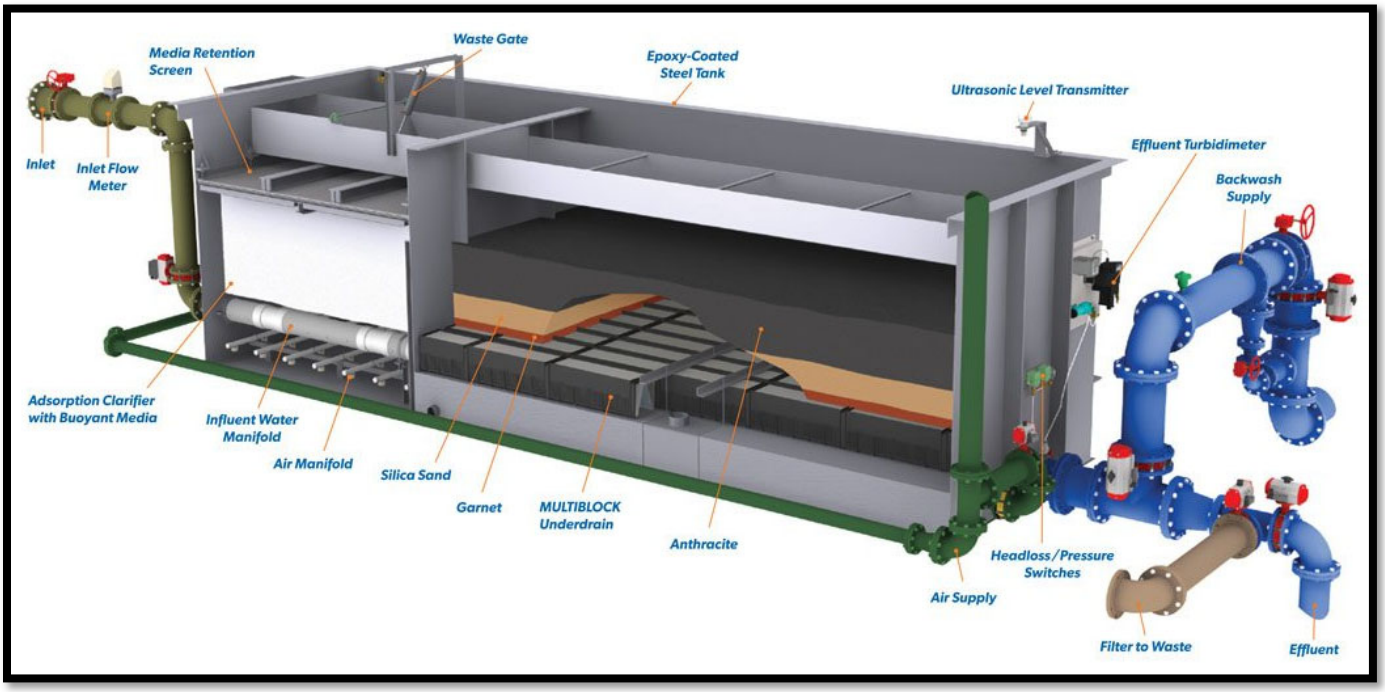
As the water travels to the top of the clarifier it spills over a weir into the multi-media filtration portion of the Trident treatment unit. A multi-media filter is a pressure filter vessel with three or more different media above the gravel bed. The three media are ordered in decreasing porosity. Anthracite (104 cubic feet), sand (84 cubic feet), and garnet 24 (cubic feet)

were used due to their size and density differences. Anthracite is the lightest, then sand, and then garnet.

The larger (but lighter) anthracite stays on top and the denser (but smaller) garnet stays on the bottom. The largest particles are removed near the top of the media bed, in the large spaces between the anthracite. As particles, get smaller, they are captured deeper and deeper in the media. In this way, the entire depth of the bed acts as a filter. This gives more efficient particulate removal. A 12-inch-thick layer of graded support gravel lies on top of the underdrain.

Backwashing of the filters is accomplished with hydraulic upflow as described in the following section.

FIGURE 2.10 – TRIDENT TRI-MITE FILTRATION UNIT



2.1.6 Backwash

Filter backwash is accomplished with hydraulic upflow water. No auxiliary air scour is provided. The filters are backwashed for approsimately 20 minutes. The original backwash pump from the 1997 plant remains in use today. The 5 hp vertical turbine pumps a combination of treated and raw water from the Blodgett Reservoir and raw water line and forces the water upwards through the filter media to expand the bed and remove sediment. Filter backwash occurs at a rate of 175 gpm with a total of 1,750 gallons of water required to backwash one filter. The total backwash volume used equates to 161 gal/ft$_2$. With a filter area of 120 ft$_2$ each, the resulting backwash rate is 15 gpm/ft$_2$. Based on the size and type of filter media, this backwash rate should achieve approximately 10 to 20% expansion of the filter bed.

The goal for ideal hydraulic backwash is to achieve a 25-50% expansion of the media. To achieve this expansion, backwash rates required will vary between 17 and 23 gpm/ft$_2$ depending on the media configuration and the water temperature. For each 1°C increase in water temperature, an increase in the backwash rate of approximately 2% is required to prevent

a reduction in bed expansion. A 25% expansion of the existing filter media during a backwash equates to 7.5-inches of rise in the existing filters. The backwash pump output (15 gpm/ft_2 maximum) is slightly less than optimal and mudball formation deep in the media is possible over time. This may be partially offset under current operations due to the lengthy backwash cycle and high total volume of water being used.

Backwash waste water is dumped into the 61,000 gallon backwash waste basin prior to being discharged into the municipal sanitary sewer system.

2.1.7 Disinfection

The disinfection system consists of sodium hypochlorite (12.5% concentration) injected in the filter effluent which provides chlorine contact time prior to water use. The chemical injection system is in good condition.

At the EPA recommended efficiency value of 10% for non-baffled chlorine contact basins, the effective volume of the clearwell/Blodgett Reservoir would be 1,000,000 gallons. A tracer survey was completed in 2010 to verify actual efficiency and contact time. Based on the tracer survey, there is no need for baffling at this time.

2.1.8 Plant Domestic Water Supply System

Plant water is supplied by the plant water pump located near the control room. Approximately One-inch piping connects the pump to a hydropneumatic tank. The tank is 3 feet in diameter, 6.5 feet tall, and is an ASME 125 pound pressure vessel. The water pump is used to maintain a set pressure range within the tank. A safety pressure relief valve is set at 100 psi. A pressure switch turns the plant water pump on and off at 60 psi and 85 psi respectively. This system shows no deficiencies, but is over 20 years old, and may need to be replaced within the planning period.

2.1.9 Electrical System

The 25-year old motor control center (MCC) in the control room is still in use today and repair and replacement parts are hard to find as the equipment is antiquated. The MCC should be updated to allow for continued reliability and safety. As noted earlier, the District is currently in the process of updating electrical systems, and controls.

A 65 kW diesel generator provides standby backup power for the plant's primary functions. The gen-set has a newer above ground fuel tank. With proper maintenance and exercising the generator should function for the planning period.

2.2 Dicks Fork Water Treatment Plant (DFWTP)

2.2.1 General

The DFWTP is a conventional surface water treatment plant with a capacity of 200 gpm. The WTP production is limited to 180 gpm as the water right associated with its raw water source limits the production to 180 gpm. The adjacent 200,000 Concrete Reservoir (Dicks Fork Reservoir) which is effectively a clearwell was constructed approximately 20 years before the WTP was constructed (1976). The WTP is over 20 years old and as a result much of the equipment is reaching the end of its lifecycle or has become obsolete. For this reason, the

Distract has plans to commit District resources toward improving existing systems equipment replacement, control automation, media replacement…etc) once BWTP improvements are complete. Figure 2.11 shows the Dicks Fork WTP Site Plan.

FIGURE 2.11 – DICKS FORK RAW WTP SITE PLAN (WILL BE INSERTED)

The plant consists of two side-by-side identical Trident treatment trains sitting on concrete pedestals. The filters, chemical feed systems, supply pumps, backwash pumps, compressor, and the sampling, lab area, and all controls and electrical components are all housed in the same room.

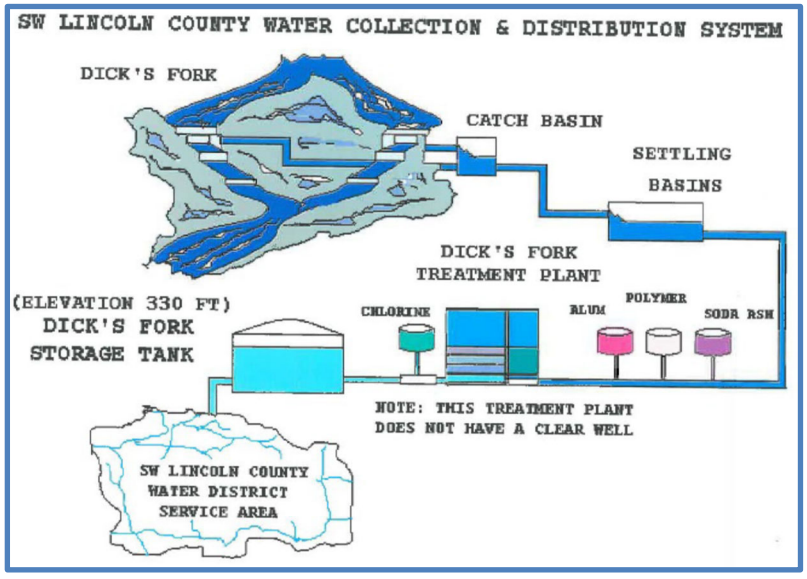
In general, finished water quality is good and the plant functions properly. The average finished water turbidity over the last ten years is around 0.09 NTU. The State of Oregon credits the plant filtration process with 2.5-log removal credit for Giardia. Several components of the plant are past their design life and will eventually require replacement. Various major components of the plant are discussed in following sections.

Turbidity spikes in the raw water during the first large storm of the winter season requires frequent filter backwashes to produce treated water. This significantly limits the ability of the WTP to produce treated water. For this reason the District usually chooses to minimize run time during these events.

2.2.2 WTP Intake Systems

The DFWTP receives water from Dicks Fork. Supply sources are shown in Figure 2.12.

FIGURE 2.12 – DICKS FORK RAW WATER SOURCES



Dicks Fork Creek:

This stream begins at three springs located at about elevation 1200 feet. There are two stream forks that come together at the diversion point. Dicks Fork flows ultimately combine into Big Creek at about elevation 80 feet. There are no recently documented sightings of salmon in this stream near the diversion. The Dicks Fork watershed above the District's diversion point was

last logged in the 1930's. The current U.S. Forest Service operating plans do not show any logging or other management practices in this watershed, which would affect the water quality for at least 30 years.

Dicks Fork source is at elevation 434 feet. Water from this source flows to a 126,000 settling basin at elevation 372 feet and then flows to the Dicks Fork WTP at elevation 310 feet (near the Dicks Fork Tank). As per water right Certificate No. 80664 THE DISTRICT can divert raw water at a rate of 0.4 cfs/180 gpm. Water right priority date is 6/7/1971.

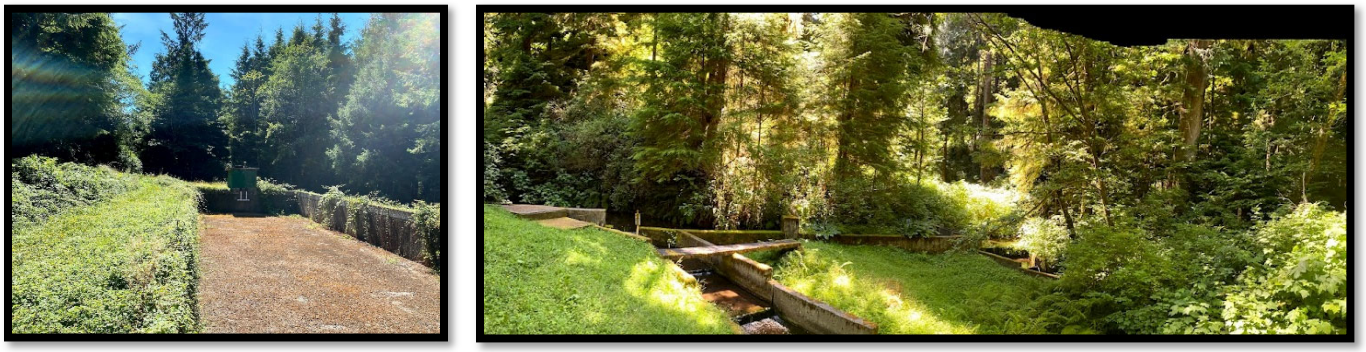


FIGURE 2.13 – DICKS FORK INTAKE AND SETTLING BASIN

TABLE 2.2 – DICKS FORK RAW WATER SOURCE SUMMARY

Water Source	Permitted Use Rate (cfs / gpm)	Permit and Certificate Number	Use and Priority Date
Dicks Fork	0.4 / 180	Permit No. S 36270, Certificate No. 80664	year-round municipal use; 6/7/1971

2.2.3 Chemical Addition

Original plant provisions included injection points for activated carbon for taste and odor control, potassium permanganate for iron and manganese precipitation, alum for primary coagulation, lime for pH and alkalinity adjustment, and polymer (Poly Super Floc c-573) for a coagulant aid. Coagulant addition occurs upstream of an in-line mechanical flash mixer that is situated in the raw water feed line. Provisions for feed points also exist after flocculation. Activated carbon and permanganate are not being used at this time.

Alum dosage at the plant averages 17 mg/L. During periodic storm events dosage is increased as high as 40 mg/L. Liquid alum is stored in a 5,000-gallon fiberglass reinforced plastic tank. A cationic polymer (573C) used as coagulant aid at a dose of 0.1 mg/L.

As with many surface waters in Oregon Dicks Fork is relatively low in natural alkalinity and supplemental alkalinity is required to allow proper alum coagulation. Approximately 45 pounds per day of lime

is used during the summer and 20 pounds per day during the winter to adjust the raw water alkalinity to allow proper alum coagulation. Lime is dosed with adjustable dry hopper and the solution is fed downstream of the rapid mix and alum feed point.

Soda Ash is added to the final filtered water for pH adjustment and corrosion control. An average of 30 to 70 pounds per day of Soda Ash is required with dosages ranging from 4 to 8 mg/L and averaging about 5 mg/L.

Sodium hypochlorite is added for final disinfection. Prechlorination provisions are not currently used but may be used in the future as needed.

2.2.4 Adsorption Clarifier

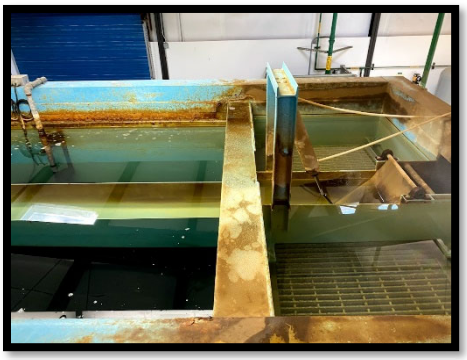
Following chemical addition and rapid mixing, raw water enters the adsorption clarifier at the bottom of the treatment unit. Water follows an upward path through a bed of buoyant plastic media, where the tortuous path causes mixing and collisions of coagulated particles. The buoyant clarifier media adsorbs the coagulated particles, eliminating the need for settling.

The Adsorption Clarifier is cleaned periodically using water at process flow rates combined with a small amount of air. The media bed becomes completely fluidized, creating a vigorous mixing environment allowing captured solids to be effectively removed. The adsorption filtration and flush modes are shown in Figure 2.8.

The air for this process is provided by a 3 HP compressor located along the inside wall of the WTP. The same compressor is used for multiple functions throughout the WTP, and was recently replaced.

Current Trident adsorption clarifiers are designed to process 10 gpm per square foot of clarifier area. The area of each clarifier at the WTP is 20 square feet, and provides a processing capacity of 100 gpm under ideal circumstances.

2.2.5 Filtration



As the water travels to the top of the clarifier it spills over a weir into the multi-media filtration portion of the Trident treatment unit. A multi-media filter is a pressure filter vessel with three or more different media above the gravel bed. The three media are ordered in decreasing porosity. Anthracite (104 cubic feet), sand (84 cubic feet), and garnet 24 (cubic feet) were used due to their size and density differences. Anthracite is the lightest, then sand, and then garnet.

The larger (but lighter) anthracite stays on top and the denser (but smaller) garnet stays on the bottom. The largest particles are removed near the top of the media bed, in the large spaces between the anthracite. As particles, get smaller, they are captured deeper and deeper in the media. In this way, the entire depth of the bed acts as a filter. This gives more efficient particulate removal. A 12 inch thick layer of graded support gravel lies on top of the underdrain.

Backwashing of the filters is accomplished with hydraulic upflow as described in the following section.

2.2.6 Backwash

Filter backwash is accomplished with hydraulic upflow water. No auxiliary air scour is provided. The original backwash pump from the 1997 plant remains in use today. The filters are backwashed for approximately 20 minutes before they return to water production. The 60 hp vertical turbine pumps a combination of treated and raw water from the Blodgett Reservoir and raw water line and forces the water upwards through the filter media to expand the bed and remove sediment. Filter backwash occurs at a rate of 100 gpm with a total of 1,000 gallons of water required to backwash one filter. The total backwash volume used equates to 161 gal/ft$_2$. With a filter area of 70 ft$_2$ each, the resulting backwash rate is 15 gpm/ft$_2$. Based on the size and type of filter media, this backwash rate should achieve approximately 10 to 20% expansion of the filter bed.

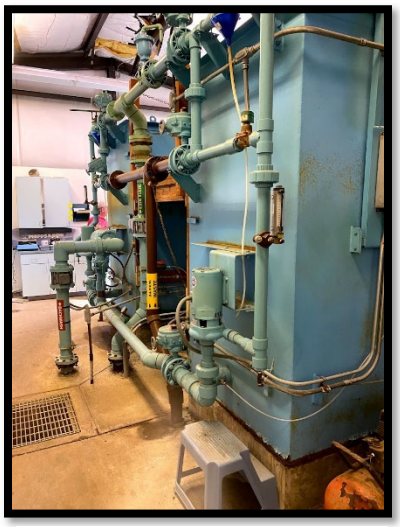


FIGURE 2.16 – BACKWASH FILTER EFFLUENT PIPING

The goal for ideal hydraulic backwash is to achieve a 25-50% expansion of the media. To achieve this expansion, backwash rates required will vary between 17 and 23 gpm/ft$_2$ depending on the media configuration and the water temperature. For each 1°C increase in water temperature, an increase in the backwash rate of approximately 2% is required to prevent a reduction in bed expansion. A 25% expansion of the existing filter media during a backwash equates to 7.5-inches of rise in the existing filters. The backwash pump output (15 gpm/ft$_2$ maximum) is slightly less than optimal and mudball formation deep in the media is possible over time. This may be partially offset under current operations due to the lengthy backwash cycle and high total volume of water being used.

Backwash waste water is dumped into the 61,000 gallon backwash waste basin prior to being discharged into the municipal sanitary sewer system. The use of filter backwash recycling provisions originally designed into the plant has been discontinued.

2.2.7 Disinfection

The disinfection system consists of sodium hypochlorite (12.5% concentration) injected in the filter effluent which provides chlorine contact time prior to water use. The chemical injection system is in good condition.

At the EPA recommended efficiency value of 10% for non-baffled chlorine contact basins, the effective volume of the clearwell/Blodgett Reservoir would be 1,000,000 gallons. A tracer survey was completed in 2010 to verify actual efficiency and contact time. Based on the tracer survey, there is no need for baffling at this time.

2.2.8 Plant Domestic Water Supply System

Plant water is supplied by the plant water pump located near the lab area. Approximately One-inch piping connects the pump to a hydropneumatic tank. The tank is 2.5 feet in diameter, 5 feet

tall, and is an ASME 125 pound pressure vessel. The water pump is used to maintain a set pressure range within the tank. A safety pressure relief valve is set at 100 psi. A pressure switch turns the plant water pump on and off at 60 psi and 85 psi respectively. This system shows no deficiencies, but is over 20 years old, and may need to be replaced within the planning period.

2.2.9 Electrical System

The 25-year old motor control center (MCC) in the control room and is still in use today and repair and replacement parts are hard to find as the equipment is antiquated. The MCC should be updated to allow for continued reliability and safety.

A 45 kW diesel generator provides standby backup power for the plant's primary functions. The gen-set has a newer above ground fuel tank. With proper maintenance and exercising the generator should function for the planning period.

3 EXISTING AND PROJECTED WATER DEMANDS

3.1 Demand Definitions

System water demand is the quantity of water that must enter the system in order to meet all water needs in the community. Water demand includes water delivered to the system to meet the needs of consumers as well as water used for firefighting and system flushing, and other unaccounted water. Additionally, virtually all systems have a certain amount of leakage that cannot be economically removed and thus total demand typically includes some leakage. The difference between the amount of water metered and sold and the total amount delivered to the system is referred to as unaccounted water. Water demand varies seasonally with the lowest usage in winter months and the highest usage during summer months. Variations in demand also occur with respect to time of day. Diurnal peaks typically occur during the morning and early evening periods, while the lowest usage occurs during nighttime hours.

The objective of this section is to determine the current water demand characteristics and to project future demand requirements that will establish system component adequacy and sizing needs. Water demand is described in the following terms:

Average Annual Demand (AAD) - The total volume of water delivered to the system in a full year expressed in gallons. When demand fluctuates up and down over several years, an average is used.

Average Daily Demand (ADD) - The total volume of water delivered to the system over a year divided by 365 days. The average use in a single day expressed in gallons per day.

Maximum Month Demand (MMD) - The gallons per day average during the month with the highest water demand. The highest monthly usage typically occurs during a summer month.

Maximum Day Demand (MDD) - The largest volume of water delivered to the system in a single day expressed in gallons per day. The water supply and treatment facilities should be designed to handle the maximum day demand.

Peak Hourly Demand (PHD) - The maximum volume of water delivered to the system in a single hour expressed in gallons per day or gallons per minute. Distribution systems should be designed to adequately handle the peak hourly demand or maximum day demand plus fire flows, whichever is greater. During peak hourly flows, storage reservoirs supply the demand in excess of the maximum day demand.

Demands described above, expressed in gallons per day (gpd), can be divided by the population or Equivalent Dwelling Units (EDUs) served to come up with a demand per person or per capita which is expressed in gallons per capita per day (gpcd), or demand per EDU (gpd/EDU). These unit demands can be multiplied by future population or EDU projections to estimate future water demands for planning purposes.

3.2 Present Demands

3.2.1 District's Existing Demands

The District does not currently have water treatment plant (WTP) production numbers tabulated on a daily basis, instead it is recorded weekly. Therefore, determining MDD, or PHD based on available data is not possible. Therefore, consistent with the 2019 Water Master Plan, peaking factors of 2.5 and 5 will be used to estimate MDD and PHD respectively. The factors are typically used in water industry to convert ADD into MDD and PHD. Table 3.1 contains the metered district water use by month. Table 3.2 summarizes system demands from 2012-2013 to 2020-2021. Due to failure in the District's recording equipment 2018-2020 water use per customer data was inaccurate, and is not represented in the Table.

TABLE 3.1 – 2020-2021 METERED DISTRICT WATER USE BY MONTH

Month	Total (gallons)	Monthly Average (gpm)	ADD (gpm)	Peak Factor (PF)(gpm)
July	7,244,150	**162**	113	**1.43**
August	6,949,110	156	113	1.37
September	5,125,780	119	113	1.05
October	5,221,950	117	113	1.03
November	4,204,280	97	113	0.86
December	4,453,490	100	113	0.88
January	4,212,960	94	113	0.83
February	3,999,490	99	113	0.88
March	4,886,740	109	113	0.97
April	3,579,136	83	113	0.73
May	4,481,790	100	113	0.89
June	5,210,730	121	113	1.06

TABLE 3.2 – AVERAGE WATER USE PER CUSTOMER SERVICE

Month	ADD (gpm) PF=1.0	MMD (gpm) PF=Varies	MDD (gpm) PF= 2.5	PHD (gpm) PF=5.0	Number of Sys. Connections	ADD (gpd) Per Connection	MDD (gpd) Per Connection
2012-2013	105	211	262	524	1253	120	301
2013-2014	94	148	236	471	1250	109	272
2014-2015	95	148	238	475	1247	110	274
2015-2016	97	140	242	483	1247	112	279
2016-2017	94	142	235	470	1254	108	270
2017-2018	98	157	246	492	1258	113	281
2018-2019	--	--	--	--	--	--	--
2019-2020	--	--	--	--	--	--	--
2020-2021	113	162	283	567	1298	126	314

3.2.2 District's Future Demands

The baseline demand quantities for MDD and PHD were calculated using peaking factors. The future demand quantities were projected using an annual growth rate . The Oregon Office of Economic Analysis long-term population forecast (as updated March 2021) indicates

an average annual population increase of 0.51%, 0.75%, and 1.16% for Lincoln County, Waldport, and Yachats respectively from 2020 to 2040. Additionally, the growth rate experienced by Lincoln County based on estimates from the Portland State University-Population Research Center (PSU PRC) for 2020-2021 is 1.02%. Finally, the historical growth rate within the DISTRICT over the last 3 years has been 1.05%. Based on local projections, and the District's historical growth, an average annual growth rate of 1.0% was adopted for this plan. Table 3.3 shows a summary of the projected future demands for the District.

TABLE 3.3 – PROJECTED FUTURE DISTRICT WATER DEMAND (GALLONS/DAY)

Demand Paramter	Peak Factor	2021	2026	2031	2041
Average Daily Demand - ADD (gal/min.)	1.0	113	119	125	138
Average Max. Monthly Demand - MMD (gal/min.)	1.7	193	203	213	235
Average Max. Day Demand - MDD (gal/min.)	2.5	283	298	313	346
Average Peak Hourly Demand - PHD (gal/min.)	5.0	567	596	626	691

3.2.3 City of Yachats Demands

The following quote summarizes the potential needs of the City of Yachats and is an excerpt from the Yachats Water Master Plan Executive Summary:

> ***Water Supply Evaluation – Chapter 6***
>
> *At the present time, the City currently obtains all drinking water from Reedy Creek and Salmon Creek. During the summer months, the combined flow from these sources can drop to as low as 180 gpm. The projected peak day demand at the end of the planning period is approximately 200 gallons per minute (Table 5-8). In order to replenish fire flow storage in a 72 hour period, an additional 110 gpm is required (Table 5-9). Therefore, the total water production required to meet projected peak day demands while simultaneously replenishing fire flow storage is approximately 310 gpm. During the winter months, the City can produce water at this rate. However, during dry weather conditions at the end of the summer when the combined flow from Reedy and Salmon Creek drop below 200 gpm, the City will be unable to meet production needs with the existing supply sources. For this reason, it is recommended that the City develop the upper Yachats River diversion during the planning period. This would provide an additional 224 gpm of supply for a total reliable water supply of about 400 gpm. This is significantly higher than the 310 gpm that is required to meet peak day demands while simultaneously replenishing fire flow storage. Once the Yachats River Intake is completed, it will increase the City's reliable water supply to not only supply the anticipated growth during the planning period, but future growth well into the next planning period (i.e., beyond 2041).*
>
> *Overall, the City's water rights are sufficient for the planning period, but additional development work (i.e., infrastructure construction) is needed to ensure a reliable water supply.*

3.2.4 City of Waldport Demands

The following quote summarizes the potential needs of the City of Waldport and is an excerpt from the Waldport Water Master Plan Executive Summary:

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 (CFRS) 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 flow is 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.

The City of Waldport is also planning on developing an Industrial Park within the boundaries of the District. Given it's location, the development would need to be fed by the Dicks Fork Water Treatment Plant. Based on information provided by Waldport's Engineer, this development will have a MDD of 154,000 gpd (106 gpm), and will need to sustain fire flows of 2,500 gpm for 3 hours.

4 WTP DEMAND VS. CAPACITY

This section of the District's Water Master Plan Addendum provides a summary of existing and future treated water demands on the District and evaluates the current facilities ability to meet that demand. The purpose of the evaluation is to identify improvements and alternatives, where such exist, for meeting the anticipated needs of the District and other entities based on existing and future demands.

4.1 Demand Summary

For this planning document the potential demand from the future Industrial Park development, the City of Yachats, and the City of Waldport will be considered alongside the demand of the District itself. The Industrial Park is a project the City of Waldport is looking to develop. This property sits within the borders of the District but is also within Waldport City limits. A summary of the existing and potential demands on the District is given in Table 4.1.

TABLE 4.1 – DEMAND SUMMARY FOR THE DISTRICT'S SYSTEM

Demand Source	Peak Demand (gpm)	Comments
SWLPUD	346	This demand is based on 2040 demand projections
Industrial Park	106	This is a Waldport development that is within the borders of the
City of Waldport	50	This demand would only be present under extreme drought conditions, or beyond the current WMP planning period (2040)-The demand under these conditions would vary, for this study it was set at 50 gpm
City of Yachats	130	Yachats Source can drop to as low as 180 gpm, projected demand is 200 gpm, and an additional 110 gpm is required to replenish fire flows in a 72 hour period
Total	**632**	

4.2 Capacity Summary

The ability for the District to meet system demands is dependent on the capacities of the key pieces of infrastructure. These system components and their associated capacities are listed in Table 4.2.

TABLE 4.2 – CAPACITY SUMMARY FOR THE DISTRICT'S INFRASTRUCTURE

Demand Source	Peak Demand (gpm)	Comments
Blodgett WTP	350	This supply is based on two filter trains operating. Plant was designed to house on more train which would add an additional 175 gpm.
Dicks Fork WTP	180	The WTP capacity is 200 gpm. Water right from Dicks Fork is 180 gpm. This limits the Districts ability to run the WTP at full capacity
City of Waldport Tie-in	225	8" Tie-in with a 2" Bypass-Water can only be conveyed to Waldport from the SWLPUD through the Tie-In due to pressure differentials
City of Yachats Tie-In	300	4" Tie-in. Pump station built at the tie-in pushes water to the City of Yachats. A pressure reducer was installed at the tie-in so water can also be fed from the Yachats system to the SWLPUD
Seabrook Pump Station	160	Yachats Source can drop to as low as 180 gpm, projected demand is 200 gpm, and an additional 110 gpm is required to replenish fire flows in a 72 hour period

4.3 Demand vs. Capacity Evaluations

The improvements that will be needed is dependent on what demands the District wishes to supply. Currently, the District can supply its own projected demand through the planning period with the infrastructure in place. In order for the District to meet the water demands of the Industrial Park, the City of Yachats, and potentially the City of Waldport, the District would need to increase the capacity of the Blodgett WTP.

If it is assumed that the City of Waldport will need approx. 50 gpm during drought conditions, the demand from all water systems totals 632 gpm. The addition of a matching third train at the BWTP would increase the BWTP capacity to 525 gpm. With the capacity of DFWTP, and the additional capacity at the BWTP the supply from all sources totals 705 gpm. The BWTP capacity increase would allow the District to feasibly supply water to themselves, the City of Yachats, and the City Waldport at the supply rate shown in Table 4.1.

The supply from Dicks Fork WTP is not sufficient to meet the peak demands of all users that are directly connected to the upper pressure system which it serves. DFWTP serves approximately 25% of the users in the DISTRICT'S system. Thus, the projected demand on the plant from users within the District would be 87 gpm (25% of 346 gpm). Additionally, the demand of The City of Waldport (50 gpm), and the Industrial Park (106 gpm), would place a total demand on the DFWTP of 243 gpm. This exceeds the capacity of the DFWTP by 63 gpm.

The additional 63 gpm could be provided by the BWTP through the Seabrook Pump Station. The Seabrook Pump Station pumps water from the lower system to the upper pressure system served by the DFWTP. The Pump Station was originally constructed in 1997 and is nearing the end of its life cycle. To reliably provide the 63 gpm supply, the pump station needs to be replaced. Increasing the size of the pump within the pump station and adding a fireflow pump should be considered when designing the new pump station.

No improvements will need to be completed at the tie-ins to facilitate meeting the projected demands of the other water system. Valves should be exercised regularly and undergo standardized maintenance.

TABLE 4.3 – DEMAND VS. CAPACITY

Demand Sources	Total Capacity vs. Total Demand	Dicks Fork Pressure Zone Capacity vs. Demand	Demand vs. Capacity Comments
District	346/530	87/180	No Improvements are required to meet these demands
District and Yachats	476/530	87/180	No Improvements are required to meet these demands
District, Yachats, and Industrial Park	582/530	193/180	To meet this demand the capacity of the BWTP would need to be increased. For redundancy, and system stability, replacement of the Seabrook pump station would also be recommended. According to Waldport, development of the Industrial Park is not a Priority.
District, Yahcats, Industrial Park, and Waldport	632/530	243/190	To meet this demand the capacity of the BWTP would need to be increased. For redundancy, and system stability, replacement of the Seabrook pump station would also be recommended. According to Waldport, development of the Industrial Park is not a Priority. Also, Waldport demand would only be necessary under extreme drought conditions. Developing infrastructure improvements based on a demand that may never be needed is not recommended.

5 WATER TREATMENT PLANTS RECOMMENDATIONS

5.1 Treatment Recommendations Based on Conditions, and District System Demands

5.1.1 WTP Control Improvements

As discussed previously, much of the equipment within the WTPs are reaching the end of their life span or are in need of upgrades to keep from becoming obsolete.

Blodgett Water Treatment Plant:

The District has begun to address the issues with old and obsolete equipment at the BWTP, and much of the needed improvements are already underway. These improvements are listed below and will not be included in our recommendations.

- Replace existing PLC/SCADA System with Rockwell Systems
- Replace WTP Desktop Computer
- Automate Water Treatment Plant to Have the Capability of Running 24-Hours a Day
- Replacement of Trident Train Underdrains
- Replacement of Trident Train Media (Sand (Silicia), Sand (Garnet), Anthracite)
- Replacement of Trident Train Suction Screen, Media Retainer Grating, and Various Gaskets
- Trident Train Refurbishment (Welding, Surfacing, Painting
- Replacement of the Compressor
- Replacement of the Turbidimeters
- Replacement of one of the Treated Water Pumps

The District has expressed no concern regarding the operation of any other pieces of equipment at the BWTP.

Although the treated water pumps are not showing any signs of failure, they are nearing the end of their life cycle. If one of the pumps did fail during the peak usage periods, the WTP could not keep up with system demands. If both pumps were replaced, the District would still be lacking redundancy in their treated water pump configuration. Adding a third pump would assist with system redundancy, and provide more capacity to the treated pumps for future expansions.

Adding a Flow meter at the Blodgett Reservoir outlet would help to optimize system function. Currently there is not a simple way to determine exactly how much flow is leaving the Blodgett Reservoir tank at any given time. This information would be helpful in leak detection and assessing precise usage patterns for future planning and billing purposes. This could be tabulated using WTP plant production numbers, and tank elevation data, but given current data collection methods, and various other considerations, the flow calculations would not be as accurate and therefore not as useful.

The recommended improvement projects for the BWTP are as follows ($98,000):

- Replace existing Treated Water Pump that was original to the WTP
- Install an additional treated water pump
- Install a magnetic flow meter downstream of the Blodgett Reservoir

Dicks Fork Water Treatment Plant:

The DFWTP is only ran a couple of days a week during high demand periods and has proven to be very reliable. For these reasons the WTP has not been modified or improved much since its construction in 1997. Although it currently does not provide the majority of the supply to the District, the need for the supply from DFWTP will increase during the planning period, and its ability to provide redundancy to BWTP makes this Plant a pivotal part of the District's infrastructure. As such, the BWTP improvements should shadow those recommended or already underway at the BWTP. These modifications would provide automation, and an ability to run 24-hours a day and would assure that the BWTP would continue to be reliable.

The recommended improvement projects for the DFWTP are as follows ($256,000):

- Replace existing PLC/SCADA System with Rockwell Systems
- Replace WTP Desktop Computer
- Automate Water Treatment Plant to Have the Capability of Running 24-Hours a Day
- Replacement of Trident Train Underdrains
- Replacement of Trident Train Media (Sand (Silicia), Sand (Garnet), Anthracite)
- Replacement of Trident Train Suction Screen, Media Retainer Grating, and Various Gaskets
- Trident Train Refurbishment (Welding, Surfacing, Painting)
- Replace existing Treated Water Pumps
- Compressor Replacement
- Turbidimeter Replacement
- Install a magnetic flow meter downstream of the Dicks Fork Reservoir

5.1.2 WTP Intake Improvements

The primary operational concern of the District for treatment system are the raw water turbidity spikes that occur during large storm events. These spikes force the operators to slow production, and in some cases shut down the plants until the turbidity level decrease.

Both operational adjustments and settling basin modifications could be used to minimize the impacts of turbidity spikes on production capabilities. The settling basins at the Big Creek, Starr Creek, and Dicks Fork could be operated to create a turbidity buffer for both WTPs.

The average daily demand for 2019-2020 during the months of October and November was 113 gpm, and 105 gpm respectively. The combined volume of the 3 settling basins is 307,000 gallons. If a large turbidity spike occurs within the raw water sources these basins could be isolated from the source and be used a raw water storage. With a raw water flow to the WTP of 123 gpm (10 gpm to account for additional flow required for backwash), the basins have enough raw water storage to last 41.6 hours. This would require the addition of control and monitoring systems to the basins to facilitate their complete isolation from their respective raw water source.

Alternatively, or in combination with basin isolation methods, reduction in the impacts of turbidity spikes would be experienced by increasing the degree of settling that occurs within the basin. Adding a coagulant at the entry point to the settling basins, and installing baffling within the basins should increase the degree of settling within the basin, and reduce any shortcutting that is occurring. Both improvements would reduce the levels of turbidity entering the WTPs.

The recommended improvement project for the Big Creek Intake is as follows ($222,700):

This project would include the installment of: a small platform and sluice gate, a small control building, raw water turbidimeter, SCADA system components and actuated valving, baffling, and a chemical injection system. Power is not provided at the site. Systems requiring power should be solar powered. Telecom is also not provided at the intake site. The District would need to either install a mission type system using cell towers to communicate with the existing SCADA system, or coordinate with the local power company to assess cost for extending their utitlity to the intake site. Utility extension will likely be cost prohibitive, but would allow for the installation of SCADA components that would be match existing infrastructure.

The recommended improvement project for the Starr Creek Intake are as follows ($204,680):

This project would include the installment of: a new fence, a small control building, raw water turbidimeter, SCADA system components and actuated valving, baffling, and a chemical injection system. Power and telecom utility connections are not available at site. This would be addressed as described in the Big Creek Improvement Project description.

The recommended improvement project for the Dicks Fork Intake are as follows ($190,400):

This project would include the installment of: a raw water turbidimeter, SCADA system components and actuated valving, baffling, and a chemical injection system. There is an existing small control building that could be used to house system improvements. Power and telecom utility connections are not available at site. This would be addressed as described in the Big Creek Improvement Project description.

5.2 Water System Reccomendations Based on Providing Treated Water to Neigboring Water Districts

The water systems to the north (Waldport) and south (Yachats) of the District have potential supply needs. If the District is required to meet the needs of both communities and its own projected demands, as described in Section 4, additional improvement projects will be needed. These additional projects are described below.

5.2.1 WTP Expansion ($1,560,000)

The BWTP was designed to house 3 Trident treatment trains, but currently contains 2. This project would include adding another 175 gpm Trident train next to the existing filters. The addition of another treated water pump, chemical injection components, piping, valving, and control systems would also be included in the project. There are existing concrete footings for the additional tank and pump.

5.2.2 Seabrook Pump Station Replacement ($255,000)

The Seabrook Pump Station is approximately 25 years old. This project includes removal of existing pump station, and construction of a pre-packaged pump station with increased capacity. The new pump station would be equipped with features not available on the original pump station. New features would include but not be limited to flow metering and remote access to pump station controls via the District's SCADA system.

6 UPDATED CAPITAL IMPROVEMENT PLAN

This study is an addendum to the District's existing WMP with its primary focus being on the water treatment system. Several improvement projects were recommended based on the evaluations of the treatment system.

The need for a portion of the recommended improvements is dependent on the District supplying water to the City of Yachats and Waldport. As it is unclear whether these neighboring water systems will request water from the District, these projects are not yet considered necessary. The remaining recommended improvements found within this addendum include various improvements to be completed at the two WTP sites based on conditions, and improvements at the individual intakes. The WTP improvements are summarized in Table 6.1. Intake improvements were not included as they were developed to address the Turbidity spikes in the raw water. However, these occur when demand is minimal, and the WTPs can afford to be shut down for a short period. Therefore, other improvement projects have a higher priority.

TABLE 6.1 – WTPS IMPROVEMENT COST SUMMARY

Project Improvements	Cost Estimate
Dicks Fork Water Treatment Plant	$256,000.00
Blodgett Water Treatment Plant	$98,000.00

As part of this planning document the existing Capital Improvement Plan (CIP) developed in the most recent WMP will be updated. All projects presented in the WMP and this addendum were considered when developing the updated CIP.

To develop project priority fundability, cost, and system need were all considered. Given the recent stimulus package approved by the federal government, projects that cater to the requirements of this funding will be more desirable as they could be partially, or fully paid for with federal/state funds. For this reason, projects that can be easily transitioned into shovel ready projects, have a high-cost benefit analysis, and/or meet the stipulations set by FEMA funding packages have been given the highest priority when developing a project list for the CIP. The CIP presented in this section includes improvement projects that are recommended to be constructed within the next 5 years.

6.1 Capital Improvement Plan

The various water storage, and water distribution system recommended improvements are summarized in Table 6.1. Refer to Sections 4 and 5 of the current WMP and this document for detailed project breakdown and justification for the specific recommended improvements.

Neither projects 5 or 9 were included in the current WMP, or discussed previously in this addendum. During the process of re-evaluating the CIP, it was noted that the PRVs did not allow fire flows from the high pressure system into the lower system. Improvement Project 5 includes the replacement of both pressure reducing vaults (PRV). The new vaults would include a 2" PRV line, and an 8" fire flow bypass line. Also noted was the lack of necessity of the two 6"

AC waterlines on the east and west side of Hwy. 101 that run parallel to a 10 inch waterline. The 10" waterline is sufficiently sized to serve and provide fire flows to all areas currently served by the 6" AC waterlines. Improvement Project 9 scope includes all work associated with the abandonment of this 6" AC waterline (service, hydrant and intersecting waterline reconnections).

Project 8 was originally discussed in the WMP as a remove and replace waterline project. The scope has been modified for the updated CIP. The project scope now includes the abandonment of the 6" AC waterline, and reconnection of all existing services, intersecting waterlines, and hydrants to the 10" waterline on the opposite side of Hwy. 101.

TABLE 6.1 – CAPITAL IMPROVEMENT PLAN 2022-2027

CAPITAL IMPROVEMENT PLAN 2022-2027				
FEMA PROJECTS				
Project Number	**Project Name**	**Pipe Length**	**Project Description**	**Item Cost**
1	Dicks Fork Tank No. 2	--	Add an additional 200,000 gallon Tank at Dicks Fork WTP Site	
2	SW Seabrook Lane	1,800	Waterline from Dick's Fork WTP to Lower Pressure Zone (North)-Primary Waterlline for Seabrook Tank-8" to 12"	
3	SW Wakonds Beach	1,600	Replace 6" Waterline from Dick's Fork WTP to Lower Pressure Zone (South)	
4	SW Tara Lane to SW Forest Lane	1,900	Replaces Aging 6" AC Pipe That Provides Looping and More Reliable Conveyance of Water From Dick's Fork Tank to the Most Northern Section of the Water System	
5	PRV Improvements	--	Fire Flows in the Lower System Can Be Provided by Dick's Fork Tank	
SHOVEL READY PROJECTS				
Project Number	**Project Description**	**Pipe Length**	**Project Description**	**Item Cost**
6	Raw Waterline From Big Creek Settling Basin to Blodgett WTP	4,400	Replace aged 8" AC Raw Waterline	
7	NE Forest Hill to NE Star Creek Dr.	1,500	Replace aged 6" AC Pipe	
8	West Side of HWY 101 -From Fernwood Drive South to Wakeetum Street	2,900	Abandon 6" AC Waterline-Reconnect Service Connections to the 10" Waterline on East Side of Hwy. 101. Relocate Fire Hydrants to the East Side of Hwy. 101	
9	East Side of HWY 101 -From Fernwood Drive North to SW Whitecap Drive	1,900	Abandon 6" AC Waterline-Reconnect Service Connections to the 10" Waterline	
10	Camp One Road	1,300	Replaces aged Pipes-Increases Fire Flow-4" to 6"	
11	NE California Street	1,000	Replaces aged Pipes-Increases Fire Flow-4" to 8"	

Images depicting the waterline projects described in the CIP are provided on the following pages.

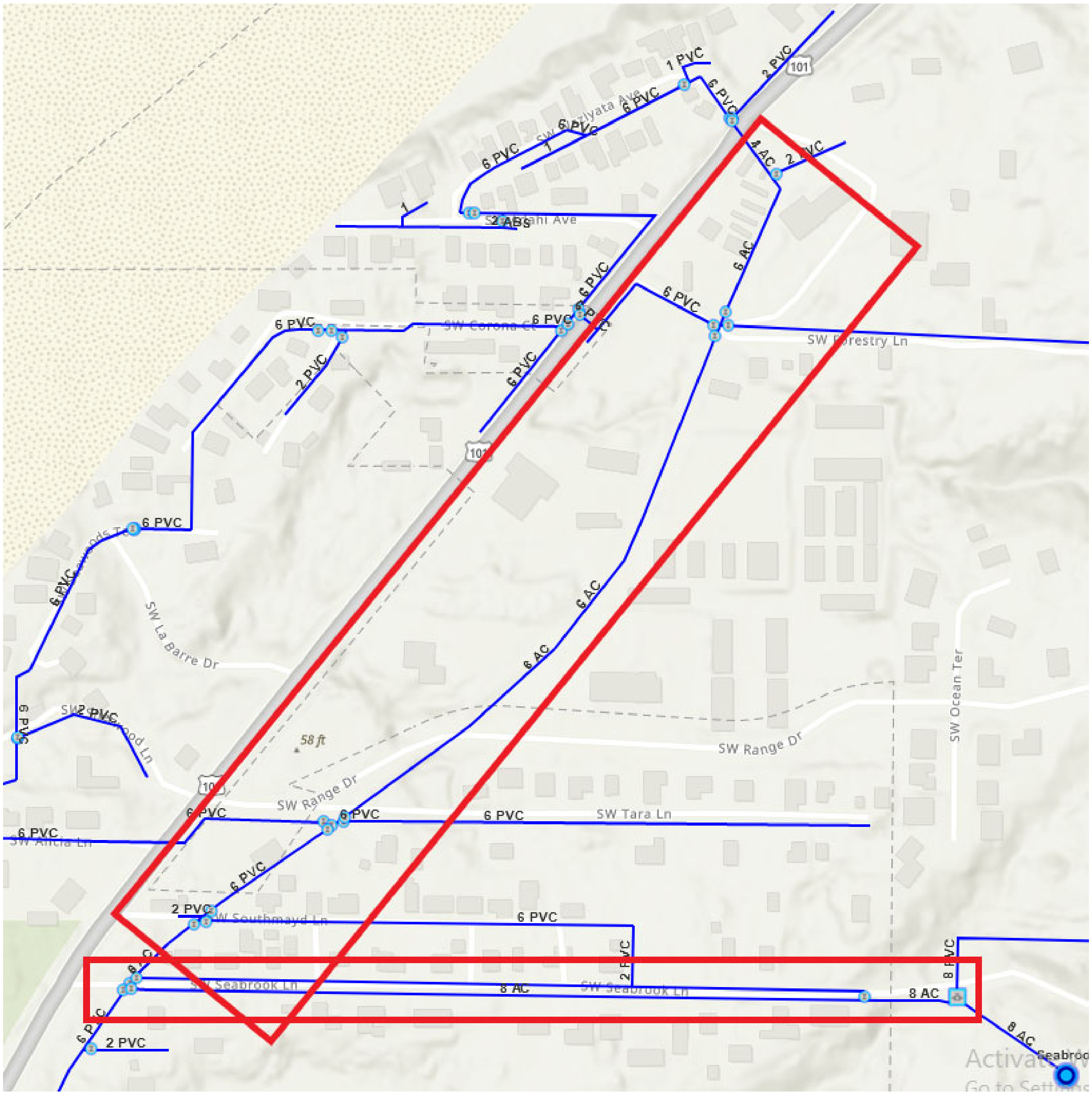
6.2 Prelimineering Engineering Report

All recommended improvement projects from the WMP and this addendum were weighed based on the priorities previously discussed. This evaluation was the means by which dozens of improvement projects were limited to the 11 shown in the 5-year CIP. Further analysis in the form a preliminary engineering report (PER) for the shovel ready projects would provide additional information that would help to further refine project priority. At a minimum the PER process would achieve the following:

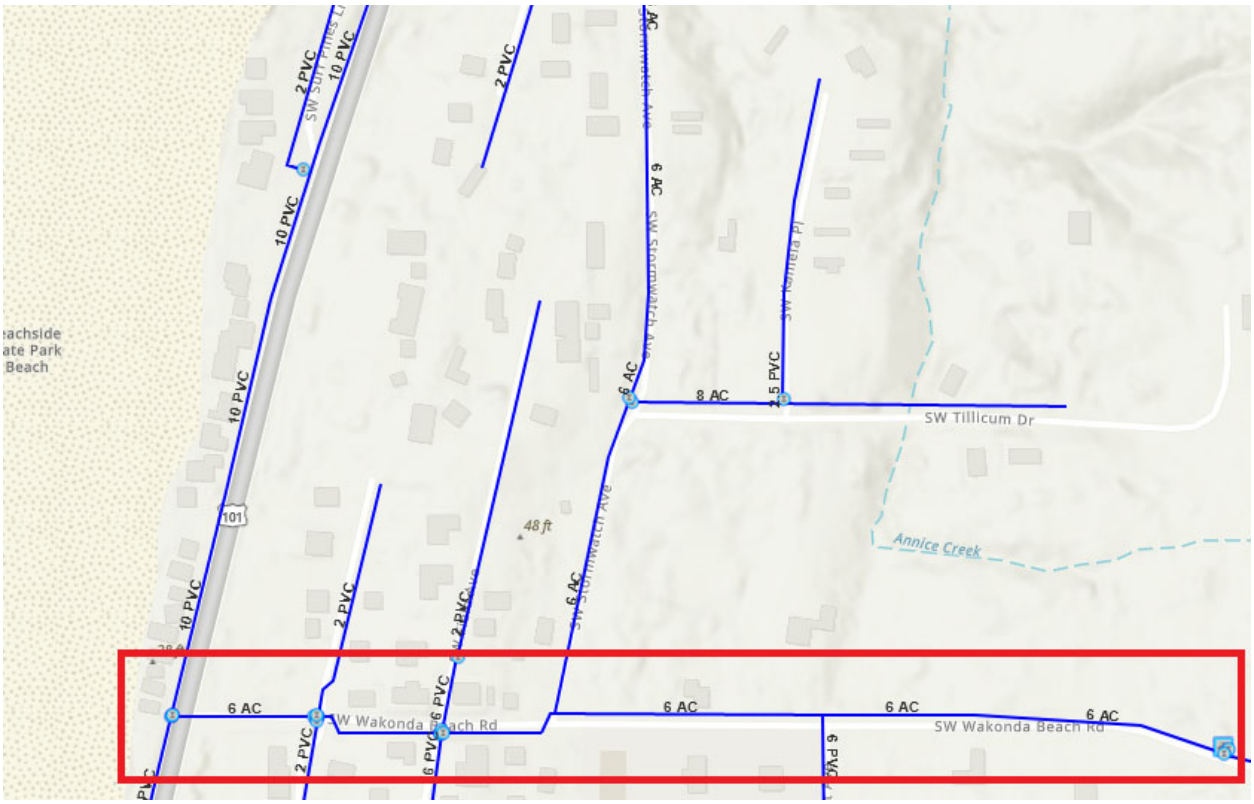
- Development of a preliminary design (30% Design)
- Establish a more accurate cost estimate based on the preliminary design
- Assess environmental roadblocks based on the preliminary design
- Assess any design obstacles that diminish the value of the project based on feasibility

It is recommended that a PER is developed for all shovel ready projects shown in Table 6.1.

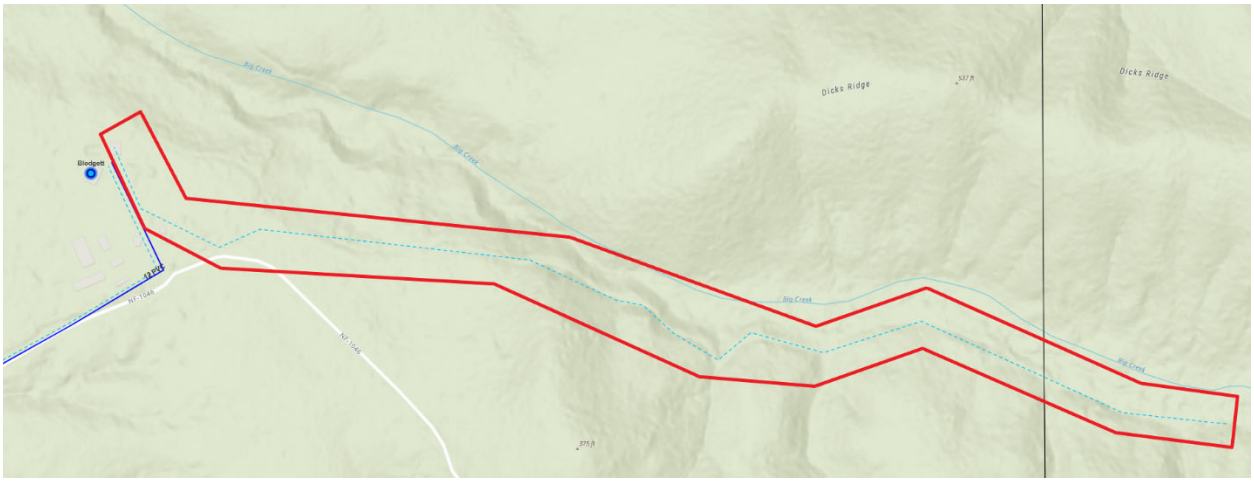
Project 2 and 4


SW Forestry Ln
SW Corona Ct
SW La Barre Dr
SW Range Dr
SW Tara Ln
SW Southmayd Ln
SW Seabrook Ln
SW Ocean Ter
SW Alicia Ln
101
6 PVC
2 PVC
6 AC
4 AC
8 AC
1 PVC
2 ABS
58 ft

Project 3



Project 6



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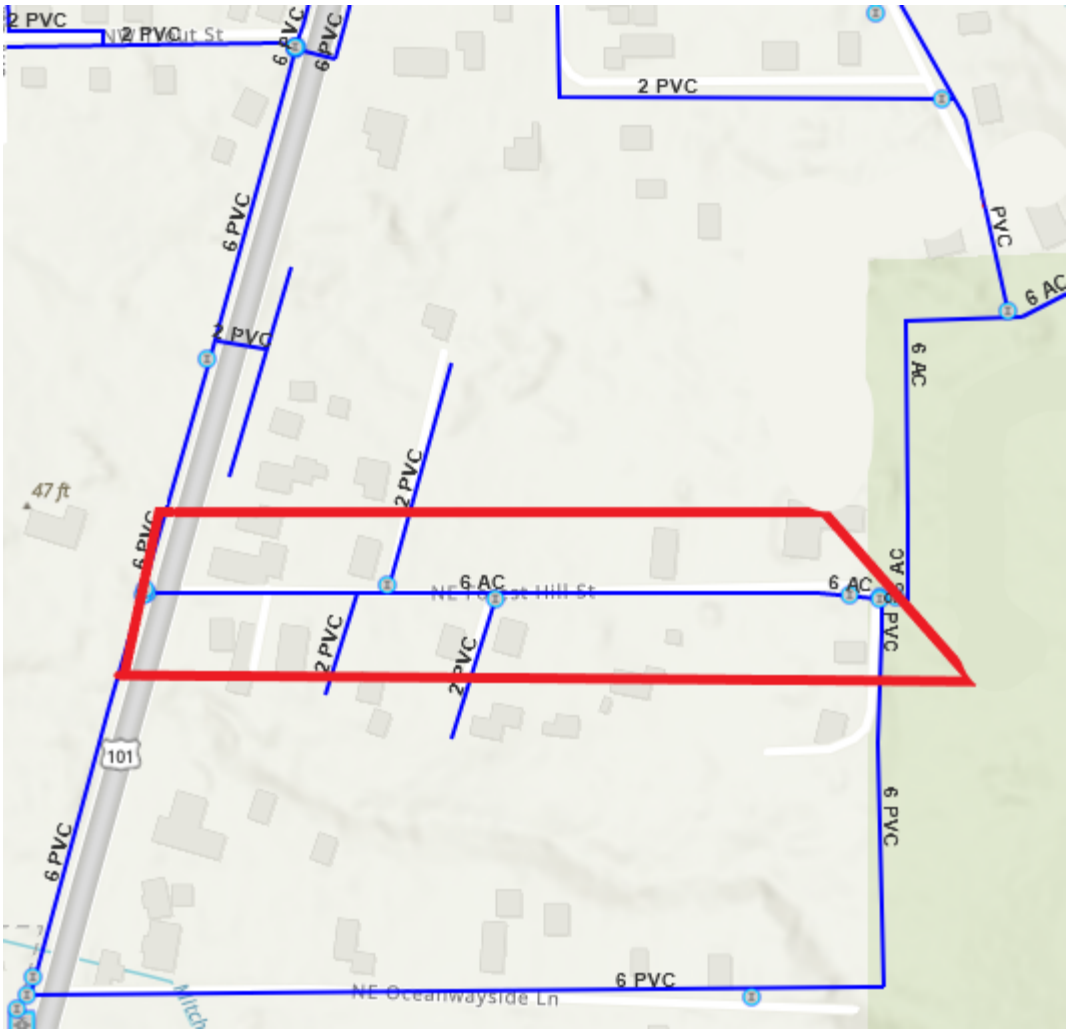
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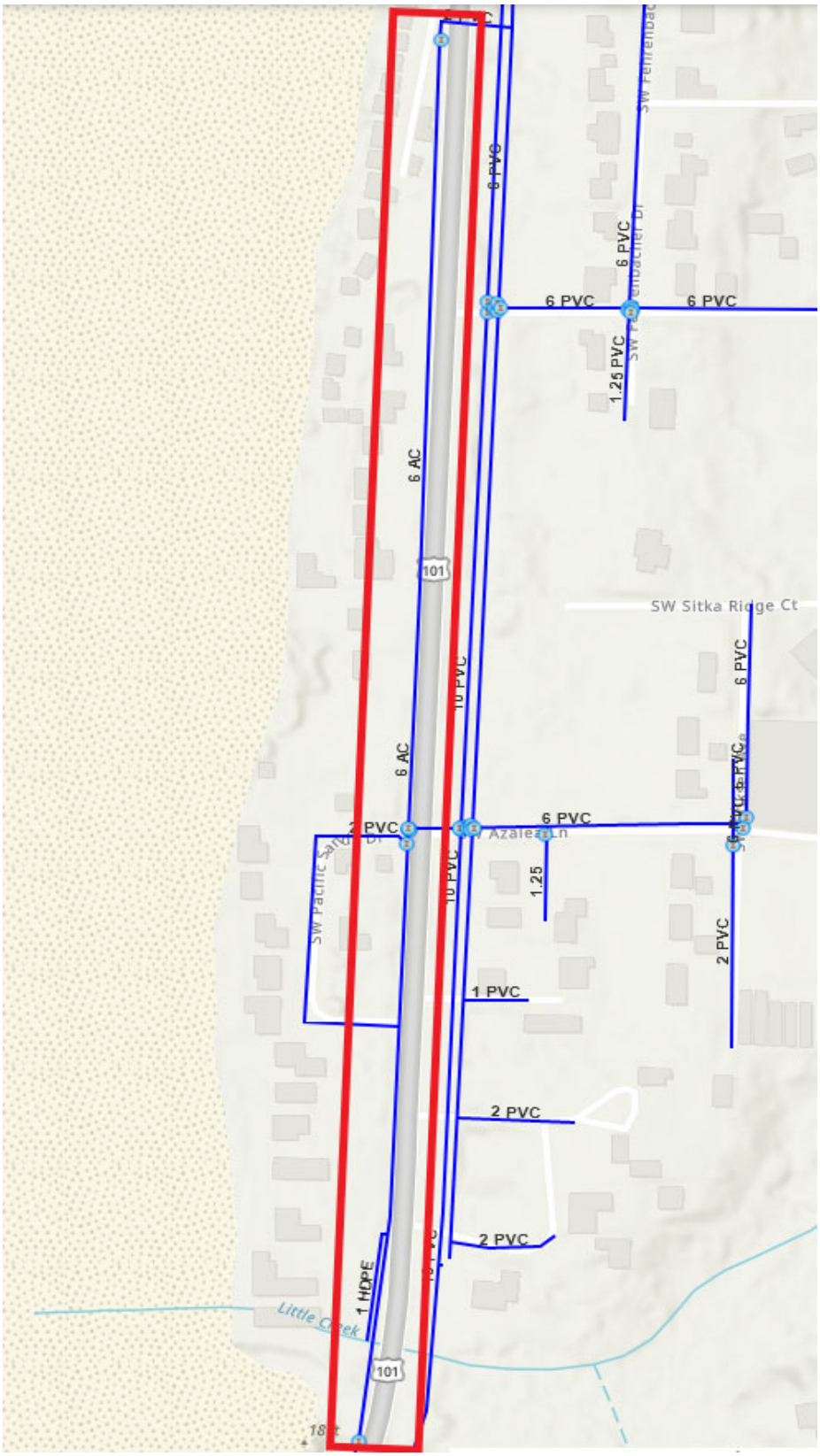
2 PVC
6 PVC
6 PVC
2 PVC
6 PVC
2 PVC
PVC
6 AC
6 AC
47 ft
6 PVC
2 PVC
6 AC
6 AC
2 PVC
2 PVC
101
6 PVC
6 PVC
6 PVC
NE Oceanwayside Ln

Project 8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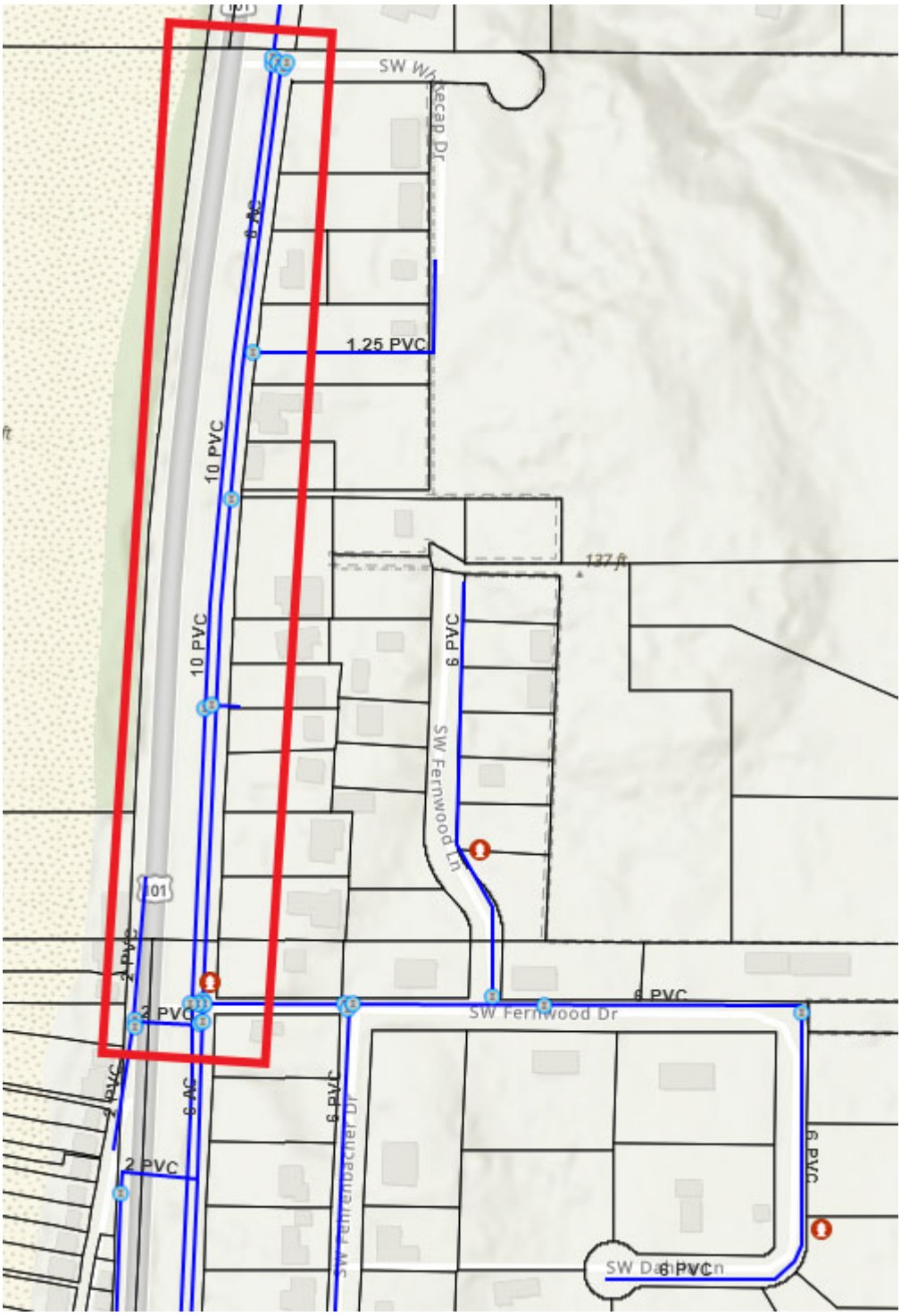
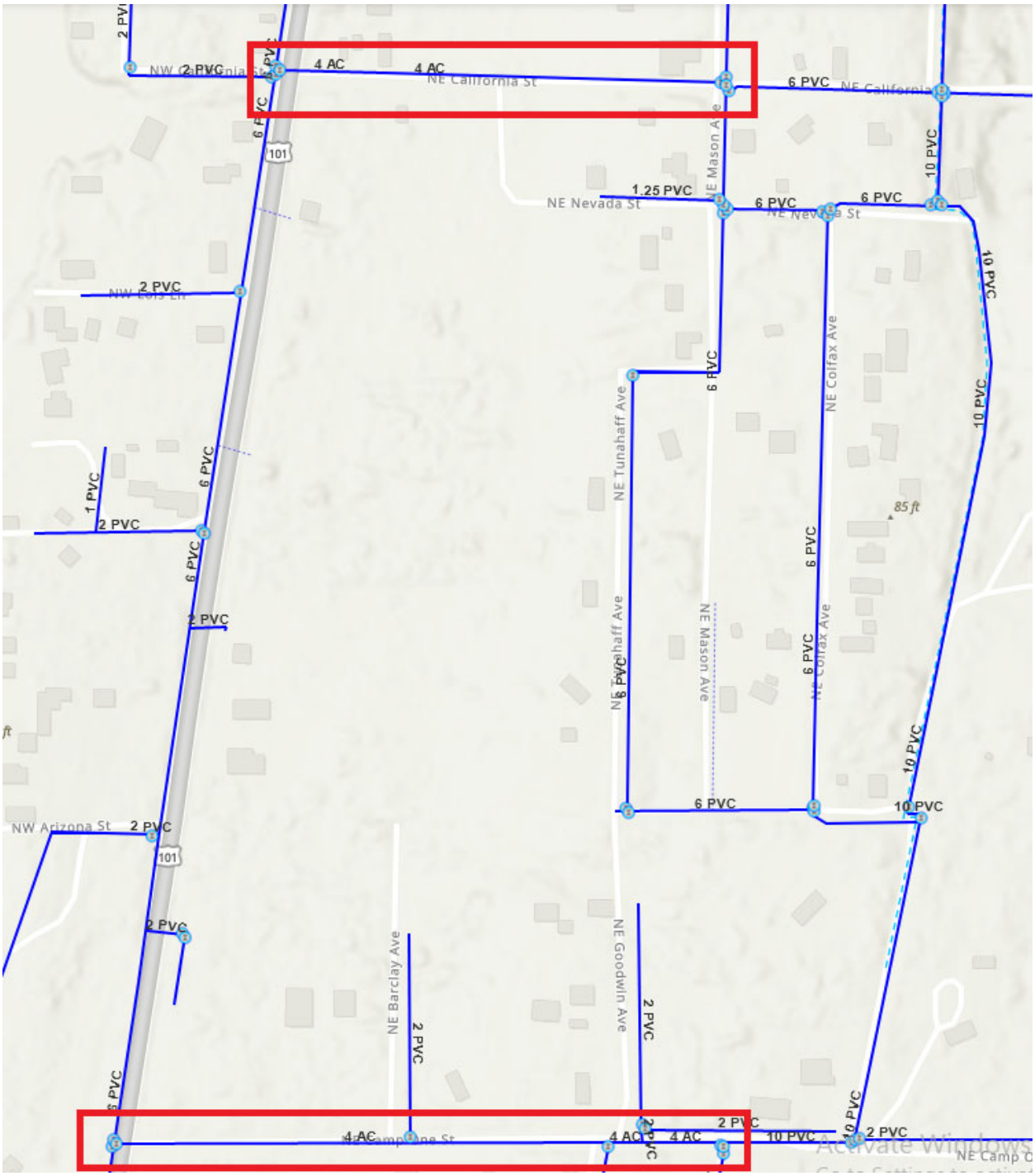
6 PVC
6 PVC
6 PVC
1.25 PVC
6 AC
6 AC
101
SW Sitka Ridge Ct
6 PVC
10 PVC
10 PVC
2 PVC
6 PVC
1.25
2 PVC
1 PVC
2 PVC
2 PVC
1 HDPE
Little Creek
101

Project 9



Project 10 and 11


4 AC
4 AC
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6 PVC
NE California
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1.25 PVC
NE Nevada St
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6 PVC
NE Nevada St
NE Mason Ave
10 PVC
2 PVC
NW Lois Ln
6 PVC
NE Tunahaff Ave
NE Colfax Ave
85 ft
1 PVC
2 PVC
6 PVC
6 PVC
2 PVC
NE Tunahaff Ave
NE Mason Ave
NE Colfax Ave
6 PVC
10 PVC
6 PVC
10 PVC
NW Arizona St
2 PVC
101
2 PVC
NE Barclay Ave
NE Goodwin Ave
2 PVC
2 PVC
6 PVC
4 AC
4 AC
4 AC
2 PVC
10 PVC
10 PVC
2 PVC

Final Draft

Water Management and Conservation Plan

City of Yachats

October 2021

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Contents

Index of Exhibits

Appendices

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1. Municipal Water Supplier Plan Elements

This section satisfies the requirements of OAR 690-086-0125.

This rule requires a list of affected local government to whom the plan was made available, and a proposed date for submittal of an updated plan.

1.1 Introduction

The City of Yachats (City) is the southernmost city in Lincoln County, located along Highway 101 on the Oregon coast. Tourism is a major driver of the economy, and seasonal residents can substantially increase the number of water users served and water demand, especially during the summer months. The combination of increased water demand in summer and reduced streamflows in the City's water supply sources has resulted in the City needing to implement water curtailment measures in recent years and to develop new strategies for providing a reliable long-term water supply.

The purpose of this Water Management and Conservation Plan (WMCP) is to describe the City's strategy for providing a reliable water supply through the implementation of existing and additional water management and conservation policies and programs. This strategy includes analysis of how the City can use its water rights to meet future water needs.

The City developed this WMCP in tandem with the City's Water System Master Plan (WSMP) (anticipated publication in 2021). Data sharing and coordination occurred during development of both plans to ensure consistency among the documents. Consequently, portions of this WMCP draw from information developed for the WSMP.

1.2 Plan Requirement

The City first submitted a draft WMCP in 1997, which Oregon Water Resources Department (OWRD) reviewed and commented on. The City resubmitted the draft WMCP on December 30, 1999 and OWRD issued a "Final Order Determination" on May 2, 2000. This order was subsequently withdrawn based on a timely request for reconsideration and OWRD issued an interim order on April 5, 2001 setting out deficiencies in the City's WMCP and providing the City time to correct the plan. On June 27, 2001, the City submitted an updated WMCP, which was part of its Water System Master Plan. This updated WMCP met the conditions of the April 5, 2001 interim order and OWRD issued a Final Order approving the City's WMCP on August 2, 2002. OWRD's Final Order required that the City submit an updated WMCP by July 1, 2006. In addition, OWRD's Final Order for Extension of Time for Permit S-53471 requires submittal of a WMCP by February 23, 2008. Finally, this plan also meets the requirement in the Final Order for Extension of Time of Permit S-29018 issued (X date) to submit a WMCP within 3 years. This is the City's second WMCP.

1.3 Plan Organization

This WMCP fulfills the requirements of the Oregon Administrative Rules (OAR) adopted by the Water Resources Commission in December 2018 (OAR Chapter 690, Division 86). It describes water

management, water conservation, and curtailment programs to guide the wise use and stewardship of the City's water supply.

The WMCP is organized into the following sections, each addressing specific sections of OAR Chapter 690, Division 86. Section 2 is an evaluation of the City's water supply, water use, water rights and water systems. The information developed for Section 2 is the foundation for the sections that follow. Section 3 discusses the City's current conservation measures and presents the City's benchmarks for future efforts. Section 4 describes the City's water curtailment history, assesses the City's abilities to address water shortages, and provides blueprints for action when curtailment of supply is necessary. Section 5 draws information from Sections 2 and 3 to present the City's future water needs and how the City intends to utilize its water sources to meet future demand.

Section	Requirement
Section 1 – Municipal Water Supplier Plan Elements	*OAR 690-086-0125*
Section 2 – Municipal Water Suppliers Description	*OAR 690-086-0140*
Section 3 – Municipal Water Conservation Element	*OAR 690-086-0150*
Section 4 – Municipal Water Curtailment Element	*OAR 690-086-0160*
Section 5 – Municipal Water Supply Element	*OAR 690-086-0170*

1.4 Affected Local Governments

OAR 690-086-0125(5)

The following governmental agencies may be affected by this WMCP:

- Lincoln County
- City of Yachats

Thirty days before submitting this WMCP to OWRD, the City made the draft WMCP available for review by the affected local government listed above along with a request for comments relating to consistency with the local government's comprehensive land use plan. The letters requesting comment are in Appendix A. The City did not receive any comments.

In addition, the City provided the following water providers with a copy of the draft WMCP as a courtesy.

- Southwest Lincoln County Water People's Utility District

1.5 Plan Update Schedule

OAR 690-086-1025(6)

The City anticipates submitting an update of this plan within 10 years of OWRD's final order approving the plan. As required by OAR Chapter 690, Division 86, a progress report will be submitted within 5 years of the final order.

1.6 Time Extension

OAR 690-086-0125(7)

The City is not requesting an extension of time to implement metering or a benchmark established in a previously approved plan.

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2. Municipal Water Supplier Description

This section satisfies the requirements of OAR 690-086-0140.

This rule requires descriptions of the water supplier's water sources, service area and population, water rights, and adequacy and reliability of the existing water supply. The rule also requires descriptions of the water supplier's customers and their water use, the water system, interconnections with other water suppliers, and quantification of water loss.

2.1 Terminology

The following terminology is used in this WMCP.

Demand (i.e., production) refers to the quantity of water delivered to the distribution system from the water treatment plant. Demand includes metered consumption (e.g., residential customer and commercial customer consumption), unmetered public uses (firefighting, hydrant flushing, other), and water lost to leakage, reservoir overflow, and other factors.

Consumption is equal to metered water use and unmetered, authorized water uses (e.g., system flushing).

Demand minus consumption equals *water loss*. Water loss is equal to the sum of apparent and real losses. Apparent losses include unauthorized consumption, accounting errors, and meter inaccuracies, among other loss types. Real losses include leakage.

Generally, demand and consumption in municipal systems are expressed in units of mgd, but also may be expressed in cubic feet per second (cfs) or gallons per minute (gpm). One mgd is equivalent to 1.55 cfs or 694 gpm. For annual or monthly values, a quantity of water is typically reported in million gallons (MG).

The following terms are used to describe specific values of system demands:

- Average day demand (ADD) equals the total annual production divided by 365 days.
- Maximum day demand (MDD) equals the highest system demand that occurs on any single day during a calendar year. It is also called the one-day MDD or peak day demand.
- Monthly ADD equals the total volume of water produced in a month divided by the number of days in the month.
- Maximum monthly demand (MMD) as a volume equals the month in a calendar year with the greatest volume of demand. MMD as a rate equals the ADD of the month in the calendar year with the greatest volume of demand.

2.2 Water Sources

OAR 690-086-0140(1)

The City holds water rights for the use of water from the following sources: Reedy Creek, Salmon Creek, North Cape Creek, and the Yachats River. Currently, Reedy Creek is the City's primary supply source and Salmon Creek is a secondary supply source used only when Reedy Creek flows are insufficient to meet the City's water demands. The City relies on its Salmon Creek water supply every summer now due to insufficient flows in Reedy Creek. In recent years, reduced flows in Salmon Creek coupled with water treatment plant limitations have forced the City to implement water curtailment measures. The City has been holding its water rights on North Cape Creek (referred to as Cape Creek) and the Yachats River in reserve for potential future water sources.

2.3 Interconnections with Other Systems

OAR 690-086-0140(7)

The City has an interconnection with Southwest Lincoln County Water People's Utility District (SWLCWPUD), which can be used to supply the City's distribution system with water during a water shortage emergency. This interconnection has a capacity of 0.33 cfs (150 gpm) and is a two-way interconnection. This interconnection has not been used to date.

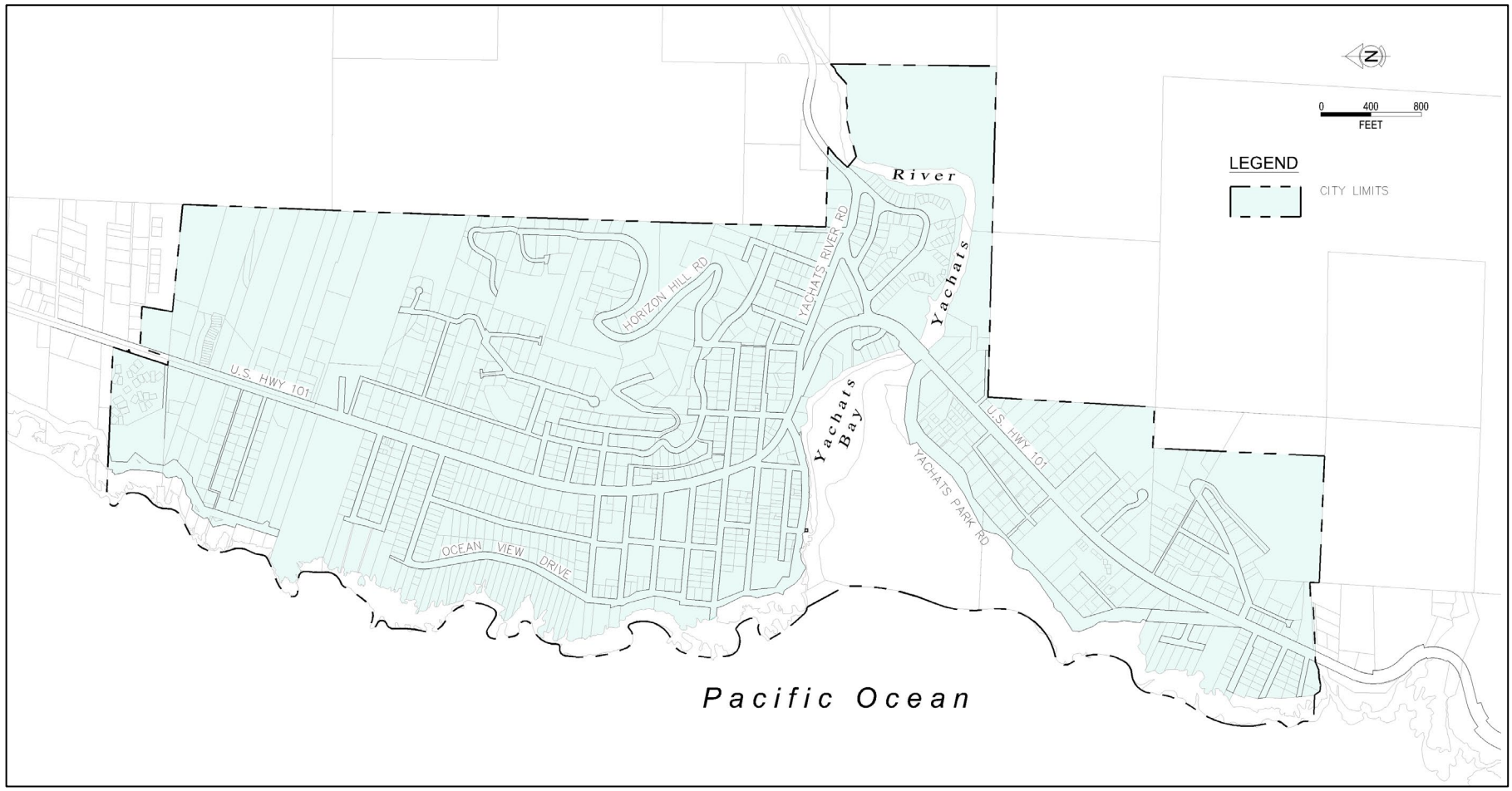
2.4 Intergovernmental Agreements

The City has an intergovernmental agreement with SWLCWPUD for operation of an interconnection between the two water providers. The agreement stipulates that the interconnection can only be used by the City of Yachats for emergency purposes, such as a water shortage, and it is not intended to be used as a supplemental water source on a regular basis.

2.5 Current Service Area Description and Population

The City's water service area is the entire area within city limits, which is approximately 600 acres and encompasses the same area as its Urban Growth Boundary (UGB). The water service area is shown in **Exhibit 2-1**. According to estimates from the Portland State University Population Research Center, the population within the UGB in 2020 was 780. Given the importance of tourism to the economy of Yachats, using this resident population in water demand projections underestimates the City's service population. The City's Water System Master Plan, developed concurrently with this WMCP, calculated the population served by the municipal water system based on the number of system connections, an estimated breakdown of user types (single family, multifamily, and hotel rooms), and estimated occupancy per connection. Using this methodology, the City's service population in 2020 was approximately 2,191.

Exhibit 2-1. City of Yachats Water Service Area



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2.6 Demand

OAR 690-086-0140(4)

2.6.1 Annual, Monthly, and Seasonal Demand

Exhibit 2-2 presents the volumes of finished water produced annually at the water treatment plant (demand) from 2017 through 2020. This exhibit shows annual water demand, average day demand (ADD), and maximum month demand (MMD) as a volume and rate.

Exhibit 2-2. Water Demand Summary, 2017 to 2020

Year	Annual Water Demand (MG)	Average Day Demand (ADD)	Max Month Demand (MMD)	Max Month Demand (MMD)*	Max Month Demand (MMD)*
		mgd	MG	mgd	cfs
2017	51.2	0.14	5.34	0.17	0.27
2018	46.9	0.13	5.42	0.17	0.27
2019	46.0	0.13	5.15	0.17	0.27
2020	**	**	5.08	0.16	0.25
Average	48.0	0.13	5.25	0.17	0.27
Max	51.2	0.14	5.42	0.17	0.27

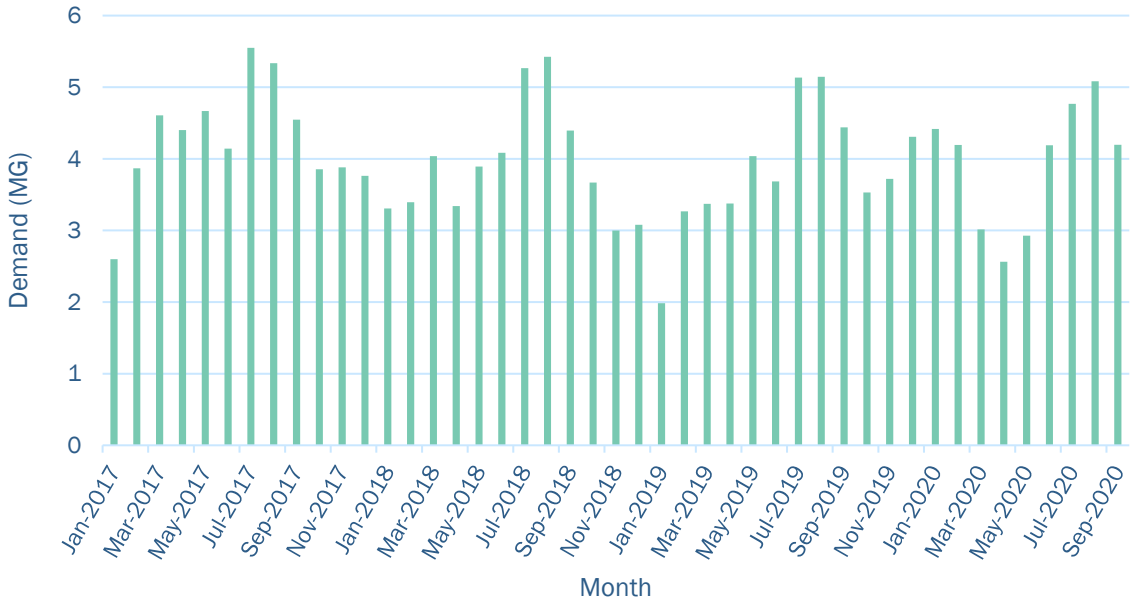
*As described further below, MMD as a rate provides the closest estimate of MDD.

**Data for water demand in 2020 was not available for the full year at the time of .

Total demand declined slightly since 2017, and ADD decreased from 0.14 mgd in 2017 to 0.13 mgd in 2019. Water production at the treatment plant is generally intermittent, with days of no production followed by days with substantially higher production. Although seasonal trends can be seen in demand, these data cannot directly be used to determine maximum day demands, because there are many days when the treatment plant is operated for long periods of time to produce water for more than one day. Therefore, maximum month demand as a rate provides the closest estimate of MDD. MMD occurred in August of each year and fluctuated slightly throughout the period of available data.

Exhibit 2-3 reflects the seasonal variations in water demand throughout the year, showing the typical pattern of increased water demand in summer and lower demand during the winter. During the summer peak demand season, the treatment plant is typically operated on a daily or almost daily basis. Throughout the rest of the year, the City first uses water from the main finished water storage tank, and then treats additional water as needed to replenish the supply.

Exhibit 2-3. Monthly Demand, 2017-2020.



2.7 Consumption

OAR 690-086-0140(6)

2.7.1 Customer Categories Data

The City has experienced numerous leadership transitions over the past eight years, which contributed to the City changing its utility billing software four times during that period. Creating customer categories and assigning customers to the appropriate categories did not occur during the repeated and disruptive changes in billing software. Consequently, the City lacks recent data on the number of customers by customer category and meter consumption by customer category. The WSMP estimated that the City has 959 total connections in 2020, including eight hotel connections and 11 multifamily connections. The remaining 940 connections were not further defined into residential or commercial connections. No further analysis of consumption by customer category is included in this WMCP due to information availability and data analysis constraints.

2.7.2 Annual and Monthly Consumption

Total annual metered consumption based on sales from the utility billing system is shown in **Exhibit 2-4** for calendar years 2018 through 2020. Consumption data was not available for August and September of 2019 and December of 2020, and as a result annual consumption in these two years are underestimated. The data shows a fluctuating but generally decreasing trend of consumption. The trend may be partially explained by the missing data for some months of 2019 and 2020.

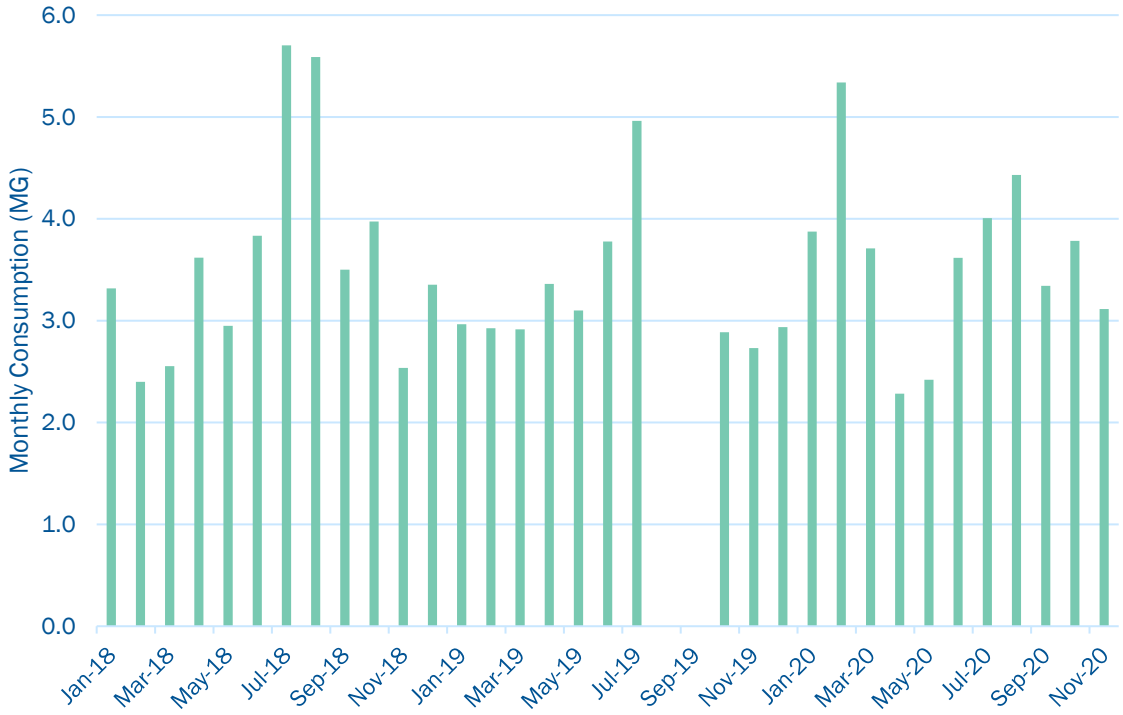
Exhibit 2-4. Annual Consumption, 2018-2020

Year	Annual Metered Consumption (MG)*
2018	43.58
2019	32.56
2020	39.92

*Data were not available for August and September 2019 and December 2020, so annual consumption in these years is underestimated.

The City's service population varies seasonally due to the influence of tourism and part-time residents. Generally, the service population, and therefore water consumption, are higher during the summer months, weekends, and holidays. Consumption also increases during the summer due to outdoor water use, including irrigation of lawns and landscapes. **Exhibit 2-5** shows these seasonal trends for calendar years 2018 through 2020.

Exhibit 2-5. Monthly Consumption, 2018-2020



2.7.3 Largest Customers

Exhibit 2-6 presents the annual consumption by the City's top 10 water users in 2016. The list is comprised of five customers in the Motel category, two City accounts, one customer in the Apartments/Assisted Living category, one customer in the Apartments category, and one customer in the Food & Beverage category. Combined, these customers' average annual consumption represented approximately 34.6 percent of the total annual consumption for all customer classes. Water conservation efforts targeting these customers have the potential to yield notable water savings.

Exhibit 2-6. Annual Consumption, 2016

Customer Category	Annual Consumption (MG)
Motel	2.55
City	2.18
Motel	2.12
Motel	1.36
Apartments/Assisted Living	1.22
City	1.01
Motel	0.86
Apartments	0.67
Food & Beverage	0.65
Motel	0.64
Total	**13.27**

2.8 Water Loss

OAR 690-086-0140(9)

The City calculated water loss as the difference between water demand and total metered consumption, and calculated the water loss percentage by dividing the resulting water loss volume by demand volume. **Exhibit 2-7** shows the City's calculations of water loss for 2018 through November 2020. In some months, the available data was either incomplete or potentially invalid as it showed consumption (water sold) exceeding demand (water produced at the treatment plant) in a given month. The City is investigating these data errors. Estimated water loss in Exhibit 2-7 therefore shows water loss as a range for each year depending on whether invalid months were excluded. These water loss estimates do not account for the estimated 0.036 MG used for flushing the water system annually. For consistency with the WSMP, flushing was not accounted for in the water loss estimates. Accounting for flushing would slightly reduce the water loss.

Exhibit 2-7. Water Loss, 2018-2020

Year	Annual Water Demand (MG)	Metered Consumption (MG)	Water Loss (MG)	Water Loss (%)*
2018	47.05	43.58	3.47	7.4-15.6%
2019	40.06	32.56	7.50	18.7-20.6%
2020	42.47	39.92	2.55	6.0%-12.6%

*Range of water loss varies based on calculations using all available monthly data or calculations omitting months where consumption exceeded demand or values were incomplete.

As noted in the exhibit, the City's water loss in 2020 was 6 percent when comparing demand and consumption totals while water loss was 12.6 percent when excluding the months of February and March due to consumption exceeding demand in those months. Consumption in excess of demand is likely due to the City not having synchronized time periods of consumption data and demand data and

accounting errors related to apparent water loss issues described below. Given the data discrepancy, the City considers its water loss to be somewhere in the range of 6 percent through 12.6 percent.

The City considers most of its water loss to be apparent water loss, specifically accounting and metering. The City has been taking actions to address accounting and metering issues. The City has been working to improve customer billing, upgrading or changing its utility billing software four times in the last eight years. The most recent utility billing software that has been operating since 2019 is proving to be the most accurate thus far. To improve tracking of water consumption for purposes of better understanding customer behaviors and targeting water conservation towards customers, the City plans to work with it billing software company to set up the system to track consumption by customer category. This is a detail that the City missed as it worked to address other issues with billing software. Using meter size as a surrogate for the customer category label does not work in the City. An array of commercial customers have not upgraded to commercial meters due to the costs associated with those upgrades, instead pursuing other ways of meeting water needs. As part of its efforts to improve accounting, the City also wants to more closely align the monthly demand and monthly consumption time periods of comparison. In the past two years, the City replaced all 2-inch meters and the more accurate meter readings showed higher water consumption than the previous meters were recording. This demonstrates that old meters in the City's system are likely under-recording water consumption, which the City is endeavoring to address. Section 3.3.3 Meter Testing and Maintenance discusses this issue in the more detail.

While real water losses (i.e., system leakage) is a component of the City's water loss, the City does not consider it to be a major component of its 2020 water loss based on results of meter replacement discussed above, SCADA system monitoring, and results of recent leak detection efforts. The City's SCADA system, which tracks water demand in the system, indicates that the City's water system has no notable leaks. In addition, the City hired a professional leak detection company to conduct a leak detection survey of the City's water system in 2014, 2016, and 2019, which found leaks in water lines that the City promptly addressed. In 2020, the City addressed leaks identified in the November 2019 survey, which the detection company estimated would save approximately 1.1 MG/month. More details about leak detection are provided in Section 3.3.5. The combination of the improved utility billing software, replacement of 2-inch meters, and water line repair and replacement efforts related to leak detection likely led to the lower water loss seen in 2020 compared to previous years.

Based on this assessment of apparent and real water losses, the City is confident that system leakage is only a small portion of its water loss presented in Exhibit 2-6, so well below the 15 percent system leakage threshold identified in the Stipulated Final Order and Agreement on Reconsideration (Stipulated Agreement) (issued in 1997) associated with the City's Permit Amendment T-7589, which would have added an additional point of diversion under former Permit S-51190 (Permit S-51190 was superseded by Permit S-53471; See Section 2.9.1 for more details). The Stipulated Agreement included a number of conditions, such as one related to water loss, that are detailed under Section 2.9.3 Assessment of Water Supply

2.9 Water Rights

OAR 690-086-0140(5)

2.9.1 Summary of Water Rights

The City holds two water right certificates and two permits, which are all for municipal use. These water rights are described below and in **Exhibit 2-8**.

- Certificate 22933 authorizes the use of up to 2.0 cfs from Reedy Creek and has a priority date of July 9, 1945.
- Certificate 14104 authorizes the use of up to 0.49 cfs from North Cape Creek (referred to as Cape Creek) and has a priority date of July 31, 1934.
- Permit S-29018 authorizes the use of up to 2.0 cfs from Salmon Creek, with 1.0 cfs having a priority date of June 26, 1963 and 1.0 cfs having a priority date of August 22, 1963. On [x date] the City received a Final Order from OWRD extending the completion date to October 1, XXXX. Permit S-29018 also states that use of the water right shall be limited to any deficiency in the available supply under the prior existing water right from Reedy Creek (Certificate 22933).
- Permit S-53471 (formerly Permit S-51190) authorizes the use of up to 2.0 cfs from the Yachats River and has a priority date of March 20, 1989. Permit S-53471 is the product of an agreement reached to address challenges to OWRD's approval of Permit Amendment T-7589, which would have added an additional point of diversion under Permit S-51190. The Stipulated Final Order and Agreement on Reconsideration (Stipulated Agreement) resulted in issuance of Permit Amendment T-7967, which changed the location of Point of Diversion 1 (POD 1) to approximately 2 miles upstream of POD 2, located in the estuary near the City's water treatment plant. The Stipulated Agreement also resulted in cancellation of Permit S-51190 and issuance of a superseding permit S-53471, as well as a number of conditions, which are detailed under Section 2.9.3 Assessment of Water Supply. The authorized date of completion for putting Permit S-53471 to full beneficial use is October 1, 2043.

Exhibit 2-8. City of Yachats Water Rights

Source	Application	Permit	Permit Amendment	Certificate	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Date for Completion	Maximum Rate of Withdrawal to Date Instantaneous (cfs)	WY 2019-2020 Average Withdrawal Monthly (MG)	WY 2019-2020 Average Withdrawal Daily (mgd)	Five-Year (WY 2015-2016 to WY 2019-2020) Average Withdrawal Monthly (MG)	Five-Year (WY 2015-2016 to WY 2019-2020) Average Withdrawal Daily (mgd)	Comments
Reedy Creek	S-20951	S-17333	--	22933	7/9/1945	Municipal	" 2.0	NA	**2.0**	4.10	0.13	4.16	0.14	City's primary water source.
Salmon Creek	S-38383	S-29018	--	--	8/22/1963 for 1.0 cfs; 6/26/1963 for 1.0 cfs	Municipal	2.0	10/1/XXXX (extension pending)	**0.52**	0.06	0.002	0.05	0.002	City's secondary water source; to make up deficiency under Certificate 22933 (Reedy Creek water right)
(North) Cape Creek	S-15440	S-11586	--	14104	7/31/1934	Municipal	0.49	NA	**0.49**	0.00	0.00	0.00	0.00	Currently held in reserve as a water source.
Yachats River	S-69856	S-53471	T-7967	--	3/20/1989	Municipal	2.0[1]	10/1/2043	**0**	0.00	0.00	0.00	0.00	Permit Amendment T-7967 changed the point of diversion for POD 1. Currently held in reserve as a water source. No water has been diverted under this water right to date.

cfs = cubic feet per second

[1] Several conditions apply to the use of this water as described in Section 2.9.3 Assessment of Water Supply.

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2.9.2 Aquatic Resource Concerns

OAR 690-086-140(5)

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

The Oregon Department of Environmental Quality's (DEQ) publishes the Integrated Report Assessment Database, which identifies surface water bodies that are water quality limited and associated water quality limiting parameters. The information described below was drawn from DEQ's 2018/20 Integrated Report, otherwise known as DEQ's "303d list" which can be found on DEQ's web page at https://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx.

The City's current water sources are Reedy Creek and Salmon Creek, which are tributaries to the Yachats River. The City also holds a permit for the use of water from the Yachats River, which has not yet been developed and is being held in reserve as a water source, and a certificate for use of water from North Cape Creek, which is held in reserve as a water source. Reedy Creek, Salmon Creek, and North Cape Creek are not listed as water quality limited in DEQ's database. The Yachats River is listed under Category 5 in the database from the confluence with Keller Creek to its mouth for the following parameters: dissolved oxygen (spawning) and temperature (spawning; year-round). The confluence with Keller Creek is upstream of the points of diversion on the Yachats River authorized by the City's permit.

The Yachats River and its tributaries support several fish species that are listed as threatened, endangered, or sensitive under state and federal laws. The listed fish species that may occur in these water bodies is summarized in **Exhibit 2-9**.

Exhibit 2-9. Listed Fish Species

Species	Evolutionarily Significant Unit (ESU)	Federal Listing	State Listing
Coho salmon (*Oncorhynchus kisutch*)	Oregon Coast	Threatened	Sensitive
Chinook salmon (*O. tshawytscha*)	Coastal Spring Chinook SMU	N/A	Sensitive
Steelhead trout (*O. mykiss*)	Oregon Coast ESU/Coastal Summer Steelhead SMU	N/A	Sensitive
Chum salmon (*O. keta*)	Coastal Chum Salmon SMU/Pacific Coast ESU	N/A	Sensitive – Critical
Western brook lamprey (*Lampetra richardsoni*)	No ESU listed	N/A	Sensitive

Species	Evolutionarily Significant Unit (ESU)	Federal Listing	State Listing
Western river lamprey (*L. ayresii*)	No ESU listed	N/A	Sensitive
Pacific lamprey (*Entosphenus tridentatus*)	No ESU listed	N/A	Sensitive
Pacific Eulachon (*Thaleichthys pacificus*)	Southern DPS	Threatened	N/A
Umpqua chub (*Oregonichthys kalawatseti*)	No ESU listed	N/A	Sensitive – Critical
Green Sturgeon (*Acipenser medirostris*)	Southern DPS	Threatened	Sensitive – Critical
White sturgeon (*A. transmontanus*)	Coastal Population	N/A	Sensitive

DPS = Distinct Population Segment
SMU = Species Management Unit
Sources for this list:

- State of Oregon Sensitive Species List (2019)-- https://www.dfw.state.or.us/wildlife/diversity/species/docs/Sensitive_Species_List.pdf
- Endangered Species Act Listing for West Coast Salmon and Steelhead, National Oceanic and Atmospheric Administration (2016)-- https://archive.fisheries.noaa.gov/wcr/publications/gis_maps/maps/salmon_steelhead/critical_habitat/wcr_salmonid_ch_esa_july2016.pdf
- Oregon Conservation Strategy-- http://oregonconservationstrategy.org/ocs-strategy-species/fish/

The City does not have any municipal groundwater rights and is not located in a Critical Groundwater Area.

2.9.3 Assessment of Water Supply

OAR 690-086-0140(3)

Reedy Creek, Salmon Creek, and Cape Creek

Streamflow in the peak summer season affects the reliability of the City's water rights on Reedy Creek, Salmon Creek, and Cape Creek. According to City staff, the City is currently maximizing the amount of water that can be diverted from Reedy Creek and Salmon Creek during the peak summer season, as demonstrated by the need to implement water curtailment stages in recent years. Consequently, these water sources are not expected to be able to provide sufficient additional water to meet increased water demands in the summer from population growth. Flows in Cape Creek have not been measured, with the exception of one measurement in September 2020 by Westech Engineering. The measured flow rate was 0.39 cfs, but given that the measurement occurred after a rainstorm, the typical streamflow during the summer months is likely less.

Yachats River

Reliability of the Yachats River as a water source is affected by conditions in Permit S-53471 and the Yachats River Mutual Agreement Stipulated Final Order issued in 1997, which was a result of challenges to OWRD's approval of Permit Amendment T-7589 (Stipulated Agreement) (See Appendix B for the Stipulated Agreement). Permit S-53471 has a priority date of March 20, 1989. Instream water right

certificates 59739 and 59608 are senior in priority (July 12, 1966 and March 26, 1974 priority dates, respectively) to the City's Permit S-53471 while instream water right certificate 73161 is junior in priority (March 25, 1991 priority date). The senior instream water rights state that the instream water rights have priority over Permit S-53471 except that 1 cfs is reserved for municipal purposes below River Mile 5, meaning that the City would have had access to use 1 cfs of water below River Mile 5 prior to the Stipulated Agreement. However, the Stipulated Agreement conditioned the City's permit such that the City can only use the full 2.0 cfs authorized by the permit when flows in the Yachats River (measured at OWRD Gage 14306872, Yachats River above Clear Creek near Yachats) are sufficient to meet the junior instream water right (Certificate 73161) and senior instream water rights (Certificates 59739 and 59608). As shown in **Exhibits 2-10**, streamflow records from 2013 through 2020 indicate that these instream rights are not met throughout the year and are met with a particularly low frequency in summer, so the City is unlikely to be able to access the full 2.0 cfs during the peak demand season.

Exhibit 2-10. Frequency Maximum Instream Water Right Met

Time Period			Max Instream Water Right (cfs)	Frequency ISWR is Met, 2013 - 2020
January 1	-	January 15	132	91.7%
January 16	-	January 31	132	90.6%
February 1	-	February 15	132	92.5%
February 16	-	February 29	132	90.6%
March 1	-	March 15	132	72.5%
March 16	-	March 31	132	73.4%
April 1	-	April 15	132	75.8%
April 16	-	April 30	132	48.3%
May 1	-	May 15	63	88.3%
May 16	-	May 31	63	52.3%
June 1	-	June 15	63	44.2%
June 16	-	June 30	42	50.8%
July 1	-	July 15	40.2	20.8%
July 16	-	July 31	40.2	0.0%
August 1	-	August 15	25.6	1.7%
August 16	-	August 31	25.6	2.3%
September 1	-	September 15	24.9	5.8%
September 16	-	September 30	24.9	26.7%
October 1	-	October 15	49.1	24.2%
October 16	-	October 31	50	50.8%
November 1	-	November 15	132	29.2%
November 16	-	November 30	132	63.3%
December 1	-	December 15	132	63.3%
December 16	-	December 31	132	77.3%

Furthermore, when flows in the Yachats River drop below the flows identified in the junior and senior instream water rights, the Stipulated Agreement and Permit S-53471 limit the City to 1.0 cfs (limited to 0.5 cfs at the upper point of diversion (POD 1) and 0.5 cfs at the lower point of diversion (POD 2)) during "emergencies" or "when population growth exceeds other sources of supply." Given that the lower point of diversion has saltwater intrusion risks, the City is largely limited to up to 0.5 cfs that the City could potentially divert from the upper point of diversion.

To allow for use under the population growth condition, the City must be in compliance with its WMCP, and the WMCP has to include certain elements from the Stipulated Agreement beyond the standard OWRD requirements, which are described in **Exhibit 2-12** along with descriptions of how the City has addressed those elements from the Stipulated Agreement.

Exhibit 2-11. Stipulated Agreement Required Elements and City Actions To Comply

Additional WMCP Element per Stipulated Agreement	Actions Taken To Meet Element in Stipulated Agreement
Goal of 85% water use efficiency and a plan and timetable for meeting that goal	The City's water loss was less than 15% in 2020, as described in Section 2.7 Water Loss.
Demand projections based on the 85% efficiency level and demand figures based upon the best practicable estimate of population and occupancy figures and seasonal average water use	Demand projections are based on the City's 85% efficiency, the best practicable estimate of population and occupancy and seasonal average water use, as shown in Section 5.
Schedule for water audits (annual)	The City conducts annual water audits, as described in Section 3.
Cooperation in efforts to develop a regional water supply	The City is involved in regional water supply planning efforts through its participation in the Mid-Coast Water Conservation Partnership and continues to communicate with other water providers about regional water supply opportunities, which are described in Section 3.
Analysis of the land-use approval process required to develop a Yachats River point of diversion and a discussion of how and when the City intends to comply with those land-use processes	This analysis is included in Section 5.
Analysis of the feasibility of other water sources and a timeline for when the City will abandon nonviable sources or seek to transfer those sources to instream rights	This analysis is included in Section 5.
Curtailment plan with triggers for curtailment based on stream flows (actual water curtailment is not required to use water under the population growth scenario)	The City has a curtailment plan with triggers for curtailment based on stream flows, as shown in Section 4.
All elements necessary to meet WMCP requirements	All required elements of a WMCP are included in this WMCP

Furthermore, the Stipulated Agreement has very specific language related to the water efficiency requirement listed in Exhibit 2-12. Per the Stipulated Agreement, since more than 15 years have passed since the Stipulated Agreement and more than 10 years since the approval of the WMCP, the relevant water efficiency requirement is that the City "has reached or exceeded 85% water use efficiency, yet

remains unable to meet the requirements of the City's resident population using other developed sources." Thus, the City must have water losses below 15% (to achieve 85% water use efficiency) and still need additional water in order to begin diverting water under the permit. If the City's losses still exceed 15%, or other developed water sources could feasibly be used to meet demand, then the City would likely be prohibited from using the Yachats River permit under the population growth provision. As described above, the City had water loss below 15% in 2020 and Section 5 describes how the Yachats River is the most feasible source to develop next to meet water demand projections.

"Emergencies" are limited to sustained drought and to the following short-term or catastrophic events: supply line breakage, firefighting, outdoor events within the City's service area that place an abnormally high demand on water supply, catastrophic loss of a primary water supply source, and threats to public health not attributable to inefficiency or chronic conditions, as may be approved jointly by ODFW and OWRD. The potential exists that sustained drought may become more of a regular event with climate change, but accessing water under this situation could only occur when curtailment measures are instituted as described in the City's WMCP.

2.10 System Description

OAR 690-086-0140(8)

A water system schematic is provided in **Exhibit 2-13**. This schematic shows the locations of the City's water supply sources, water treatment plant, transmission and distribution lines, reservoirs, and pump stations.

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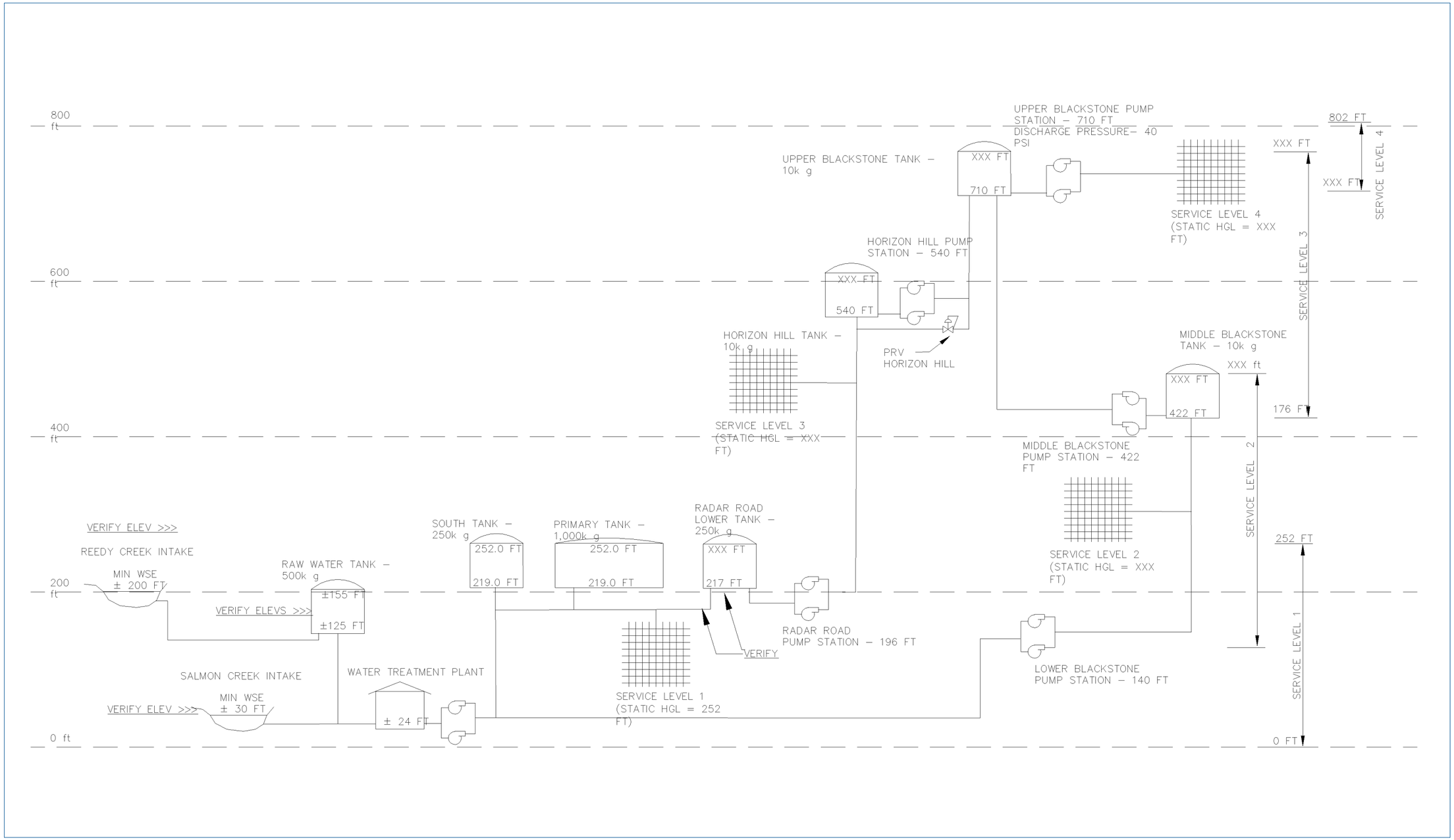
Exhibit 2-12. City of Yachats Water System Flow Schematic



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2.10.1 Raw Water Intakes, Transmission Lines, and Storage

The City's Reedy Creek intake is approximately one-half mile upstream from the Yachats River. The City built the original intake impoundment in the 1940s. A landslide in 1998 destroyed the original impoundment and intake, and the City only rebuilt the intake. The intake consists of an infiltration gallery that pre-filters the raw water, which is then conveyed by gravity approximately 8,400 feet to the City's raw water storage tank via a combination of asbestos concrete pipe and high-density polyethylene pipe.

The City's intake on Salmon Creek is approximately 300 feet from the water treatment plant. The stainless steel intake pipe is located in an impoundment, and water is then conveyed by gravity through a PVC pipe to the treatment plant.

Cape Creek is located approximately 2 miles south of the City's UGB in the Cape Perpetua area. Although Cape Creek historically served as the City's water source, the source has not been used for many years. No infrastructure has been developed for use of water from the Yachats River.

The City constructed a 500,000 gallon raw water reservoir adjacent to the water treatment plant in 2000. The reservoir is made of welded steel and is 35 feet high and 50 feet in diameter. The reservoir is filled with flows from Reedy Creek. Water from the reservoir is fed to the treatment plant during low flows to supplement direct flows from the City's water sources.

2.10.2 Water Treatment

The City completed construction of its water treatment and filtration plant in 1992 and has a total rated treatment capacity of 0.5 mgd (350 gpm). Currently, the City is able to reliably operate the plant at approximately 475,000 gallons per day (330 gpm). The plant includes the following components:

- Pre-chlorination
- Chemical coagulation and polymer addition
- Up-flow contact clarification
- Multi-media filtration
- Disinfection (post-chlorination)
- Serpentine contact basin clearwell

The plant is a custom treatment system with a "conventional" type treatment train. The treatment process includes a single stage flocculation and clarification process followed by mixed media filtration. Water is pumped from the clearwell into the City's distribution system by two vertical turbine high service pumps.

2.10.3 Treated Water Storage

The City currently has six finished water reservoirs with a combined storage capacity of 1,590,000 gallons as described below.

The Upper Radar Road Reservoir was built in 1992 concurrently with the water treatment plant, and it is the City's primary storage structure. All water from the treatment plant is conveyed to this reservoir before being directed to other reservoirs and pump stations. The water level in this reservoir therefore determines the pressure provided to a large number of water users in the service area. The rectangular reinforced-concrete structure is approximately 124 feet long and 49 feet wide, and it has a storage volume of 1.0 million gallons.

The Lower Radar Road Reservoir, built in 1945, is located approximately 120 feet from the Upper Radar Road Reservoir and is about 50 feet lower in elevation. It is a circular concrete cast-in-place structure with a diameter of 50 feet and a storage volume of 200,000 gallons. This reservoir provides water primarily to the northern part of the City. The reservoir delivers water directly to the Radar Road Pump Station and to the Lower Blackstone Pump Station.

The Horizon Hill Reservoir was built in 1964. The reservoir is a rectangular reinforced-concrete cast-in-place structure, approximately 14 feet long and 14 feet wide, with a storage capacity of 10,000 gallons. Water is delivered to the reservoir primarily from the Radar Road Pump Station. A pump station located next to the Horizon Hill Reservoir is used to maintain water levels in the Upper Blackstone Reservoir.

The South Reservoir was constructed in 2018 and primarily serves users south of the Yachats River. The tank is constructed of bolted steel with a glass-fused coating system. It is 36 feet in diameter and has a storage volume of 250,000 gallons. The reservoir's level is maintained by the level in the Upper Radar Road Reservoir.

The Middle Blackstone Reservoir was built in 2007. The reservoir is made of welded stainless steel, 10 feet in diameter, and its storage volume is 10,000 gallons. The reservoir's levels are maintained by the Lower Blackstone Pump Station based on water level readings.

The Upper Blackstone Reservoir was constructed in 2007 as part of the Blackstone development. It is a circular concrete cast-in-place structure with a diameter of 31.5 feet and a storage volume of 120,000 gallons. The reservoir's levels are maintained by the Middle Blackstone Pump Station.

2.10.4 Distribution System

The City's distribution system conveys water from the water treatment plant and from reservoirs to end users. Pipe sizes range from 1-inch water services up to 12-inch water mains. The current distribution system consists of a mix of asbestos cement, ductile iron, high density polyethylene, and polyvinyl chloride (PVC) pipes, with the majority being composed of PVC in a variety of sizes. The City operates approximately 15.3 miles of distribution pipeline.

3. Water Conservation Element

This section addresses the requirements of OAR 690-086-0150(1) – (6). This rule requires a description of specific required conservation measures and benchmarks, and additional conservation measures implemented by the City.

3.1 Progress Report

OAR 690-086-0150(1)

This is the City's second WMCP. OWRD approved the City's first WMCP on August 2, 2002. The previous WMCP described the City's efforts to implement mandatory conservation activities required under OAR 690-086, as well as additional water conservation activities, including a description of each measure, progress in implementation, and a schedule and budget for each activity, rather than a specific benchmark for each conservation measure. **Exhibit 3-1** presents a progress report on each of these benchmarks.

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Exhibit 3-1. Progress Report for City of Yachats' Conservation Benchmarks

OAR 690-086-150 (4) Requirement A description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following conservation measures that are required of all municipal water suppliers.		
Sub-Section Requirement	2001 Implementation Progress	2021 Conservation Measure Status
(a) An annual water audit that includes a systematic and documented methodology for estimating any un-metered authorized and unauthorized uses	The City compares finished water meter demand to metered consumption.	The City conducts annual water audits. The City uses its SCADA system to track water demand. The City has upgraded utility billing software for improved accuracy in tracking consumption. Over the past two years, all 2" meters have been replaced with models that give more accurate readings.
(b) If the system is not fully metered, a program to install meters on all un-metered water service connections.	The system is fully metered and the City has plans in place to replace older, inefficient meters.	The system is fully metered, and meters are installed at all new connections.
(c) A meter testing and maintenance program	Meters are being systematically replaced and upgraded.	Approximately 200 older meters have been replaced with radio read meters. Meters are tested when consumption is observed to change abnormally.
(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections	The base rate charged to customers increases with increasing meter size.	The base rate charged to customers increases with increasing meter size.
(e) If the annual water audit indicates that system leakage exceeds 10 percent, a regularly scheduled and systematic program to detect leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the municipal water supplier	Leak detection surveys are completed regularly by a professional leak detection company. The City repairs leaks and replaces leaking lines identified in the Capital Improvement Plan.	Leak detection surveys continue to be completed regularly by a professional leak detection company. The City repairs leaks and replaces leaking lines identified in the leak detection reports and in the Capital Improvement Plan.
(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers	The City has not yet implemented a public education program for water conservation.	The City has partnered with regional water providers to establish the Mid-Coast Water Conservation Consortium, which will provide public education about water conservation (e.g., billing messages, newsletter articles, and water quality report content) to members of the consortium. The City plans to begin implementing public outreach measures in Fiscal Year 2021-2022 either through that newly established organization or on its own, including billing messages, newsletter articles, and website content promoting indoor and outdoor water conservation.

OAR 690-086-150 (5) Requirement If the supplier serves a population greater than 1,000 and proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), or if the supplier serves a population greater than 7,500, description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following measures; or documentation showing implementation of the measures is neither feasible nor appropriate for ensuring the efficient use of water and the prevention of waste.		
Sub-Section Requirement	2011 Implementation Progress	2021 Conservation Measure Status
(a) Technical and financial assistance to encourage and aid residential, commercial, and industrial customers in implementation of conservation measures	The City serves a permanent resident population under 1,000 but the service population during the peak season and holidays is greater than 1,000. The City was exploring technical and financial assistance activities but had not yet implemented them in 2011.	The City intends to begin implementing technical and financial assistance programs, including technical assistance for leak detection and offering toilet leak detection dye tablets to customers.
(b) Supplier financed retrofitting or replacement of existing inefficient water fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation	The City was exploring fixture replaced programs but had not yet implemented them in 2011.	The City intends to begin implementing a fixture replacement program starting with offering low-flow showerheads and faucet aerators to its customers. The City will also explore a rebate program for additional fixture replacements.
(c) Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation	Customers are billed monthly, enabling them to connect higher water use with higher bills and encouraging conservation.	Customers are billed monthly, enabling them to connect higher water use with higher bills and encouraging conservation. The City is considering implementing a tiered water rate structure.
(d) Water reuse, recycling, and non-potable water opportunities	The City had not begun to develop water reuse and recycling projects.	The City is developing a project to recycle water treatment plant backwash water.
(e) Any other conservation measures identified by the water supplier that would improve water use efficiency	The City does not yet implement additional conservation measures.	The City is engaged with the Mid-Coast Water Planning Partnership for regional collaboration on sustainable water supplies. During 2020-2021, the City developed a Drinking Water Protection Plan with stakeholder engagement, which identified water conservation and public education recommendations. The City has partnered with other regional water providers to establish the Mid-Coast Water Conservation Consortium that will assist participating water providers with water conservation outreach and support.

3.2 Other Current Conservation Measures

Since the City needed to implement water curtailment stages in 2015 and 2017, it has been more aggressively pursuing strategies to address its water supply issues in summer when flows in Reedy Creek and Salmon Creek have been inadequate. Actions that the City has been taking are summarized below and detailed further in this section.

- Installing Automated Meter Reading (AMR) meters to improve accounting and to more quickly identify customer leaks
- Developing a project to recycle backwash water from the water treatment plant
- Developing a Drinking Water Protection Plan to create strategies to address risks to the City's drinking water supply
- Participating in the development and launch of the Mid-Coast Water Conservation Consortium aimed at cost-effectively implementing water conservation measures by pooling resources of water providers on the Mid-Coast
- Participating in the Mid-Coast Water Planning Partnership, which is a region-wide effort of diverse stakeholders to develop sustainable water supply solutions

3.3 Use and Reporting Program

OAR 690-086-0150(2)

The City's Public Water System Identification number is 41-00966.

The City's water measurement and reporting program complies with the measurement and reporting standards in OAR Chapter 690, Division 85.

The City currently measures diversions from Reedy Creek using a mutating disc positive displacement meter located 900 feet from the intake. This meter is experiencing fouling from solids, so the City is in the process of buying a magnetic meter. The City measures diversions from Salmon Creek using a mutating disc positive displacement meter, and it plans to buy a magnetic meter for the Salmon Creek intake in Fiscal Year 2021-2022. The City also has a master meter at the intake of the water treatment plant, allowing the City to measure the total flow from both sources and subtract the meter readings from a functioning intake meter to determine flows at a meter that may not be working properly at a given time period.

The City submits monthly water use measurements to OWRD on an annual basis. Reporting is for the previous water year (October 1 to September 30). The City's water use records can be found at http://apps.wrd.state.or.us/apps/wr/wateruse_report/

3.4 Required Conservation Measures

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

OAR 690-086-0150(4) requires that all water suppliers provide a description of activities implemented and five-year benchmarks for each of the following water conservation measures:

1. Annual water audit
2. System-wide metering
3. Meter testing and maintenance
4. Unit-based billing
5. Water loss analysis
6. Public education

This sub-section describes the City's activities under those water conservation measures and the City's plans during the next five years to initiate, continue, or expand its water conservation activities. These water conservation measures are required of all municipal water suppliers when a condition of a water use permit, permit extension, or another order or rule requires a WMCP.

3.4.1 Annual Water Audit

OWRD defines a water audit as an analysis of the water system that includes a thorough accounting of all water entering and leaving the system. The City's water audit currently consists of comparing demand (finished water entering the distribution system) to metered consumption to determine water loss on a monthly and annual basis. The City has not been estimating unmetered authorized water uses, except the City does have an estimate of water used annually to flush hydrants and other water system components, which is 36,000 gallons. The City is not aware of any unauthorized water uses.

As shown in Exhibit 2-7, the City's water loss was between 6 percent and 12.6 percent in 2020. The City attributes this water loss to primarily accounting and metering, and consequently, has been implementing the following actions: improving its utility billing software, planning improvements in tracking of customer accounts and alignment of demand and consumption data, replacing old customer meters, and investigating replacing customer meters with AMR meters. The City also continues to address the system leakage component of its water loss by using its SCADA system to monitor for system leaks and regularly hiring a professional leak detection company then repairing any leaks found. The City's efforts to reduce water loss are described in greater detail in Section 2.8 Water Loss.

Five-Year Benchmark – The City will continue to conduct annual water audits. In the next five years, the City will add a systematic and documented methodology for estimating any unmetered authorized and unauthorized uses. In the next five years, the City will analyze and implement to the extent possible alignment of monthly demand and consumption data. In the next five years, the City will begin tracking water consumption by customer category.

3.4.3 System-wide Metering

The City's water system is fully metered and the City installs meters at all new water connections.

Five-Year Benchmark – The City will continue to install meters on all new water connections.

3.4.4 Meter Testing and Maintenance

The City has a meter testing and maintenance program. The City replaced all of its customer meters 20 years ago and then slightly upgraded them 10 years ago. In the past 2 ½ years, the City has converted approximately 200 meters to radio read meters to improve accuracy and increase meter reading efficiency. However, the City wants to convert all of its meters to Automated Meter Reading (AMR), which will provide the City with water consumption in real time. This upgrade will help the City quickly identify leaks that a water customer may be experiencing and will improve water auditing, such as enabling closer comparison of monthly demand and consumption. In the meantime, the City is testing meters when billing staff or customers note that consumption has changed abnormally from one month to the next.

The City has water system master meters at the intakes of Reedy Creek and Salmon Creek, before entering the water treatment plant, and where water leaves the water treatment plant and enters the water distribution system. The meters at the two intakes are mutating disk positive displacement meters, which are old and susceptible to fouling from solids. As a result, the City is currently buying a magnetic meter for the Reedy Creek intake and plans to buy a magnetic meter for the Salmon Creek intake in Fiscal Year 2021-2022. The City has magnetic meters at the water treatment plant. To date, the City has been tracking accuracy of the meters based on SCADA trends, but the City plans to create a maintenance schedule for testing the water treatment plant master meters.

Five-Year Benchmark – The City will continue its meter testing and maintenance program. The City will continue its effort to secure funding to convert its customer meters to AMR. In the next two years, the City will replace the old meters at both intakes with magnetic meters. In the next year, the City will create a meter maintenance schedule for its water treatment plant master meters.

3.4.5 Water Rate Structure

The City's water rate structure consists of a base rate that includes a water consumption allowance of up to 1,496 gallons per month (2 units) and a usage rate based on the volume of water consumed beyond the allowance (ranging from $5.33 to $8.02 per unit beyond 2 units, as of December 2020).

Five-Year Benchmark – The City will continue to bill customers, based in part, on the volume of water consumed.

3.4.6 Water Loss Analysis

As discussed in Section 3.3.1, the City's water loss was between 6 percent and 12 percent in 2020. The City attributes this water loss to primarily accounting and metering, and consequently, has been implementing the following actions: improving its utility billing software, planning improvements in tracking of customer accounts and alignment of demand and consumption data, replacing old customer meters, and investigating replacing customer meters with AMR meters.

The City implements activities to detect and fix system leaks. The City uses its SCADA system to monitor for data trends that suggest leaks and those trends indicate that the City has a tight water system with no notable leaks. The City has been implementing water line repair and replacement projects identified in its current Capital Improvement Plan. In addition, the City hired a professional leak detection company to conduct a leak detection survey of the City's water system in 2014, 2016, and 2019. The City promptly addressed leaks identified, including those identified in November 2019. (The City also added meters to two water services identified as lacking meters in the 2019 leak detection survey and fixed the touch read portion of meters identified as broken in that survey. The meters still worked, but had to be hand read before repair.) The 2014 leak detection survey found 17 leaks totaling approximately 1.04 MG per month of leakage in the City's water system. The 2016 leak detection survey found 10 leaks totaling approximately 0.5 MG per month of leakage. The 2019 leak detection survey of the City's entire water system found 10 leaks totaling approximately 1.1 MG per month of leakage.

Given that the City has discrepancies in its data that makes it difficult to clearly determine whether its water loss is below 10 percent or not, the City will approach OAR 690-086-0150(4)(e) as though its water losses exceed 10 percent. The City understands that OWRD's rules under OAR 690-086-0150(4)(e)(A) and (B) require the City to provide a description and analysis identifying potential factors for loss and selected actions for remedy to OWRD within two years of approval of this WMCP. In addition, if the selected actions do not reduce water loss to less than 10 percent within five years of approval of the WMCP, the City will have to take additional leak detection and repair measures.

Five-Year Benchmark – Within two years of approval of this WMCP, the City shall provide OWRD with 1) results of water audits for the past two years and 2) a description and analysis identifying potential factors for the water loss and selected actions for remedy. If the selected actions do not show that water loss is less than 10 percent within five years of approval of the WMCP, the City will either develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system, or develop and implement a water loss program consistent with AWWA standards.

3.4.7 Public Education

This rule requires the City to establish a public education program to encourage efficient indoor and outdoor water use that includes regular communication of the supplier's water conservation activities and schedule to customers. The City has been unable to implement public education measures that promote water conservation due to lack of staff resources. However, the City recognizes the importance of doing so, and as such, has been working with other regional water providers since 2019 to develop a water conservation consortium that can help water providers on the Mid-Coast implement a range of water conservation measures, including public outreach, by pooling resources. The City plans to begin implementing public outreach measures in Fiscal Year 2021-2022 through participation in the Mid-Coast Water Conservation Consortium, including billing messages, newsletter articles, and website content promoting indoor and outdoor water conservation and leak detection.

Five-Year Benchmark – In Fiscal Year 2021-2022, the City will begin to promote indoor and outdoor water conservation through at least three billing messages per year and at least two newsletter articles per year, with at least one article focused on outdoor water conservation. In Fiscal Year 2021-2022, the

City will add indoor and outdoor water conservation information, including leak detection information, to its website.

3.5 Additional Conservation Measures

OAR 690-086-0150(6)

OAR 690-086-0150(6) requires municipal water suppliers that either: (a) serve a population greater than 1,000 and propose to expand or initiate diversion of water under an extended permit for which resource issues have been identified, or (b) serve a population greater than 7,500, to provide a description of the specific activities, along with a five-year schedule to implement several additional conservation measures. This rule applies to the City given that it serves a population greater than 1,000 and proposes to initiate diversion under *extended permit* S-53471 within the 20-year planning period of this WMCP.

3.5.1 Technical and Financial Assistance

The City is not currently implementing technical and financial assistance programs, but considers it important to assist customers with leak detection and other water conservation practices. The City plans to begin offering toilet leak detection dye tablets to assist residents with identifying leaky fixtures that need to be repaired or replaced. Technical assistance on leak detection will be provided via the City's website. The website will also include an online home water audit tool for understanding home water use and increasing water efficiency.

Five-Year Benchmark – In the next 5 years, the City will begin to provide toilet leak detection dye tablets to help customers identify leaks and leak detection information on its website. In the next 5 years, the City will provide an online home water audit tool on its website for customers to better understand their personal water use.

3.5.2 Supplier Financed Retrofitting or Replacement of Inefficient Fixtures

Significant water savings can be achieved through the installation of low-cost items, such as water-efficient faucet aerators and showerheads. Other water-efficient fixtures may require a higher initial investment in order but greatly reduce water consumption, such as water-efficient clothes washers or landscaping irrigation systems. The City intends to begin offering customers free water-efficient faucet aerators and showerheads to encourage immediate water conservation, and it will further explore developing a rebate program for other water-efficient fixtures.

Five-Year Benchmark – In the next 5 years, the City will begin offering free water-efficient faucet aerators and showerheads to customers. In the next 5 years, the City will explore the feasibility of offering rebates for customer investments in water-efficient fixtures and will implement the program if deemed feasible.

3.5.3 Rate Structure and Billing Practices that Encourage Conservation

Water utility billing is completed on a monthly basis to provide customers with timely feedback on their water consumption. The City plans to start including water conservation outreach in customer

water bills to reach water users directly and to reinforce the need for conservation and avoidance of water waste.

As previously described, the City's water rate structure currently includes a base rate and a usage rate based on volume of water consumed beyond the allowance included in the base rate. At the City's request, the Oregon Association of Water Utilities conducted a water rate study that included analysis of a tiered increasing block rate structure to encourage water conservation. The study was completed in December 2020 and used American Water Works Association standards. The study identified inconsistencies in billing rates compared to meter size, which the City plans to address as part of its exploration of implementing a tiered rate structure in 2021. The tiered rate structure is a potential tool for reducing demand in summer when the City has been experiencing water supply issues.

Five-Year Benchmark – The City will continue to bill customers on a monthly basis. In the next year, the City will begin to include water conservation messages in water bills at least 3 times per year. In the next year, the City will bring a tiered water rate structure proposal to City Council for consideration and will implement that rate structure if approved.

3.5.4 Water Reuse, Recycling, and Non-potable Water Opportunities

Currently, the City is seeking funding for a project to recycle backwash water from the water treatment plant. The project cost is estimated at $150,000 and would save 60,000 gallons per day (30,000 gallons per backwash, conducted twice daily).

Five-Year Benchmark – The City will continue its effort to obtain funding to recycle water treatment plant backwash water. The City will continue to look for water reuse, recycling, and non-potable water opportunities.

3.5.5 Other Water Conservation Measures

The City has been engaged in the activities of the Mid-Coast Water Planning Partnership, a collaborative regional effort to develop sustainable solutions that balance the needs of local public water systems and local industry, as well as healthy watersheds and fish and wildlife.

The City pursued development of a Drinking Water Protection Plan in 2019 to develop a strategy for addressing risks to its water supply, which became a particular concern after the City needed to implement water curtailment stages in recent years (2015 and 2017). The City secured a grant that year from Oregon Health Authority to develop a Drinking Water Protection Plan from 2020 through 2021. The Drinking Water Protection Plan, which involved robust stakeholder participation, identified a range of water conservation activities to protect the municipal drinking water supply. These include activities such as increased public education, incentives for installing more water-efficient fixtures, and ordinances to increase indoor and outdoor water conservation.

Spurred by water supply issues in recent years, the City has been working with other Mid-Coast water providers since 2019 to develop a framework for a water conservation consortium. This organization would assist water providers in cost-effective implementation of water conservation activities and public education efforts. A group of Mid-Coast water providers, including the City of Yachats, decided in March 2021 to fund Year 1 (Fiscal Year 2021-2022) of the Mid-Coast Water Conservation Consortium. Tasks of the Mid-Coast Water Conservation Consortium will include: developing water

conservation and leak detection website content; developing newsletter articles, billing inserts, billing messages, and content for Annual Water Quality Reports; and purchasing water-efficient fixtures, such as water-efficient showerheads and faucet aerators.

The Public Works Department and Planning Department have been working together to develop City ordinances that promote water conservation and plan to have ordinances ready for City Council review within the next year or two.

The City also has a streamflow gage on the Yachats River that it monitors to determine when the City is in drought and the stage of water curtailment, and to initiate public outreach to reduce customer water demand.

Five-Year Benchmark – The City will continue to participate in the Mid-Coast Water Planning Partnership and to be involved in regional water supply discussions. The City will participate in the Mid-Coast Water Conservation Consortium. In the next 2 years, the City will develop draft water conservation ordinances for City Council review, with at least one draft ordinance addressing water-efficiency standards for indoor water fixtures and at least one draft ordinance addressing outdoor water conservation. If approved by City Council, the City will add these ordinances to City Code.

Exhibit 3-2 provides a summary of the conservation benchmarks developed for this WMCP.

Exhibit 3-2. Summary of 2021 Conservation Benchmarks

Conservation Measures	Five-Year Benchmarks
Annual Water Audit	The City will continue to conduct annual water audits. In the next five years, the City will add a systematic and documented methodology for estimating any unmetered authorized and unauthorized uses. In the next five years, the City will analyze and implement to the extent possible alignment of monthly demand and consumption data. In the next five years, the City will begin tracking water consumption by customer category.
System-wide Metering	The City will continue to install meters on all new water connections.
Meter Testing and Maintenance	The City will continue its meter testing and maintenance program. The City will continue its effort to secure funding to convert its customer meters to AMR. In the next two years, the City will replace the old meters at both intakes with magnetic meters. In the next year, the City will create a meter maintenance schedule for its water treatment plant master meters.
Water Rate Structure and	The City will continue to bill customers, based in part, on the volume of water consumed.

Conservation Measures	Five-Year Benchmarks
Billing Practices that Encourage Conservation	The City will continue to bill customers on a monthly basis. In the next year, the City will begin to include water conservation messages in water bills at least 3 times per year. In the next year, the City will bring a tiered water rate structure proposal to City Council for consideration and will implement that rate structure if approved.
Water Loss Analysis	Within two years of approval of this WMCP, the City shall provide OWRD with 1) results of water audits for the past two years and 2) a description and analysis identifying potential factors for the water loss and selected actions for remedy. If the selected actions do not show that water loss is less than 10 percent within five years of approval of the WMCP, the City will either develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system, or develop and implement a water loss program consistent with AWWA standards.
Public Education	In Fiscal Year 2021-2022, the City will begin to promote indoor and outdoor water conservation through at least three billing messages per year and at least two newsletter articles per year, with at least one article focused on outdoor water conservation. In Fiscal Year 2021-2022, the City will add indoor and outdoor water conservation information, including leak detection information, to its website.
Technical and Financial Assistance Programs	In the next 5 years, the City will begin to provide toilet leak detection dye tablets to help customers identify leaks and leak detection information on its website. In the next 5 years, the City will provide an online home water audit tool on its website for customers to better understand their personal water use.
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	In the next 5 years, the City will begin offering free water-efficient faucet aerators and showerheads to customers. In the next 5 years, the City will explore the feasibility of offering rebates for customer investments in water-efficient fixtures and will implement the program if deemed feasible.
Water Reuse, Recycling, and Nonpotable Opportunities	The City will continue its effort to obtain funding to recycle water treatment plant backwash water. The City will continue to look for water reuse, recycling, and non-potable water opportunities.

Conservation Measures	Five-Year Benchmarks
Other Water Conservation Measures	The City will continue to participate in the Mid-Coast Water Planning Partnership and to be involved in regional water supply discussions. The City will participate in the Mid-Coast Water Conservation Consortium. In the next 2 years, the City will develop draft water conservation ordinances for City Council review, with at least one draft ordinance addressing water-efficiency standards for indoor water fixtures and at least one draft ordinance addressing outdoor water conservation. If approved by City Council, the City will add these ordinances to City Code.

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4. Water Curtailment Element

This section satisfies the requirements of OAR 690-086-0160. This rule requires a description of past supply deficiencies and current capacity limitation. It also requires inclusion of stages of alert and the associated triggers and curtailment actions for each stage.

4.1 Introduction

Curtailment planning is the development of protocols for identifying the level of water curtailment needed and water conservation measures to reduce water demand. Events or conditions that can cause water supply shortages include: prolonged drought, water source contamination, and partial or full system failure. The City's 2021 Drinking Water Protection Plan identified an array of risks to the City's drinking water source areas that could cause water supplies shortages, such as: municipal, residential, and commercial property management practices (e.g., development and management, aging water infrastructure, landscape care, and sabotage/vandalism of municipal water infrastructure); forestry land management practices (e.g., timber harvest, pesticides and herbicides, and access roads); and natural disasters (e.g., drought/low flows, climate change, severe weather events, wildfires, earthquakes, tsunamis, and insect outbreaks).

The City developed this curtailment plan by reflecting on the most likely events that may reduce the City's ability to meet system demands and cause water shortages. Those events include an earthquake, power failure, infrastructure failure, and source water contamination. The City's planned responses to these types of events are described in Section 4.4.

The curtailment plan described in this WMCP draws directly from Yachats Municipal Code Chapter 8.22-Water Shortage Emergency Regulations, and some sections from the Yachats Municipal Code are identified when applicable.

4.2 History of System Curtailment Episodes

OAR 690-086-0160(1)

The City needed to implement water curtailment stages two times within the last 10 years as a result of low flows in Reedy Creek and Salmon Creek. In 2015, the City activated Stage 2 curtailment (nearly needed Stage 3 curtailment), which remained in place for three months. In 2017, the City activated Stage 1 curtailment (nearly needed Stage 2 curtailment), which remained in place for one month.

4.3 Capability Assessment

The City's current capacity limitations are the flows in Reedy Creek and Salmon Creek, specifically during summer months. The raw water storage tank, water treatment plant capacity, and the distribution piping are all sufficient. If a drought, natural disaster, or contamination event were to occur in one of the City's drinking water source areas, the City's water supply would be limited to the flows that can be diverted from the unaffected creek and the water in its finished water storage tanks.

4.4 Curtailment Stages and Initiating Conditions

OAR 690-086-0160(2) and (3)

The City developed a four-stage curtailment plan to be invoked in the event of a water supply shortage. These stages are of increasing severity and could be initiated and implemented in progressive steps or a later stage could be implemented directly. The plan includes both voluntary and mandatory measures, depending upon the cause, severity, and anticipated duration of the shortage.

Exhibit 4-1 presents the City's four curtailment stages and their initiating conditions (i.e., triggers). Initiation of a curtailment stage is based on the specific circumstances of the actual event. The decision to implement curtailment will also consider the knowledge and judgment of City staff members familiar with the water system. Staff members may evaluate such considerations as assessments of the extent of system damage or contamination, duration of repair, costs, fire hazards, and weather forecasts.

Exhibit 4-1. Curtailment Stages of Alert and Initiating Conditions

Curtailment Stages	Initiating Conditions
Stage 1: Water Alert Status	1. The flow in the Yachats River is recorded to be less than thirty-five (35) cubic feet per second (hereafter cfs)[1]; or 2. The combined flow of Reedy and Salmon Creek is less than 0.64 cfs (two hundred seventy-five (275) gallons per minute (hereafter gpm))[2]; or 3. According to the Palmer Drought Severity Index, the Coastal Region is in a Moderate to Extreme Drought and the Public Works Director determines that conditions exist to warrant Stage 1 restrictions.
Stage 2: Water Warning Status	1. The flow of the Yachats River is measured to be less than twenty (20) cfs[1]; or 2. The combined flow of Reedy and Salmon Creek is less than 0.50 cfs (two hundred (200) gpm)[2]; or 3. According to the Palmer Drought Severity Index, the Coastal Region is in a Severe or Extreme Drought and the Public Works Director determines that conditions exist to warrant Stage 2 restrictions.
Stage 3: Emergency Water Status	1. The flow of the Yachats River is measured to be less than fifteen (15) cfs[1]; or 2. The combined flow of Reedy and Salmon Creek is less than 0.40 cfs (one hundred seventy-five (175) gpm)[2]; or 3. According to the Palmer Drought Severity Index, the Coastal Region is in an Extreme Drought and the Public Works Director determines that conditions exist to warrant Stage 3 restrictions.
Stage 4: Critical Water Status	1. The City's water system has been damaged beyond immediate repair. 2. The City cannot meet the basic water needs, creating a health and safety hazard.

[1] Based on readings at OWRD Gage 14306872, Yachats River above Clear Creek near Yachats.
[2] Based on the City's master meter readings.

4.5 Authority and Enforcement

The authority to declare a water shortage emergency is described in Sections 8.22.100 and 8.22.060 of the City's municipal code. In an emergency, as determined in the discretion of the Public Works Director, the Public Works Director may declare a water shortage and the necessity for water conservation actions under Stages 1 through 3. The Public Works Director shall notify the Council immediately upon such declaration, and the Council shall meet as soon as practical to accept, reject, or modify such determination. Stage 4 water conservation actions shall be implemented in case of disaster conditions and may be put into effect without further action of the City Council upon determination by the Public Works Director that the water system has been damaged beyond immediate repair (Section 8.22.060). The water conservation actions shall be in full force and effect and shall be enforced until such time as the Public Works Director declares a suspension or termination of the water shortage. The penalties for violating the water conservation requirements are set forth in Sections 8.22.070 and 8.22.080. Each day a violation is committed or permitted to continue constitutes a separate infraction. Penalties range from a written warning to suspension or termination of water service.

4.6 Curtailment Plan Implementation

OAR 690-086-0160(4)

The City's curtailment plan provides specific curtailment actions for each of the four curtailment stages. In Stage 1, voluntary actions are requested of customers. In the latter curtailment stages, mandatory actions are prescribed to restrict water use. In regard to the following lists of measures or restrictions, the City may revise, add, or remove specific measures or restrictions on water use or activities as needed, depending upon the circumstances of the event for which curtailment is necessary.

4.6.1 Stage 1: Water Alert Status

The following non-essential uses are restricted or prohibited under Stage 1:

- The watering of lawns, gardens and landscaping is restricted to alternative days. Specifically, houses with an address number ending in even numbers (0-2-4-6-8) shall be permitted to water lawns only on even numbered calendar days. Houses with an address number ending in odd numbers (1-3-5-7-9), or fractional addresses, shall be permitted to water only on odd numbered calendar days. All watering of lawns, gardens and landscaping shall be prohibited between the hours of 10:00 a.m. and 7:00 p.m. of each day.
- All sales of water to persons who are not customers of the water system are prohibited.
- No water shall be used by the Yachats Rural Fire District for drills, fire hose testing, hydrant flushing or truck washing.
- The operation of an ornamental fountain, unless it is equipped with a recirculation system, is prohibited.

4.6.2 Stage 2: Water Warning Status

In addition to the restrictions and prohibitions for Stage 1 above, for Stage 2 the following non-essential uses are prohibited:

- The watering of any vegetation, except that trees and shrubs may be watered with a hand held watering device, bucket or hose with flow control nozzle, or drip irrigation system only (no airborne sprinkler systems).
- The use of water for washing, hosing and the like of buildings and pavement or other pedestrian surfaces.
- Drinking water served at restaurants, motels and other businesses which serve food or drink to the public, unless users post "drought notices" in a clearly conspicuous manner so that members of the public will be apprised of the water shortage. If so posted, water for drinking purposes may be served upon request.
- Washing of vehicles, equipment, watercraft and the like.
- The operation of all exterior ornamental fountains, even with a recirculating system.
- Use of City water for dust control.

For Stage 2, all commercial large meter, commercial water, and transient water users shall post the written notice, provided by the City, in a conspicuous location on the property receiving City water service within twenty-four (24) hours of receiving said notice. For transient water users, the notice shall be posted in each rental unit.

4.6.3 Stage 3: Water Emergency Status

In addition to the restrictions and prohibitions for Stages 1 and 2, above, for Stage 3 the following non-essential uses of water are prohibited:

- All landscape watering is prohibited.
- Use of water from a fire hydrant for any use other than for firefighting.
- Use of non-recirculating hot tubs, whirlpools or spas.
- All "commercial large meter" users are required to send linens for laundering outside the City except that commercial laundromats are exempt from this regulation.

For Stage 3, all small meters, including residential water, outside City water, commercial water, and transient water users shall be charged the base volumetric rate for the first four hundred (400) cubic feet per month usage. Usage over four hundred (400) cubic feet per month usage shall be charged the base volumetric rate plus two dollars ($2) per one hundred (100) cubic feet over the four hundred (400) cubic feet. Fractions of months under Phase 3 water conservation restrictions shall be billed extra based on daily usage over 13.33 cubic feet per day. Meters may be read more frequently by City personnel or approved City agents to enforce these restrictions. Small meter users using more than twenty-seven (27) cubic feet per day on average shall be given a written warning to reduce usage and thereafter cited.

For Stage 3, all users may be required to reduce their normal usage by a certain percentage when compared to the average normal usage over the same calendar time period from the previous two (2) years. For water utility accounts with less than two (2) years of usage history, the percentage reduction shall be compared to a City-wide median usage for similar users.

No water connections to new residences, business or industry shall be permitted during Phase 3.

All commercial large meter, commercial, and transient water users shall post the written notice, provided by the City, in a conspicuous location on the property receiving City water service within two (2) days of receiving notice of a Stage 3. For transient water users, the notice shall be posted in each rental unit.

4.6.4 Stage 4: Critical Water Status

Stage 4 addresses disaster conditions or when the City's water system has been damaged beyond immediate repair. Under Stage 4, restrictions and prohibitions for Stages 1 through 3 are intended to remain in effect (even though that is not explicitly stipulated in City code). Water use is intended to be limited to only essential needs that sustain life, health, and safety.

In Stage 4, the City shall take the following actions:

1. The City shall discontinue service through its normal distribution system;
2. Providing adequate water remains in the City reservoirs, water may be provided directly from the reservoir only to single, duplex and multiple family dwellings, other residential uses, health clinics and assisted living facilities. If this water can be dispersed through the distribution system without substantial losses, such water may be provided through the system during set hours (for example, from 6:00 to 7:00 a.m. and 7:00 to 8:00 p.m. daily) so as to extend the treated water supply for sustaining life.
3. In the event reservoirs are destroyed or damaged, the City shall purchase available water from the nearest city or water district. If the nearest city or water district is unable to supply water to the City, the City may contract for or commandeer private vehicles to transport water to the City. If the City is unable to obtain water from other sources, the City will pump raw water from the Yachats River with a boil water order until the critical water supply status has ended and the City's water system is functioning on a normal basis.

4.7 Notifications of Curtailment

The City will notify water customers of stages of curtailment. The City will notify customers using such means of communication as: the City's website, signage in conspicuous locations in town, water bills or newsletters if timely, flyers, calls or text messages, and/or personal visits. The method of notification will depend upon the stage of curtailment and event triggering curtailment.

4.8 Drought Declaration

If a declaration of a severe drought in Lincoln County is declared by the Governor per ORS 536.720, the Oregon Water Resources Commission may order political subdivisions within any drainage basin or subbasin to implement a water conservation or curtailment plan or both, approved under ORS 536.780. The conservation and curtailment elements of this WMCP meet these requirements. If the City falls within a severe drought area declared by the Governor, such as Lincoln County, the City will

consider whether curtailment measures are needed to meet system demands. Regardless of whether curtailment is needed, the City will continue to encourage customers to conserve water.

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5. Municipal Water Supply Element

This section satisfies the requirements of OAR 690-086-0170.

This rule requires descriptions of the City's current and future service area and population projections, demand projections for 10 and 20 years, and the schedule for when the City expects to fully exercise its water rights. The rule also requires comparison of the City's projected water needs and the available sources of supply, an analysis of alternative sources of water, and a description of required mitigation actions.

5.1 Delineation of Service Area

OAR 690-086-0170(1)

Within the 20-year planning period, the City does not anticipate that its service area will expand beyond its existing service area boundary. Thus, the City's future service area for the WMCP planning period is the same as its current service area, which is described in Section 2 and delineated in Exhibit 2-1.

5.2 Population Projections

OAR 690-086-0170(1)

The population projections presented in this WMCP draw directly from the City's 2021 Water System Master Plan (WSMP), excerpts of which are in Appendix C.

The Portland State University Population Research Center prepared population projections for Lincoln County in 2017. These projections estimate the population of Yachats within the UGB to increase to 1,061 in 2040, based on an average annual growth rate of 1.4 percent from 2020-2035 and 0.9 percent from 2035-2067. The City used these projected annual growth rates to project that the City's population would be 942 in 2031 (extrapolated from WSMP data) and 1,070 in 2041.

However, these projections underrepresent the population that the City experiences at points during the year, and as a result, the City developed population projections that account for seasonal occupancy and a wider range of users. The City considered the influence of seasonal occupancy on its water service population given that many of its connections are vacation homes or are utilized for tourism (e.g., hotels and vacation rentals). Water use from these connections fluctuates on a seasonal basis with increases during the summer, weekends, and holidays. To account for fluctuations in demand related to the degree of occupancy of the service population, the City assumed occupancy percentages associated with levels of demand, with the MMD reflecting 80 percent occupancy and MDD reflecting 100 percent occupancy of the total service population.

The City determined that its water demand projections needed to focus on a service population estimate at full occupancy comprised of three different types of water users: single-family, multifamily, and hotel rooms. The City estimated the number of people per connection for the three types of users comprising the service population: single-family units (1.8), multifamily units (1.8), and hotel rooms (1.2). Each user type was assumed to grow at the same rate forecasted by PSU. The City estimated the

number of multifamily units, calculated the number of hotels and the number of rooms per hotel, and assumed the number of single-family units to be the total number of connections less the total multifamily and hotel connections. **Exhibit 5-1** presents the resulting projected service population at 80 percent and 100 percent occupancy.

Exhibit 5-1. Estimated service population at MMD (80 percent) and MDD (100 percent) occupancy

Year	MMD Population	MDD Population
2020	1,753	2,191
2031	2,045	2,556
2041	2,282	2,853

5.3 Demand Forecast

OAR 690-086-0170(3)

The demand projections presented in this WMCP draw directly from the City's 2021 WSMP, excerpts of which are in Appendix C.

The City combined the projected populations described in Section 5.2 with historical water demand data to develop its water demand projections. Specifically, the City calculated the projected MMD and MDD by multiplying the projected total service population by the estimated water use rate of the service population during corresponding occupancy (100 gallons per capita per day for both the MMD and MDD occupancy scenarios) and the corresponding occupancy rate (80 percent for the MMD and 100 percent for the MDD). Given that the City's historical water production data cannot be used to determine MDDs (see Section 2.6 for MDD details), the City used a conservative municipal per capita water consumption of 100 gallons per person per day, which compared well to City data for relatively high water demand events, including historical peak week water demands during the summer, and to water plant operator observations.

The City's demand projections also include the following assumptions.

- Future occupancy rates will remain approximately equal to the existing occupancy rates.
- The ratio of residential to non-residential use (commercial, industrial and public uses) will remain constant. In other words, future commercial and industrial developments will track population growth.
- Long-term per capita water demands will not exceed the City's historical averages despite anticipated longer, warmer summers due to water conservation measures that will be implemented.

- New commercial and industrial developments will not be large water users; no provision has been made for new industries with heavy water demands, such as food processing or beverage production.
- The population projections of Section 5.2 are reasonable estimates of future municipal populations and the ratio between MDDs to ADDs will remain relatively constant during the planning period.
- Future water loss will not exceed the City's historical averages. As described in Section 2, the City's water loss in 2020 was in the range of 6 percent to 12.4 percent.

Exhibit 5-2 presents the City's MMD projections in 2031 and 2041, which are 0.31 cfs and 0.34 cfs.

Exhibit 5-3 presents the City's MDD projections in 2031 and 2041, which are 0.40 cfs and 0.44 cfs.

Exhibit 5-2. MMD Projections

Year	Population	MMD (gpm)	MMD (mgd)	MMD (cfs)
2020	2,191	117	0.16	0.25
2031	2,556	138	0.20	0.31
2041	2,853	154	0.22	0.34

Exhibit 5-3. MDD Projections

Year	Population	MDD (gpm)	MDD (mgd)	MDD (cfs)
2020	2,191	152	0.22	0.34
2031	2,556	178	0.26	0.40
2041	2,853	198	0.28	0.44

5.4 Schedule to Exercise Permits and Comparison of Projected Need to Available Sources

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

As described in Section 2, the City currently uses its Reedy Creek water right (Certificate 22933) up to its authorized rate or the extent to which the City can divert water during summer low streamflow periods. The City uses its Salmon Creek water right (Permit S-29018) to meet water demands in excess of what can be met by Reedy Creek. However, flows in Salmon Creek also decrease in summer to the point that the City has already been close to diverting the maximum possible under low streamflow conditions within the permit's authorized rate, as shown by the City's need to implement water curtailment stages in 2015 and 2017. Historically, the City has diverted up to 0.52 cfs (232 gpm) under Permit S-29018,

however, the City is no longer able to sustain that rate of diversion. In addition to reduced streamflows in recent years, water use under Permit S-29018 has not exceeded 0.52 cfs due to treatment limitations. A waterfall above the intake makes the water highly oxygenated, necessitating that this water moves through the water treatment plant more slowly for proper treatment. Water treatment plant upgrades to address this issue are currently not cost-effective due to the marginal increase in water supply during low flow months, though this may change in the future. Therefore, at this time the City is not seeking access to additional water under *extended permit* S-29018, but will continue evaluating its options for Salmon Creek to meet operational water needs year-round (especially in the peak season), to secure a year-round redundant water supply for Reedy Creek in the event that Reedy Creek is insufficient or becomes unavailable, and to provide the opportunity for the City to participate in a potential regional water supply effort. As described in the extension of time for Permit S-29018 full beneficial use of the permit is expected to occur within approximately 20 years, by 2041.

However, given that Reedy Creek and Salmon Creek have already been proven to be insufficient to meet summer MDDs (estimated to be 0.34 cfs in 2020) and the MDD in 2041 is projected to be 0.44 cfs, the City needs to plan for an additional water source to meet projected demands within the 20-year planning period of this WMCP and to provide some level of redundancy in the event that the City loses its Reedy Creek or Salmon Creek supply sources.

After analyzing an array of water supply options, the City's 2021 Water System Master Plan identified the following as the two best options: developing Permit S-53471 for use of the Yachats River at POD 1 (the upstream authorized POD), and increasing reliance on the Southwest Lincoln County Water PUD (SWLCWPUD).

As described in Section 2, conditions in Permit S-53471 and the Stipulated Agreement limit the rate that the City can divert water from the Yachats River at POD 1 to 0.5 cfs, which is enough to enable the City to meet the projected MDD in 2041 and is greater than the rate that would be present in Cape Creek during the critical summer months. Currently, the City does not have access to any water under Permit S-53471 based on a development limitation in the Final Order approving the extension of time for Permit S-53471 (dated February 23, 2005), and therefore, will need to request access to water under the permit in a WMCP and receive approval in a WMCP Final Order to be able to divert water. In this WMCP, the City is not requesting access to water under *extended permit* S-53471 due to current uncertainties about the best water supply option to pursue.

The 2021 Water System Master Plan recommends that the City enter into discussions with the SWLCWPUD to determine the costs and conditions required to purchase water on a routine basis. The City currently has an agreement with the SWLCWPUD for mutual aid of water in emergencies only, so would need to negotiate a new agreement that allows the City to use SWLCWPUD water on a routine basis. A new agreement between the two parties will likely require a significant financial contribution from the City to the SWLCWPUD in addition to normal water user fees, as well as significant funding from the City to implement major infrastructure improvements to increase the water production capacity of the SWLCWPUD's system. The 2021 Water System Master Plan recommends that the City gather information about the SWLCWPUD option and compare it to the Yachats River option to determine the best long-term water supply solution for the City.

In summary, the City is currently not requesting access to water under its water right permits as more information is needed to determine the best long-term water supply source for the City. If subsequent analyses indicate that the water from Salmon Creek under Permit S-29018 can be feasibly developed to a greater extent or water from the Yachats River under Permit S-53471 is the best option for a future water supply source, the City will request access to water under one or both of these permits in a subsequent WMCP.

That said, in accordance with the permit extension for Permit S-29018 (Final Order issued XX), the City intends to fully develop Permit S-29018 by 2041 and in accordance with the permit extension for Permit S-53471 (Final Order issued February 23, 2005), the City intends to fully develop Permit S-53471 by 2043. The City is currently meeting the conditions for use of water under Permit S-53471 listed in Permit S-53471 and the Stipulated Agreement, as described in Exhibit 2-12.

5.5 Alternative Sources

OAR 690-086-0170(5)

OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet future water demand. The City currently has no plans to expand diversion under *extended permit* S-29018 or to initiate diversion of water under *extended permit* S-53471. Therefore, this rule does not apply.

5.6 Stipulated Agreement Elements

5.6.1 Land-use Approval Process Analysis

The Stipulated Agreement requires an analysis of the land-use approval process required to develop a Yachats River point of diversion and a discussion of how and when the City intends to comply with those land-use processes.

As described in Section 2.9.3, the City can essentially only divert water from the upper point of diversion (POD 1) due to saltwater intrusion risks at the low point of diversion (POD 2). POD 1 is believed to be located on land owned by the Siuslaw National Forest. Consequently, the City would need to obtain an easement from the US Forest Service for the new intake and potentially additional easements to convey water through other private properties. The City will initiate the process to comply with those land-use processes upon approval from City Council to proceed with developing the Yachats River as a water source. Following approval, the City would contract with a consulting/engineering firm to investigate and comply with land-use processes.

5.6.2 Feasibility of Other Water Sources

The Stipulated Agreement requires that the City provide an analysis of the feasibility of other water sources and a timeline for when the City will abandon nonviable sources or seek to transfer those sources to instream water rights.

The WSMP analyzed the feasibility of other water sources. The following summarizes this analysis.

- (North) Cape Creek: The City has a certificated water right for this water source, but Cape Creek

has not been utilized for many years and no infrastructure currently exists. As described in Section 2.9.3, summer streamflows in Cape Creek are low, affecting the reliability of this water service. Consequently, flows are anticipated to be too low in summer to justify infrastructure investment in this water source at least over the next 20 years. If after 20 years the City has found sufficiently reliable water sources to meet its long-term water needs and concludes this source to be nonviable, the City will consider transferring this water right instream.

- Raw Water Storage Reservoir: A raw water storage reservoir could be constructed to store water during the winter months for use during the summer months. However, a relatively large impoundment would need to be constructed, which would require constructing a dam, a challenging task in the current regulatory climate. In addition, a dam construction project would need to include mitigation for all wetland impacts and impacts to aquatic species habitat, which would likely be prohibitively expensive. Other issues include finding the site with suitable topography and subsurface conditions, purchasing the land, and likely needing expensive filters added to the water treatment plant to address taste and odor problems related to anticipated algae or other plant growth in the stagnant water of the impoundment. Another option is to use the piece of City-owned land near the water treatment plant for a storage pond that would serve as a supplemental source to meet demands for short duration (1-2 weeks) during critical low flow periods. While this could provide supply to meet peak demands for short periods, it does not provide the City with a supply that could help meet demands throughout the summer and water treatment plant improvements would be needed to address taste and odor issues that would likely exist.

- Obtaining Existing Water Rights: The City could identify the water rights held on the Yachats River or tributaries that could help meet its water supply needs and approach holders of those water rights to discuss a potential purchase. The City could potentially purchase an entire piece of property to obtain the water rights appurtenant to the property, as well. This approach requires research and willing sellers of water rights or properties with water rights, and could provide extra supply, but likely less than the 0.5 cfs that the City can obtain by exercising its water right on the Yachats River. An intake on the Yachats River would be needed to support this approach.

- Regional Water System: The water distribution systems from the City of Newport to the City of Yachats are almost entirely interconnected, except for a missing section at the bridge crossing the Alsea River along Highway 101. If that connection occurs, water providers on the Mid-Coast could potentially develop a strategy for using their collective water rights to provide a net benefit. However, at the same time many of the Mid-Coast water providers have individual water supply challenges that complicate a regional approach to satisfying water demand. The City of Yachats has been participating in the Mid-Coast Water Planning Partnership to explore possibilities for a regional approach to meeting projected water demands and to develop stronger relationships with other water providers.

- Increase Reliance on SWLCWPUD: As described in 5.4, the City could consider changing its agreement with SWLCWPUD to become a customer instead of an emergency user in the future, which would require an assessment of source supply, successful negotiation, and infrastructure upgrades.

- Desalination: A desalination plant has the ability to remove salt from seawater to provide municipal drinking water. No desalination plants currently exist in Oregon and desalination is not considered a cost-effective option during the current planning period, but it could be a water supply option in the future.

5.7 Quantification of Maximum Rate and Monthly Volume

OAR 690-086-0170(6)

OAR 690-086-0170(6) requires a quantification of the maximum rate of withdrawal and maximum monthly use if any expansion or initial diversion of water allocated under an existing permit is necessary to meet demands in the 20-year planning horizon. The City currently has no plans to expand diversion under *extended permit* S-29018 or to initiate diversion of water under *extended permit* S-53471. Therefore, this rule does not apply.

5.8 Mitigation Actions under State and Federal Law

OAR 690-086-0170(7)

Under OAR 690-086-0170(7), if mitigation is required for expansion or initial diversion of water under an existing permit, the water supplier is to describe mitigation actions it is taking to comply with legal requirements of the Endangered Species Act, Clean Water Act, and other applicable state or federal environmental regulation. The City currently has no plans to expand diversion under *extended permit* S-29018 or to initiate diversion of water under *extended permit* S-53471. Therefore, this rule does not apply.

5.9 New Water Rights

OAR 690-086-0170(8)

Under OAR 690-086-0170(8), an analysis of alternative sources of additional water is required if acquisition of new water rights will be necessary within the next 20 years to meet the projected water demands. The City's water rights are anticipated to be sufficient to meet projected water demands over the next 20 years, as described in Section 5.4. Consequently, this rule does not apply.

Appendix A

Letters to Affected Local Governments and Comments

GSI Water Solutions, Inc.

September 14, 2021

Onno Husing, Director
Lincoln County
Department of Planning & Development
210 SW 2nd Street
Newport, OR 97365
ohusing@co.lincoln.or.us

Subject: Water Management and Conservation Plan for the City of Yachats

Dear Mr. Husing:

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

Under these rules, the water supplier shall make its draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. Attached you will find a copy of the City of Yachats's draft WMCP for your review.

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

If you have any questions, please feel free to contact me at 541-224-4588. Thank you for your interest.

Sincerely,
GSI Water Solutions Inc.

Suzanne de Szoeke, Water Resources Consultant

Enclosure

GSI Water Solutions, Inc.

September 14, 2021

Katherine Guenther, City Planner
City of Yachats
501 Hwy 101 N
P.O. Box 345
Yachats, OR 97498
planner@yachatsmail.org

Subject: Water Management and Conservation Plan for the City of Yachats

Dear Katherine Guenther:

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

Under these rules, the water supplier shall make its draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. Attached you will find a copy of the City of Yachats's draft WMCP for your review.

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

If you have any questions, please feel free to contact me at 541-224-4588. Thank you for your interest.

Sincerely,
GSI Water Solutions Inc.

Suzanne de Szoeke, Water Resources Consultant

Enclosure

GSI Water Solutions, Inc.

September 14, 2021

Southwest Lincoln County Water People's Utility District
P.O. Box 368
Waldport, OR 97394-0368
swlcwpud@swlcwpud.org

Subject: Water Management and Conservation Plan for the City of Yachats

Dear Southwest Lincoln County Water People's Utility District:

The City of Yachats has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department. Under these rules, the water supplier shall make its Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans.

As a courtesy, the City of Yachats is providing you with a copy of the Draft WMCP via email. If you have any questions, please feel free to contact me at 541-224-4588 or sdeszoeke@gsiws.com.

Sincerely,
GSI Water Solutions Inc.

Suzanne de Szoeke
Water Resources Consultant

Enclosure

Appendix B

Stipulated Final Order and Agreement on Reconsideration (Stipulated Agreement)

STIPULATED FINAL ORDER AND AGREEMENT ON RECONSIDERATION

STATE OF OREGON

WATER RESOURCES DEPARTMENT

Oregon Department of Water Resources Permit

In the matter of the Special Order, Volume 50, Page 578-579 Approving an Additional Point of Diversion for City of Yachats, Transfer 7589 Modification of Permit 51190

Background

On July 8, 1996, pursuant to ORS 537.211(4), the City of Yachats (City) submitted an application to add a point of diversion to the water right authorized by permit 51190 (T-7589). The additional point of diversion is proposed downstream from the original, in the Yachats River estuary. The Department received comments opposing the application to add a point of diversion from the Yachats Area Watershed Restoration Advisory Council, WaterWatch and others on or before September 12, 1996.

On September 12, 1996, the Department granted the City's request (Special Order Vol. 50, page 578). On November 8, 1996, WaterWatch of Oregon; T.B. Dame and Paul Engelmeyer; Yachats Area Watershed Restoration Advisory Council (Council); Dike Dame; Ron Taves; Hans Radtke; Andrea Scharf; Paul Engelmeyer; and James Adler (collectively, "the Petitioners") petitioned the Department to reconsider it's approval of the permit amendment, on several grounds.

On April 4, 1997, the Department issued an "Order of Reconsideration" and listed the two matters on which the Department sought additional evidence and argument before entering a final order. A second "Order on Reconsideration" reciting the basis for the grant of reconsideration and referring the matter to contested case hearing, was issued on October 10, 1997. An order setting contested case hearing was issued on January 28, 1998, by Administrative Law Judge Weisha Mize.

The Petitioners contest the City's proposed action, maintaining, inter alia, that the Water Resources Department has no authority to issue an order adding a point of diversion, that an additional point of diversion will result in injury to existing instream water rights, that approval of the City's proposed action allows violation of permit conditions which include compliance with land use laws and that the approval of the City's proposed action sets bad polity because it allows for expansion of a permit and perpetuates wasteful use of water. The City contends inter alia, that the proposed diversions are lawful and necessary to maintain a reliable water supply for the current and future residents of Yachats.

Agreed Terms and Conditions

The City, the Petitioners and the Department now agree that the issues in this case may be settled on the following terms and conditions and hereby stipulate as follows:

1. Entry of this stipulate final order by the Administrative Law Judge.

2. Issuance of an order approving the City's permit amendment application (T-7589), a draft of which is attached an incorporated herein by reference. The attached order shall supersede the Special Order at Volume 50, Page 578 – 579.

3. Issuance of a permit superceding permit 51190, a draft of which is attached and incorporated herein by reference.

4. The parties waive the right to file exceptions to this order and the right to judicial review of this order and agreement, and permit conditions arising from this order and agreement.

5. The City shall install and maintain a permanent recording measuring device on the Yachats River, the design and location of which will be specified in consultation with the Water Resources Department (WRD) and the Department of Fish and Wildlife (ODFW). The device shall be installed prior to any diversions or use of water under this permit, placed so as to accurately measure steam flows needed to meet instream water rights Cert. 59739, Cert 59608 and Cert. 73161, and be accessible to WRD and ODFW staff at all times. Maintenance of the measuring device and associated rating curve shall substantially comply with the applicable provisions of OAR 690-085-015(4) (methods for measuring open channels) so an estimate of flow can be made at any time. Flow shall be determined prior to and during diversions under this permit, and the City shall maintain a record of flow measurements and observations.

6. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director at each point of diversion. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the volume and instantaneous rate of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located with a private structure, the watermaster shall request access upon reasonable notice.

7. When streamflow on the Yachats River, measured at the device described in #5 above, exceeds senior and junior instream rights (Cert. 59739, Cert. 59608, Cert. 73161) the City may exercise this permit (both points of diversion and the full 2.0 cfs) without restriction beyond the existing terms of the permit as amended. The minimum streamflows are set out in the following table:

MONTH	DAYS	59739	59608	73161
Jan		65.00	65.00	132.00
Feb		65.00	65.00	132.00
Mar		65.00	65.00	132.00
Apr		65.00	65.00	132.00
May		40.00	40.00	63.00

June	1 – 15	30.00	30.00	63.00
June	16 – 30	30.00	30.00	42.00
July	1 – 15	20.00	20.00	40.20
July	16 – 31	15.00	20.00	40.20
Aug		15.00	15.00	25.60
Sep		15.00	15.00	24.90
Oct	1 – 15	15.00	25.00	49.10
Oct	16 – 31	50.00	50.00	49.10
Nov		70.00	70.00	132.00
Dec		70.00	70.00	132.00

8. When streamflows measured at the device described in #5 above drop below the flows identified in the junior instream water rights (Cert. 59739 or Cert. 69608), use of the Yachats River under this permit may be made only in emergencies or when population growth exceeds other sources of supply. Future use due to population growth exceeding supply shall be limited by the City's compliance with it's approved water management and conservation plan.

a) For purposes of this settlement agreement, "emergencies" are limited to: sustained drought, accompanied by the institution of curtailment measures described in the City's water management plan that include curtailment triggers linked to steamflows; supply line breakage; firefighting; outdoor events within the City's service area which place an abnormally high demand on water supply (e.g. Cycle Oregon, outdoor festivals); catastrophic loss of use of primary water supply sources; and threats to public health, not attributable to inefficiency or chronic conditions, as may be approved jointly by ODFW and WRD.

b) For purposes of this settlement agreement, population growth will be deemed to have "exceeded other sources of supply" only if the City: (1) is in compliance with its approved water management plan which includes the elements specified in #9 of the Stipulated Final Order and Agreement on Reconsideration, and (2) (a) prior to 15 years from the date of this agreement or 10 years from the date of approval of the management plan, whichever comes first, is either meeting the plan schedule or has reached the goal of 85% water use efficiency, yet remains unable to meet the requirements of the city's resident population using other developed sources; or (b) after 15 years from the date of this agreement or 10 years from the date of approval of the management plan, whichever comes first has reached or exceeded 85% water use efficiency, yet remains unable to meet the requirements of the City's resident population using other developed sources.

9. The City will amend and resubmit it's draft water management plan, currently under department review. The parties agree that submission of the amended plan triggers the review and appeal provisions of OAR 690 Division 86. The amended plan shall include the following:

a) goal of 85% water use efficiency and a plan and time table for meeting that goal by fifteen years from the date of this agreement or ten years from plan approval, whichever comes first;

b) demand projections based on the 85% efficiency level and demand figures based upon the best practicable estimate of population and occupancy figures and seasonal average water use;

c) a schedule for water audits;

d) a commitment to continue to cooperate in efforts to develop a regional water supply;

e) an analysis of the land use approval processes which will be required to develop the two points of diversion on the Yachats River described herein, and a discussion of how and when the City intends to comply with those land use processes;

f) an analysis of the feasability of other water sources and a timeline for when the City will abandon nonviable sources or seek to transfer those sources to instream rights;

g) a curtailment plan which includes triggers for curtailment that are based upon streamflows; and

h) all elements necessary to meet the requirements of the WRD Division 86 rules.

WRD agrees to process the amended plan in a timely manner.

10. Addition of the lower diversion point shall be a permanent change.
11. In the event streamflows measured at the device described in #5 are insufficient to satisfy the junior instream water rights (Cert. 73161) or the senior instream water rights (Cert. 59739 and Cert. 69608), and the Yachats River is utilized under this permit, diversions shall not exceed 1 cfs, and those diversions shall be made at a rate not to exceed 0.50 cfs at the upper point of diversion and 0.50 cfs at the lower point of diversion.
12. The City agrees to relinquish its rights to divert 3 cfs from Marks Creek under permit 35219. The City agrees to file an affidavit of cancellation with the Department certifying that the City is the owner of the permit and that the permit has been abandoned by the owner and that the owner desires cancellation of the permit. The City shall not divert of use water under this permit until the Marks Creek Permit 35219 has been canceled.
13. The Protestants agree not to protest or appeal Department action on the City's new permit amendment to change the upper point of diversion from 14S 11W 31 1740'S 2550'E FRM NW COR (application T-7967), and agree not to protest or appeal Department action on the City's next request for an extension on this permit that is filed specifically to extend the October 1, 1998, expiration date.
14. The terms of this agreement will be incorporated into the City's water management plan and to the extent possible, into the attached draft order approving the July, 1996, permit amendment request (T-7589). Permit 51190 shall be superceded by the attached draft permit and shall include the conditions contained in the final order approving the City's July 8, 1996, permit amendment request.
15. The Department, the City, and the petitioners agree on all aspects of this agreement and the attached draft order.
16. This agreement may be executed in counterparts.

_____ _____

On Behalf of WaterWatch of Oregon Date

_____ _____

On Behalf of Yachats Area Date

Watershed Advisory Council

_____ _____

T. B. ("Dike") Dame Date

_____ _____

Ron Taves Date

_____ _____

Hans Radtke Date

_____ _____

Andrea Scharf Date

_____ _____

Paul Engelmeyer Date

_____ _____

James Adler Date

_____ _____

On Behalf of the City of Yachats Date

_____ _____

On Behalf of Oregon Water Resources Date

Department

Stipulated Final Order

Pursuant to the Agreement described above, the City's application to add a point of diversion under Permit 51190 is approved. An order, consistent with the attached draft order, shall be issued bearing the modifications to the order recorded in Special Order Volume 50, Page 578-579. The previous order approving this permit amendment is of no further force or effect.

_____ _____

Date Weisha Mize

Administrative Law Judge

Water Resources Department

STATE OF OREGON

COUNTY OF LINCOLN

ORDER APPROVING AN ADDITIONAL POINT OF DIVERSION

Pursuant to ORS 537.211, after notice given, reviewing objections, and resolving a petition for reconsideration, this order approves, as conditioned or limited herein, TRANSFER 7589 and modifies Permit 51190 in the name of CITY OF YACHATS P.O. BOX 345, YACHATS, OREGON 97498. This order is issued to modify the previous order approving T-7589 (Special Order Volume 50, Page 578- 579) and by reference incorporates the Stipulated Final Order and Agreement on Reconsideration issued August XX, 1998, by Administrative Law Judge Weisha Mize.

The permit to be modified, Permit 51190, has a priority date of March 20, 1989. The permit allows the use of the YACHATS RIVER, a tributary of the PACIFIC OCEAN, for MUNICIPAN USE. The amount of water to which this permit is entitled is limited to an amount actually beneficially used and shall not exceed 2.0 cubic feet per second, of which 1.0 cfs is not subject to instream water right Certificate 59708 minimum stream flows with a date of priority of March 26, 1974, if available at the authorized point of diversion: NE ¼ SW ¼, SECTION 31, T 14 S, R 11 W, WM; 1740 FEET SOUTH AND 2550 FEET EAST FROM THE NW CORNER OF THE SW ¼ NW ¼, SECTION 31, or its equivalent in case of rotation, measured at the point of diversion from the source.

The use shall conform to any reasonable rotation system ordered by the proper state officer.

The authorized place of use is as follows:

NE ¼ SE ¼ W ½ W ½

S ½ SE ¼ SE ¼ SW ¼

SECTION 22 SECTION 26

SW ¼ SW ¼ NE ¼

SECTION 23 N ½ SE ¼

SE ¼ SE ¼

SECTION 27

NE ¼

SECTION 34

TOWNSHIP 14 SOUTH, RANGE 12 WEST, W.M.

The right to use the water for the above purpose is restricted to beneficial use on the lands or place of use described.

The applicant proposes to add an additional point of diversion to:

NW ¼ SE ¼, SECTION 26, T 14 S r 12 W, MW; 295 FEET NORTH AND 420FEET EAST FROM THE NW CORNER OF THE SW ¼ SE ¼

SECTION 26

THIS CHANGE TO AN EXISTING WATER PERMIT MAY BE MADE PROVIDED THE FOLLOWING CONDITIONS ARE MET BY THE PERMIT HOLDER:

1. The quantity of water diverted at the new point of diversion, together with that diverted at the old point of diversion, shall not exceed the quantity of water lawfully available at the original point of diversion and is further limited as described below.
2. The City shall install and maintain a permanent recording measuring device on the Yachats River, the design and location of which will be specified in consultation with the Water Resources Department (WRD) and the Department of Fish and Wildlife (ODFW). The device shall be installed prior to any diversions or use of water under this permit, placed so as to accurately measure stream flows needed to meet instream water rights Cert. 59739, Cert 59608 and Cert. 73161, and be accessible to WRD and ODFW staff at all times. Maintenance of the measuring device and associated rating curve shall substantially comply with the applicable provisions of OAR 690-085-015 (4) (methods for measuring open channels) so an estimate of flow can be made at any time. Flow shall be determined prior to and during diversions under this permit, and the City shall maintain a record of flow measurements and observations.
3. Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director at each point of diversion. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the volume and instantaneous rate of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

1. When streamflow on the Yachats River, measured at the device described in #2 above, exceeds senior and junior instream rights (Cert. 59739, Cert. 59608 and Cert. 73161) the City may exercise this permit (both [points of diversion and the full 2.0 cfs) without restriction beyond the existing terms of the permit as amended.
2. When streamflows measured at the device described above drop below the flows identified in the junior instream water right (Cert. 73161) or senior instream water rights (Cert. 59739 or Cert. 69608), use of the Yachats River under this permit may be made only in emergencies or when population growth exceeds other sources of supply. Future use due to population growth exceeding supply shall be limited by the City's compliance with its approved water management and conservation plan.
3. "Emergencies" are limited to sustained drought, accompanied by the institution of curtailment measures described in the City's water management plan that include curtailment triggers linked to streamflows; supply line breakage; firefighting; outdoor events within the City's service area which place an abnormally high demand on water supply (e.g. Cycle Oregon, outdoor festivals); catastrophic loss of use of primary water supply sources; and threats to public health, not attributable to inefficiency or chronic conditions as may be approved jointly by ODFW and WRD.

Population growth will be deemed to have "exceeded other sources of supply" only if the City : (1) is in compliance with its approved water management plan which includes the elements specified in the Stipulated Final Order and Agreement on Reconsideration (T-7589), and (2) (a) prior to 15 years from the date of approval of the management plan, whichever comes first, is either meeting the plan schedule

or has reached the goal of 85% water use efficiency, yet remains unable to meet the requirements of the City's resident population using other developed sources; or (b) after 15 years from the date of this agreement or 10 years from the date of approval of the management plan, whichever comes first has reached or exceeded 85% water use efficiency, yet remains unable to meet the requirements of the City's resident population using other developed sources.

4. Addition of the lower diversion point shall be a permanent change.
5. In the event streamflows measured at the device described in #2 above are insufficient to satisfy the junior instream water right (Cert. 73161) or the senior instream water rights (Cert. 59739 and Cert. 69608), and the Yachats River is utilized under this permit, diversions shall not exceed 1cfs, and those diversions shall be made at a rate not to exceed 0.50 cfs at the upper point of diversion and 0.50 cfs at the lower point of diversion.
6. Water may not be diverted at any point of diversion authorized under this permit until all applicable conditions of the permit have been met, including compliance with state-wide land-use goals and any local acknowledged land-use plans.
7. Water shall be acquired from the same surface water source as the original point of diversion.
8.
9. All other terms and conditions of the permit shall remain the same.

Permit 51190, in the name of the City of Yachats, is amended as described herein and a superceding permit, consistent with the attached draft permit shall be issued. Permit 51190 is of no further force or effect.

WITNESS the signature of the Water Resources Director, affixed _____.

Martha O. Pagel, Director

STATE OF OREGON

COUNTY OF LINCOLN

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF YACHATS

PO BOX 345

YACHATS, OREGON 97498

To use the waters of YACHATS RIVER, a tributary of PACIFIC OCEAN, for MUNICIPAL USE.

This permit is issued approving Application 69856. The date of priority is March 20, 1989. The use is limited to not more than 2.0 CUBIC FOOT PER SECOND (CFS), OF WHICH 1.0 CFS IS NOT SUBJECT TO INSTREAM WATER RIGHT Certificate 59608 OR MINIMUM STREAM FLOWS WITH A DATE OF PRIORITY OF MARCH 26, 1974, or its equivalent in cases of rotation, measured at the point of diversion from the source. The use of water under this permit is further limited as described below.

The points of diversion are located as follows:

POD 1 – NE ¼, SW ¼, SECTION 31, T14S, R11W, WM; 1740 FEET SOUTH AND 2550 FEET EAST FROM THE NW CORNER OF THE SW ¼ NW ¼, SECTION 31. POD 2 – NW ¼ SE ¼, SECTION 26, T14S, R12W, WM; 295 FEET NORTH AND 420 FEET EAST FROM THE NW CORNER OF THE SW ¼ SE ¼, SECTION 26.

Within 1 year from the date this permit is issued, the permittee shall submit a revised water management and conservation plan consistent with the Agreement and Stipulated Final Order on Reconsideration issued on September 3, 1998, and OAR Chapter 690, Division 86.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the proposed place of use under this permit is as follows:

- NE ¼ SE ¼
- S ½ SE ¼
- SECTION 22
- SW ¼ SW ¼
- SECTION 23
- W ½ W ½
- SE ¼ SW ¼
- SECTION 26
- NE ¼
- N ½ SE ¼
- SE ¼ SE ¼
- SECTION 27
- NE ¼
- SECTION 34
- TOWNSHIP 14 SOUTH, RANGE 12 WEST W.M.

The City shall install and maintain a permanent recording measuring device on the Yachats River, the design and location of which will be specified in consultation with the Water Resources Department (WRD) and the Department of Fish and Wildlife (ODFW). The device shall be installed prior to any diversions or use of water under this permit, placed so as to accurately measure stream flows needed to meet instream water rights Cert. 599739, Cert 59608 and Cert. 73161, and be accessible to WRD and ODFW staff at all times. Maintenance of the measuring device and associated rating curve shall substantially comply with the applicable provisions of OAR 690-085-015 (4) (methods for measuring open channels) so an estimate of flow can be made at any time. Flow shall be determined prior to and during diversions under this permit, and the City shall maintain a record of flow measurements and observations.

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director at each point of diversion. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the volume and instantaneous rate of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.
B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

When streamflow on the Yachats River, measured at the device described above, exceeds senior and junior instream rights (Cert. 59739, Cert. 59708, and Cert. 73161) the City may exercise this permit (both points of diversion and the full 2.0 cfs) without restriction beyond the existing terms of the permit.

When streamflows measured at the device described above drop below the flows identified in the junior instream water rights (Cert. 73161) or senior instream water rights (Cert. 59739 or Cert. 69608), use of the Yachats River under this permit may be made only in emergencies or when population growth exceeds other sources of supply. Future use due to population growth exceeding supply shall be limited by the city's compliance with its approved water management and conservation plan.

"Emergencies" are limited to: sustained drought, accompanied by the institution of curtailment measures described in the City's water management plan that include curtailment triggers linked to streamflows; supply line breakage; firefighting; outdoor events held within the City's service area which place an abnormally high demand on water supply (e.g. Cycle Oregon, outdoor festivals); catastrophic loss of use of primary water supply sources; and threats to public health, not attributable to inefficiency or chronic conditions, as may be approved jointly by ODFW and WRD.

Population growth will be deemed to have "exceeded other sources of supply" only if the City: (1) is in compliance with its approved water management plan which includes the elements specified in The Stipulated Final Order and Agreement on Reconsideration (T-7589), and (2) (a) prior to 15 years from the date of this agreement or 10 years from the date of approval of the management plan, whichever comes first, is either meeting theplan schedule or has reached the foal of 85% water use efficiency, yet remains unable to meet the requirements of the City's resident population using other developed sources; or (b) after 15 years from the date of this agreement or 10 years from the date of approval of the management plan, whichever comes first has reached or exceeded 85% water use efficiency, yet remains unable to meet the requirements of the City's resident population using other developed sources.

In the event streamflows measured at the device described above are insufficient to satisfy the junior instream water right (Cert. 73161) or the senior instream water rights (Cert. 59739 and Cert. 69608), and the Yachats River is utilized under this permit, diversions shall not exceed 1 cfs and those diversions shall be made at a rate not to exceed 0.50 cfs at the upper ponit of diversion (POD 1) and 0.50 cfs at the lower point of diversion (POD 2).

Addition of the lower diversion point (POD 2) shall be a permanent change.

Water may not be diverted at any point of diversion authorized under this permit until all applicable conditions of the permit have been met, including compliance with state-wide land-use goals and any local acknowledged land-use plans.

Actual construction shall begin on or before November 19, 1991, and shall be completed on or before October 1, 1998. Complete application of the water to the use shall be made on or before October 1, 1998 (See Special Order Volume 46, page 534 and Special Order Volume 49, page 208).

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

The use of water allowed herein may be made only at times when sufficient water is available to satisfy all prior rights, including rights for maintaining instream flows.

This permit is issued to supercede permit 51190. Permit 51190 is superceded in order to incorporate the relevant portions of the Stipulated Final Order and Agreement on Reconsideration issued on September 3,

1998, by Administrative Law Judge Weisha Mize and to incorporate the conditions contained in the Order Approving An Additional Point of Diversion recorded in Special Order Volume 52, pages 767 – 771. Permit 51190 is superceded by this instrument and is of no further force or effect.

Issued September 15, 1998

Martha O. Pagel, Director

Water Resources Department

Appendix C

City of Yachats Water System Master Plan (2021) Excerpts

- *Average Day Demand (ADD)* – The total volume of water that enters the system over a period of one year, divided by 365 days.
- *Maximum Month Demand (MMD)* – The largest total volume of water that enters the system in a one-month period, divided by 30 days.
- *Peak Day Demand (PDD)* – The largest total volume of water that enters the system in a 24-hour period. PDD is commonly used to size water treatment plants, large diameter transmission mains and factors into the sizing of reservoirs.

5.3 POPULATION

Population projections serve as the basis for future wastewater flow and load projections. Much of the challenge in projecting system growth relates to the difficulty in accurately tracking or projecting actual populations. This is especially challenging in Yachats. As a tourist destination, The population in Yachats fluctuates on a seasonal basis and on a weekly basis. The population generally increases during the summer season with peaks occurring during weekends and holidays. As noted in the following subsection, the current population of Yachats is estimated to be about 760 residents. During peak holidays, the population is believed to greater than 2,000 residents. This fluctuation is significantly greater than a typical City. Therefore, traditional population estimates are of limited use and other means must be developed to track the service population in Yachats.

The population of Yachats consists of permanent residents, part time residents, and tourists. Permanent residents generally own homes in the City and reside in the City on a full-time basis. Part time residents own homes, but the homes are not occupied on a full-time basis. Tourists visit the City for short periods of time and occupy hotel rooms and vacation rentals.

5.3.1 Historical and Future Population

Historical population histories provide a tool for determining the future growth rate of the municipal water system in Yachats and were considered for this report. The population in Yachats's City Limits has steadily increased from approximately 441 people in 1970 to an estimated population of 760 in the year 2020. This trend is expected to continue during the planning period.

In June of 2017, population projections for Lincoln County were prepared by the Portland State University Population Research Center. These projections estimate the population of Yachats within the UGB to increase from 773 in 2017 to 1,061 in 2040. These projections are based on an average annual growth rate of 1.4% from 2020-2035 and 0.9% from 2035-2067. These projections will be used for planning purposes in order to conform to state-wide planning goals. As noted elsewhere in this document, the study period ends in 2041. Therefore, the 2040 population was extrapolated for one additional year for the preparation of this document. Adding an additional year of growth at a rate of 0.9% to the 2040 population of 1,061 results in a 2041 population of 1,070.

Table 5-1| Historical and Projected Municipal Population

Year	Municipal Population
1970	441
1980	482
1990	533
2000	617
2010	690
2017	773
2020	797
2030	929
2040	1,061
2041	1,070

1- Data for 1970-2010 referenced from US Census data.
2- Underlined values for 2017-2040 referenced from PSU Population Research Center, Coordinated Population Forecast, 2017.

5.3.2 Seasonal Occupancy of Service Population

The City's water system demand is substantially influenced by the seasonal occupancy of the service population. Many connections served by the City are vacation homes or are utilized for tourism, such as hotels and vacation rentals of single or multifamily residences. As such, the service population fluctuates on a seasonal basis with more users during the summer months, weekends and holidays.

As previously described, peak water demand varies on an annual, monthly and daily basis. For Yachats, these demand variations are assumed to directly depend on the amount of occupancy of the service population. It is assumed that average day demand (i.e., ADD) corresponds with 70% occupancy. It is assumed that maximum month demand (i.e., MMD) corresponds with 80% occupancy. It is assumed that peak day demand (i.e., PDD) corresponds with 100% occupancy.

Table 5-2| Occupancy of Service Population by Demand Variation

Demand Variation	Occupancy of Total Service Population
Average Day Demand (ADD)	70%
Maximum Month Demand (MMD)	80%
Peak Day Demand (PDD)	100%

5.3.3 Current and Future Service Population

Water demand projections in this document are based on estimating the service population that is comprised of three different types of users. Users are categorized either as single family units, multifamily units, or hotel rooms. It is assumed that the relative amount of each of these types of users will stay constant throughout the planning period.

Therefore, each user type is assumed to grow at the same rate forecasted by PSU. Table 5-3 indicates the assumptions used to estimate the service population at full occupancy of each user type.

Table 5-3| Full Occupancy Rates by User Type

User Type	People per Connection
Single Family	1.8
Multifamily	1.8
Hotel Room	1.2

The total number of connections to the City's water system were determined from City records. The number of multifamily units was estimated. The number of hotels and their amount of rooms was determined. It is assumed that the number of single-family units is the number of total connections less the total of multifamily and hotel connections.

The current and future total service population is estimated in Table 5-4.

Table 5-4| Estimated Current and Future Users at Full Occupancy

	Units by User Type			Population by User Type			
Year	Single Family Units	Multifamily Units	Hotel Rooms	Single Family Population	Multifamily Population	Hotel Population	Total Service Population
2020	940	70	311	1,692	126	373	2,191
2025	1,008	75	334	1,815	135	400	2,350
2030	1,081	81	358	1,946	145	429	2,520
2035	1,160	86	384	2,087	155	460	2,703
2040	1,213	90	401	2,183	163	482	2,828
2041	1,224	91	405	2,203	164	486	2,853

5.4 HISTORICAL WATER DEMAND

City records of historical water production were evaluated to determine water demand, usage rates and demand fluctuations. Records from January 2017 through September 2020 were used as a basis to establish historical water demands. The information from this section combined with the population data & projections forms the basis for estimating future water demands as presented in Section 5.5.

5.4.1 Water Production Records

The City's water production is tracked using the flow meter at the water treatment plant. Figure 5-1 graphically illustrates the trends and variation in historical water production during different periods of the year. As would be expected, water production increases during the summer to meet increased demand, and decreases during the winter months.

During the peak summer months, the City produces water almost on a daily basis. However, during fall, winter, and spring months, the City will make water every other day or every third day as needed to replenish the water in the

main storage tank. This decreases the overall workload for City staff, but the daily water production curve is significantly obscured by this practice, as depicted in Figure 5-1. The water treatment plant is operated manually based on water levels in the main storage reservoir. City staff monitor the water level in the main reservoir and manually start the water plant to fill the tank.

For this study, the average daily demand (ADD), the maximum monthly demand (MMD), and the peak day demand (PDD) were determined for planning purposes. Water demand varies across seasonal periods, days of the week, and hours of the day. The establishment of an average day demand rate serves as the baseline against which other more intensified demands are measured. Maximum monthly demand rates are useful for determining seasonal demand variations. Peak day demand values are conventionally utilized to size treatment plant capacity and factor into the sizing of reservoirs. Peak day demand is typically the most critical water demand scenario and is usually the standard by which system adequacy is measured.

As shown in Figure 5-1, water production is generally intermittent, with days of no water production followed by days of higher water production. The water production data can be analyzed on an annual or monthly basis to estimate demand variations, but the data cannot be used to determine peak day demands, because there are many days where the plant is operated for long periods of time to make water for more than one day. As such, the peak day demands shown below were estimated based on an assumed water use rate of the service population during full occupancy (100 gallons per capita per day). Municipal water consumption typically averages about 100 gallons per person per day. This value is regularly observed in many municipal water systems in the region. This estimate compared well to data and information provided by the City on relatively high-water demand events, including historical peak week water demands during the summer and water plant operator observations. During the years 2017 through 2020, the City consistently produced the most amount of water per week during the 27th week of the year. This is the week of July 4^{th,} which is historically a busy time for seasonal occupancy.

The current average day and maximum month demands are listed in Table 5-6. The last column in Table 5-6 lists the existing demand per connection in the system. These values are slightly lower in Yachats than for most municipal systems. As previously described, municipal water consumption typically averages about 100 gallons per person per day. Typical household sizes or the number of people per connection typically ranges between 2.2 and 2.8. As such, average water demands per connection should be between 200 and 300 gallons per day. In Yachats, this value is 137 gallons per day (Table 5-6). This discrepancy is likely due to the fact that there are many homes in Yachats that are not occupied on a full-time basis. This is common for coastal communities where second homes are common and many residents are older with smaller family sizes. These historical use rates inform water use rates used for projecting demand. For the purposes of projecting demand variations in this report, per capita use rates were assumed as indicated in the following table.

Table 5-5| Per Capita Water Use Rates for Demand Projections

Demand Variation	Water Use Rate (gallons per capita per day)
Average Day Demand (ADD)	90
Maximum Month Demand (MMD)	100
Peak Day Demand (PDD)	100

The authors of this report are currently working on a planning document for the City's wastewater utility. The wastewater data shows that the average occupancy rate in Yachats is about 70%. The average daily demand of 170 gallons per connection per day roughly corresponds to this same occupancy rate.

Figure 5-1| Historical Water Production

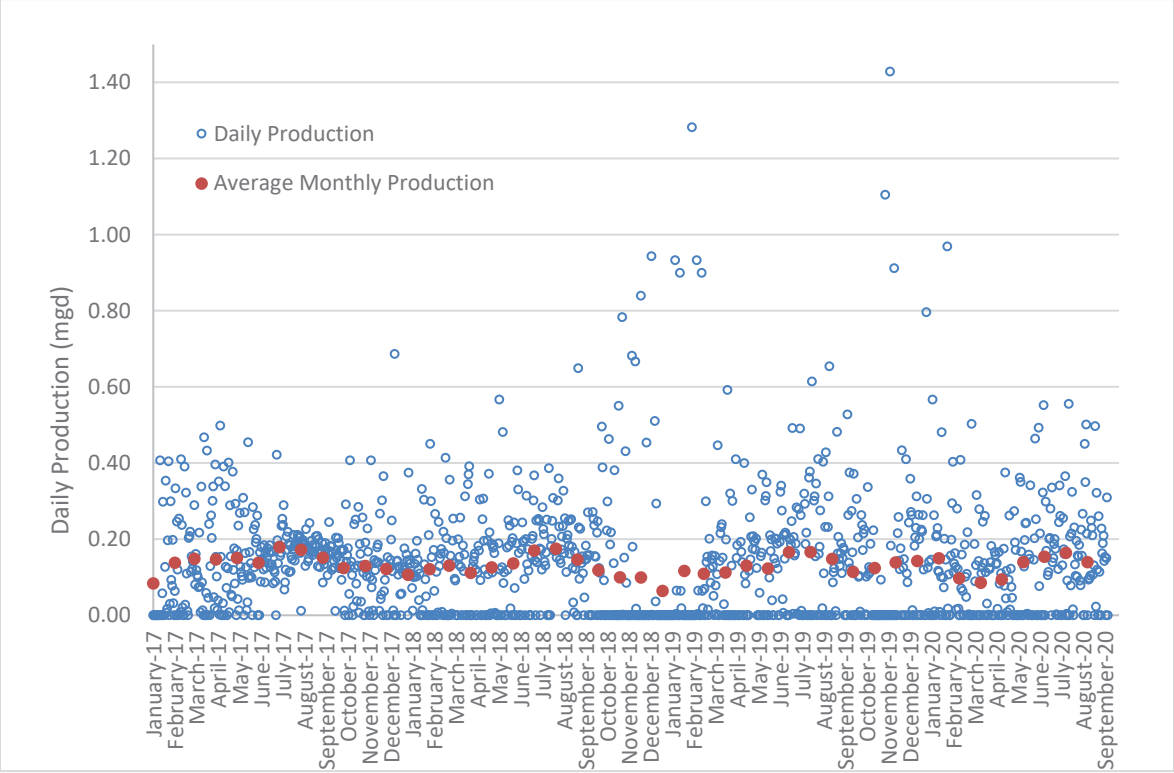


Table 5-6| Existing Water System Demands

Demand	Gallons Per Day	Gallons Per Connection Per Day[1]
Average Day	132,000	137
Maximum Month	169,000	177
Peak Week	192,000	200
Peak Day	220,000[2]	228

1 Based on 959 connections
2 Estimated to be 100 gallons per capita per day for the service population at 100% occupancy, 2,191 people (see Table 5-4).

5.4.2 Water Loss

Water loss or unaccounted-for water is comprised of the difference between the finished water produced at the treatment plant and the water consumed, and consists of all unmetered uses and system leakage. It is important to differentiate these two categories of water loss.

Unmetered use is commonly the result of incomplete or inaccurate metering of consumer demand, including the following typical categories.

- Unmetered or unauthorized connections
- Inaccurate or unrecorded flows for hydrant and main flushing
- Unmetered water for construction activities

- Unmetered water for operations & maintenance uses (street cleaning)
- Unmetered water for fire fighting
- Reservoir overflows
- Data collection errors including faulty meters (non-registering or under-registering)

System leakage, as the name implies, is water lost due to deteriorating pipe, compromised pipe joints, service connections, valves, etc. With proper record keeping and metering of water, the percentage of unaccounted-for water approaches the net volume lost to actual leakage. Conventionally acceptable rates of water loss range between 10% and 15%, although water loss for many small Oregon municipalities can be as high as 20%.

OAR 690-086-0150(4)(a) requires municipalities to conduct annual water loss audits. The City has compiled monthly data for 2018, 2019, and 2020. However, in some months the available data was either incomplete or potentially invalid. For example, in some months, the amount of water sold exceeded the amount of water produced, which would result in a negative amount of water loss. The reason for these errors is unknown and should be investigated early in the planning period. Two annual programs are recommended as a part of this plan to better determine and reduce water loss in Yachats. These programs are described in more detail in 8.4.1.

Based on the available data, the average annual water loss for the Yachats distribution system is estimated to be between 11% and 16% (Table 5-7). Reducing water loss below 15% and maintaining water loss below this amount are important goals for the City. As explained in Chapter 6, this plan recommends the construction of a new intake on the Yachats River. Based on the City's Yachats River water right and another related settlement (see section 4.1.5), the City must have system losses below 15% in order to use water from the Yachats River. Water loss below 15% is a reasonable and attainable goal. Better data management practices may show that water loss in the City is already less than 15%. If the previously mentioned programs are consistently implemented, it is expected that the City should be able to reduce and maintain water loss below 15%.

Table 5-7| Annual Water Loss Data

Year	Total Water Sold (Million Gallons) (1)	Total Water Produced (Million Gallons) (1)	Unaccounted for Water, All Data (%) (2)	Unaccounted for Water, Excluding Invalid Months (%) (3)
2018	43,575,128	47,045,400	8%	16%
2019	32,561,092	40,057,500	18%	21%
2020	39,922,986	42,468,300	6%	13%
Average	-	-	11%	16%

1- Values include all available monthly data.
2- Values calculated based on all available monthly data.
3- Values calculated by omitting months where consumption exceeded water sold or values were incomplete.

5.5 PROJECTED WATER DEMAND

This section builds on the discussions of population projections in Section 5.3 and the discussion of historical water demand as presented in Section 5.4. The basis for projecting future water demands is based in the establishment of a historical demand baseline. The growth projections of Section 5.3 will be combined with historical usage rates to forecast future water demands.

Projected water demands are based on the following assumptions:

- Future occupancy rates will remain approximately equal to the existing occupancy rates. As explained above, average water demands in Yachats are lower than would be expected in a typical municipal system. This is due largely to the high number of second homes and older residents with small family sizes. If future occupancy rates increase, the City may want to consider re-evaluating the demand projections presented in this plan.
- The ratio of residential to non-residential use (commercial, industrial and public uses) will remain constant. In other words, future commercial and industrial developments will track population growth.
- Long-term per capita water demands will not exceed the City's historical averages. Since the efficacy of planned water conservation programs is unknown at this time, the water demand projections of this report exclude conservation. The future success of the City's water conservation policies will serve to further increase the margins of safety used to plan and design the water system infrastructure.
- New commercial and industrial developments will not be large water users; no provision has been made for new industries with heavy water demands such as food processing or beverage production.
- The growth projections of Section 5.3 are reasonable estimates of future municipal populations and the ratio between peak month and peak day demands to average day demands will remain relatively constant during the planning period.
- Future water loss will not exceed the City's historical averages.

5.5.1 Projected Water Demand Summary

Projected water demand variations for the service population are calculated by multiplying the total service population in a given year (Table 5-4) by the corresponding unit demand per capita (Table 5-5) and the occupancy rate (Table 5-2). These results are summarized in Table 5-8 and illustrated in Figure 5-2 below.

Peak day demands have special significance because they can put stress on the water supply capabilities of the system. The water sources should be able to supply the entire water demand during the peak day of the year in addition to any required fire flows.

Table 5-8| Summary of Projected Water Demands

Year	2020	2025	2030	2035	2041
Total Service Population	2,191	2,350	2,520	2,703	2,853
Average Day Demand (ADD)					
mgd	0.132	0.142	0.153	0.164	0.174
gpm	92	99	106	114	121
Max. Month Demand (MMD)					
mgd	0.169	0.182	0.195	0.210	0.222
gpm	117	126	136	146	154
Peak Day Demand (PDD)					
mgd	0.219	0.235	0.252	0.270	0.285
gpm	152	163	175	188	198

City of Yachats
Public Works and Streets Commission
Meeting Summary

January 10, 2023

Guests/Audience: 11

1. (0:09) West called the meeting to order at 2:01 pm. Present: Kevin Erdahl, Alex Cox, Linn West, Bob Bennett, Don Groth and Don Phipps. Staff: Kimmie Jackson, Recorder, David Buckwald, Wastewater Lead, and Rick McClung, Water Lead.

2. (0:54) Correspondence / Communications: Chair West received emails regarding citizens concerned with streetlights. Received an email from Mr. Roslund wanting to make sure the Overleaf Lodge and Fireside Hotels were still included in the new Stormwater Study same as before.

3. (3:20) No citizens' concerns.

4. (4:00) Elect Chair & Co-Chair: Commission volunteered West as Chair and Don Groth as Co-Chair. The Commission voted unanimously, and the Ayes have it.

5. (5:12) Hybrid Meetings starting in February 2023.

6. (11:35) Public Works Report is attached to online packet.

7. (13:49) Stormwater Study is not happening until March 2023; E 2nd St. rebid will get done at the end of March 2023; Seismic Valve & Backwash Project will start at the end of January 2023, and Backwash will start in mid-February; the Water Conservation Study Final Submittal Status is that one more public meeting is needed at the beginning of February.

8. (16:16) South Lincoln Water District wants to team up with the City to come up with raw water solutions as a collaborative effort. They are proposing the City could help with some of their Capital Improvements as part of the negotiations, like the expansion of their water plant. The City needs to decide if they are interested in moving forward. McClung stated the framework has been laid out and Public Works will need to consult with Council. Discussion continued around the stability of South Lincoln Water, infrastructure concerns, the creeks being on forest service land, and the potential of having enough water for Yachats and Waldport in the future. The next step is the Commission recommend to the City Manager and Council to start the conversation on the possibilities.

9. (41:30) The Motion was made to recommend to the City Manager take to Council to recommend they begin and open up communications with South Lincoln Water

District Board and the City Council of Waldport, to include subjects as long term look at the amount of water available, management of the operation and the infrastructure, and that this is only for preliminary talks. The Commission voted all in favor and the Aye have it.

10. (43:27) CIP: Commission discussed installing emergency bypass connections; the Slide Gate is being researched by the CIP Coordinator for next budget year; the property next to the Water Plant is still an outstanding project and the need for a Geotech Study to see if the property is suitable. There will be a possible Steering Committee for the water group to work on securing the Water Shed.

11. (52:00) Water Sales report looks like there is a discrepancy in February in that there was more sold than what was made. The water in December went up another 600,000 gallons; McClung will revisit the data and report findings; McClung will let the City Manager know the need to contact Tim Tice for a review study for Water and Wastewater.

12. (1:00:41) Financial Report: November 2022 attached to online packet.

13. (1:10:25) The Fire Department is starting CPR classes. Individuals will need to call on their own and sign up for a date and time. Will forward information to the City to post in the newsletter and on the website. Tomorrow at 9:30am volunteers will inventory of the Conex on Radar Road. If raining, then will do the following day. There was no Fire Department meeting or report. It will be on Monday January 23rd.

14. (1:14:44) Hwy 101 Phase II: The Commission discussed having until the end of the month to put in the application and requires detailed scope of work, detailed budget by task, and decide if we will submit the application. Will also need to ask ODOT for a letter of approval as a formality and they did indicate they would; McClung suggested to make this into a CIP then submit to Council, and it will need to include public input. McClung suggested to bring this to Council on the 18th to move this forward and then spend the next nine months perfecting the application and the public outreach. The cycle will begin in August for application process and agrees that the City Manager or Planner should submit the application. After further discussion, the Commission decided they may bring this up during goal setting to meet the timeline.

15. (1:25:38) Delineators: The final agreement laid out which ADA rules that need to be followed; need a six-foot-wide strip and lot of the area is not even four feet; could possibly use rumble strips. An option is to go back to phase I and fix the dangerous gap so they will acknowledge the issue and hold off on phase II, but keep in mind what needs to be done and have the information ready. The

commission would like to see delineators where is adequate and are open to other options for the narrow areas for safety.

16. (1:54:15) CIP 2023-24: Will revisit in February after CIP Coordinator reviews, and the Slide Gates still need the write up and forward to the CIP Coordinator.

17. (1:57:20) Street Inventory: Need further Commission discussion about what areas need pavement work to be done in the next couple weeks with the Public Works Leads. Chair West & Commissioner Phipps will discuss the speed limit.

18. (1:58:42) There is a way to lower the speed limit to 25mph and it involved a request formally made by the City to have this study done, it's then reviewed. The surface streets can be reduced to 15mph and 20mph, but have to meet certain ORS Codes, and the enforcement portion can be addressed.

No further business to discuss, meeting adjourned by West at 4:17pm.

Next Meeting: Tuesday, February 14, 2023, at 2:00pm

Prepared by Kimmie Jackson Deputy Recorder on January 2023.

Water Rate Study

City of Yachats

Final Report

December 2020

Prepared by:

Oregon Association of Water Utilities

Table of Contents

EXECUTIVE SUMMARY

The City of Yachats called upon the Oregon Association of Water Utilities to conduct a water / wastewater rate study to determine the adequacy of the water/wastewater rates in conjunction with the proposed budget for the 2020-2021 fiscal year, with subsequent adjustments for years 2022-2024. The purpose of the study was to develop financial assistance and rates that:

- Provide examples of rates which meet the projected capital and operation and maintenance (O&M) costs of the system
- Determine equitable costs among the different types of system users
- Encourage efficient use of the water
- Are relatively simple to administer, understand, and are consistent with industry standards

The rate study stems from a justification of a single expenditure line created and managed by the city's administration office. This figure includes personnel services, materials and services, contingency funding, and capital improvement. The capital improvement costs are reviewed in this study and implemented to align system costs to future rates.

Table 1: Current Rate Information

Service Connection Size (in.)	# of connections	Allowance (Units) [1,2]	Base Rate	Unit Rate Cost	Average Consumption [3]	Typical Monthly Cost
5/8 Residential	704	2	$48.24	$5.33	5.44	$77.23 [4]
5/8 Residential	11	2	$72.37	$8.02	NA	NA
5/8 Commercial [5]	136	2	$48.24	$5.33	NA	NA
5/8 Commercial	28	2	$48.24	$5.33	NA	NA
2.0 Commercial	7	2	Varies [7]	$5.33		NA
3.0 Commercial [6]	1	2	$94.54	$5.33	210	$1,213.84
4.0 Commercial [6]	1	2	$70.78	$5.33	96.1	$582.99
Total Connections	888	NA		NA		
Total Annual Base			**$522,925.08**			
Total Annual Consumption			**$195,127.54**			
Combined Base and Consumption			**$718,052.62**	**94.99 %**		
Proposed Budget			$755,900.00			

1 – One unit of water = 748 gallons, 2-1,496 gallons allowance per month 3 – figures taken from various calculations provided by Public Works Committee, 4-cost average based on average usage of all 5/8-inch meters, with 3.44 units of water costs at $5.33 per unit, 5 – Service connection associated with rental housing, 6 – Figures taken from 2015 calculation of Yachat's 53 largest consumers, 7- base rate varies from $94.54 to $305.69,

Current Revenues / Expenditures:

Proposed revenue requirements for fiscal year 2020-2021 are $755,900.00 dollars. The base rate revenues equal $522,925.08 or 69.18 percent of the total proposed budget. An annual adjustment to the base rate has been initiated since 2016 and should be continued as fluctuations in capital planning changes with each succeeding year.
The existing consumption rate (a charge per unit of water) is $5.33, with an allowance of water provided in the base rate. The allowance of water included is two units or 1,496 gallons per month. All water consumed after the allowance is charged at $5.33 per unit. Consumption revenues equal 25.81 percent of the proposed budget or $195,127.54 dollars. The combination of base and consumption rates total 94.99 percent of proposed budget or $718,052.62 dollars.

With figures based on averages of water produced and delivered to the consumers, the current budget has an estimated shortfall of $37,847.38 or approximately 5 percent.

User Characteristics:

Equitable fees assessed to customers begin with a determination of the type of users. For the City of Yachats, the classification of customers is categorized as follows:

- 715 - Single-family residents, 80 percent of total users
- 136 - Vacation units, 15 percent of all users
- 37 – Classified as commercial.

It appears there are discrepancies among users in the volume of water consumed monthly. Single family residential dwellings on average use approximately 5.44 units or 4,000 gallons per month, with the commercial users' diverse consumptions total from 10,000 gallons to over 200,000 gallons per month. The large users account for approximately 52 percent of total water sales. One note to mention is the 7.5 percent of total produced water is used at the water and wastewater treatment facilities. This is mentioned to look at both water/wastewater system upgrades, cost associated with and revenues required for such projects.

Cost Evaluations:

If the total operating expenditures were equally divided per the number of consumers, the cost per user for the city would be $70.94 per month. This simplistic approach immediately proves unfair due to the extreme averages of water consumed and the major differences between residential and commercial consumptions.

$755,900.00 divided by 12 months divided by 888 connections = $70.94

Believed as the highest priority regarding water costs, all consumers pay for those costs associated with the infrastructure that provides continued high quality, safe, clean drinking water. When determining the cost for water, equity centered on water consumption should be applied across the spectrum of users. Reclassifying users specific to meter size accentuates this point, relies on the price per unit and the amount of consumption per month. The intrinsic value associated with water service and the consumption of water during each billing cycle make up a fair and equitable rate for all customers.

Rates:

Water rate designs include city customers and outside urban growth boundary services, totaling charges necessary to generate a level of revenue to meet proposed budget forecasts for the water system. At this point, we reviewed the amount of water produced and divided the new expenditure line to determine the cost associated with producing a single unit of water (one hundred cubic feet or 748-gallons). Using the production numbers from 2019 and applying those same amounts to the new fiscal year expenditures, provides a way for the price per unit required to meet proposed expenditures. See Table 2:

Table 2: Cost per unit of production		
Annual Production of Water	Proposed Expenditures	Cost per 748 gallons (1 unit)
62,895 units (47,045,460 gallons)	$755,900.00	$12.02

Looking at the monthly allowance of water and applying the cost per unit to the number of units, two units at $12.02 cost per, equates to $24.04 monthly cost for the water department to provide this allowance. With a $48.24 monthly base rate, one can speculate the favorable revenues for the water department at these consumption levels, but an additional consideration with total consumption is necessary to consider when the unit price (currently $5.33) is less than fifty percent the production cost per unit.

When a typical residential bill has an average consumption of 5.44 units of water, operating cost to deliver those units would be $65.38 dollars. This approach is applied when estimating the actual cost per residential customer, and revenues required to meet budgetary concerns.

One main interest within this study was the equitability of usage for all customers and their charges, respectively. Fairness across the user classification is often defined in a manner that low volume consumption should pay a fair share, while large consumers should not receive a volume discount.

Several methods to determine rates can be applied to a study, with the basic approach examining the base rates versus consumption (volume) rates. It is typically suggested that the base rate cover 60 percent-to-75 percent of the annual fixed expenses of the water budget, allowing the balance of revenues to be generated by what is termed a *volume rate.* The City of Yachats has executed sound practices in this area as current base rates equal 69.18 percent of the proposed budget.

Existing Rates:

This first step provides a concise view of the existing rates (both base and consumption rates) which currently provides an indication of the overall revenues generated using current water rates. The City of Yachats, with concerns of capital improvement planning, originally strategized with the idea of upgrades to the existing system using either $100,000.00 or $200,000.00 as a single line item for capital improvements for the proposed budget. Using the $200,000.00 figure, the current production cost per unit of water tallied at $12.02 per. Consideration towards maintaining the unit cost, comparing the total

monthly bills alongside the total units consumed, indicated a vast difference in the fair and equitable approach in rate applicability as it related to both residential and commercial accounts.
At the request of the City Council, a random comparison of the two inch and larger meters, using typical levels of consumption indicated the charge per unit of water ranged from $5.78 - $7.22 which is significantly lower than the current production cost at $12.02 dollars per unit. With total water sale revenues from both base and consumption rates, the city is in good condition meeting 94.99 percent of the proposed budget.

First Findings:

In this example, the emphasis is not on the base rate, but how the price per unit influences, and plays a role in the total proposed budget. The increase in budgetary requirements to a total figure of $755,900.00 is based upon sustaining capital monies for smaller annual projects, deemed short-term.

As the above proposed budget was confirmed, a review of the base rates from the commercial classification of users indicated a distortion in how base rates are applied. Similar sized meters had different monthly base rates. Discussions with staff indicated an unclear reasoning behind how the base rates were established, but they may have been originated by how much water was being consumed. Discovered were larger metered connections paying less than smaller metered connections.

Through this step of the process, two recommendations were provided for consideration: a) apply a meter multiplier to the base rate, which will also provide the same ratio of allowance of water for the user, and b) apply a tiered (increase block) rate for all consumption beyond the allowances stipulated with the meter ratios. This approach affords the exact per unit cost for all users, regardless of the size of the service connection for the base rates, then applies a conservation minded approach to the consumption rates. Table 3 makes available both the current monthly base rates and the Council affirmed base rate to be implemented. See page V

Another change recommended with establishing new rates is moving away from multi-line charges (capital improvement reserve) which determine total monthly costs. All figures recommended in the water rate study provides a single monthly base rate and consumption rate. The current consumption rate is a uniformed rate at $6.00 per unit, with the potential to become a tier consumption rate. These figures were developed and calculated to include capital reserves as feathered into the consumption rate. This simplifies both the billing process and understanding of the monthly charge.

Meter Multiplier Base Rate:

Discovered during the water rate study, is the varied levels of monthly usage, as it was explained in an analysis submitted by the Public Works Commission, showing a great number of accounts using the minimum allowance of water, and twenty percent of the users consuming fifty percent of the deliverable water. Associated with the varying degrees of water usage, the cost per unit also had unique ranges. A unit of water (748 gallons) could cost one customer one amount, and a second customer could be paying a higher or lower per unit cost, which originated from current five categories of users by size and having ten different base rates.

The meter multiplier establishes for the City of Yachats uses American Water Works Association standard that relates a monthly cost based on replacement of a meter and adjacent infrastructure over the life of the meter. Table 3 on the following page shows a comparison of both current and recommended base

rates. a meter ratio applied to each of the meter sized base rates and two options for the consumption rate.

Option one, highlighted in columns 8 and 9, show new monthly costs associated with both a fixed consumption unit rate as well as a tiered structure based on levels of consumption, then compared to current costs, displayed in column 7. The key points from this table offer evidence how complex the current base rates are and the varied rates for the same type of user shown in column 2. One point that is usually overlooked is the understanding of the allowances, column 5, that matches the allowances in ratio to the recommended base rates that follow the meter multiplier. With the proposed budget set at approximately $755,900.00 dollars, the expected unit cost would be $6.00 for all water sold. The City Council has accepted the meter multiplier be applied to the base rates along with the unit cost be increased from $5.33 per unit to $6.00 per unit.

The tiered rate structure focused on conservation will be offered for the Council to entertain for July 2021 decision. This step pertains to the consumption side of revenues, which will add a conservation minded approach to the water rate structure. This method, “tiered block rate” is centered on the more water consumed, the increase per unit is applied. Oregon Association of Water Utilities will be looking at providing these figures to the city during the first quarter of 2021.

Table 3: Base Rate Comparison

1	2	3	4	5	6	7	8	9
Meter Size	Mo. Base Rate	Mo. Base Rate		Allowances	Consumption Levels **		Using Tiers***	Unit Costs ^^
	Current Base Rate	New Base Rate*	Meter Ratio	With Base Rate		Current Costs	New Costs	New Costs
5/8"	$ 48.24	$ 48.24	5/8" = 1.0	2		$ 48.24	$48.24	$ 48.24
5/8"	$ 52.98	$ 48.24	5/8" = 1.0	2	4	$ 58.90	$60.24	$ 60.24
5/8"	$ 61.87	$ 48.24	5/8" = 1.0	2	6	$ 69.56	$73.24	$ 72.24
					8	$ 80.22	$86.24	$ 84.24
					10	$ 90.92	$100.24	$ 96.24
1"	$ 112.37	$ 67.54	1" = 1.4	2.8		$ 116.63	$67.54	$ 67.54
					6	$ 133.69	$86.84	$ 86.74
					10	$ 155.01	$112.84	$ 110.74
					15	$ 181.66	$148.34	$ 140.74
2"	**$ 94.54**	$ 139.90	2" = 2.9	5.8		$ 114.79	$139.90	$ 139.90
2"	**$ 133.15**	$ 139.90	2" = 2.9	5.8		$ 153.40	$139.90	$ 139.90
2"	**$ 150.97**	$ 139.90	2" = 2.9	5.8		$ 171.22	$139.90	$ 139.90
2"	**$ 305.69**	$ 139.90	2" = 2.9	5.8		$ 325.94	$139.90	$ 139.90
					10 ^	$ 175.79	$165.10	$ 165.10
					15 ^	$ 202.44	$199.70	$ 195.10
					30 ^	$ 282.39	$298.20	$ 285.10
3"	$ 94.54	$ 530.64	3" = 11.0	22		$ 201.14	$530.64	$ 530.64
					45	$ 323.73	$680.14	$ 668.64
					60	$ 403.68	$777.64	$ 758.64
					90	$ 563.58	$977.64	$ 938.64
4"	$ 70.78	$ 675.36	4" = 14.0	28		$ 209.36	$675.36	$ 675.36
					50	$ 326.62	$807.36	$ 807.36
					100	$ 593.12	$1,132.36	$ 1,107.36
					150	$ 859.62	$1,482.36	$ 1,407.36
					300	$ 1,659.12	$2,532.36	$ 2,307.36

Notes

* - Applied meter multiplier to the base rate - starting point at $48.24

** - Random levels of consumption and costs associated with usage

*** - Rates set using tier structure based on $6.00, $6.50, $7.00

^ - Based on Base rates - $133.15

^^ - Rates set using fixed unit costs at $6.00 for all units of water consumed - 2 percent revenue with $755K budget, or $8.50 with $855K budget

Water Rate Study

Introduction:

In July 2019, the City of Yachats authorized Oregon Association of Water Utilities to review current water rates. The purpose of this study is to develop examples of financial strategies and rates that:

- Provide adequate revenue to meet the operation and maintenance costs, capital improvement costs, as well as review contingency funding
- Determine and distribute costs among the various consumer types
- Are relatively simple to understand and implement, being consistent with industry practices

It is a privilege for Oregon Association of Water Utilities to provide this level of rate study assessment as a member service to the City of Yachats. When conducting a rate study, the best results are based on the most accurate data obtained, equity among the consumers, and revenues that meet demands and allow the water system to operate per state regulations.
After careful review of the written materials provided by the city's staff, along with discussions with key personnel, some points are necessary to mention to maintain continuity, they are:

- Changes in necessary monies for capital improvement
- Creation of a contingency fund for emergency purposes
- Existing expenditures based on billing unit of 748 gallons
- Monthly costs based on the number of active meter connections or 100 cubic feet (ccf)

After an extensive evaluation of current budget numbers regarding this rate study, it appears that an update/modification in the existing water rates are necessary to create a fair and equitable structure. The city has done well to meet the financial obligations in funding the operations of the public water system as routine annual adjustment of the water rates have been implemented. Reserves have been created for future capital improvement projects, contingencies, and for major maintenance and repairs. System Development Charges (SDCs) will not be part of this study, but it is recommended that they be reviewed on a regular basis.

A recommended contingency fund for emergencies may be 10 to 20 percent of the operational portion of the budget. This single line item ($60,000.00) is 7.94 percent of the 2020-21 budget. These contingencies do not need to be expanded if not essential to match future endeavors. It is advisable to carry unused contingencies, and other revenues not expended, over to the next year's working capital expense line item, and again set aside a new contingency figure for the next budget year. The City annual adjustment of water rates follows the construction cost index, which has averaged 2.91 percent per year.

Several water rates examples and options for the City of Yachats' Council to review are included in this report. In addition to the general expectations of a water rate study, Oregon Association of Water Utilities considers policies, ordinances, and customer relations as factors in the development of water rates. Special interests, political climate, and an ease of understanding also play roles in the formation of rates.

Oregon Association of Water Utilities utilizes the information provided by the water system when performing a water rate study. The information includes the existing/adopted budget that consists of revenues necessary for O&M, personnel, contingency, capital outlay, loan debt service, and loan debt reserve fund if required. We also consider policies, practices, resolutions, and ordinances that have been adopted from an operational view, not a legal review or opinion. The system figures are based on an estimate from the existing records and future needs as discussed and is $755,900.00 dollars.

Table 1: Proposed Budget Information		
Personnel and Materials Services:	$447,900.00	
	Sub-total:	$447,900.00
Contingency Reserve/Transfers: [1]	$60,000.00	7.94%
Annual Debt Service:	$48,000.00	6.35%
Capital Outlay: [2]	$200,000.00	26.46%
	Total Expenditures:	$755,900.00
1 – Contingency dollars are normally based on 10-20 percent of operating costs; actual rate is 7.94 percent of proposed budget. 2- Capital outlay should be adjusted annually based on prospective projects for the year(s) of succession		

There are proposed approximately 888 active connections and eighty percent are residential customers. Also, included in the calculation of rates is the amount of averaged water produced at 47 million gallons or 62, 900 hundred cubic feet (ccf) annually, the amount of water sold is 43 million gallons, or 57,900 ccf, and the unaccounted water is 3.7 million gallons. The unaccounted-for water is 7.9 percent is a significant achievement as most public water systems strive for 15 percent unaccounted-for water.

Originally, the primary purpose for a formal water rate study was to assist the city in developing a structure that is balanced for all users. Both the City Council and Public Works Committee had past rates and annual adjustments so the city could operate in the black. While reviewing revenues and expenditures, the primary emphasis was to a look at short-term (low costs) annual projects which can be supported through rates. By emphasizing annual short-term projects, we can increase maintenance of the water system and provide a report to the City Council.

Comparing annual production and delivery records of water against the operating expenses provides insight as to the efficiency of the water system. When viewed as cost per unit of water, 748 -gallons, the water system can determine the actual system cost as it relates to each consumer in a billing cycle.

Table 2, Cost per Unit of Delivery is figured on a running average of all water produced over a given p*eriod*. When water is not accounted for through meter readings or other methods, it is seen as a 100 percent loss associated with the production cost for that delivered unit. The exception to this is when operations can provide accurate water usage relating to leaks, flushing, treatment plant operations and other maintenance tasks. This water is then considered non-billable used water rather than unaccounted for water. Water that cannot be sold should be considered potential lost revenues.

Table 2: Delivery Cost per Unit			
Total Expenditures: Used in this study			$755,900.00
Water Production: 47 million gallons (62,900 ccf) units			
Unaccounted for Water: 3.7 million gallons (5,000 ccf) units			
Average cost per single unit (748 gallons)			
Expense per gallons	0.016	Current rate per 748 gallons	Potential Revenue [1]
Expense per unit	$12.02	$6.00 [2]	**$347,400.00**
1- Potential revenue based on selling 57,900 units of water at $6.00 per unit or 45.9 percent of budget 2 - Current rate at $6.00 was adopted during September 2020 Council meeting, increase from $5.33			

Rate structures vary from utility to utility, but generally include three elements. First, is consideration of the classification of customers served, i.e., residential, commercial, and industrial. Second, all customers have an established frequency in billing; third, the schedule of charges will be identified and charged.

For water utilities using a cost-of-service approach, the level of the utility's rates is a direct reflection of the utility's costs and customer's demands. The above table outlines this approach to reveal how water deliverables affects the overall revenue required.

Setting the base rate per size of connection, multiply by the number of connections, and then multiply by 12 (12 months/yr.) forecasts an amount that can be considered as revenue income to help ensure that most "fixed" annual expenditures are covered.

It is typically suggested that the base rate cover 60-75 percent of the annual water budget. This allows for the balance of revenues to be generated by what is termed a *volume rate.* The metered amount of water can be charged by a unit measurement in gallons or cubic feet. The meters, measure in one-hundred cubic feet (748-gallon unit) and a dollar amount can be charged per said unit.

In table 3, *Current Rate Information,* the City of Yachats revenues are derived from: the size and number of connections, the monthly base rate, allowance of water given in the base rate, if applicable, volume unit rates, and other miscellaneous revenues, i.e., late fees.

To recover the difference in revenues not earned in the base rate, the volume (consumption) rate income when added to the base rate income should meet the total revenue requirements. The current rate per unit of consumed water is $5.33. The City now applies a construction cost index to both the base and consumption rates, fluctuating between 1.7 and 3.3 percent over the past four years.

The City of Yachats total revenues from existing rates is $713,184.22 or 94.35 percent of the proposed budget at $755,900.00. Base rates equate to 68.54 percent while providing 36.79 percent of the available water to be sold, while consumption revenues equate to 25.81 percent.

Table 3: Current Rate Information						
Service Connection Size (in.)	**# of connections**	**Allowance (units)**	**Base Rate**	**Unit Rate Cost**	**Average Consumption**	**Typical Monthly Cost**
5/8" Residential	715 [1]	2	$48.24	$5.33	5.44	$66.58
5/8" Residential	164 [2]	2	$48.24	$5.33 [2]	10.00	$90.92
2" Commercial	7	2	*	$5.33	30.00	$282.39
3" Commercial	1	2	$94.54	$5.33	60.00	$403.68
4" Commercial	1	2	$70.78	$5.33	100.00	$593.12
Total Connections	888					
Total Annual Base			**$522,925.08** [3]			
Total Annual Consumption			**$195,127.54**			
Combined Base and Consumption			**$718,052.62**	**94.99 %**		
Proposed Budget			**$755,900.00**			
1 – small number of users are outside city limits – base rate = $72.37, 2 – Users are considered commercial accounts – unit cost is $8.02 for outside city limits, 3- figure is based on 2" connection average monthly rate at $129.38, *- see table 3 – page 5						

When developing a fair rate structure that meets the water system requirements, the rate study results, suggestions, and final decision are established on:

- Total revenues generated by base rates.
- Total gallons of water associated with the base rates.
- The price per unit that establishes equitability among all consumers.
- Amount of available water for sale and the price per unit.
- Total revenues generated by volume (consumption) rates.

Oregon Association of Water Utilities can use this information and apply it to various scenarios, providing a method to better understand the effects from various rate approaches.

Cost Evaluations:

If the total operating expenditures are equally divided by the number of connections, the cost per connection for the City of Yachats would be $70.94 per month.

$755,900.00 divided by 12 months divided by 888 users = $70.94 per month

Consumers pay for those costs associated with the infrastructure that provides continued high quality, safe, clean water. When determining the cost for water, equity centered on water consumption should be applied across the spectrum of users, (meter size and classification of the connection) and this is accomplished through the price per unit and the amount of consumption per month.

Rate Study Approach:

Many diverse and competing models can be applied to any rate study, but when they are not well understood and evaluated, they can cause confusion among those that are affected by a change in the water utility rates. It is the goal of this water rate study to bridge key elements and provide an informational tool for the City Council and Public Works Committee in selecting an appropriate rate structure. Any rate structure has key components and aligning said approach, so it is easily understood and adopted.

Examples shown in this rate study are based on a single line budget to operate and maintain the city's water system**.** While there are many approaches to determining a monthly consumer's cost, this rate study uses a methodical style with the following points:

- Affordability Index – rates allowed by the affordability index and historical monthly costs [1]
- System Data – information relevant to the study
- Existing Rates – current revenues and expenditures, speculation of gains and losses.
- Recommended Rate – apply rates evenly regardless of total water consumption

The varied points will show base rates established, what percentage of revenues is generated from said base rates, and how consumption charges make up any revenue deficits. Examples provide both an amount of water included in the base rate and cost per unit of water consumed. Often as examples are presented, it will be likely that no single method satisfies all the requirements for every community.

Alternative rate structures identify aspects in rate studies that assist in highlighting the dynamics of the water system. Although rate structures are generally composed of three components, who is charged, how often and how much, additional attention is centered on the structure's consumption charge. Typically, there are four basic types of consumption charges: declining block, uniform block, inclining block, and seasonal.

As rates are adjusted, policy choices are the responsibility of the utility decision makers. Even though public involvement is not required to design a water rate structure, it is important to keep the public relations door open by allowing for comment at a public meeting, and following proper procedures for adopting policies, resolutions, or ordinances. This should take place prior to adopting rate policy by ordinance or resolution. The level of impact on the consumer, and the values and views of the decision makers plays a key role in sustaining rates that will meet the operation and maintenance of the City's water system, all the while maintaining and building customer trust.

Factors that affect forecasted revenues include the following: water conservation, weather, economic conditions, number of actual billable customers, etc. These are mentioned points to consider when forecasting revenue needs to meet budgeted expenditures.

The following information is designed to illustrate methods of approach that will expand the various examples and highlight specific points of relevancy. The focus with this water rate study is to build on all levels of understanding, create a fair and equitable approach for all consumers, and provide a rate structure frame for revenues for the water system to continue to operate.

1 - https://www.oregon4biz.com/assets/docs/IFA/SDWhandbook.pdf

Affordability Index:

The impact of water cost for median household incomes (MHI) for the area is the affordability index. A tool that state's agencies review to determine loan interest rates, loan fees, any percentage of principal forgiveness (if possible), loan repayment periods and the effect on the single-family residential user. These are areas that may impact economically disadvantaged areas. A review of the index may be used to establish a pre-determined rate for a specific amount of water each month. For this rate study using the 2019 Median Household Income at $49,293.00 and the 2019 Affordability Index of 1.25% ($/Mo) for the 97498-zip code area, equates to $51.34 for a monthly water bill. **See Table 4**

Table 4: Median Household Income Information

Zip Code	Certified Population 2015	U.S. Census Population 2010	Annual Growth	MHI 2019	2019 Affordability Index 1.25%
97498	740	690	1.14%	$49,293*	$51.34

Information obtained from US Census Bureau American Community Survey 2018 – inflation adjusted for 2019, * - Average Household income - $62,132 for Yachats service area

Historical Rates:

The City of Yachats water rates were $48.24 base rate per month for a 5/8-inch service connection and $5.33 per unit (748 gallons) consumption rate for all users. This structured format is labeled a "uniform block" which gives a price signal to the customer based on increased usage, but the unit cost does not increase with higher consumptions.

The city used an annual adjustment; associated with the construction cost index, on both the base rate and consumption, which over the past four years averaged 2.91 percent increase or $2.15 dollars. In July 2020, no adjustment to either the base rate or consumption rate was implemented due the concern of the COVID-19 pandemic. The city was looked at the impact on the community, lost revenues for operations and maintenance, and adjusted budgets to remain solvent for the rest of 2020.

System Data:

Information compiled in the "System Data" spreadsheet (see next page) outlines those factors that influence the monthly revenues based on the annual proposed operating budget. Water produced, water sold, and water losses are criteria that affect the rates. Relating the volumes of water to the operating expenses will define the cost per unit, either 1,000 gallons or 100 cubic feet (748 gallons).

The number of connections, the size of connections, and the monthly rates determine if a surplus or deficit in revenues is associated with the current rate structure. One important factor to consider is the amount of water allowed with the base rate. A larger allowance of water included in the base rate will lower the price per unit within the base, so any additional water will be at a higher cost per unit to deliver. All the information will be based on how much of the percentage of total expenditures is generated from the base rate. Consumption rates will be included in the existing rate spreadsheet. **(See Table 5: System Data)**

Table 5: System Data			
Total Gallons Produced		62,895 ccf	
Total Gallons Sold		57,921 ccf	
Cost per Unit (748 gallons)		$12.02	
Base Rate Revenues		$518,056.68	
Total Operating Budget	$755,900.00	% of Total Budget	68.54

Additional information that relates to the initial review of the figures associated with the City of Yachats water rate study.

Table 6: Expensed Points			
Personnel / Materials	$447,900.00		**59.25%**
Contingency	$60,000.00		**7.94%**
Capital Outlay	$200,000.00		**26.46%**
Annual Debt Service	$48,000.00		**6.35%**
			Base Rate % Total Cost
TOTAL OPERATING EXPENDITURES	$755,900.00		**68.54%**

The City's last rate increase was July 2019, this follows the routine review of water rates the City Council has been implementing since 2016. The base rate percentage of total proposed budget falls in the range of 60 – 75 percent of fixed operating expenses. Currently, base rates are calculated using two figures, one which sets the base rate and a second figure added as a "Capital Improvement Reserve". The new recommendation is to have the base rate designed as a single figure.

Water Rate Study
for
City of Yachats

System Data

For Year:	2020-2021
Date completed:	December-20

	Gallons (annual)	100 Cubic Feet		
Amount of Water Produced	47,045,400	62,895	Total Units Sold	
Amount of Water Sold	43,325,128	57,921		
Non-Revenue Water	3,720,272	4,974		7.91%

	Dollars	Cost per Gallon	Cost Per 1000 Gals	Cost Per 100 Cu.Ft.
Personnel / Materials	$447,900.00			
Contingency	$60,000.00			
Annual Debt Service	$48,000.00	$0.01607	$16.07	$12.02
Capital Outlay	$200,000.00			
Proposed Annual Budget	$755,900.00	Lost Production Cost		$59,775.32

Connection Information
Base Rate Only

Size	# of connections Residential	Commercial	Outside	
5/8"	704	28	11	
5/8"		136		Vacation Rentals
1"				
1 1/2"				
2"		7		5 services varied monthly cost
3"		1		
4"		1		Total Connections
6"				888

Current Rate information (base)

	Residential	Commercial	Outside	
5/8"	$48.24	$48.24	$72.37	
5/8"		$48.24		
1"				
1 1/2"				
2"		$48.24	$129.38	
3"		$94.54		
4"		$70.78		Base Rate Revenues
6"				$518,056.68

Current Consumption Rate	Per 100 Cubic Feet	$5.33	$5.33	$8.02
	748 gallons per			

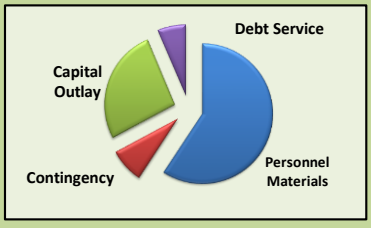
Operating Budget Outline

Personnel / Materials	$447,900.00	59.25%
Contingency	$60,000.00	7.94%
Capital Outlay	$200,000.00	26.46%
Annual Debt Service	$48,000.00	6.35%
		Base Rate % Total Cost
TOTAL OPERATING EXPENDITURES	$755,900.00	68.54%

Percentage of budget without any consumption revenue

Notes:

- Last rate adjustment July 2019
- Balance of reserves - $162,000.00
- Capital Improvement plans - 5-years - $450,000.00 or $90,000.00 annually - CIP set at $200K annually
- Contingency funded at 7.94 percent of budget
- Base Rate actually $45.99, $2.25 is Capital Improvement Reserve - all meter sizes - inside city limits
- Base Rate actually $68.99, $3.38 is Capital Improvemnet Reserve - all meters - outside city limits
- Capital Improvement Reserve rates = 26 percent of proposed budget



Existing Rates:

The "Existing Rates" spreadsheet details much of the same information as the system data spreadsheet, plus expands the details on the adjustment of base rates. Applying revenues from consumption rates, allowance of water included in the base rate (if applicable) and the revenues generated by selling additional units of water. Since the City of Yachats provides an allowance of water in the base rate, the consumption charge begins once the allowance is consumed. Aligning the base rate revenue with the consumption revenue will show any surpluses or deficits of the current rate structure. Later examples will show water allowance with the base rate and how various base rates will give similar value level to the consumer. Included at the bottom of the "Existing rate spreadsheet" are residential figures of monthly rates supported by three hypothetical levels of monthly consumption.

Table 7: Existing Rates			
Total # of Connections	**888**		
Total Production of Water (annual ccf)	**62,895** [a]	**Sold Water (annual ccf)**	**57,921** [b]
Consumption Charge per Unit (1 - ccf)	**$5.33** [1]	**Total Billable Units**	**36,609**
Base Rate Revenues [2]	**$522,925.08**	**Revenue Percent**	**69.18%**
Consumption Rate Revenues	**$195,127.54**	**Non-Revenue Water**	**3,720**
Total Revenues	**$718,052.62**	**% of Total Budget**	**94.99%**
Total Proposed Budget	**$755,900.00**	**Budget Shortfall**	**5.01%**
Findings			
Cost Per Unit	**$12.02** [3]	**Allowed Units**	**23,088 (37%)** [4]
Consumption Rate Revenues	**$277,517.76**	**% of Total Budget**	**37%**

a – Averaged units of water produced over past three years, b – average units sold over the past three years, 1- Averaged price sold among user groups, 2- Figure based on current base rates per month, 3- Cost per unit calculates total operating budget by total units in production, 4 – Allowed units is total units provided in allowance compared to total units produced,

The average consumer purchases approximately 5.44 units or 4,000 gallons per month, which equates to a water charge of $66.58 per month. Approximately a third of all customers use 2-4 units, while ten larger customers account for 50 percent of all water sold. The water and wastewater treatment plants account for 7.3 percent of total water produced.

Water Rate Study
for
City of Yachats

Existing Rates

For Year: 2020-2021
Date completed: December-20

	Annual Gals	Annual Units CCF	
Amount of Water Produced	47,045,400	62,895	
Amount of Water Sold	43,325,128	57,921	
Non-Revenue Water	3,720,272	4,974	8%

	Dollars
Annual Operating Budget	$707,900.00
Debt Service	$48,000.00
Proposed Annual Budget	$755,900.00

Cost per 1,000 gallons
16.07
Cost per 100 Cubic Feet
12.02

Connection information	Size	# of connections Residential	Commercial	Outside	
	5/8"	704	28	11	
	5/8"	0	136	0	Vacation Rentals
	1"	0	0	0	
	1 1/2"	0	0	0	
	2"	0	7	0	
	3"	0	1	0	
	4"	0	1	0	
	6"	0	0	0	
Consumption w/ base					Total Connections
Water Allowance		2	2	2	888

Current Rate information		Residential	Commercial	Outside	
	5/8"	$48.24	$48.24	$72.37	33% increase
	5/8"	$0.00	$48.24	$0.00	
	1"	$0.00	$0.00	$0.00	
	1 1/2"	$0.00	$0.00	$0.00	
	2"	$0.00	$48.24	$129.38	5 accts ave monthly base rate
	3"	$0.00	$94.54	$0.00	
	4"	$0.00	$70.78	$0.00	
	6"	$0.00	$0.00	$0.00	
Consumption Charge	per 748 gallons	$5.33		$8.02	

Current Base Revenue		Residential	Commercial	Outside	Totals
	5/8"	$33,960.96	$1,350.72	$796.07	$36,107.75
	5/8"	$0.00	$6,560.64	$0.00	$6,560.64
	1"	$0.00	$0.00	$0.00	$0.00
	1 1/2"	$0.00	$0.00	$0.00	$0.00
	2"	$0.00	$337.68	$0.00	$337.68
	3"	$0.00	$94.54	$0.00	$94.54
	4"	$0.00	$70.78	$0.00	$70.78
	6"	$0.00	$0.00	$0.00	$0.00
	Total/month	$33,960.96	$8,414.36	$796.07	$43,171.39
Base Rate Totals	12 mo. Total	$407,531.52	$100,972.32	$9,552.84	$ 518,056.68
% of operating budget		53.91%	13.36%	1.26%	68.54%
Water with base charge	Total/month	1,408	346	22	1,776
	12 mo. Total	16,896	4,152	264	21,312
Total Water Included in Base Rate	12 mo. Total	21,312	36.79%		
Available Units to be sold					36,609
Consumption Rate Revenues	Figured at $5.33 per unit				$ 195,127.54
	Potential Lost Revenue Cost				25.81%
Non-Revenue Units	3,720	$59,775.32			
			Total Revenue Generated		$ 713,184.22
			Annual Gain/(Shortfall)		$ (42,715.78)
					-5.65%

Notes: MONTHLY USAGE -

Approx 300 accts full-time average usage 2-4 units or 1,500 - 3,000 gallons
Approx 330 accts usage = 1 unit or 750 gallons
100 accts usage = 6.5 to 16.5 units or 4,850 - 12,500 gallons
10 accts usage > 200 units or 150,000 gallons

Typical Residential Water Bill	
Units of Water	Residential Water Bill
2.00	$48.24
5.44	$66.58
10.00	$90.88

Preliminary Observations:

Expanding on "existing rates" using the figures provided by the city, some discoveries will be noted to enhance and support the methodology of a new rate structure.

a) Approximately 7.91 percent of water is considered "non-revenue water" which for water operations is phenomenal. This amount of water equates to approximately 5,000 units of "non-revenue" water that correlates to $60,000.00 of costs associated with water production
b) With base rate revenues totaling 68.54 percent and current consumption rate at $5.33 per unit or 25.81 percent; a shortfall of 5.65 percent. If the City Council wished to leave the current base rates as the July 2019 resolution, then the consumption rate would have to be increased to $6.50 per unit for all consumers. For the average consumer using 5.44 units of water per month, this will increase the monthly charge by $6.36 to balance the proposed budget
c) When determining total revenue from consumption, the $5.33 price per unit was applied to all consumed units, and cost per unit for outside users is $8.02. Eleven users or 1.2 percent of customers are outside the city and are charged this increase per unit price for delivery, a small influence on the overall budget.
d) Allowances of water account for 36.79 percent of total water produced, while the base rates equate 68.54 percent of total budget
e) The first set of data provided early in the process outlined the largest monthly consumers. This information provided figures that could be related to new recommended monthly water rates and the impact on this class. While reviewing the largest consumers, operations for both the water and wastewater department impacts the revenues generated by the city as it relates to water consumed. This is non-revenue water. The two departments consume approximately 7.3 percent of total metered water or 4,275 ccf or 3.19 million gallons annually
f) As stated in the above bullet (e) non billable water used by the water and wastewater departments account for 7.3 percent of total produced water. This equates to 4,275 units of water, annually. Normally this information is not calculated into the financial review, but the volume of water is enough to influence total cost of operations. If the units of water were taken from the "available water" category, the unit price for all water sold would increase from $6.50 to $7.35 per unit.
g) Two-inch meters monthly base rates range from $94.54 to $305.69 (July2019) which when applying a meter multiplier (next example) all two-inch meters will be recommended at $139.90 per month base rate. Category and meter size should be consistent for all customers in each class.
h) The base rates for the largest two connections were substantially lower than smaller service lines, which may have been a front-end discount for total water purchased. A move towards cost-of-services approach, applying the support infrastructure to establish base rates, will provide a more fair and more equitable rate format
i) See "Preliminary Observations" spreadsheet on the next page

Rate Study
for

City of Yachats

Preliminary Observations

For Year: 2020-2021
Date completed: December-20

	Gallons MG	Units
Amount of Water Produced	47,045,400	62,895
Amount of Water Sold	43,325,128	57,921
Non-Revenue Water	3,720,272	7.91%

	Dollars
Annual Operating Budget	$707,900.00
Debt Service	$48,000.00
Proposed Annual Budget	$755,900.00

Monthly Cost per Connection
$70.94

Cost per 1,000 gallons
16.07
Cost per 100 Cubic Feet
12.02

Connections
888

Connection information	Size	# of connections Residential	Commercial	Other
	5/8"	704	28	11
	3/4"	0	136	0
	1"	0	0	0
	1 1/2"	0	0	0
	2"	0	7	0
	3"	0	1	0
	4"	0	1	0
	6"	0	0	0
Consumption w/ base (gal.)		2	2	2

Current Rate (base)	Residential	Commercial	Outside
5/8"	$48.24	$48.24	$72.37
5/8"	$0.00	$48.24	$0.00
1"	$0.00	$0.00	$0.00
1 1/2"	$0.00	$0.00	$0.00
2"	$0.00	$48.24	$129.38
3"	$0.00	$94.54	$0.00
4"	$0.00	$70.78	$0.00
6"	$0.00	$0.00	$0.00
Consumption Charge [1] per 748 gallons	$5.33		$8.02

In-line with existing rates

Current Base revenue	Residential	Commercial	Outside	Totals
5/8"	$33,960.96	$1,350.72	$796.07	$ 36,107.75
5/8"	$0.00	$6,560.64	$0.00	$ 6,560.64
1"	$0.00	$0.00	$0.00	$ -
1 1/2"	$0.00	$0.00	$0.00	$ -
2"	$0.00	$337.68	$0.00	$ 337.68
3"	$0.00	$94.54	$0.00	$ 94.54
4"	$0.00	$70.78	$0.00	$ 70.78
6"	$0.00	$0.00	$0.00	$ -
Total/month	$33,960.96	$8,414.36	$796.07	**$ 43,171.39**
12 mo. Total	$407,531.52	$100,972.32	$9,552.84	**$ 518,056.68**
% of operating budget	53.91%	13.36%	1.26%	**68.54%**

Water with base charge					
	Total/month	1,408	346	22	**1,776**
	12 mo. Total	16,896	4,152	264	**21,312**
Typical 5/8" Usage (gals)	5.44			4,275	

Total Water Included in Base Rate		Residential	Commercial	Other	Total Base Revenue
36.79%	12 mo. Total	16,896	4,152	264	$ 518,056.68
Available water to be sold	12 mo. Total			36,609	$ 195,127.54
Consumption Revenues					$ 713,184.22
			Total Revenue Generated		**$ (42,715.78)**
			Annual Gain/(Shortfall)		**-5.65%**

Notes:
2" meter service monthly base rates range from $94.54 to $305.69
1 - Price per unit set to meet proposed budget - from $5.33 to $6.50 (Inside)
Consumption rate at $5.33 and $8.02, indicates a 5.65 percent deficit ($42,715)
Average consumption per user per month = 5.44 CCF

Typical Residential Water Bill	
Units of Water	Res. Water Bill
2.00	$48.24
5.44	$66.58
6.00	$69.56

Meter Multiplier:

Generally, meter ratios are designed from two separate theories, a) meter multiplier cost ratios are used when assigning elements of costs specifically related to meters, and b) meter capacity ratios, are most often used when estimating the potential demand requirements from customers.

Customer costs by their meter-and-service ratios vary, depending on size of service pipe, materials used, locations of meters, and other characteristics for various sized meters as compared to 5/8-inch meter service. With a 5/8-inch meter being the starting point and using a one-to-one ratio, increasing the size of the meter increases those ratios as they relate to the cost for repair and replacement. Table 8 provides specific ratios.

Table 8: Meter Cost Equivalencies / Dollar Ratios		
Size (inches)	Equivalent Cost Meter Ratio [1]	Equivalent Dollar Ratios
5/8	1.0	$1.00
3/4	1.1	$1.10
1.0	1.4	$1.40
1.5	1.8	$1.80
2.0	2.9	$2.90
3.0	11.0	$11.00
4.0	14.0	$14.00
6.0	21.0	$21.00
1 – American Water Works Assoc – Manual M-1, Principle of Water Rates, Fees and Charges		

A two-inch meter is typically 2.9 times more costly to repair and or replace during the service life than a 5/8-inch meter. If a 5/8-inch meter service costs the consumer $10.00 per month, then a two-inch meter has a monthly rate at $29.00.

Using this approach in determining costs associated with various meter sizes removes the distinction of class categorization, i.e., residential, commercial, or industrial. This approach places the emphasis on the size of meter and not user type. The size of the meter is the focus in determining appropriate monthly base rates.

Another focal point using a meter cost ratio is when a water allowance is given as part of the monthly base charge; they will increase proportionately with the cost ratios. A significant difference from the capacity ratio, especially as it relates to the larger meters. A two-unit allowance for a 5/8-inch meter would translate to (two-units multiplied by 2.9) 5.8 units of water allowance for a two-inch meter based on the cost ratio established using the American Water Works Association standards.

The city has done well with keeping the water rates in line with expenses. The meter equivalency structure, merges two methods into a single set of rates. Setting the rate for a 5/8-inch meter and aligning the cost to meet 60-75 percent of total expenditures. Using the ratios will synchronize the larger meters with the monthly base costs. Using the meter-multiplier cost ratio, the city's efforts on routine rate adjustments will allow the meter multiplier to be applied to the existing 5/8-inch meter base rate, then follow the ratios for applying base costs for the larger users.

Calculating all water provided in the base rate will better determine the amounts of available water to be sold. Water provided in the base rate is subtracted from the total water produced.

Using the meter multiplier approach to base rates, the city can apply the same theory to allowances of water. Current number of units provided in the allowance for all users is 21,312 which increases to 22,183 when applying the meter ratios to water allowance. The remaining available water being 62 percent (35,738 units) should be sold at a minimum of $6.00 per unit.

Total base rate revenues obtained when the larger meters are formulated using the meter cost ratio increases base rate revenues up 2.03 percent or a total of 71.4 percent. The meter multiplier will be applied to fifteen larger accounts, that use a two-inch meter and larger. The remaining 28.79 percent of the proposed budget revenue will be generated by water sales. Tables 9 and 10 - provide specifics as it relates to the City Council implementing new rates based on meter size and the unit charged increased from $5.33 to $6.00 for inside city customers and $8.02 to $8.69 for outside city customers.

Table 9: Meter Multiplier Costs			
Total # of Connections [1]	**888**	**Allowance**	**Two units [2]**
Base Rate [3]	**$48.24**	**Annual Base Revenue**	**$539,680.78**
Total Allowance of Water		**22,241 units (16.63 MG)**	
Available Water for Sale		**35,680 units (26.68 MG)**	
Required Balance of Revenues	**$216,219.22**	**Total Billable Units**	**35,680 [2]**
Consumption Rate per Unit	**$6.00**	**Annual Consumption Revenue**	**$214,082.96**
		Total Revenues	**$753,763.74**
			-2,136.26
Typical Monthly Cost (5/8" meter) (gals.) [3]		**5.44 units (4,000 gals.)**	**$68.88**
1 – Discovered during the writing of the rate study, 6-one-inch meters were thought to be 5/8-meters, 2- unit is 748 gals or1,496 gallons allowance per month, 2 – 4,275 units are supplied to city entities as non-revenue 3 – 5/8-inch meter, inside city users			

Table 10: Meter Multiplier Base Rates Comparison									
1	2	3	4	5	6	7	8	9	10
Meter Size	Current Base Rate	Residential	Commercial	Vacation Rentals	Outside	Meter Ratio	New Base Rate	Allowed Units	Allowed Gallons
5/8"	$48.24	698	28	136		5/8" = 1.0	$48.24	2	1496
5/8"	$72.37				11	5/8" = 1.0	$48.24	2	1496
1"	$67.54	5	1			1" = 1.4	$67.54	2.8	2094
2"	**varies***		7			2" = 2.9	$139.90	5.8	4338
3"	$94.54		1			3" = 11.0	$530.64	22	16456
4"	$70.78		1			4" = 14.0	$675.36	28	20944
Notes									
* - two – inch meters current base rates range from $94.54 - $305.69									

MM Cost

Rate Study
for

City of Yachts

For Year: 2020-2021
Date completed: December-20

	Annual Units		
Amount of Water Produced	62,895		
Amount of Water Sold	57,921		
Non-Revenue Water	4,974	7.91%	

	Dollars
Annual Operating Budget	$707,900.00
Debt Service	$48,000.00
Proposed Annual Budget	$755,900.00

Connection Information	Size	# of connections Residential	Commercial	Outside
	5/8"	698	28	11
	5/8"	0	136	0
	1"	5	1	0
	1 1/2"	0	0	0
	2"	0	7	0
	3"	0	1	0
	4"	0	1	0
	6"	0	0	0
Consumption w/ base (gal.)		See Units Allowed (748 gals per)		

Gallons Allowed		Residential	Commercial	Outside	Meter Multiplier In Use
2.0	5/8"	$48.24	$48.24	$72.73	5/8" = 1.0
2.0	5/8"	$48.24	$48.24	$0.00	5/8" = 1.0
2.8	1"	$67.54	$67.54	$101.82	1" = 1.4
3.6	1 1/2"	$86.83	$86.83	$130.91	1 1/2" = 1.8
5.8	2"	$139.90	$139.90	$139.90	2" = 2.9
22.0	3"	$530.64	$530.64	$800.03	3" = 11.0
28.0	4"	$675.36	$675.36	$1,018.22	4" = 14.0
42.0	6"	$1,013.04	$1,013.04	$1,527.33	6" = 21.0
Consumption Charge	per 1,000 gals	$6.00		$8.69	

Current Base Revenue		Residential	Commercial	Outside		Totals
	5/8"	$33,671.52	$1,350.72	$800.03	$	35,822.27
	3/4"	$0.00	$6,560.64	$0.00	$	6,560.64
	1"	$337.68	$67.54	$0.00	$	405.22
	1 1/2"	$0.00	$0.00	$0.00	$	-
	2"	$0.00	$979.27	$0.00	$	979.27
	3"	$0.00	$530.64	$0.00	$	530.64
	4"	$0.00	$675.36	$0.00	$	675.36
	6"	$0.00	$0.00	$0.00	$	-
	Total/month	$34,009.20	$10,164.17	$800.03	$	44,973.40
	12 mo. Total	$408,110.40	$121,970.02	$9,600.36	$	539,680.78

% of operating budget		53.99%	16.14%	1.27%	71.40%
Water with base charge	Total/month	1,410	421	22	1,853
	12 mo. Total	16,920	5,057	264	22,241
Typical 3/4" Usage	5.44	Percentage of Allowed Water			38%

		Residential	Commercial	Other	Base-Consumption Revenue
Water Consumption	12 mo. Total	16,920	5,057	264	$ 539,680.78
Total Cost of Produced Water	12 mo. Total	Consumption Revenues		35,680	$ 214,082.96
	12 mo. Total	Total Revenue Generated			$ 753,763.74
Available Water to be Sold			Annual Gain/(Shortfall)		$ (2,136.26)
					-0.28%

Notes:

Base Rate $48.24, meter ratio applied = 71.4 percent of budget

Water allowance in Base Rate = 22,241 units or 38 percent of avail H2O, 35,680 units for sale or 62%

Typical Residential Water Bill	
Gallons Used	Res. Water Bill
2	$48.24
5.44	$68.88
10	$96.24

Increase Consumption Rate:

The approach taken in this example is a schedule of rates applicable to blocks of increasing usage in which the usage in each succeeding block is charged a higher unit rate. Currently the City of Yachats has what is termed a "uniform rate" structure as a single charge per unit of volume of water for all water used, regardless of the amount of water consumed. Increasing block rates are designed based on the customer classification determined by similar usage patterns. The design of the increased block rate will be categorized by the size of the meter. Each successive block rate "may" be applicable to a greater volume of water delivery than the preceding block(s).

This rate structure requires applying a judgment and utility policy regarding the number of blocks, the point at which one block ends and the next block begins, and the relative price levels of the blocks.

From the City Council's workshops, the accepted figures base charge for a 5/8-inch meter user monthly rate will be set at $48.24, with an allowance of 1,496 gallons (two-units). Larger metered connections will be provided with an allowance of water that correlates to the meter ratios applied to the base rates.

An example of this structure is: four-inch meter is 14.0-1 ratio to a 5/8-inch meter. If a 5/8-inch meter is allowed two units of water per month in the base rate, a four-inch meter is allowed 28 units of water per month. To eliminate the "judgement" factor for consideration in applying successive block volumes, each subsequent block(s) can be set in step with the previous block. The total number of tiers considered for an increase block formation will vary from one service provider to another, but normal design is configured using three tiers. The base rate and allowance of water reflect a representation of the actual usage that will determine the various set points of each block.

Conservative in nature, this method applied towards water rates creates an incentive to save water. Understand, that normal water consumption, if reduced by this approach, should later return to levels prior to the rate change. One facet in setting water rates is the fact that the total revenues are calculated from the average consumption figures and not on the expectancies of greater water sales.

Table 11: Tier Rate Recommendations

1	2	4	5	6	7	8
Meter Size	Mo. Base Rate	Allowances	With Base Rate	Tier One $6.00 per	Tier Two $7.00 per	Tier Three $8.00 per
	Base Rate	With Base Rate	With Base Rate	Tier One Range [C]	Tier Two Range [C]	Tier Three Range [C]
5/8"	$ 48.24	2	2	2.1 - 4.0	4.1 - 8.0	8.1 +
5/8"	$ 48.24	2	2	2.1 - 4.0	4.1 - 8.0	8.1 +
5/8" [A]	$ 72.73	2	2	2.1 - 4.0	4.1 - 8.0	8.1 +
[B]	Applied tier adjustments for outside city users			$9.19	$10.19	$11.19
1"	$ 67.54	2.8	2.8	2.9 - 5.6	5.7 - 11.2	11.3 +
2"	$ 139.90	5.8	5.8	5.9 - 11.6	11.7 - 23.2	23.2 +
3"	$ 530.64	22	22	22.1 - 44.2	44.3 - 88.4	88.4 +
4"	$ 675.36	28	28	28.1 - 56.2	56.3 - 112.4	112.4 +
A - service connection base rate for outside city limits - (11 total users)						
B - Tiered rates for outside users synchronized with inside user increases						
C - Typical start-stop points at each step of the tiered structure.						

Table 11 – Tier Rate Recommendations shares a format that outlines the accepted base rates and allowances, plus offers a set of ascending steps of adjustment for each sized meter in service. Note the outside city service users have the same ascending steps, but cost per unit is reflective of the original price per unit.

Costs per unit are usually set according to actual usage of like groups. The group that usually sets the foundation will likely be the majority users, single family residences. In the analysis performed using the meter-multiplier example, proves if all available units can be sold at $6.00 per unit, revenues will be marginally lower (0.28 percent) (-$2,136.36) than the proposed budget. Taken from the "Rate Analysis 2020 V3" spreadsheet provided by the Water Committee indicates approximately 28 percent of users use less than two units of water, while 34 percent of users consume greater than 100 units of water.

The initial outline for a tier rate structure was to implement the $6.00 per unit for the first tier, then consider modestly increasing the unit cost as the tiers increased. A three-tier structure should be more than adequate to fund two goals, a) both short projects, those defined and funded by the capital outlay amount and b) building reserves to compensate, subsidize funds for long-term projects, i.e., new raw water storage or moving the water treatment out of the Tsunami zone.

Water Consumption Chart:

As a precursor on the tier structure for the City Council to consider, a chart is presented that outlines respective monthly costs associated with various levels of water consumption and associating said tier rates for a three-tier format. These monthly costs are associated with columns six through eight in Table 11 on the preceding page.

The chart depicts three tiers as:

- Base Rate – white area, cost associated with replacement of water service infrastructure
    - Allowance of water is included in base rate
- Tier One – yellow area, monthly cost after allowance of water is subtracted
    - $6.00 charge per unit
- Tier Two – orange area, tier two begins with associated levels for the sized meters
    - $7.00 charge per unit
- Tier Three – blue area, tier three begins, continues at rate for all water consumed
    - $8.00 charge per unit

The bold red consumption levels coincide with the meter-multiplier ratios implemented with the current base rates as voted and affirmed by the City Council during the September 2020 meeting. Not every level of water consumption combined with each sized meter is calculated, but those levels that are relative to past data applied in this rate study.

With this tiered format, "increased block rate" the objective is to meet proposed budget when the average usage per customer matches past data supplied by the City of Yachats, as well as the encouragement of water conservation. Discussions indicate the City's concern with providing water demand to its customers during the months the raw water source is limited.

Water Consumption - Monthly Rate Comparison							
Connection Size		**5/8**	**5/8**	**1.0**	**2.0**	**3.0**	4.0
Base Rate Water Allowance		**2.0**	**2.0**	**2.8**	**5.8**	**22.0**	**28.0**
Base Rate		**$48.24**	**$48.24**	**$67.54**	**$139.90**	**$530.64**	**$675.36**
Consumer Class		Above Base Rates include Capital Improvement Reserve					
Residential		698	0	5	0	0	0
Commercial		28	136	1	7	1	1
Outside		11	0	0	0	0	0
Monthly Usage and Hypothetical Cost at Various Consumption Levels							
Base Rates	**Tier One**	**$6.00**		**Tier Two**	**$7.00**	**Tier Three**	**$8.00**
Consumption Levels	**Gallons**						
2.0	1496	$ 48.24	$ 48.24	$ 67.54	$ 139.90	$ 530.64	$ 675.36
2.8	2094	$ 53.04	$ 53.04	$ 67.54	$ 139.90	$ 530.64	$ 675.36
4.0	2992	$ 60.24	$ 60.24	$ 74.74	$ 139.90	$ 530.64	$ 675.36
5.6	4189	$ 71.44	$ 71.44	$ 87.14	$ 139.90	$ 530.64	$ 675.36
5.8	4338	$ 72.84	$ 72.84	$ 88.54	$ 139.90	$ 530.64	$ 675.36
7.0	5236	$ 81.24	$ 81.24	$ 96.94	$ 148.30	$ 530.64	$ 675.36
8.0	5984	$ 88.24	$ 88.24	$ 103.94	$ 155.30	$ 530.64	$ 675.36
11.2	8378	$ 113.84	$ 113.84	$ 126.34	$ 177.70	$ 530.64	$ 675.36
11.6	8677	$ 117.04	$ 117.04	$ 136.54	$ 180.50	$ 530.64	$ 675.36
12.0	8976	$ 120.24	$ 120.24	$ 139.74	$ 183.30	$ 530.64	$ 675.36
13	9724	$ 128.24	$ 128.24	$ 147.74	$ 190.30	$ 530.64	$ 675.36
22.0	16456	$ 200.24	$ 200.24	$ 219.74	$ 253.30	$ 530.64	$ 675.36
23.2	17354	$ 209.84	$ 209.84	$ 229.34	$ 262.90	$ 537.84	$ 675.36
28.0	20944	$ 248.24	$ 248.24	$ 267.74	$ 301.30	$ 566.64	$ 675.36
35	26180	$ 304.24	$ 304.24	$ 323.74	$ 357.30	$ 608.64	$ 724.36
44.0	32912	$ 376.24	$ 376.24	$ 395.74	$ 429.30	$ 662.64	$ 787.36
45.0	33660	$ 384.24	$ 384.24	$ 403.74	$ 437.30	$ 669.64	$ 794.36
46.4	34707	$ 395.44	$ 395.44	$ 414.94	$ 448.50	$ 679.44	$ 804.16
47.0	35156	$ 400.24	$ 400.24	$ 419.74	$ 453.30	$ 683.64	$ 808.36
48.0	35904	$ 408.24	$ 408.24	$ 427.74	$ 461.30	$ 690.64	$ 815.36
56.0	41888	$ 472.24	$ 472.24	$ 491.74	$ 525.30	$ 746.64	$ 871.36
75.0	56100	$ 624.24	$ 624.24	$ 643.74	$ 677.30	$ 879.64	$1,023.36
88.0	65824	$ 728.24	$ 728.24	$ 747.74	$ 781.30	$ 970.64	$1,127.36
106.0	79288	$ 872.24	$ 872.24	$ 891.74	$ 925.30	$ 1,114.64	$1,271.36
112.0	83776	$ 920.24	$ 920.24	$ 939.74	$ 973.30	$ 1,162.64	$1,319.36
120.0	89760	$ 984.24	$ 984.24	$1,003.74	$ 1,037.30	$ 1,226.64	$1,383.36
138.0	103224	$ 1,128.24	$ 1,128.24	$1,147.74	$ 1,181.30	$ 1,370.64	$1,527.36
157.0	117436	$ 1,280.24	$ 1,280.24	$1,299.74	$ 1,333.30	$ 1,522.64	$1,679.36
208.0	155584	$ 1,688.24	$ 1,688.24	$1,707.74	$ 1,741.30	$ 1,930.64	$2,087.36
230.0	172040	$ 1,864.24	$ 1,864.24	$1,883.74	$ 1,917.30	$ 2,106.64	$2,263.36
260.0	194480	$ 2,104.24	$ 2,104.24	$2,123.74	$ 2,157.30	$ 2,346.64	$2,503.36
392.0	293216	$ 3,160.24	$ 3,160.24	$3,179.74	$ 3,213.30	$ 3,402.64	$3,559.36

Annual Rate Adjustments:

The City of Yachats has worked diligently in developing water rates that are both sustaining to the water department to perform the necessary operations, also mindful of the consumers. Each year the city would review the “construction cost index” (CCI) and apply an increase percentage to the base rate, capital improvement reserve and the water consumption cost.

A viable alternative to the CCI is the “consumer price index” (CPI) that can extract specific costs associated with water and sewerage maintenance prices and inflation. Looking at specific costs as it relates to the previous year(s) and can be quite different from the overall CPI, or overall inflation rate.

The link below offers the City a method to follow the CPI as it relates to water and sewer inflation and apply any adjustment to the base rate.

https://www.in2013dollars.com/Water-and-sewerage-maintenance/price-inflation/2010-to-2020?amount=20

Key indicators that will adjust the operational cost for the fiscal year is the listing of capital improvement plans (short-term) to be completed within the timeframe. Timelines for completion of short-term projects can align with City Council elections, where Council members terms coincide with project completion.

The City of Yachats has a single line budget for CIP at $200,000.00 which will support current projects, while future project list changes each year. The purpose of the single budget line item is to support and maintain those projects which develop in the upcoming years.

This single budgeted line item will vary with each year's analysis, as projects are completed, tabled to the subsequent year, or rescinded. Employing a set figure for capital improvement planning maintains consistency in the budget. A major impact to budgeting is the inevitable large project that is usually projected over a timeline of a loan repayment program. Large projects are usually the component that increase rates significantly, causing uneasiness for most involved with establishing the annual budget.

Summary:

There are various arrangements that can be used to reach an acceptable water rate that meets budgetary requirements. The uniqueness of communities creates challenges that may or may not work from community to community. Whatever the cost associated with providing water from the source to the consumer's tap, usually varies from one water system to another. The variables associated with other water systems may not apply to the City of Yachats. A new water system completed without any debt owed is rare. The age of a water system plays a bigger role in determining future cost since rebuilding is often more expensive than new construction.

The importance of looking at the future regarding system growth and repair, or replacement of aging components, and determining an evaluation of costs can be challenging. Proposed costs are often lower than actual costs due to various circumstances. It is important for public relations and communications to play a role in preserving consumer confidence in both water quality system operations and management.

Covered facts discovered in the initial assessment were two: a) the variations in base rates created an unequal cost per unit of water delivered, b) the price differentiation in the unit price for 748 gallons of water (one hundred cubic feet), with current per unit charge at $5.33 as compared to $12.02 production unit cost.

Pertaining to the examples presented in this rate study, the City of Yachats has chosen a two-step approach, with implementing a meter multiplier to establish new base rate, while employing the same ratios for water allowances and applying a slight increase to the unit cost. The following are recommendations:

- Begin an annual review of prioritized smaller projects and costs
    - Apply the findings against the identified short-term capital improvement projects
    - Adjust projects to match single line-item funding, or adjust capital improvement figures

- Review CPI figures and adjust the “base rate” according to the inflation index for water and sewerage maintenance.

These suggestions create formality in the water rates; using absolute ratios to apply base rates and allowing the City to adjust the rates in the future. Using one of the industry standards of having the base rate meet 60-75% of proposed budget, the City has performed well to maintain fixed cost revenues.

The City of Yachats has requested the Oregon Association of Water Utilities to suggest how to conclude an annual adjustment for the city’s monthly water rates, which is accomplished by using the CPI. The aspect of water rates determination relative to future cost can be difficult to forecast.

As the City chooses to implement the proposed rates, the homework in tallying up production costs figures, water sales, non-revenue water, and expenditures will begin to confirm that the “in theory” ideas presented in this study meet the “reality” of water system operational costs and revenues during the subsequent year.

It is our experience that applied fair and equitable rates provide a tool for the City of Yachats to continue service. The knowledge learned from past studies as priority one is the continued responsibility to review and evaluate recent established rates and ensure the City is on track to make necessary adjustments that balance expenditures against revenues.

As collected evidence presents itself during the subsequent year, the Oregon Association of Water Utilities will return, if called upon, to review and confirm the effectiveness of the chosen rate scenario, thus assuring the goals presented in this water rate study.

With numerous considerations and decisions being calculated with this rate study, it is an objective of Oregon Association of Water Utilities to assist the City of Yachats towards a sufficient water rate to meet the needs of the water system, provide fair and equitable rates for all consumers, and to ensure the water system is poised for the future.

Wastewater Rate Study

City of Yachats

Final Report

February 2021

Prepared by:

Oregon Association of Water Utilities

Table of Contents

Executive Summary:

Oregon Association of Water Utilities is pleased to present this report on the wastewater cost of service, rate design and capacity fee study to the City of Yachats. We are confident that the results developed, based on a cost-of-service analysis, when implemented, will result in fair and equitable sewer rates for the City's users. Secondly with equal priority, the revenue program will be in aligned with the operations of the wastewater department.

The wastewater rate study involved a review of the City's financial plan or rate structure, and usage characteristics. In addition, the study also included a review of the City's capacity in relation to the flows generated in the winter months. The adopted changes to the City's existing rate structures and capacity fees are summarized below.

Rate Structure:

Based on our review of the City's existing residential and commercial/industrial rate structures and, we propose the following:

- Continue the use of a rate structure that includes both a fixed monthly base fee and a variable charge based on water usage.
- Continue monthly single-family residential (SFR) user charges based on a minimum six-month (October – March) winter water usage, applying averages for the remaining months.
- Consider a 95 percent return factor may be applied to SFR usage to account for water use that is not returned as sewer flow. This step may complicate the billing and understanding of the rate structure.
- Continue applying the same fixed monthly fee to other classes of users, then adjust base rates for larger sized service connections to align with impartiality. The Significant Industrial Users Survey (SIUS) proved it is not necessary to create additional charges for total suspended solids (TSS) or biological oxygen demand (BOD).
    - Current commercial monthly base rates range between $52.31-$327.24.
    - Consider a base rate of $60.00 per month for all commercial users equal to or greater than 1.0-inch water service connection.
- Other classification of users applies a single month water usage to determine wastewater generation. This is the current billing structure used in 2020-2021.

Recommendations for the City of Yachats to consider:

- An annual review of the flows, biological oxygen demand (BOD), total suspended solids loadings for the commercial industrial classes.
- Update and review overall operating costs.
- Look at developing an appropriate SFR class sewer cap as it is aligned with the monthly water usage.

Background:

The city retained Oregon Association of Water Utilities in July 2019 to update the cost of services for wastewater rates. A rate design to ensure a continued fair and equitable system of user charges for provided wastewater services. A review of the capital improvement planning (both short-term and long-term) using a single line-item expense to determine said monthly rates. One consideration the City should consider is the increased State mandated permits that will likely impact overall operating expenses and users' rates.

To meet the annual operating expenses required by the City's adopted budget, the City should consider a billing format developed on a strength-based billing method, which was completed in-house October 2020

Objectives:

- Revenue sufficient to meet operations and maintenance costs, capital outlay, and debt service
- Revenues to provide adequate operating funds and short-term capital reserves.
    - Smaller projects that can be completed within the timeframe of this study.
    - Revenues to cover cost of short-term small annual projects.
- Create rates that are fair and equitable for all users.
- Produce rates that meet criteria of lending agencies for the future long-term capital projects and loans.
    - Large projects that are funded through low-interest loans, grants, possible principal forgiveness.

Scope:

The scope of this study update includes the determination of wastewater user rates through an update of system costs, flows, loadings, and review of rate design. User rates facilitate the generation of adequate revenues to meet routine annual O&M and capital expenditures including debt service.

The three major processes are as follows:

Financial Planning: Revenue requirements are projected for a three-year period from FY 2021 through FY 2024. Financial planning involves assisting the city with taking a single line item for the annual O&M and capital expenditures, annual debt service and reserve requirements, operating and capital revenue sources and the determination of required annual user revenues from rates.

Cost of Service: Cost of service involves the apportioning of required annual revenues to the different user classes proportionate to their contributions of flows and loadings. Since the City has completed the SUIS, a uniformed rate can be applied for all users. The City has an agreement with a single wastewater generator to adjust characteristics of the waste stream to meet current permit guidelines.

Rate Design: Rate design involves the development of a fixed and variable schedule of rates for each of the different user classes to equitably recover the costs attributable to them.

Assumptions:

Following are the assumptions used in the study:

- Annual O&M and capital expenditures, revenues from the customer base, and reserve requirements are based on the City's adopted budget.
    - $712,535.00.
- Annual average wastewater system flow is based on the City's Wastewater Treatment Plant (WWTP) "Daily Monitoring Reports" from 2016-2019.
- Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) strength assignment for the different user classes is not used as determined by the completion of the SIUS.

Conclusions:

The City of Yachats has been outstanding in their application of wastewater rates with small incremental annual increases, using the construction cost index, which has averaged 2.63 percent annually. Current base rates produce approximately 70 percent of operating cost based on a figure $712, 535.00. Calculations indicate a per unit (748 gallons) treatment cost at $8.07 which is based on a total collected annual average of approximately 88,000 units. Wastewater generation rate is $5.91 per unit which includes cost for treatment and a capital improvement reserve (CIR) of $0.57 per unit.

Rate Structure:

- Wastewater Base Rate for all 5/8-3/4-inch water service - $47.91
    - Usage is determined by a winter average from October through March.
- Wastewater Base Rate for one-inch and larger service - $60.00
    - Currently there are nine separate base rate charges for large services.
    - Usage is applied for the month of water usage.
- Wastewater Generation Flow Rate per unit - $ 6.00
    - This single figure removes the CIR per unit, follows the water rate study completed in December 2020.
- Annual adjustment based on consumer price index relating to the basket of services (water, wastewater maintenance) – averaging approximately 2.4 percent.

Wastewater Rate Study

Introduction:

In July 2019, the City of Yachats authorized the Oregon Association of Water Utilities to review current wastewater rates and determine adjustments to be considered. This coinciding with aspects of system operations and capital improvement planning. Procedures to conduct a wastewater summary began during late summer in conjunction with the water rates.

The approach of this study includes financial strategies and rates that:

- Adjust current wastewater utility revenues due to inflation, operations and maintenance modifications, and capital improvement planning.
- Review capital expenses as they relate to operational costs of the wastewater system and adopted Capital Improvement Plan projects.
- Are relatively simple to understand and implement, being consistent with industry standards and practices.

The rate summary proposal is based upon combined expenditures placed into a single total line item. These budgeted amounts are obtained from the City of Yachats' documents. This figure includes personnel services, materials and services, contingency funding, and capital improvement.

Oregon Association of Water Utilities is pleased to present this wastewater rate study to the City of Yachats. When conducting a rate study, the consideration that the best results are based on the most accurate data obtained, equity among the consumers and revenues that sustain a budget allowing the wastewater system to be operated according to State regulations.

Assumptions:

- Annual O&M and capital expenditures, revenues from the customer base and reserve requirements are based on the City's adopted budget.
- Annual average wastewater system flow is based on the city's annual report on projected flows.
- TSS strength assignment for the different user classes has been determined non-applicable as the city completed the significant industrial user's survey (SIUS).
- BOD strength assignment for the different commercial/industrial SIC classes were not part of this wastewater rate study.

Billing for sewer service coincides with the volume of wastewater a user will discharge to the sewer system. Discharge is measured by comparing water usage over a specific period as it

relates to the classification of generator. These measurements assist in defining the difference of the discharge of sewage by the users and the total volume of wastewater received at the wastewater treatment plant (WWTP). The variance between the two consists of the inflow and infiltration. Inflow and infiltration (I&I) are defined as groundwater and stormwater that enter a sewer system.

Written materials provided by the City and discussions with personnel support the key points necessary to meet the following goals:

- Establish revenues to meet budgeted expenditures.
- Changes in necessary monies for capital improvement.
- Creation of a contingency fund for emergency purposes.
- Existing revenues founded on water meter readings as outlined in section Costs of Services.
- Apply industry standards for adjustments in revenue/expenditure relations.

One point of discrepancy is the comparison of actual influent into the WWTP and how the units of measure are derived. Currently, the City of Yachats wastewater system comprises of 846 connections:

- 662 residential connections – Single-family residential (SFR).
- 39 commercial connections supplied by a 5/8-inch meter.
- 136 residential / commercial connections – vacation rentals – businesses.
- 09 commercial connections supplied by 2+ inch meters.

Wastewater System:

The City owns and operates a wastewater system that includes all services within the City limits. The collection system maintains approximately eight miles of main sewer pipe that are both gravity and pressurized flow, five pump stations and approximately 300 manholes. The WWTP provides primary and secondary treatment prior to an ocean outfall. The plant has a capacity to 1.9 million gallons per day peak demand. [1]

Review of the daily monitoring reports, dating from 2015 through 2019, the average daily flows are approximately 0.179 MGD with the maximum single day flow at 1.228 MGD, December 2015. Dry weather timeline, May through October, indicate average daily flows for the five-year period to equate to 0.207 MGD, while the wet weather period daily average is 0.505 MGD.

1 – Wastewater Master Plan – Dyer Partnerships Engineers

Flows into the WWTP can be summarized by those fluids being generated by users connected to the system and the I&I from rainfall or groundwater. Treatment costs are directly associated with flows (total volume) and solid loading through the WWTP. The city tracks monthly rainfall totals and compares figures with influent entering the WWTP.

Water - Wastewater Relationship

When discussing wastewater rates an applicable correlation and implementation of said rates is assumed as one with the water service. Billing for sewer service is based on the volume of wastewater a user will discharge to the sewer system. Discharge is measured by comparing water usage each month and billing on a one-to-one ratio of said usage. These measurements assist in defining the difference of the discharge of sewage by the users and the total volume of wastewater received at the WWTP.

One point of discrepancy is the comparison of actual influent into the WWTP and how the units of measure are derived. Currently, the City of Yachats is comprised of 846 connections with 94.3 percent as residential connections and the remaining 5.7 percent commercial connections.

Sixteen percent (136) of the residential dwellings are considered a business and likely generate above average sewage. These dwellings are rental units supported by marketplace companies and private party entities which promote travel. These places may have above normal occupancies, therefore consuming more water and generating more wastewater. Experience found in other studies indicate generation of waste can be fifty percent higher than normal single-family residential (SFR) dwellings.

Following the allowance of water in the water rates, two units of wastewater (1,496 gallons) are provided in the monthly base rate expense. The current unit rate for wastewater is $5.34 for all users that generate wastewater above the allowance of 1,496 gallons (2 units).

This study does not include reviewing commercial users in comparison to a single-family resident or the review of monthly water consumption. Currently the city bills for additional water over the allotment of 1,496 gallons, which corresponds to 5/8-3/4-inch meter service connections, while larger sized connections apply a meter cost ratio. The meter cost ratio will not apply to establishing wastewater rates or allowances of additional generated wastewater. All wastewater customers will receive two units of wastewater in the base rate regardless of the size of the water service connection.

An additional $0.57 per unit (100 cubic feet of water) (748 gallons) is added to existing consumption rate to support “capital improvement reserves”. This figure will be included in the consumption rate that is recommended for the future wastewater rates. Current total unit charge is $5.91 per unit.

The City of Yachats produces approximately four million gallons per month of drinking water with 3.6 million gallons registering through water meters.

The wastewater treatment plant (WWTP), over a five-year review, receives approximately 5.15 million gallons of wastewater per month. [1] The additional flows, assumed from I&I, account for an additional thirty percent wastewater that is required to be treated per Federal and State rules.

The additional wastewater generated does not necessarily increase additional costs on a one-to-one ratio associated with treatment, but it will impact the total operating expenditures for the wastewater department. Stormwater may dilute the TSS and BOD strengths found in some of the wastewater generated.

System Data spreadsheet outline total documented flows, total budget based on personnel, materials, annual debt service, contingency funding, and capital improvement figures. Budget figures are displayed in table.

Table 1: City of Yachats Wastewater Rate Budget 2020-21			
Personnel / Materials	$	552,500.00	Figures from Fund 670 WW Dept 100 WW Systems
Contingency	$	60,000.00	Figures from Fund 670 WW Dept 100 WW Systems
Total Debt Service	$	505,035.00	Fund 155-1276 Restricted Reserves WW Plant Loan
Capital Outlay [1]	$	100,000.00	Fund 150 Dept 170 WW Plant *
Total Proposed Budget	**$**	**1,217,535.00**	
URD/F&B Tax [2]	$	465,000.00	Speculation to the consistency of revenue
SDC/Transfers [3]	$	40,000.00	Figures from Fund 155 WW Dept 176 WW Plant Loan
Balance Surplus / Deficent [4]	**$**	**(712,535.00)**	
1 - Figure adjusted down from $368,000.00 - over four year timeline			
2 - Figure chosen as an average,			
3 - Figure consistent each year from 2017-18 fiscal year, prior year figure was $80,000.00			
4 - Balance is figure we anticipate the rate payers will cover each year with annual adjustments based on CIP			
* - Figure close to $95,000.00 in "City of Yachats Finance Committee" 5-YR CIP Plan			
Base Rate Revenue [A]	$	486,686.88	
Consumption Revenue [B]	$	342,314.85	
Total Revenue	**$**	**829,001.73**	
A - Revenues figured at $47.94 per month x 846 users			
B - 2 units allowed (1,500 gallons) per month - all remaining units charged $5.91 - total units sold 57,921 = **43.32 MG** annually			
B - Over 5-yr timeline, average monthly inflows = 5.45 MG or **65.40 MG** annually or 53% additional water for treatment.			
B - 22.08 MG "precipitation" = 29,500 units - what is actual cost to treat this capacity - impact on total revenues			

1 – Daily Monitoring Report from 2016-2019

Wastewater Rate Study

for

City of Yachats

System Data

For Year: 2020-2021

Date completed: December-20

	Gallons (annual)	100 Cu Ft. (annual)	4 YR Total Treament	
Wastewater Influent [1]	66,020,000	88,262	264.02	
Water Sold [2]	43,325,128	57,921		
Potential Infiltration	22,694,872	30,341		34.38%

	2020-2021 Dollars	Annual WWTP Flows MG
Personnel / Materials	$ 552,500.00	2019 - 56.377
Contingency	$ 60,000.00	2018 - 61.966
Annual Debt Service	$ 505,035.00	2017 - 74.193
Capital Outlay	$ 100,000.00	2016 - 71.539
Total Proposed Budget	$ 1,217,535.00	
URD/F&B Tax [3]	$ 465,000.00	
SDC/Transfers [3]	$ 40,000.00	
Balance Surplus / Deficent	$ 712,535.00	

	Cost per Gallon	Cost Per 1000 Gals	Cost Per 100 Cu.Ft.
	$0.0108	$10.79	$8.07
Potential Treatment Cost	$ 244,939.27	$ 244,939.27	

Connection Information

Base Rate Only

Size	# of connections Residential	Commercial	Residential (Out)
5/8"	662	39	
3/4"		136	
1"			
1 1/2"			
2"		7	
3"		1	
4"		1	
6"			

Total Connections [4]: 846

Current Rate information (base)

Size	Residential	Commercial	Residential (Out)
5/8"	$47.94	$47.94	
3/4"		$47.94	
1"			
1 1/2"			
2"		$173.25	
3"		$91.87	
4"		$69.27	
6"			

Average base rate for 2-inch

Base Rate Revenues: $497,996.04

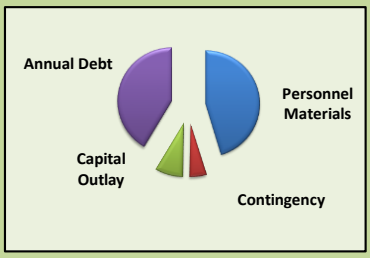
Current Generation Rate Per Single Family Residence

Cubic Feet	Gallons	Balance
5.44	4,000	

Percentage of budget without any consumption revenue

Operating Budget Outline

Personnel / Materials	$552,500.00	77.54%
Contingency	$60,000.00	8.42%
Capital Outlay	$100,000.00	14.03%
Annual Debt Service	$505,035.00	70.88%
Supplemental Revenue	$505,000.00	Base Rate % Total Cost
TOTAL OPERATING EXPENDITURES	$712,535.00	69.89%



Notes:

WWTP Capacity design @ 1.96 MGD with minimum DEQ removal rate at 85%, achieving 98%

Urban renewal contribution @ $95,000.00

F&B Tax contribution @ $370,000.00

1- Taken from the Wastewater DMRs from 2016-2019

2 - Figures taken from Water Rate Study

3 - Figures taken from Fund 155 WW Plant Loan

4 - Provided by billing software

User Classification and Loading:

In a Cost-of-Service Study, the City is currently using a water consumption method to determine total flows and treatment costs associated with managing the wastewater system. Residential users have similar characteristics and therefore, assumed to have identical discharge parameters. The commercial and industrial user waste strengths vary based on the type of business that generates the waste, identifying additional parameters, total suspended solids (TSS) and biological oxygen demand (BOD) loadings. Currently, the City has completed the process of performing a Significant Industrial Users Survey (SIUS) to determine there is no single high strength waste generator connection to the sanitary system.

Single-Family Residential Usage:

The residential classifications are homogenous in that all the users are assumed to have the same TSS and BOD strengths. Since all residential accounts are considered the same TSS and BOD strengths, they each have a single wastewater rate that includes all three parameters and are based on metered water usage. However, the volume of wastewater flows can vary among the individual users depending upon water usage. The specific variation of the SFR water usage possibly includes significant irrigation usage for yard and garden areas whereas MFR water usage includes exceptionally low irrigation usage since most MFR users have a small yard area, if any. Usually, MFR complexes that have large common green areas and pools have separate irrigation meters.

One method to differentiate actual water usage to wastewater generation is looking at winter months usage and applying the average volume of purchased water during October through March and applying the same figures to the monthly wastewater generation for the entire year. This will increase the level of responsibility on staff to ensure routine meter reading is completed within a narrow timeline.

Commercial Usage:

Typically, there is significant variability in both the volume of wastewater flows and loadings strengths, among the different types of commercial/industrial users such as food service establishments, retail stores, and supermarkets. Therefore, to ensure fair and equitable determination of wastewater service charges, the City uses separate unit rates applied to flow, TSS, and BOD loadings of users. The City's SIUS did not identify any high strength wastewater producers during the time of this study. The City should consider developing a future outline indicating parameters of normal strength waste (SFR, MFR) as well as commercial or public entities that the City determines to contribute sewage of a quality type consistent with that of domestic waste. Parameters for commercial high loading waste should be included as a guide the City can use in the future.

Revenue Requirements:

Revenue requirements from rates are the total of all expenditures, including reserve requirements for debt service. The City has a few principal sources of revenue to recover operating costs which includes the base rate and unit generation rate, Urban Renewal contribution and the Capital Reserve transfers (food and beverage tax). The annual revenue requirements for the wastewater operation and maintenance budget were established at $1.21 million dollars. With allocated funding from the additional revenue streams, required revenues from consumer rates account for approximately $712,000.00 annually.

Existing Rate Structure:

The City's existing wastewater rate structures for the community include a fixed base fee and a usage (generation) rate. While the base fee is charged to each wastewater service, the usage rate is linked to a users' water consumption, thus totaled for wastewater generated. The wastewater billed monthly are based on water sold for the current month.

Base – Consumption Fees:

In the existing rate structure, the base fee is identical for every user class except for the commercial accounts. Residential or single family residential (SFR) have a base rate of $47.94 which includes 1,496 gallons (two-units) of wastewater discharged, a unit cost of $5.34 with a capital improvement reserve of $0.57 per unit. The sewer flows (generation) wastewater fee is $5.91 per unit. The existing base rates match approximately 70 percent of the adopted budget. The City of Yachats has been diligent with managing wastewater rates in the aspect of annual rate adjustments. A small incremental annual adjustment is a recommended best management practice that is currently being implemented by the City.

Table 2: Current Wastewater Rates

	Residential - 5/8- meter	Commercial	
Sewer w Two Units	$ 47.94	1.0 - inch	$ 103.15
		2.0 - inch [1]	$ 173.24
		3.0 - inch	$ 91.87
		4.0 - inch	$ 69.27
Total Base	$ 47.94		varies
Sewer Consumption (unit) [2]	$ 5.91		$ 5.91
Capital Improvement Reserve [3]	$ 2.28		$ 2.28
Total Consumption (unit)	$ 6.01		$ 5.91

Notes

Current annual rate adjustments follow the construction cost index

1 - Two inch sewer service base rate ranges from $91.60 - $327.24, average monthly rate is shown in table

2 - Sewer consumption fees are associated with water meter readings

3 - CIR applies to the base rate, actual base rate is $45.63

Wastewater Rate Study
for
City of Yachats

Existing Rates

For Year:	2020-2021
Date completed:	December-20

	100 Cu. Ft. (Annual)	Million Gallons (Annual)
Wastewater Collected	88,262	66,020,000
Amount of Water Sold	57,921	43,325,128
Potential Infiltration	30,341	34.38%

	Dollars
Annual Operating Budget	$1,217,535.00
Supplemental Revenue	$505,000.00
Total Annual Budget	$712,535.00

Monthly Cost per Connection: $70.19

Treatment Costs
Per 1,000 gallons: $10.79
Per 100 Cubic Feet: $8.07

Connection information

Size	# of connections Residential	Commercial	Residential (Out)
5/8"	662	39	0
3/4"	0	136	0
1"	0	0	0
1 1/2"	0	0	0
2"	0	7	0
3"	0	1	0
4"	0	1	0
6"	0	0	0
Discharge allowed - Sewer Base	2.00	2.00	2.00

Total Connections: 846

Current Rate information

	Residential	Commercial	Residential (Out)
5/8"	$47.94	$47.94	$0.00
3/4"	$0.00	$47.94	$0.00
1"	$0.00	$0.00	$0.00
1 1/2"	$0.00	$0.00	$0.00
2"	$0.00	$173.25	$0.00
3"	$0.00	$91.87	$0.00
4"	$0.00	$69.27	$0.00
6"	$0.00	$0.00	$0.00

Discharge Cost Rate: per 100 cu. ft. $5.91

Current Base Revenue

	Residential	Commercial	Residential (Out)	Totals
5/8"	$31,736.28	$1,869.66	$0.00	$ 33,605.94
3/4"	$0.00	$6,519.84	$0.00	$ 6,519.84
1"	$0.00	$0.00	$0.00	$ -
1 1/2"	$0.00	$0.00	$0.00	$ -
2"	$0.00	$1,212.75	$0.00	$ 1,212.75
3"	$0.00	$91.87	$0.00	$ 91.87
4"	$0.00	$69.27	$0.00	$ 69.27
6"	$0.00	$0.00	$0.00	$ -
Total/month	$31,736.28	$9,763.39	$0.00	$41,499.67
Base Rate Totals — 12 mo. Total	$380,835.36	$117,160.68	$0.00	$ 497,996.04
% of operating budget	53.45%	16.44%	0.00%	69.89%

Water with base charge — Total/month	1,324	368	0	1,692
12 mo. Total	15,888	4,416	0	20,304

Discharge Included in Base Rate — 12 mo. Total: 20,304

Additional Discharge (units): 37,617

Generation Rates: $ 222,318.21

31.20%

Total Revenue Generated	$720,314.25
Annual Gain/(Shortfall)	$7,779.25
	1.09%

Notes:
2" commercial service connection varies from $91.60 - $327.24
2" service connection figured at an average

Gallons	Typical Residential Water Bill: EDU Gen	Residential Wastewater Bill
4,000	5.44	$68.27
7,500	10.02	$95.34
15,000	20.05	$154.62

Examples of variable cost associated with additional discharges >>>>>>

Cost of Service Evaluation:

If the total operating expenditures were equally segregated according to the number of service connections, the revenue necessary per connections required by the authority would be $70.19 per month.

$712,535.00 divided by 12 months divided by 846 service connections = $70.19

When determining cost for wastewater, equity based upon the treatment of wastewater expenses are applied, and this is accomplished by means of determining the price per unit and the amount of generation per month. Additional factors, such as strength of waste stream measured in BOD and TSS can impact treatment costs. Believed as one of the highest priorities regarding wastewater rates, is that consumers should pay for their costs associated with services rendered.

If the City of Yachats looked at adopted budgets as a single line item of total required revenues, the figure can be calculated against the number of total units being processed. The adopted budget used in this wastewater study is $712,535.00 (revenues required from user rates) and the average annual volume of wastewater treated at the WWTP is 66.02 MG.

The 66.02 MG converted to 100 cubic feet equates to 88,262 units of wastewater. This figure is taken from the wastewater daily monitoring reports for 2016-2019 is 34 percent higher than the wastewater generated by customers. Customer generated wastewater, in line with total meter reading (water sales) sees 57,921 units of water sold. The treatment costs per unit is:

- 88,262 units divided by $712,535.00 = $8.07 per unit or $0.0108 per gallon

Looking at the Existing Rates spreadsheet, a couple key facts should be pointed out:

- Current base rates equal 69.89 percent.
- Generation rates equal 31.20 percent.
    - Presumed all units of wastewater charged at $5.91 per.
- Two-inch service connections are charged differently.

Financial Review:

- Sewer service revenues total $712,535.00 dollars, which equates to 69.89 percent of necessary funding in the adopted budget.
- Capital outlay and contingency is figured at $160,000.00 in preparation for future upgrades to maintain the existing wastewater system. These monies account for only thirteen percent of the entire adopted budget.
- Various costs (I&I rehabilitation, equipment purchase, etc.) are items taken from the Fund 150 – Capital Reserves, Department 170 with a total of $368,000.00 dollars. This aligns with the annual budget figure set in the above bullet.

Technical Review:

- Total connections 846 billed monthly, average water consumption 5.44 units.
- Average monthly (actual) discharge per connection 4,069 gallons.
- Total average monthly influent into WWTP = 5.15 MG.
- Consumer generated average monthly influent, = 3.61 MG.
- Average annual influent into WWTP = 66.02 MG (2016-2019).
- Treatment cost per unit, total influent = $8.07 or $0.0108 per gallon.

Note: The discrepancy of consumer generated annual flows compared to total annual WWTP measurements is figured on the infiltration and inflows of groundwater and confirmed from WWTP operations. Infiltration and inflows account for an additional thirty percent of total sewer flows.

Capital improvement planning, and the funds necessary to complete future upgrades, stem from recommended improvements outlined in the City of Yachats Capital Improvement Plan (CIP) for planning cycle 2017-2018, which designates approximately $150,000.00 annually through the year 2021.

Capital Improvement planning priority is based on a two-fold purpose, as capital improvements (increased capacities) or as a maintenance item (maintain existing capacities). With CIP, discrepancies between estimated and actual costs for construction projects will vary, depending upon several factors. These variations in construction costs may increase or decrease the timeline in which to proceed, impacting the allotment of funds.

An annual review of the projects completed, projects not completed and those not listed, but arise over time will assist in determining the single line item dedicated to meeting the goals in CIP planning.

Annual Review:

A routine review of the commercial customer's water consumption will determine any changes in sewer flows for this classification of users. A consideration for the SFR dwelling that is not a rental unit, a six-month (October through March) basis for determining an average monthly wastewater flow, which will base the 100 percent return of winter water usage to the sewer. For each SFR dwelling, the winter month's water usage should be revised annually July 1 and this usage is the basis for monthly sewer flows charges for the following twelve months

The remaining city customers' wastewater bills should follow the single month when potable water is consumed, then applied to the wastewater flows. Due to the types of businesses the city serves, majority of metered water is assumed to return to the sewer.

A wastewater utility must be monetarily self-sufficient, recuperating not only the cost of daily operations but also being able to fund capital improvements. Customers using a lot of water or

those with large seasonal variations in consumption should pay their fair share, since collection networks are sized to meet peak demands.

Artificially maintaining low rates will lead to deferring maintenance, rehabilitation, and replacement of deteriorating infrastructure and creating public health hazards in the future. There are ways to address affordability issues within rate structure designs without placing the utility in financial risk. A routine evaluation of these three bulleted points can substantiate rate structure designs.

- Operating Ratio: Operating revenues must meet operating expenses, excluding depreciation which will equate to a ratio benchmark of 1.25 or higher [1].
- Debt Service Coverage Ratio: is calculated as operating revenues minus operating expenses divided by principal and interest and equate to a benchmark ratio of 1.20 or higher [1].
- Contingency Reserves (Emergency Reserves): At a minimum have appropriation funds satisfy your billing period (e.g.: 2 months) or reserves to replace the single most expensive asset.

Water and wastewater utilities are very capital-intensive. Majority of expenses for a utility are tied to capital improvement and administrative costs, and not tied to the cost to collect and treat wastewater.

Considerations:

There are ways the utility can design its rate structures to buffer against insufficient revenues, mainly through charging higher non-variable base charges. Methods require a balance between setting revenue stability-oriented rate structures and conservation-oriented rate structures. A method should reward customers financially for reducing consumption. In order to offset some of the burden of high base charges on their customers, utilities sometimes include a minimum consumption allowance with the base charge such that any use within the consumption allowance is already paid for through the base charge.

The City of Yachats has created a stable structure that combats revenue changes due to fluctuations in wastewater flows. From a perspective to maintain customer satisfaction, particularly low volume customers, the city provides two units of wastewater in the base rate.

A base charge is the amount a customer is required to pay each billing period, regardless of the amount of water that is used, or wastewater generated. This is oftentimes called a minimum charge. Base charges are highly stable sources of revenue for utilities since they are immune to customer use behavior. There is an incentive to charge as much of the fixed costs of running the utility in the base charge as possible yet reward those customers who are conservation minded.

1 – Information taken from Utility Financial Assessment Tool - NRWA

A good rule-of thumb is to have consistent revenues which match 60-75 percent of the total budget, pending the size of community served.

Due to the capital- demanding nature of wastewater utility costs and because of economies of scale, large utilities can spread their costs over a large customer base and thus are often able to charge lower base charges. Smaller utilities, however, typically rely on higher base charges to recover some of their fixed costs.

As with base charges, the higher the amount of water included in the consumption allowance, (wastewater flows) the less sensitive the total bill will be to water use reductions, and the less conservation-oriented the rate structure will be.

Unlike base charges however, the utility has no revenue stability incentive to include higher amounts of water in the consumption allowance. In fact, the more water is included in the consumption allowance, the less revenue the utility can expect to collect from most of its customers if the base charge is not adjusted similarly.

With the City of Yachats, cost for treatment is $8.07 per unit, which associates to $16.14 of expenditures included the base rate. Since the city collects approximately 70 percent of total budget from the base rate, it makes sense to provide an allowance, yet keep focus on the percentage changes based on the variations in expenditures.

With the City of Yachats being a destination area for tourism, the normal consumption (water) and generation flows likely does not fall into a normal range of daily usage as vacationers will be unaware of the amounts of water being consumed or wastewater generated.

With this point, the best approach to wastewater billing continues to be based monthly water usage that includes both a fixed monthly base rate and a per unit flow rate. Essentially the meters will be the measurement for the wastewater bill.

For the same reason, seasonal rates are like uniform rate structures, but the price for water associated with wastewater ($/100 cubic feet) is higher in specific summertime months is unlikely to work for the city. The only users this approach may discourage are the local residents who see and pay the monthly bill. Seasonal rates are also appropriate for seasonal communities where demand for water is high in certain months and incredibly low in others.

In times of drought and mandatory watering restrictions, utilities' revenues are vulnerable to reductions in use, while the utilities' costs remain. The lack of revenues to reductions in use is particularly large for utilities that designed conservation-oriented rate structures. To recover some of the lost revenue during the drought and to prevent a permanent increase of rates right after the drought, some utilities have considered temporarily raising rates during the mandatory restrictions period. These are sometimes called drought surcharges. These temporary rate increases would go into effect for two simultaneous reasons:

- To recover some of the lost revenue as customers use less water (to continue paying the extremely high fixed operating costs), and
- To encourage further conservation by setting higher rates for high volume use. These temporary rate increases must be prepared for and communicated to the customers well in advance of droughts. Create an ordinance or resolution with specific rules about when the temporary rates would be implemented, when they would be removed, which blocks would be affected, and how high the rates would go.

Recommended Rate Structure:

- Wastewater Base Rate for all 5/8-3/4-inch water service - $47.91
    - Usage is determined by a winter average from October through March.
- Wastewater Base Rate for one-inch and larger service - $60.00
    - Currently there are nine separate base rate charges for large services.
    - Usage is applied for the month of water usage.
- Wastewater Generation Flow Rate per unit - $ 6.00
    - This single figure removes the CIR per unit, follows the water rate study completed in December 2020.
    - Increase of $0.09 per unit – unifies the billing software
- Annual adjustment based on consumer price index relating to the basket of services (water, wastewater maintenance) – averaging approximately 2.4 percent.

As collected evidence presents itself during the subsequent year, the Oregon Association of Water Utilities will return, if called upon, to review and confirm the effectiveness of the recommendations, thus assuring the goals presented in this wastewater rate study.

With numerous considerations and decisions being calculated with this rate study, it is a goal of Oregon Association of Water Utilities to assist the City of Rockaway Beach towards a sufficient wastewater rate to meet the needs of the system, provide fair and equitable rates for all consumers and to ensure the wastewater system is poised for future growth.

Sustainable Water Plan 2/14/2023

Goal: To create a plan for a sustainable water system

Options:

Conservation - This is the easiest option. It will buy time while work on a long-term solution can be pursued.

New Water Supply - If we accept the premise that climate change will result in less water falling in the northwest, Yachats needs to look beyond our immediate area for additional water.

This discussion focuses on conservation.
3% of the city's utility accounts consume 48% of the water sold while only contributing 29.5% to the base rate. This rate inequity has been a long-term issue in Yachats. There are two problems that perpetuate this imbalance. To understand the situation, additional background information is needed.

The water / sewer rate structure has two components. The variable rate is based on water consumption. Currently the base rate is based on the meter size. The two problems are a base rate using meter size leaves no option for an incentive to encourage conservation. The second problem is the consultant hired to work on the rate study didn't understand that the base rate at the time was predicated on a single family consumption of 6,400 cu. ft. of water while 71.5% users use 200 cu. ft. or less per month.

When the rate study was discussed in 2005, the Public Works commission recommended starting with a high Yachats Equivalent Unit (YEU) and gradually dropping it down over a series of years. The gradual reduction was never done leaving the existing 2005 rate inequity in place.

Experience has taught us the single greatest motivator for conservation is what people have to pay for water.

2005-06 water rate discussion documents:

Council approved YEU base rate - https://yachatsoregon2.org/Documents/Download/09-14-06_-_City_Council_Minutes.pdf

Public Works & Streets commission rate base rate discussion - https://yachatsoregon2.org/Documents/Download/11-01-05PWS.pdf

Council / Commission joint meeting - https://yachatsoregon2.org/Documents/Download/10-17-05_Special_Joint_Meeting_City_Council_and_PWS.pdf

Public Works & Street commission rate base discussion - https://yachatsoregon2.org/Documents/Download/08-02-05PWS.pdf

Prepared by: Greg Scott

City of Yachats

WATER DEPARTMENT
500 W. 7th St.
P.O. Box 345
Yachats, OR 97498

Date: February 6th, 2023

To: Heide Lambert, City Manager

From: Rick McClung, Water Department Leader

Re: WMP and WMCP **Subject:** Next steps

This report focuses on water sustainability and water management. In addition, a path forward will be introduced.

The city has two major plans it should be following. They were written at the same time and complement each other.

1. 2021 Water Master Plan (WMP) covers the nuts and bolts of a water system.
2. 2021 Water Management and Conservation Plan (WMCP) covers management of a water system.

Below are my comments on both,

1. Water Master Plan

With the completion of 2021 Water Master Plan (WMP) it is time to start implementing CIP projects that are outlined in the 20-year plan. The majority of the CIP recommendations in the plan center around upgrades and replacements to the city's current infrastructure; distribution lines, reservoirs, booster stations, water plant and creek intakes and only a small portion of the plan has recommendations to address water sustainability. The obtainable choices were limited at the time the WMP was written and had 3 recommendations.

- Yachats River- was included in the plan with cost estimates of near $5,000,000.
- Raw Water Storage- only the need of raw water storage was mentioned in the plan because there was no identifiable location to construct it.

- Southwest Lincoln Country Water PUD – Utilizing the PUD was only mentioned because there was no agreement with the PUD beyond emergency use. The plan recommended obtaining agreements for water usage beyond emergency use.

For a variety of reasons, the city does not wish to develop the Yachats River. This leaves the city with 2 options -raw water storage and the PUD.

Over the last year the city manager and I have been exploring these two options and a lot has been discovered on raw water storage and the PUD.

Raw Water Storage

The adjoining 8-acre property west of the water plant has come up for sale. It is an ideal location to build new raw water storage tanks on and has been identified by the city as a potential CIP and is currently in the discovery phase.

Project Concept

The city currently has a 500,000g raw water tank next to this property and this project would add more tanks to the area creating essentially a reservoir farm. Rough guess is the site could hold a total of 1.5 million gallons giving the city a total of 2 million gallons of storage. Project cost estimate: $4,000,000

Southwest Lincoln County Water PUD (SWLCWPUD)

The city has an intergovernmental agreement with the PUD and an interconnection between the two water providers. The agreement stipulates that the interconnection can only be used by the city for emergency purposes, such as a water shortage, and it is not intended to be used as a supplemental water source on a regular basis.

The intertie at the north end of the limits was developed about 20 years ago, we are each other's backup plan in case of water emergencies. Outside of emergencies, the PUD doesn't need the city's water, but the city needs water from the PUD.

The PUD has amazing water sources and I have seen all 4 of their water intakes at the end of summer, it's easy to see how they could supplement Yachats and Waldport's water needs well into the future.

The city manager and I have been working to develop a strong relationship with the PUD and a lot has been happening in the background. Over the last year we have made progress and we have positive results to report.

The city manager has been working with high level stakeholders like the PUD board president, County Commissioners and State Representatives. I started temporarily helping PUD run their water plants as they go through staff transitions and have developed a good working relationship with the PUD manager. The city manager and I have been transparent with the PUD by saying the city wants the PUD water and how do we do this?

The PUD recently created new 20-year WMP to upgrade and replace their infrastructure. The WMP did not include the infrastructure needed to supply Yachats with water as a permanent customer.

The PUD manager tasked engineers to create an addendum to the WMP to identify how much water the PUD can provide to Yachats and Waldport, and the cost of the infrastructure needed to do it.

The addendum identifies the PUD can supply Yachats a maximum of 300 gallons per minute/ 432,000 gallons per day/ 12,960,000 gallons per month. This is more than enough to supplement the city's future water demands. The cost of the infrastructure needed to supply this water will be a few million and in addition there will be added staff cost to operate the water treatments plants.

Water Management and Conservation Plan

The purpose of the Water Management and Conservation Plan (WMCP) is to describe the City's strategy for providing a reliable water supply through the implementation of existing and additional water management and conservation policies and programs.

The city developed this WMCP in tandem with the city's WMP. Data sharing and coordination occurred during development of both plans to ensure consistency among the documents. Consequently, portions of this WMCP draw from information developed for the WMP.

The WMCP fulfills the requirements of the Oregon Administrative Rules (OAR) adopted by the Water Resources Commission in December 2018 (OAR Chapter 690, Division 86). It describes water management, water conservation, and curtailment programs to guide the wise use and stewardship of the City's water supply.

Final Recommendations

Southwest Lincoln County Water (PUD)

The city manager and I both agree this is the best option and should be further pursued. The PUD is understanding of the cities desire to begin negotiations and are ready to talk.

Before entering negotiations, a couple items need to be noted:

- The PUD has not and nor do they ever wish to be involved in the Mid-Coast Water Partnership. The city's goal needs to be kept simple- all we want is to be a permanent customer of the PUD.

- The city will need to financially contribute to the PUD's infrastructure development. Our cost may end up costing as much as a raw water storage farm or the Yachats River intake.

Hopefully after our meetings with the PUD some sort of deal structure will begin to form. This is when we will need professional and volunteer help.

Professional

- Attorney- There will a considerable amount of law work involved.
- Engineer- WMP will need an addendum that is focused on projects that enhance infrastructure for long term use of the PUD water.
- Consultant- Yachats might need guidance to help steer the ship.

Volunteers

Public Works and Streets Commission

- Help with the WMP addendum that is focus on the PUD.
- Restructure the 5–20-year priority list of CIPs as upgrades and replacements to the city's current infrastructure; distribution lines, reservoirs, booster stations, water plant and creek intakes still need to happen.

Finance Committee

- CIP expenditures will need to be planned for in conjunction with the new 5-20-year plan.
- When the day comes the city uses PUD water more routinely, water revenue will need to be analyzed and rates may need to be adjusted.

Raw Water Storage

A contingent offer will need to be made on property that stipulates the property needs to pass an expansive Geotech study first. Cost of Geotech study is $40,000.
I recommend putting the concept of raw water storage on the shelf for now until the city knows more about the opportunity to use PUD water.

Help Needed
Volunteers- Consider other uses for this property. It's out of the tsunami zone and could be used for purposes such as public works equipment storage and/or relocating the water treatment plant.

Water Conservation
I recommend that the city make this plan part of its institutional memory and start being reviewed so action can start taking place on the responsibilities and elements of being a municipal water purveyor.

Help Needed

Volunteers
Public Works and Streets Commission

- Review the WMCP
- Define a list of tasks that came from the review.
- Delegate tasks to a task force as needed

Thank you,

Rick McClung

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